Ingrid Bahler
and
Katherine Gyékényesi Gatto
(Eds.)

The Lapidary of King Alfonso X The Learned

Foreword
by
John E. Keller

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1997

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DEDICATION

To Katalin Korcsmár Gyékényesi
(1915 - 1997)

and

Robert C. Bahler

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ILLUSTRATIONS

CONSTELLATION ILLUSTRATIONS FROM THE *LAPIDARIO*

These illustrations are reproductions of constellation figures in an 1881 facsimile of the original *Lapidario* manuscript. Constellation figures in the facsimile were photographed with a 35 mm camera and color print film. The prints were digitized with a scanner at 150 dots per inch and manipulated as computer graphic objects. Digitized images were edited to the extent of removing the illustration frames and any background color. The contrast of some of the figures was enhanced but no other editing was done to the figures. Thus, the figures presented here are faithful black and white reproductions of the colored originals.

All 48 constellations are included in the reproductions. Each of the reproductions represents an original from a selected degree, except for Leo, which is from a master illustration. This was necessary because all of the other illustrations of Leo are contained in the lost parts of the manuscript.

The constellations are labeled with their modern names. The location of the illustration in the original manuscript is indicated in parentheses below the name.

Stars in the original illustrations are colored gold and are circles or multi-pointed objects. They can be seen easily in most of the black and white reproductions. However, the stars in three reproductions are difficult to see and are described as follows. The star in the Crater illustration is on the right handle. The star in the Delphinus illustration is on the spine just behind the rear fin. The star in the Hercules illustration is on the right ankle.

There are numerous variants between illustrations of the same constellation in the original manuscript. These variants are not depicted because only one representative reproduction is included for each constellation. In many cases the variations are minor, such as different colored clothes or slightly different renderings of a face or body. However, there are also some major variants which will be listed here. Some of the figures of Cancer are drawn with 6 legs and others with 8 legs. Aquila is depicted as a vulture in one drawing and as an eagle in the others. There are two illustrations of Equuleus, one with wings, and one without (the one with wings could easily be confused with some of the illustrations of Pegasus). There are striking variants in the hull design of

Argo. In addition, one illustration depicts the ship with full sails, while the others show the sails gathered on the yards.

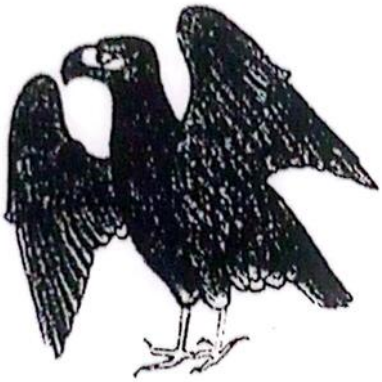
There are numerous errors in star placement in the original illustrations and these are discussed elsewhere in the appendix. The *Lapidario* illustrator also erred in applying the figure of Hydra in the illustrations for the 10^{th} and 11^{th} degrees of Virgo, which is the figure reproduced here.

Andromeda

(2° Aries)

Aquarius

(6° Aquarius)

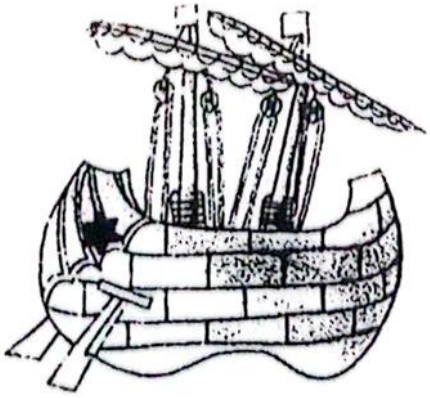


Aquila

(1° Capricornus)

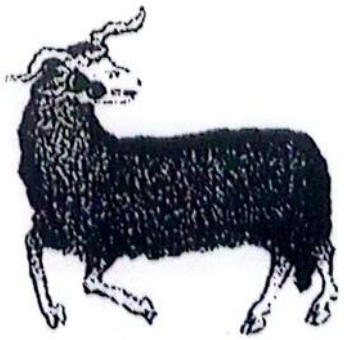
Ara

(3° Sagittarius)



Argo Navis

(7° Cancer)



Aries

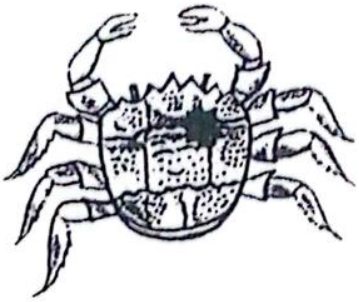
(12° Aries)

Auriga

(2° Gemini)

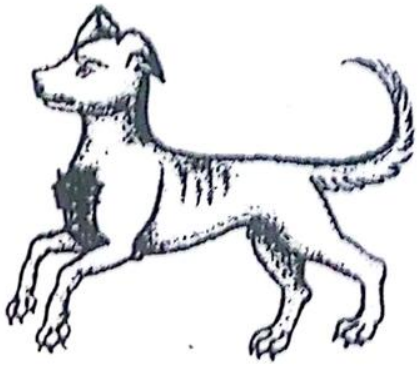
Boötes

(23° Virgo)



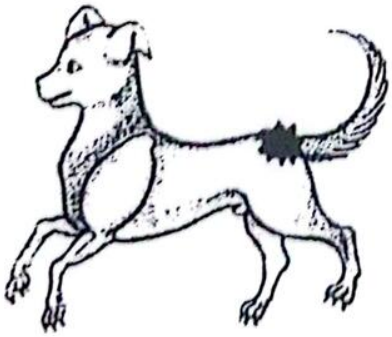
Cancer

(9° Cancer)



Canis Major

(21° Gemini)



Canis Minor

(29° Gemini)

Capricornus

(11° Capricornus)

Cassiopeia

(8° Aries)

Centaurus and Lupus

(6° Libra)

Cepheus

(4° Taurus)

Cetus

(23° Aries)

Corona Australis

(15° Sagittarius)

Corona Borealis

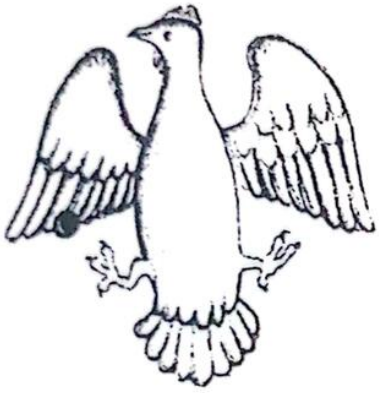
(14° Libra)

Corvus

(17° Virgo)

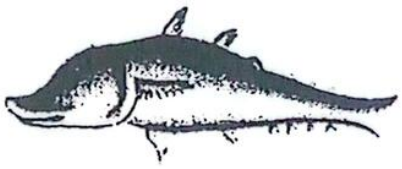
Crater

(30° Leo)



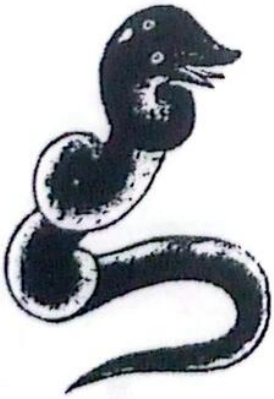
Cygnus

(23° Capricornus)



Delphinus

(20° Capricornus)



Draco

(11° Virgo)

Equuleus

(28° Capricornus)

Eridanus

(5° Aries)

Gemini

(22° Gemini)

Hercules

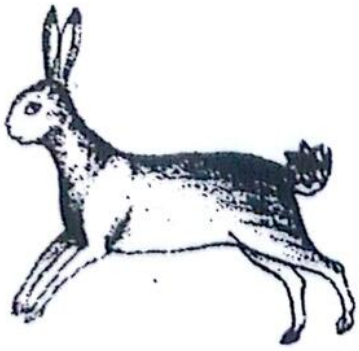
(12° Scorpius)

Hydra

(29° Cancer)

Leo

(master illustration)



Lepus

(4° Gemini)

Libra

(23° Libra)

Lyra

(2° Capricornus)

Ophiuchus and Serpens

(14° Scorpius)

Orion

(29° Taurus)

Pegasus

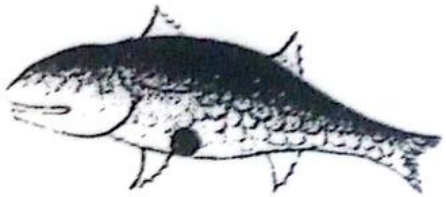
(10° Aquarius)

Perseus

(5° Taurus)

Pisces

(1° Aries)



Piscis Austrinus

(26° Capricornus)

Sagitta

(3° Capricornus)

Sagittarius

(9° Sagittarius)

Scorpius

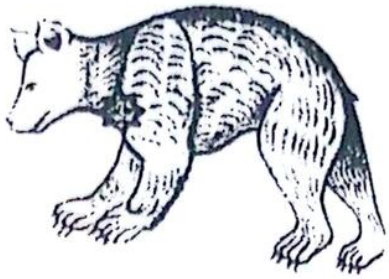
(8° Scorpius)

Taurus

(3° Taurus)

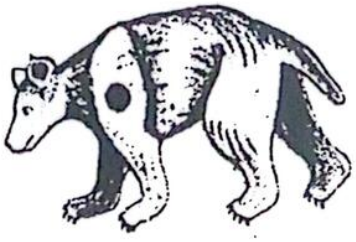
Triangulum

(17° Aries)



Ursa Major

(10° Cancer)



Ursa Minor

(30° Gemini)

Virgo

(22° Virgo)

FOREWORD

The *Lapidario* sponsored by King Alfonso X el Sabio, *the Learned*, is a book about stones—precious and semi-precious, beautiful, commonplace, medicinal and magical. It is also a book filled with astrological lore because it treats the influences of stars, planets, and the signs of the zodiac upon stones. Ancients from as far back as Sumerians, Babylonians, Egyptians, Greeks and Romans, assiduously studied the science of stones. And in due time this knowledge reached the Middle Ages. Even today we know of birthstones and many of us believe in their properties.

When the lapidary written in Arabic reached King Alfonso's hands he, as a scientist himself, must have been thrilled to be able to have it translated into Castilian for the benefit of his people. Obviously he saw that it added to the astrological/astronomical knowledge being translated at his behest. And, as was the case with most of the books he caused to be written, he employed the best calligraphers as well as the best miniaturists to make it a truly royal manuscript. This, of course, is why it has survived for some seven hundred years.

The pictorial record of the *Lapidario* is remarkable. In its many miniatures we can see the scientists who collected stones, the workmen who mined them or brought them up from the sea, and even something of the scenic backgrounds from which they came. The value to the history of book illumination is also considerable. But it is the written contents of the *Lapidario* which reveal its treasure house of beliefs and superstitions. The medieval texts of this great book have been translated or rendered into modern Spanish, but the need for an English translation has been a desideratum of long standing. Now, due to the efforts of two learned and diligent scholars, the *Lapidario* can be read and greatly enjoyed by medievalists and the general educated public. Their English translation, let it be noted, reads as clearly as does the medieval translation from Arabic into Spanish.

Their readers will find the entire manuscript scrupulously presented, but even so, a foreword can offer a few interesting samples to prepare the reader for the fascinating material of the full-blown text. The reader will be amazed to learn that medieval people still gave credence to the ancient lore of stones and stars. He will smile, perhaps, as he reads that diamonds originate in the Far North, where it is always night and that, as they are carried by rivers filled with poisonous reptiles, they are impregnated with that venom. Therefore the diamond can be used as a deadly poison; however, when pulverized and imbibed by a person suffering from bladder stone, it can break up the stone. A magical

stone is the emerald, which not only has curative virtues, but also this magical power: if one wears an emerald engraved with the figure of a man or of a lion, he may travel from royal court to royal court with no fear of danger and will always be received by princes and great men. The *stone of the hermit* found in the Red Sea must have been worn by every man who could have it. If a hermit or any man who chose to be celibate wore a ring set with this stone or had a necklace, the beads of which were made of the *stone of the hermit*, he could always be safe from the wiles of women.

King Alfonso's *Lapidario* was quite probably the first book which imparted eastern and classical gem lore in a western vernacular language. The Spanish *Lapidario* supplemented, as well as introduced earlier lapidaries; and it stimulated the imagination of medieval scientists and even writers of fiction and love poetry so redolent of love potions and of poisons used to dispose of rivals and enemies. We can believe also that the lore of stones became the property of soothsayers and other practitioners of the occult.

We can hope that Katherine Gatto and Ingrid Bahler will regard their translation of Alfonso's *Lapidario* to lead them to translate into English some of the learned King's other untranslated books. Readers will also be grateful to Jeffrey LaFavre's interesting essay, *The Astronomy of the Lapidario*.

John E. Keller
University of Kentucky

ACKNOWLEDGMENTS

We owe the idea for an English translation of the *Lapidario* to Dr. John E. Keller, professor emeritus of the University of Kentucky, who has inspired an entire generation of Alfonso X scholars, and who shares with that king an endless love of learning, and the ability to energize and mentor younger researchers.

To Dr. Jeff La Favre we extend our gratitude for the painstaking, thorough, and illuminating commentary on the stars, the planets, and the signs of the zodiac. In brief, Dr. La Favre's appendix has contributed greatly to our understanding of the astrological/astronomical content of the *Lapidario*. We also thank our friend, Stephen Zahony, mining geologist, for having identified some of the stones, and also for establishing what stones a certain description would or could not fit.

To John Carroll University we extend our appreciation for the support of time and secretarial assistance in the person of Ruth Cickavage, without whose tireless labor this manuscript would never have been realized.

For possibilitating the inclusion of illustrations we are grateful to Sue Hanson, head of Special Collections at the Kelvin Smith Library of Case Western Reserve University, Cleveland, Ohio, who graciously made available to us the 1881 facsimile edition of the *Lapidario*. Again, we are indebted to Dr. La Favre for preparing the reproductions of the constellations which are included in this book.

Finally, we thank our families for their patience, understanding, and encouragement.

INTRODUCTION

THE INFLUENCE OF THE ARABS IN MEDIEVAL SPAIN

Medieval Spain owed its cultural uniqueness to its intimate coexistence with the Arab world. The erstwhile dominance of the Arabs, who initially conquered almost the entire Iberian Peninsula in the early eighth century, eventually weakened both because of the renewed resistance of the Christian kingdoms and the internal fighting among the Arab rulers, and gave way to a shared ownership of the peninsular territory. Until the balance of power shifted in favor of the Christian kingdoms, ending with the expulsion of the Moors in 1492, the centuries-long coexistence was characterized by periods of tranquility, intermittent outbursts of hostility, alliances between Christian kings and Moorish caliphs against common adversaries, and a system of *parias*, taxes levied on the conquered enemy who, in turn, was allowed to keep his lands and possessions.

Although political, religious and cultural differences kept the Christian and the Moorish populations largely apart, the influence of the vastly superior civilization of the Arabic world made itself felt in many areas. Its influence was pervasive in the arts and sciences, such as mathematics, astronomy, navigation, medicine, and architecture. The decorative use of tiles, the fabrication of paper and glass, the use of irrigation in agriculture, and the introduction of new crops were Arab ways eagerly adopted by the Christians. Instrumental in transmitting these elements of the Arabic civilization were the so-called *mozárabes*, Christian Spaniards, who lived in the Arab-occupied territories and who, after the reconquest by the Christian forces, disseminated the knowledge they had absorbed among their congeners. Conversely, the *mudéjares*, Moors living under Christian domination, also exerted their influence, particularly in architecture. Outstanding monuments, such as the Alhambra in Granada and the mosque in Cordoba, still bear witness to the airy, elegant style of construction and elaborate decoration characteristic of the Moorish builders.

With Cordoba as its center, the intellectual life of the Arabs of al-Andalus was vigorous and the dissemination of knowledge was greatly enhanced by the use of paper, much cheaper than parchment. By nature, Arabic culture was not original and creative; rather, its characteristic was to adopt and to improve upon elements taken from the cultures of conquered lands and of the peoples with which they came into contact through trade. This was true not only in practical matters, but in the fields of philosophy and letters as well, since Arabic literature owed so much to the Orient, especially to Persia and through Persia to the literature of India. The sciences and philosophies of Ancient Greece, propounded by Aristotle, Plato, Ptolemy, and Hippocrates, were also borrowed by Arabic scholars, and it was this borrowing in translation into Arabic

which brought these important elements of ancient Greek knowledge to medieval Spain and thence to other western cultures.

During the first three centuries of the Arab presence in Spain the intellectual activity in the Christian kingdoms was scant and preeminently religious in nature. The situation changed in the latter part of the eleventh century, with the reconquest of Toledo by the Christian forces (1085). Toledo, which had been an important Arab capital, became a major center of cultural interchange, where learned men of three religions—Muslims, Jews and Christians—collaborated as teams of translators in order to render into Latin the texts in Arabic, the scientific language of the day, so as to make their contents accessible not only to Christian Spain, but to all of Europe. The Jews, in particular, due to their being bilingual and familiar with both Arab and Christian cultures, played an important role as intermediaries in the process of translation. Thanks to the work of the Toledan translators, Europe learned about matters as diverse as the medicine of Hippocrates and Galen, the Ptolemaic system and the basics of modern algebra, all of which though Greek in origin, reached Spain in translations from Greek into Arabic. In philosophy, Aristotelian rationalism, which is the foundation of St. Thomas Aquinas' *Summa Theologica*, the central work of medieval scholasticism, became known to Christian Europe through the translation into Latin of the Arabic language works of the Cordovan physician-jurist-philosopher Averroes and the Jewish philosopher Maimonides.

ALFONSO X EL SABIO* AND HIS LITERARY COURT

* (Also referred to in English as Alphonse *the Learned*)

The thirteenth century marked the triumph of the Christian reconquest, which limited the Arab presence to the kingdom of Granada. It also was a milestone century for the cultural advancement of Christian Spain. With the reduction of the Moors' political power to a level of relative insignificance, the focus of attention shifted from military to intellectual endeavours. The prime moving force promoting this activity was Alfonso X *the Learned*, king of Castile and Leon (1252-1284), under whose instigation the royal court became a scientific and literary hub renowned throughout Europe. His ambition was to compile a comprehensive, encyclopedic body of all knowledge, considered to be important at that time, of both European and Oriental origin. The vast number of works that came into being under Alfonso's direction, and at times with the king himself as the author, can be categorized as: a) legal, b) scientific, c) historical, and d) poetic and recreational. The selection of these categories was not arbitrary: they addressed the principal areas of medieval man's, and

especially a king's, needs in governing life. Written history was deemed important as a means to preserve universal man's, as well as a particular people's and its ruler's, life and accomplishments, and also as a source of edifying *exempla*; laws were essential for an orderly society; science attended to the needs of the body and was of use in carrying out a multitude of daily tasks; and poetry and recreational games, both physical and mental, provided a respite from cares, exercised the body and gladdened the spirit, banishing melancholy, the seedbed of sin.

The cultural activity of Alfonso X was divided into two distinct periods, 1250-1260 and 1269-1284, with an hiatus of almost a decade, when affairs of the kingdom demanded the king's full attention. The first period was linked to the tradition inherited from the old Toledan school of translators, still very much alive. According to that tradition, a given work was translated by a team of two translators, one of them fluent in the language of the original text (principally Arabic, but also other languages, such as Greek and Chaldean), the other in the target language, i.e., Latin, while both shared in the knowledge of Castilian, which served as an oral bridge between the two. Alfonso's novel contribution, motivated by his desire to make the translated texts accessible to a wider readership, was to order the use of Castilian, instead of Latin, as the target language,[1] consequently establishing the preeminence of Castilian over the other Romance languages spoken on the Iberian Peninsula as the language of literary prose. The king further intervened in the production of the translations by selecting the works to be translated as well as the translators, whose knowledge of the subject matter and of the respective languages best qualified them for the task. Moreover, he personally reviewed and edited the translated works, in order to achieve greater clarity and correctness and beauty of expression. Such was his concern for linguistic correctness that he would order a new translation of an inadequately rendered text years later.

In the second period, Alfonso X's personal involvement in the work carried out at the royal scriptorium intensified. The outstanding characteristic of this period was the king's obvious effort to compound important works of different areas of learning so as to create a comprehensive body of knowledge. To that end, he gathered books from all available sources and spent innumerable hours studying their contents. He would travel to different destinations where he would, at times, spend several years, studying texts and consulting with learned men, in order to better determine which texts should be translated. There

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1. Menéndez Pidal, Gonzalo. "Cómo trabajaron las escuelas alfonsíes." *Nueva revista de filología hispánica.* México, 1951. 364-5.

are miniatures illustrating the royal codexes of that period which show Alfonso X presiding over a reunion with his collaborators, pictorially documenting the king's active participation in the literary production issued from his court. The *Prologue* of the astronomical text *Octava Esfera* gives further evidence of the king's personal involvement both in directing the composition of the works to be translated and in giving it the final polish:

> Et despues lo endereço et lo mando componer este rey sobredicho; et tollo las razones que entendio eran soueianas et dobladas, et que non eran en castellano drecho; et puso las otras que entendio que complian, et quanto en el lenguaje endereçolo el por si se;...[2]
>
> [And then the above mentioned king directed it and ordered it to be composed. He eliminated the parts which he judged to be superfluous and repetitious and which were not written in good Castilian. In their place, he put the arguments which he considered to be more appropriate and he also corrected the language.]

In addition to his scholarly endeavors, Alfonso X was also a poet and a musician. Practicing the poetic genres cultivated at that time, he wrote love songs in the courtly love tradition as well as defamatory poems of *maldecir*. However, best known among his verses are the *Cantigas de Santa María*, a collection of pious poems dedicated to the Virgin, some of them lyrical songs of praise, others narrative, folkloric compositions about the miracles she performed. In keeping with the practice of the era, the great promoter of the Castilian language in prose caused the *Cantigas de Santa María* to be written in Galician-Portuguese, the poetic language of choice. The *Cantigas* are accompanied by music, some of which may have been composed by Alfonso himself. That the king had more than just cursory interest in music is evidenced by his founding a first-rate royal chapel and one of the best schools of polyphony in Europe.[3] The art of painting miniatures, which interested Alfonso so much, reached its apogee in the more than 2000 individual miniatures in the *Cantigas de Santa María.*

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2. *Libro del saber de astronomía*, in the beginning of the treatise, "De las 48 figuras de la viii esfera." Also see Antonio G. Solalinde's article, "Intervención de Alfonso X en la redacción de sus obras." *Revista de filología española* 2 (1915). 283-8.

3. Segura Graiño, Cristina. *Semblanza humana de Alfonso el Sabio.* Universidad Complutense. 11-29.

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> [And then the above mentioned king directed it and ordered it to be composed. He eliminated the parts which he judged to be superfluous and repetitious and which were not written in good Castilian. In their place, he put the arguments which he considered to be more appropriate and he also corrected the language.]

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3. Segura Graiño, Cristina. *Semblanza humana de Alfonso el Sabio*. Universidad Complutense. 11-29.

ALFONSO X'S WORKS ON ASTRONOMY AND THE LAPIDARIES

To a great extent, Alfonso X *the Learned* owed his fame of being learned and wise to the voluminous works produced on astronomy. The king's great interest in astronomy, which his critics saw as a time-consuming distraction from the affairs of the state, is understandable in light of medieval cosmology, according to which all things on earth, animate as well as inanimate, received their virtue from heavenly bodies and were subject to their movement. Hence, astronomy was considered to be a science of prime importance and the king immersed himself in its study. His *Libros del saber de astronomía* and *Octava esfera* contain a detailed presentation of the movement of stars and constellations and the fixed stars of the "eighth heaven," while the *Tablas Alfonsíes* are a record of the work carried out in the castle of San Servando of Toledo, where Alfonso X had established an "observatory."[4]

Closely related to the works on astronomy are the ones dealing with the study of stones and minerals in accordance with the position and movement of celestial bodies, whence they were believed to receive their virtue and power. It is not known how many of these works were completed and subsequently became lost, but one of the conserved manuscripts listed ten lapidaries that were at least in the planning stage. In all, only four codices of the Alfonsine works on stones and minerals have been preserved to our day. Two of them, both dating from the thirteenth century, are in the Escorial Library and bear the library numbers h-I-15 and h-I-16, respectively. Later they belonged to Philip II. In addition, the Escorial Library houses a sixteenth century copy of the h-I-15 manuscript, identified as MS.&-II-16. The fourth, MS.1.197, also a sixteenth century copy of the h-I-15 manuscript, with some of its folios missing, is kept in the National Library in Madrid.[5] Manuscript h-I-15, known as the *Lapidario* (Lapidary), actually contains four lapidaries. Manuscript h-I-16 is comprised of a table of contents that lists the ten lapidaries to which we referred above and a treatise which deals with the figures that rise in each one degree segment of the signs of the zodiac. This second codex is often referred to as the *Tabla*, since its cover bears the title *Tabla del libro llamado lapidario*. Others think it to be more accurate to call it *Libro de las formas & ymagenes*, since it is not simply

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4. Valbuena Prat, Angel. *Historia de la literatura española*. Vol. I. Barcelona: Editorial Gustavo Gili S.A., 1964. 114-15.

5. See the "Introducción" of María Brey Mariño's edition of the *Lapidario*. Madrid: Editorial Castalia, "Odres Nuevos." 1970. XIII.

an index of the lapidaries.[6] On the basis of the data given in the prologues of both codices, MS h-I-15 belongs to the early period of Alfonso X's literary activity, whereas MS h-I-16, completed more than a quarter of a century later, is a product of the second period.[7]

To date, there are four Spanish language editions of the *Lapidario*. Chronologically the first is the 1881 photochromolithographic reproduction by José Fernández-Montaña, which has been criticized by subsequent editors for containing numerous errors. In 1970 María Brey Mariño published an edition of the first treatise of the *Lapidario* in modern Castilian, with an extensive introduction that describes all four treatises of MS h-I-15 and even the miniatures that illustrate the text. In 1980, Roderic C. Diman and Lynn W. Winget of the University of Wisconsin issued an edition titled *Lapidario and Libro de las formas & ymagenes*. It includes all four treatises of the *Lapidario* and, as the title implies, the MS h-I-16 text as well. The editors' introductory notes are in English. A year later, another edition of the complete h-I-15 codex was produced by Sagrario Rodríguez Montalvo. It is of interest to note that Rafael Lapesa, in his *Prólogo* to said edition, celebrates the work for being the first reliable copy of a text which up to then had been accessible only through very few error-ridden transcriptions. Neither Lapesa nor Rodríguez Montalvo seem to have had notice of the work going on almost coetaneously at the University

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6. See the "Introduction" of *Lapidario and Libro de las formas & ymagenes*, edited by Roderic C. Diman and Lynn W. Winget (Madison, 1980).

7. Opinions vary as to whether the lapidaries listed in the *Tabla* represent completed works or merely projected ones. Horace J. Nunemaker believes the latter ("In pursuit of the sources of the Alfonsine Lapidaries"), whereas María Brey, in the "Introducción" of her edition of the *Lapidario*, argues in favor of the likelihood of completed works. Roderic C. Diman and Lynn W. Winget do not venture a definite opinion, saying that it "is not known." However, they do point out that the first eight folios of the Vatican Library's MS Lat. reg. 1283, which was also a product of the royal scriptorium, include an incomplete version of the third treatise of the *Libro de las formas & ymagenes*. This, they reason, allows for the possibility that those eight folios were part of the Escorial MS h-I-16, which had become separated and bound with other materials contained in the Vatican manuscript. A close comparison of the table of contents in MS h-I-16 and the contents of these eight folios leaves them with the impression that said folios may be one version of the text which was to become part of MS h-I-16. Sagrario Rodríguez Montalvo is of the opinion that MS h-I-16 is not simply an index of lapidaries, but that it represents an intent to put together an index of all books dealing with astrology, some of them already written, and others in the planning stage. (For complete bibliographical information, please consult the included bibliography.)

of Wisconsin. In addition to describing the manuscript, Rodríguez Montalvo discusses the date of the original translation into Spanish and the sources of the Alfonsine lapidaries. She also adds an extensive list of medieval Spanish vocabulary.

In our English language edition, we, like María Brey Mariño, have focused our attention on the first treatise of the *Lapidario*. Extending from folio 1 to 94a, it is the most extensive one of the four lapidaries contained in MS h-I-15 and also the most diverse in its content. Even though its main purpose is to describe stones and their properties, it also allows the reader to have a glimpse of the varied aspects of everyday medieval life, especially in its miniatures.

LAPIDARIO-MANUSCRIPT h-I-15

Description

The MS h-I-15 consists of 118 parchment folios, 119, if one counts a blank one which bears no number and is located between folios 100 and 101. Either due to the copier's error or the loss of copied materials, there are sizable omissions of text in two places, between folios 39 and 40 and folios 91 and 92. Although the four lapidaries are independent of each other, connecting phrases in the prologues referring to the completion of the foregoing work give them a certain unity. The text of h-I-15 is written in two columns and is richly adorned with miniatures. The upper part of the first page bears a decorative border representing a white-bearded man with a pointed hat, trademark of scholars, seated in a chair and holding a book. He is addressing a group of sixteen men, whose beards and pointed hats identify them as his congeners and who are seated on the ground or floor, listening with rapt attention. The whole grouping is framed by gothic arcades, anchored laterally by towers. The initial letter "A" of the introduction is adorned by another grouping: a king, cleanshaven and wearing a crown, with a book on his lap and two scribes to whom he seems to be dictating. Surely the miniature is meant to represent Alfonso X himself, leading the work of his scientific collaborators.

The initial letters of the signs of the zodiac are also illuminated, except for that of Aries, which shares the adornment with the above-mentioned "A" of the introduction, and for Leo and Pisces, due to missing parts of the text. The same is true for the initial letters of the text describing the stones. One notes an effort on the part of the artist to adapt his work to the text. The miniatures show, as a rule, two figures, that of a workman in pursuit of the stone and that of a learned man examining it. The worker's efforts—digging in a mine,

climbing a mountain, looking for the stone in the sea, etc.—match the text. At the end of the description of each stone, there is a pictorial representation of the star that exerts influence on the stone and of the constellation to which it belongs. In marking the star's position on the figure of the constellation, however, the illustrator's attention must have wandered: in many instances, the position of the star indicated on the illustration seems to bear no relationship to that given in the text.

At the completion of the chapters of each sign of the zodiac appears a full page illustration with the constellation of the sign and its stars in the center, as a hub of a wheel, surrounded by the thirty constellations and their pertinent individual stars which exert their influence on the stones described in each degree. These are further surrounded by a chorus of thirty angels, a reminder of the divine origin of all virtue and power. Missing here are the illustrations for the signs of Cancer and Aquarius, due to lacunae in the text, while that of Virgo is unfinished.

In addition to the illustrations which are directly related to the text and serve to give a visual dimension to the written word, the margins of all the folios of the first treatise of the MS h-I-15 bear illuminations of a great variety, both realistic and belonging to the realm of fantasy. There are castles, midgets, scenes of hunting, fighting and of music, all elements of the life of a medieval nobleman or a king, but there are also strange animals and other creations of the imagination. We are not qualified to make judgments best left to art historians, but all together, the marginal illuminations seem to depict the rich and varied texture of the medieval world, where concrete reality and fantasy have equal standing and mix freely. This is certainly true in the text of our manuscript, where stones of ordinary origin and properties share space with those of the most fanciful imagination.

Finally, some of the folios of the first treatise of MS h-I-15 include miniatures—such as birds, flowers and leaves, and geometrical figures, whose only function seems to be that of embellishment, in order to add textural richness befitting a work issued forth from the royal scriptorium.

Contents

First and foremost, the *Lapidario* is a medical-pharmacological reference book, since by far the greatest number of stones are prescribed as cures for diseases. Through the frequent mention of certain cures we learn about the most prevalent health problems of the medieval populace. While some of the problems were much the same as the ones that plague our present-day

society—ulcers, migraine or gout, for instance—others have a closer correlation with the physical and mental environment characteristic of the era. Given the frequency of warfare and other armed skirmishes and poor hygiene, it is not surprising that the most frequently mentioned cures are for wounds, abscesses and sores. Various eye diseases, digestive disorders, including poisonings, toothache and respiratory and urinary tract problems also seem to have been prevalent maladies. As was true in any society, sexual concerns were enmeshed in many superstitions. There were amulets for arousing sexual desire as well as for taking it away; for increasing male potency; easing childbirth or preventing it from happening; ensuring that a woman conceive only male offspring; for keeping the fetus safe from any harm ... This list is by no means complete. Wearing the stone called *beruth*, a fat person may have become thin and without any ill side-effects. *Fisicos* and sorcerers concocted aphrodisiacs and restored virginity. A drink concocted with the appropriate stone would make young men grow in wisdom and understanding; the right amulet would give one strength and prevent one from getting tired. Melancholy, considered to be the root of many ills and even detrimental to the salvation of the soul, also numbers among the more frequently mentioned problems. The convulsions and facial distortions brought on by epileptic seizures were diagnosed as the disease of "the demon," and the work includes treatments for its cure as well as recommending amulets for warding it off. Of remote pagan origins, the popular belief in the power of an amulet or a talisman was obviously great, since our text associates different stones with a wide variety of effects. Some are medical in nature; others make lions meek and obedient, prevent death by drowning, chase away fear of darkness, bestow happiness and wisdom, help one to manage one's wealth, induce forgetfulness, cause worries and sadness, and give nightmares. María Brey Mariño, in her edition of the *Lapidario*, lists all the different diseases and counts the number of times each one is mentioned.[8]

Although they are far fewer in number, the work also includes practical, everyday uses for some of the stones. Stones praised for their beauty were valued as jewelry, others were used to polish jewels and give them luster. There were stones and minerals used as tools in carpentry and construction, or in making household items, and those which could be fashioned into eating and drinking vessels. The latter often were believed to have a specific effect on their contents or their users. The advice or warning, at times sounding absurd, could, on occasion, be real enough, as when alerting one to the danger of poison in a fish that is kept in a copper dish. Some other uses, picked at random, were tanning hides and gluing them together in order to make them look seamless,

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8. See Brey Mariño 265-71.

cleaning fabrics that had gold in them, making paper, dying hair, and applying them to the body as a deodorant.

In order to have put the stones to their many uses, they had to be rendered into the appropriate form. Directions of how to prepare the various medicines give one a glimpse into the work of a medieval physician *cum* chemist, grinding, measuring and weighing, heating and cooling, dissolving and mixing. Mostly, stones were heated or burnt and ground into a fine powder and mixed with either wine, water or oil, depending on whether the concoctions were to be taken orally or used as enemas, ointments or plasters. At times the powder was applied directly, particularly to cure diseases of the eyes and to enhance vision. Powdered copper, for example,was prescribed for reducing swelling in eye-sockets, for drying up excessive watering of the eye, and for improving vision. How these powders could be administered without blinding the hapless patient altogether is difficult to imagine! Alfonso X himself comes to mind, since he was known to have suffered, among other ailments, from painful eye trouble.[9]

Even as a modern medicine bottle includes a warning about contra-indications and side-effects, so does the *Lapidario*. There are stones which, when ingested would ulcerate the intestines, or make holes in the liver and bladder and thereby cause death. An amulet could make one be disliked and shunned and scorned by his fellow men, or it could cause loss of memory. Antidotes to poisons could themselves be deadly poisons when ingested by a well person. When it came to poisons, the author of the book allows that while the learned men of yore talked a lot about the nature of poisons, they were reluctant to put much of their knowledge in writing. No doubt because of the potential for doing harm, they did not wish to dwell on the uses of poisons in the art of medicine and would limit their written instructions so as to be understood only by other learned men.

Another delicate subject was the practice of necromancy and alchemy, the latter mostly referred to as *obra mayor*. Widely condemned by medieval moralists for being in conflict with God's laws, the practice of magic was nevertheless very much a part of medieval science in Spain, given the strong

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9. Based on Marisel Presilla's interpretation of the royal chronicle and the *Cantigas de Santa Maria*, modern medical experts have concluded that Alfonso probably suffered from squamous cell carcinoma. See her essay, "The Image of Death and Political Ideology in the *Cantigas de Santa Maria*," in Katz & Keller's *Studies on the Cantigas de Santa Maria, Art, Music and Poetry.*

Arabic influence.[10] The attitude of Alfonso X vis à vis magic seems to be, at first sight, rather ambivalent. In his *Siete partidas*, a juridical work that spells out the do's and don'ts concerning every aspect of life in medieval society, he clearly expresses his disapproval of magic (necromancy). Yet the *Lapidario* includes references to the use of stones in necromancy, bewitchment, evil eye and, above all, in the works of alchemy. It is interesting to observe the attitude of different scholars when confronted with this apparent contradiction. Two giants among the historians of Spanish literature, Amador de los Ríos and George Ticknor, represent diametrically opposing views: the former, perhaps wishing to stress Alfonso's Catholic orthodoxy, insists on his disapproval of alchemy,[11] the latter calls the king an alchemist.[12] J. Horace Nunemaker, author of numerous studies on the *Lapidario*, finds the lack of references to alchemy in relationship to the work remarkable, considering the frequency with which it appears in the text. He proceeds to list, folio by folio, the instances alchemy is mentioned, without any allusion to it being either secret or forbidden.[13] More recently, Sagrario Rodríguez M. Montalvo, in the introductory notes to her edition of the *Lapidario*, judges Nunemaker's assertions concerning the prevalence of alchemy to be "hyperbolic" and minimizes its presence in the work to the point of being negligible. She states that alchemy is mentioned only in the chapter dealing with orpiment and even then only in passing.[14] Since this is patently not true, one is left to speculate as to the reason of the steadfast denial in face of evidence to the contrary: most likely, it is still done in defense of Alfonso's Catholic orthodoxy. Yet there need not be such a controversy. The answer can be found in the *Lapidario*'s text itself, in the chapter discussing gold. Here, the author sounds a warning to the ignorant about mixing the noble gold with lesser metals, thus reducing its quality and, in so doing, harming the good name of the science of alchemy. For alchemy, he goes on to say, is the mastery to improve things, and those who in their ignorance do the opposite, err twice,

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10. Haskins, C. H. *Studies in the History of Medieval Science*, 2nd edition, 1927. 5,19. Also see Waite, A. E. *The Secret Tradition of Alchemy*, 1926. 89.

11. Amador de los Ríos, José. *Historia crítica de la literatura española*. Tomo III. Madrid: 1863. 517.

12. Ticknor, George. *History of Spanish Literature*. Vol. 1. 1853. 35.

13. Nunemaker, J. Horace. "Noticias sobre la alquimia en el 'Lapidario' de Alfonso X." *Revista de filología española* 16 (1929): 161-8.

14. See Rodríguez M. Montalvo 14.

against God and against the world. Further down the page there are instructions on how to improve the color of gold, and this also serves as an example of the true and rightful use of alchemy, making *lo malo bono*. This is the only instance when alchemy is treated in some detail. Mostly, it is mentioned in passing as one of the uses for a particular stone, and on occasion, the author includes the remark that elaborating on its use in alchemy would be out of place (*no conviene*). One does not get the impression of the subject being tabu, nor should it be, considering the definition it has been given.

Structure

MS-h-I-15 consists of a Prologue and twelve major sections, which correspond to the twelve signs of the zodiac. Each of these sections is further divided into thirty chapters, in keeping with the thirty degrees of each sign of the zodiac. A particular stone corresponds to each degree within a given sign and is believed to receive its virtue(s) from a given star (or stars), the star's influence being the strongest when it is either on the ascendant or in midheaven. Hence the author of the *Lapidario* undertakes to describe three hundred sixty stones, thirty for each of the twelve zodiac signs. However, not all signs are complete: the sign of Leo has only one stone, Aquarius twenty-eight and Pisces two. With fifty-nine stones missing, the number of stones described totals three hundred and one.

With only slight variations in the order of presentation, the description of the stones follows a set pattern. First, we learn to which degree of the zodiac sign the stone belongs; its name, often in several languages;[15] its appearance and other physical properties, such as texture, weight and hardness or softness; and its "nature," i.e., whether it is hot or cold, wet or dry, depending on the given zodiac sign.[16] Following this, the text informs us about where the stone is

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15. The languages mentioned are Chaldean, Arabic, Latin, Castilian, Egyptian, and Greek. Of those, the first four appear more frequently, Egyptian and Greek only occasionally.

16. The nature of the stones, determined by the zodiac sign to which they belong, varies as follows: Aries: hot and dry; Taurus: cold and dry; Gemini: hot and wet; Cancer: cold and wet; Leo: hot and dry; Virgo: cold and dry; Libra: hot and wet; Scorpio: cold and wet; Sagittarius: hot and dry; Capricorn: cold and dry; Aquarius: hot and wet; Pisces: cold and wet. There are only a few discrepancies, most likely attributable to scribal omissions or errors. The nature of the stone is not indicated in the 27th degree of Taurus; the 30th degree of Gemini; the 27th and the 29th degrees of Cancer; the 16th, the 18th, the 23rd and the 29th degrees of Libra; the 13th and the 30th degrees of Scorpio; the 22nd degree of Sagittarius, and the 2nd and the 26th degrees of Aquarius.

found or mined and what its properties or "virtues" are, and gives detailed instructions on how to prepare and apply it to obtain the desired results. The description always ends by telling which star gives the stone its power and the position the star must occupy in order to exert maximum influence.

Each new zodiac sign is introduced with a prologue, which reiterates the completion of the work in the previous section and admonishes the would-be user of that section to pay close attention to the position of the planet to which the alluded sign belongs. Conceptually, the so-called prologue is really an epilogue of the completed section. In effect, María Brey, in her edition of the *Lapidario*, treats it as such, calling it an epilogue and placing it between brackets, at the end of the completed section. We chose to leave it as it appears in the manuscript.

Prologue

The *Prologue* tells the reader about the *Lapidario*'s Latin and oriental antecedents, its contents, its tortuous and long journey from its Chaldean origins to the royal court of Alfonso X, where it reemerged translated into Castilian. It concludes with an admonition to those who would make use of it to be well-versed in astronomy and in the art of medicine and to know the physical properties and the origins of the stones, in order to be able to distinguish between the genuine ones and those of similar appearance. Lastly, it points out the importance of having the wisdom to use all this knowledge for good and to avoid causing harm, for only then will the stones show the marvelous virtue which they have received from God.

In keeping with a common medieval practice, the *Prologue* begins with a reference to Aristotle, as the maximum authority of learning to establish the premise that, as was ordained by God, the prime source of all virtue, all things on earth act according to the virtue they receive from the celestial bodies. The Greek philosopher's authority also is adduced in support of the medieval concept of the universe as a hierarchical structure, where all things, animate and inanimate, are interrelated and receive their virtue from each other, the lower forms from the higher. Furthermore, he is credited with having written a book in which he described seven hundred stones, specifying their color, size and virtue, as well as where each one could be found. The authorship of a book on stones by such an eminent authority would attest to the importance of the subject

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Also, the nature of the stone belonging to the 5th degree of Cancer is given as cold and dry, instead of cold and wet, as expected; that of the stone belonging to the 21st degree of Libra as hot and dry, instead of hot and wet; and that of the stone belonging to the 20th degree of Scorpio, as hot and wet, instead of cold and wet.

matter, emphasized even more by a statement that many other learned men have written books about these matters.

Having established the world order in which all things function and the importance of the subject in general, the *Prologue* introduces the work at hand. It talks about the remote Chaldean origins of the work; its translation into Arabic; its loss and eventual reemergence in Toledo and its subsequent translation into Castilian by order of king Alfonso X.

In many ways, Abolays, the Moor credited with having translated the *Lapidario* from Chaldean into Arabic, reminds one of Alfonso X: a learned man knowledgeable about astrology, fond of studying books and searching for them himself as well as having others do it for him. Like Alfonso X, who unearthed the long-forgotten book and had it translated into Castilian for greater accessibility, Abolays also had come upon the book after it had been lost for a long time and, realizing the value of the wisdom it held, translated it into Arabic to aid its dissemination.

The *Prologue* identifies Abolays only as a Moor of Chaldean origins who, his Islamic faith notwithstanding, harbored friendly feelings toward the gentiles, especially those of the land of his forefathers. Despite scholars' efforts to learn more about Abolays, we still remain in the dark as to his true identity. Nunemaker, in his article *The Lapidary of Alfonso X*, credits Abolays with the authorship of the *Lapidario* and identifies him as Abboul-Abbas, a prominent thirteenth century naturalist, who lived in Spain, where he died in 1239.[17] He subsequently considers it erroneous to attribute the authorship to Abolays because the *Prologue* clearly states that he was the translator.[18] Diman and Winget relate the confusion about the frequent attribution of the text's authorship to Abolays to the structural sameness of the tables of contents of the first treatise of the *Lapidario* and of the first three treatises of the *Libro de las formas & ymagenes*—360 chapters divided equally among the twelve signs of the zodiac—and to the fact that the author or compiler of the first treatise in the *Lapidario* as well as in the *Libro de las formas & ymagenes* is identified as one Abolays (Abolayx). This coincidence, they submit, has led to the assumption that the first treatise of the *Lapidario* is the very same text whose table of contents appears first in the *Libro de las formas & ymagenes*. Although Diman and Winget admit to the possibility that the Abolays mentioned in each instance is one and the

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17. *Philological Quarterly* VIII (1929): 248-54.

18. "Note on Abolays." *Hispanic Review* II (1934): 242-6.

same, they are quick to point out that, to date, there is no positive proof: no underlying Arabic, Hebrew, Greek or Latin text has been found that resembles either the text in the *Lapidario* or the table of contents in the *Libro de las formas & ymagenes*. Furthermore, except for the similarity in structure, there exists no relationship between the table of contents given for the work of Abolays in the *Libro de las formas & ymagenes* and the first treatise of the *Lapidario*.[19] Other possible Arabic authors have been suggested on the basis of certain similarity of their names to that of Abolays,[20] but thus far the learned Moor, a kindred spirit of Alfonso *the Learned* remains an elusive personage.

Even if we remain in the dark about Abolay's identity, the *Prologue* gives us exact information as to the dates of the *Lapidario's* rescue from obscurity by Alfonso X and its translation into Castilian, as well as to who the translators were. The precious book fell into don Alfonso's hands whilst he was still a prince, in the year he conquered Murcia, i.e., 1243, and the translation was completed two years after Fernando III had conquered the city of Seville, that is to say, 1250. The translator charged with the task of rendering the Arabic text into Castilian is identified as Yhuda Mosca el Menor, don Alfonso's physician, a Jew who knew both Arabic and Latin well and was also learned in the art of astronomy. To aid him with the Castilian fell to the cleric Garci Pérez, also recognized for his superior knowledge of the subject matter. Don Alfonso's own enlightened persona contrasts with that of the Toledan Jew from whom he obtained the book: one recognized the value of the wisdom the book contained and wished to share it, the other was an obscurantist who hid the treasure, for he did not want anybody to benefit from it.

Sources

The fact that the names of the stones are given in many languages implies that the compilers of the *Lapidario* either consulted a variety of sources or else worked with a text which made references to other treatises on the subject. Horace J. Nunemaker, referring to Sarton's study of the different types of medieval lapidaries, relates the Alfonsine treatises to; a) the mineralogical lapidaries, derived from Theophrastus and Discorides and, b) the astrological lapidaries of anonymous Alexandrian origins, which became known in the west

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19. See Diman and Winget, IV-V.

20. Darby, G. O. S. "The Mysterious Abolays." *Osiris* I (1936): 251-9.

through works such as *Kurannides* (*Kyranides*) and the *Damigeron*.[21] Elsewhere, Nunemaker considers Aristotle to have been the basic and ultimate source of the first three Alfonsine lapidaries, although the material may have passed through some intermediate stages. As a note of interest, he adds the observation that "almost invariably, the stones described by El-Ghafeky (Algafiki), Abboul-Abbas, Discorides, and Serapion are found in our manuscript in almost identical language." Nunemaker admits that, despite the reference to Aristotle's authorship of a lapidary in our manuscript's *Prologue*, there is no firm evidence that such a work ever existed. However, it is considered highly improbable that Aristotle did not pass on his knowledge of mineralogy to his students.[22]

Joan Evans, in her article, "The 'Lapidary' of Alfonso the Learned,"[23] tracing the origins of the Alfonsine treatises, strengthens our statement that medieval North-Western Europe did not inherit the classical science of astrology directly, but through the Arabic East. Alexandrian science gave rise to works such as the *Kurannides*, which united astrology with mineralogy and medicine, a combination that finds its way into the Spanish lapidaries. Nunemaker, like Evans, and ourselves, believes the Spanish lapidaries were translated from Arabic.[24]

TRANSLATORS' COMMENTARY

We embarked on the task of translating the first of the four treatises of the MS h-I-15 fully aware of the difficulties inherent to such an undertaking. One thing—and a major one at that—was the language itself. Besides having the work rendered into Castilian, Alfonso X's principal contribution was his personal involvement in the correction of the text in order to enhance the clarity of expression and to embellish the style. Obviously, a translation cannot convey

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21. Nunemaker, Horace J. "An Additional Chapter on Magic in Medieval Spanish Literature." *Speculum* VII (1932) 556-64.

22. See Nunemaker's "The 'Lapidary' of Alfonso X." *Philological Quarterly* VIII (1929): 248-54.

23. *Modern Language Review* XIV (1919): 424-6.

24. "In Pursuit of the Sources of the Alfonsine Lapidaries." *Speculum* XIV (1939): 483-9.

king Alfonso's feeling for the Castilian language and is useless to a linguist. For that very reason, we were not overly concerned about errors present in our source materials. Like the translators of the royal scriptorium, who consulted several available texts, we utilized three Spanish language editions side by side: the edition of Rodríguez M. Montalvo, the modernized version of Brey Mariño, and the much maligned edition of Fernández-Montaña. We found that wherever there were discrepancies, two of the three versions were in agreement. We based our translation on the shared versions and tried to stay, insofar as possible, close to the style of the medieval Castilian.

Another problem, shared by all who have dealt with the work, is the impossibility of identifying many of the stones. This is partly so, because many of the stones are plainly creations of fantasy, whereas in other cases, it is essentially a problem of faulty comprehension: the names, on their journey from language to language, were poorly understood and passed on in a phonetic approximation that ultimately made them unrecognizable. Consulting the mining geologist, Stephen Zahony, we were told that most of the stones described in the *Lapidario* are rocks—a mixture of minerals. They are local varieties that are not known by those names today. Some of the stones are minerals and can be identified, but these are just a few, and even their identity is tenuous. Thus, we had no other recourse but to leave the names of the unidentified stones as they appeared in the Spanish texts with Zahony's clarifications in the footnotes. In contrast, Jeffrey La Favre's arduous and painstaking study of the astronomy of the *Lapidario* is a major contribution toward the understanding of the passages that deal with the zodiac.

Finally, one might well question the rationale for translating the *Lapidario.* Clearly, we are not targeting the scholars of medieval Spanish literature, much better served by the Spanish language text itself. Yet the student, whose level of language proficiency makes reading the work, even in María Brey Mariño's modernized version, a definite challenge, would benefit from the translation, as would his teacher, and the general educated public. The era of Toledo's School of Translation, the subsequent period of continuation and evolution of translation activity under the auspices of Alfonso X *the Learned*, and the significance of this work for the cultural and scientific advancement, not only of Spain but of the entire western Europe, is important enough to merit closer scrutiny by all who are interested in Spanish history and civilization. Medical historians, as well, would find the work a rich source of information about the myriad of diseases that afflicted the body and mind of medieval humanity, and about their proposed cures. Orientalists, folklorists, or anyone else, for that matter, will find the rich assortment of superstitions and the

extravagancies of fantasy of interest. And it goes without saying that the book should be attractive to those interested in astrology. Medieval society, with its belief in God's virtue and power operating on earth through the influence of the stars as well as in numerous superstitions, amulets, and the magical *obra mayor*; with its physical and mental ills and their remedies; with its attitudes toward sexuality; and with facets of its everyday existence, comes to life on the pages of the *Lapidario* and permits the reader direct access to an unedited representation.

Alfonso X *the Learned* had the *Lapidario* translated into Castilian in order to make its contents more accessible. Many centuries later, we rendered it into English for the same purpose. Convinced of the value of the work, we wished to emulate the sharing spirit of Abolays and Alfonso X and not be like the Jew of Toledo, who neither appreciated it nor wanted anyone else to benefit from it.

I. PROLOGUE

Aristotle, who was the most perfect among philosophers and who most naturally explained all things according to true reason and made them be understood as they are, said that all things under the heavens move and act in accordance with the movement of the celestial bodies, because of the virtue they receive from them, as was ordained by God, who is the first virtue whence all other things receive theirs.

He showed that all things in the world are related to one another and receive their virtue from each other, the meanest from the noblest and that while in some this virtue is more manifest, as in animals and plants, in others, such as in stones and metals, it is more hidden.

Learned men wrote books about these matters. In these they spoke about the celestial bodies, which are not made up of the four elements, as well as about other things that are made up of them, such as animals, which are all the living things who have the anima to feel and to move. They also spoke of plants, such as trees and grasses, which are the fruits born of the earth.

They also spoke of harder things which are made of the earth, such as stones and metals and wrote books about each one of these things. Moreover, those who wrote about the stones, like Aristotle, who wrote a book in which he named seven hundred of them, told about the color of the stone, its size, and its virtue, and where it was found. And many other learned men who dealt in these matters wrote books about them.

But among the learned men were some who knew more about stones and thought that it was not enough to know their color, size, and virtue. It was necessary to know the celestial bodies to which they were related and from which they received their virtue so as to act, be it in good or bad works, in accordance with the position of the bodies above.

Among the learned men who worked the most in these matters, there was one by the name of Abolays. Although he was of the faith of the Moors, he was a man who loved gentiles, especially those of the land of Chaldea, because this was where his forefathers were from. And since this learned man knew how to speak the Chaldean language and could also read it, he was fond of looking for books in that tongue and studying them, because he had heard it said that in that land had lived men who where more highly learned than anywhere else in the world.

But because of great wars and other happenings, the people had died and the wisdom was lost, so that very little of it was left. This Abolays had a friend who searched for these books and gave them to him.

And among them he found one that talks about three hundred and sixty stones according to the degrees of the signs that are in the eighth heaven. It tells the color, the name, and the virtue of each one, and the place where it can be found; and it tells about the star of the constellation which is in the degree of that sign from which the star receives its power and virtue: all this according to the movement of the sun all year through the degrees of the constellations of the twelve signs, which together make up three hundred sixty degrees and which are all configured by small stars, and many other constellations, which are in the eighth heaven and are also made up of stars. Some of them are in the northern part, which is toward the star called *Trasmontana*, others are in the south, and while some are within the signs, others are outside, so that all of them together, including the signs, number forty-eight.

When Abolays found this book he was very pleased with it, because he believed to have found in it what he desired to find about the knowledge of stones. When he had read much of it and understood what was in it, he translated it from Chaldean into Arabic. And during his life he tried to prove those things which were in the book and he found them to be certain and true, because he was learned in the art of astronomy and in the knowledge of stones.

After Abolays died, for a long time the book was as if lost, because those who had it did not understand it well, nor did they know how to use it the way they should have, until God willed that it should fall into the hands of the noble king don Alfonso, son of the very noble king don Fernando and queen doña Beatriz, and lord of Castile, Toledo, Leon, Galicia, Seville, Cordoba, Murcia, Jaen and the Algarve. Whilst still a prince, he found the book during his father's lifetime, in the year in which he conquered the kingdom of Murcia, which was in the year of Our Lord. . .

And he obtained it in Toledo, from a Jew, who had it hidden, for he did not want to make use of it, nor did he want that anyone else benefit from it. As soon as don Alfonso had the book in his possession, he had another Jew, who was his physician and was called Yhuda Mosca the Younger, read it. This Jew was very learned in the art of astronomy and knew and understood Arabic and Latin well.

And when don Alfonso had learned from this Jew the good and the great benefit which lay in this book, he had it translated from Arabic into the

Castilian tongue, in order that men understand it better and learn to make better use of it.

Garci Pérez, a cleric, who was also very learned in the knowledge of astronomy, helped him in this translation. The translation of the book was finished two years after the noble king don Fernando conquered the city of Seville.

This is a very noble and precious book and whoever wishes to benefit from it has to keep in mind three things. First, he has to be learned in astronomy, know the stars, in which state they are and in which season they give the greatest virtue to the stones which belong to them, in accordance with the virtue they receive from God. The second thing is that he be able to recognize the stones and their colors and characteristics; and also that he know for certain the proper places where the stones are formed and found and that he know how to separate the false from the true ones; and be able to tell apart the ones that naturally resemble one another, knowing them by their weight and their hardness, and by the other signs by which a man learned in this art can know them. The third thing is that he be learned in the art of medicine, since much of it lies in the virtue of the stones, as this book shows; and that he know how to make use of the stones as the book commands; and that he be of good judgement, so as to know how to use things to do good and be wary of the things that cause harm. Working in this manner, he can do whatever he wishes through the stones, and he will see marvelous things of their virtue, which they receive from God and for which he has to laud and bless His name, and may it be blessed forever and ever, amen.

II. ABOUT THE SIGN OF ARIES

ABOUT THE STONE CALLED *MAGNITAT* IN CHALDEAN AND IN ARABIC, AND *MAGNETES* IN LATIN AND *AYMANT* IN THE CASTILIAN LANGUAGE (MAGNET)

The first sign is that of Aries, which is to say, the shape of the ram. It is the house of Mars and the exaltation of the sun, and according to the characteristics that it shows in all its works, it is hot and dry.[25]

The stone, which is in its first degree, is called *magnitat* in Chaldean and in Arabic and *magnetes* in Latin, and *aymant* in the Castilian language. This stone is black in color, but it tends somewhat toward red, and there are some that look bluish-purple. These are the best ones. And although mines of these stones can be found in many places, the best of all is the one which is in the land of India, close to the sea. This stone has in it the natural virtue to attract iron with very great force, so that it looks like a great marvel to those who do not know the nature of things. They should not marvel that this stone, which is hot and dry, can attract iron, which is cold and dry, because if they kept in mind what learned men have said, they would find that all things that attract one another do it in two ways: either because they are alike or because they are opposites. To prove this, the learned men have shown many reasons which need not be put in this book, because what is said here is enough for all intelligent men, for through the property of this stone they can know all the others. The attraction of the magnet depends on the size of it and on the amount of iron that it attracts. So it is that in the land of India, in the mountain close to the sea where it is found, its force pulls out all the nails from those parts of a ship which are toward the rocks, making them fly like arrows; and if the nails are well bent and cannot be straightened and pulled out, the magnet's force makes the ships crash against the rocks so hard that they fall apart and perish. It is a great marvel that iron, which is above all other metals because of the strength it has, is overcome by the property of this stone, which makes it come to it obediently. This shows that the attraction is due to their being opposites rather than being alike. The virtue, which the iron receives from the stone, is so great that, if it is of very good quality, it will attract other smaller amounts of iron, so that these will stick to it as well as to the stone itself. In this manner, it can attract many pieces of iron, all sticking to one another, until it can take no more. This virtue is so well proven and so evident that, having the stone in one hand and iron in the other,

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25. A stone's colors, whether it is hot or cold, wet or dry, big or small, are its most variable properties. Actually, all stones are relatively hard, cold, and dry.

it is possible to feel, without looking, how the iron sticks to the stone, and how in turn another piece of iron sticks to it.

To make the stone lose its virtue, one must cover it with garlic or onion water for three days and three nights, and the virtue will be lost. To make it recover its virtue, it should be covered with ram's blood for another three days and three nights, and the blood should be changed every day.

This stone contains another great marvel: if it is placed in a glazed jar and put in a very hot oven four times, changing the jar each time, and then taken out when it is very hot, adding a little brimstone and sprinkling the stone with water, so strong a fire will spring forth from it that it will burn everything it can reach and it can burn for a great distance around. The stone does this because it is hot and dry and when heated, it stores up in itself the energy of the fire and hides it. And it flees from water, which, being cold and wet, is its opposite and joins the brimstone which, like the magnet itself, is hot and dry. In this way, vigorously fleeing from its opposite, which is stronger than it is itself, and joining with great force with its own kind, the magnet will burn everything for a great distance around, as we said above.

Whoever wants to make the magnet lose this great heat must pour oil of any kind on it and it will lose the heat.

This stone also has the virtue that it makes a weakhearted man, who wears it on his person brave, and it will make a brave man braver yet. It is also very useful in the art of medicine, for if a man who has been given a drink with filings of iron in it or some other poison that has iron mixed into it, or if he has been wounded with poisoned iron, grinding this stone, making it powder and mixing it with any kind of oil and giving it to the poisoned man to drink, will make the poison come out down below and he will get well. The same will happen if the pulverized stone is applied to the wound of the poisoned man.

Whoever wishes to know to which stars this stone is connected and from which ones it receives its power and virtue, should know that it is those three which are together and follow the line that divides the sign of Pisces, and one of which is at the end of the tail of one of the fish. The stones receive their property to attract iron from the virtue of these stars, and their power in all the works which we have related is greatest when the middle star rises to the horizon from the east.

ABOUT THE STONE CALLED *ÇURUDICA*[26]

The stone which belongs to the second degree of the sign of Aries is called *çurudica*, which means *destroyer of the liver*. This stone is purple in color, so that it is like sapphire in its purple color, but not so in its light. It is not transparent like sapphire, but dense and turbid. But there are some that have white grains in them that look like droplets, and those are the best.

These stones are found in the Promised Land, on the shores of a river called Alberich, which flows between the mountains, far from towns.

By nature this stone is hot and dry. Its property is such that whoever carries it is afraid for no apparent reason. And according to its physical nature, which is to do harm, the stone has the virtue that when it is polished and ground and someone is given a big enough drink with its grindings, it will destroy all his liver, with blood flowing out down below without stopping until he dies. And if the liver of an animal is placed in a basin with this stone, it will be destroyed and turn into running blood.

The middle star of the three which are on the waist of the figure of the Chained Woman has influence over this stone. The stone receives its power and property from this star and has the most power and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *GAGATIZ* IN CHALDEAN AND *GAGATES* IN LATIN

The stone which belongs to the third degree of Aries is called *gagatiz* in Chaldean and *gagates* in Latin. It gets its name from the river Gaga, where it's found. It is also called the River of Hell and it flows close to the House of the Temple. This stone is not transparent, for its color is that of turbid clay. It can also be found in Spain, in the mountains close to Zaragoza, in a place called Diche; and also close to Granada, in some caves which are in a mountain called Soler. But both the ones from Zaragoza and those from Granada are few and they are not as good as the ones found in the river Gaga.

By nature this stone is hot and dry. It has the property that when it is polished and the dust that results from it is given in a drink to someone whose body smells bad because of sweat, it makes him smell good. And besides that,

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26. The mining geologist Stephen Zahony questions whether this might be an *amethyst*.

it has yet another property: when tied to the belly of someone who has worms called squash seeds in his intestines, it will make the worms die and be expelled down below.

The star which is on the right wrist of the Woman Seated in the Chair has power over this stone. The stone receives its power and virtue from this star and its power and virtue are the greatest and it will work the best when the star is on the ascendant.

ABOUT THE STONE CALLED *MILIZTIZ*[27]

The stone that belongs to the fourth degree of Aries is called *miliztiz*, which in Chaldean means *ripener of abcesses*. The color of this stone is purple, somewhat blue. It breaks easily and can be ground between the fingers. This stone can be found in the mountains close to the House of the Temple, in some cave-like places, and whoever enters there feels something like the warmth of a bath and the smell of smoke. Some of the stones are big and others small, and those that have white mixed in with the purple are the best. And when this stone is polished, it becomes clear and shiny like other stones. It has the property to attract the chips of *ciguda* (hemlock?), like magnet attracts iron.

According to its physical nature this stone does great good. For if it is pulverized, its powder mixed with some liquid, and then placed over an abscess, it will make the abscess mature quickly. And if hung over the abscess, it will do the same. Whoever wishes to use it to an evil end and gives someone six drachmas' weight of it to drink, will cause that man to die, with the poison coming out down below. But if the man drinks less than this amount, he will escape death. And if a man, who is known to have drunk it, is given any kind of oil, he will not be harmed and he will get well.

By nature this stone is hot and dry. It receives its virtue and power from the southernmost one of the three stars that are on the waist of the Chained Woman Who Never Knew Man and works best when this star is in mid-heaven.

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27. Zahony suggests that this might be colored clary.

ABOUT THE STONE CALLED *CENTIZ* (WAXSTONE?)

The stone that belongs to the fifth degree of the sign of Aries is called *centiz*. It can be found in the land of India, on an island on the banks of a river which bears the same name. Its color is so deep green that it is almost black.

This stone is very strong and it weighs one hundred twenty drachmas. When the stone is cleaned up and polished, it reflects men's images like a mirror. By nature this stone is hot and dry.

This stone's property is such that if a woman, when lying with a man, has it hanging on her or mounted in a ring, she will only conceive a male child. The same is true for any animal on whom it is hung.

The stone receives this virtue from the star that is in the bend of the River, the one that touches the chest of Caytoz. The stone will work best when this star is in midheaven.

ABOUT THE STONE CALLED THE *MOVER*

The stone that belongs to the sixth degree of the sign of Aries is called the *mover*. It has this name because when it is polished and the powder that it gives off is given to a pregnant woman in a drink, it will move the baby and push it out, be it dead or alive. And it does the same thing if the woman has it hanging on her body. Also, it will do the same thing to any animal who would drink it or on whom the stone is hung. This virtue is bad for the women who have live babies in their bellies, whom they do not want to lose and good for the ones whose babies are dead and whom they cannot push out, or for those who are too weak to give birth.

The color of this stone is green mixed with red, but the green is so weak that it tends toward yellow, and also the red is so weak that it looks more like the salted water in which meat is stored.

The mines of this stone are located on the shores of the islands of the sea which are in the land called Çin. By nature the stone is hot and dry.

The star that follows the one which is on the bend of the River has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *GOLIZTIZ*

The stone that belongs to the seventh degree of the sign of Aries is called *goliztiz*. It receives its name from the river where it is found, on the shores of the Indian Sea. And, because it is not found anywhere else, it has no other name, except that of the river.

By nature this stone is hot and dry, and its color is brown mixed with yellow, but it is more yellow than brown. Its property is such that if a weight of ten drachmas is used, it attracts copper, or amber, at halfweight, like a magnet attracts iron; and according to this proportion, it attracts greater or lesser amounts. It has yet another virtue: if one takes the weight of half a drachma, and adds it to ten drachmas' weight of molten silver, the silver will turn yellow; and if this is done three or four times, it will turn the color of pure gold and it will withstand melting by fire forever, but it is not natural gold. It does this because it has in it the nature of red sulphur.

In the art of medicine, the stone has this virtue: if one takes it in the amount that equals the weight of two grains of barley, grinds it and mixes it with drinking water, and puts it into the nose of one who is born with the malady called "the demon" (epilepsy), he will get well the first time this is done, or at any rate the second time.

The front one of the two stars on the horn of the sign of Aries and the one which is on the neck of the same figure have power over this stone. The stone receives its virtue from these stars and works best when they are on the ascendant.

ABOUT THE STONE CALLED *TELLINIMUZ*

The stone that belongs to the eighth degree of the sign of Aries is called *tellinimuz*. By nature this stone is hot and dry and its dryness is in the fourth degree. Its color is black, with some red in it, so that it looks like grains of pepper. It is strong and very hard, so that it cannot be broken with anything except with yellow brass colored with *tutia* (tutty?) of Alexandria. This brass will break the stone as soon as it is close to it.

This stone can be found in the land of the Negroes, on the shores of a river that passes through those parts where these stones are. They come in different forms and colors, big and small, but always round and flat like a tortilla. Its virtue is very useful in the art of medicine, because when it is placed

on a wound or a sore it cures it right away, without the wound or sore becoming infected or abscessed. The same happens when the stone is hung over a wound or a sore.

The star which is on the head of the Woman Seated on the Chair, and the one which is on the staff of the same figure and which is called the Red Palm, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *MILITITAZ*

The stone that belongs to the ninth degree of the sign of Aries is called *milititaz*. By nature it is hot and dry. It is found in the islands of a land called Çin, in a place where there flows a river called the River of Honey. This stone is light of weight and very porous, and it is always shaped like a square. Its color is red, but not very, since it tends strongly toward yellow and some of them are all yellow. It has the property that, when polished with something, it gives off a sweet taste like that of honey.

This stone is very good in the art of medicine, because when it is given in a drink to someone who has a cough or some other malady of the chest, it will do him great good and he will get well quickly. And when it is hung over the place that suffers from the malady, it will do the same thing, but not as quickly.

The front one of the three stars in a row which are in the figure of the River has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE THAT FLEES FROM MILK*[28]

The stone which belongs to the tenth degree of the sign of Aries is the *stone that flees from milk*. By nature it is hot and dry. Its color is black and it is porous, so that it is very light of weight. It is rough to the touch and it breaks easily. This stone is found on the shores of a river called d'Ysia, in the land of Egypt.

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28. Zahony identifies this as possibly *scoria*.

The property of this stone is such that if it is placed close to the milk of any animal, it will jump and flee from it; in no way does it want to be close to milk. And, this is because by nature it has an animosity towards milk.

This stone is very good in the art of medicine, because when it is pulverized and dissolved in vinegar and rubbed on a *morfaga* (morphea-scales?) either white or black, it will cure it quickly.

The star which is on the right knee of the Chained Woman has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ALIOFAR* (PEARL)

The stone which belongs to the eleventh degree of the sign of Aries is called *aliofar*. By nature it is hot and dry. It can be found in many parts in the great sea, which surrounds the world, in some large shells where they grow in the following manner: when strong north winds blow, the shells open up to catch the moisture that is brought along. With these dew drops which fall inside they close up and at night go to the bottom of the sea. At daybreak, they come out into the sun and open up to catch a lot of its heat, then descend to the bottom, and they do the same thing in the afternoon, when the sun goes down. When the shells feel that the water has set, they push the pearls out. The waves of the sea push the pearls so hard that they cast them on the shore; then, when the waves retreat, they carry the pearls with them. Being moved back and forth in this manner, the pearls become round, beautiful and shiny, and the bigger they are, and the whiter and clearer, the more they are worth.

Although it is very white, this stone is not transparent, because its whiteness is dense. But it is very shiny on the outside, as if it had been polished. And those that are of a bad color, dull, or badly formed, not perfectly round or smooth, are so because of faulty growth in the shells, where they have not received as much air or heat from the sun as they should have, nor at the right time; or else they have not been carried back and forth by the waves of the sea enough to make them round.

This stone is very noble and very valued by men and it has great virtue, for everybody who sees it loves it for its natural form and beauty, which need not to be worked upon. It is highly valued by great lords, because it is considered to be one of the noblest stones.

The pearl is very good in the art of medicine, because it aids greatly against the tremors of the heart and it aids those who are sad or fearful, and also in all maladies that come from melancholy, because it purifies and clears the blood of the heart and takes away all its turbidity. For this reason it is good for the things that have been told. Therefore, physicians put it in their medicines and confections which they administer by mouth and with which they cure these illnesses. They also turn the pearls into powder and put it into the eyes, because it greatly clears the vision, fortifying the nerves, making the fog disappear, and clearing the water that covers the eyes. When this stone is dissolved so that it becomes liquid and rubbed on m*, it will cure it the first time around. It will do the same thing when put into the nose of someone who has a headache due to the movement of the eyes' nerves. To dissolve this stone, one has to grind it very fine, then make it into a paste with the water of bitters of cider and place it into a container made of glazed clay, cover it with the same water and hang it over another container of very strong vinegar, closing both containers tightly. The containers must be buried in moist dung and allowed to stand for fourteen days. At the end of this time, the stone will have turned into liquid.

Two stars, the one which is in the southern part of the triangle that is on the third bend of the figure of the Dragon, and that which is on the chest of the Woman Seated in the Chair, have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *ANETATIZ* (BLOODSTONE)

The stone which belongs to the twelfth degree of the sign of Aries is called *anetatiz,* which means *bloodstone.* By nature it is hot and dry, and its color is so dark red that it looks like blood. It is turbid, so that it is not transparent, and strong, and very heavy. The substance it yields when polished is similar to blood, in color as well as in all its qualities.

The stone's virtue is such that when it is hung over abscesses that break out, it will clear them up in a day. This is especially true when the abscesses are rubbed with the residue given off when the stone is polished. And when this blood-like substance is applied to watery eyes, it will dry the tears. It is helpful in all illnesses of the eyes that have to do with secretions, and this is so because of the great heat and dryness of the stone. It will do even more: whoever looks at it every morning can be sure of never having abscesses in his eyes.

Two stars which are on the mouth of the figure of Aries, one toward the north, the other toward the south, have power over this stone. The stone receives

its virtue from these stars and works best when both stars are on the ascendant or in midheaven.

ABOUT THE STONE CALLED *BERUTH* (BORAX)

The stone which belongs to the thirteenth degree of the sign of Aries is called *beruth*, and it is also called *açuz*, after a mountain in the land of Egypt where it is found. The Egyptians call it "snow of Açuz" because its color is white, but it has some yellow veins in it.

This stone is very light and easy to break, so that it can be easily broken with anything. It has on it a color which is like the dust that covers the walls of a mill; it gets this from the nature of the mist of the sea close to which it is found. By nature it is hot and dry. And if one wants to test whether or not it is good, one must put it on the tongue and it should sting, because of the sharpness it has in it.

The virtue of this stone is such that when it is pulverized and its powder is put on abscesses, it makes them open in a day. And when it is put on a wound that has rotten flesh, it will make it go away in the same manner. It does yet another powerful thing: if a very fat man carries it on him, he will become thin in no time without doing him any harm; therefore, it is very good for those who are too fat and who want to get thin fast and without any trouble.

Two stars have power over this stone: the middle one of the three stars on Caytoz' mouth; and the northernmost one of the stars which are above the eye and the eyebrow of the same figure, the one that looks like it is on his hair. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *ÇIN*

The stone which belongs to the fourteenth degree of the sign of Aries is called the *stone of Çin*, because it is found in the land that bears the same name. The people of that place call it *ratiz*, which means "hollow inside." By nature it is hot and dry, and its color is brown with black veins. It is strong and hard to break, and when broken, it is found to be hollow inside.

The virtue of this stone is such that when it is hung around the neck of someone who has an abscess called *quinancia* (angina), it cures the abscess

immediately; and when it is pulverized and given in a drink, it does the same thing. And besides, it has another strange property, in that flies flee from where it is, and for that reason the people of that land fashion from it drinking vessels and plates, on which they keep their vittles. It does yet another thing: when it is put in olive oil, it dissolves right away and mixes with the oil.

The star that sets toward the north and is on the waist of the Woman Seated in the Chair has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE THAT ATTRACTS GOLD*[29]

The stone which belongs to the fifteenth degree of the sign of Aries is the *stone that attracts gold.* By nature it is hot and dry. In color it is of a yellow that tends toward brown, and when a man takes it in his hand, he finds it soft and bland.

This stone attracts gold, like magnet attracts iron, and makes it obey. When one polishes the gold and mixes the dust with earth or anything else, and touches the mixture with the stone, the gold will separate from the other things with which it is mixed and cling to the stone. This stone is much used by goldsmiths, or by those who wish to purify gold. When it is heated in the same manner as we said about the stone that attracts iron, it has greater power to burn than that stone. This stone has yet another virtue: it gives great happiness to the heart, so that whoever looks at it in the morning will be happy all day, unless great efforts are made to make him sad.

The middle star of the three which are on the bend of the River has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE THAT SUCKS BLOOD*

To the sixteenth degree of the sign of Aries belongs the *stone that sucks blood.* By nature it is hot and dry and it is found in some parts of the Orient. Its color is green and it has a red spot in it. When one takes it in the hand it feels rough and light, because it is porous. Its form is that of half a sphere, with one side of it flat and the other one round.

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29. Zahony postulates this to be limonite gossan.

This stone's property is such that when one cuts the skin of an animal and puts the stone in the place of the cut, it will extract the blood with very great force. This it does in the live body but not when the blood is by itself. Whoever wants to know the quantity of blood extracted must weigh the stone after it has extracted the blood and then put it in hot water. All the blood will come out of it and it will be as it was before; then he must weigh the stone again and he will know how much blood it extracted.

The star that sets toward the south and is the one that is on the right foot of the Chained Woman, has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE THAT APPEARS IN THE SEA WHEN MARS RISES*

The stone which belongs to the seventeenth degree of the sign of Aries is the one which appears in the sea when the planet called Mars rises and disappears when that planet sets. By nature it is hot and dry and it is found in the sea, toward the west. Its color is red and clear, like that of fire, and its shape is always round, never anything else. When Mars appears above the earth, this stone comes out on top of the sea and floats on the waves; and when Mars sets, it goes down to the bottom of the sea. And it does this continually, up and down, and it cannot be caught except when Mars is above the earth.

It has a glow which is like lightning or like an ember in burning fire, and a good one will give light in the night, like a candle. The stone has this glow when Mars is above the earth, and when this planet sets, the stone will get dull and dark like other stones. This is one of the great marvels which appear because of the power that the planets have over stones and mines through the virtue that God gave them. Therefore, this stone's property is such that lions will obey him who wears it on his person, so that he can handle them without them doing him any harm. This is because when the lion sees the stone, he loses all strength and has no power.

The middle one of the three stars which are on the base of the Triangle has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE THAT ATTRACTS GLASS*[30]

The stone which belongs to the eighteenth degree of the sign of Aries is the *stone that attracts glass*. By nature it is hot and dry, and its color is brown with black veins. It is heavy and rough to the touch, and has ridges in it. This stone is not found anywhere except in Sicily, in a mountain called Vulcan, which burns all the time. Its property is such that fire cannot burn it since it always lies within fire, nor can it ever change its color.

This stone has another property in that glass obeys it, and it attracts glass like magnet attracts iron. Its force of attraction equals its own quantity, and hence it is counted among the stones that attract. When things made of glass, such as goblets, are placed near this stone, they will break immediately, and when it is placed near the opening of a kiln in which there is glass, it will make the glass fly out, whether it be hot or cold. It has this power according to its size and weight. Yet another property of this stone is that whoever wears it on his person can be sure of not having gout in his feet nor in his joints. This is because it strengthens those places where gout can occur. If the gout occurs beforehand, the stone will make him much better, even if it cannot fully cure the disease, and if he wears the stone for a long time, he can get cured.

The last star on the spine of the sign of Aries, and the one that is on the right foot of the Chained Woman, have power over this stone. It receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *ANNORA* (LIMESTONE)

The stone which belongs to the nineteenth degree of the sign of Aries is called *annora*, which in Chaldean means *limestone*, because lime is made from it. By nature it is hot and dry, and it is found in many parts of the earth. Men use it in all necessary heavy labor, because it joins one stone to another, and seals holes, so as to make places watertight; hence men use it to seal pipes and boats and put it wherever they don't want water to enter. When this stone is heated, it will hold heat until water is poured over it, and then it shows the heat it has within by giving off smoke-like steam. And when placed near sulphur, it gives off fire that burns, but not as much as other stones that burn, of which we have named some and will name others in due course. When this stone is mixed with orpiment and rubbed on the hair of any animal, it will eat the hair away in a short time; and when left in place for a long time, it will eat away the skin.

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30. Zahony thinks this might possibly be basalt, and found in Mt. Etna.

It is like a strong poison, because when both stones are pulverized and mixed together in water, and the solution is given to someone to drink, it will make holes in the bladder, wounds in the intestines, and it will greatly damage the liver. But this stone is also of great benefit, because when it is pulverized and mixed with oil so as to make an ointment and the ointment is put on large and wide wounds, the wounds will grow together very quickly and will heal well.

The star which is on the ankle of the back leg of the sign of Aries has force and power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *YZF* (JASPER)

The stone which belongs to the twentieth degree of the sign of Aries is called *yzf*, which we here call *iaspio*. By nature it is hot and dry. There are many kinds, but five of them are the best. The first of them is of the color of dark green agate, which some take to be a crude emerald, because it doesn't have the light color of a fine emerald. In this they err, because it has its own nature which has nothing in common with that of the emerald. And the same is true for green jasper, which is similar to dark green agate, but does not share its nature nor its characteristics, nor its properties, as will be shown in this book.

The second kind of jasper is of the color of heavy wine, but it is transparent. The third kind is of the color of air. The fourth is of the color of smoke and it is the worst of them. The fifth is of many colors and is opaque, but it has white and shiny transparent veins. In due course we will tell the properties of each one, or to which star it is connected, whence it receives its virtue.

But first we want to talk about the properties of jaspers of all kinds. And we say that most of them are clear in color, transparent, and that the ones which are murky are shiny, so that they all look good to those that use them. The best of the jaspers are found on an island called Çarandin, on the shores of a river which flows through the land where other very noble stones of many kinds can be found, about which we will talk later on in this book. But here, above all, we wish to talk about the jasper which is green in color, but somewhat dark. Its shape is always found to be long, rather than wide or round, and its virtue is such that whoever wears it hanging around his neck is healed from the illnesses of the throat, because by nature it takes away the pain of these parts and cures them without delay. It has yet another property, in that whoever looks at

it every day in the morning is strenghthened in his eyesight, and it will comfort the spirit and bring happiness to the person who wears it.

The star which is on the rear haunch of the sign of Aries has force and power over this stone. The stone receives its strength and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *CUMINON* (YELLOW-RED JASPER)

The stone which belongs to the twenty-first degree of the sign of Aries is called *cumynon,* which is the second kind of jasper and which we already mentioned in this book. Its color is that of white wine that tends toward yellow, and this yellow is mixed somewhat with red. It is found on the shores of the island Çarandin, and its shape is round, but not very. This kind of jasper is beautiful and very bright and transparent, and it is valued more than the others of which we spoke. Its virtue is such that whoever carries it on his person is protected against the illness called "decrepitude." It is also good against those illnesses which come from melancholy, because it gets rid of them by strengthening the heart and making it happy. And it does yet another thing: when it is pulverized and given in a drink to one whose intestines hurt, it cures him right away. Therefore, physicians put it in electuaries and other medicines to strengthen the heart and to cure the illnesses that come from melancholy.

The star which is on the knees of the Woman Seated in the Chair has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ASTARNUZ*

The stone which belongs to the twenty-second degree of the sign of Aries is called *astarnuz*, which means *similar to a star*. It is the third kind of jasper of which we spoke. The stone has white, transparent veins in it and it was given its name because these veins always shine like stars. It is found in the river where we said these jaspers were. This stone is nobler than any of the others and men value it more because it is shinier and better than the others. The nature of this stone is such that when it is placed in fire, the longer it stays, the shinier it becomes and the more beautiful. Fire does not damage it; rather, it purifies the stone and increases its brilliance, as is true for other stones which are clarified by fire. Therefore, it is important that whoever wants to work with the stone know the art of making the fire with which to treat it. When the stone

is placed in the vessel in which the stone is to be fired, it must be covered with another vessel on top and well sealed with mud. Two small furnaces must be lit, one with fire below the vessel and the other above, so that the heat is equal. The stone has to be uncovered in order to see if it is done. If it does not look like it should, it has to be left longer. When it has been refined, it should not be taken out in untimely fashion, but left in the oven to cool of its own accord, because the heat of the noble stones, when it is very great and is suddenly exposed to cold air, attracts the cold so much that the stone will expand and break. But when the stone cools of its own accord, this does not happen.

The virtue of this stone is such that it strengthens the heart of the man who wears it and it makes him happy, so that his tasks will be easy for him. And when this stone is hung on someone who has pain in the stomach or in the liver, it will make it go away promptly if the illness is new; and if it is old, the stone is of great benefit, in that it does not let the illness get worse.

The front star of the two that are on the base of the Triangle which is formed in the third turn of the figure of the Dragon has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *BELYNIZ*

The stone which belongs to the twenty-third degree of the sign of Aries is called *belyniz*. It is another kind of jasper of which we spoke. The stone has the clear and clean color of air when seen in the light and it is transparent like air. Like air, it has no color of its own; rather, it takes on the color of whatever comes close to it. When the air is clear, the stone is clear, and when the air is unclear, the stone is unclear. This stone is found on the shores of the river where the other jaspers about which we spoke are found. Its virtue is such that it takes away the pain in the middle of the head, which in Arabic is called *xaqueca* and in Latin *migranea* (migraine). This it does when it is hung over the part where the pain is. Moreover, when it is hung on young boys as they are growing up, it is of great benefit for their development as it makes them grow better and be healthier, and it will make them less whiny besides.

The middle one of the three stars which are on the body of Caytoz has power over this stone. The stone receives its force and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *GACIUZ*

The stone which belongs to the twenty-fourth degree of the sign of Aries is called *gaciuz*, which means *smoky*. It is the fourth kind of jasper of which we have spoken. It is of the color of smoke and hence looks like it has been smoked, and it is the meanest among all the other jaspers of which we have spoken. It is a dark stone that has no clarity, and it cannot be polished. It is found on the shores of the river where the other stones about which we have spoken are found. By nature it is hot and dry. Its virtue is such that when it is pulverized and an amount equal to the weight of four drachmas is given in a drink to someone who has pain in the part of the intestine called the colon, it will cure him right away. It will do the same thing when tied to or hung on the stomach, but not as quickly. Found on the island of Çarandin, some stones of this kind of jasper are small and others so large that men use them to make pillars or lintels and beds on which they lie.

The front one of the three stars which are against the tailbone of Aries has power over this stone. The stone receives its virtue from this star and works the best when the star is on the ascendant.
(Only four kinds of jasper are described.)

ABOUT THE STONE CALLED *AÇUFARATIZ*

The stone which belongs to the twenty-fifth degree of the sign of Aries is called *açufaratiz*, of which there are four kinds. The first one is called *lyeme*, because it is found in the land of Lyemen (Yemen). The second one is called *kabroci*, because it is found in the land called Kabrocen in Arabic and Chipre (Cyprus) in Latin. The third one is called *lubi*, because it is found in the land called Lubia (Libya). The fourth one is called *antoqui*, because it is found in the land called Antoquia (Antioch), which in Latin is Antiecha. We will speak about each one of these four stones in the proper place of this book, but first we wish to speak about the one called *lyeme*.

By nature this stone is hot and dry. It is black in color and light in weight. Its shape is that of an *agalla* (nutgall?) and it is found only on the shores of the river of that land. It is soft and easy to break and when broken, another stone is found inside, which is hard and difficult to break. This stone's virtue is such that when the stone that is found inside it is pulverized and mixed with the milk of a woman and a little piece of wool is moistened in it and inserted into a woman when she lies with a man, she will become pregnant the

very first time. The same is true for any kind of animal if the stone is mixed with the milk of the same species.

The last of the four stars, which follow the three that come after the bend of the River, has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *ABIETITYZ*

The stone which belongs to the twenty-sixth degree of the sign of Aries is called *abietityz*, which means *vulture-like*. It has this name because the female vulture takes it to her nest in order to make the birth of her young easier. By nature it is hot and dry and it is the second kind which we said was called *cabroci*. It is found to have the shape of an acorn, but there are some that are oblong.

This stone is soft and easy to break, and light of weight. Its color tends toward white but not so very much. When it is broken, another, harder stone is found inside which tends a little toward yellow. Besides, other small and yellow stones can be found inside which break as easily as the others.

The virtue of this stone is such that when it is wrapped inside the hide of a deer and tied to the left thigh of a woman who is to give birth, she will give birth easily and without danger, and the children are born without defects, unless nature had erred before in forming them.

The middle star of the three which are on Aries' tail has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *LUBI*

The stone which belongs to the twenty-seventh degree of the sign of Aries is called *lubi*. By nature it is hot at the beginning of the first degree and dry at the beginning of the second degree. It is the third kind of *açufaratiz* of which we spoke and is called *lubi*. It is found in the land of Lubia in a cave at the foot of a mountain called Corcor. These stones are small and of the color of sand. They are light and soft to the touch, and easy to break. When they are broken, other stones, white and hard, are found inside and these are very hard to break.

Whoever takes this stone, pulverizes it and knows how to turn it into liquid, can make from it a very strong glue with which to join hides in such a strong way that one cannot see where they were joined. For this reason in that land they make good leather shields which cannot be pierced by iron or anything else. And the glue that is made this way is good for closing wounds before they become filled with pus or poison, because afterwards it is too late. This stone has another virtue in that when it is tied with a red silk thread to a pregnant woman's neck so that it touches her belly, it will guard the baby from evil and harm until birth, unless force is used to harm it.

The purple star that is at the end of the right hand of Perseus, who holds the head of Algol, has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *CERAQUIZ*

The stone which belongs to the twenty-eighth degree of the sign of Aries is called *ceraquiz*. It is the fourth kind of the stone which we said was called *açufaratiz* and it is the Antiochian one. This stone is round in form, its color is very white, and it is light of weight, because it is very porous, for there are many small holes in it which cannot be seen. It breaks easily and when it is broken, another stone is found inside which tends toward yellow. By nature it is hot and dry.

This stone's virtue is such that it prevents birth in the following manner: when it is wrapped in the skin of a lamb, whose head has been cut off with a fine steel knife, and hung over the genitals of a woman, it will hinder her so that she will not be able to give birth. Hence it is necessary to take it away at the time of birth, because if not, the woman will, per force, explode and die. And the same is true for any animal on whom the stone might be placed.

The star which is on the leg of the Woman Seated in the Chair has power and dominion over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *BERLIMAZ*

The stone which belongs to the twenty-ninth degree of the sign of Aries is called *berlimaz*, which means *chasing away sleep*. By nature it is hot and dry. It is found in a part of the Occident on a mountain which is close to the misty

place where there is fog for most of the year. The color of this stone is a yellow-brown that tends toward black. The stone is hard and very heavy, so that its weight is like that of lead, and it is so strong that it can be broken only with great difficulty. The virtue of this stone is like its name: when a stone whose weight equals ten drachmas is hung on a man, he will not sleep, neither day nor night, as long as he has it on his person. But the wakefulness caused by this stone is not as harmful as the wakefulness of a man who forces himself to stay awake in order to work. And this wakefulness is enjoyable if it does not go too far, so that his nature cannot withstand it any longer. This wakefulness is so pleasing to the person who has the stone, that even when it is taken away from him, for a long time he still will not be able to sleep as well as before.

The stone has yet another virtue: when a quarter of a drachma's weight of it is pulverized and put into a leper's nose, the stone will cure him the first time around if the leprosy has not gone so far as to make him lose some member of the body, for it cannot be restored by the power of the stone; but it will take away the leprosy from what is left in the body and it will not let the disease go any further.

The second star of the two which are together and beyond the bend of the River has power over this stone. The stone receives its virtue from this star and will work best when the star is on the ascendant.

ABOUT THE STONE CALLED *ANNOXATIR* (AMMONIUM SALTS)

The stone which belongs to the thirtieth degree of the sign of Aries is called *annoxatir* in Arabic and *armoniaco* in Latin. By nature it is hot and dry at the end of the third degree. It is a salt of which there are many kinds, depending on the mines from which it comes. Some that are mined are like very small and hard stones and very salty, so that when put on the tongue, they will stick to it very hard. There are some that have black spots in them, others have white ones, and others yet are brown. The best of them are white and transparent like crystal. All kinds of this stone mentioned above have the same nature and the same virtue, which is that of pulling bodies from the bottom to the top and washing what is hidden inside them, rather than that which is on the outside. Due to this pulling force, it cleanses the bodies with which it is mixed together and because of this, physicians put it in the alcohol they prepare for eyes and in the powder they make for cleaning teeth.

The stone has yet another virtue: when a house is sprinkled with its brine, no snake will come to it. It does even more, in that when its powder is

blown into the throat of an animal that has a leech in it, it will kill the leech and make it be expelled.

Those who work in alchemy and are masters in it dissolve this stone and use it in many ways.

The two stars which are united, one bright, the other dull, and which are on the head of Algol, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

III. ABOUT THE SIGN OF TAURUS

PROLOGUE

We have spoken about the thirty kinds of stones that belong to the sign of Aries and have shown with which star each one of them is connected, and whence it receives the virtue and the power to do its works in this lesser world, which is the one from the heaven of the moon downward. The ancients made up general rules so that men could make use of this knowledge with greater certainty. They ordered that, with each sign, one also look at which planet has the greatest power over the stone and work according to one's understanding of the planet's disposition: doing good when it is good and causing harm when it is bad, as is shown about each planet in the proper place of this book. Whoever does not have complete knowledge of this cannot know the relationship that the stars have with each other, nor the power they have over the things in this world, nor how they change their disposition from one to another. Therefore, the ancients thought it good that in all works that belong to the degrees of the sign of Aries, one pay attention to the planet of the star called Mars; and also to the decan of the decanate in which a given degree is at the time one wants to work with a stone using one of its properties on this earth, orienting it so that it has no obstacle. All this has to be born in mind in the works that one wishes to be for the good, and in ill deeds the opposite is true. When all these things are born in mind, the virtues of the stars will join together with the virtues of the stones, so as to do their work perfectly, and whoever carries out the work will be able to do as he wishes.

ABOUT THE STONE CALLED *DIAMANT* (DIAMOND)

Taurus is the second one of the twelve signs of which we spoke and it is also divided into thirty degrees. Each degree has a certain stone which is related to it and whence the stone receives its virtue, as will be shown below.

The first of these stones is the one which in Arabic is called *mez* and in Latin *diamant*. By nature this stone is cold and dry in the fourth degree. It is found in the river called Barbicen, which flows in the land called Horacin, but is born nowhere else but in the land where for six months it is daytime, and for six months it is night. No man can reach the place where this river is born, because there are many snakes and other kinds of poisonous beasts, and there are snakes that kill by looks alone. Hence men do not dare go there. But as the river grows, it gives off many tributaries which carry the stones along. And although at the place where the river is born some of these stones are very big and others

small, as is true for other stones, the streams can carry along only the smaller ones.

The color of the diamond is similar to that of clear ammonium salt and it is like burnished iron. The color of some of the stones tends toward purple and that of others toward yellow, but the best of them are those that are like glass, and there are men who use glass to make false diamonds. To tell the difference between the true and the false stones, they should both be placed in fire: the false one will melt and the true one not, since fire will never harm it.

This stone will break all others, piercing or cutting them, without any of them leaving a mark on it. The diamond will do yet another thing: if it is rubbed together with other stones, it will pulverize all of them. But there is a kind of lead, which in Arabic is called *azrob* and in Latin *stannu*, which will break this stone in the following manner: when the lead is wrapped around the stone and hit with a hammer, the stone will break right away, and when the lead is then fashioned into a mortar and pestle, the stone, once it has been broken, can be ground into powder. And when some of this powder is mixed with something and given to a person who has a stone in the bladder, it will break the stone right away and he will be cured. The same will happen when a small piece of the diamond is attached to the tip of a thin iron rod and introduced into the virile member of a man who has a stone in it, so that the diamond will touch the stone. But this should not be done except when it is doubtful that the man can get cured otherwise.

Those who wish to pierce or cut other stones should take small, very thin and sharp pieces of diamond and fasten them to the tips of fragments of either silver or copper, in order to pierce or cut stones they want to carve, or to make cameos.

But this stone is poisonous due to the poisonous varmints who live where it is formed. Since the shape of the stone is always square and sharp, these animals will scratch themselves against it and in this way the stone receives their poison, so that when men put it in their mouths, and keep it there for some time, their teeth will fall out. The stone will do an even worse thing: when one drachma's weight of it is pulverized with lead, as we told above, and is given to a man in a drink, it will kill him.

Since the nature of this stone is cold and dry, its property is such that whoever wears it on his person angers easily and is inclined to get into fights and do things that take daring and force.

The bright star that is on the right upper arm of Perseus, he who holds Algol's head, and the one that is on Perseus' head, have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *AGUQUIRYAZ*

The stone which belongs to the second degree of the sign of Taurus is called *aguquiriaz* in Chaldean, which in our tongue means *preventer of conception*. By nature it is earthen, cold and dry, and very strong in these two complexions. Its color is white, with black spots in it, so that it is always a mixture of black and white. The stone is strong and hard to break. It is opaque, so that one cannot see through it, but when polished, it becomes somewhat clearer. It is found on the Mountain of the Moon, where the Nile is born.

The virtue of this stone is such that whatever animal takes it, if it is a male, it will not beget, and if female, it will not conceive. And when any one of them is given ten drachmas' weight of it in a drink, the animal will lose its ability to beget or to conceive forever. Physicians put a small amount of this stone in the medicines that they make to stanch great loss of fluids, because, due to its nature, it stops the loss of fluids very effectively.

The star that is on Perseus' left upper arm has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *CAMORICA*

The stone which belongs to the third degree of the sign of Taurus is called *camorica* in Chaldean, which in our tongue means *vinegary*. This is because when it is mixed with any liquid, it gives that liquid a sour taste, like that of a very strong vinegar. By nature it is cold and dry, and its color is bright red. It is rough to the touch because it is very porous, but hard to break, just the same. This stone is found in the land of Meçanabor, in caves that are in the mountain located in that city. Some of the stones are big, others small.

People of that land pulverize these stones and mix the powder with water and after six days it will become a very strong vinegar, which they use in their foods. Physicians mix it in syrups and other things in order to separate humors, because it separates them better and quicker than the other vinegar.

Also, if some of it is poured on a cloth, either linen or wool, it will make holes in it. Because it dissolves strong materials and washes them clean of dirt, it is used by those who work in alchemy.

The two stars, one of them southern, the other northern, which are in the front line of Azoraya, which is called the Seven Kids and which are within the figure of Taurus, have power over this stone. The stone receives its power and virtue from these stars and it works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *FULUDIA*

The star which belongs to the fourth degree of the sign of Taurus is called *fuludia*, which means *curdler of milk*. By nature it is cold and dry, and it is very strong in these two complexions. Its color is very white, so much so that it looks like frozen snow. It is not clear and one cannot see through it, and it is so strong that no stone except the diamond is stronger. This stone is found in the mountain of Açir, which is located in the land of Egypt, and a good hundred *migeros* away from any settlement. There one finds caves inhabited by snakes and other vile beasts, and the stones are outside the caves, because the snakes push them out. The herders who are guarding the cattle see the snakes do it, and they take the stones and sell them.

When this stone is churned with milk, that milk will curdle all milk with which it is mixed. Therefore, the people of that land use it to make cheese and in all other things of milk which they wish to curdle. Physicians use it a lot in medicines that they make for hemorrhaging or for ulcers in the intestines.

This stone's virtue is such that whoever wears it on his person will not be able to urinate as long as he has it on him. For this reason, the people of that land use it to make vessels and bowls, which are used by those who have the disease of not being able to contain their urine.

The star that is on the left foot of Faycoz, which means "inflamed" or "burning," and is also called "the shepherd," has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ABARQUID*

The stone which belongs to the fifth degree of the sign of Taurus is called *albarquid* (sic).[31] It is found in the land of Africa, in the sulfur mines. It is light in weight and hard to break. On the outside, its color is that of henna, a mixture of green with a little yellow. Its shape is flat and when one looks closely, one can see a figure of a scorpion in it. And when the stone is broken, the same figure is found inside. By nature it is cold and dry.

The virtue of this stone is such that when a woman wears it on her person, she will burn with such desire for a man, that she can control it only with very great effort. And this is true for any female animal who wears the stone. The people of India, who work a lot in the art of necromancy, make much use of this stone.

This stone has the virtue that when it is pulverized and given to a woman in a drink, her belly will swell little by little, so that she looks pregnant, and when it is time for her to give birth, the swelling disappears. The necromancers make believe that, through their art and knowledge, a pregnancy is caused and undone.

The shiny star which is on the right side of the figure of Perseus has power of this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *RACONIC*

The stone which belongs to the sixth degree of the sign of Taurus is called *raconic* in Chaldean. It is found in the land of Spain, especially in the region of Barcelona. Its color is brown and it has in it faint blue lines, so that they can hardly be seen and only in very good light. By nature it is cold and dry.

This stone's property is that it flees from oil, so that when it is placed close to oil, it leaves the place where it has been put with great force. And when it is pulverized and mixed with some liquid and later olive oil is added, all the powder will separate to one side, and by this, one can tell that it is good. If one drachma's weight of the powder is given to a dog in a drink, it will become

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31. Zahony believes this can be apalite.

rabid. The same is true for a man if he is not helped by giving him warm oil to drink within twenty-four hours.

The middle one of the three stars which come after the two which follow the bend of the River has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE THAT ATTRACTS BONES*

The stone which belongs to the seventh degree of the sign of Taurus is the *stone that attracts bones*. It is found on the island of Sardinia, because, when there is a great storm on the sea, the waves throw these stones to the shores. Its color is a brown which tends a little toward yellow. It is light in weight, so that it seems to be hollow to the person who holds it in his hand. It is soft to the touch and strong and very hard to break. When it is broken, there is a very white piece inside, which can be pulverized between the fingers.

By nature this stone is cold and dry. And its property is such that, when it is placed near a bone, it attracts it very strongly, the way other attracting stones do with things over which they have power to attract. For this reason, it is good in the art of surgery, because it can be used to pull bones which have been broken in men's bodies, either because they were wounded or due to some other kind of break. Since the stone pulls the bones very gently, a plaster is made of it and placed over the wound in the place where the break is located.

The people of this land use this stone to make drinking cups which they value greatly because they are light. It is also good in the art of medicine, because when three drachmas' weight of the white substance, which is found inside, is given in a drink to someone who has the disease called black jaundice, it will cure him quickly.

The star which is on the right knee of the figure of Taurus has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *MENEFFI*

The stone which belongs to the eighth degree of the sign of Taurus is called *meneffi*.[32] It is found in the land of Egypt, near the city called Menef, from which it receives its name. It is a small stone and each one has many kinds of colors, but the most common colors are bright red, yellow and green. This stone is hard and difficult to break. It is of average weight, not very light nor very heavy. By nature it is cold and dry. The Egyptians call this stone *mardican*, which means "numbing," for its virtue is such that, when it is pulverized and dissolved in some liquid, and placed on any one of man's limbs, that limb will become numb right away so that he cannot feel it. For this reason, it is used in the art of medicine to place on the parts that one wishes to burn or to cut, and also on those parts which ache a lot. It is so strong in taking away feeling that, when placed on those parts, nothing can be felt, neither that which is being done to it by force, nor the pain that existed before.

The southern one of the two stars which are on the northern ear of the sign of Taurus has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ZUMBERIE* (EMERY)

The stone which belongs to the ninth degree of the sign of Taurus is called *zumberie* and in Latin *esmeri* (emery). This stone looks like coarse sand and there are stones, some of them small, others big, that stick together. It is of average weight and hardness. Its color is a brown that tends to be dark. This stone can be found in many parts, but the best of all is the one found close to the sea of Çin. By nature it is cold in the second degree and dry in the third.

This stone's property is to eat away the bodies of other stones. Master craftsmen use its powder to finish precious stones on a copper or lead surface, or on blocks made of some special wood used in this art, making them clear and beautiful by rubbing them on these surfaces. Also, the stones can be cut or pierced as one wishes, for there is no stone that can withstand the emery, except for the diamond. And it will polish the other stones better when its powder is wet rather than dry.

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32. If this is a stone and not a rock, it might be garnet, according to Zahony.

Those who work in alchemy use this stone because it is good for cleaning things by separating dirt from them. When clean, they will be better at taking on the color and weight that the alchemists want to give them.

This stone has yet another virtue in that when its powder is placed in wounds that are old and infected, it will eat away the rotten flesh and the wounds will heal more rapidly.

The southern one of the two stars which are on the front line of the quadrant that is on the neck of the figure of Taurus has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ZAMORAT*

The stone which belongs to the tenth degree of the sign of Taurus is called *zamoricaz* (sic), and also *the stone of hermits*.[33] It is found near the sea called Alcuçun (the Red Sea), the one through which Moses led the sons of Israel, and close to the city called Bocaliz. When there is a storm, the waves of that sea toss the stones to the shore. The stones are very yellow, glossy and transparent like clear oil. Some of them are big, others small, and they are hard to break. The stone always has the shape of a chestnut. By nature it is cold and dry, and very strong in these two complexions.

This stone is highly valued in the land where it is found and it is used in rings and necklaces, for the man who wears it feels no desire for a woman and even if he tried to mount her, he would not able do anything while having this stone on his person. For this reason, the learned men of old gave these stones to the religious and to the hermits, and to those who had taken the vow of chastity. And some gentiles, who wanted to lie with their wives only at certain times, in order to have them get pregnant quicker and to make their sons stonger and more robust, carried this stone on them at all times, save when they wanted to beget. When three drachmas' weight of the powder of this stone is given to a man in a drink, it will forever make him unable to lie with a woman. For this reason, when the kings of India wished to castrate the men who would guard their wives, they gave them a drink of this stone to save them the pain of cutting off their virile members, since it worked as well as castrating.

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33. Zahony believes this might be citrine, the yellow variety of quartz, or peridot.

Of the stars that are on the face of the sign of Taurus, the one on the nose has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *CORAL*

The star which belongs to the eleventh degree of the sign of Taurus is called *coral* in Latin and in Arabic. Its root is called *margen* and its branches, *becet*. This stone is formed in seawater, and it is shaped like a tree, and it looks like the plant that is called seaweed. It has many branches and, while under seawater, it is soft, but after it is taken out and exposed to air, it becomes hard. This stone is found in many places, but the best kind is found either in the sea of England or on the island of Sardinia. It is not transparent and its color is red, and the redder it is, the better. By nature it is cold and dry.

The property of this stone is such that it is somewhat constipating; and its grindings, dissolved either in wine or something else, are very helpful when given to drink to those who spit up blood. It also helps those who have trouble urinating. Moreover, if one drinks it mixed in some liquid, it will break open an abscess in the spleen.

The star which is between the one on the nose of Taurus and the one on the southern eye of the same figure has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *BLACK CORAL*

The stone which belongs to the twelfth degree of the sign of Taurus is called *black coral*. In Arabic, it has the same name as the other coral, and like the other coral, it is also soft under water and becomes hard when exposed to air, but its color is much stronger. By nature it is cold and dry, but its dryness is greater than that of the other coral.

The black coral has exactly the same virtues as the red coral, and this one besides: taking its grindings in a drink is good for the ulcers of the intestines and for tremor of the heart. Also, it is mixed into the medicines which are used to make one happy. When burnt and made into powder, it is very good for drying watery eyes; therefore, it is good to put it into alcohols.

The star which is on the northern eye of the figure of Taurus has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *NERIZECH*

The stone which belongs to the thirteenth degree of the sign of Taurus is called *nerizech*, and some call it *belmuz*. By nature it is cold at the end of the second and dry at the beginning of the fourth degree. Its color is a very pale red and there are very thin and faint lines in it which cannot be seen except when one looks at it closely in sunlight, for at first sight it just looks red. The lines that we mentioned are not straight; rather, they look as if they were painted by a painter who doesn't know how to paint, but they are clear and very shiny when the sun hits them, so that they make rays on the ground, just like crystal does. Some of these stones are big, others small, and they are of many shapes, but most of them have the shape of an egg. The best of them are found on the island of Çarandin, where other noble and precious stones are found.

Goldsmiths use these stones a lot in making necklaces and mounting them in rings. The noblest of these stones are found in the mountain of said island, near the town called Tarhan.

The property of this stone is such that, when it is placed in running water, the water will separate to its right and left and will not flow over it. The learned men of old recognized this property and said that whoever carries this stone on his person cannot die in water, since the stone will always save him because, by separating itself from water, it will give him space to breathe so that he will not drown. This is one example of the noble virtues which can be found in stone mines.

The star which is on the southern eye of the figure of Taurus, the one called Aldebaran, has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *BARAN*

The stone which belongs to the fourteenth degree of the sign of Taurus is called *baran*. It is found in mines located in some parts of Africa. It is soft when it is extracted but later, when it has been taken out and exposed to air, it becomes hard and very strong. Its color is brown, and some have veins in them

that look like gold, others like silver; but the best of them, the ones that have the greatest virtue, are gold-colored. By nature this stone is cold and dry.

The virtue of this stone is such that when it is hung over a bleeding cut or wound, it will stop the bleeding right away. Moreover, when it is pulverized and mixed with vinegar to make a paste and then shaped into acorn-shaped balls and placed on a woman's genitals, it will make them dry up. Also, physicians mix the grindings of this stone with the powders they make to tighten teeth and gums that are loose.

The star which is on the left forearm of the figure of Taurus has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE WHICH APPEARS IN THE SEA*

The stone which belongs to the fifteenth degree of the sign of Taurus is the one that appears in the sea when the planet Venus rises and hides when it sets. This stone, and the other one of Mars that we talked about, as well as the ones related to the other planets about which we shall talk in the future, are all found in the sea which is called the Mar Tenebrosa (North Sea), but every one in its place and not all together. We shall also tell how a planet's virtue appears in the stone that receives its power and virtue from it. The color of this stone, which is specifically related to Venus, is a white that tends somewhat toward yellow. It is a clear and shiny stone, and of great radiance. It is light of weight, but very strong and hard to break, so that, of all the metals, only gold can break it; when gold is placed next to it, the stone will break right away. In all ways, this stone shows the complexion of Venus, but by nature it is cold and dry. This stone looks very beautiful and is highly valued by those who know it.

The stone's property is such that all kinds of poisonous snakes flee from it. And it has another important property in that whoever wears it on his person has great desire for a woman, and although he gives in to it, he will not be harmed as much as would someone else.

The second one of the two stars which are on Perseus' crown has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *ZAMORAT* (EMERALD)

The star which belongs to the sixteenth degree of the sign of Taurus is called *zamorat* in Arabic and in Latin *esmeralda* (emerald). This stone is of a very beautiful green color, and the greener it is, the better. It is composed of a mixture of earth and stone and by nature it is cold and dry. It often forms in goldmines, and is mostly found in the land of the Occident.

The virtue of this stone is such that it helps against all deadly poisons, as well as against wounds or bites caused by poisonous animals. When one drachma's weight of it is pulverized and sifted and given to a poisoned man to drink in wine or in water, it will cure him and he will not die, nor will his hair fall out, nor his skin peel away.

This stone has another virtue in that whoever wears it on his person will be safe from the disease called "the demon" (epilepsy), if he has the stone before he gets the disease. For this reason, and because it is very beautiful, men, especially the honorable ones, love this stone. In the land where the best of these stones are found they are hung around the necks of children to guard them from the disease mentioned above. And if they have just the beginning of the disease and the stone is tied either to their left upper arm or to their left thigh before the disease gets old, they will get well.

The star which is at the base of the northern horn of the figure of Taurus has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ZAUARGET* (CHRYSOPRASE)

The stone which belongs to the seventeenth degree of the sign of Taurus is called *zauarget* in Arabic and *prasme* in Latin (chrysoprase). In color, it is similar to emerald, and it is found in the same goldmines where those are found, but it is also found in other mines. Its complexion is that of earth and stone. By nature it is cold and dry and its green color and brilliance are much better than those of the other emerald.

The virtue of this stone is such that when it is tied to a woman's thigh at the time of giving birth, it will allow her to give birth easily and without any danger. And it does yet another thing: it makes whoever wears it on his person lose the fear of being alone at night. This is so because it greatly strengthens and comforts the heart.

This stone has great enmity for the other stone we spoke about, the one which in Arabic is called *adehenie* and in Latin *green jasper*. They are both of the same color, but *prasme* is the better of the two and the more beautiful one. To show how these two stones dislike each other, they should be placed close together: in a short while, there will be black spots in the *prasme* and the emerald will do the same to the stone called *dihenie*.

The star which is on the heel of the right foot of the figure of Perseus has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ALAMBARI*

The stone which belongs to the eighteenth degree of the sign of Taurus is called *alambari*. This stone is cold in the third degree and dry in the beginning of the second degree. It is found in mines of clay. Some of these stones are big, others small, but their shape is always round. The stone's color is a very pure yellow, but in some there are green spots, and these are the best ones and of the greatest virtue.

This stone is strong and very hard to break. Its virtue is such that whoever has it in his mouth will not get drunk from the wine he drinks, nor will the wine harm him as it does the one who does not have it. It has the same property when it is carried about, but its virtue is not as strong as when it is held in the mouth. When placed in a cask or a jar, or any other container of wine, it will take away the wine's power to cause drunkenness, but without taking away its taste, and it does the same to the wine that men drink. For this reason, in the land of Occident, where this stone is found, people are wont to hang it around the necks of children, so that they might drink wine in order to grow better, without it doing them any harm. For the same reason, they enchase the stone in their cups and other vessels used for drinking, for the wine tastes good and does not cause them any harm.

The star which is at the base between the horn and the northern ear of the figure of Taurus has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *QUERC* (AGATE)

The stone which belongs to the nineteenth degree of the sign of Taurus is called *querc* (agate). It is found in the land of India, on the seashore, when

great winds come and make the waves wash them up. By nature it is cold and dry in the third degree and its color is a very bright white. This stone is soft, so that it can be readily shaped on a potter's wheel, so that the potters use it to make small flasks and other things. When it has been worked, it is white and clean, similar to polished ivory, and the vessels made of this stone are very highly valued in the land of India. It is also worn in rings and on clothing, for it is believed that its virtue is such that whoever has it on his person cannot be harmed by the evil eye or works of necromancy, or by anything known as casting spells.

This stone does yet another thing: when one places it in a vessel that contains vinegar, leaves it there for a whole hour, and then takes it out and places it away from the vinegar, at a distance proportionate to the attracting power of a stone of that size, and then makes a small canal through which the vinegar can flow, the stone will attract the vinegar and absorb it. While being absorbed, little bubbles of vinegar will form in the stone and in this manner, the stone can take up vinegar ten times its own weight, and then it will break.

The physicians of that land grind this stone and put it into medicines for eyes, for its virtue is such that it will make disappear the white stain which forms in the eyes and which is called "the cloud." It will work on any animal who has the stain and especially on man, because he is more apt to take the medicine.

The third star of the nine that are on the sleeve that hangs from the left hand of the figure of Orion and which is positioned at midday has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE *COTTON STONE* (ASBESTOS)

The stone which belongs to the twentieth degree of the sign of Taurus is called *cotton stone* (asbestos). By nature it is cold and dry. Its color is white, but not very, so that it tends toward that of light ashes. Some of these stones are big, while others are small. This stone is light of weight, but despite this, it is strong and hard to break, and when it is broken, a substance is found inside that both in texture and color is like cotton.

The virtue of this cotton is such that fire does not burn it, and it is spun and made into cloth like the other cotton. When it gets dirty, it is placed in fire and it comes out clean and bright, as if it had been washed, and the longer it is

in fire, the whiter and more beautiful it becomes. The physicians of that land burn it, make it into powder and put it into eyes, because it stops tears and all wateriness in the eyes.

Some of these stones are big, others small, and they come in many shapes. They are found in the mountain of Moon, where the Nile is born, in the depth of some caves. But the caves are so deep that whoever descends into them and stays for a long time, will either die or become paralyzed. Those who know how to gather these stones, take them as soon as they get to where they are and come out, and when they have come out, others go in. They get the stones only in this manner.

The two stars, one southern, the other northern, which are in the front line of the quadrant that is on the ears of the figure of the Hare, and also the star which is on the left heel of the figure of the Man Who Has the Reins have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE *STONE THAT FLEES FROM WINE*

The stone which belongs to the twenty-first degree of the sign of Taurus is the *stone that flees from wine*. It is cold at the end of the fourth degree and dry at the beginning of the second degree. This stone is strong and hard to break, and it is shiny and of many colors, so that the many different ways the colors are mixed make it look to those who see the stone as if there were letters written in it. It is found in the sea called Alcuçun (the Red Sea), close to the island called Uauac. The island has this name because, according to Ptolemy, on the trees of that land grow fruits in the shape of women that hang by their hair, and while they are green and in the trees they are alive and keep saying "uacuat," but when they age, they fall down and die. Close to the island of said name there is a place where it is possible to walk along the shore for a distance of twelve *migeros*, and this is where the stones are found mixed in the sand. Some of them are big, others small, and they are of different shapes. They are highly valued in those lands for their clarity and beauty. The kings wear them in their crowns and rings and in other noble adornments.

The virtue of this stone is such that whoever wears it on his person will not be affected by the imagination which men call "the demon" (epilepsy), nor will he fear to be alone in the dark at night. It also has another virtue: by nature, it abhors wine so much that when it is put together with wine, it will jump and flee from it with great vigor. This stone shows yet another marvel, for

when it is burnt and turned into ash, all the colors that the stone had before appear in the ash afterwards. And this ash has the property that when a cupful of it is added to a cask of wine, no matter how strong the wine, it will ruin it, turning its substance and color into those of water. Moreover, when mixed with dog urine so as to make a paste and rubbed on sores, it will make the sores go away after the third application, provided that the sores have not entered the bone.

The two stars, one northern, the other southern, which are on that horn of the figure of Taurus which is toward the midday position, have power over this stone. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *ATARRAZ*

The stone which belongs to the twenty-second degree of the sign of Taurus is called *atarraz*. By nature it is cold and dry, and very strong in these two complexions. But the people of the land where it is most often found call it the *stone of the hare* for the following reasons: in the place where the great river of the Nile enters the Mediterranean Sea lives an animal which in all its members and in all its aspects looks like the hare that lives on land, and for this reason it is called *seahare*. The nature of this animal is such that, when the sea surges forming great waves and goes up the Nile churning up the waters, he comes out, opens his mouth and swallows as much of this water as he can; after he has swallowed the water he lies down in the sun on the river bank and, with the great heat that the animal has inside and the heat that he gets from the sun, a stone starts to form inside him. When he feels that the water inside him starts to thicken, he enters the sea; from the sea he returns to the river and from the river, to land. This he does repeatedly, until he feels that the water has set and turned into stone. When he feels that the stones are dry and hard, he comes to the land and vomits them out. It is because of this that these stones are found on the banks of the Nile and on the shores of the sea.

The color of this stone is very green, and it is so hard that it cannot be broken with anything. Because of this, it is called *rofolez* in Chaldean, which means *a thing that cannot be broken*. It is heavy for its size, but the biggest one that can be found does not weigh more than two drachmas. Some of these stones are round, others oblong, and the latter are the best.

Learned men have tried many ways to break this stone, but could find only the following one: take the living hare, crush it, and squeeze it hard, so as

to get out as much liquid as possible; place this liquid in a container, made either of glass, soldered copper, or silver; add the stones, covering them with the liquid, and close the container tight, so that no other moisture can enter; when this is done, hang the container in a well of fresh water so that it does not reach the water, and cover the opening of the well tight, so that neither the heat of the sun nor anything else can touch it; leave the container in the well for forty days, then take it out, and all the stones will have been destroyed and turned into water. The virtue of this water is such that when it is used to rub those places where hair has either been pulled out or scraped off, it will prevent the hair from growing back. For this reason, the physicians of that land use it to cure those who have the disease that makes hair grow in the eyes, which hinders sleep and vision.

The two stars, one southern, the other northern, which are in the quadrant of the ears of the figure of the Hare, have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *ALIAZA* (ONYX)

The stone which belongs to the twenty-third degree of the sign of Taurus is called *aliaza* (onyx), of which there are five kinds: the first is white; the second, black; the third, green; the fourth, the color of tin; and the fifth, a mixture of colors. Learned men have spoken about each one of them in the proper place, about where they could be found and the virtues and the properties they have. Above all, they found them to be very hard, with only a few stones that are as hard or harder. Therefore, when they are pulverized and their powder is used to polish other stones, they will make them clear and give them good color.

In the language of the land where these stones are found, the name *aliaza* means *lessening of good*, for their common virtue is such that whoever wears one feels great fear without any cause and without knowing why. Besides, it makes him be disliked by other people, so that they will speak ill of him without any reason, scorn him, and avoid his company.

All five kinds of *aliaza* have the properties of which we spoke, but the first stone about which we shall speak is the one that is black and very shiny. By nature it is cold and dry. Whoever wears it shall always have worries and sadness, and at night, when asleep, he shall have bad and frightening dreams. Moreover, it is a deadly poison: when a certain amount of the pulverized stone

is steeped in wine and given in a drink to a man or a woman, it will shred his or her lungs, making them into pieces. They will remain like this until the person dies, and very few can last longer than two days.

The star which is on the left upper arm of the Man who has the Reins and which is called the Goat, and the other two which are on the same upper arm of the same figure and are called Kids have power over this stone. The stone receives its virtue from these stars and works best when the stars are on the ascendant.

ABOUT THE STONE CALLED *IRON ORE* (LIMONITE)

The stone which belongs to the twenty-fourth degree of the sign of Taurus is called *iron ore* (limonite). Since it is a metal, it is a mineral stone. Iron ore is found in many parts of the world and there are many mines of it. Men put it in most tools they use for work and in many kinds of arms. To work it, it is placed into fire and heated and then shaped as wished. It is one of the best known stones used by man. Some of the stones are soft by nature, others hard, and there are some that, the longer they are kept in hot water, the harder they get, whereas others get softer. There is an iron ore which, when one adds to it some substances at the time of founding, becomes so hard that it will cut other irons. This the Moors call *alhinde* (steel), while in some countries it is called *andanico*. And there is another one that is not made strong through skillful working, but is strong in itself, so that it will cut softer iron; this is called *azero*. This stone is well-known to all men and no one can do without it. By nature it is cold and dry and its color, when it is taken out from under the earth and duly prepared, is brown and black, but more black than brown. This stone is easy to brighten up and it also tarnishes easily, but it tarnishes more easily than it brightens up.

The virtue of this stone is such that when it is heated in fire, then reduced in water or wine and given to drink to the person who suffers from persistent diarrhea, it will be very good for him and help him get well fast. It will do the same for someone who has ulcers in the intestines, an abscess in the spleen, or weakness in the stomach due to loose bowels or a lot of vomiting. Besides, the physicians make use of its ground slag and of its filings to make powders, which they put in medicines and potions, for it helps in many illnesses.

The star which is on the handle of Orion's sword has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ARTICAM*

The stone which belongs to the twenty-fifth degree of the sign of Taurus is called *articam* in Chaldean, and some call it *artiqui*, while the Greeks call it *astra*. It is found in the land called Artica. These stones are small and yellow, the brightest yellow being the best. This stone is light of weight because it has many open pores. When it is burnt it becomes red, and it is so soft that it can be broken with the fingers. By nature it is cold and dry and when it is put on the tongue, it sticks to it. When it is pulverized and made into paste with warm water, and placed on inflamed abscesses, it cools them and helps cure them. It does the same with sores and wounds that are very inflamed, because, in cooling them, it lessens the pain they cause; besides, it takes away the excess flesh that grows in them. It has another marvelous property, in that when it is put in a container with another stone called borax, the borax will break up and become powder, which will receive great virtue, as we shall show later, at the end of the place where we shall talk about borax.

The foremost one of the four stars which are in a straight line on the spine of the figure of Orion has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE WHICH IS FOUND IN THE HARE'S HEAD*

The stone which belongs to the twenty-sixth degree of the sign of Taurus is the one found in the head of the hare of which we spoke. When the hare is killed and its head is abruptly cut off, the stone is found inside, either in the brain or attached to the bone. By nature this stone is cold and dry, and it is light of weight because it is porous. It is rough to the touch, and its color is brown with red spots. It is counted as one of the stones which are found in animals.

The virtues of this stone are few and they are harmful, for its property is such that when it is placed next to the flesh of any live animal, it will attach itself to the flesh and tear it away and, depending on the amount of flesh it takes, it leaves a big, bad wound. This wound is slow to heal and if the animal is not given any medicine, it can die. The stone acts the same when it is placed next to dead flesh, and if a large quantity of the pulverized stone is given to a person in a drink, it will wound his intestines and, if the person is not helped, he will die.

The star which is on the left shoulder of the Man who has the Reins and who is called *Alayoz*, and another one, which is on the right heel of the same

figure and which location, that star and the northern horn of Taurus have in common, have power over this stone. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE *STONE FOUND IN MAN*

The stone which belongs to the twenty-seventh degree of the sign of Taurus is the *stone found in man.* Like the other stone about which we spoke, it is counted among the stones found in animals, but with the difference that the *stone found in man* is formed inside his body, to wit, in the bladder or in the kidneys, while in the other animals they are formed either in the head or in the extremities. As learned men have explained, other animals have wide ducts through which thick humors can flow and go out with urine; but in man the ducts are narrow and the humors cannot flow so easily, and stopping in the place where the heat is the greatest they thicken and become solid, because one humor ends up on top of the other. It is for this reason that, when the stone is big, it is in layers, one over the other.

This stone is brittle and breaks easily. The color of some is very red, others are white or yellowish, and yet others are brownish, and in those that are well heated there is a kind of light, like in gypsum. The stone is not formed alike in all men, for in some it is white, in others red, or some other color that we mentioned. Besides, even in those in whom the stone is red as it forms, at times it changes color, depending on the places in the body where it hardens, the foods that are eaten, the humors that make it up, or the times when the hardening takes place.

The stone has the following virtue: when pulverized and well sifted and put in the eyes of those who have the blemish called *cloud*, the stone will detach it. However, it does not do this right away, but after using it over a period of time.

Two of the three stars which are at the hilt of Orion's sword, the northernmost and the middle one, have power over this stone. The stone receives its virtue and power from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *LOTARICAN*

The stone which belongs to the twenty-eighth degree of the sign of Taurus is called *lotarican*, which means *holder back of nature*. By nature it is cold and dry at the end of the fourth degree of each of these two complexions. This stone is hard to break and it is not always the same size, for there are big and small ones. It is found in the land of Armenia, in some clay mines, where it shows up when digging takes place. The stone's color is a mixture of red and yellow, each of these colors being pale, so that it looks the color of water that comes out of meat when it is salted. When taken out of the mine, this stone is very dull, but when polished, it will become quite shiny, though not transparent.

The virtue of this stone is such that when it is hung on a person who has diarrhea, it will make it stop right away, so that while he has the stone on his person, he cannot pass anything, and if he is given a drink with some of the dust left from polishing the stone, it will do the same thing. When put into the eyes of a person whose eyes are runny with tears or with some other discharge, it will also stop them from running, for the stone's power to hold back all moisture is marvelously great.

The star which is at the tip of that horn of the figure of Taurus which points toward midday, and the one on the head of the figure of Orion, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *ALIAZA*

The stone which belongs to the twenty-ninth degree of the sign of Taurus is called *aliaza*, and this is the second kind of stone of which we spoke, and which is green. Yet the green color is not very strong, but tends somewhat toward yellow. For the most part, it is cold and dry, and its property is abhorrent, like that of other stones of the same nature. This stone is very commonly found in the land of Arabia, but the Arabs take great care to keep away from its mines.

The virtue of this stone is such that if it is hung on a child when he is small, it makes him cry and slobber a lot. Those who do not know this, use it to make cups and bowls for eating and drinking. The nature of the stone makes those who use the cups and bowls much lose sleep, and if a person drinks from them a lot, he will stay awake until he dies. If he is given help using things that

serve to cure this ailment, he can be saved from death, but he will never be able to sleep as well as before.

The rearmost of the three stars that are on the waist of Orion has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *CAMIRUCA*

The stone which belongs to the thirtieth degree of the sign of Taurus is called *camiruca*, which in that language means the same as *forgetful* in this one. By nature it is cold and dry, and its color is red, mixed with green. It gives out rays which reflect back on themselves, as they do in a mirror; therefore, it is beautiful and people value it highly when they see it, but they do not know its virtue. This stone is strong and hard to break, and it is heavy for its size. It is found in the land of Arabia, where there are mines of it, but the people of that land abhor it so much that they do not want to use it for rings, nor do they use it for anything else. They do not sell this stone to each other, but send it to be sold far away, to other lands where it is not known, and there it is bought a lot because of its beauty.

The virtue of this stone is such that whoever wears it on his person forgets all the things he has to do, and he will not remember any of them while he has the stone on him. And when he is given its dust or its particles in a drink, he will forget those things forever, until he dies. Another strange virtue, used a lot by women who wish to do harm, is that when one takes its powder, mixes it with a liquid and inserts it into women who are not virgins, it will tighten them in such a way that they will be harder to penetrate than the ones who are still virgins.

The southern one of the two stars which are on the hind feet of the figure of the Hare has power and dominion over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

IV. ABOUT THE SIGN OF GEMINI

PROLOGUE ABOUT THE DEGREES OF THE SIGN OF GEMINI

We have shown the thirty natures of the stones which correspond to the thirty degrees of the sign of Taurus, and we have talked about the powers they receive from the other fixed stars which are in the figures that are in partnership with this sign and connected to it. Furthermore, whoever wishes to use this work must pay attention to the planet Venus, whose house is the sign of Taurus, and he must make sure that it can be easily perceived, either by sight or because of its proximity to the precise place where the stars of the same degree are located. Also, he must pay attention to the decan of the decanate, making sure that it is, at that time, in a good position and in possesion of one of its powers. All these things must be kept in mind when doing works that are good, and for those that are bad the opposite is true. But now we shall return to our intent to speak about the thirty degrees of the sign of Gemini.

ABOUT THE STONE CALLED *ZAROCAN*

The stone which belongs to the first degree of the sign of Gemini is called *zarocan*. Its color is white, of a bright whiteness that looks like that of a well-scraped bone, and it is quite clear, but not as clear as to be transparent. It is light of weight and very soft to the touch, but strong and hard to break. By nature it is hot and wet. There are many mines of this stone in the world, but the best ones are in the land of Barbary and in Spain, and they can be found on the seashore and on riverbanks.

The virtue of this stone is such that it greatly increases milk in women who wear it, as it does in all animals. For this reason, the Berbers make their women wear it around the neck, like pearls. It does the same thing when mixed into confections and given to eat. It is also good for melancholy and very useful for abcesses that form in the eyes.

The star which is at the end of the Little Bear, the one called the Kid of Benanays, has power and dominion over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE OF GOLD*

The stone which belongs to the second degree of the sign of Gemini is the *stone of gold*. By nature it is hot and wet. It is the noblest of all metals,

because in it, the nobility and the virtue of the sun appear to be most evident. Men love and appreciate this stone greatly. It is very heavy, heavier than any other stone found either in the mines or above ground. Small pieces of it—never big—can be found in the sand, either in the sea or in rivers. It is found in many parts of the world, but the best is found in Spain, which is part of the Occident. The color of this stone is yellow, which, when the stone is cleaned and polished, becomes more yellow and clearer, but not so as to be transparent. And when it is polished a lot, it becomes so clear that one can see oneself in it like in a mirror.

The virtue of this stone is such that when the particles that are given off when it is polished are mixed with something which is given to eat or to drink to someone who has trembling or weakness of the heart, it will help him, and it will also help the one who is fearful due to melancholy. It also cures, or helps greatly, the person who has either ringworm or another disease, called alopecia, which makes the hair fall out. Moreover, it is good for cautery, for it does not cause blisters and the healing is faster.

The nature of the stone of this metal is such that, when mixed with copper, it becomes like glass and breaks, but it fuses with it. Also, when mixed with tin, it turns black, and when mixed with silver, it takes on its whiteness, and so on, taking on the color of every metal with which it fuses. For this reason, those who work in alchemy, which is called "major works," have to bear in mind that they must not hurt the name of that science, since alchemy means mastery to make things better, not worse. Hence, those who take noble metals and mix them with common ones, understanding neither the science nor the mastery, cause damage to those which are noble and do not better those which are common. In this they commit two errors: one, they go against God's knowledge; the other, they do harm to the world. But when gold has been damaged with a common substance, it must be mixed with marcasite and sulphur must be added when smelting it, for this will separate it from all other metals and clean it of all impurities. This is so because sulphur will burn all other substances when it is with them for a long time, but it will not burn gold. Marcasite also has the nature of sulphur and because of this it is used to dye red copper the color of gold; it does the same to silver, if one knows well how to mix it with silver, but these results do not last.

What can we tell you! The noble qualities and the virtues of gold are so many that it would be a long tale..., but there are some obvious ones, such as ...[missing text] when men see it, it gives them...[missing text] heart and when they have gold, they think of themselves as being richer than when they have anything else. Moreover, they use gold more often than any other metal to make

things which they wish to be noble and luxurious. Gold also has many uses in the art of medicine, all of which cannot be told in this book.

Gold has one single, very marvelous property: when one makes a ring from it in which the stone is also gold, heats it, and uses it to burn doves' wings before putting them in a dovecot, they will never go to roost in another place, even when their wings grow back. Some have argued against this property, saying that it is in the form of the ring and not in the gold and that if it were in the gold, it would act the same, no matter what the form. But he who composed this book said that he believed the virtue to come from both, since the ring alone could not do this when made of a metal other than gold.

There are some golds that naturally have bad color and some of the wise men who worked in alchemy said that if one takes the yellow stone—the one which is well-known to goldsmiths and about which we shall talk later in this book, in its proper place—pulverizes it and throws its dust on molten gold, it will turn gold's color good. This is one of the works of alchemy that is right and true, for it makes that which is bad, good.

The star which is on the right shoulder of the figure of the Man who has the Reins has power and dominion over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *BARCADUNITICAZ*

The stone which belongs to the third degree of the sign of Gemini is called *barcadunitycaz*, which in Chaldean means *swallower of oil*. This stone is very hot and wet, but not very wet. The mines of this stone are found in many places. Even though the stones found in the land of Baracin are good, the ones found in the Promised Land are better and show their virtue more clearly. There are many open pores in this stone and hence it is rough on the outside. Despite this, it is heavy, strong and hard to break and when it is broken, it looks like a sponge inside. Some of these stones are very big, others middle-sized, while yet others are small, and in color they are a yellow that tends toward brown.

The virtue of this stone is as follows: when placed near any kind of oil, it attracts the oil and absorbs it in the amount equal to its size and weight, and it attracts the oil, either from a distance or from nearby, also according to its size and weight. When the stone is left close to oil for a long time, and the stone is good, it will attract even more oil than its own volume. This can be proven by first weighing the oil and the stone separately, for in this way one can clearly see

that the stone has attracted more than its volume. To separate the stone from the oil after the stone has incorporated it, the stone must be placed in a container filled with vinegar, and all the oil will come out.

When pulverized and mixed with water, this stone will make oil spots go away from any kind of cloth soiled with oil. It will do yet another thing: when pulverized and mixed with its weight of oil, and cooked on a low fire, it will incorporate the oil to make a kind of ointment. This ointment is a very good medicine for abscesses, for it makes them mature fast and drain, and it will eat away the bad flesh that forms in the abscesses. When ground up fine and sifted, it is also very useful for the abscesses that form in the eyes.

The two stars, one southern, the other northern, which are on the head of the Man who has the Reins, but with the northern star above his head, are the ones that have power over this stone. The stone receives its power and its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE *STONE THAT ATTRACTS FLESH*

The stone which belongs to the fourth degree of the sign of Gemini is the *stone that attracts flesh.* It is found in the sea called Alcuçun (the Red Sea), the one through which passed the sons of Israel. Its color is that of bruised flesh. It is soft to the touch and light of weight, and its nature is hot and wet.

The virtue of this stone is such that when it is placed close to the flesh of a live animal, it will attract the flesh to it, but it does not do it with dead meat. In this it differs from the stone we said was in the hare's head, which attaches itself to both live flesh and dead meat and pulls the flesh, causing pain and bleeding and creating a bad sore. This stone does not do these things, but whoever wears it a lot, even though he wears it on top of his clothing, for it heats the body, will find that, in the place where the stone touches the body, his flesh will be somewhat hurt and bruised. This is the only virtue this stone was found to have by those who experimented with it.

The star which is at the end of the tail of the figure of the Hare has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *MARGUL* IN CHALDEAN

The stone which belongs to the fifth degree of the sign of Gemini is called *margul* in Chaldean. By nature it is hot and wet. The mine of this stone is located in the Mountain of the Moon, where the river Nile is born. It is a strong stone and hard to break and it is somewhat shiny, but not transparent. The stone's color is like that of an egg yolk, and when it is broken, a damp substance is found inside, which sticks to the hands and smells very good. When this is used to anoint sores, or discolorations that form on the face, it makes them go away and leaves the body smooth and radiant. This damp substance has another virtue that is very good for bridegrooms. If, when they lie with their wives, they anoint with it the virile member with which they are to beget offspring, it will make the member grow, so that it will be longer and bigger. All this is done by the dampness that is inside the stone. The outer part of the stone, which is like a shell, is very good when ground into powder and mixed into the confections made for opening the ducts of the liver. It will open the ducts and undo the obstructions that occur in them, and bring about a fast cure to the person who suffers liver disease due to the obstruction of the ducts. The stone does another very strange thing: when placed in fire, it will dissolve and run like water; and if it is then caught and cooled, and placed into fire again, it will return to its original nature. This it will do as many times as it is placed into fire, dissolving and congealing, but each time becoming more refined, so that it will become somewhat smaller.

The front one of the two stars which are on the rudder that faces the north side of the figure of the Ship has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *LURITA*

The stone which belongs to the sixth degree of the sign of Gemini is called *luryta*, which means *oily*. It is hot and wet, soft to the touch, and easy to break. Its color is that of a white rose which has some red mixed into it. The mine of this stone is in the Promised Land, in some very deep caves. They are recognized in the following manner: when the sun shines upon the openings of these caves, the stones are seen shining deep inside, like burning candles. People of that land use this stone to make utensils, and those who eat and drink from them will gain a lot of weight, their faces and bodies will have good color, and men will feel increased desire to lie with women, and women with men.

When this stone is cleaned and polished, the substance rendered by the polishing is like oil in all its qualities. It burns and gives light like oil, but it does not float on water like oil does; rather, it goes to the bottom.

This stone is very useful in the art of medicine, for when it is pulverized and given in a drink to someone who has consumption or who has ulcers in the lungs, he will get well, and the same is true when its dry powder is used.

The star which is on the right upper arm of the figure of Orion has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE OF THE SERPENT*

The stone which belongs to the seventh degree of the sign of Gemini is the *stone of the serpent*. It is found on Mount Sinai. Its color is a very dark red, so dark that it is almost black. Some of the stones have in them a white spot, and those are the best and the noblest ones. When the stone is placed in fire, this white spot grows larger and the stone becomes clearer, until finally it becomes very clear and shiny. This is not true when the stone is taken out of the mine, for then it is murky; it is the fire that makes it clear and shiny. The stone comes in many shapes, some of them large, others small. They are heavy and difficult to break, but men work them and give them whatever shapes they wish.

By nature this stone is hot and wet in the second degree of its complexion, and its virtue is such that when hung on the neck of someone born with epilepsy, it will cure him. It will do the same for the person who has the disease called forgetfulness, which is the result of a diseased brain. This stone has yet another virtue in that when it is passed over a snake bite, it cures the bite. It does one more strange and marvelous thing: when placed in a fire which does not burn well, it makes the fire burn brightly, as if somone had blown on it; and when a candle is going out and the stone is placed close to it before the flame has died out completely, it will light up.

Two stars, the front one and the one next to it, which are on the southern line of the quadrant that is on the right palm of the figure of Orion have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE *STONE OF SLEEP*

The stone which belongs to the eighth degree of the sign of Gemini is the *stone of sleep*. By nature it is hot and wet and it is found in the sea called Alcuçun (the Red Sea), on the shores of the island called Alycuat. Its color is very red, and it is very clear and shiny and transparent. It is strong and hard to break, so that it can be broken or polished only with a lot of work; nor does fire affect it in any way. During daytime, there is movement within the stone, but it does not move from one place to another. When one stands in front of the stone and pays close attention, it will seem to him that it gives off a dust-like smoke. At night, the stone is clear and like fire, and it lights up a large part of its surroundings. When those traveling that sea close to the island of which we spoke see that light, they will know that it comes from this stone. They will go toward the light and search for it until they find it and then take it.

Some of these stones are big while others are small. The stone's virtue is such that whoever has on his person one that equals the weight of one drachma or more, will sleep three days and three nights. When it is taken from him, he will wake up completely as he should, but if he wakes up with the stone still on him, he will be drowsy, as if drunk, and will go back to sleep. This will go on until the stone is taken away from him. The stone will act the same way when placed under the head of the one who goes to sleep. Physicians and surgeons use this stone to alleviate the pain of those they want to open up and cut, and it will do the same for those who cannot bear the great pain caused by some disease they suffer. But there is a difference between the sleep caused by this stone and natural sleep: the latter does not swell the head with vapors, nor does it make the sleeper wake up tired.

Of the two stars which are on the northern line of the quadrant that is on the right palm of the figure of Orion, the one which is toward the back has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *BEZAHAR* (*BEZOAR*)

The stone which belongs to the ninth degree of the sign of Gemini is called *bezahar* (*bezoar*). This stone is highly valued and very noble, and it comes in many colors: some are light yellow, others brown, and so on. Each has its own color, as we shall demonstrate later, in the appropriate place. The best of these stones are found in the land of Çin, of India, and of Horaçin. The one about which we shall speak here is the best and the noblest of all. Its color

is a brown that tends toward yellow, and in Greek it is called *ubericulequyn*, which means *taker away of poison*. This stone is made up of subtle parts of the elements. By nature it is hot and wet, but not very much so in either of these two complexions, and its body is soft and easy to break.

The virtue of this stone is that it is against all poisons, the ones that do harm without killing as well as those that kill; against those of the earth, as well as those found in animals. It is also against the bites and wounds caused by all poisonous animals. It does good in the following manner: if half a drachma's weight of the pulverized stone is given in a drink to the person who has drunk some kind of poison, it will make him sweat the poison out and he will be cured. And if one touches with the stone a wound or a bite caused by a poisonous animal, it will help, but not as much as when the stone is pulverized and then put on the wound. If the site of the wound or of the bite has gone bad before any medicine has been used and the powder of this stone is then put on the wound, it will be cured promptly. The stone shows its virtue in yet another manner: if one takes a scorpion and touches its sting with this stone, the scorpion will lose the ability to wound forever. Also, if half a drachma's weight of the pulverized stone is thrown into the throat of a viper or a snake, it will choke and die. The throats of the poisonous snakes are wider than their bodies, and the wider the throats, the more poisonous the snakes. Yet, the virtue of this stone works so strongly against them, that it will tighten their throats so as to choke them to death. Learned men talked a lot about the nature of poisons, but they wrote it down in as few words as possible, so that only other learned men would understand it. They said that poison does not kill so much due to the cold or the hot complexion it may have, but because of the power of the bad virtue, which it has in abundance. This bad virtue goes directly to the blood of the heart and of the liver, freeing it and making it run more than it should, and making it pale, like the water in which meat has been rinsed. Moreover, it goes into the veins in which blood runs, captures the spirit that flows in them and pushes it so hard that it will leave the body. In this manner, it will kill a person if he is not helped with the medicines that serve this purpose. If there is a delay and the person is not helped quickly, he will die, regardless.

The learned men, who talked about the art of medicine, wrote about this in their books very extensively, but the one who composed this book did not wish to dwell on it. Instead, he went back to talking about this stone, saying that many men are mistaken about it, for they do not know it well and because there are other stones which are similar to it. One of them is called *çafilly*, another one *almamar*, and yet another one, *maduz*. But although these stones are similar to *bezahar* in color and softness and even in weight, they are not like it in their virtue and their works. Each of these stones will be discussed later in this book

as to how they look, how they differ from each other and how they can be told apart.

The star that follows the one which is on the foot of the front Gemini figure and which seems to be at the spot where the leg begins, has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE SECOND KIND OF THE STONE CALLED *BEZAHAR* (*BEZOAR*)

The stone which belongs to the tenth degree of the sign of Gemini is the second kind of *bezahar* (*bezoar*). It is found in the land of Çin. Because of its yellow color, it is called *yellow bezahar*. There is no turbidity in it, nor anything else to mar its color. By nature it is hot and wet in both of the two complexions, but it is stronger than the other *bezahar* and harder to break. This is so because the parts of the elements of which it is made are not as fine as the ones which make up the other one. This stone has a great virtue which is useful against some poisons, such as that of the scorpion, for when it is worn over the wound inflicted by a scorpion, it will heal it. The same is true when it is given in a drink. The stone does yet another thing: whoever wears it on his person will not be harmed if bitten by a rabid dog or any other poisonous animal. For this reason, it is counted among the precious stones.

The star which is at the end of the Great Dog's right foot has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *BEZAHAR* (THE THIRD KIND OF *BEZOAR*)

The stone which belongs to the eleventh degree of the sign of Gemini is called *bezahar*. This stone is found on the islands of India, and it is the third kind of *bezahar* about which we said we would speak in this book. Its elemental make-up is fine, but not as fine as that of the others about which we spoke earlier and, according to its nature, it is not as noble as those. By nature it is hot and wet, and its color is a brown that has no shine whatsoever.

The virtue of this stone works against poisons other than those born of the earth, such as mandrake and henbane and others of that kind, because they

are cold by nature. Whoever has been given poisons to eat or to drink will be helped by this stone when it is given to him in a drink, and he will escape death and get well. This stone has yet another virtue. When it is hung on the person who suffers from the illness called weakness, which is caused by melancholy, it will cure him. Likewise, it will cure another illness called freezing, meaning numbness of the extremities due to cold.

The star which is on the right foot of the front Gemini figure has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *COLOQUIA*

The stone which belongs to the twelfth degree of the sign of Gemini is called *coloquia*. It has this name because it is found in the mines on an island called Col. This stone is yellow in color, but some of the stones are yellower than others. In size, some are big, others small. It is strong and hard to break, so that it can be broken only with a lot of work. The stone is dark and dull, but when cleaned and polished, it becomes clearer, yet not clear enough to be transparent. By nature it is hot and wet.

Philosophers value this stone very highly, for its virtue is such that it sharpens the understanding and the wits of the one who wears it on his person, so that nothing will be hard for him to understand or to learn. And it has the same effect when it is pulverized and taken mixed in a drink. The ancients gave it to drink to young men before they became of age, for they saw that this made them grow in wisdom and understanding, so that whatever they heard they learned right away and never forgot it. Moreover, when those who have the disease that makes them forget things, wear this stone on their person, they will be cured.

The star which is at the end of the Great Dog's front paw has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE THAT ATTRACTS WINE*

The stone which belongs to the thirteenth degree of the sign of Gemini is the *stone that attracts wine*. By nature it is hot and wet. It has open pores and is very light of weight, but strong and hard to break. When broken open,

it is like a sponge inside. The color of this stone is that of lemon oil yellow, mixed with white. It is found in the mines on the island called Uacuac. Some of the stones are very large. He who composed this book said that he saw one which weighed two *arrobas*, but that despite this it was light for its size.

The virtue of this stone is such that when it is placed close to something which contains wine, it will attract and absorb the wine according to its weight. It does the same from a distance and for this reason, it is counted among the magnets, which means attractors, for they attract with great force the things they must attract due to their property. And if one wants to know how much wine the stone has absorbed, one has to take it after it has absorbed the wine and either put it in the sun or close to the fire, and all the wine it absorbed will come out. When this wine is caught in a container held ready for it and weighed, it will be found that the stone had absorbed its own weight. The stone does yet another thing: when placed into wine to which water has been added, it will attract only the wine, leaving the water behind.

If the stone is placed into fire, it will enclose in itself the fire which will burn the stone, converting it into lime, the same thing that happens with other magnets that are attractors. And when water is thrown on this stone after it has burned and been converted into lime, the stone will burn again. It does yet another thing in connection with wine: when it is pulverized and added to either a cask or a tumbler of spoiled wine, it will undo the spoilage and restore the wine to its original state.

This stone does yet other things which are useful in the art of medicine: it is beneficial to the paralytics, and to those whose heads tremble, or who have some other disease of that kind. When it is pulverized and given in a drink, it will cure both of these diseases.

The star which is on the left foot of the second Gemini figure has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *TAROC* (ANOTHER VARIETY OF *BEZAHAR*)

The stone which belongs to the fourteenth degree of the sign of Gemini is called *taroc*, and it is another kind of *bezahar* (*bezoar*). It is found in the land of Ballac, in some mines that are known to be there. Some of these stones are large, others small. The color of *taroc* is a white which is somewhat turbid. It

is heavy in weight, strong, and hard to break. When polished with the powder of the stone which in Arabic is called *azumberic* and which we call *esmeril* (emery), it will become clearer and will be beautiful. By nature it is hot and wet.

The virtue of this stone is such that it acts against the poisons of animals which are not very poisonous, such as those of spiders, wasps, and horseflies, as well as the common poisons which are born of the earth. When given in a drink, it will bring about a cure right away, and when hung on a wound or a bite caused by these animals, it will take away the pain and cure it in a short time.

This stone does yet another very strange thing: when it is pulverized and mixed with strong wine vinegar, placed in an earthen jar, buried in the dung of large animals and left there for thirty days in summer, when the weather is the hottest, and then removed, one will find yellow worms in the jar. When the worms are burnt and their ashes are placed on the spot on a man's body which one wishes to burn, they will burn the same as fire, so that it will not be necessary to use anything else to burn him. Moreover, this burn will not hurt like a burn caused by fire.

The star which is on the left knee of the front Gemini figure has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *QUEDORITOZ*

The stone which belongs to the fifteenth degree of the sign of Gemini is called *kedoritoz* (sic), which means *attractor of worms*. By nature it is hot and wet. It has open pores, but is heavy rather than light of weight, and rough to the touch. When broken, it feels very rough at the line of breakage. The color of this stone is purple: rather like blue, but somewhat more reddish. Even though the stone is hard, it can be polished like other stones and when it has been polished, it looks smooth but is rough to the touch. More than anywhere else, this stone is found in the mines which are in the land of Arabia. The Arabs value it very highly and wear it in rings, and their women put it into strings of beads which they wear around their necks.

The virtue of this stone is such that when it is placed in the mouth of a person who has leeches in his throat, it will attract them like a magnet attracts iron. It will do the same for the person with leeches or worms in the intestines: when placed in the rectum, it will attract them and he will get well. Whoever

wears it on the belt with which he girds himself every day can be sure of not having worms in his body.

The star which is on the right foot of the posterior Gemini figure, as well as the front one of the two stars which are on the Great Dog's left knee, both being of the same nature, have power over this stone. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *SIPHE*

The stone which belongs to the sixteenth degree of the sign of Gemini is called *siphe*, which means *healing*. By nature it is hot and wet. Its color is yellow, but with purple lines in it which look like trees, and no matter into how many pieces the stone is broken, this figure will always be in it. This stone is strong and hard, and shiny. Some of them are large, others small and in weight they tend to be light rather than heavy.

The virtue of this stone is such that it heals the pain in the stomach and in the intestines when worn hanging over them. Moreover, if a person wears it before having this disease, he can be sure of not getting it, and when given in a drink to the one who already has the disease, it will heal him promptly. The stone was given its name because it gives such great relief and, for the same reason, it is held to be one of the most precious stones.

Of the three stars that are on the Great Dog's right knee, the one which descends toward midday has power and dominion over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE WHICH APPEARS IN THE SEA*

The stone which belongs to the seventeenth degree of the sign of Gemini is the stone that appears in the sea when Mercury rises and disappears when Mercury goes down. The sea is the one called the Mar Tenebrosa (North Sea), which is in the north, where there are stones of other planets which, according to this book, behave in the same way.

The virtue of this stone is such that it appears on the surface of the sea and disappears under water, and becomes clear or turbid, as do the other stones, each one following its planet. However, to the one who pays close attention, it

will seem that this stone obeys Mercury more than the other stones obey their planets, because when Mercury is under the rays of the sun, the stone will not become clear, even though it be above ground, whereas when Mercury is away from the sun's rays, the stone will become clear even when below ground.

This stone has a mixture of many different colors, is very shiny, and strong and hard to break. It is heavy and it appears in many shapes, but is always small in size. By nature it is hot and wet.

The virtue of this stone is such that it strengthens the extremities of the body, their movements, and also the senses of whoever wears it on his person, so that no matter what work he undertakes, he will not get tired. And it has yet another virtue: all animals will flee from the one who wears it on his person and none will get close to him as long as he has the stone.

The star which is on the left upper arm of the front Gemini figure, and the one which is at the base of Little Bear's tail, both being of the same nature, have power and dominion over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *HETORA* (FIFTH VARIETY OF *BEZOAR*)

The stone which belongs to the eighteenth degree of the sign of Gemini is called *hetora*. It is considered to be one of the varieties of *bezahar* (*bezoar*) which works against poison. It is a noble stone and highly valued, and it is found in mines which are in the land of Yemen. Some of these stones are large, others small, and they are strong and hard, and shiny. The color of *hetora* is a green that tends toward yellow. Its body is sensitive, for it changes with the air: it is clear when the air is clear, and turbid when the air is turbid. By nature it is hot and wet.

The virtue of this stone is such that when placed close to a container with poison, no matter which kind, it loses its clarity right away and becomes turbid, and something like a cloud forms beneath it. Because of this, men value it highly, for it protects them against the ills caused by poisons. The stone has been tested in yet another way: when it is pulverized and its powder is placed over a poison, it will boil like water over fire, and the stronger the poison, the harder it boils.

This stone has another very good virtue: when pulverized and given in a drink to a person who has blood or pus in his urine, due to an abscess in the

kidneys or in the bladder, or in the ducts through which the urine flows, it will cure him.

The star which is on the Great Dog's mouth, and which is called Alaabor, has power and dominion over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE WHICH IS FOUND IN THE BELLY OF THE SWALLOW*

The stone which belongs to the nineteenth degree of the sign of Gemini is the *stone which is found in the belly of the swallow*, and it is one of the valued stones formed in animals. Whoever wishes to find it has to take the swallow's first chick of the year, making sure that he does it during a waxing moon, and when the chick has hatched, he must open its belly; inside, he will find two colored pebbles. Most of the time, one of them will be green and the other white, but they can also be of many other colors. These stones are rough to the touch, hard to break, and small in size. By nature they are hot and wet.

The virtue of these stones is such that when they are placed inside the hide of a deer or a calf, and tied with a red silk thread around the neck of a person possessed by the devil, they will cure him promptly. But this virtue does not work if the two stones are not together, or if they did not come from a male chick.

These stones have yet another virtue: when they are pulverized in a gold mortar with a gold pestle, and the well-ground powder is placed in the eyes of a person whose eyes are not clear due to the water trapped in them, it will greatly improve his vision, and if he uses the powder regularly, he will be completely cured.

The star which is on the left upper arm of the front Gemini figure has power over these stones. The stones receive their virtue from this star and work best when the star is on the ascendant.

ABOUT THE STONE CALLED *KOLOQUID*

The stone which belongs to the twentieth degree of the sign of Gemini is called *koloquid*, which means *changing* or *convertible*. It has this name because, between day and night, it changes into many different colors. At times

it changes to white, or to yellow, to black, to green, and so on, to all colors. And it is so shiny that it is as if rays of fire beamed out of it. This stone is found in the sand, in the land of the Negroes. Some of the stones are big, others small, and they are strong and hard to break.

The virtue of these stones is such, that it seems to those who gather them in the place where they are formed, that they are being stoned. Because of this, only men who are very brave and bold, and who understand that what appears to be real is naught but fancy, dare go to the place where these stones are found and gather them.

By nature this stone is hot and wet. The property of which we spoke, and which does not appear in any other place except where the stone is formed, is even stronger at night, for whoever has it on his person at night when he sleeps, will dream that he is being stoned and must needs wake up and leave the place where he was lying. But if he only wears the stone by day and not by night, he can be sure of not getting the disease that comes from demons. This stone does yet another thing: when placed in the water in which the herb called *asafetida* has been cooked and left there for a day and a night, it will dissolve and take on the nature of water; and when hair is combed with a comb moistened in this water, it will be dyed black and this dye will last for a long time.

The star which is between the Great Dog's ears has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *TARMICON*

The stone which belongs to the twenty-first degree of the sign of Gemini is called *tarmicon*. This name, in Chaldean, is the same as *assabac* in Arabic and in Latin it is *lust for a woman*. By nature it is hot and wet. Its color is red, of a pale redness, like that of the water which comes out of salted meat. It is strong and hard and can be broken only with a lot of work. The stone has great aversion for silver, for when the two are placed together, the stone breaks up right away, while the silver turns the color of copper. This stone is found in the Promised Land, in mines which are at the top of the mountain called Xereha.

The virtue of this stone is such that when a man puts it into his mouth he will have an erection of his virile member and this will last as long as he has it in his mouth, and no matter how many times he lies with a woman, his

member will not weaken and become flaccid, nor will this do him any harm. And when the stone is pulverized with something moist and rubbed on the virile member, it will do its work with more vigor.

The star which is on the Great Dog's chest has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *GEMEZT*

The stone which belongs to the twenty-second degree of the sign of Gemini is called *gemezt*. By nature it is hot and wet in the third degree of both of these two complexions. It is soft, has open pores, is light of weight, rough to the touch, and is dark and without any shine. The stone's color is a yellow that tends toward red. It is found in many places, such as the Promised Land, Yemen, Çin, the island of Sardinia, and other lands.

The virtue of this stone is such that when a person has it in his mouth and takes a swallow of wine, he will become drunk and do all the things done by someone who has drunk a lot. And when this stone is pulverized and some of it is placed in a tumbler of wine, it will give the wine its virtue and the wine will cause drunkenness, the same as if the stone were held in the mouth. But this drunkenness lasts only a short time, and the body will not be as wrecked as it would be by other wines.

The star which is on the right knee of the back Gemini figure has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *CAMYULICAZ*

The stone which belongs to the twenty-third degree of the sign of Gemini is called *camiulicaz*, which means *keeper of horses*. This stone is found on the island of Çarandin. By nature it is hot and wet, but not very much so. It is strong and hard, light of weight, and its color is green mixed with some red, similar to the feathers on a peacock's neck. The stone has no shine to it when taken from the mine, but will become shiny when polished.

The virtue of this stone is such that a horse who sees it, cannot leave it; rather, it will keep looking at it and neighing until it dies, unless the stone is

hidden or taken away. Yet another virtue of this stone is that when it is pulverized and given in a drink to a paralytic or to someone who has the disease called stupor, it will cure him promptly.

The star which is between the shoulders of the front Gemini figure has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *MECELUCAN*

The stone which belongs to the twenty-fourth degree of the sign of Gemini is called *mecelucan*, which in Chaldean means *relaxer of nature*. By nature it is hot and wet, being strong in both of these two complexions. It is light of weight and its body is soft, so that it breaks very easily. The stone's color is a green which tends toward yellow. Very shiny when extracted from the mine, it loses its brilliance and becomes darker after it has been taken out. When polished again, it will recover its clarity, but if polished many times, it will diminish in size. It is found in the mines which are located in the land of Arabia.

This stone is named according to its virtue, for whoever has it, will not be constipated as long as he has the stone on his person. When the powder of this stone, or the dust given off when it is polished, is added to an enema, it will have the same effect, for it purges the humors. When one drachma's weight of it is given in a drink, it will extract the humors one by one: first, phlegm, then melancholy, then bile, and finally blood. And if in extracting these humors it causes their excessive flow, this can only be cured promptly with the stone called *leturican*, of which we spoke before. This is because whatever *mecelucan* makes flow, *leturican* stops, and that which the latter arrests, the former makes flow, so that the one which is given to drink last will win out. Therefore, if drinking one causes an excessive flow in a sick man, and he is then given a drink of the other, he will get well. When soaked in the juice which comes from the herb called *asafetida*, the stone will lose its virtue, and it will recover the virtue when placed in human blood.

The star which is on the head of the front Gemini figure, and the one on the left side of the back Gemini figure, both being of the same nature, have power and dominion over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE *STONE THAT ATTRACTS FAT*

The stone which belongs to the twenty-fifth degree of the sign of Gemini is the *stone that attracts fat*, drinking it in the manner of sucking it up. It is very white in color, but there are some stones whose color tends toward brown. It is light of weight and has open pores. By nature it is hot and wet, and it is found at the western end of Spain.

The virtue of this stone is such that when a thousand pounds of solid fat are placed together with a stone of the same weight, the fat will melt and boil as if placed on a fire, and the stone will absorb a quantity of the fat that corresponds to its size. When the stone is weighed afterwards, it will weigh twice as much as before, and when the fat is later extracted from the stone, it will return to its original weight; from this, it can be known that the stone absorbs fat in the amount equal to its own weight. The stone does yet another thing: when it is held in the hand or placed directly on flesh, that place will feel as if greased, for it attracts the fat which is in the flesh through the pores, so that one will feel what he is losing. When fat is mixed with either wax or something else and then placed close to the stone, it will melt and boil, but the wax will not melt. When the powder of this stone is given to a person in a drink, he will feel boiling heat inside his body and a lot of fat will come out, so that its flow will kill him, if he is not helped with some purge which would stop the stone's effect.

The star which is on the right shoulder of the front Gemini figure has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE WHICH IS THE SEA CRAB'S TOOTH*

The stone which belongs to the twenty-sixth degree of the sign of Gemini is the *sea crab's tooth* and is counted among the stones which come from animals. By nature it is hot and wet and its color is that of the crab's shell.

The virtue of this stone is such that when it is pulverized and put into the eyes, it will improve vision, cure scabies, and make the itching in the eyes go away.

Two stars, one of which is in the mouth, the other in the eye of the Great Bear, have power over this stone. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *BATOCITA*

The stone which belongs to the twenty-seventh degree of the sign of Gemini is called *batocita*, which in Chaldean means *impeder of gray hair*. By nature it is hot and wet, and it is found in the gold mines of the land of Ethiopia. The color of this stone is green, like that of the emerald, but the difference between them is that the emerald's shine is such that it is transparent, whereas this stone is not. However, when it is polished, it will reflect rays of light like a mirror. There is another difference: while the emerald is very heavy and hard to break, this stone is light of weight and breaks easily. Those who wish to do harm and cheat, sell this stone for an emerald to the ones who do not know the difference.

The virtue of this stone is such that it prevents the one who wears it on his person from becoming gray until very late in life. When the stone is pulverized and distilled, combing the hair with a comb dampened in the water this process yields, will prevent the growth of more gray hair and will dye the already existing gray hair with a dye which lasts a very long time. This water has yet another virtue: when given to drink to someone who has pain in any part of his stomach, it will cure him without delay. In this, its virtue is as great as that of theriaca, especially if the nature of the pain is cold. The powdered stone, mixed with something and given in a drink, will do the same thing, but not as well as the water distilled from the stone.

Two stars, one on the head, the other on the shoulder of the back Gemini figure, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE *LIVER STONE*

The stone which belongs to the twenty-eighth degree of the sign of Gemini is the *liver stone*. Its color is a red that tends somewhat toward black, and it looks like liver, both in color and shape, for one end of it is round and the other concave, and it has no brightness whatsoever. This stone is strong and heavy, and hard to break, but when broken, a liquid will come out of it that is the same color as the stone itself. By nature the stone is hot and wet, and it is found in mines which are in the land of Egypt, in a deserted place called Lexuncaz, where there are many lions and other wild beasts.

The virtue of this stone is such that when it is hung over a diseased liver, it will heal it. Drinking the liquid that comes out of the stone will have

the same effect, and the liver will be cured. Generally, the stone will cure all the diseases of the liver and will open its ducts, either when it is hung over the liver or when one drinks the stone's water.

The star which is at the tip of the front ear of the Great Bear has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE WHICH TURNS WATER INTO BLOOD*

The stone which belongs to the twenty-ninth degree of the sign of Gemini is the *stone which turns water into blood.* There is no other name for it in any language. It is very light of weight and easy to break, so much so, that it will break when squeezed between the fingers. It is also very soft, like soapstone. It is found in the land of Egypt, in the mines of which we spoke before, in very deep caves, where other stones are found as well, and where there are many fierce and poisonous animals. Therefore, those who go down there to gather the stones run a very great risk. Moreover, these caves are very dark and one cannot go there and gather stones without a bright light. When taken out, these stones look red, but not very much so.

By nature this stone is hot and wet. Its virtue is such that when it is pulverized and a little of it is put into a container to which a lot of water is added, it will turn the water into blood, both in substance and color, but not in taste. When placed into hot fire and left there for a long time, it will harden and become very strong. And when taken hot from the fire and cooled in wine, it will return to its original state, but the wine will be rendered so poisonous that if anyone drinks it, it will cause all the teeth the wine touches to fall out. However, when the stone is pulverized and given to someone in a drink other than wine, it will not cause his teeth to fall out; rather, it makes worms in the intestines become so bad, that if the person is not helped by giving him something to drink that would kill the worms, the worms will kill him.

The star which is on the back part of the Little Dog, called Alqumeyça, has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *MADUZ*

The stone which belongs to the thirtieth degree of the sign of Gemini is called *maduz*. Those who do not know the stone take it to be *bezahar*. This has already been mentioned elsewhere in the book, at the beginning of the description of *bezahar* and, besides, it was demonstrated how one can be mistaken in taking one to be the other. Yet, there are many signs by which those who pay attention can tell the two stones apart. Although the color of *maduz* is a brown which tends toward yellow and is similar to that of *bezar* (sic), so that one can be confused, there is, on the other hand, another test which cannot confuse anyone, for whereas *maduz* is hard and becomes shiny when polished, *bezahar* does not have these properties. There is another important test: *maduz* does not have any virtue against the harm caused by poisons, whereas *bezahar* does. Moreover, there is yet another big difference, in that *bezahar* is not damaged when placed in fire, while *maduz* is burnt and turned into a substance similar to lime. Therefore, if the two stones could not be told apart in any other way, they can be identified by this test alone.

The virtue of this stone is such that, when worn on one's person, it will dispel all cares which are caused by melancholy and for which there is no real reason. Pulverized, it is added to all confections made for this purpose. Also, its powder is good for the lesions that occur in the eyes, and it greatly strengthens vision.

Of the two stars which are on the front line of the quadrangle that is on the body of Little Bear, the one that looks toward midday has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

V. ABOUT THE SIGN OF CANCER

PROLOGUE

Whoever wants to work within the thirty degrees which belong to the sign of Gemini has to bear in mind the state of the planet Mercury, for it has dominion over them. Therefore, when Mercury is in a favorable position, one can do good work, and when its position is unfavorable, the opposite is true.

ABOUT THE STONE CALLED *ADEHENICH*

The stone which belongs to the first degree of the sign of Cancer is called *adehenie* (sic), and there are five kinds.[34] The first kind is of the color of *azauarger*, which is called *prasine*: this one is known as *green adehenich*. The second kind is the color of a peacock's feathers and is called *peacock adehenich*. The third kind is green like copper and is called *verdet* (verdigris). The fourth kind is of many different colors, whereas the fifth has no more than two colors.

In this book we shall talk about each one of these stones in its proper place. First, we shall talk about the green one, called *prasine*. It is found in copper mines, even as emerald is found in gold mines. It is a soft stone and easy to break, and after it has been worn for a while, it loses its clarity. Also, it darkens when it is dark and becomes clear when it is light. Whatever figure is carved on it will be worn off with use. In some places it is used to make little boxes and other things.

The virtue of all five kinds of this stone is that, when pulverized and given in a drink to someone who has been poisoned, it will make him well; and, to the contrary, when drunk by a well person, it will do him great harm. This is because it is itself a deadly poison. When another poison is present in the body, it puts such great effort into getting rid of that other poison that it loses the virtue of its own poison and, therefore, instead of harm, it does good.

This stone gets its poison from the copper mines, where it is found, for when this metal sets in the mines, it gives off vapors which, when they come in contact with the air, will settle one on top of the other and harden so as to form stones. Hence this stone always appears to be in layers, one atop the other, and of one, two, or many colors, according to the nature which rises from the metal of its origin, or depending on the purity of the air, whether it be clear or turbid.

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34. Zahony identifies this possibly to be malachite.

These properties are common to all five kinds of stones of the nature of *adehenich*. The one which is of the same color as *prasine*, about which this book speaks first, is so green that it can be told apart from *prasine* only by the two following things: while *prasine* is hard, and comes both in big and small pieces and in many different shapes, this stone is soft and is always found in a size according to the amount of emerald. The natural properties of the *adehenich* are such that it will do great harm to a person, especially to his airways, when he swallows saliva while having the stone in his mouth. Also, when mixed with vinegar and rubbed on the spot that has the disease called rose, it will cure it. It does yet another thing: when pulverized and thrown on gold that breaks when being founded, it will mend the break line and the gold's quality will be greatly improved.

The middle one of the three stars, which are on the curve at the base of the neck of the figure called the Valiant One, has power and dominion over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *PEACOCK ADEHENICH*

The stone which belongs to the second degree of the sign of Cancer is called *peacock adehenich*, and this is the second kind of *adehenich* about which we shall speak.[35] Both by nature and in its softness it is like the other stones of its kind. It is naturally cold and wet, but it has properties that differ from those of the others. It is of some help when placed on a scorpion's sting and when one takes five or seven flies, removes their heads and crushes them with this stone and then applies them to a wasp's sting. It will cure it and the pain will go away.

It is in this stone's nature to become clear with the clear morning air. When one breaks it, one finds copper mixed with it inside. When this copper is pulverized and given in a drink to someone who has drunk the poison of a poisonous animal, it will cure him promptly.

The front one of the two stars which are on the neck of the Great Bear has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

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35. This is probably "peacock copper" or bornite, according to Zahony.

ABOUT THE STONE CALLED THE *GREEN ADEHENICH*

The stone which belongs to the third degree of the sign of Cancer is called the *green adehenich*.[36] It is the third stone of its kind and, like the others, it is cold and wet by nature. The color of this stone, however, is similar to that of verdigris, which is used for painting. Besides, when ground up with linseed oil, it is finer and clearer than verdigris. Also, physicians mix it into plasters, for it has the property to make the pain and the redness caused by hot abscesses go away, especially in case of the abcess called *alhambra*. It does yet another thing: when pulverized and diluted with water, and rubbed on ringworm, it will make the ringworm disappear after one or two uses.

The star which is on the northern back leg of the image of Cancer has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED THE *MULTICOLORED ADEHENICH*

The stone which belongs to the fourth degree of the sign of Cancer is called the *multicolored adehenich*, because it has so many colors of so many shades that, to those who do not know the stone, it looks hand-painted.[37] By nature, this stone is cold and wet like the other stones of its kind, but it differs from them in that it is a very strong poison. A drink of it in the amount of two drachmas or more will destroy the stomach and the intestines, and cause immediate death to the person who ingests it. The only remedy against it is the stone called *bezahar*, which acts against all mortal poisons. However, whoever carries this *adehenich* on his person will find it to be useful against sadness caused by the humor of melancholy.

The northernmost one of the two stars that are on the beam which is on the curved end of the figure of the Ship has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

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36. Zahony thinks this might be chrysocolla.

37. Zahony identifies this possibly as tarnished chalcopyrite.

ABOUT THE STONE CALLED THE *THREE-COLORED ADEHENICH*

The stone which belongs to the fifth degree of the sign of Cancer is the *adehenich* of three colors. It is the fifth kind of *adehenich* and it is more valuable than all the others. By nature it is cold and dry, but only slightly, and it always has two colors, green and white.

When this stone is placed in an amount of wine that will cover it and left for two days and two nights, it will dissolve and mix with the wine. If one then mixes this wine with henna and washes his hair with it, the hair will be dyed black and this color will not fade until it grows out. Any part of a man's body can be dyed in the same manner.

The northernmost one of the two stars which are on the front line of the quadrangle forming the body of the Little Bear has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE THAT ATTRACTS SILVER*

To the sixth degree of the sign of Cancer belongs the *stone that attracts silver*. It is found on the right side of the Occident, where the sun sets. By nature it is cold and wet, and its color is a white which tends toward brown. It is soft and smooth to the touch, and it will crumble between one's fingers. It is quite heavy, and turbid, without any brightness in it.

The virtue of this stone is such that whoever wears it on his person, set either in gold or in copper, can be certain of never getting the disease called *pesada*. The property of this stone is to attract silver, the same as that of other attracting stones, called magnets, which attract the bodies they are meant to attract. But this one attracts more powerfully than any other magnet, for it can do so from a long distance and with great force. And even though the silver may be attached to something else, the stone can pull ten times its own weight, for its force of attraction is ten times greater than its mass.

This stone is very soft, and when bitten, it makes a sound like tin does, although there is no tin in it. When burnt, it turns into lime and absorbs the heat of the fire, just like other magnets do.

The two stars on the right knee of the Great Bear, and the one which is on the hind paw of the same figure, have power over this stone. The stone

receives its power and virtue from these stars and works best when the stars are on the ascendant.

ABOUT THE *STONE THAT ATTRACTS LEAD*

The stone which belongs to the seventh degree of the sign of Cancer is the *stone that attracts lead.* It is found in the land of Occident. It looks ugly, for its color is a white that tends toward that of lead. However, it is not as heavy as lead. Its nature is to attract only small amounts, not as much as the other magnets attract, nor from as far away as they do.

By nature this stone is cold and wet, and it has a bad smell, like that of *asafetida.* It is used like the other magnets, since, when it is burnt, it will absorb the fire and become like lime. Those involved in alchemy use this stone in their works, for when one takes one weight of it, after it has been well burnt, and sixteen weights of mercury, and then places both in fire and blows on them like the goldsmiths do, the mercury will thicken so as to withstand hammering and fire.

The brilliant star which is in the stern of the Ship has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *FOLORICA*

The stone which belongs to the eighth degree of the sign of Cancer is called *folorica.* It is found on the island of Çarandin, on the top of a mountain called Follorac, whence it receives its name. By nature it is cold and wet, and its color is white like crystal. The stone is not clear when taken from the mine, but later, when polished, it becomes somewhat clearer. It is light of weight and easy to break, so that it is broken with iron and used to make tumblers, bowls and other things.

Although this stone looks beautiful, its virtue is very bad, for when the remnants left from polishing it, or its powders, are given to someone in a drink, it will make him lose his mind and be as if stupid and benumbed, until he is given something very hot that would have the power to take away the cold and the harm that comes from the coldness of the stone. Yet it has another property which is useful: when it is pulverized and the powder mixed with rose oil, and

the mixture rubbed on the head of someone who has a fever, especially one of the great fevers, it will cure him.

The northern one of the two front stars which belong to the quadrangle that surrounds the cloud of the figure of Cancer has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE THAT APPEARS IN THE SEA WHEN THE MOON SETS*

The stone which belongs to the ninth degree of the sign of Cancer is the *stone that appears in the sea when the moon sets* and hides when the moon comes up. It is found in the North Sea, where one also finds the other stones which clearly show the virtue of the planets. By nature this stone is cold and wet, light of weight, and very black in color. With moonlight, the stone descends to the bottom of the sea, whereas, when there is no moon, it ascends and floats atop the water. When taken away from that place, the stone darkens when the moon is above the earth and brightens when the moon goes down, and it continues to do this.

The great marvel is that, although this stone is very black, it is transparent like crystal. And it has the marvelous and strange virtue, that whoever wears it hanging between his eyes can see at night as well as in daytime, without the help of a candle or any other light.

Two stars have power over this stone: of the two stars in the front of the quadrangle which surrounds the cloud of the figure of Cancer, the one that is toward midday; and the star on the front horn of the same figure. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *AFRICANA*

The stone which belongs to the tenth degree of the sign of Cancer is called *africana*. It has this name because it is found in the land of Africa, on the banks of a river which descends from a mountain and flows throughout that land. Some of the stones are large, others small. The color of this stone is that of yellow orpiment, but it is dull, rather than shiny. It is strong and hard to break.

By nature this stone is cold and wet. When it is broken, the stone has a body inside which is similar to egg yolk, both in color and feel, as well as in all its other qualities. When some of this matter is rubbed on hemorrhoids, it will cure them promptly. Also, when it is used in an enema, given to someone who bleeds because of broken veins, it will cure him. When the stone's outer shell, which is hard and has no moisture, is pulverized and mixed with dyes used for writing or painting, it will brighten them and give them a good color. However, it will do this only for yellow, green or red; mixing it with any other colors will spoil them.

The northern one of the two stars which are on the Great Bear's chest has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *TARMICAZ*

The stone which belongs to the eleventh degree of the sign of Cancer is called *tarmicaz*. The color of this stone is a white which is somewhat mixed with green. This stone is small in size, the largest one not weighing more than half a drachma, but it is quite heavy for its size. It is always triangular in shape, and all of it feels very soft.

By nature this stone is cold and wet. It is found in the Red Sea, which the sons of Israel crossed, on a kind of shell which grows there. The stones form on top of these shells, like scales do on fish. The larger the shell, the larger the stone that grows on it, but never larger than the size we said.

The virtue of this stone is such that when it is placed in psyllium—*azarcatona* in Arabic—water, it will become soft like warm wax. When it has become soft like this and is given to a woman to drink, she will, from then on, conceive only female offspring, and the same holds true for any female animal who takes this drink.

The northern one of the two lower stars in the quadrangle of the sign of Cancer, the one called Hamelin, has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ARGENT* OR *SILVER*

The stone which belongs to the twelfth degree of the sign of Cancer is commonly called *argent* or *silver*, while the Moors call it *feda*. This stone can take hammering and founding, as do the other stones that are metals. When hammered, it spreads more than iron or copper, but not as much as gold does. And because these metallic stones are of the same nature as to their being soft and hardening, there is an affinity between them and they bond when mixed together. However, some of them reject others. For instance, silver, when exposed repeatedly to the fumes caused by the founding of lead, will break, and mercury also will have the same effect on it. On the other hand, salt is very good for this stone, for it purifies and clarifies it, bringing out its whiteness and beauty.

By nature this stone is cold and wet, and in weight it is lighter than gold, but heavier than iron and copper. The particles given off when silver is polished are helpful when mixed into medicines which are against the kind of phlegm called *vitreum*. Moreover, it is good against all those diseases which are caused by phlegm. When silver is placed in a container and buried underground so that the earth does not come into contact with it, it will keep a long time without receiving any damage. However, if it stays underground for a very long time, it will eventually become earth. But if silver is buried without a container, with nothing between it and the earth, it will tarnish rapidly, lose its color and be destroyed altogether. The color of this stone is white, and the more it is polished, the more it will shine, but it is not transparent. It is mined in many places and is well known to men, for it is a noble metal and has many uses.

The southern one of the two lower stars which are in the quadrangle of the figure of Cancer, the one called Hamelin, has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *LEAD*

The stone which belongs to the thirteenth degree of the sign of Cancer is called *plumbo* in Latin, *plomo* in Romance, and *arraçaz* in Arabic. Lead is also a metal, just like silver and the other known metals. It can be found in many places, and by nature it is cold and wet in the second degree. It contains a humor-like wateriness which it never loses, except when placed in fire and burnt; then it becomes cold and dry.

Lead is very close to silver, but due to the bad quality of the earth and the air, which sometimes are mixed together in a disproportionate manner, it receives three bad properties. One is that it tarnishes easily, the other, that it smells bad, and the third, that it makes a noise when one bites down on it. This last kind of lead is called *tin*. There is also another kind of lead, called *black lead*. This is even more natural than the other one of which we spoke, and the book will talk about it later on, in its proper place. But about the first kind of lead, which is the nobler of the two, learned men have said that whoever works with it as is proper, using myrtle juice, marcasite, salt, and cantharides, can make it lose its three bad properties. However, since this belongs to the works of alchemy, we do not wish to include it in this book.

Therefore, we will return to our intent and say that burnt lead is very good when put in the eyes, for it cleanses the moisture of the eyes, and heals the wounds in them. It works in animals, as well as in men. It will also dry the moisture produced in the wounds, making them heal faster.

The front one of the three stars which are in the front of the Ship's shadow has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *CAZMIRA*

The stone which belongs to the fourteenth degree of the sign of Cancer is called *cazmira*. More than anywhere else, it is found in the western part of Spain, close to the seacoast. When taken out from the ground, it resembles lead both in color and weight, but it is more fragile than lead and breaks when squeezed between the fingers. By nature it is cold and wet, but when burnt, it loses its moisture and erstwhile softness and becomes hard like the other stones which are difficult to break. When the burnt *cazmira* is reduced in wine, by dipping it in and taking it out many times, it shrinks and becomes light in weight, and also somewhat shiny. The wine used for reducing the stone has a very bad virtue: when given to drink, it will close up the urinary tract and will not allow the urine to pass. Hence it will kill the person who drinks it if he is not helped by giving him a drink with either theriaca or the stone called *bezahar*.

When this stone is burnt and pulverized and put into a bleeding nose, it will stop the bleeding, and it will stop the bleeding of wounds and sores as well. When pulverized without burning it first, mixed with wax and resin, and made into a plaster, it is very good for making wounds grow over with flesh and heal promptly.

The middle one of the three stars which are in the front part of the Ship's shadow has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE THAT FLEES FROM HONEY*

The stone which belongs to the fifteenth degree of the sign of Cancer is the *stone that flees from honey*. By nature this stone is cold and wet, and it is found on the island called Merutaz, located in the Red Sea, which the sons of Israel crossed. This island is uninhabited, but ships pass close to it both coming and going. There are many kinds of stones on that island, some of which we will mention in this book, each one in its proper place. But the stone about which we speak here is hard and heavy, and its color is a purple, which sometimes tends toward red. Some of these stones are big, others small.

The property of this stone is such that it abhors honey, so that, when placed close to honey, it will jump and flee as far as possible. And there is another test: when this stone is pulverized and mixed with water, it will absorb the water so that it cannot be separated from it in any other way except by adding honey to the mixture; this makes it leave the water and set itself apart.

This stone is very beautiful and to the person who does not know it well, it looks like one of the very clear light sapphires that are not transparent. It has a very bad virtue in that it will weaken the urinary tract of one who wears it on his person, so that he cannot control his urine as he wishes, especially at night, when sleeping.

The star which is at the tip of the curved beam in the front of the Ship has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *STONE OF THE MOON* (SELENITE)

The stone which belongs to the sixteenth degree of the sign of Cancer is called *stone of the moon* (selenite). It has this name because it cannot be found except at night, when there is a full moon. By nature this stone is cold and wet. Its color is white, it is light of weight, and it takes on every color that is nearby. This stone is found most often in the land of the Occident, in caves which are in a deserted area. It can only be found at night, when the moon is full. Because of this, the people of that land believed that the moon makes this

stone at that particular time and hence they gave it the name it has. But others call it *foam of the moon*, and the people in Chaldea call it *ceduluquindat*, which means the same thing.

The virtue of this stone is such that when the particles, which are given off by polishing the stone, are given in a drink to someone who is possessed of "the demon" (epilepsy), it will cure him promptly. Also, it will protect the person who wears it against the same disease. When hung on a tree, it will make the fruit grow and ripen very rapidly.

The two stars, one of them northern, the other southern, which are on the head of the serpent called Hydra, have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *ZEXEGT*

The stone which belongs to the seventeenth degree of the sign of Cancer is called *zexegt*. It is found in the land of India. By nature it is cold and wet. Its color is between red and yellow, but it tends more toward yellow, and there are some whose color tends toward brown. In color, this stone resembles a hazelnut. It makes a noise when shaken, and when it is broken open, there is another stone inside, whose color tends toward yellow.

When this stone is pulverized and mixed with water, and rubbed on a limb which has an abscess, or some other disease caused by melancholy, it will cure it very promptly, and when tied to the leg of a woman in labor, it will help her give birth easily.

The southern star called Azobene, which is on the front horn of the sign of Cancer, has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *LECHAR*

The stone which belongs to the eighteenth degree of the sign of Cancer is called *lechar*. It has this name because the liquid that it gives off looks like milk in color, substance, and taste. By nature this stone is cold and wet. Its color is white, it is soft to the touch, smooth and heavy. When polished, it yields this liquid of which we spoke.

When placed in runny eyes, it will dry them up, and it will also heal the ulcers in them, as well as the ulcers which are formed in the intestines. This milk's virtue will increase when kept in a lead container.

The star which is over the quadrangle of the Great Bear's body has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *JUDIEGA*

The stone which belongs to the nineteenth degree of the sign of Cancer is called *judiega*. It is found in the land called Falaztim, and it always has the shape of an acorn. Its color is white, with lengthwise green lines in it. By nature this stone is cold and wet. It dissolves when placed in water, and the substance it yields has no flavor whatsoever. Some of these stones are flat at one end and round at the other, like the shape of a chestnut, and in size they are like walnuts. This stone is heavy in weight and its virtue is such that, when about a chickpea's size piece of it is polished on a black whetstone, and given in a drink that has three times its amount of fresh water to someone who cannot pass urine, it will break the stone that has formed in his bladder and cure him. It works equally well against kidney stones.

The front one of the two hidden stars in the east, which is in the shadow of the Ship, has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *BACIZ*

The stone which belongs to the twentieth degree of the sign of Cancer is called *baciz*. It is found on the island of Cabroz (Cyprus), in a river called Baciz, whence it takes its name. Even though this stone is light of weight, it is strong and hard to break. By nature it is cold, but not very wet. It is quadrangular in shape, but its four sides are triangular and come together to a point, so that they come down in the shape of a cone. The color of this stone is a yellow that tends toward white and it is translucent, so that one can see through it. The nature between this stone and the red *targonça* is such that they abhor each other, in the manner that, when placed together, each of them is damaged. But, of the two, *baciz* is damaged more, for it loses its shine more than the other stone, and if it stays close to it for a long time, it will break and be

ruined. The damage that the other stone suffers will be told later on, in the place where the book deals with that stone.

The virtue of *baciz* is such that, whoever has it in his mouth will lose the sensation of thirst, and will not have it as long as the stone remains there. Therefore, it is very good for those who have a very high fever. This virtue is even greater when the stone is pulverized and given to the sick person in a drink. The stone has yet another virtue: when pulverized and soaked in cider vinegar and then used to rub on hot abscesses that are of the nature of blood, it will make the pain and the heat go away and the abscesses will be cured promptly.

The hidden star which is between the two rudders of the Ship has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE WHICH APPEARS IN THE SEA WHEN THE MOON RISES*

The stone which belongs to the twenty-first degree of the sign of Cancer is the *stone which appears in the sea when the moon rises* and disappears when the moon goes down. It is found in the Mar Tenebrosa (North Sea), where the other stones, which show the power of the other planets, can be found. Its color is very white and it is very brilliant. Its shine increases when the moon is above the earth and lessens when it is below the earth, and the same holds true with the waxing and waning moon. This stone is very round in shape and it is large in size. By nature it is cold and wet.

The virtue of this stone is such that, whoever wears it on his person can be sure of not having any trouble with his spleen, nor will he receive any harm from drinking water, no matter how much he drinks.

The front one of the two stars which are next to each other on the neck of Hydra, who is a snake, has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *PLOMEÑA* (LEAD-LIKE)

The stone which belongs to the twenty-second degree of the sign of Cancer is called *plomeña* (lead-like). It has this name because it resembles lead

in color; however, it is lead's opposite in weight, since lead is heavy and this stone is light. It is found in the mines which are in the land called Aquitaz.

By nature this stone is cold and wet. When it is burnt and dipped in oil many times, it changes its color to red, and becomes lighter and somewhat shiny. And if after being burnt it is sprinkled with wine, a fire will spring forth from it which will burn everything it can reach. This can be done with any kind of oil, but with nothing else but oil. If, after the stone has been burnt and treated in oil, it is mixed with butter to make an ointment used to rub on the disease which in Arabic is called *anaxe*, and which affects the vein in the leg that runs along the leg from behind the knee to the heel, it will cure the disease promptly. Similarly, it cures other diseases which affect the legs and which cause the veins to enlarge, particularly the disease that makes the leg swell up and is called the elephant disease (elephantiasis).

This stone does yet another thing: three drachmas' weight of it, prepared with the things of which we spoke and given in a drink, will purge crude phlegm and cure all diseases caused by it.

Of the three stars in the shadow of the Ship, the brightest one has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *FERREÑA* (IRON-LIKE)

The stone which belongs to the twenty-third degree of the sign of Cancer is called *ferreña* (iron-like). It has this name because it resembles iron in color. This stone is hard and strong, and the Greeks call it *ambonencuz*. By nature it is cold and wet, and it can be found in the land of Argent, on the bottom of a river which flows there and which is called Río Ferreño. When this stone is rubbed with another stone, it gives off a liquid whose color looks like foul blood. When some of this liquid is given to drink to the person who has the kind of stomach pain called cramps, either because of the nature of the body humor, or because of the strong medicine which he has been given to drink, it will cure him promptly.

This stone, like the others about which we spoke, traps fire inside it when it is burnt. When pulverized and mixed with oil after it has been burnt, it will give off a pigment that is shiny and good for painting.

The back one of the two stars which are on the left hind foot of the Great Bear and which is called Salto Segundo has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *GALAPAGO* (OF THE ROOSTER?)

The stone which belongs to the twenty-fourth degree of the sign of Cancer is called *galapago*, and it is one of the animal stones. It can be found in the following manner: watch for the first egg that a hen lays, and if the hatched chick turns out to be a male, raise it for eight months and then kill it; when it is dead, a white stone will be found in its stomach, of a color that looks like that of crystal, and the size of a bean or slightly bigger.

By nature this stone is cold and wet. Its virtue is such that when it is pulverized and given in a drink to a man who is very thirsty, it will make the thirst go away. When the stone is washed before it is pulverized, drinking of the water in which it was washed will gladden life's spirit and dispel unhappiness, if one has it. The stone will do the same thing for whoever wears it on his person, and when young boys do it, they will lose the fear which they usually acquire when they are little.

The second one of the two stars which are at the base of the neck of the figure of Hydra, which is that of a snake, has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *ALMAGNICIA*

The stone which belongs to the twenty-fifth degree of the sign of Cancer is called *magnicia* (sic), and there are three kinds of it: one is brown, the other, black, and the third, green. In Greek, all three kinds are called *andardimuz*. There is no difference in the nature or in the virtue of these three kinds of stone; the only distinction is that of color. It can be found in many places, and by nature it is cold and wet.

The virtue of this stone is such that it unites the glass, which is dispersed like sand, and this it does because it has some lead mixed in it. Men used to be mistaken about this stone: because they saw it unite the body of glass, they thought that it joined that which was dispersed and dispersed that

which was joined. Also, when pulverized, this stone is mixed into the powders made to cleanse the eyes.

The second one of the two stars which are over the bright star of the Ship's shadow has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *MERCURY*

The stone which belongs to the twenty-sixth degree of the sign of Cancer is called *mercury*. It is found in mines that are in the lands of Adragecen, Sennen, and Spain. Some of it can be found loose, some in a stone. When the stone is burnt, mercury separates from the stone and in this loose state it is used in many ways. The kind of mercury that is in the stone is the one extracted from the mine before the stone has been burnt.

By nature this stone is cold and wet, and it is like silver that has been tainted. It has an odor, and a sound, and it quivers. The nature of mercury is to kill lice, and the residue of the stone, left after it has been burnt, mixed with food, will kill mice. If man is exposed to the fumes of mercury, he will become paralyzed, his hands and legs will tremble, he will lose his hearing, and have many other illnesses. Moreover, snakes and other reptiles will flee from the place penetrated by mercury fumes and those who stay, die.

When mercury is mixed with marcasite and the two are worked together in the appropriate manner, the mercury will thicken. Similarly, talcum powder will also thicken it when used in the appropriate manner.

When burnt mercury is given to drink to the person whose ileum is diseased, it will cure him. Mercury as is, however, without burning, will kill whoever drinks it.

The second one of the two stars which are on the Great Bear's left hind foot has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *GACIEGALEYTIZ*

The stone which belongs to the twenty-seventh degree of the sign of Cancer is called *caciegaleytiz* (sic). It is found in the land called Cabeeduquia,

carried by the water that flows down from a very high mountain. Some of the stones are big, others small. The color of this stone is white, and somewhat yellow underneath. It is light of weight and when broken open, it is very white inside. Also, when the yellow is scraped off, it is white underneath.

This stone is used to make goblets and bowls. Its virtue is such that whoever wears it on his person will not fall in love, and eating and drinking from the utensils made from it has the same effect.

The front one of the two stars which are at the top of the Ship's mast has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *ONNA*

The stone which belongs to the twenty-eighth degree of the sign of Cancer is called *onna*. It is found in the land of Argeoz. That land is very humid and cold, and it gets a lot of rain. In wintertime, when there is a lot of water, big ponds are formed in the fields, which the heat of the sun dries up in the summer. This is when these stones are found, some of them big, others small. The color of most of them is white, but there are some that tend toward yellow. These stones are shiny and heavy of weight, and by nature they are cold and wet. When the stones are ground up well, mixed with water to make a paste, shaped into whatever form one wishes, and then let dry in the sun, they will become very hard and shiny, so that they look natural instead of manmade.

The women of that land use this stone on their bodies, in order to make them soft and to give them good color. And those who make paper use this stone in it so as to make the paper whiter and glossier.

The southern one of the two stars which are in the middle of the Ship's mast has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *SANGUINA*

The stone which belongs to the twenty-ninth degree of the sign of Cancer is called *sanguina*. It is found in the land called Daquitaz, on the banks of the river Sagaf, from which it gets its name. The color of this stone is green, but it tends somewhat toward purple. *Sanguina* looks very much like the stone

called *alferuzach*, except that it is very light of weight, has open pores, and is easy to break, so that it can be crushed between the fingers. When it is broken open, there is a sticky, paste-like substance inside, and when the stone is pulverized and mixed with water, it makes a very strong glue. In the Promised Land, it is used in covering books, and the carpenters use it to join boards.

The virtue of this stone is such that when it is pulverized, made into a paste with water in which mallows have been boiled, and given in a drink to a person who has an abscess either on his chest or his sides, it will cure him after he takes one or two drinks.

The southernmost one of the three stars along Hydra's neck has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *FARQUIDIUZ*

The stone which belongs to the thirtieth degree of the sign of Cancer is called *farquidiuz*. It is found on the island of Alcaquak, on the shores of the sea. The color of this stone is yellow, with black lines in it which are on top of each other, resembling a tree. This stone is very heavy of weight, and it is strong and hard to break, so that it can only be broken with great effort. When placed in fire, it emits a very bad smell, like that of rotten meat. If a person who is possessed by the devil smells this odor, he will have an attack right away; but it does no harm to those not possessed by the devil. By nature this stone is cold and wet.

The dim star, which is the northernmost one of the two stars on Hydra's body, has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

(The Epilogue for the sign of Cancer, as well as the first twenty-nine degrees of the sign of Leo are missing.)

VI. ABOUT THE SIGN OF LEO

ABOUT THE STONE CALLED *MULTICOLORED SULPHUR*

The stone which belongs to the thirtieth degree of the sign of Leo is called *multicolored sulphur* and it is rather clear. It is found on the island called Lynar. By nature this stone is dry like the others, but its coloring is weaker. When pulverized and mixed with oil, it is good against scabies, the itch, head colds, and coughing. It is also a cure for the disease brought on by the flow of mucus from the head, which is the cause of consumption.

The star that is on the Jar's handle, which points toward midday, has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

VII. ABOUT THE SIGN OF VIRGO

PROLOGUE

We have spoken about the thirty different kinds of stones which belong to the thirty degrees of the sign of Leo. It is necessary that whoever wants to make use of the knowledge in this book pay attention to the position of the sun, the same as we have said about the other planets of the signs about which we have spoken. Also, one has to bear in mind the state of the decan of the decanate of that degree of the sign to which a particular stone belongs: when it is in a favorable position, the virtue of the stone to do good is greater, and when it is in an unfavorable position, the opposite is true. But let us now continue our account and start with the sign of Virgo.

ABOUT THE STONE CALLED *UENEQUEN*

The stone which belongs to the first degree of the sign of Virgo is called *uenequen*. It is found in the river called Queueniz, which flows on the island by the name of Nelyle. There is very little water in that river and in hot weather it dries up. It is then that this stone can be found. The color of this stone is a light and shiny green, it is hard to break, and it has branches like coral. When broken open, it is white inside. Some of these stones are so long that they are made into knife handles.

When this stone is pulverized and mixed with wine, and used to rub the shaft of a spear or any other wood, that wood will never bend out of shape; rather, it will straighten out if it is already bent. Also, when it is used to rub on hot abscesses, the abscesses will be cured. It has this effect because it is cold and dry by nature. Furthermore, when placed on the stomach, it will stop vomiting. When the powder of this stone is sprinkled over a dead body, it will dry the body and keep it from rotting. However, the stone itself is a mortal poison, for if it is given to a person in a drink, it will kill him; and, the body of the person who dies from this poison will not rot.

The two stars, one northern, the other in the midday position, which are on the cape of the figure of Virgo have power over this stone. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *DARK ALIAZA* (ONYX)

The stone which belongs to the second degree of the sign of Virgo is called *dark aliaza* (onyx). We already used this name for some other stones, which belong to the degrees of the sign of Taurus, and we spoke about one that is green and about another one that is black, but the one about which we will speak now is very dark, is cold and dry by nature, and is found in the land of Çin.

This stone is hard of body and it has all the bad virtues that the other kinds of onyx have and about which we spoke before. People will not like the person who wears it on his body and they will be quick to pick a quarrel with him. This stone is used to make goblets and bowls from which to eat and drink, but its virtue is such that whoever eats and drinks from them will have many worries and illnesses, which are caused by melancholy.

The northern star which is on the rim of the Jar has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *MIXED ALIAZA* (VARIEGATED ONYX)

The stone which belongs to the third degree of the sign of Virgo is called *mixed aliaza* (variegated onyx). It has this name because it is always made up of two colors, one brown, the other, red. By nature it is cold and dry and its virtues are the same as in the other onyx we spoke about, but this one is softer to the touch than any of the others.

The front one of the three stars which are on the left hand of the Man Who Cries Out has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *WHITE ALIAZA* (WHITE ONYX)

The stone which belongs to the fourth degree of the sign of Virgo is called *white aliaza* (white onyx). It is found in the land of Yemen. Its color is white and by nature it is cold and dry.

Nobody should wear this stone on his person, because it is a mortal poison. If a person has one drachma's weight of it in a drink, he will die. If he

is given half an ounce of hot oil to drink within three hours of taking the poison, he will get well; however, nothing will save him from death after three hours have elapsed.

The middle one of the three stars which are on the left hand of the Man Who Cries Out has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *FARDICANER*

The stone which belongs to the fifth degree of the sign of Virgo is called *fardicaner*, which in Chaldean means *holder of the tongue*. The color of this stone is very black, with white spots in it. By nature it is cold and dry, and it is found in the land of Adurugen, on the shores of the sea. It is a small stone, mixed with sand. It is light of weight and with open pores, and very soft, so that it will break when squeezed between the fingers. When it is burnt, however, it becomes as hard as the other stones. When these stones are pulverized and mixed with watered down wine to make a paste, and then molded into whatever shape one wishes and placed into fire, they will become very hard, while keeping their color and virtue intact.

The property of this stone is such that whoever wears it on his person will not be able to speak, and when given in a drink, it makes one mute. However, this muteness will only last as long as the stone remains in the stomach, which can be for seven days.

The northernmost one of the two stars which are at the bottom of the Jar and on the body of the figure called Hydra has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE WHICH APPEARS IN THE SEA WHEN MERCURY SETS*

The stone which belongs to the sixth degree of the sign of Virgo is the *stone which appears in the sea when Mercury sets* and disappears when it rises. It is found in the Mar Tenebrosa (North Sea), where one finds the stones which manifest the virtue of the other planets. This stone is the opposite of the one which we mentioned before in this book, the one belonging to the twenty-seventh degree of the sign of Gemini, in that this one shines when the other one is dark,

and darkens when the other one can be clearly seen. It is a very thin stone and has no color of its own, but it takes on whatever color is placed next to it. By nature it is cold and dry, and it brightens up and darkens according to the state of the planet Mercury.

The property of this stone is such that whoever wears it on his person feels tired all over his body, so that all his limbs will feel very heavy, and when given in a drink, this effect is even stronger.

The last one of the three stars which are on the left thumb of the figure of the Man Who Cries Out has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *AZECH* (VITRIOL)

The stone which belongs to the seventh degree of the sign of Virgo is called *azech* (vitriol). There are four kinds: the first is called *çori*; the second, *calcatar*; the third, *calcadiz*; and the fourth, *calcant*. We shall speak about each one of them in its proper place, but it is appropriate that we speak first about the properties that they all have in common, and which are the following ones: by nature they are cold and dry; they blacken the bodies with which they come into contact; they stop nosebleeds as well as the bleeding of wounds, but the place they touch turns black; they damage the nerves; and they strengthen and tighten the parts which are slack. If a person drinks a certain amount of any of them, they will dry out his lungs, so that he will die if he is not helped promptly. Also, if one bathes in the waters that flow in the place where these stones are formed, he will get a high and long-lasting fever, the cure of which takes a very long time.

Now we shall speak of the first kind of the *azeches* (vitriols), the one called *çory*. Its color is red, and there is a mine of it in the land of Spain and another one in the land called Cades, but the best one is in the land of Egypt.

This stone has a very strong smell, and when broken open, it is black inside and has holes in it. Also, it has some light enclosed in it, and its smell is so strong that it makes one vomit, especially if one drinks it. It has a bitter taste and therefore in Latin it is called *stittico*. When pulverized and used in an enema, it helps to cure sores on the legs. *Çori* is the most stone-like and the shiniest one of the vitriols.

The star which is on the rim of the Jar, in the midday position, has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *MARMUNIA*

The stone which belongs to the eighth degree of the sign of Virgo is called *marmunya*. By nature it is cold and dry, and its mine is in a town called Caryen. It is found in a cave that has a wide road in it, at the end of which there is a house, and in the middle of that house there is a kind of saltwater lagoon. Drops of yellow water fall into that lagoon from above. These drops are hard and very strong, and they are somewhat shiny. The shine increases when they are broken, and is also greater at the line of breakage. This stone has a great power to constrict, so that if a person has it in a drink, he will choke, and if he drinks a lot of it, it will kill him. Men test it in the following manner: when they go past the place where these stones are, the smell of the stones makes them feel like they are choking, and if a stone is placed in fire, it gives off a smoke which constricts the throat so as to make it hurt. If women expose themselves to this smoke, taking care not to breathe it in either by nose or by mouth, it will tighten them a lot and make them much drier, so that their husbands will have renewed pleasure with them.

The star which follows the last star of the shadow of the Ship has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *CALCATAR*

The stone which belongs to the ninth degree of the sign of Virgo is called *calcatar*, and it is the second kind of *azech* (vitriol) of which we spoke before. Its color is yellow, and it dissolves when boiled or when placed in water. At times, one finds in it pieces of red vitriol, of which we spoke before, and when one takes away a layer that it has underneath, it looks yellow inside. Therefore, it follows that, with time, the yellow becomes red, and the red, yellow. The best of the yellow vitriol is the one whose color is like that of brass and which is easier to break. Then there is another one, whose color is like that of gold. This one is stronger and more difficult to break and, when broken, it is shiny at the line of breakage. Because of this shine, which makes it look like a star, it is called *stellar*. In Chaldean, it is called *litarne*.

The best kind of this vitriol is found on the island of Cabroz (Cyprus). However, it can be found in many other places and, besides, it also appears where the other vitriols are found, for it is of the same nature. Because of its great sharpness, it has great power to constrict. It also has such great heat in it, that it burns the flesh it touches and causes it to scorch. When burnt, the stone loses some of its sharpness and, for this reason, it is better not to use it in its crude form, but after it has been burnt, for it is then not so harsh and also is easier to dissolve. It is used in many medicines against wateriness and tears in the eyes. When mixed with the juice of leeks, it is good for hot abscesses, and it is also used in medicines made for abscesses on the gums and for pustules, sores, and fistulas that form on the body.

The front one of the three stars which are on the northern right arm of the figure of Virgo has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *CALCANT* (VITRIOL)

The stone which belongs to the tenth degree of the sign of Virgo is called *calcant* and it is one of the vitriols that we talked about. Its color is green, and in Greek it is called *guielketiz*. This kind of vitriol dissolves in water and it is made up of finer parts of the elements than the other vitriol, called *calcatar*, about which we spoke earlier. At times, this stone is found to be in layers that are one above the other, and this takes place because it is formed over a very long period of time. This kind of stone is called *tanners' vitriol*. There is also the one that is made up of the drops that fall in its mine and this is called *alcatar*. Yet another one is formed from the mine itself, and it can be found in the land which in Greek is called Esfama and which means Spain. And some of it is of a very ugly color and very weak in its natural state, but when mixed with water and boiled, and then put in a container and left exposed to the air and sun for a long period of time, it becomes solid and forms stones. Of these stones, the best are the ones whose color tends toward blue.

Calcant is clear and of a clean color, and it is heavier than the other vitriols. However, it has the same properties as do all the others, except that it has a greater power to constrict, so much so that it is somewhat bitter. Because of this property, it dries the moisture of the flesh better than any of the other vitriols, it joins together things which are apart, and is blander and not as sharp as the vitriol called *calcatar*. It is very good to use on teeth that are loose, for it tightens them and makes them firm. Also, it is used in medicines made for dyeing hair black. The crude form of these *calcatars* is better than the burnt one.

Two of the three stars which are in a straight line and which follow the triangle on the Dragon, one of them pointing toward midday, the other being the middle one of the three, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *CALCANT* (VITRIOL)

The stone which belongs to the eleventh degree of the sign of Virgo is called *calcant*, and it is the fourth kind of vitriol about which we have spoken. Its color is white and in Arabic it is called *xehera*, which in that language means *purification*. In Greek, it is called *melytria*. In some things, this stone is held to be better than *calcadiz*, and in other things the opposite is true, so that they are exchanged often. But *calcant*, which is white, is easier to dissolve than the others, because it is made of a more unstable substance.

There is some *calcant* which has become stone in the mine, and the best of these stones are the ones found in the land called Calybia, although they can be found in other places as well. The best of them are the ones which are of the color of yellow sulphur and are soft and clean, and when placed in water become black, for this is in their nature. In all other things, *calcant* is the same as the other vitriols. It does yet another thing: when given to eat or to drink in water, it will kill the worms that form in the stomach due to illness, and make the person vomit them out. Moreover, it is very good against the poison that is in mushrooms, and when mixed with water and used as nosedrops, it will clear the head of mucus.

The two stars which follow the three that are in a straight line on the west side of the figure of the Dragon have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *HARMINICA*

The stone which belongs to the twelfth degree of the sign of Virgo is called *harminica*. It is found in the land called Çulunia and its mine is at the foot of a mountain called Nacauie, in a very deep cave where there is a square saltwater lagoon, in the middle of which there is a hole where green-colored water flows. It is in the middle of that hole where these stones are found and it takes great effort to dig them out. When first taken out, the stones are yellow

and later they turn black. Some are big, others small, and although they come in different shapes, most of them are round. These stones are strong and hard to break, heavy of weight and somewhat shiny on the surface, but not transparent.

By nature this stone is cold and dry. When placed on the eye that hurts, it will take away the pain and cure the eye, and when dust left from polishing the stone is placed in the eye that has the disease called ophthalmia, it will cure the eye. Also, this stone when pulverized, mixed with water and rubbed on the body, is of great help to the person who suffers from dropsy. When used in time, it will cure the disease if it is of a warm nature.

The front one of the three stars which are on the base of the Jar, and which are also on the triangular figure of Hydra, have power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *ÇULUCANDRIA*

The stone which belongs to the thirteenth degree of the sign of Virgo is called *culucandrya* (sic), which means *magnet of wood.* By nature it is cold and dry in the third degree. It is strong and hard to break, and rough to the touch. When broken open, it is equally rough inside. The color of this stone is a green which tends a little toward purple, and is somewhat similar to blue.

The property of this stone is to attract all kinds of wood, the same as other magnets attract the things over which they have power. It only attracts the wood that is close by, but it can attract bodies that are larger than itself. After it has drawn these bodies to itself, it sticks to them so hard that they can be pulled apart only by using great force, either by breaking them or by burning them with fire. When some kind of wood enters a man's body, such as a splinter, or a chip of an arrow or a lance, and the stone is placed on it, the stone will attract it and pull it out from the place where it is imbedded. When one places this stone on top of a piece of wood and presses down on it with the hand, it will enter the wood with great force, like a nail that has been hit with a hammer.

This stone is found on the shores of the Red Sea, washed up by the waves. Its virtue is such that when pulverized and mixed with oil, and rubbed on a bruised virile member, it will heal it.

The northernmost one of the three stars which are on the left side of the figure of Virgo and which is called Alaabor, has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *MAIHUTYZ*

The stone which belongs to the fourteenth degree of the sign of Virgo is called *maihytyz* (sic). By nature the stone has in it carved shapes that look like grapevines with branches and leaves. It is a soft stone and its color is black, but not very dark. It is found in the land of Egypt and in some parts of the Occident, in very deep underground mines.

By nature this stone is cold and dry, but its dryness is greater than its coldness. Its virtue is such that when it is ground very fine and applied to ringworm, it will cure the ringworm. It also heals very deep wounds and broken nails.

The second one of the four stars which are in a line on Virgo's side has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *AXUFARAQUID*

The stone which belongs to the fifteenth degree of the sign of Virgo is called *axufaraquid*. This stone is hard to break, porous and soft to the touch, and light in weight. It is found on the bottom of a river that flows in the land of Occident.

The virtue of this stone is such that when it is smeared with the warm blood of a billy goat, it dissolves and mixes with the blood. This blood, when mixed with myrrh and honey and applied to the tongue of a person who, because of illness has difficulty in speaking, will make this difficulty go away promptly, and the person will be able to speak correctly. Also, when this blood is smeared on women's breasts it will greatly increase their milk. And it does yet another thing: it cures the illness that affects the veins of the eyes.

By nature this stone is cold and dry and its virtues are contrary to its nature. This is one of the great marvels found among the virtues that things have in them naturally.

The star that is on the right side of Virgo's waist has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *MARMUNIETIZ*

The stone which belongs to the sixteenth degree of the sign of Virgo is called *marmunietiz*. By nature it is cold and dry, and it is of a fine substance. It is very dark in color, and it breaks very easily, so that it breaks by just holding it between the fingers.

This stone is found on the island called Uelyen and also in the land of Occident. It is found in both of these places. It is a mineral stone. Its property is such that when placed into fire it melts and runs, but not as other metals do, for this one becomes like water, and when taken out of fire it will not harden again unless cold water is poured on it. Then it becomes a hard stone, stronger than before and heavier, and increasingly so, the longer it stays in water. When this stone, melted over fire, is applied to the face of a person which is pockmarked, it will make the pockmarks disappear. Likewise, it will heal the cracks that appear on the palms of hands and on feet. When mixed with beaten egg and applied to a wound or a cut, the liquid stone will make it close over and heal without leaving a scar. But this has to be done while the blood is still running and not congealed, because later on, although it still helps, it does not do it as quickly nor as well.

The star that is on the Crow's beak, and which is shared with Hydra, has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *MOLUBEDENEDA*

The stone which belongs to the seventeenth degree of the sign of Virgo is called *molubedeneda*. Its color is a brown that tends toward red, but when cooked in oil, it turns white. There is a mine of this stone in the land called Zaritez, and it can be found also in the land called Coroz. The best of its kind is the one that does not weigh much and whose color does not look like lead slag.

By nature this stone is cold and dry, and it has a certain power to clean things. It is not hard; rather, it breaks easily and can be pulverized quickly.

When it is pulverized and mixed with oil, it dissolves completely, leaving only a small residue in the bottom that looks like sand. When this sand is ground up, it is made into an oil used for wounds, to make them get rid of their discharge promptly and grow over with flesh. In this way, the stone cleanses the wounds of pus and heals them fast.

Two stars, one of them on the Crow's chest, and the front one on its left wing, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *PLOMO*

The stone which belongs to the eighteenth degree of the sign of Virgo is called *poleo* (sic). By nature this stone is cold and dry in the fourth degree. Its color is a brown that tends toward green, and it is speckled with yellow and black spots. It is a dark stone and very hard to break, and it is found on the shores of the sea in the land of Alcucun. These stones are large and they are used to make cups and bowls, but it is not good to eat from them, because they cause the illness of melancholy. Yet these utensils are good for storing things that smell good, for they do not spoil for a long time, nor do they lose their odor; rather, their odor grows stronger. When this stone is placed in a woman's milk, it will dissolve completely. However, when the milk is then cooked until it is gone, the stone becomes more refined and harder. But when this milk is mixed with water and used to wash one's hair, it gets rid of dandruff and cures the disease that splits the hair.

The third one of the four stars which are on Virgo's left side has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE THAT ATTRACTS FINGERNAILS*

The stone that belongs to the nineteenth degree of the sign of Virgo is the *stone that attracts fingernails*. By nature it is cold and dry, and it belongs to the attracting stones called magnets. There is a mine of this stone on the island called Çarcytez, close to the sea that bears the same name. It is also found above ground. Some of these stones are big, others small, and their color is white, but they are not transparent. Soft to the touch, this stone is very strong and hard to break, so that it can be broken only with great effort. Even when using a diamond, which is harder than any other stone, it takes a lot of work to

break it. However, when placed in the blood of a virgin, it breaks up and becomes like sand. When, after the stone has been calcined in fire, one throws water on it, it will burn like the other magnets about which we have spoken, but even more so.

The virtue of this stone is such that when passed over fingernails that lie on the ground, it will attract them, much like other magnets attract things over which they have power. When passed over a person's nails, it will bend and twist them, so that blood will come out between them and the flesh, and a large stone will pull the nails out by force. The stone does not lose its virtue when broken with iron, but it does lose it when broken with a diamond.

Of the two stars which are on the Crow's left wing, the one toward the back has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *MARMOL* (MARBLE)

The stone which belongs to the twentieth degree of the sign of Virgo is called *marmol* (marble). It is the one that we spoke about when we mentioned *bezoar*, which it resembles. However, they are not alike either in their power or their virtue, for marble is cold and dry, and *bezoar* is not. The Greeks call this kind of marble *faraztaz*. A lot of it is found in mines of *aliaza*, about which we spoke before, mixed with it, and also in the Promised Land, as well as in the land of Domas. The best kind of marble is the one that is white in color, with green, yellow and red lines in it.

When marble is burnt and mixed with ammonium salt, and the two are pulverized together, the powder, when applied to yellow or blackened teeth, makes them white and also tightens the gums. Moreover, the burnt and powdered marble is very good to put on burn wounds. When a little of it is given in a drink to a person who vomits a lot, it will stop the vomiting by tightening the mouth of the stomach. When the stone is ground and mixed with wax and oil, it will help against stomachache.

The star which is on the end of the Crow's foot and which is shared by Hydra has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ABCATRITAZ*

The stone which belongs to the twenty-first degree of the sign of Virgo is called *abçatritaz*. By nature it is cold and dry, and it is very abundant in the land of Egypt, mixed in the sand on the banks of the Nile. It is said that the crocodiles, who live in that river, expose these stones when cleaning out the places where they lie, for their virtue is such that no animal who has them nearby can sleep. This stone resembles the diamond in its color, but it comes in bigger sizes.

Abçatritaz is soft to the touch and it breaks easily. When placed in dog's milk, it dissolves completely, and when that milk is then given to drink to a person who has pain in his bowels or intestines, it will cure him promptly. Also, when that milk is used to wash one's hair, it will make gray hair disappear and prevent it from growing back.

The middle one of the three stars which are on the leg of the Man Who Cries Out has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *GALETACIZ*

The stone which belongs to the twenty-second degree of the sign of Virgo is called *galetaciz*. The color of this stone is red, but this red is so pale that it looks like the water that comes out of salted meat. It is strong and hard to break, so that nothing except a diamond or red copper will make a mark on it. Also, it is dull, but will become brighter when polished. Some of these stones are big and others small, but most commonly they look like eggs that are a little longer than average.

By nature this stone is cold and dry, and it is found in the Promised Land, in a place called Galequid, from which it takes its name. The stone's virtue is such that whoever wears it on his person can be sure of not getting an abscess in his brain. When ground up with copper, it is used to make medicine for the head and the heart.

The last one of the four stars which are on the back side of the figure of Virgo has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *QUETMEE*

The stone which belongs to the twenty-third degree of the sign of Virgo is called *quetmee*. It is found close to Mount Sinai, where Moses spoke. The mine, in which it is found, is at the foot of that mountain. By nature this stone is cold and dry, and its color is blue, but not very dark, and it tends to be dull. It is rough to the touch, strong, and very hard to break, and it is somewhat astringent.

The property of this stone is such that when it is pulverized and mixed with purslane juice, and then rubbed on parchment which has writing on it, it will erase the writing so that none will be left and leave the parchment as clear and clean as it was in the first place. This is the only virtue that this stone is known to have.

The northernmost one of the three stars which are on the left leg of the Man Who Cries Out has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE THAT ATTRACTS VINEGAR*

To the twenty-fourth degree of the sign of Virgo belongs the *stone that attracts vinegar*. It is found in the land called Azench, on a hillock which is close to an acidic lagoon. The water of this lagoon is different from all others, for it dries up in winter when it is cold and fills up when it is very hot. By nature this stone is cold and dry. It has open pores, is rough to the touch, light of weight, and is easy to break. It has a sour taste, and its color is a red that is speckled with white dots; in some, there are white lines instead of dots. Some of the stones are big, others small.

The virtue of this stone, whence it also gets its name, is such that when it is placed in a container of vinegar, it will absorb the vinegar according to its size, and its weight will increase by the amount of vinegar it takes up, so that it is possible to tell how much it has absorbed. And it will not release the vinegar it has absorbed unless it is first placed in oil. When the stone is placed in oil, the vinegar will be released and, after it has been separated from the oil, it will be much more sour than it was before. When the stone is placed in wine, the wine will turn into vinegar, and when placed in vinegar, it will make the vinegar exceedingly strong. The same will happen to the aforesaid liquids when poured into containers made of this stone. The stone becomes lime when burnt and will retain the heat of burning fire, much like other magnets do. It is of great help

when pulverized and mixed with the medicines made to treat scabies, and when one uses it to wash oneself, as in a bath, it will clean the body of all kinds of dirt, and will also cure the disease called *morphea*.

The front one of the two stars which are on the waist of the Man Who Cries Out has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *NACARAT* (CARNELIAN?)

The stone which belongs to the twenty-fifth degree of the sign of Virgo is called *nacarat*. By nature it is cold and dry in the first degree. Its color is that of iron, which is a mixture of yellow and red, but while some stones have more yellow in them, there are others that have more red. This stone is naturally shiny and it resembles *aliaza* both in color and its qualities, so that some have taken it to be one and the same, but whoever pays close attention will find this not to be true, although it resembles *aliaza* in some of its virtues. Like *aliaza*, it is abhorrent by nature, and those who know its virtue and its property do not wish to come near it, nor have it on their person.

This stone is found in the land of Yemen, and its mines are a long distance from populated areas, in places that are dangerous for their lack of water, as well as for the harmful and poisonous animals which inhabit them. For this reason, only very poor and needy men, who are desperate to earn something, go there to gather these stones.

The evil of this stone is so great that whoever wears it on his person will be hated by others and have quarrels with them. If the stone is used to make bowls or cups from which to eat or drink, it will have the same effect. However, it has other qualities which are good. It helps the person who wears it to get cured from the great fevers; moreover, when taken in a drink, it will cure the disease called jaundice and also another disease called sciatica, which is caused by the shrinking of the nerve in the leg. The star which is on the right buttock, below the waist of the figure of Virgo has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *EZBENECEN*

The stone which belongs to the twenty-sixth degree of the sign of Virgo is called *ezbenecen*. The best mine of this stone is in the land of Barca. There is another mine in the land of Uirgia, but that one is not good. Some of these stones are large and others small, and they are valued for their brilliance. Artisans, who know how to work stone, can fashion it into any shape they wish. Yet despite this, it is strong and hard to break and it can be cut only with iron or with a diamond. The color of this stone is a yellow that tends toward red, and it is cold and dry by nature. In the land of Barca it is called *wine stone*, because its beautiful color resembles that of red wine. In the land of Uirgen (sic) the stone is called *alharcon*. It has no other virtue than its beauty.

Of the two stars which are on the waist of the Man Who Cries Out, the one that is toward the back has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *ÇUMICLUM*

The stone which belongs to the twenty-seventh degree of the sign of Virgo is called *çumiclum*. The color of this stone is black, like ashes. It is very heavy and hard to break. When broken open, it looks something like hair and splinters inside. By nature it is cold and dry and it is rough to the touch. The mines of this stone are located on the shores of the Indian Ocean and of Çin.

This stone is dark and without any shine. When one washes with it, as one does with other stones which are used to cure wounds, it works very well and closes the wounds. It has great power to keep liquid from running and to join together things that are apart. For this reason, it is used to make alcohol to cure the white of the eye that has become discolored, and also the pupil that wants to come out of the eye, which is accompanied by great pain.

The northernmost star on the front line of the left leg of the sign of Virgo has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *TYFFURENEZ*

The stone which belongs to the twenty-eighth degree of the sign of Virgo is called *tyffurenez*. It is plentiful in the land of Çin, where it is found on

the seashore. This stone is porous and so light of weight that it seems as if it could float in the air, but all the same, it is strong and hard to break. It is somewhat shiny and its color resembles that of saffron, which is why some call it *saffron stone*. It can be found also in the land of Spain, on the shores of the sea that is toward the east.

By nature this stone is cold and dry in the third degree. When it is pulverized and given to someone in a drink, it will dry up the liquid in the stomach and stop vomiting, and it has the power to hold back vomiting as well as diarrhea. The stone does yet another thing: it will keep the person who has it in his mouth from spitting too much. Besides, it will prevent a person from drooling when asleep, and will also stop the drooling in small children.

The southernmost star on the front line of the quadrant on the left leg of the sign of Virgo has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *CARABE*

The stone which belongs to the twenty-ninth degree of the sign of Virgo is called *alcarabe* (sic), which in Greek means *stone which attracts straw*, and which in our language is called *alambre*. It is found in a river called Açtuz, located in the land of France, as well as on the shores of the sea of the Occident, in the land called Baltar, in the western part of Spain. The stones are most plentiful close to the palms in the mountains.

The color of this stone is similar to that of yellow hyacinth, and there are some whose color is like that of gold. When broken open, its color appears the same inside, but in some of them the color tends toward red. Also, when broken open, the stone gives off an odor like that of camphor.

By nature this stone is cold and dry, and its virtue is that of attracting straw. When it is pulverized and its powder is spread over a dead body, it will prevent it from rotting. It does this due to its property to arrest and to dry up. Because of this property, it stops nosebleeds, as well as bleeding from any other part of the body. It also stops vomiting. When taken in a drink, it cures the disease called *coryza* (common cold) and also tremors of the heart and stomachache, and when the powdered stone is placed on a cracked or broken bone, it will also heal that.

The southernmost star, which is on the second line of the quadrant on the left leg of the figure of Virgo, has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *KINFAR*

The stone which belongs to the thirtieth degree of the sign of Virgo is called *kinfar*. By nature it is cold and dry. Its color is that of gold, dotted with black spots, and in some of them there are black lines instead of spots. This stone is strong and hard to break, and it is opaque, not transparent. When broken up, there is some clarity at the breakline, but the color inside is black and very dense. The stone is also heavy in weight. It is not found in mines, but in a river called Torys, which flows in the land of Spain. There are some trees, which in Latin are called *populus* and whose leaves and wood are black: from these trees flows a sap that falls into the river, and the stone is formed from this sap, under the water.

When this stone is pulverized and mixed with any kind of oil so as to make a paste, it becomes soft like wax and also burns like wax. When applied to the bite of a rabid dog, it will heal the bite, and when its powders are placed in eyes that have fissures in them, it will cure them. Moreover, when the stone is pulverized and steeped in vinegar, it makes a good and bright ink for writing.

The star which is on Virgo's right leg has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

VIII. ABOUT THE SIGN OF LIBRA

PROLOGUE

We have finished talking about the thirty kinds of stones which belong to the sign of Virgo, and now it is necessary that whoever wishes to work with them pay attention to the position of this planet, the same as we said about the other planets with each one of the signs. Whoever does this, will be able to use this knowledge as he wishes.

ABOUT THE STONE CALLED *TEBELCUZ*

The stone which belongs to the first degree of the sign of Libra is called *tebelcuz*. This stone is light of weight and has open pores, so that when held in the hand, it seems as if the wind were blowing through it. Its color is a brown that tends toward green. It is found in the Oriental Sea in the following manner: with big storms, the waves lift the stones up because of their light weight and, when they break on the shore, they throw the stones on the sand; and if at that time the waves do not throw them out and the storm lets up, the stones will return to the depths of the water where they were before.

By nature this stone is hot and wet. Its virtue is such that whoever has it hanging from his arm, in an amount that weighs as much as ten grains or more of barley, cannot be defeated in a feat of arms. But on the other hand, it is a deadly poison and if given to someone in a drink, it will damage his kidneys and make his urine run with blood and pus, so that if he is not helped promptly, there is nothing for him to do but to die.

The star which is on the right side of the waist of the Man Who Cries Out has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *SEAFOAM* (MEERSCHAUM)

The stone which belongs to the second degree of the sign of Libra is called *seafoam* (meerschaum), and there are five kinds. The first kind is called *sponge*; the second, *marine alga*; the third, *ferfide*, which means *red mixed with brown*; the fourth one is called *laveña*; and the fifth, *hongueña*. This book will speak about each one of these stones in its proper place.

The stone which is called *sponge* has this name because it looks much like a sponge, for it is light of weight and full of holes, both inside and outside. It is strong and hard to break. It smells of fresh fish, and its dominant color is brown. It is mostly found on the shores of the sea.

By nature it is hot and wet in the second degree. Women use this stone a lot to wash their bodies, for it has a great power to clean. The virtue of this stone is such that it makes scars left by ulcers and burns disappear, cleans teeth really well, and makes the gums grow. It does all these things even better when a little salt is added to it, or when it is burnt.

The star which is on the left knee of the Man Who Cries Out has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ALGUEÑA* (ALGA-LIKE)

The stone which belongs to the third degree of the sign of Libra is called *algueña* (alga-like), and it is the second kind of meerschaum. It is mostly found to be shaped like the moon and its color is a brown that is mixed with purple. It is full of holes, just like the first kind of meerschaum of which we spoke. This stone is heavy and coarse, and smells like marine alga, whence it gets the name *algueña*; however, in Chaldean it is called *gacora*. Most of these stones are found in the sea of the land called Galatia.

This stone is hot and wet by nature, but its heat is greater than that of the first kind of sponge of which we spoke. Therefore, when given in a drink of wine, it will help cure dropsy, as well as liver and spleen diseases. When the stone is burnt and made into medicine, it is good for the disease called alopecia, which makes the hair fall out, and also for scabies caused by dampness.

The front one of the two stars which are on the left leg of the figure that is Half Man and Half Horse, and which looks like it is in front of the three stars at the base of the tail of the same figure, has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE WHICH IS MADE FROM MEERSCHAUM*

The stone which belongs to the fourth degree of the sign of Libra is called *farfiri*, and it is made from meerschaum. It is full of holes and it looks as if it were made up of small worms. The color of this stone, whence it gets its name, is a red which is mixed with brown; however, in Greek it is called *milicion*. It is found in the sea of the land called Varnitaz. By nature this stone is hot and wet, and it is lighter in weight and made of a finer substance than the other stone of which we spoke.

The virtue of this stone is such that when it is given in a drink to someone who cannot urinate, it will cure him. It is also good against the disease of the stone, the abscess that forms in the bladder, and against ringworm, when it is rubbed with the stone. Against all these things, the stone has more power when it has been burnt.

Of the two stars which are on Cantoriz' right leg, the one toward the back has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *LANENNA* (WOOL-LIKE)

The stone which belongs to the fifth degree of the sign of Libra is called *lanenna* (wool-like), and it is the fourth kind of sponge of which we spoke. Its shape looks like that of dirty wool and it also smells like it, hence its name. It is full of holes, just like the other stones of which we spoke, and it is lighter in weight than any of them. It is strong and hard to break, and in Chaldean it is called *guyrunion*. It is found on the shores of the sea, especially on the island called Baritoria.

By nature this stone is hot and wet, and its heat is greater than that of any of the other kinds about which we spoke, but its wetness is not as great as that of the others. For this reason, it has the power to penetrate bodies, washing them well and taking off the skin. And its virtue is such that when it is pulverized and mixed with water and rubbed on a woman's breasts which have abscesses, it will cure them.

The star which is on the right shoulder of the Man with Bent Knees has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *FOGUENNA* (MUSHROOM-LIKE)

The stone which belongs to the sixth degree of the sign of Libra is called *fonguenna* (sic) (mushroom-like) and it is the fifth kind of the sponge called meerschaum about which we spoke before. By nature it is hot and wet and its shape is like that of a mushroom, whence it gets its name. It has no odor whatsoever. Smooth on the outside, it is rough inside when broken open. This stone is not as porous as the others of its kind and therefore is heavier. Its color is green, with its underside ash gray, but whoever breaks it open will find the inside to be of a more natural green than the outside. It is found on the shores of the sea, on an island called Çafuracon, and the people of that land call it *aluzahne*.

This stone is hotter than all the others of its kind about which we have spoken and whoever puts it on his tongue will feel a sharp taste like that of a burn. When pulverized and rubbed on hair, it will burn it, but it is good for curing the disease called *morphea*, and also another disease which takes off skin.

Two of the three stars, the one in the middle and the backward one, which are on the rump of the figure that is Half Horse and Half Man, have power over this stone. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE *FISHSTONE*

The stone which belongs to the seventh degree of the sign of Libra is called the *fishstone*. It is found on the island called Çulumea, in very deep mines located on the shores of the sea. Some of the stones are big, others small. It is light of weight, full of holes, rough to the touch, and strong and hard to break. However, when broken open, it is smooth inside. On the outside, its color is like that of seawater, but when broken open, the color inside is a reddish yellow.

By nature this stone is hot and wet, and on the island where it is found it is called *aquiueruz*, which means *stone of fish*. It has this name because it smells like raw fish which has started to spoil. The virtue of this stone is such that when it is thrown in a place where there are fish, the fish will all crowd around the stone. When pulverized and given to a leper in the amount that equals the weight of three drachmas, it will cure him, and when rubbed on the leper in a bath, it will also cure him.

Two stars, one on the left shoulder, the other below the knee of the left leg of the figure that is Half Horse and Half Man, have power over this stone. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *ELBEHTU*

The stone which belongs to the eighth degree of the sign of Libra is called *elbehta* (sic), which means *freezing*. By nature it is hot and wet and its color is similar to that of golden marcasite, only the latter is clearer and shinier. This stone is found in the sea of the Occident, in places where there is great darkness. With great storms, the waves throw the stones out unto the sands of the shore. Some of the stones are big, others small.

This stone's virtue, which gives it its name, is as follows: the person who sees it will remain gaping at it with his mouth and eyes wide open, as if frozen and numbed by cold, and unable to avert his gaze from it until it either is taken away or covered up with something. There is yet another thing about this stone. In the land where it is found there are birds that are the size of doves, red of color and shiny, and with long, green legs. They are called *çulunen* in Chaldean, and the people of that land eat them. If any one of these birds settles on this stone, it will make the stone lose its virtue. When the stone is placed in human blood, it dissolves and becomes mixed with the blood, and when afterwards the blood is heated over fire, it disappears and only the stone remains, separated from the blood but rendered much softer than before. However, when it is then placed in acidic citron juice, it will become as hard as it was originally. The stone has no other virtue than this, and it is not possible to make use of even this one without having the stone covered up.

Two stars, one on the left shoulder and the other below the knee of the left leg of the figure that is Half Man and Half Horse, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *MILITAZ*

The stone which belongs to the ninth degree of the sign of Libra is called *militaz*. This stone is so strong and hard that no other body but a diamond can make a mark on it, neither does fire harm it. It is found in the land of India, above ground, not in caves or in other deep places. It is very shiny and its color

is like that of fine gold. Some of these stones are big, others small, and they vary in shape.

By nature this stone is hot and wet. Its virtue is such that all flies and harmful reptiles flee from it. Moreover, learned men have said that the demons keep away from whoever has this stone on his person, and that he will not be harmed by any acts of necromancy or sorcery.

The star which is at the end of the front leg of the beast called Cantoriz has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE *CRACKED STONE*

To the tenth degree of the sign of Libra belongs the *cracked stone.* It is found in the land called Lebria (Libya). Its color is like that of saffron, only darker. Because it is cracked, it is easy to break and lighter of weight, and in everything it is like ammonium chloride, except that this stone is hot and wet in the third degree. Its virtue is such that, when pulverized and mixed with woman's milk and put in the eyes, it will cure and close up the deep ulcers that may form in them, and it will also make the fat that grows in the eye sockets disappear. Also, when given in a drink to the person who has an abscess in his liver, it will cure him.

Two stars on the figure of Cantoriz, one on his right shoulder, the other on the horse's spine, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are in midheaven.

ABOUT THE *TANNER'S STONE*

To the eleventh degree of the sign of Libra belongs the *tanner's stone*, which is also called *mobile* for the following reason: when placed in still water, it stays on the surface and does not move, but afterwards, when placed in running water, it goes to the bottom. It is more abundant on the island called Argenica than anywhere else. It is found on the shores of the sea, above ground rather than in mines. Despite having open pores it is very heavy. Its color is like that of citron, and in size some are large while others are small.

By nature this stone is hot and wet. Tanners use it in tanning hides. When pulverized and put into the throat of a person whose uvula is hanging

down, it will cure him. Also, when it is given in a drink to someone who has an abscess in his stomach, it will cure him promptly.

The northern one of the two stars which are on the right knee of the figure whose knee is bent has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE *SNAKESTONE*

The stone which belongs to the twelfth degree of the sign of Libra is called *snakestone*. In Chaldean, it is called *bezaquid*, which means *silencer of noise*. This stone is found in goldmines, where also good emeralds are found. It is shiny and its color is that of ashes, dotted with white spots. This stone is highly valued in the land where it is found. In size, some are big, others small, and neither fire nor iron can do the stone any harm.

By nature this stone is hot and wet. Its virtue is such that whoever wears it on his person can be sure of not contracting the disease of hearing a noise in his head, and if he has the disease already, he will be cured. Also, when the stone is placed on a snakebite, it will cure it. The same is true when the stone is pulverized and given to a person in a drink.

The two stars which follow to the east of the figure called Elfeca and which are both in the Corona Borealis, with one star more northern than the other, have power over this stone. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *ZFEDARONA*

The stone which belongs to the thirteenth degree of the sign of Libra is called *zfedarona*. It is found in the land of Cin, mixed with other stones which contain copper. This stone is strong and hard to break, and by nature it is hot and wet. Its color is that of saffron, with black spots; however, in some of the stones there are black lines instead of spots. These stones are large when taken out of the mines, but later they can be made to take on whatever shape is desired.

The virtue of this stone is such that when equal amounts of silver and copper are founded and then separated, so that silver is to one side and copper to another, and the silver is founded again and mixed with the stone that has

been pulverized, and then made into an anvil and a hammer, and the anvil is pounded with the hammer in a place where there are birds, each bird will remain still in its place and will not move. In this way, the birds can be caught by hand. This is the only virtue that this stone has.

The front one of the three stars which are on Cantoriz' right side has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *LAVICH*

The stone which belongs to the fourteenth degree of the sign of Libra is called *lavich*. By nature this stone is hot and wet, and it is found in the caves and holes which are in the sea, close to the island called Cabroz, which is the same as Cyprus. It is also found in the copper mines of that island. The color of this stone is very dark red, so dark that it is almost black. It is dull, without any shine, light of weight, and easy to break because it is porous.

The virtue of this stone is such that when it is pulverized and applied to an ulcer in which there is excess flesh, it will make it disappear, and when pulverized and washed like other stones, it will have greater power to do this work.

The fourth star which is on the eastern part of the Corona Borealis has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *FISHSTONE*

The stone which belongs to the fifteenth degree of the sign of Libra is called *fishstone*. It is very black and shiny like a mirror, but not transparent. It is very strong and so hard to break that it can be done only with great effort. This stone is more abundant in the land of the Occident than any other place. It is soft to the touch and, in daytime, it appears to give off a dust that looks like smoke. But the dust has no noticeable smell, nor does it appear at night.

The virtue of this stone is such that when placed on a thousand weights of fish, its property makes the fish cook as if it were on fire. Also, this stone, which has been placed on the fish, then placed in hot water, will make the water run right and left. The same virtue manifests itself also in cold water springs.

By nature this stone is hot and wet. It does yet another amazing thing: when a pearl, whose color is not perfect or which is not quite round, is placed on the fish where the stone was before, the pearl's good color will be restored and it will become perfectly round. Besides all this, it is good to put the stone in medicines which are used for curing the liver.

The bright star on the Corona Borealis, which is called Elfeca, has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE THAT APPEARS IN THE SEA WHEN VENUS SETS*

To the sixteenth degree of the sign of Libra belongs the *stone that appears in the sea when Venus sets* and disappears when it rises. It is found in the Mar Tenebrosa (North Sea), together with the other stones which demonstrate the virtue of the planets. This stone is found on the eastern side of that land, on the shores of the sea. Its color is a very dark yellow, with purple spots in it. It is strong and hard to break, so that the only thing that can break it is gold. This stone is bulky and very heavy, and its color is very beautiful, clear and shiny. In this stone, the power of Venus appears to be the opposite of that of which we spoke in the fifteenth degree of Taurus, for it comes up and floats on water from the time Venus sets until it rises, and goes down to the bottom of the water from the time Venus rises until it sets, and it continues to do this indefinitely. This virtue is demonstrated even more clearly when the stone is taken out to dry land, for it becomes dark when Venus rises and brightens up when the planet sets. Also, the stone's virtue is such that whoever wears it on his person can be sure of not dying in water by drowning.

Always, this stone is found to be shaped like a pillar, but master stonecutters can give it any shape they wish. Also, when placed in the juice of *caña hueca*, which is a kind of cabbage, it dissolves when mixed with the juice and turns into water. When this mixture is rubbed on a leper, it makes his hair fall out and his skin slough off, and he will be cured of that disease. The mixture will do the same thing when given to the leper in a drink; however, he who drinks it loses the desire to lie with a woman.

Two stars, one on the right side of the figure of Cantoriz, the other on the hock of the same horse's leg ... (incomplete)

ABOUT THE STONE CALLED *UIDIANA*

The stone which belongs to the seventeenth degree of the sign of Libra is called *uidiana*. By nature it is hot and wet in the third degree. It is found in the land of Egypt more than anywhere else, and it is also found on the island called Yequiraz. The color of this stone is that of ripe jujube. It is heavy, has no shine, and is so easy to break that it can broken by squeezing it between the fingers. In Greek, it is called *abraytoz*.

The virtue of this stone is such that when it is pulverized and given in a drink to the person who has been stung by a scorpion, it will cure him promptly. It will also cure those who have hemorrhoids and it will stop all bleeding caused by bloodletting. When soaked in boiling wine, the stone will harden, so that it can be worked on a lathe or with iron, in order to make tumblers and bowls, and the virtues we mentioned manifest themselves more strongly in the person who drinks from these utensils.

Two stars, one on the right shoulder of the part that is man, the other, which is one of the two located on the belly of the part that is horse of the figure of Cantoriz, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE *BLOODSTONE*

The stone which belongs to the eighteenth degree of the sign of Libra is called *bloodstone*. It gets its name from its virtue to absorb blood. When blood and this stone are placed in water, the stone will attract as much of it as it can find, so that it is not possible to get any of the blood out, except when the stone is placed in the sun or on a fire. Then the blood will come out of the stone without losing either its taste or consistency; it only will lose its color. When placed in a vessel that has blood in it, the stone will absorb the blood according to its size, while turning that which remains the color of water. Although this stone and the other one of which we spoke before are similar in color, there is a great difference between them in that the other stone only absorbs the blood in a dead animal, while this one absorbs the blood in both dead and live animals. Other than what we have said, this stone has no medical or any other virtue. It always has the shape of a nut, and is strong and so hard to break that it can be done only with great effort. At the same time, it is so light of weight that it almost floats under water.

Of the two stars which are called Azubene and which are on the southern scale of the figure of Libra, the dark one that is more toward the north has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED THE *STONE OF THE LAGOON FISH*

To the nineteenth degree of the sign of Libra belongs the stone called the *stone of the lagoon fish.* It has this name for the following reason: in the middle of an island called Cauhelyn are some lagoons which are very far away from the rivers and in which there are many small fish, the biggest of them less than the palm of the hand in length, and although they are alive, their heads are out of stone. They also have another stone in their spine of which we shall speak later in this book, in its proper place. The stone of the head is hot and wet and, among the animal stones, it is considered to be one of the most marvelous ones. When it is burnt and pulverized, and its powder applied to ulcers, it will eliminate the excess flesh in them and make them heal promptly.

The shiny star of Azubene, which is on Libra's southern scale, has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *MEYMENYEZ*

To the twentieth degree of the sign of Libra belongs the stone which in Chaldean is called *meymenyez* and which means *attractor of sperm.* It is one of the magnets of which we spoke and whose property it is to attract things by force. Like other magnets, it contains fire within, so that it burns with great heat when sprinkled with water, and whatever else this stone burns can be cooled only with wine mixed with honey.

By nature this stone is hot and wet in the fourth degree, is light of weight, has open pores, and is soft to the touch, so that, when picked up, it slips through the fingers. All the same, it is strong and hard to break. When broken open, it is rough inside and its color is a clear green, while the color on the outside is red which is not very clear.

The nature of this stone is such that when a man wears it on his person, it makes his sperm flow, so that if this goes on for a long time before he gets help, he can die. This is especially true when he eats or drinks something that

has this stone mixed into it. The stone does yet another thing: when, after a man has been lying with a woman and has left her, and a little of it is placed in the woman, it will attract all the sperm, without leaving any behind. This is what women do when they wish to fulfill their desire with men without getting pregnant.

Of the four stars on the branch of grapevine that Cantoriz holds in his hand, the southernmost one of the two front stars is the one that has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *MARCASITE*

The stone which belongs to the twenty-first degree of the sign of Libra is called *marcassita* in Arabic and in Greek, *parides*. There are three kinds: the first is called *aurea* because its color is like that of gold; the second, *argentea*, because its color is like that of silver; and the third, *cobreña*, because its color resembles that of copper. The book will tell about each one of these stones in its proper place, but first we will talk about the one that is similar to gold in color and also in some other things. This stone is very well known and it can be found in many places. By nature it is hot in the third and dry in the first degree, and it calcines when burnt. When ground, the stone becomes powder and hence loses moisture and increases in heat, acquiring the natural strength of sulphur, and then the learned men can use it in alchemy. When, at the time of founding, a little of it is added to gold, which is mixed with some other matter, it will purify the gold by separating it from the other matter. This stone is also good for cleaning pus from ulcers, for curing fistulas, wherever they may occur, and for making the covering that grows in the eyes disappear. Moreover, when the stone in its natural state is hung on a small child, it will take away the child's natural fear of things.

The star which is on the snake's mouth in the figure which in Arabic is called *Alhaue*, meaning *hunter of snakes*, has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *SILVER MARCASITE*

The stone which belongs to the twenty-second degree of the sign of Libra is called *silver marcasite*. It resembles silver in its appearance and color, and by nature it is hot and wet.

The virtue of this stone is such that when placed together with iron that has veins of gold in it, it will make fire burn brighter than before and, as we said before, it will purify gold. When burnt, it has the power to retain in itself some fire, and when one works with the stone after it has been burnt, it will curl hair, strengthen eyesight, and when rubbed on the skin, will cure the disease called *morphea*.

The front star, which is in the middle of Azubene, on Libra's southern scale, has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *COPPER MARCASITE*

The stone which belongs to the twenty-third degree of the sign of Libra is called *copper marcasite*, because it resembles copper in color and redness. Hence, when it is burnt, some of the copper that is mixed with it will separate out. This stone, like the other magnets which have the power to purify, can purify gold. Moreover, when mixed with iron, it burns as well as silver marcasite does. When, after the stone has been burnt and pulverized, it is applied to the eyes, it will make the excess flesh in them disappear, improve eyesight, take away the pus that is in the eyes, and clear away the scales from them.

The more brilliant one of the two stars which are at the end of Azubene and are on Libra's northern scale has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE THAT IS FOUND ON MOUNT SINAI*

To the twenty-fourth degree of the sign of Libra belongs the *stone that is found on Mount Sinai*. By nature it is hot and wet, and it is very hard to break, so that nothing except a diamond can make a mark on it. This stone is green like an emerald, but it is shinier: its brilliance is so great that those who look at it cannot do so directly, because it makes them avert their eyes.

This stone is found in a very deep cave on the top of Mount Sinai. The entrance to this cave is very narrow, long and frightening, because it has many turns, but those who have the courage and dare enter, will see that the cave is roomy and light inside, and this is from where they extract the stones.

The virtue of this stone is such that whoever wears it on his person has no fear nor will he be frightened although he be or go about alone, and those who see him hold him in high esteem, and honor and fear him. But he himself is courageous and valiant, humble and modest.

The northern star which is outside of the head of the Man Who has the Serpent has power and command over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *SECUTARICA*

The stone which belongs to the twenty-fifth degree of the sign of Libra is called *secutarica,* which means *maker of pregnancy*, for its virtue is such that the woman who wears it on her person will get pregnant the first time she is with a man. It is found in the Promised Land and also in the land of the Orient. The color of this stone is red, like that of a very dark red rose, and it is so clear that it is transparent. It is light of weight and while some of the stones are big and others small, all of them are egg-shaped and have a hole that goes through them. By nature this stone is hot and wet. People love and treasure it for the sake of its beauty, but it has no other virtue than the one we talked about, to wit, to cause pregnancy.

The star that is in the middle of Azubene, on the southern side, and is on the beam from which Libra's balance hangs, has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *VINEGAR STONE*

The stone that belongs to the twenty-sixth degree of the figure of Libra is the *vinegar stone.* Its color is a yellow that tends toward green, but is dull. The stone is porous, light of weight, easy to break, and on the outside, soft to the touch. It is found on the island of Sardinia, on the shores of the sea. It is small in size, the largest one not weighing more than four drachmas.

By nature this stone is hot and wet in the third degree. Its virtue is such that it appears to reject vinegar as well as all things sour, so that, when placed near them, it jumps and flees, distancing itself as much as possible. When pulverized and mixed with another substance, it separates itself when vinegar is added. When pulverized and administered in a drink, it cures cough and difficulty in breathing. It also stops spitting up blood or pus due to an abscess in the lungs or in the side of the body, as well as all diseases that can be in the chest, in parts of the lungs, or in other parts that have to do with breathing. When mixed with an oil and applied on the places mentioned above, where these diseases appear, it has the same effect.

The star which is on the hind leg of the bear that is close to Cantoriz' hand has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *MARINA*

The stone which belongs to the twenty-seventh degree of the sign of Libra is called *marina*. It is found in the Occident, on the shores of the sea, because the waves wash them out on the sand. It is shaped like the whorl that is placed in a spindle that is used for spinning, and the middle of the stone has a hole through it. Some of these stones are big, others small, and on the top, all are grainy. The stone is yellow in color and it looks like it is dusty on the top. It is strong and hard to break, and its color is murky. By nature this stone is hot and wet.

The virtue of this stone is such that when half a drachma's weight of it is taken in a drink, it will destroy the stone that forms in the bladder or in the kidney, so that it can be passed like fine sand. When a small amount of the stone is placed in the meat that is to be cooked, it will soften the bones, so that they can be eaten as well as the meat. It will do the same thing with the bones of fish.

The southernmost one of the three stars that come after the bend in the neck of the snake which the Snake Charmer holds, has power over this stone. The stone receives its power and virtue from this stone and works best when the star is in midheaven.

ABOUT THE STONE CALLED *TARNICEN*

The stone which belongs to the twenty-eighth degree of the sign of Libra is called *tarnycen*, which means *attractor of leeches*. It is strong and hard to break, and its color is a brown that tends toward red. It always comes in the shape of a conical flask, with the figure of a leech inside, and when broken into pieces, each piece has the same figure in it. This stone is found at the foot of Mount Sinai, in a cave which is not very deep.

By nature this stone is hot and wet, and the heat in it is stronger than the dryness. This stone's virtue is such that, when placed on the mouth of an animal that has a leech in its body or throat, it will pull the leech with such great force as to make it come and attach itself to the stone. When pulverized and placed on flesh that has healed only on the outside, it will undo the surface and heal the wound. It will also cure warts. Moreover, this stone has great power to retain liquids, preventing them from running, and also to bring together things that are apart. Because of this, it is used to make alcohol to cure the eyeball which has become stained, and which wants to come out, causing great pain.

The northernmost star on the front part of Virgo's left leg has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *ARMENIANA*

The stone which belongs to the twenty-ninth degree of the sign of Libra is called *armeniana*. It has this name because it is found in Armenia Major, very far from any settlements, in sandy places, mixed with sand. This stone is soft and easy to break, and when broken, its inside looks like it is made up of sand. The stone is blue in color, the darkest one being the best. The stone resembles sand a lot, but differs from it both in nature and virtue. Some of these stones are very large, others small.

Dyers use this stone to dye cloth, and painters to paint on wood. Its virtue is such that, when applied to the eyes, it greatly improves one's vision. It also causes abscesses to go down and decrease in size and, when made into powder and placed on the virile member, it will dry up the water in it and return it to its normal state.

The star located on the arm, close to the elbow, of the Man with the Bent Knee has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE *FISHSTONE*

The stone which belongs to the thirtieth degree of the sign of Libra is called *fishstone* and it is counted among the stones found in animals. This stone is found in the Red Sea, on the island of Vacuat, where there is a lagoon which borders said sea, and where there are fish the size of the palm of the hand, without any scales, and with round heads in which, when broken, instead of a brain, there are these stones. This stone is strong and hard to break, light of weight, and rough to the touch. Its color is a white that tends toward yellow. By nature it is hot and wet in the third degree.

The virtue of this stone is such that when three drachmas' weight of the pulverized stone is administered in a drink, it will break the stone that forms in the kidneys and cure the person who has it. The stone does yet another thing: when it is made into a dough by mixing it with goat urine, placed into a narrow-mouthed earthenware vessel, buried in manure, and left there for thirty days in summertime, at the end of this time one will find an animal whose shape resembles that of a lizard, but whose color is green. When this animal is burnt and made into powder, and given to a person in a drink in any amount whatsoever, it will kill that person without him having any disease or showing any signs of it. The same will happen if a person smells it, and there is nothing one can do against this poison.

The star which is at the tip of the Bear's hind foot, which is near Cantoriz' hand, has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

IX. ABOUT THE SIGN OF SCORPIO

PROLOGUE TO THE SIGN OF SCORPIO

We have completed talking about the thirty degrees of the sign of Libra as well as about the thirty kinds of stones that belong to that sign. It is necessary that whoever wants to make use of this knowledge pay attention to the planet Venus and to the controlling decan of the decanate, making sure both are well received and in good position in relationship to the star with which they work, for it is then, God willing, that he will accomplish what he wishes to do.

ABOUT THE STONE CALLED *ALAZROB*

To the first degree of the sign of Scorpio belongs the stone called *alazrob*, which some call *ubar*. It is a kind of lead, the one of least value. This stone smells bad. In part, its nature is made up of earth that is clumped together very hard, and in part of air, but very little of the latter.

By nature this stone is cold and wet. That part of it is air is shown by its easy dissolution in fire, even with very little heat, and also by the fact that, when left in a wet place, it increases in weight so as to become very heavy. When it is made into a mortar and a pestle and used to grind things that are wet, the wetness of their natures will increase greatly. Using a mortar made of this stone to grind up medicines for abscesses is very beneficial. This is also true of the medicines for the diseases that affect the procreative members. Moreover, when the stone is made into a lamina and tied on a man's virile member, it will prevent the emission of semen that occurs at night, while he is sleeping.

Two stars, one on the stomach, the other on the leg of the bear that is in the figure of Cantoriz, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *TACCIE*

The stone which belongs to the second degree of the sign of Scorpio is called *taccie*, which in Chaldean means *created by water*. This is because, in the land of Argioz, near the town called Arraca, there is a spring with very good tasting fresh water, which descends from a mountain to the bottom of a very wide lagoon. In wintertime the water of the lagoon freezes, and when it melts with the heat of the summer, there remain some hardened pieces that are like

stones. This happens every year. These stones are strong, hard, heavy of weight, and clear, and their color is white, like that of frozen water. Yet, this is a stone which never dissolves, and is therefore counted among the land stones.

By nature this stone is cold and wet. Its virtue is such that, when it is ground up with something and used to rub on the palm of a hand, it enables one to hold fire in it without feeling anything and without getting burnt. Moreover, when used to rub on the forehead and the *tenlleras* of someone who has a fever, it will make the fever go away, and it does the same for the person who has a fever due to sunstroke. For the same reason it is very good for hot abscesses.

The star which is on the muscle of the right upper arm of the Man of the Bent Knee has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *MURUFEZ*

The stone which belongs to the third degree of the sign of Scorpio is called *murufez*. It is found in the eastern part of Spain, in mines near the town called Celem, which means *salvation* in Arabic. These mines are so deep that one can enter them only by using ladders. Some of the stones are big, others small, and they come in many shapes. It is clear enough so as to be transparent, but it breaks very easily. The stone has two colors, one part of it being white, another green, and each of them is very clear. It is one of the stones which is loved for its beauty. By nature its substance is earthy, and it is cold and wet in the third degree of both of these complexions.

The virtue of this stone is such that whoever wears it on his person can be sure of not getting a migraine headache, and when the stone is placed on someone who already has it, it will cure him. When the stone is pulverized and half a drachma's weight of it is given to someone in a drink, it will cause the illness called stupor, which is like fainting, and if a person drinks more of it than the above-mentioned weight, this illness can get as serious as to make him die. The stone does yet another thing: when placed in garlic juice, it dissolves; when this solution is left in the sun until it thickens and then poured into a mold and heated over fire until it becomes solid, it will once again become stone without losing any of its clarity, beauty, or color, but losing its previous nature and virtue.

The southernmost one of the stars which are on the right forearm of the Man of the Bent Knee has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *INDIANA*

The stone which belongs to the fourth degree of the sign of Scorpio is called *indiana*. It absorbs water and is found on the islands of India, in mines which are located close to the riverbanks. It is always three-sided in shape, which in Latin is called *triangular*. This stone is very porous, very light of weight, and yellow in color, but not very dark.

The virtue of this stone is such that when it is placed on someone who is hydropic, it will extract from him yellow-colored water, absorbing it according to its size. The amount can be known by weighing the stone after it has absorbed the water. When the stone is alternately placed on the hydropic person and then taken off many times, it will cure him by extracting all the bad water he has inside. The stone acts the same when placed on anything that has hot water in it, but it cannot extract cold water. It does yet another thing: it will expel the hot water it extracted after the water has turned cold.

By nature this stone is cold and wet and when heated, it will enclose fire, the same as the other magnets about which we spoke, but it will not be as hot.

The star which is on the right side of the Man of the Bent Knee has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *CRISTAL*

The stone which belongs to the fifth degree of the sign of Scorpio is called *bollar* in Arabic and in Latin, *cristal*. By nature it is cold and wet and it is found in many parts, but the best of the stones are found in the land of Ethiopia. The substance of which this stone is made is water that has frozen and petrified. There is proof of this in that, when one breaks open the stone, one finds something like small grains inside, locked in at the time when the stone petrified; also, in some of the stones, one finds a substance that looks like water.

This stone is strong and hard to break, but not too hard. Its color is white, like that of very clear water. There are two things that distinguish it from all other stones: this one, when heated, takes on any color that is placed with it; and, while other stones become more valuable the older they are, for *cristal* the opposite is true. This stone is easier to work than other stones, and it fuses in fire. Because of this, it can be made into any shape that one wishes. When shaped so that it is perfectly round and then placed in the sun, it will burn whatever happens to be close by that is burnable. However, it is not the stone's virtue to do this; rather, this happens because of its clarity and the roundness of its shape, and because of the rays of the sun hitting it.

Two stars, the back one of the two which are on the Bear's shoulder, and the northernmost one of the other two which are on his rump, both of them in the figure of Cantoriz, have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE *BROWN STONE FOUND IN THE RIVER CALLED "JARET"*

To the sixth degree of the sign of Scorpio belongs the *brown stone found in the river called "Aliarech"* (sic). In this river, there are four kinds of stones which do not resemble each other in anyway. This book will tell about each of them in the proper place, showing the virtues of each one of them separately as well as together. In the first place, the book will tell about the stone which is brown in color, is strong and hard to break, and whose shape is always that of a cube, just like a die. It is rather clear, but not so much so as to be transparent.

By nature this stone is cold and wet and its virtue is such that, when placed in a vessel of water, it will keep the water cold and does not let it warm up. When the stone is placed into hot water, it will make the water turn cold in a short time, and the longer it remains in the water, the colder the water gets. When it is pulverized and mixed with an oil to make a paste and then rubbed on hot abscesses, it will cure the abscesses.

Two of the three shiny stars which are on the forehead of the figure of Scorpio, the middle one and the one in the midday position, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are in midheaven.

ABOUT THE *SECOND STONE FOUND IN THE ABOVE-MENTIONED RIVER*

The stone which belongs to the seventh degree of the sign of Scorpio is a white stone and it is the second kind of stone found in the river about which we spoke before. The whiteness of this stone is very beautiful, and the stone itself is stronger and harder than the brown one of which we spoke. Its shape is always round and flat, like that of a cake. By nature it is cold and wet in the third degree.

The virtue of this stone is such that whoever wears it on his person can live a long time without drinking, neither feeling thirst nor suffering any harm. When this stone is placed in a vessel of water, any man who drinks from it will lose his desire to lie with a woman for a long time, and if he uses this water a lot, he will lose it for good. Also, when given in a drink, it cures the person who has hiccups. Moreover, when used to rub on the spot where one wishes to have hair, it will make beautiful hair grow fast.

Two stars, the northernmost one of the three shiny stars which are on the forehead of the figure of Scorpio, and the one which is in the midday position on the foot of the same figure, have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE *BLACK STONE WHICH IS IN THE ABOVE-MENTIONED RIVER*

To the eighth degree of the sign of Scorpio belongs the *black stone of the above-mentioned river*, the third kind of stone that is found there. It is very dark and its color is extremely black, and it is so shiny and smooth that it appears to have been polished. Its shape is always that of an acorn and it is stronger than either one of the other two which we said can be found in that river. When one breaks open the stone, one finds a very thick liquid inside. It dyes whatever it is placed upon, especially hair, which it dyes with a permanent dye. When used to write on parchment, it makes beautiful, shiny lettering. This stone is heavy of weight, and by nature it is cold and wet in the second degree.

The virtue of this stone is such that when one drachma's weight of it is taken in a drink, it acts as a very strong laxative. Also, it makes the person who wears it while sleeping sleep very soundly.

The northern star that follows the star which is the northernmost one of the three shiny stars on the forehead of the figure of Scorpio has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE *HALF-AND-HALF STONE*

The stone which belongs to the ninth degree of the figure of Scorpio is the *half-and-half stone*. It is found in the river Algaret, together with the other stones about which we spoke, and this one is the fourth kind. One half of this stone is green and the other half white, but this division is lengthwise rather than crosswise, and hence the stone is called *half-and-half*. The colors of both halves are clear and shiny, and it is always shaped like a pillar, long and straight. It is not as strong as the other kinds of stone of which we spoke, and it is porous, light of weight, rough to the touch, and it breaks easily. When one breaks open the stone, one finds it to be soft inside, and the person who breaks the stone feels as if air were coming out of it. In size this stone is bigger than any of the other kinds of which we spoke.

By nature this stone is cold and wet in the first degree. Its virtue is such that whoever wears it on his person will not get the disease called jaundice, neither the black nor the yellow kind. Moreover, when placed on someone who already has the disease, the stone will cure him. When pulverized and mixed with something that is then fed to a dog, it will kill the dog.

Two stars, one on the left upper arm of the Man Who Holds the Snake, the other on the snake's left side, below the twist in its body, have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *BELMUNICEN*

The stone which belongs to the tenth degree of the sign of Scorpio is called *belmunicen*. It is found on the island called Argenica, in the sand on the shores of the sea. It is light of weight, porous, rough on the surface, and easy to break. When one breaks open the stone, one finds it to be soft inside. The color of the stone is red, but not very red, and it comes in different shapes.

By nature this stone is cold and wet. When rubbed very hard either against wood or with cloth, it becomes very soft, so that it can be used to polish

gold. No matter where it is applied, it makes the gold very shiny and beautiful. When pulverized and mixed with water, it makes a very good paste, and neither moths nor worms will do damage to the woodwork that has been made with it. This stone has yet another virtue: when the bottom of a hot bath is rubbed hard with this stone, the person who sits in that bath will get a very severe case of the disease called colic, so that, if he does not get out forthwith, he can die.

The front one of the two stars which are on the hind leg of the figure of Scorpio and which are located in front of its heart, has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *BURITASSEN*

The stone which belongs to the eleventh degree of the sign of Scorpio is called *buritassen*. The color of this stone is that of red ocher, and by nature it is cold and wet in the second degree. Its property is such that it floats on water, and when one breaks open the stone, one finds it to be hollow inside and filled with a delicate substance which resembles a spiderweb.

When this stone is pulverized and mixed and then fused with ten times its weight of tin and founded in wine, it will become silver and will withstand hammer and fire, as well as everything else that silver withstands. However, it is not true silver, because, when heated many times, it will return to its original state.

This stone, when pulverized and given to a person in a drink, will make him pass a lot of urine, so much so that he cannot stop urinating, and if he drinks a lot, it will kill him. However, when taken in moderation by the person who suffers high fevers, it will cure him by making urine, especially in case of fevers in which there is more phlegm than bile. The stone does yet another thing: it makes the person who looks at it sweat a great deal, so that if he stares at it a lot, he can be cured by sweating, the same as the person who is cured through urinating. Furthermore, when this stone is used to make a lamp for burning oil or a wax candle, it will make them both burn ten times longer than otherwise.

This stone is found in the Promised Land, not in deep mines, but rather on the surface of the earth, in some sandy places. At times, it can also be found on the island of Sardinia.

The front one of the three shiny stars, which are on the body of Scorpio, has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ASLAGONIZ*

The stone which belongs to the twelfth degree of the sign of Scorpio is called *aslagoniz*, which in Chaldean means *spoiler of the sense of taste.* It is found in the land of Armenia Major, where there are some very large fields with very deep wells; when one gets water from these wells, one also brings up the stones.

This stone is soft to the touch on its surface, and its color is between white and yellow, like the wax of a swarm of new bees. Its virtue is such that, from sunset to sunrise, it becomes soft like wax, so that one can turn it into whatever form one wishes, join one piece with another, or divide it into any number of parts. But from the time the sun rises until it sets, the stone becomes hard and breakable, so that it is possible to grind it.

By nature this stone is cold and wet. Its name, which we gave above, is very appropriate, for whoever has it in his mouth will not be able to taste anything he eats or drinks. When added to medicines which taste bad, it will make the bad taste disappear and instead, make them taste good. Besides, as long as it is kept with the medicines, it will prevent them from spoiling.

The star which is on the ankle of the left leg of the Man of the Bent Knee has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE THAT APPEARS IN THE SEA WHEN MARS SETS*

To the thirteenth degree of the sign of Scorpio belongs the *stone that appears in the sea when the planet Mars sets* and which disappears when Mars rises. It is found in the Mar Tenebrosa (North Sea), same as the other stones which manifest the virtue of the planets. The color of this stone is white and it is so clear and shiny that at night it shines like a candle. Because of its great brilliance, it takes on whatever color is placed next to it. This stone is strong, so that it can be broken only by using great force.

The property of this stone is to abhor salt so much that there seems to be a great enmity between the two. When placed together, the stone will crumble, while the salt will lose its salinity.

It is light of weight and it manifests the opposite of what is said for the stone of the seventeenth degree of the sign of Aries: when Mars rises, it goes down to the bottom of the sea and when Mars sets, it will float on top of the water. Moreover, when it is out of the water, it brightens up when Mars is above the earth and becomes dull when Mars sets. There is yet another thing about this stone: whoever observes the stone when Mars is above the earth will notice that it can be easily damaged and broken, whereas, when Mars is below the earth, the opposite is true. This stone has yet another virtue: whoever wears it on his person in summertime will not feel the heat, and when those who suffer from high fever take a little of it in a drink, they will be cured.

The middle one of the three brilliant stars which are on Scorpio's body, and which is Scorpio's heart, has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *CARAHEYXURA*

The stone which belongs to the fourteenth degree of the sign of Scorpio is called *caraheyxura*. Its color is a very dark red, with white spots in it, and it is somewhat shiny, but not transparent. This stone is very large and by working it on a lathe, it is made into pots, tumblers and other things. These utensils are very beneficial to those who eat or drink from them, for they cure tremor of the heart and other heart diseases, as well as diseases of the liver and the spleen. The stone has another marvelous virtue: when some of it is placed in a container of milk, it will turn the milk into blood in its substance, color, taste and all of its other qualities.

By nature this stone is cold and wet. It is found in the land called Maneruquia, close to a town called Tetmir. The manner in which it is found is as follows: outside the town there is a field where there are many cisterns for collecting rainwater, and at the end of the field there is a very high mountain from which water flows down to fill the cisterns; in summertime, when the heat dries up the water, the stones are left behind.

The front one of the two stars which are on the left shoulder of the Hunter of the Snakes has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *ÇULUFIDENA*

The stone which belongs to the fifteenth degree of the sign of Scorpio is called *çulufidena*, meaning *lead-like*. It is found in the land of Aguiquia, in mines which are not very deep. Some of the stones are large, others small, and they resemble lead in weight and color, as well as in all the other qualities. There is only one difference: while lead melts as soon as it is put in fire, this stone will not melt; instead, it will break, so that it can be ground up.

When this stone is pulverized and mixed either with rose oil or any other oil that is cold, it makes a good ointment for curing dry scabies and itch, and it also will cure hot abscesses and make flesh grow in deep ulcers. And when the pulverized stone is thrown on iron while it is being smelted, the iron becomes soft like tin, or softer, so that it can be formed into any shape one wishes. Moreover, it stays this soft and only after smelting it and then placing it in goat's milk many times over will it recover its original nature. By nature this stone is cold and wet.

The farthest one of the three brilliant stars which are on Scorpio's body has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *BULUQUIXMEN*

The stone which belongs to the sixteenth degree of the sign of Scorpio is called *buluquixmen*, meaning *camphor-like*, because, when placed in fire, it gives off a strong smell that is similar to that of camphor. However, it does not resemble camphor in color, nor in anything else but the smell. The color of this stone is a yellow that tends a little toward red. The stone is porous and light of weight, and strong and hard to break. By nature it is cold and wet. It is found in the fords of the river called d'Isia. These stones are small and the best ones are shaped like eggs and are somewhat shiny.

The virtue of this stone is such that whoever wears it on his person can be sure of not getting an abscess on his head, and when it is given in a drink to someone who already has such an abscess, it will make it disappear. When hung on the bodies of children at the time when they are growing, it will make them grow well and be healthy. For these reasons, this stone is loved and held in high esteem by those who know it and know its virtues.

Two stars, the middle one of the three stars which are on the left hollow of the knee of the Man of the Bent Knee, and the one that touches it, have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *BURUQUIDTEZ*

The stone which belongs to the seventeenth degree of the sign of Scorpio is called *buruquiztez* (sic). It is found on the banks of the river called Alfarat, mixed in the sand. In length, all of these stones are made up of six squares. Some of these squares are green in color, others red. The stone is heavy in weight, shiny and strong, and hard to break. No matter how long it stays in fire, it will not be damaged. Rather, the longer it stays in fire, the more refined it becomes, increasing in clarity and beauty.

By nature this stone is cold and wet. Its property is such that when placed in honey, it will become dull and break up. It is a deadly poison, for when one drachma's weight of it is given to a person in a drink, it will make him lose his appetite for food as well as his ability to keep anything in his stomach. Even if he forces himself to eat or drink something, he will vomit it up right away and this is how he will die. The stone has the same effect on whoever has it on his body, for it makes him lose his sense of smell, so that he will not be able to smell anything. And it does not do this only to animals, but also to other things on which it is placed.

Two stars, the farthest one on the left hollow of the knee, and the middle one of the three which are on the left foot of the Man of the Bent Knee, have power over this stone. The stone receives its power and its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *TARNIFICEN*

The stone which belongs to the eighteenth degree of the sign of Scorpio is called *tarneficen* (sic). It is shaped like a bowl, concave on one side and round on the other, and it comes both in big and small sizes. The color of this stone is a green that tends toward yellow and it has red spots in it. The place where this stone is found is called Paradise Cave, located at where the Promised Land begins, close to the banks of the river called Lardon. In this cave there are many kinds of snakes and serpents. There is one kind of snake which is one *palmo* (21 cm.) long, like the vipers, and the property of these snakes is such

that, when Mars rises above the earth, they make such horrible sounds that he who hears them will die. For this reason, the people of that land, who know this, avoid getting close to the cave at that time. The stones, which are in the cave, can be obtained only in the following manner: when the river rises due to great floods, it enters the cave and swells, and when the water recedes and leaves the cave, it carries the stones along. According to the force of the water that pours out of the cave, the stones found on the banks of the river are either big or small. This is the only way to get the stones, for one cannot enter the cave because of the great danger of which we spoke.

By nature this stone is cold and wet. It is soft to the touch and heavy of weight. When placed in fire, it will burn quickly and turn brown. It is porous and light of weight. When the stone is pulverized after it has been burnt, and a little of it is placed either on iron or on some other metal while it is being forged and made into a dart, a lance, or any other kind of weapon, the animal which is wounded with it so as to make it bleed will never heal and will die. The stone does the same thing when some of it is given in a drink to a person whose body has a lesion or a place where it can reach blood: it will kill him as soon as it comes in contact with blood.

The star which is on the left shoulder of the Man of the Bent Knee has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *CEMINEZ*

The stone which belongs to the nineteenth degree of the sign of Scorpio is called *ceminez*, which in Chaldean means *crier*, because he who wears it on his person will be sad and will feel like crying. For this reason, those who know the stone shun it. It is found on the island called Çarandin, where one finds other very noble stones described in this book. This stone resembles sapphire in color, but not in anything else. It is dull and lacks clarity, and is strong and hard to break. There are only a few of them around, for, because of their bad virtue of which we spoke, men do not dare get them. By nature this stone is cold and wet.

When this stone is pulverized, mixed with purslane juice and used to wash out the mouth, it will cure the sores that form in it and get infected because they are of a bad complexion.

Two stars, one on the first, the other on the second node that form part of the figure of Scorpio's body have power over this stone. The stone receives its virtue from these stars and has greater force and virtue in all its works when both stars are in midheaven.

ABOUT THE STONE CALLED *FARTINICEN*

The stone which belongs to the twentieth degree of the sign of Scorpio is called *fartinicen*, which in Chaldean means *causer of bad dreams*. It gets this name from its virtue, which is such that whoever has it on his person while asleep will dream of very frightful and fearsome things, so that he cannot help but cry out aloud, even when snoring loudly. When this stone is pulverized and mixed with rose oil, it makes an ointment which is very good for erasing discolored blemishes from the face, as well as against the fever that is caused by sunstroke. It does this because it is hot and wet by nature.

In color this stone is black, with yellow spots in it. It is clear like a mirror, but not transparent. In size some stones are big, others small, and they come in different shapes. The stone is strong and hard to break and its virtue is such that when placed in salty water, it will turn the water yellow, the same color as its spots. The stone is found in the river called Tirbes, in the easternmost part of Spain, at the bottom of the river, mixed with sand and other stones.

The last one of the three stars on the left foot of the Man of the Bent Knee has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *MARTIZ*

The stone which belongs to the twenty-first degree of the sign of Scorpio is called *martiz*. In color it is very black and it is so shiny that it reflects the rays of light like a mirror. Its shape is round and concave, and in it there are some lines equally hollow, like those of an olive press. It is soft to the touch, light of weight, and porous.

The virtue of this stone is such that, when pulverized, mixed with something and rubbed on ringworm, it will cure the disease. It will also cure the disease called tetter, as well as whitlow, which appears around the tips of fingernails and toenails. By nature it is cold and wet in the second degree of

both complexions. This stone is found in the land called Zardel, on the outskirts of the town called Xerez, in some very deep mines, located at the top of a mountain which is close to that place.

Two stars, the one on the bend of the third node of Scorpio's tail, which is the northern one, and the other, which is on the same bend but toward midday, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *GEBRATIFEZ*

The stone which belongs to the twenty-second degree of the sign of Scorpio is called *gebratifez*, which in Chaldean means *protector of babies*. It has this name because its virtue is such that, when a pregnant woman wears it on her person, it will protect the baby from any harm until the time when it is born; moreover, the stone makes the baby's birth easy and without any danger, and helps it to grow rapidly and without any harm. This stone is found in Armenia Minor, close to the town called Gurfen, in a dark place. Its mine is in a sandy place, on the banks of a river, which flows nearby. The shape of the stone is always round and it has elevated lines on its bottom. It is porous, very light of weight, and soft to the touch. It has only a little shine to it and its color is that of refined gold, which tends a little toward red.

By nature this stone is cold and wet, and it breaks very easily. When it is pulverized and a little of it is added to copper at the time of founding, it will make the copper take on a very beautiful color of gold and make it resemble gold in all its qualities. However, it is not gold by nature, for when it is founded many times over, it will return to its erstwhile nature. Also, when placed on sores, the stone will cure them promptly.

The star which is on the left knee of the Man Who Has the Snake has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *TUMEN*

The stone which belongs to the twenty-third degree of the sign of Scorpio is called *tumen*. By nature it is cold and wet and it is found on the shores of the Red Sea in the following manner: on the shores of that sea there are fish called *cumy*, which have no other means of getting rid of their waste

except through the mouth; because of this, a stone forms inside their bodies and when the fish want to get rid of the stone, they go on the shore and throw it up.

The virtue of this stone is such that after it has been expelled, it will promptly kill other fish who come near it. Fishermen find these stones on the shore and value them highly because, when they put the stones on their fishhooks, all the fish who come near them will die and hence they can catch them easily. The color of this stone is like that of the leaves of green leek which tends somewhat toward white. It is light of weight, rough to the touch, and easy to break. When one drachma's weight of it is taken in a drink, it works well to clear up phlegm and, for this reason, is good for all kinds of pain in the arteries which are cold by nature.

The star which is on the left upper arm of the figure of the Man of the Bent Knee has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *CATU*

The stone which belongs to the twenty-fourth degree of the sign of Scorpio is called *catu*. It is considered to be one of the animal stones and is found in the following manner: in the land of Tept there are mountain sheep, which are small in size and such powerful runners that no one can catch them and, therefore, they can be caught only with cunning; in Chaldean, these sheep are called *catu* and that is how the stone gets its name. Each one of these sheep has a stone in its forehead, between the skin and the flesh. As the stone forms, the skin becomes stretched out and this is how one knows the sheep has the stone. When the stone is removed, it is of the color of jujube. In shape, the part of the stone that is toward the bone is flat, whereas the outward part, which is against the skin, is high and round. While the flat part shines like a mirror, the round one does not. This stone is strong and hard to break, but when broken open, it is web-like inside. By nature it is cold and wet.

This stone is used to make handles for knives and swords, by fitting the pieces together. The stone smells like amber. This smell becomes stronger when the stone is heated on fire, and when the burnt stone is pulverized, its powder smells very good. When the powder is mixed with rosewater so as to make a paste and applied to a burn, it will heal the burn without leaving a scar.

The star which follows the bend which is on the fourth node of the figure of Scorpio has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *MAZINTARICAN*

The stone which belongs to the twenty-fifth degree of the figure of Scorpio is called *mazintarican*, which means *governed by cold*, since this is one of the stones whose formation is governed by something outside itself. It is formed underground, in wintertime, in very cold places, mostly where rainwater accumulates in the years when there is a lot of rain. This stone is found in the seventh zone in the following manner: when the water rises a lot and afterwards goes down and is dried up by the heat of the sun, some cracked mounds are formed and whoever takes notice of them and opens them up will find inside them stones that have branches, much like those of coral, although they have nothing else in common.

This stone is very strong and can be broken only with great difficulty. It is very heavy, and it comes in two colors, green and white, both very shiny. By nature this stone is cold and very wet. Some of its branches are thick, others thin, and they are entangled underground, like the roots of trees.

Because it is more...(text is missing), it is hung around the necks of children. This is done also because of its virtue to protect them against the disease called *maseda*, and to stop them from drooling and also from crying a lot. When pulverized and given in a drink, the stone is useful against all diseases of the chest and it will help those who cough up blood and pus, as well as the ones who dribble urine. Moreover, when used to make a plaster, it is very good for hot abscesses.

Two stars which are united, one of them northern, the other southern, and which are above the figure of the Hearth have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *CAFFYURI*

The stone which belongs to the twenty-sixth degree of the figure of Scorpio is called *çaffyuri*. This is the stone about which we said that it is similar to *bezoar* and because of this, some, who do not know it, confuse the two. It is

light of weight, breaks easily, and its color is a brown that tends toward yellow. By nature it is cold and wet, and in this it is the opposite of *bezoar*. This stone is found in the land of Yemen and also in the land of Cin. It is quite shiny, but it loses its color when it is cloudy. It is of a delicate substance, for it wears away with time, destroyed by air.

This stone, when pulverized and placed on a scorpion's sting when the pain is the greatest, will take away the pain and cure the wound, and it will do the same for the bite of a rabid dog. When the pulverized stone is placed on scars left by sores, it makes them disappear, and he who has a piece of the stone in his mouth while drinking wine will not get drunk, nor will the wine do him any harm.

Two stars, the third and the fourth ones of the four stars which are on the right foot of the Man Who Holds the Serpent, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *ANCALICETZ*

The stone which belongs to the twenty-seventh degree of the sign of Scorpio is called *ancalicetz*. By nature it is cold and wet in the fourth degree of both of these complexions. This stone is found on the shores of that sea of Spain which is located to the east, and also in Barbary. It is very heavy of weight, soft to the touch, porous, and coarse. When it is burnt it will contract, become very light of weight, and it will shrink and become harder than it was before, so that it will not disintegrate when placed in water. When placed in water without heating it first, it will fall apart like clay.

When this stone is pulverized after having been burnt and the powder is placed on the wounds on feet, caused either by bumping against something or by shoes that were too tight, it will cure them. It will also cure the *esquenas* on the base of the toenails or fingernails.

The color of this stone is a yellow that tends toward green, and it is used in dyeing and painting. When placed in oil, it will cause the sediment to fall to the bottom, so that the oil will become purified and clear, and keep without becoming rancid or being affected by any other damage common to oil.

The star that is on the right shoulder of the figure of Alhave, the Hunter of Snakes, has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *LEGUYA*

The stone which belongs to the twenty-eighth degree of the sign of Scorpio is called *leguya* in Persian, *mechinecia* in Chaldean, and *guiraciel* in Greek. All these names mean *hardener of quicksilver*, for when one weight's worth of the stone is added to fifteen weights of quicksilver at the time of founding, the quicksilver will harden, so that it can be hammered and forged. However, if the founding process is repeated many times, the quicksilver will return to its original nature. This stone is very white in color, light of weight, and easy to break. It is found in Armenia Major, close to the town called Cequid. Its mines are at the top of a very high mountain, and on this mountain there are many kinds of grasses and trees, about which the learned Ceherit spoke when he spoke about Chaldean agriculture, telling many marvels about it, both heavenly and earthly. However, because it does not pertain to this book, it was left out.

This stone is dull, and its property is such that when placed in onion juice, it will lose its virtue to thicken quicksilver; however, moistening it subsequently with purslane juice will make it recover this virtue. By nature it is cold and wet in the second degree. Its virtue is such that whoever wears it on his person, either on land or sea, will not suffer ill effects from the changes of the air, nor from putrid water, no matter how stagnant it is.

The stars which are on the sting where Scorpio has its poison have power over this stone. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *NIFICER*

The stone which belongs to the twenty-ninth degree of the sign of Scorpio is called *darnificer* (sic). Its color is yellow with very black spots in it. It is heavier than lead and very shiny, so much so that it is transparent. Some of the stones are big, others small, and they come in many shapes. Men value this stone highly because of its beauty. It is strong and hard to break, so that only a diamond and gypsum can break it. Although the latter is of little quality

and soft, it is able to break this stone, which is very strong and of a very noble nature.

This stone owes its name, *darnificer*, to its virtue. It means *healer of pain in half of the head* in Chaldean and in Greek, this pain is called *cefalea*. The stone cures this pain very easily when hung over the head, and he who wears it on his person can be sure that said ailment will never afflict him. By nature this stone is cold and wet and it is found in the land of Merecitz, close to the Red Sea. It has yet another wondrous virtue: any animal who walks on four legs and eats meat will die upon seeing the stone.

The star that is on the fifth node of Scorpio's tail has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ZARMIQUIDEZ*

The stone which belongs to the thirtieth degree of the sign of Scorpio is called *zarmiquidez*, which in Chaldean means *healer of jaundice*, for its virtue is such that whoever wears it on his person can be sure that he will never get this disease, and when placed on the person who has the disease, it will cure him. The stone has yet another very noble and wondrous virtue: when placed next to a food that contains poison, it becomes turbid, mixes with the poison, and becomes damaged. When the food is solid, such as meat or fish, or some other similar solid substance, the damage to the stone is total and it disintegrates. This is one of the greatest marvels which the learned men discovered among the virtues of the stones.

The color of this stone is green, like that of an emerald, but darker, brighter and shinier, and it comes in many shapes. This is not true for a real emerald, which always is shaped like a tube. Also, this stone is heavier than emerald, stronger and more difficult to break, and has greater resistance to fire. It is found on the island of Alacuac, close to the Red Sea, in some very deep mines that exist in that land.

The star which is on the seventh node of Scorpio's tail, close to the sting that contains the poison, has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

X. ABOUT THE SIGN OF SAGITTARIUS

PROLOGUE

It is important that whoever wants to make use of the thirty degrees of Scorpio pay attention to the planet Mars, making sure that it is received by the star that has power over the stone. Also, it is necessary that he bear in mind the decan of the decanate and see if it is in a favorable position. By doing these things, he can, God willing, accomplish that which he sets out to do.

ABOUT THE STONE CALLED *ZEQUETH*

The stone which belongs to the first degree of the sign of Sagittarius is called *zequeth*. It is found in the land of Luquia, and also by the river which flows close to the town called Mitaz. This stone is black in color and it is very light of weight. When burnt, it bursts into flame and gives off a smoke that smells like fish when placed in the fire. By nature this stone is hot and dry.

When the smoke of this stone is applied to someone possessed by demons, it will help him right away, and it will also cure a woman with pain in her womb, for it penetrates very readily. Moreover, reptiles will flee from the smoke of this stone when it is being burnt. It is also good to mix this stone into medicines used for curing the disease called arthritis, caused by the nature of phlegm, because it is somewhat salty.

The star which is on the left knee of the Man of the Bent Knee has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *SEDINECH*

The stone which belongs to the second degree of the sign of Sagittarius is called *sedinech*, which means *amatites* (hematite). It is found in the cave called Cetui and also in mines in the land of Egypt. By nature this stone is hot and dry, and it is easy to break. Its color is red, and the deeper the color, the better the stone. Also, the stones of better quality are pure, and they do not splinter.

This stone is very well known. Its property is such that it has strong retentive powers, for which it is esteemed. It reduces the fat in the eye sockets and, when mixed with the milk of a woman, it will cure the disease called

ophthalmia, as well as the ulcers that appear in the eyes. When given in a drink of wine, it will cure the disease caused by the retention of urine, and it will also cure women who suffer from excessive menstrual flow. Moreover, this drink is very good for the person who is spitting up blood, for he will get well promptly. To make the virtue of this stone stronger, it must be burnt, pulverized and given in a drink of wine, for then it will have more power and will work better than in any other way. However, it must not be burnt too much or it will be damaged. To know just how much the stone must be burnt, one must pay attention to when it begins to change color, and one should take it off the fire immediately. When rubbed on a whetstone, the stone gives off a red color that is very good both for curing scabies and the itch that affects the eyes.

Two stars, the northernmost and the southernmost ones of the three that are on the left arm of the Man of the Bent Knee, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *COPPER*

The stone which belongs to the third degree of the sign of Sagittarius is the mineral stone called *copper*. By nature it is hot and dry and it comes in two colors. One of the colors is reddish, the better stones being light red; the other tends toward black and is not as good. The red-colored stone is found in the mines located in the land of Cabroz (Cyprus). It contains a lot of green, which is hidden, and does not appear except when the stone is placed either in vinegar or something else that is acidic. This leads to the formation of verdigris, a very strong poison. When this stone is placed together with the one called *dehenich*, of which we spoke earlier in this book, and both are mixed with quicksilver, the latter is hardened so that will break. When copper is mixed with some silica and borax and then reduced in cold water, its color becomes like that of fine gold; however, if afterwards it is placed in fire, it will turn black.

Whoever eats or drinks from dishes made of this copper will get many diseases, such as the one called the *elephant disease (elephantiasis)* and which enlarges legs, or the one called *cancer*. Also, this stone will cause his liver and spleen to become diseased, as well as damage all his complexions. It will do all this mainly when used to store any kind of cooked fish, for this food will take on a bad odor and become poisonous. On the other hand, the powders of this stone are good for reducing the fat, as well as the scabies that form in eye sockets, and for improving vision and drying up watery eyes. Moreover, these medicines will be better and act quicker when pulverized on a copper surface or

in a mortar made of copper. After being burnt and washed, copper can be made into medicines good for curing ulcers as well as the diseases mentioned above. But he who wants to work with copper has to make sure that he is not using it on soft and delicate substances unless it has been burnt, for it is too harsh; only with strong substances can it be used without first burning it.

The southern one of the two stars located on the bottom of the Hearth has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *MAÇACONIA*

The stone which belongs to the fourth degree of the sign of Sagittarius is called *maçaconia*. By nature it is hot and dry, and it has the power to cleanse. It will cure the whiteness that forms in the eyes, take the *uña* from them, and dry their wateriness. It is also useful against scabies and the itch, when used to rub on oneself in a bath.

The color of this stone is green and is similar to the silica that has green color in it. It is somewhat salty, and it is plentiful in the land called Latifi, as well as in the land of Spain. Goldsmiths use this stone a lot to purify gold in order to cleanse it of all impurities and things mixed with it, for it is in the stone's nature to do so. For this reason, the stone is very well known.

The star on Alhave's right hand, which rests on the bend at the end of the snake's tail, for Alhave is known to be the Hunter of Snakes, has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *MEHE*

The stone which belongs to the fifth degree of the sign of Sagittarius is called *mehe*. It is found in mines located on the shores of the Red Sea and it is also found in the land of Egypt. This stone is all white, without any other color mixed in. Some of the stones are light in color and these are the best; others are dark and brown, and these are harder to break. All of them look like silica and some say that they are a kind of silica. However, this is not true, for these stones do not break, nor can they be worked like silica. When this stone is struck with a strong iron, a lot of fire will come out of it, and there are some which look like clumps of salt.

By nature this stone is hot and dry in the third degree. When pulverized and applied to hard abscesses, such as scrofulas and other similar ones, it makes them mature and open up in a short time. Besides, it is used a lot by those who work in alchemy.

The star which is at the tip of Sagittarius' arrow has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *JOINER OF GOLD*

The stone which belongs to the sixth degree of the sign of Sagittarius is called *joiner of gold*. It has this name because it joins everything together, no matter how small the amount. It is found in the land of Armenia, and also in the land of Cabroz (Cyprus). Its color is that of green leek leaves, but even darker. It is heavy of weight and easy to break. By nature it is hot and dry and in many ways it resembles *aziniar* (sic).

This stone is very good for cleaning flesh. It has a point as if for scraping, which makes it useful for ulcers, for it eats the excess flesh that forms in them, thereby cleaning them and making them heal. The stone is also good for the eyes for it clears the scabies in them, and it cures the disease called opthalmia, by joining together the parts that have separated. Goldsmiths use this stone to solder gold. This stone is better and has greater power in all its works when it is mined in hot weather, rather than in wintertime. Like other stones, it is better yet when burnt. Also, it is better for the medicines made for eyes when it has been purified.

The northernmost one of the three stars which are on the left arm of the Man of the Bent Knee has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *CALYCON*

The stone which belongs to the seventh degree of the sign of Sagittarius is called *calycon*. The Arabs call it *ceni*. It is a kind of copper, but the ancients mixed hot spices with it, which made the stone poisonous. The greatest use is made of copper slag, moistened with cow's urine. This manner of copper, when heated in fire and hammered, will stretch, which is something no other copper will do. By nature it is hot and dry.

When made into a weapon and used to wound an animal so that it comes in contact with the animal's blood, it will cause great pain and if the wound is big, the animal will die. And if it is used to make hooks for fishing, the fish, once caught on it, cannot get free, even if the hook is small and the fish big. This is because of the great pain that the fish feels due to the poison in the copper.

When a person, whose mouth is twisted, is placed in a dark house, where he looks at himself in a mirror made of this copper, he will be cured. This stone has yet another property: when burnt in fire and then reduced in cold water, no animal will go near it. When made into pincers used for pulling out hair, it will make sure that the hair will never grow back. But, all this aside, it has the same power that the other coppers have.

Two stars, the northern one of the two which are on the same side of Sagittarius' bow, and the one which is on the right hock of that part of the figure which is horse, have power over this stone. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE *BATH STONE*

The stone which belongs to the eighth degree of the sign of Sagittarius is called *bath stone*. It has this name because it is found in the cauldrons of bathhouses. It is a sediment in the water at the bottom of these cauldrons, formed due to the longtime heating of them. This stone is porous, light of weight, and easy to break. By nature it is hot and dry, and its color is brown. When pulverized and applied to the cancer that affects women's sexual organs, it will cure them.

The star which is on the hand that holds the bow of the figure of Sagittarius has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE FOUND IN BULL'S BILE*

The stone which belongs to the ninth degree of the sign of Sagittarius is the one found in the bile of a bull, or in that of an ox, when the animal is killed during a new moon. For this reason, it is counted among the stones that come from animals. By nature this stone is hot and dry in the fourth degree.

It is round in shape, hard, and its color is a red that tends somewhat toward yellow. In Arabic, it is called *uare*, and in Greek, *kiron*.

The property of this stone is such that, when mixed with powders that are for the eyes, it will strengthen nerves and sharpen vision. When mixed with cold herbs and rubbed on hot abscesses, it will cure them, and it will also cure corrosive ulcers called the itch. When mixed with the juice of Swiss chard and applied inside the nose of someone who suffers from the disease which in Latin is called *catayrata* and with which the eyes are white and the person cannot see, it will cure him. It will also cure the disease called alopecia, which makes the hair fall out, by making new hair grow. Moreover, it will restore white hair to the color it had before.

The star which is on the upper part of Sagittarius' bow, pointing toward midday, has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *ARABIC STONE*

The stone which belongs to the tenth degree of the sign of Sagittarius is called *Arabic stone*. In color it is very similar to clean, white marble. It is soft to the touch, heavy of weight, strong and hard to break, and when broken, its inside is rough.

This stone has an amazing virtue in that, being as white as it is, when placed together with something liquid, it gives off a color which is like that of saffron. It is found in the land of Arabia, in mines which are close to the town of Caryndurin.

By nature this stone is hot and dry and this is the reason why it will clear away discolored blemishes that appear on the face, as well as other things which are caused by an excess of humors. When pulverized and applied to a spot that bleeds, it will stop the bleeding. Moreover, when burnt and pulverized, it can be made into a powder which, when rubbed on teeth, works very well to clean them.

The southern one of the two stars on the left side of the figure of Sagittarius has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *SILICA*

The stone which belongs to the eleventh degree of the sign of Sagittarius is *silica*. Some of it appears as a separate body, while some is dispersed in sand, and when purified and separated from sand, it joins together and forms a body of its own. This stone comes in many colors. One of them is white and this is the noblest of them and better than any of the others, but there are also those that are red, green, bright yellow, and purple.

This stone is easily founded when fired and once taken from the fire, it will return to its original state; however, when removed from the fire at the wrong time, unless it has cooled down some, it will break. The stone easily takes on any color that is added to it. It will wound any animal as well as iron will do, leaving some poison that it makes in the wound. By nature it is hot and dry.

This stone, when taken mixed in a drink of white wine that is clear and mild, will break up the stone that forms in the bladder. When burnt and pulverized, it is made into medicine which is good for it and it does not hurt. When burnt, it has greater power to break the stone in the bladder than it has otherwise. When ground very fine and mixed with clay, and then used to wash one's head, this stone will get rid of dandruff and cure the red blisters, caused by the itch. It also makes the hair smooth and, while it destroys kinky hair, it keeps the others from falling out and makes them grow fast and in abundance. Moreover, it is good for including in medicines made for itchy eyes.

The two stars which are in the midday position, on the arch of the Corona Australis that is toward the north, have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *AZARNECH*

The stone which belongs to the twelfth degree of the sign of Sagittarius is called *azarnech*. In Chaldean, it is called *zinderch*, and in Latin, *orpiment*. There are two kinds: one is red in color, the other, called *zeurech*,[38] is bright yellow. This book shall speak about each one of them, but it is proper that we

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38 This is identified by Zahony as realgar. Orpiment and realgar are deadly poisons, although when burnt, the contained arsenic is oxidized and less reactive.

first speak about the things which both have in common, and later about each one separately.

This stone is found in many places and in many mines, but the best kind is the one found in the land called Ecicoriton. By nature it is hot and dry in the fourth degree and it contains great heat. When one burns the stone until it looks like white lime, mixes copper with a small amount of borax and, while founding the copper and adding borax, also adds some of this stone, the stone will make the copper turn the color of gold, both inside and out, and make it lose its bad smell. However, it will not be natural gold. It is very good to rub burnt and pulverized *azarnech* on teeth, as well as on receding gums. This is so because burning turns it into a finer substance. When rubbed on hair, it will take it all off and when left on for a long time, it will burn the flesh.

The above things are what both kinds of *azarnech* have in common. Speaking separately about the kind that is red, we will say that its color is a very dark red, very clear and clean, and that it is easy to break. When pulverized and made into a paste with mistletoe juice and rubbed on the place where hair has been pulled out, it will make sure that the hair will never grow back. Moreover, when mixed with resin, it will cure the disease called alopecia and, when stirred together with the resin called *pez*, it will make the white spots, which appear on the fingernails, disappear. This stone is added also to medicines for all the diseases which affect the nose and mouth, for ulcers and fistulas, and for hemorrhoids. It is also good to add to medicines made for those who have had pus accumulate in the chest. Inhaling the smoke of this stone is good for the person who has a chronic cough and, when a little of it is mixed with honey and eaten, it will greatly clear the voice.

The front one of the two northern stars which are on the northern arch of the Corona Australis has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *(YELLOW) AZARNECH* (ORPIMENT)

The stone which belongs to the thirteenth degree of the sign of Sagittarius is called *(yellow) azarnech* (orpiment) and it is the second kind of this stone of which we spoke above. It comes in three colors: one is yellow; another one, red; and the third, white. The best and the noblest of them is the yellow stone, while the white one is the worst and of the least value.

This stone can be found in many mines and in many places, but the best are found in the land called Essicoriton. Its yellow color is like that of gold, because it looks like leaves placed on top of each other. By nature it is hot and dry in the fourth degree and, when mixed with lime, it forms a deadly poison. When a little of it is pulverized and mixed with milk, it will kill all the flies that eat from it.

This stone, when mixed with either oil or wax, is good to use on someone who has been whipped, or who has a scratch wound, for it will get rid of the infected flesh and he will be cured. The white-colored stone is a deadly poison. Moreover, all kinds of this stone are poisonous when vaporized. But the yellow stone cures the corrosive disease of the mouth which in Greek is called *fermes esiominus*. Also, when mixed with pork fat, it will heal abscesses.

The star which follows the star that is outside the southern arch of the Corona Australis has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE THAT CONSUMES HONEY*

To the fourteenth degree of the sign of Sagittarius belongs the *stone that consumes honey*. It is counted among the attracting magnets. When placed close to honey or sugar, it will absorb it according to its size and the more it absorbs, the more it will increase in weight. Afterwards, what has been absorbed cannot be extracted in any other way except by placing the stone in milk.

This stone is found in the land called Rabearnaue, in a mine which is close to the town called Entz. Its color is a very dark purple, with black spots in it. The stone is porous and light of weight, and it is easy to break. Some of the stones are large, others small. When taken from the mine, it has no luster whatsoever, but it becomes somewhat shiny when polished. When the stone is burnt, it will retain the fire, like other magnets do, and hence the stone itself has great power to burn.

By nature this stone is hot and dry in the second degree. Whoever wears it on his person can be sure of not getting any eye disease, for it greatly strengthens vision. However, it is a deadly poison when drunk in large amounts.

The star that is on Sagittarius' left shoulder and on the string of the bow has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE THAT APPEARS IN THE SEA*

To the fifteenth degree of the sign of Sagittarius belongs the *stone that appears in the sea* when Jupiter rises, and disappears when Jupiter sets. It is found in the Mar Tenebrosa (North Sea), where one finds the other stones which manifest the virtues of the planets, but this stone is found in a more oriental part of the sea than where the others are located. It floats atop the water when Jupiter is above the earth and it hides when Jupiter descends below the earth. The stone manifests the power of Jupiter in yet another way: when taken from the water and put on land, it brightens up when Jupiter is above the earth and it becomes dull when Jupiter sets. The color of this stone is a green that tends toward white, and its form is always that of the moon. However, the learned men, who know this stone, can give it any shape they wish. The stone is heavy of weight and hard to break, and it is so clear as to be transparent. By nature it is hot and dry.

The virtue of this stone is such that when a viper, or any other kind of snake, sees it, its eyes will be destroyed and it will die.

Two stars, both on the same arch of the Corona Australis, but one toward the north, the other toward the south, have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE *FIRESTONE*

The stone which belongs to the sixteenth degree of the sign of Sagittarius is the *firestone*. By nature it is hot and dry in the third degree. It is found in a cave called Cemny, located in the land called Latisi. This cave is very deep and bright, and the stones found in it are very clear, but not so as to be transparent, for they reflect the rays of light like a mirror. The stone is shaped like a bowl, one side of it being round, the other concave. It is porous and light of weight. Nevertheless, it is strong and hard to break, and when broken open, it is rough inside and white in color.

This stone has an amazing virtue, whence it gets its name. When oil of any kind is placed in the hollow part of the stone, it looks like a burning olive oil lamp and this will last as long as the oil is kept in it, and neither the oil gets consumed nor does the light grow dimmer. However, if salt is added, the light goes out, even though the oil remains in place. The same holds true when the stone is rubbed with salt. However, if the stone is then placed in fire while

blowing on it hard with bellows, it will recover its original virtue. Whoever uses the stone to eat from it foods that are not very fatty can be sure of not getting any disease in his chest, nor will he have any shortness of breath, and should he have a disease already, he will get rid of it.

Two stars, the blue star, and the one which, of the three stars that are on the head of Sagittarius, is the one on the eye facing the front, have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *ANATRON*

The stone which belongs to the seventeenth degree of the sign of Sagittarius is called *anatron*. It is a kind of *baurac* and, like *baurac,* a mineral. It is found in the land of Carabe, the place where we said that the other red *baurac* could be found. *Anatron* resembles it both in taste and color, but it is not as dark. By nature this stone is hot and dry.

When pulverized, this stone will cleanse bodies of dirt, making them fresh and clean, and it gets rid of excess wetness in them. For this reason, it is good for strengthening the nerves. Learned men, when working in alchemy, found this stone to have great knowledge and excellent quality, for which it is used a lot. It can be used to make very beautiful and valuable things, and it has the same uses as does red *baurac*.

The star which is under Sagittarius' arm and is one of the three stars on his ribs, has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE OF SALT*

The stone which belongs to the eighteenth degree of the sign of Sagittarius is the *stone of salt*. There are many kinds and it can be found in many places. Some are formed in the lagoons of the sea and are dug out like sand and there is another one, called *sal gema (stony salt)*, which is like stone. Yet another one, called *Indian salt*, is equally hard. Beside these, there is another one, which can be obtained from the lagoons on land. It is formed either by fire or by the heat of the sun and is called *sal de amasar (kneading salt)*. Of all the salts, this is the one men use most. Some of it is found in certain caves and

wells. However, it is proper that we speak here of only the two salts that count among stones, the one called *Indian salt*, and the other, *stony salt*.

First, we wish to speak about *Indian salt*. Its color is a brown with black dots in it, and it is plentiful in the land of India. This stone is strong and very hard to break, hot and dry in the third degree, and its taste is very salty. Therefore, it has the power to cleanse bodies, and it will greatly brighten gold and silver, each one in its own color, getting rid of dirt and oil. For this reason, it is used in alchemy.

Mixed into most of these stones is a substance that is very salty and somewhat like sulphur. But because talking about this would take very long and because it does not pertain to this book, we shall not do so.

About the *Indian salt* we say that, when placed on the flesh of any kind of animal, it will dry the flesh, extracting liquid. By doing so, it makes the meat keep a long time, without spoiling, or rotting, or smelling bad. No other stone will do this. Other substances, such as aloe, myrrh, camphor, and balsam, will dry the liquid that is in bodies, but they do it within the body, whereas salt dries by squeezing the liquid out of the bodies. For this reason, it is good for men, since it helps against phlegm, which grows in them often. This salt is also good against the abscesses that are caused by phlegm and, when mixed with other medicines which serve this end, it will make the growth that forms in the eye disappear. Furthermore, when mixed with oil and used to rub on the body, it will get rid of fatigue.

The star which is on Sagittarius' front left heel has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *STONY SALT*

The stone which belongs to the nineteenth degree of the sign of Sagittarius is called *stony salt*. As we said before, its substance is stone-like. It is found mostly in the land of Armuniaqui, and by nature it is hot and dry.

This stone prevents bad flesh from growing in ulcers. It is also good against abscesses caused by phlegm, as well as against the ones caused by dropsy. Moreover, it is used a lot in medicines made against the disease of the uvula and against quinsy, which is an abscess that grows in the throat. It also cures tetter. Mixed with horsemint, it is used to make a plaster which is very

good for scorpion stings. Also, in Egypt, it is used to make a plaster for the bite of the *atimçach*, for which it is better than any other medicine. It is in this stone's nature to cause vomiting, and when a little of it is given in a drink, it gives a loose stomach and purges the phlegm. This stone is used a lot in medicine.

The star which is on the spine of the Turtle, also called the Flying Vulture, has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ATYMCAR*

The stone which belongs to the twentieth degree of the sign of Sagittarius is called *atimçar* (sic). It is a well-known variety of salt and is found in many lands. It tastes salty and somewhat bitter and in this it resembles *baurac*. Its mines are located on the shores of the sea, close to a town called Lynauy. By nature this stone is hot and dry in the third degree, and of a fine substance.

This stone is of great help in founding gold, which it softens. When the stone and gold are put together, gold melts so fast that it seems to fear the stone. Also, this stone is very useful in that it keeps teeth and gums from rotting, kills the worms which appear in them and makes teeth look white and beautiful. It is used a lot in medicine, as well as in alchemy.

The farthest one of the three stars which are on Sagittarius' head has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *AXEP* (ALUM)

The stone which belongs to the twenty-first degree of the sign of Sagittarius is called in Arabic *axep*, and in Latin, *alumbre* (alum). It has this name because all things which are boiled together with this stone become bright and shiny, each according to its nature. Also, it will make things that are dyed take on beautiful and clear colors. The best of these stones are found in Egypt, and in a land called Milez. It is also found in Greece and in a land which in its own language is called Madunye, and in Latin, Macedonia. There are many kinds of this stone, but three of them are the best: the first is the one called *fendida* in Latin, and in Greek, *çacaztir*; the second one is round, and it is called

çatiriculi in Arabic; the third one is wet, and it is called *uguria* in Greek, and in Arabic, *alyamei*. Among these three kinds, there are some that have a green color in them, others which resemble tutty, and yet others which tend toward yellow. Whoever tastes them with his tongue finds that all of them are acidic. All are easy to break, and very white in color.

Of these stones, the best one is *fendida*, in which the acidity is greater than in any of the others. Of the kind that is round, the best is the one which is yellowish in color. The best of the wet stones is the one that is clear and of the color of milk, whose parts are all equal, and which smells like fire.

Since all the above stones are the same as to their nature and virtue, we shall speak about all of them together and say that they are hot and wet, and astringent. For this reason, they are good for clearing away the veil that covers the eyes and for getting rid of excess flesh, wherever it may appear. They are used in medicines made for scabies, which is caused by excessive wetness, and are good also for treating the sores which form in the mouth.

When burnt, mixed with some kind of ointment and rubbed on armpits, they will get rid of the armpits' bad smell. Also, this mixture is helpful against abscesses on the gums and against lesions called scrofula, which are caused by scabies. These stones will clean metals as well, making them shiny. Moreover, when *axeb* (sic) is dissolved, so that it runs like water, it will turn that which is liquid, solid. For this reason, it is used a lot in alchemy.

Of the three stars which are on the figure of Sagittarius, the one between his shoulders has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *RED SULPHUR*

The stone which belongs to the twenty-second degree of the sign of Sagittarius is called *red sulphur*. It is one of several kinds of sulphur, and we already have talked about three of them. This one, the fourth kind, is a red stone which is not very dark. It is found in the land of Africa, in its western part, close to the ocean. When this stone is in its mine, it gives off a lot of light, so much so that it resembles a torch, but it loses this virtue when taken out of the mine. By complexion and nature it is like the other sulphurs and it coincides with them in all of its qualities.

The virtue of this stone is such that, when a little of it is placed in the nose of a person possessed by the devil, it will help him, and if he uses it a lot, he will be cured. It has the same effect on the disease called apoplexy, as well as on the disease which in Greek is called *cefalea*.

This stone is used a lot when working with gold, because it dyes gold's white red, giving it a good color. For this reason, it is used a lot by those who work in alchemy.

The middle one of the three stars which are on the northern one of the hanging parts of Sagittarius' headdress has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *BIZEDI* (CARBUNCLE)

The stone which belongs to the twenty-third degree of the sign of Sagittarius is called *bizedi* (carbuncle). Its color is red, so that in color it looks like hyacinth. However, it cannot withstand fire like hyacinth can; rather, it will be damaged and lose its color. The best mines of this stone are in the orient. When taken from the mines, the stone has no brilliance whatsoever, but later, when polished, it becomes beautiful and shiny. By nature this stone is hot and dry: less hot, as compared to hyacinth, but drier.

The virtue of this stone is such that whoever has the weight of ten grains of barley or more of it on his person will not have any nightmares. Also, looking at one's reflection in the stone after it has been kept in the sun greatly lessens vision. Furthermore, when heated by rubbing it hard with hair and then put on the ground, it will attract straw and small pieces of wood.

The best of these stones is the one that is the reddest in color and the shiniest. There is also another variety of this stone, called *medibich*. This one is not red, nor does it attract straw and twigs like the one we have been speaking about, yet it has the same virtues.

The two last stars of the three which are on the northern one of the hanging parts of Sagittarius' headdress have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *MURUQUID*

The stone which belongs to the twenty-fourth degree of the sign of Sagittarius is called *muruquid*. It is found in the land of the Negroes, in a place called Çurin, close to a town called Aterbuliz. The mine of this stone is at the top of a mountain. This stone is strong and hard to break, light of weight, and its color is reddish brown, like clay. By nature it is hot and dry in the third degree.

This stone greatly cleans the bodies which are washed with it, especially the head, for it gets rid of dandruff and kills lice, and makes the hair very beautiful. When used to clean the whole body, it will clean away all the dirt from it; refine the skin, giving it good color; and make abscesses and boils disappear, especially the ones on the head.

When vinegar is poured on this stone, the stone will blister and expand, and when a lot of vinegar is used, it becomes soft like dough. Vinegar is the only substance that will break up this stone and when broken up, the stone smells like mountain rue. When placed under the nose of a person who is wont to faint, it will revive him, and it is also useful against the disease called apoplexy.

The star which is between the horns of the Turtle has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *BEYNEBEYRI* (BERYL)

The stone which belongs to the twenty-fifth degree of the sign of Sagittarius is called *beynebeyri* (beryl), which means *abhorrer of water*. By nature it is hot and dry, and it is found in the eastern part of the Promised Land, on the shores of the Dead Sea, which is at the end of said land. This stone is strong and hard to break, and it is shiny and so clear as to be transparent. Its color is like that of the sky. It is always oblong in shape and it has three sharp edges, so that each one of them cuts like a knife. Most of these stones are found at the bottom of a cave, which is at the end of that sea, where there is a stone hollowed out in the shape of a grave.

The virtue of this stone is such that, when placed in a liquid other than water, it falls to the bottom, but when placed in water, it will jump out, as if it abhorred water. One drachma's weight of this stone, given in a drink, will greatly purge cholera.

The star which is on Sagittarius' right upper arm has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ARYURITAZ*

The stone which belongs to the twenty-sixth degree of the figure of Sagittarius is called *aryuritaz*. It is found on the mountain called Aritar, whence it get its name. This mountain is in the land called Cetunaz, which borders Ethiopia. The mine of this stone is at the top of the mountain, and the stone is not found deep below the ground, but on the surface. This stone is heavy of weight and easy to break. It is clear and shiny and violet in color. When broken, its inside is found to be made up of sheets, layered one atop the other, and the more of the sheets that are taken away, the more beautiful the stone becomes.

By nature this stone is hot and dry. When placed on teeth that ache, it will make the pain disappear. Also, when mixed with oil so as to make a paste, and then placed as a plaster on the stomach of a person who suffers from stomachache, it will take away the pain and the person will be cured. Moreover, when a little of the stone is placed in a lot of water, which is then used to sprinkle on wood, the wood will never rot nor bend out of shape.

The hidden star, which follows the three stars on the northernmost one of the hanging parts of Sagittarius' headdress, has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *BULUFIRIZ*

The stone which belongs to the twenty-seventh degree of the sign of Sagittarius is called *bulufiriz*. It is found in the lagoon called Belfiz, whence it gets its name. This lagoon is at the end of the land called Karuquia and borders on the land called India. The water of this lagoon has a very marvelous virtue in that it does not let any animal who enters it go down to the bottom, but makes him float on top of the water.

The color of this stone is that of refined gold which tends toward red, and in its texture it resembles sand that has been gathered together. It is strong

and hard to break. Painters use it to paint wood the color of gold and, in the land where it is found, it is used to paint walls. By nature it is hot and dry.

The virtue of this stone is such that when it is added to gold during founding, the gold will turn white like silver and remain so until founded many times over. When burnt and washed like other stones and then mixed with oil, it makes a very good medicine for ulcers, for it purges and cleanses them of all impurities, so that they will heal.

The front one of the two stars which are on the Flying Vulture's right shoulder has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *LEYLERIZECH*

The stone which belongs to the twenty-eighth degree of the sign of Sagittarius is called *leylerizech* in Chaldean, meaning *stancher of spittle*, for its virtue is such that, when a person wears it on his body, it keeps the spittle from running when he is asleep. It will do the same thing for small children.

This stone is beautiful, so clear as to be transparent, and its color is a brown that tends toward red. It is light of weight, strong and hard, but easy to break when placed close to red ocher. It is found at the bottom of "the lagoon of fish," which is in the western part of the Promised Land. The water of this sea has a very good taste, and its color is like that of saffron. By nature this stone is hot and dry.

This stone, when pulverized and given in a drink in the weight of about half a drachma, adding a little red ochre, will cure the disease called *cholic*. It will also get rid of pain in the stomach and in the intestines, and it is very good for the liver that is weak or has been chilled.

Two stars, one on the right hind leg, the other, which is the front one and toward the north and located in the square formed at the base of Sagittarius' tail, have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *FARUQUID*

The stone which belongs to the twenty-ninth degree of the sign of Sagittarius is called *faruquiz* (sic). It is found in the land called Faruquia, whence it gets its name. The place where it is found is close to the town called Aterbuliz, where there are natural hot baths and where there is a cave with very hot sulphur water. The steam of this water rises and sticks to the walls of the cave and forms stones which are heavy of weight and strong and hard to break. When taken from the mines, the stones look as if dusty but when polished, they are very black in color and somewhat shiny.

When this stone is pulverized and one drachma's weight of it is given to someone in a drink, it will ulcerate the intestines and kill the person due to hemorrhage. When burnt, it becomes lime, with the fire enclosed in it, and if it is then sprinkled with water, it will burn everything flammable that is within reach. Moreover, this fire cannot be extinguished with anything except melted wax. By nature this stone is hot and dry. When it is placed in water and left there for some time, that water will have the same benefits for the person who bathes in it as does the water of the baths which are naturally hot.

Two stars have power over this stone. Both are in the quadrangle which is formed at the base of Sagittarius' tail: one of them follows the star which is on the northern side, the other is the first star on the southern side. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *MULUDINTAZ*

The stone which belongs to the thirtieth degree of the sign of Sagittarius is called *muludyntaz*. It is found in the land of Spain more than in any other place, and it is found on the bottom of a river which flows close to the town called Cayde. By nature this stone is hot and dry, and its color is black, with yellow lines in it. The stone is rough to the touch and light of weight. It has a strange property in that, when thrown into water, it goes to the bottom, but when thrown into wine, it floats on the surface.

When this stone is pulverized and mixed with resin, it will cure hot abscesses and, when put on hair, will pull it all out. The hair that grows in afterwards is weaker than before and if the hair is destroyed like that many times, it will not grow back. The stone is also good in medicines made for the eyes, for it gets rid of the whiteness in them.

The star which is on the southern side of the quadrangle that is formed at the base of Sagittarius' tail has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

XI. ABOUT THE SIGN OF CAPRICORN

PROLOGUE

We have spoken about the thirty kinds of stones which belong to the thirty degrees of the sign of Sagittarius. It is necessary that whoever wishes to work with them pay attention to the planet Jupiter, making sure it is well received by the star with which he wishes to work. Also, he must be mindful of the decan of the decanate, making sure its position is favorable for doing good works and not bad ones.

ABOUT THE STONE CALLED *TUTYA*

The stone which belongs to the first degree of the sign of Capricorn is called *tutya*. There are three kinds of it. The first one is white and is called *Indian tutya*; the second one is green and is called *marine tutya*; and the third one is of a yellow that tends toward red and is called *Spanish tutya*. We shall speak about each one in its proper place, but first we shall speak about the *Indian tutya*, which is found in the Indian Ocean, whence it gets its name. It is found in other places as well, such as the land of Cabroz (Cyprus). Its color is white and it looks as if covered with powdered salt. It is very light of weight, light in color, and by nature cold and dry. When placed in vinegar, this stone gives off an odor like that of copper. It has retentive powers, is very comforting, and it makes flesh grow in ulcers, closing them, and getting rid of the bad smell they have. Also, it dries up tears and keeps eyes from watering. The stone does these things all the better when it is pulverized and washed with wine. The *Indian tutya* is finer than the other stones which are of the same nature.

The star that follows the one on the left shoulder of the Eagle (also called the Flying Vulture) has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *GREEN TUTYA*

The stone which belongs to the second degree of Capricorn is *green tutya*, also called *marine tutya*. The mine of this stone is on the shores of the sea of the land of Cin. The stone is green in color, rough to the touch, full of holes, heavier than the first kind of *tutya*, and of a coarser substance. By nature it is cold and dry.

This stone has the virtue to dry. It is retentive and will make the veil disappear from the eyes. It is also good for cancerous ulcers, blisters, and ulcers in the eyes. The stone will perform these works better when it is pulverized and mixed with water into a paste, and then made into tablets and dried in the shade.

The southern one of the two stars which are on the Turtle's eye has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

THE STONE CALLED *SPANISH TUTYA*

The stone which belongs to the third degree of the sign of Capricorn is *yellow tutya*, also called *Spanish tutya*. It is formed in the land of Spain, whence it gets its name. It is also found in the land of Cin, where it is called *mahudia*, but the one found in Spain is more stone-like than the others, also heavier of weight, and less clear. By nature this stone is cold and dry and for this reason it is retentive and very drying, and it has some *punnimiento* (acidity?).

This stone is better than any other medicine for ulcers that form on the private parts. Also, it keeps the eyes from watering and strengthens and sharpens the eyesight.

The star which is on a feather of the lone arrow has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *ZEBECH* (JET)

The stone which belongs to the fourth degree of the sign of Capricorn is called *zebech* (jet). This stone is hard, very black in color, light of weight, and easy to break. It shines like a mirror, but is not transparent. The mines of this stone are found in many places, but the best of them are on the islands of India. By nature it is cold and dry in the third degree.

This stone, when pulverized, is very good when mixed with medicines made for strengthening eyesight. Moreover, when it is fashioned into a mirror, and one looks into it, it greatly strengthens the eyesight that is weak, either because of old age or due to illness. When mined, these stones have the shape of boards, some of them thick, others thin, which can then be worked into

whatever shape one wishes. However, it is not good for one to always wear it on his person, for if he does, it will bring him sadness.

The front one of the two stars which are on the Eagle's left shoulder has power over this star. The star receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *CLINIA*

The stone which belongs to the fifth degree of the sign of Capricorn is called *clinia*. It is found in many places: some of them in silver mines; others in the ovens where copper is founded; and some are found in very rapidly running rivers, because the water uncovers them by wearing away the sand and dirt with which they are mixed. Yet other stones are found on the island of Cabroz (Cyprus), and these are more natural than the others of which we spoke. They are counted among the good stones, and for this reason, we shall speak about them before we speak about the others.

This stone has the shape of a bunch of grapes. This is why in Arabic it is called *ancodi* which means *racemose*. Black in color, it is of a coarse substance, but rather light in weight. There are some stones which, when broken open, are the color of ashes inside; others are green, and those are the best. By nature this stone is cold and dry; hence it greatly dries everything to which it is applied, and also restrains humors, so that they cannot flow. For this reason, it is used in medicines made for the eyes and other places where one does not wish the humors to flow and cause harm.

The star which is on the Hen's mouth, called the beak, has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *CORNELINA* (CARNELIAN)

The stone which belongs to the sixth degree of the sign of Capricorn is called *alaaquic* in Greek and in Latin, *cornelina*. Its color is a red that tends toward yellow, and it is so clear and shiny as to be transparent. The stone that has these traits is better and nobler than the other one, which looks like water that comes out of meat when it is salted. Also, there are some stones which have very faint white lines in them. There are mines of this stone in many places,

such as in the land of Arabia and that of Yemen, on the shores of its sea, in the land of Rome, and in many other parts. By nature this stone is cold and dry.

Men love this stone because of its beauty, and also because of its virtues. It has three great and good virtues: one, it helps the advocates who speak on behalf of someone else, because wearing this stone on their person gives them strength to argue without fear and it also helps them to do it well; two, it is good for stopping bleeding, especially in women whose menstrual flow is too great; three, when pulverized, it is very good to apply to teeth, for it cleans and whitens them, makes the flesh of the gums grow in, and also makes the color of the gums very red. The stone that has the virtue to stop bleeding is used more than all the others. It is the one whose color is that of the water which comes out of meat when it is salted and, as we said, it works on teeth better than the others. And it does yet another thing: it heals the cavities which form in the roots of the teeth and stops the gums from bleeding.

The star which is at the tip of Capricorn's front horn has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *ALMARTAC*

The stone which belongs to the seventh degree of the sign of Capricorn is called *almartac*.[39] Some of these stones are artificial, while others are natural, and we wish to speak here about the latter, because they belong with other natural stones. The best of these stones are found in the land called Rachbearnaue and also in India. The color of this stone is red and like *fouida* and it is clear, but not so as to be transparent. It is heavy and soft and easy to break.

By nature this stone is cold and dry and for this reason, it has the property to dry a lot and to absorb, and it cleans the things to which it is applied. Although the stone's power and coldness are not very great, it is very good against the itch and the ulcers produced by the itch. When mixed with wax, it is used to make a very good medicine, which cools ulcers, alleviates the pain they cause, clears away the putrid flesh in them and makes them heal. The stone's power to do these things is greater when it has been burnt.

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39. Zahony thinks this might be rhodochrosite.

This stone constricts and dries a lot and because of this, when it is burnt and mixed with a little rock salt, it turns very white. For this reason, it is used in the works of alchemy, but how this is to be done is not included in this book since it does not belong here.

The second one of the two stars which are on the Flying Vulture's left shoulder has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *ALMAGRA* (RED OCHER)

The stone which belongs to the eighth degree of the sign of Capricorn is called *almagra* (red ocher). There are two kinds: one of fired brick, of which it is not proper to speak here; and the other, which comes from the mines and of which we shall speak in this book. Although this stone is found in many places, the best is the one found in the land called Ceymicaz. The color of this stone is like that of liver. It is of a coarse substance, heavy of weight, and of equal parts in all its qualities. By nature it is cold and dry. When soaked in water it enlarges a lot.

Because this stone is retentive, it is used in medicines made for hemorrhage, and because of its attribute to dry, it brings together the parts which are separated. To make the stone more effective in its work, its powder must be stirred into a soft cooked egg. It will work the best this way, and will help greatly against pain in the liver. The stone is very good when used to rub on hot abscesses, and it is also good for ulcers in the intestines. Moreover, it helps those who spit up blood, as well as those who have chronic hemorrhaging. When given in a drink, or used in an enema, it will kill the worms that form in the intestines.

Two of the three stars which are on the back horn of the figure of Capricorn, the southernmost and the northernmost ones, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE *AGUZAR* (WHETSTONE)

The stone which belongs to the ninth degree of the sign of Capricorn is the *aguzar* (whetstone). This stone is well known to men. It is found in many places and it comes in different colors, but the best and the noblest of them is

the green one, about which this book will now speak. It is called the *oil whetstone*, because its color is that of oil which tends toward green. This stone is soft and easy to break, and by nature it is cold and dry.

When the water, which comes out of the stone when it is used to sharpen something made of iron, is used to rub on the disease called alopecia, it will cure the disease and make the hair grow. This water, when mixed with vinegar and drunk, will get rid of the abscess that forms in the spleen, and it is also useful against the disease called epilepsy. When rubbed on the breasts of little girls, the water of this stone will keep their breasts from growing, and it acts the same when rubbed on the private parts of little boys. When copper, which is found on the island of Cabroz (Cyprus), is rubbed against this stone, it is very good for ulcers that men get sometimes. Moreover, when mixed with vinegar and saltpeter, this stone is very good for scabies, itch, and the scabs which are called scrofulas. When pulverized and put in the eyes, it will get rid of the whiteness that occurs in them.

Two stars, the first and the last ones of the three stars on Capricorn's mouth, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *TALC*

The stone which belongs to the tenth degree of the sign of Capricorn is called *talc*. It is formed from the dew which at night descends from the air and settles on the ground, and it is made up of layers, one on top of the other. In Arabic, it is called *alfath*, and also *arat araroça*, which means *bride's sweat*. The color of this stone is like that of seashells. This stone is found in many places, such as the land of Haruquia, the land of Yemen, and that of Cabroz (Cyprus). When flayed, it shines a lot, and for this reason, it is used to make louvers for baths, the same as glass is used. And the thinner the peeled layers, the lighter and brighter they are.

This stone has a marvelous virtue in that, when hit with a hammer or any other thing, it will only break up in layers. However, when placed inside a coarse woolen cloth together with stone pebbles and rubbed very hard, it will become pulverized. This powder is used to set the bodies that had contracted some disease and for this reason, it is used in alchemy. By nature it is cold and dry.

Rubbing this stone on any part of the body will prevent fire from burning that part as easily as it would do otherwise. The stone has great retentive power and because of this, it stops bleeding in the person who, because of some illness, spits up blood. It also stops excessive menstrual flow in women; is good for abscesses that form on the breasts, the ones that form on those virile members of men with which they create their lineage; and also abscesses that form behind the ears. It is good for all flesh that has been damaged by wetness, and it cleanses and heals the ulcers which the lepers get on their fingers and toes.

The southernmost one of the three stars which are on the mouth of the figure of Capricorn has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *AZDE*

The stone which belongs to the eleventh degree of the sign of Capricorn is called *azde*. By nature it is cold and dry in the second degree and is easy to break. It is found in many places, but the best is the one found in the land called Milez. This stone is very heavy, and its color is a brown that tends a little toward yellow.

This stone, when it has been pulverized and mixed with some sawdust and water, forms a mixture which, when applied to wood that has split or which one wishes to join, will join it so well as not to leave a mark where the split had been or where the wood was joined together. The stone has the property to dry and to retain a lot, and it will make the darkness in vision disappear. Also, it is of great help when mixed with water and rubbed on hot abscesses that form on women's breasts or on their genitals, or on male virile members, for it takes away the pain and makes the abscesses heal.

The star which is behind Capricorn's right knee has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *CALDAMUQUIDA*

The stone which belongs to the twelfth degree of the sign of Capricorn is called *caldamuquida*. It is red in color and so clear as to be transparent. But he who has sharp eyesight and pays close attention, will see within the stone the figure of a deer, outlined in yellow. Moreover, no matter into how many pieces

the stone is broken, the same figure will appear in each piece. This stone is strong and hard to break, and it is also heavy. It is found in a cave called Camuy, in the land called Cenhuquid, close to the land of India. In this cave there are many other stones of which we have already spoken in this book, and others of which we shall speak in the appropriate place. But this particular stone is found to be hanging in the cave, as if it had been formed there, and it can be picked by hand. It comes in many shapes, large as well as small, and by nature it is cold and dry.

This stone has four virtues. The first virtue is that whoever wears this stone on his person will never be found dead in water. The second virtue is that, when one drachma's weight of it is taken in a drink, it will purge melancholy gently and well. The stone's third virtue is that, when hung on the abscesses which form on a person's throat, it makes them break open and heal. The fourth virtue is such that, when a person looks at the stone a lot, it will strengthen his eyesight and it will also cure eye diseases which impair vision.

Two stars which are on Capricorn's neck, one northern, the other southern, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *CALUN*

The stone which belongs to the thirteenth degree of the sign of Capricorn is called *çulun* (sic). It gets this name from a mountain which is in the land called Cicopes, meaning "castrated by cold." This mountain is big and very high, and its name is Curun. The mines of this stone are found at the top of this mountain, and the stone is named after the mountain. This stone is very heavy, and is easy to break. When broken open, it is like coarse sand inside. Its color is black, with green veins in it. Upon being burnt, it contracts a lot and becomes very hard, so that it can be broken only with great effort, but except for hardening, the stone receives no other property from the fire. By nature this stone is cold and dry in the third degree.

After it has been burnt, this stone is used to make a medicine which restrains and cools a lot. For this reason, it is very good for hot abscesses, especially the one called carbuncle, since, by cooling it down a lot, it prevents the carbuncle from developing into an abscess. When pulverized and applied to the gums, this stone heals the ulcers in them, as well as the itch of the mouth.

It is also good for all tightness in breathing, whatever the cause. The stone has yet another unusual virtue in that, when it is pulverized and mixed with wine, given the shape of an acorn and placed into a woman's vagina, it will prevent the woman from becoming pregnant.

The star which is on the hollow of Capricorn's left knee has power over this stone. The stone receives it power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *CAPCIA*

The stone which belongs to the fourteenth degree of the sign of Capricorn is called *capcia*, which means *cappadocia*. This stone is soft and easy to break, and it dissolves easily in water, but not in anything else. Its color is dark green and it is fine-textured. It is very common in the land of Egypt, and it is used by those who treat cloth, for it whitens it fast and well. By nature it is cold and dry, and the virtue that it has to whiten cloth is against its nature.

This stone will stop the bleeding in women whose menstrual flow is excessive, and it is used in medicines which are made for closing ulcers, especially the ones which occur in soft and wet bodies.

The stone has no taste and, when dissolved in water and drunk, it is very good for pain in the bladder and it also will stop all types of hemorrhage.

The northernmost one of the three stars which are on the feathers of the Hen's right wing has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE OF SODOM*

The stone which belongs to the fifteenth degree of the sign of Capricorn is called the *stone of Sodom*. This stone is black and dull, and porous and rough to the touch, but strong and hard to break. When broken open, it looks the same inside. This stone is found in the mines which are in the mountains of Sodom, whence it gets its name. Some of the stones are big, others small, and they come in many shapes. By nature this stone is cold and dry in the first degree.

The virtue of this stone is such that, when pulverized and made into a plaster and placed upon the bladder, it will break up the stone which grows in

the bladder. Moreover, it cures the disease that causes dribbling of urine, as well as bed-wetting.

The star which is on the Hen's neck has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *BICARUQUID*

The stone which belongs to the sixteenth degree of the sign of Capricorn is called *bicaruquid*. It is found in the land of Lynar and also in the land of Cabroz (Cyprus). In both places it is found in wells. When taken out, it is soft like wax, but it hardens with exposure to air. The color of this stone is that of red ochre and it is very dark. By nature it is cold and dry in the first degree and dry in the third degree. For this reason, its dryness is greater than its coldness.

This stone has both retentive and drying powers with some sharpness to it and this is also how it tastes. For this reason, it is good for ulcers which are bad and infected, especially the ones that form in the mouth. This stone, when pulverized and mixed with honey and applied to the uvula that has been cut, will cure it promptly and also protect against the dangers which often accompany a cut uvula. The same mixture will also cure ulcers which form on the head or the *fondón*, and it greatly decreases excess flesh. Moreover, when the pulverized stone is applied to hair that is coarse, it will refine the hair and make it very beautiful.

The star which is on Capricorn's left shoulder has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *BEZEBEKAURY*

The stone which belongs to the seventeenth degree of the sign of Capricorn is called *bezebekaury*. In Chaldean, this means *taker away of sadness and giver of happiness*, for its virtue is such that it rids him who wears it on his person of all sadness, whatever its cause, and it will also cure all symptoms caused by melancholy. This stone is found in the land of Çulun, close to the town called Eraz, where there are men who have been castrated by cold. Men value it highly because of its beauty. It is always found to be of two colors,

green and red, both very clear and transparent, and of great brilliance. By nature this stone is cold and dry, and it is strong and hard to break, but light of weight.

This stone, when pulverized, is used a lot in medicines made for the heart, and it is also good for the ulcers that form in the intestines, as well as for stopping bleeding.

Two of the three stars which are on Capricorn's front horn, the northernmost one and the dim one, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *ECCE*

The stone which belongs to the eighteenth degree of the sign of Capricorn is called *ecce*. It is found in Spain, on the mountain called *Cehide*. This mountain is not very high, and it is located near the town called *Arraca*. The color of this stone is very black, with yellow dots in it. It is shiny, light of weight, porous, easy to break, and by nature it is cold and dry.

The virtue of this stone is such that it gives great courage to the one who wears it on his person, ridding him of fear and making him bold in all the feats of arms in which he may take part. When pulverized, mixed with honey so as to make a paste, and smeared on glass, which is then fired, it will give the glass a beautiful golden color. It will also make the glass stronger, so that it does not melt as fast, nor break as easily as it did before. Mixed with wax and resin, the pulverized stone can be made into a plaster, which is very good for making flesh grow in ulcers, making them close over promptly.

The two front stars of the three which are on the eastern part of the Dolphin's tail and which belong to the group of four stars in the quadrangle that is on its body have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *GUIFIRQUIZTI*

The stone which belongs to the nineteenth degree of the sign of Capricorn is called *guifirquizti*, which in Chaldean means *protector of children*. It has this name because of its virtue, which is such that, when placed on children when they are born, it will protect them against *maseda* and other

common childhood diseases. This stone resembles an acorn, in shape as well as in color. It is found in the river called Zeyle, which flows in the western part of the Promised Land. Light of weight, it is strong and hard to break. When broken open, it looks inside like teaseled wool.

This stone turns into ashes when burnt, and when these ashes are applied to the roots of a tree, no matter what kind, neither frost nor any other kind of burn will harm that tree, and it will bear good fruit at its proper time and without any mishaps. When pulverized and given in a drink to someone who suffers from pain in his intestines, the stone will cure him, and it will do the same for the person who has pain because of stones. By nature this stone is cold and dry.

The last one of the three stars which are in the middle of Capricorn's horn has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *TARMIZES*

The stone which belongs to the twentieth degree of the sign of Capricorn is called *tarmices*, which in Chaldean means *earth stone*. It is found in a very deep well in the land of Latisi, close to a place called Carcidon. The water taken from this well is turbid and very thick, and its color is green. This water, taken from the well and left in the sun, will harden and turn into a stone of the same color. It takes a day for this to happen and leaving it in the sun for a longer period of time does not make the stone get any harder. When polished, it will become shiny. By nature this stone is cold and dry and it is very strong in both of these complexions.

The virtue of this stone is such that, when half a drachma's weight of it is given to a person in a drink, it dries up his body, shrivels up his nerves and kills him. When mixed with wine so as to make a paste and then used to rub on the body of the person who has dropsy, it will slim him down so as to cure him; however, if this treatment is carried too far, it will dry his body too much and cause death. Also, the stone's virtue is such that whoever wears it on his person will never sweat, nor will there be much wetness in him.

The last one of the three stars which are in the space between the eastern end of the Dolphin's tail and the four stars of the triangle which is on its body has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE WHICH APPEARS ON THE SURFACE OF THE SEA WHEN SATURN RISES*

To the twenty-first degree of the sign of Capricorn belongs the *stone which appears on the surface of the sea when Saturn rises* and hides when it sets. It is found in the Mar Tenebrosa (North Sea), together with the other stones which manifest the virtue of other planets, as we have said before. This stone is very black in color and it is always shaped like a pine cone. It is very dense and strong and hard to break. When broken open, it is white inside, but this whiteness is barely visible and only when the planet is above the earth; when the planet is below the earth, it cannot be seen at all. By nature this stone is cold and dry.

The virtue of this stone is such that whoever wears it on his person will live a long time, and he will not get any of the diseases or infirmities common in other old people; to the contrary, his mind will stay clear and he will conserve his strength as long as he lives. The stone has yet another very unusual virtue: if a man or a woman looks in it as if in a mirror, it will greatly strengthen his or her eyesight, but if any other animal does it, it will lose its eyesight.

The foremost one of the two stars which are on Capricorn's belly has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT *PIEDRA DEL AZUL* (LAPIS LAZULI)

The stone which belongs to the twenty-second degree of the sign of Capricorn is called *piedra del azul* (lapis lazuli). This stone is very well known and it is found in many places. It is very blue in color. The best of its kind is found in the land of Horacen, and the ones held to be most valuable have gold colored veins or spots in them.[40] This stone is very easy to break. Placing the stone next to gold or mixing the two together will make each of them seem more beautiful.

Its virtue is such that when its powder is applied to the eyes, it will do much good. Also, when a piece of this stone is placed in a fire which gives off no smoke, it will produce a violet flame and the stone itself will become very hot and sharp, although by nature it is cold and dry. Moreover, it will acquire retentive powers. When the powder of this stone is given to someone in a drink,

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40. Lapis commonly contains pyrite as disseminations or as veinlets.

it will purge all thick humors as well as act against all diseases caused by melancholy. This stone also has the virtue that, either when taken in a drink or when inserted in the vagina, it will make a woman's menstrual flow come at its proper time. It is also good against pain in the bladder and does yet another thing: when mixed with water and used to wash one's hair, it curls the hair. This stone is often used in medicine.

Of the two stars which are on Capricorn's spine, the one that is toward the back has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE WHICH IN CHALDEAN IS CALLED *MELIZLUMEN*

The stone which belongs to the twenty-third degree of the sign of Capricorn is called *melizlumen* in Chaldean, which means *the stone that breaks up the other stone, which grows inside man.* By nature this stone is cold and dry and, when broken open, the substance inside is silica. It is found on the shores of the Sea of the West, washed ashore by the waves. It always comes in the shape of a troche, with small sand-like grains inside.

The virtue of this stone is such that one drachma's weight of it, given in a drink, will break up the stone that forms either in the kidneys or in the bladder, causing it to be expelled in the form of fine sand. It is also used in powders which are made for the eyes, and it does yet another thing: when given in a drink to a mount whose skin is blistered, it will cure him.

The southernmost one of the three stars which are on the feathers of the Hen's right wing has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *ALFEYXU* IN CHALDEAN

The stone which belongs to the twenty-fourth degree of the sign of Capricorn is called *alfeyxu* in Chaldean and some call it *feynac*. It is found in many places, but the best of all is found in the land of Sicily, on a mountain called Vulcan, and also in the land of Armenia. This stone is very porous and so light of weight that it floats on top of water just like wood. It is easy to break, its color is a white that tends toward brown, and by nature it is cold and dry.

This stone, when pulverized and used to rub on pelts, makes the pelts white and beautiful, and when powders of this stone are placed on parchment, they will erase the writing on it without leaving a trace. Moreover, they will clean teeth, making them white and beautiful and, with other medicines used to that end, it helps to reduce the whiteness in the eyes, but does not get rid of it completely. This stone has yet another property: when some of it is placed in a vat or a jar, or any other utensil that contains wine at the time when the fermentation is at its peak, it will stop it right away. The stone also makes ulcers grow over; rubs off hair from any place where it is applied; and takes off dead skin from the soles of feet when used to rub them in the bath.

The front one of the two stars which are at the base of the tail of the figure of Capricorn and which set toward midday has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *YESSO* (GYPSUM)

The stone which belongs to the twenty-fifth degree of the sign of Capricorn is called *yesso* (gypsum). This stone is soft, white in color, and easy to break. The color of some of the stones tends toward red, while others are a mixture of red and white. It is found in many places and there are many mines of it. By nature this stone is cold and dry.

This stone, when pulverized and mixed with some other substance, hardens right away and becomes stone. For this reason, physicians use this stone a lot in medicines whose property is to dry. It is also good for building houses and other things, because they will turn out fine and good. Moreover, this stone is good for stopping excessive bleeding. When burnt, it becomes drier and more refined and it has more power to keep wet substances from running, especially when mixed with vinegar to make a paste; then, when rubbed on the body, it stops sweating. This stone itself is a deadly poison, and if someone takes it in a drink before it has been burnt, it will choke him so as to kill him. It has the same effect after it has been burnt, only not as powerful.

The front one of the two stars which are at the base of the tail of the figure of Capricorn has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *QUEYEBYZ*

The stone which belongs to the twenty-sixth degree of the sign of Capricorn is called *queyebyz*. In Latin it is called *azul arambrenno* (coppery azurite), because of its blue color. However, it is darker and harder than the other stone about which we spoke before, and it has copper spots in it, while the other stone has spots of gold. When this stone is broken open, its color inside is purple mixed with yellow and for this reason, it is used to dye wood. Even so, this dye is not as good as that of the other azurite. By nature this stone is cold and dry and for this reason, it has great power to cool and to retain.

This stone is used in medicines which are made for the eyes; it cures hot abscesses, and also sores which appear on the body. Moreover, it whitens teeth and cures sores which appear on the gums. The stone is used in alchemy in the following manner: when it is burnt and some of it is added to gold at the time of founding, it softens the gold so as to make it spread out very easily. Moreover, it gives the gold a good color. Also, this stone will dye silver the color of gold, but this color does not last for a long time.

The front one of the two stars which are on the belly of the Fish and which points toward midday has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *NIMIUZ*

The stone which belongs to the twenty-seventh degree of the sign of Capricorn is called *nimiuz*. Its color is green, it is strong and hard to break, and it is rough to the touch. It is found on the island of Çarandin. This stone is used to sharpen iron implements and to polish stone, for it sharpens all manner of iron implements and polishes all stones very easily. In size, this stone is very large, so that in the land where it is found men use it to make pillars and also kettles and pots for cooking food, and bowls and goblets for eating and drinking. Everything placed in utensils made of this stone cooks fast and with a small fire, and those who eat the foods cooked in these utensils will be cured of hemorrhoids and of arthritic gout. By nature this stone is cold and dry.

Two stars, the first one and the first of the four toward the north, located on the base of Capricorn's tail, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *CAOZ*

The stone which belongs to the twenty-eighth degree of the sign of Capricorn is called *caoz*. Its color is a black that tends toward red. It is soft on the outside and it is light of weight, but strong and hard to break. When broken open, there is something resembling a fine powder inside. This stone always comes in the shape of an almond. Its name, which we gave above, is in Greek and means *earth stone*, because it is found deep in the earth. It is found mostly in the land called Beymyra. Some of these stones are big, others small. By nature it is cold and dry.

The virtue of this stone is such that when the powder, which is found inside the stone, is mixed with glass at the time of founding, the glass will not break when pulled out from the fire, as it does otherwise; rather, it will spread out when hammered and will tolerate hammering well, so that it can be made into whatever one wishes, the same as gold or silver, without it losing its clarity.

This stone smells like vinegar and when placed on the tongue, it will stick to it. It dries the wetness in a woman's vagina, and also heals ulcers by closing them over. Moreover, it heals the ulcers which form in the intestines.

Of the two stars which are on the mouth of the Piece of the Horse, the one toward the back has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *SAYASTUZ*

The stone which belongs to the twenty-ninth degree of the sign of Capricorn is called *sayastuz*. Its color is that of yellow hyacinth and it is very clear and shiny, so much so as to be transparent. Its yellow color is very beautiful, but it tends somewhat toward white. This stone is found in the river which flows near the town called Armuniaqui. Born in the south, this river flows toward the north, and where it enters the sea, at two hundred *migeros* from the point where it starts to flow, is where the stones are found. By nature this stone is cold and dry.

This stone's virtue is such that when placed in anything that is boiling, it will cool it down right away. Also, whoever wears it on his person loses all desire for a woman. Moreover, of all the men who wore the stone on their person, not one can be found who died by the sword. When this stone is pulverized and mixed with the juice of green coriander, it will dissolve so as to

become of the same substance as the juice. This liquid, when rubbed on a snake bite, or on the bite of a rabid dog, will cure the bite promptly, and when rubbed on ulcers, it will make them close over without leaving a scar.

Two stars have power over this stone: the one that sets toward midday and the one which, of the four stars on Capricorn's tail, is at the tip of it. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *FANAQUID*

The stone which belongs to the thirtieth degree of the sign of Capricorn is called *fanaquid*. It is found in a lagoon located between the land of those "castrated by cold" and the one called Cercuiniz. The virtue of the water of this lagoon is such that all manner of wood thrown into it sinks to the bottom. This stone is found at the bottom of the lagoon. It is shaped like a man's eye and it is very shiny and clear. By nature this stone is cold and dry, and it is very hard, so much so that nothing but glass will break it. It is a great marvel of nature that something as weak as glass will break something as hard as this stone.

The virtue of this stone is such that it has the same effect on wild animals as the stone called *beth* has on men: the animal who sees it has such great desire to keep looking at it that, if not taken away by force, he will keep staring at it until he dies. This virtue is the only one this stone has.

Of the two stars on the head of the Piece of the Horse, the one toward the back has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

XII. ABOUT THE SIGN OF AQUARIUS

PROLOGUE

We have spoken about the thirty kinds of stones in accordance with the thirty degrees of the sign of Capricorn, indicating the stars to which they are related and whence they receive their virtue. For this reason it is important that whoever wishes to work with them pay attention to the planet Saturn, the same as we have said about the other planets.

ABOUT THE STONE CALLED *CARBEDIC*

The stone which belongs to the first degree of the sign of Aquarius is called *carbedic*. It is counted among the animal stones for the following reason: in the mountain called Culequin, in the land of Macedonia, there are some very large hares; when one kills them before they become one year old, one finds in their hearts a white-colored stone which has a very red dot in it. This stone has no shine to it, and by nature it is hot and wet in the second degree.

The virtue of this stone is such that it warms the body of the man who wears it on his person so strongly, that winter's cold does not harm him like it does someone who does not wear it. Also, he will have great power to lie with a woman. When this stone is pulverized and mixed with wine, and applied to hard abscesses, such as cancer and others which are of the nature of melancholy, they will be cured in a short time.

The star which is on the head of Aquarius has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *MARUYRA*

The stone which belongs to the second degree of the sign of Aquarius is called *maruira*. It is found in the land of Africa, on the shores of the sea, where there is a large beach. It is very green, has no shine, and is strong and hard to break. When broken open, it is white inside. This white substance can be easily scraped, and when one or two drachmas' weight of it is given in a drink, it will purge phlegm in a gentle manner. Some of these stones are large, others small.

When this stone is dissolved in water and used to wash one's hair, it will get rid of dandruff and lice and render the hair very beautiful and soft, and it also will make hair grow in places where it has been lost, due to disease or some other cause. The stone has yet another virtue: rubbing it on limbs which have wasted away due to a disease that weakens the nerves, will help cure them, restoring their strength and virtue; and limbs which are diseased and difficult to move will be loosened up, so that they can move easily. When burnt, the stone blackens and becomes porous. It is then that it is used in alchemy.

The southern one of the two stars which are on the left loin of the man who pours down water in the figure of Aquarius has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *SPONGE STONE*

The stone which belongs to the third degree of the sign of Aquarius is the *sponge stone*. This stone can be found in many places and it comes in many shapes. The ones found in the Promised Land are small in size and very hard. The color of this stone is like that of jujube. By nature it is hot and wet, its wetness being in the first degree and its heat, in the third, and for this reason it dries more than it moistens.

This stone, when given in a drink, will break up the stone that forms in the bladder, but not the kidney stone. It has yet another property: when placed in water, it moves away, rejecting it. Placed together with any kind of oil, it incorporates the oil, so as to become one and the same thing with it. When this form of the stone is applied to teeth, it will cure the sores on them. It also will cure scabies and the itch and will relieve the pain caused by these diseases. When heated and placed in the ear, it stops the noise produced in the ear, dries up the water and the foul discharge in it, and prevents the development of an abscess.

Of the two stars on the right foot of the Hen, the one which is toward the back has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *MEZARIGEZ*

The stone which belongs to the fourth degree of the sign of Aquarius is called *mezarigez*, which in Chaldean means *cooker of meat*. The virtue of this stone is such that when a little of it is added to meat that is to be cooked in a pot or some other utensil, it makes the meat cook very fast. Also, meat cooked in this way strengthens the limbs, takes away fear of life, and gives comfort and courage to the person who eats it.

By nature this stone is hot and wet. It is strong and hard to break, and its shape is always round. It is sandy, and its color is a green that tends toward purple. It is shiny and so clear as to be transparent. This stone is found on the island called Mata, on the shores of the sea, mixed with sand. At night, it illuminates its surroundings. When pulverized and given in a drink, it is useful against all kinds of poisons, of animal as well as of vegetable origin, and also against tremors and weakness of heart.

The northern one of the two stars which are on the left loin of the figure of Aquarius has power over this stone. The stone receives its power and virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *ZARUKUTAZ*

The stone which belongs to the fifth degree of the sign of Aquarius is called *zarukutaz*, which means *golden stone*. It has this name because, in the land of Cabeduhya, near the town called Limebi, there is a cave with a mine where this stone is found. Some of the stones are large, others small, and they look like pieces of gold, in color and sheen, as well as in every other way. This stone is strong and hard to break, but when force is used to break it open, its inside looks like leaves. It cannot be pulverized unless it is first heated in fire, after which it is possible to finely pulverize it. When one part of this stone, after it has been burnt, is placed with twenty parts of silver, it will give the silver a beautiful golden color, so that it cannot be distinguished from gold unless founded many times over. By nature this stone is hot and wet.

When a small amount of this stone is mixed with a lot of water, and a cloth made of fibers which grow forth from the earth, such as flax, hemp, or cotton, is placed in this water, it will be dyed a very beautiful golden color. This stone, after it has been burnt, as well as when untreated, is used in many medicines which are made for the chest, and it opens air passages to the lungs.

Moreover, when the powder of the stone is blown into a person's nose, it will purge his head of all phlegm and of all bad humors that might be there.

The star which is on the left buttock of the Man Who Pours Water has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *YARMINEZ* (ARMEIUS LAPIS)

The stone which belongs to the sixth degree of the sign of Aquarius is called *yarminez* (armeius lapis). The mines where this stone is found are in the land of Spahen, and in that of Cabroz (Cyprus). It is very porous, light of weight, rough to the touch, and easy to break. The stone is blue in color, but it is not dark. When placed in fire, it burns, but despite this, it does not change in appearance, except for becoming more perforated. By nature it is hot and wet in the third degree.

This stone has the power to retain and to arrest humors, and it is very good for stomachache. When raisins are put in the water in which the stone has been steeped, they will become like the fresh fruit they were before. It has the same effect on all kinds of fruit, for it does not let them spoil or rot, but keeps them in the condition in which they were at the time of being immersed in the water thus treated. Moreover, this water, when used to wash clothes which contain gold, and which could not be cleaned in any other way, cleans them very well, without making them lose any of their beauty.

Of the two stars on Aquarius' right shoulder, the dim one has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *MAZIUQUEZ*

The stone which belongs to the seventh degree of the sign of Aquarius is called *maziuquez*. It is found on Mount Sinai. This stone is strong and hard to break. Its color is a brown that tends toward yellow, and in it, there is the figure of a green tree. And no matter into how many pieces the stone is broken, each piece has this figure in it. By nature this stone is hot and wet.

This stone, when pulverized and applied to sores that are long-standing, will make them grow over in a short time, and it works even better when mixed

with wax and resin. It has yet another very noble virtue, in that no one who wears it on his person has ever been known to have lost his fortune. For this reason, the people of the Promised Land always guard this stone in their coffers and with their valuables.

Of the two stars on Aquarius' right shoulder, the bright one has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE THAT ATTRACTS POISON*

To the eighth degree of the sign of Aquarius belongs the *stone that attracts poison.* It is yellow in color, with black dots in it. By nature it is hot and wet. It is light of weight, porous, strong, and so hard to break that it can be done only with great effort. This stone is already quite shiny, but when polished, it becomes shinier. When broken up, the inside of every piece is yellow and has black dots in it, just like the surface. Its nature is such that when placed in fire, the fire gets enclosed in it and burns, but not as long as in the other stones of which we spoke before.

The virtue of this stone is such that when it is added to any food or drink in which there is poison, be it of animal, vegetable or mineral origin, it will attract the poison just as a magnet will attract iron, and will absorb it. And if the stone is small and there is so much poison that it cannot absorb it all when used once or twice, it will do it when used three or more times. In order to find out how much poison the stone attracts each time, the following is done: after the stone has absorbed all it can, it is placed in hot oil, which will make it release all the absorbed poison; this is done repeatedly until it is clear that no more poison will come out. This method was developed by the ancients so that, when someone was poisoned, they would know the amount of poison given and hence be better able to cure him. The stone does yet another thing: when placed in the mouth of a person who has either eaten or drunk poison, it will make him throw it up. Similarly, it will extract the poison when placed on a snake or scorpion bite.

Two stars have power over this stone: of the two stars on Aquarius' buttock, the one that is toward the back; and the more northern one of the two stars on Aquarius' left leg. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *YAYMENI*

The stone which belongs to the ninth degree of the sign of Aquarius is called *yaymeniz* (sic). It is found on a mountain called Baymeniz, which is located in the western part of Spain. This mountain is very high and it extends well into the sea. This stone is very strong and hard to break, and its inside is rough to the touch. Its color is blue, but it is not as clear as the one whose color tends somewhat toward yellow. By nature it is hot and wet in the third degree. It is good for rubbing marble or other stones which one wishes to make smooth and polished. Also, the powder of the stone is good for rubbing on teeth, for it whitens them and makes them very beautiful. When the proper amount of it is given in a drink, it purges cholera. Moreover, when mixed with the pitch used to coat wineskins or other containers used to store wine, it prevents the wine from spoiling. Also, this stone is used a lot in medicines made for healing sores.

Two stars, one of them on Aquarius' right loin, and the southern one of the two on his left leg, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *CAHADENYZ*

The stone which belongs to the tenth degree of the sign of Aquarius is called *cahadenyz*. It is found on the mountain called Çahyt, whence it gets its name. This mountain is located in the land called Cabeduquia. This stone is a mineral. It is easy to break, and its color is violet, but somewhat darker. When burnt, it becomes porous and light of weight. By nature this stone is hot and wet.

This stone is good for rubbing hides which one wishes to make into parchment on which to write or paint. It is very good to add to medicines which are made for a stomachache. Moreover, the powder of the stone, when applied to the eyes of a person whose eyes are clear and who cannot see at night, will cure his eyes and greatly improve his vision.

The northern one of the two stars which are together and are located on Pegasus' head has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *YAMEZ*

The stone which belongs to the eleventh degree of the sign of Aquarius is called *yamez*. It is found in mines which are in the land called Virgin, and also in the mines of Canaan, in the land of Yemen. The latter are the best and the most valuable ones, and most of them are large in size, so that they can be shaped into whatever one wishes. The color of this stone is a white that tends toward crystal, except that when one stares at it hard, there seems to be a hidden redness in it. By nature this stone is hot and wet.

The virtue of this stone is such that whoever wears it on his person feels sure of himself and has no fear. It also cures headaches and gets rid of the noise in the head. The appropriate amount of the stone, given in a drink, will purge melancholy and aid against all diseases that it causes.

The star which is on the Hen's left foot has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *MENEFIX*

The stone which belongs to the twelfth degree of the sign of Aquarius is called *menefix*. It is found on the banks of a river that flows near the town called Huluen. It is strong and hard to break, and so clear as to be transparent. The stone's color is a red that tends somewhat toward yellow. In size, some of the stones are large, others small, and they come in various shapes. Goldsmiths can give them any shape they wish. By nature this stone is hot and wet in the second degree.

The virtue of this stone is such that whoever wears it on his person manages his possessions well and with ease. Also, when given in a drink, it will purge melancholy by causing vomiting. The stone is held in high esteem for its beauty and virtue.

Two stars, the northern one of the two stars on the left leg of the Man Who Pours Water, and the first one of the three stars on Aquarius' last bend, have power over this stone. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE STONE CALLED *MEYXMETIZ*

The stone which belongs to the thirteenth degree of the sign of Aquarius is called *meyxmetiz*. By nature this stone is hot and wet. Its color is brown, with green dots in it. It is light of weight, rough to the touch, and easy to break. It is found in the western part of Spain, on top of a very high mountain called Carcith.

The property of this stone is such that when a small amount of it is mixed with a large amount of silver at the time of founding, it will turn the silver into something like finely ground lime and no matter how the silver is treated, it cannot be restored to its previous state. And if someone takes this powder in a drink, all his limbs will fall off and he will die. However, when mixed with oil and rubbed on a limb which is paralyzed, this powder will cure it. It also will cure burns, and it is used a lot in ointments made for healing sores.

Two stars, the southernmost one of the three which are on the right palm of the Man Who Pours Water, and the southernmost one of the three stars on the last bend of the water being poured, both of them in Aquarius, have power over this stone. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *ZARBENIC*

The stone which belongs to the fourteenth degree of the sign of Aquarius is called *zarbenanenic* (sic), which in Chaldean means *curer of fright and of paralyzed limbs*. It has this name because of its virtue which is such that whoever wears it on his person is safe from any disease that comes from one of these two conditions, and if he had the diseases before, he will be cured. By nature this stone is hot and wet in the second degree. It is strong and hard to break, and it is dark, with its color looking like that of the scoria of iron. It is found in the land called Alcarach, where there are many mines of this stone.

When placed in fire, this stone encloses the fire inside itself, where it will burn, but not as much as in the other stone of which we spoke. When it is pulverized and applied to deep sores, it makes the flesh grow in them promptly and evenly. The stone has yet another virtue which distinguishes it from all other stones: when placed in blood, the stone will blend with it, changing the blood's nature.

Two of the three stars on the back right palm, and the northernmost one of the three on the last bend of water, all of them in Aquarius, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *ERAQUI*

The stone which belongs to the fifteenth degree of the sign of Aquarius is called *eraqui*. It has this name because it is found in the land called Erac. Black in color, this stone is very heavy, and it is easy to break. By nature it is hot and wet.

This stone, when pulverized and mixed with vinegar, makes a very good and bright ink for writing. Also, when used to wash hair, it will give it a dark color and make it very beautiful. Moreover, when its powders are mixed with oil, it is made into a medicine that is very good for the scabies caused by excessive wetness.

When this stone is distilled and added to copper at the time of founding, it will give the copper the beautiful color of silver; however, if the copper is founded many times over, it will revert back to its original state.

The second star of the southern stream of water, which is close to Aquarius' hand, has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *ROMANA*

The stone which belongs to the sixteenth degree of the sign of Aquarius is called *romana*. It is found in the western part of the land of Rome, in a cave which is at the foot of a mountain called Cinac. In color this stone is green, and it has white lines in it which resemble Roman letters. And no matter into how many pieces the stone is broken, it keeps this appearance in all of them. It is thick by nature.

The virtue of this stone is such that whoever wears it on his person all the time will never get the disease called *porido*, and if he already has the disease, he will be cured. Moreover, it heals ulcers of the intestines. By nature it is hot and wet in the third degree. For this reason, when pulverized and

applied to the eyes, it will get rid of the whiteness and the *uña* that form in them. It will also get rid of the stained spot that forms on the face and will give the face a good color. Also, rubbing the spots where warts have been cut off with this stone, will prevent the warts from ever growing back.

The star which is on the Hen's left knee has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE THAT APPEARS IN THE SEA*

To the seventeenth degree of the sign of Aquarius belongs the *stone that appears in the sea* when Saturn sets and disappears when Saturn rises. It is found in the Mar Tenebrosa (North Sea), together with the other stones which clearly manifest the virtue of the planets. Saturn's power over this stone is contrary to the power it has over the stone which belongs to the twenty-first degree of the sign of Capricorn, of which we spoke earlier. The marks that identify this stone are the following: it is very white and shiny, heavy, and so strong and hard to break, that it can be broken only with great effort. Also, when it is broken open, its color inside is black and it appears darker in clear light. It brightens up when Saturn sets and becomes dull when it rises. By nature this stone is hot and wet.

The stone has a very bad virtue in that whoever looks at it when Saturn is below the earth becomes blind; however, looking at it when this star is above the earth causes no harm. Also, the stone makes the person who wears it while sleeping snore in a very loud and ugly manner.

The star which is on Pegasus' left knee has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *BEYTI*

The stone which belongs to the eighteenth degree of the sign of Aquarius is called *beyti*. By nature this stone is hot and wet in the second degree. It is found in mines which are in the land called Cabeduquia. It is soft, and looks like multi-colored sand grains gathered together. The stone is found on the surface of the earth, and its little grains seem sharp.

When this stone is pulverized and its powder is rubbed on silver containers, or other things made of silver or metal, it makes them very shiny and beautiful. The same is true for swords and knives, and they get sharpened besides. When pulverized and made easy to pour, so as to mix it with something to make a paste and form a ball, and then introduced into a woman's vagina, it will dry the vagina and tighten it, and make the woman wish for a man. This will also make her become pregnant faster.

Two of the three stars which are on Aquarius' second bend, the middle one and the one toward the back, have power over this stone. The stone receives its power and virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *YETANIZ*

The stone which belongs to the nineteenth degree of the sign of Aquarius is called *ietaniz*. It gets its name from the mountain where it is found and which is called Ytin. This mountain is located in the land of Beymini, and at the top of the mountain there are mines of this stone. The color of this stone is a red that tends somewhat toward yellow. It is strong and hard to break, has no shine, and feels soft, even though it is full of holes. When flayed, the color of the stone's center is white. By nature this stone is hot and wet.

This stone, when pulverized and distilled with wine and then used to rub on a bald head, will make the hair grow. The same is true for any part of the body where there had been hair that has been pulled out, and it also prevents newly grown hair from falling out. Moreover, the stone also cures the disease which makes one faint frequently, provided the right amount of it is administered at the time the person shows signs of having the disease.

The southernmost one of the three stars which are on Aquarius' third bend has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *MECIENA*

The stone which belongs to the twentieth degree of the sign of Aquarius is called *meciena*, which in Chaldean means *weeping stone*. It has this name because its virtue is such that whoever wears it on his person is always sad and weepy. It has the same effect when placed in someone's bed, and also when

given in a drink. For this reason, those who know the stone shun it. This stone is hard to break, and it is so clear as to be transparent. Its color is brown and it has yellow lines in it which are joined together. The stone is found on the islands of India, on the shores of a river called Carech that flows through these islands. By nature it is hot and wet.

Two stars, the northernmost and the southernmost ones of the stars on the second bend of the flowing water in the figure of Aquarius, have power over this stone. The stone receives its virtue from these stars and works best when both stars are on the ascendant.

ABOUT THE STONE CALLED *CIDADENNA*

The stone which belongs to the twenty-first degree of the sign of Aquarius is called *cidadenna*. By nature this stone is hot and wet. There are mines of it near the town called Aterbuliz, in the land of Furunia. The color of this stone is a purple that tends somewhat toward yellow. Some of the stones are large, others small, and they come in many shapes. This stone lightens up with clear weather and becomes darker when it is cloudy. As the learned men say, all stones which change their color are of a bad essence. There is some gold included in this stone, which, when founded, remains on the bottom of the crucible used for founding.

The virtue of this stone is such that everybody fears the person who wears it. Also, when pulverized and applied to eyes that have scabies, it will cure the scabies in a short time.

Two stars have power over this stone, both of them in Aquarius: of the two stars that follow the first bend of the water, the one which is located toward the back; the other, apart and far away, is toward midday and below the second bend of the water. The stone receives its virtue from these stars and works best when both stars are in midheaven.

ABOUT THE *STONE THAT ATTRACTS SALT*

To the twenty-second degree of the sign of Aquarius belongs the *stone that attracts salt*. By nature it is hot and wet. Its virtue is such that, when placed near salt, it attracts it, just as other magnets attract the things over which they have power. This stone's power to attract is even greater than that of the other magnets, since it attracts from a greater distance and as much as double its

own weight. The color of this stone is a pale yellow that has white dots in it. It is opaque, not transparent, porous, and light of weight.

This stone, when placed in a cold liquid which contains salt, will absorb all the salt, whatever the liquid's nature; however, it does not do this when the liquid is hot. When, after it has absorbed the salt, the stone is placed in cold water, it feels hot. Also, when placed in sea water, this stone will take away its salinity and make it good for drinking.

This stone is called *alardo* and it is found in the Promised Land, on the shores of the sea, near the place where the river called Alardon enters the sea. When pulverized and applied to the eyes of a person whose eyelashes are falling out, it will keep them from falling out and make them grow anew.

The northernmost one of the three stars which are on the third bend of the water of the sign of Aquarius has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *DELMENICA*

The stone which belongs to the twenty-third degree of the sign of Aquarius is called *delmenicari* (sic), which in Chaldean means *curer of deafness*. It has this name because its virtue is such that when a deaf man wears it on his person he will be cured, no matter what kind of deafness he has. By nature this stone is hot and wet in the third degree. In color it resembles red ocher, but it is darker, harder, shinier, and heavier. When burnt, it gives off a smoke whose smell is so strong and sharp that one can barely stand it. After it has been burnt, the stone becomes light of weight and very porous. When pulverized and mixed with oil and placed in the ear, this stone will cure deafness as well as all other diseases which affect the ear.

The mine of this stone is found on the island of Dragen, far away from the sea. The island is located in the great sea called Ocean, which is in the western part of the world and near its end, and which is uninhabited by man.

The middle one of the three stars which are on the third bend of the flowing water of the sign of Aquarius has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *SECUTAZ*

The stone which belongs to the twenty-fourth degree of the sign of Aquarius is called *secutaz*. It gets its name from the river called Secut, where it is found. The river is in the land of Ethiopia, and the stone is found on the riverbottom. Some of these stones are large, others small, and in shape they are both long and round. The stone is layered like a reed, its color is like that of burstwort grain, and it is so clear and shiny as to be transparent. It is light of weight, but so strong and hard to break that nothing except silver can break it, because it is in the nature of silver to do so. If one wishes to fashion something out of this stone, he must first make a saw or a chisel out of silver with which to cut it: with these, the stone can easily be given whatever shape one wishes. Among stones, only the diamond can leave a mark in it.

By nature this stone is hot and wet, but it is more wet than hot. The virtue of this stone is such that whoever wears it on his person, having had it set in silver, will not be afflicted by emission of semen while asleep, and if he is, by reason of some disease, he will be cured of it. Moreover, when made into plaster and applied to a bite of either a rabid dog or some other poisonous animal, this stone will cure it.

Of the two stars which are together and which follow the second bend of the water, it is the star toward the back that has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE *STONE WHICH IS FORMED IN A SEASHELL*

To the twenty-fifth degree of the sign of Aquarius belongs the *stone which is formed on the backbone of the seashell*. Therefore, it is counted among the animal stones. By nature it is hot and wet, but it has in it more dryness than wetness. The stone is brown in color, and it feels rough to the touch.

The virtue of this stone is such that, when pulverized and given in a drink, it will be helpful against all lung diseases, for it opens the lungs' airways and clears the voice. Also, when the pulverized stone is applied to an arrow wound from which the arrow could not be removed, it will make the arrow come out and cure the wound. Moreover, when a person with ulcered intestines, sits in the water that comes out of this stone when it's boiled, he will be cured.

The front one of the two stars which are together on Pegasus' chest has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *SERALICEN*

The stone which belongs to the twenty-sixth degree of the sign of Aquarius is called *seralicen* in Chaldean, which in that language means *destroyer of the spleen.* The stone resembles the human spleen both in shape and color. The virtue of this stone is such that whoever wears it tied to his body, will be cured of all ailments of the spleen, and he can be certain of the spleen not becoming diseased as long as he keeps the stone on his person. It also makes the thirst that is caused by a diseased spleen disappear. This stone is light of weight, porous, and easy to break. The best mines of it are found in the eastern part of Spain, on the shores of the sea. The stone also has a bad virtue in that when the powder of the burnt stone is given to a person in a drink, it will kill him, for it is a deadly poison.

The star which is on the heel of Pegasus' right foot has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE *STONE THAT IS FORMED ON THE SPINE OF THE CRAWFISH*

To the twenty-seventh degree of the sign of Aquarius belongs the *stone that is formed on the spine of the crawfish.* It belongs among the animal stones, but it is softer than the stone which forms on the teeth. By nature it is hot and wet.

The virtue of this stone is such that, when pulverized and applied to the eyes, it will alleviate the pain in them, dry their wetness, strengthen their nerves, and improve vision. When pulverized and mixed with vinegar to make a paste, and then rubbed on the skin disease which in Arabic is called *bazez* and in the language of Spain, *empeines* (tetter), it will cure it. When burnt, the wetness of this stone decreases, whereas its dryness and fine quality increase. Whilst burning, it gives off a very sharp odor. Women use the burnt stone to refine the skin of their faces and to give them good color.

The star which is between the Horse's shoulders has power over this stone. The stone receives its virtue from this star and works best when the star is on the ascendant.

ABOUT THE STONE CALLED *KEDUNAZ*

The stone which belongs to the twenty-eighth degree of the sign of Aquarius is called *kedunaz*. It is found in a mountain called Kedun, whence it gets its name and mines of it can be found in the land called Milez. This stone is soft and dull, and its color is brown, with green specks in it. It is heavy, and when burnt, it gives off a smell similar to that of fatty meat when it is being roasted. By nature it is hot and wet.

This stone, after it has been burnt and pulverized, will cure festering sores when rubbed on them. Moreover, if given to a person in a drink, it will take away his reason and understanding and make him forget things, as if he were drunk; and if he drinks a lot of it, he will die.

Of the two stars which are together on the Horse's chest, it is the back one that has power over this stone. The stone receives its virtue from this star and works best when the star is in midheaven.

XIII. ABOUT THE SIGN OF PISCES

ABOUT THE STONE CALLED *TEZCUIDEN*

The stone which belongs to the twenty-ninth degree of the sign of Pisces is called *rezcuiden* (sic). By nature it is cold and wet. This stone is found in the land of Babylonia, in mines which are located in large wastelands. Its color is yellow, with white specks in it. It is strong and hard to break, heavy, and so clear as to be transparent.

The virtue of this stone is contrary to the one of which we spoke in the degree before this one, for whoever wears it on his person is loved, feared, and praised by all who meet him. When pulverized and given in a drink, it will take away the bad taste that comes from eating dirt or clay, which people do because of melancholy.

The last of the three little stars on the head of the fish which, in the figure of Pisces, is toward the back, has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

ABOUT THE STONE CALLED *YETHBEMEL*

The stone which belongs to the thirtieth degree of the sign of Pisces is called *yethbemel*. Its color is a very deep red, with very faint purple lines in it, and it is so clear as to be transparent. This stone is plentiful in the land called Quebeelyz. By nature it is cold and wet. The virtue of this stone is such that whoever wears it on his person is greatly feared by everybody, and he will not suffer any illness in his stomach or his intestines. Men greatly value the stone for this reason as well as for its beauty. This stone and the ruby are so intolerant of each other that, when placed together, each will break up by itself.

The southern one of the two stars on the stomach of the fish which, in the figure of Pisces, is the one toward the back, has power over this stone. The stone receives its power and virtue from this star and works best when the star is in midheaven.

XIV. TREATISE II of the *LAPIDARIO*

[BOOK OF STONES ACCORDING TO THE DECANATES OF THE SIGNS]

(ANONYMOUS)

PROLOGUE

We have spoken about the thirty kinds of stones according to the thirty degrees of the sign of Pisces, indicating the stars with which they are connected and whence they receive their power and virtue. It is important that whoever wishes to work with the stones pay attention to the planet Jupiter, making sure that it is in a favorable position for doing good works; otherwise, ill deeds will result. This is a general rule which is true for all planets, fixed stars, and the stones which have their agreement with them, as well as for plants and animals, for all have power and virtue given to them by God through His angels. Because virtue is present in the heavens and in the stars therein, and after these, in the four elements, and in all other things, it will affect birth, growth and the maintenance of life.

APPENDIX:
THE ASTRONOMY OF THE *LAPIDARIO*

In this appendix I have attempted to identify the stars of the *Lapidario*, as they are known to modern science. The reader who is interested in learning the identity of a star(s) associated with a particular stone should consult the list found after this introduction. The appendix should also serve as a reference for those who are interested in the history of astronomy, and in particular, the sources of astronomy adopted by the *Lapidario*.

This appendix should not be taken as an exhaustive study of the *Lapidario* astronomy. Such an endeavor would require considerably more time than I have been able to invest and would require examination of manuscripts housed in the libraries of Europe and the Middle East. Nevertheless, I hope that this work will serve those who are interested in the *Lapidario* astronomy and those who may carry the studies further.

For reference material I have relied primarily on a recent English translation of the *Almagest* by Toomer (1984), because the astronomy found in the *Lapidario* draws heavily from this Greek book of antiquity. I have also consulted the following books: *Ptolemy's Catalogue of Stars, A Revision of the Almagest* (Peters and Knobel, 1915); *Star Names, Their Lore and Meaning* (Allen, 1963); *Tetrabiblos* (an English translation by Robbins, 1940); *The Mapping of the Heavens* (Whitfield, 1995), and *Sky Signs: Aratus' Phaenomena* (introduction and English translation by Lombardo, 1983). I was not able to obtain a copy of the work by the Islamic astronomer, Al-SõfÐ. His work should be consulted as part of a more thorough study of the *Lapidario* astronomy. In addition, I have not inspected a copy of the Alfonsine Tables, a work which should also shed considerable light upon the *Lapidario* astronomy. Lastly, I was not able to inspect the last half of the *Lapidario*, treatises number 2 through 4. This study is an examination of the astronomy that is contained in the first treatise.

The source of the *Lapidario* has not been established with certainty, but in the prologue we are told that Abolays translated the book from the Chaldean language into Arabic. The Chaldean astronomers of Mesopotamia may have contributed to the knowledge found in the *Lapidario*, but it is clear that the book has incorporated later knowledge from the Greeks of the Hellenistic period. In fact, the exact meaning of the word "Chaldean," as it is used in the *Lapidario*, has not been determined to my knowledge. It may be a reference to a group of people who lived during late antiquity or the early Middle Ages, and who used the Syriac language (Nunemaker, 1939). The passage in the *Lapidario* "Although he (Abolays) was of the faith of the Moors, he was a man who loved

the gentiles, especially those of the land of Chaldea, ..." may be a reference to those who used the Syriac language. Our quest for the source of the *Lapidario* might be enhanced if we knew the identity of Abolays, but I believe his identity has not been established with any certainty (Nunemaker, 1934).

The *Lapidario* sets the number of constellations at 48, which serves as our first clue to the origin of its astronomy. The Greek astronomer, Ptolemy, also organized the sky into 48 constellations. Claudius Ptolemaeus (ca. 100 - 174 AD) or Ptolemy, worked in Alexandria. His monumental treatise on astronomy, known as the *Almagest*, served as the standard source of astronomical knowledge in the Middle East and Europe until it was toppled by the Copernican revolution. Keeping this in mind, it should come as no surprise that the astronomy of the *Lapidario* is heavily based on knowledge gained from the *Almagest*.

Most of the constellations listed in the *Lapidario* are readily identified with Ptolemy's list. Others require some investigation to establish their identity. These are: Faycoz (Cepheus), Caytoz (Cetus), Gallina (Cygnus) and Tortuga (Lyra). The identity of Caytoz is revealed in the *Lapidario* because a star on the bend of Rio (Eridanus) is said to touch the chest of Caytoz (Cetus). According to Allen (1963), "The *Alfonsine Tables*, in the recent Madrid edition, supposed to be a reproduction of the original, illustrate their **Gallina** by a forlorn Hen instead of a Swan ..." Allen also reveals the identity of Tortuga. Under Lyra he says, "The Alfonsine illustration is of a Turtle ..." Faycoz can be identified by the process of elimination because it is the only constellation that remains unidentified. However, Allen also lists some names that appear similar to Faycoz under Cepheus: "The name Κηφευς, compared by Brown to Khufu of Great Pyramid fame, was the source of many queer titles from errors in Arabic transcription - first into **Kifañs, Kikañs, Kankaus**; later into **Fikaus, Fifaus,** and **Ficares** or **Phicares**, its usual designation in Persia, and **Phicarus.**"

The constellations of Ptolemy are listed below according to their modern names and the equivalent name(s) used in the *Lapidario*.

ALMAGEST	LAPIDARIO
Andromeda	the chained woman who never knew man
Aquarius	man who pours water down

ALMAGEST	LAPIDARIO
Eridanus	the River
Gemini	Geminis

Aquila	the Eagle, also the Flying Vulture
Ara	the Hearth
Aries	Aries
Argo Navis	the Ship
Auriga	man who has the reins
Bootes	man who cries out
Cancer	Cancer
Canis Major	the Great Dog
Canis Minor	the Little Dog
Capricornus	Capricornio
Cassiopeia	Woman seated on the chair
Centaurus	half man half horse, Cantoriz
Cepheus	Faycoz
Corona Australis	Corona Meridional
Corona Borealis	Corona Septentrional
Corvus	the Crow
Crater	the Jar
Cygnus	the Hen

Hercules	the valiant one, man with bent knees
Hydra	Hidra
Leo	the Lion
Lepus	the Hare
Libra	Libra
Lupus	the bear held by Cantoriz
Lyra	the Turtle
Ophiuchus	Alhave, hunter of snakes, man who holds the snake
Orion	Orion
Pegasus	Caballo Mayor, the Horse
Perseus	Perseo
Pisces	the Fishes
Piscis Austrinus	the Fish
Sagittarius	Sagitario
Scorpius	Escorpion
Serpens	snake which the snake charmer holds
Triangulum	the Triangle
Taurus	Tauro

Dephinus	the Dolphin
Draco	the Dragon
Equuleus	piece of the horse

Ursa Major	the Great Bear
Ursa Minor	the Little Bear
Virgo	Virgo

All of Ptolemy's constellations, except Argo Navis, are accepted by modern astronomy. Argo Navis was divided by Lacaille (ca. 1750) into 3 constellations: Vela, the Sail; Puppis, the Stern; and Carina, the Keel. The exact boundaries of the constellations were not specified by Ptolemy in the *Almagest*. The boundaries that were established later cut across the edges of Ptolemy's figures in a few cases. For example, the star on Andromeda's right foot in Ptolemy's figure is presently contained within the boundaries of Perseus (Phi Persei).

Ptolemy's famous star catalog is part of the *Almagest*. In the catalog he describes the location of each star on the constellation figures, in a manner similar to the *Lapidario*. It would be difficult to identify most of the stars based solely on these descriptions. A positive identification is facilitated if the description is accompanied by a listing of the star coordinates. This is the scientific approach used by Ptolemy, who lists the coordinates along with the descriptions in his catalog. Unfortunately, the *Lapidario* does not list the coordinates of the stars, but assumes that the reader will be able to make a positive identification based only on the descriptions. Such an assumption should not be made, for a star on the hand according to one astronomer may be the star on the elbow according to another.

We must turn to the *Almagest* for help in order to establish the identity of the *Lapidario* stars. It would be an easy task if the descriptions matched perfectly, but they do not in many cases. Apparently, astronomers after Ptolemy's time preferred different descriptions for some of the stars. These could have been of their own design or those set forth by other astronomers of antiquity. Upon gazing at the imaginary figures at night, each astronomer must judge how well the stars fit the proportions of the constellation. Ptolemy himself made some adjustments to the constellations set down by his predecessor, Hipparchus. For example, the entry in the *Almagest* for the star Alpha Arietis is described as follows: "The star over the head, which Hipparchus [calls] the one on the muzzle."

Soon after I began the task of comparing the *Almagest* and *Lapidario* descriptions, I realized that the *Lapidario* does list the coordinates of a star in a fashion, but only the longitude, not the latitude. The implied longitude can be

used along with the description in an effort to match the *Lapidario* stars to Ptolemy's catalog. The longitude of the star in the *Lapidario* is approximated by using the degree of the sign in which the description is found. Of course, the *Lapidario* author(s) could have selected stars at random to fit the degrees of the signs. But a thorough analysis reveals that most of the stars in the *Lapidario* fall into the degree of the sign in which they are described if the data for longitude in the *Almagest* is used. Thus, it is clear that the *Lapidario* has assigned the stars to the degrees of the signs by using the longitudes listed in Ptolemy's star catalog.

Perhaps it would be helpful to discuss celestial coordinate systems. The modern astronomer maps stellar positions in space by treating the celestial sphere as a two-dimensional surface. In this case, we can imagine ourselves residing on Earth, in the middle of a crystalline sphere, just as the Greeks imagined the Universe in classical times. The stars are assigned to the surface of this transparent sphere using a two-dimensional coordinate system, similar to the way location is specified on the surface of the Earth by using a grid with lines of latitude and longitude. The modern astronomer's coordinate system is based on the celestial equator and the celestial poles. The North Celestial Pole is the place in space that coincides with the extension of the Earth's axis of rotation from the northern pole. The celestial equator is the extension of the Earth's equator into space. Then there are lines of **right ascension** (like longitude) and **declination** (like latitude). But the *Lapidario* and the *Almagest* use a different coordinate system. Their system is based on the ecliptic, which is the path across the constellations of the zodiac that the Sun marks throughout the course of the year. The ecliptic is the extension of the Earth's plane of orbit into space.

In the classical coordinate system, the ecliptic is analogous to the modern celestial equator. However, they are not the same thing. The equator and the ecliptic mark different great circles across the celestial sphere. And the ecliptic system has its own unique poles, the north and south ecliptic poles. In the classical system, position is specified by a grid with lines of **longitude** and **latitude.** In the old tradition, the 360 degrees of longitude are divided into the 12 signs of the zodiac, with 30 degrees in each sign. The "prime meridian" so to speak, is the location on the ecliptic where the Sun is located at the moment of the vernal (spring) equinox. This position is also the place where the ecliptic intersects the celestial equator. The two also intersect at the position of the autumnal equinox. The position of the vernal equinox marks the zero point of longitude. It is also the beginning point of the first degree of Aries. Then the degrees of the zodiac progress around the ecliptic in an easterly direction. A star that falls between zero and one degree on the ecliptic is then said to fall into the first degree of Aries. A star at 1 1/2 degrees longitude falls into the second

degree of Aries. After the first 30 degrees of the ecliptic, we come to the second sign of the zodiac, Taurus. A star with a longitude of 30 1/2 degrees falls into the first degree of Taurus. And Ptolemy would list such a star at a longitude of 0 1/2 degree in Taurus.

This is how the longitude system of the *Lapidario* and *Almagest* works. We are only left to decide exactly where one degree of a sign starts and ends (*i.e.*, is 30.0 degrees in the 30th degree of Aries or the first degree of Taurus). For our purposes here, I will use an overlapping system, which allows more of the *Lapidario* stars to fall into the proper sign and degree. If I am trying to fit a star into the first degree of Aries, I will consider it in if it has a longitude between 0.0 and 1.0 degree. If I am trying to fit it into the second degree, I will consider it in if it has a longitude between 1.0 and 2.0 degrees. Now in the strict sense, this is not a proper system because a star with a whole number for longitude can be placed in two adjacent degrees of a sign. However, I have settled on this procedure because it appears to be one that was acceptable to the *Lapidario* astronomer (I define the *Lapidario* astronomer as any person who contributed to the *Lapidario* astronomy in some direct way).

There are a number of cases where a star falls just outside the degree to which it is assigned when the longitudes listed in the *Almagest* are used. For example, Tau[1] Eridani is listed at a longitude of 5 1/6 degrees in Aries according to the *Almagest*, which places it in the sixth degree of Aries. However, the descriptions in the *Lapidario* and *Almagest* clearly match if Tau[1] Eridani is assigned to the 5th degree of Aries. There are many other cases in the *Lapidario* where a star falls slightly out of position by longitude when the descriptions in the *Lapidario* and *Almagest* match. As in the 5th degree, the good matches between the descriptions suggest that a slight error in longitude should be accepted.

What are the causes of slight mismatches in longitude between the *Almagest* and *Lapidario*? In a number of cases it appears that the *Lapidario* astronomer may have moved a star into an adjacent degree of a sign to fit his needs. I suspect that in a few cases, the astronomer may have moved a star across several degrees of a sign. Certain sections of the sky have few prominent stars and it can be difficult to find stars in a particular degree. Perhaps the *Lapidario* astronomer cheated a little by borrowing a star from a nearby location! Ptolemy did not have to find a star to fit each degree of each sign of the zodiac. He just reported the locations of the stars with the best information available to him. The *Lapidario* astronomer/astrologer had a different agenda. He needed to place a star in each degree, meaning that he had to find at least 360 stars, one for each degree. Thus, when position errors appear in the *Lapidario*, we are left

to ponder whether the *Lapidario* astronomer moved a star across the zodiac or whether there is some type of error.

If the stars were not moved intentionally, what errors could account for the longitude mismatches? It is necessary to keep in mind that the *Almagest* was transmitted by numerous copies and translations. The duplication efforts that were carried out by scribes and translators gave rise to manuscript variants. Extant manuscripts of the *Almagest* can be classified into two groups according to their heritage: Greek and Arabic. The *Almagest* was transmitted in the Greek language by scholars of the Byzantine Empire. Islamic astronomers working in Baghdad possessed Arabic versions of the *Almagest* whose transmission history is poorly known, but apparently there was one route of transmission through a Syriac version which is now lost. Some values for longitudes of stars in the *Almagest* have variants among extant manuscripts. We do not know which manuscript version of the *Almagest* the *Lapidario* astronomer possessed but it seems reasonable to suggest that it had a common heritage with Arabic versions (perhaps a Syriac version?).

The version of the *Almagest* that I have adopted is that of Toomer (1984), which is based on extant Greek manuscripts, the oldest of which date to the 9th century. However, Toomer also notes some variants in longitude that are known in Arabic versions. All of the extant manuscripts are considerably removed in time from the original and probably represent copies that have passed through several hands. Scholars agree that none of the extant manuscripts of the *Almagest* are perfect copies of the original, which must be kept in mind when analyzing the *Lapidario* astronomy. Therefore, we should not demand that the longitudes of Toomer's *Almagest* match perfectly with those in the *Lapidario*.

There are seven stars listed in the *Lapidario* that appear to have longitude variants that may hold clues to the version of the *Almagest* adopted by the *Lapidario*. These are: the 17th and 24th degrees of Gemini (Epsilon Ursae Majoris and 58 Geminorum), the 11th and 15th degrees of Virgo (Theta Draconis and Delta Virginis), the 3rd degree of Sagittarius (Theta Arae), and the 6th and 25th degrees of Capricorn (Xi^1 + Xi^2 Capricorni and Gamma Capricorni). The implied longitude for Epsilon Ursae Majoris in the *Lapidario* fits with most of the Greek and later Arabic versions of the *Almagest*, not the Syriac, early Arabic or Greek manuscript "B" versions. The implied longitude of 58 Geminorum fits with all Arabic versions and Greek manuscript "D." The implied longitude of Theta Draconis fits with the Greek versions, not the Arabic ones. The implied longitude of Delta Virginis fits with the Greek and later Arabic versions, not with the early Arabic versions. The implied longitude of Theta Arae fits with the Greek versions and a minority of the Arabic versions, most Arabic versions

don't match. The implied longitude of $Xi^1 + Xi^2$ Capricorni fits with most of the Arabic versions and only one of the Greek manuscripts (D). The implied longitude of Gamma Capricorni fits with all Arabic versions and only one Greek manuscript (A). On balance, this analysis does not seem to indicate which group of manuscripts have a common heritage with the *Lapidario* astronomy. I suspect that the *Lapidario* is based on a manuscript version that predates the extant versions because it does not seem to align with either of the two major groups. Toomer (1984) mentions the Syriac version only once as a variant (this manuscript no longer exists) and unfortunately, it does not match with the *Lapidario*, which does not support my theory that the *Lapidario* astronomy follows a Syriac source. Nevertheless, there could easily have been another Syriac version of the *Almagest* that is totally unknown.

Up to this point we have been concerned primarily with stellar longitude. But a complete description of location requires a number for the latitude as well. In the ecliptic system, this is specified as degrees north of the ecliptic (+) or south of the ecliptic (-). The *Almagest* provides the latitudes of the stars, the *Lapidario* does not. However, the *Lapidario* does make qualitative statements regarding latitude, such as "the northern star of two," which means the star with a more northern latitude.

The lack of complete coordinates in the *Lapidario* necessitates a reliance on the descriptions for identification purposes. In many cases, when a star is suggested by its longitude in the *Almagest*, the descriptions of the figure position differ between the *Lapidario* and the *Almagest*. For example, a star on the "right hand of Hercules" that fits a particular degree in the *Lapidario* may have the same longitude as a star on the "right elbow of Hercules," according to the *Almagest*. Then we must decide whether the hand of the *Lapidario* figure is equivalent to the elbow of the *Almagest* figure, or whether the *Lapidario* astronomer has moved the star in longitude, or is in error. Sometimes it is not possible to decide, so I have provided two or more candidate stars.

It is important to keep in mind that the coordinates of the ecliptic system are not the same as those specified on modern star atlases. The lines of right ascension do not run in the same direction as lines of longitude. If a person attempts to understand the descriptions found in the *Lapidario* or *Almagest* on the basis of modern coordinates on a star atlas, confusion is sure to develop. It is possible for star X, of a pair, to be north of star Y using the equatorial (modern) coordinates and be south of star Y using the ecliptic (classical) coordinates.

The *Lapidario* stars of the first degree of Aries are actually stars in Pisces. This is a source of confusion for those who are unfamiliar with astronomical precession. The Greek astronomer Hipparchus, who was productive during the time span of 150 to 125 BC, is credited with the discovery of precession. Precession is caused by the rotation of the Earth's axis around the ecliptic poles, with a period just under 26,000 years. As a result of precession, the stars drift in longitude with time, crossing one sign of the zodiac in about 2,000 years. The signs of the zodiac were developed by Babylonian astronomers around 500 BC. At that time, the Earth's axis was positioned such that the vernal equinox occurred in Aries. Thus, the term "the first degree of Aries." And at that time the signs of the zodiac coincided closely with the constellations of the zodiac. But by the time of Ptolemy, the axis had shifted enough to place the vernal equinox in Pisces. This is why the "first degree of Aries" fell in Pisces during Ptolemy's lifetime. The vernal equinox is currently in Pisces as well and will move into Aquarius around 2700 AD, marking the so-called "age of Aquarius." Thus, over a 26,000 year period, the first degree of Aries will visit every constellation of the zodiac!

The descriptions in the *Lapidario* may hold some important information regarding the character and past history of a star. In this regard, historians of astronomy have been interested in color descriptions of stars in old astronomy works. Ptolemy notes the color of six stars in his catalog, all described with a "reddish" color. These are Alpha Canis Majoris (Sirius), Alpha Tauri (Aldebaran), Alpha BoØtis (Arcturus), Alpha Orionis (Betelgeuse), Alpha Scorpii (Antares) and Beta Geminorum (Pollux). All of these except Sirius still have a distinct color today, although they appear more yellow to my eye than red (color assessment will vary between individuals). Ptolemy's color description of Sirius is a mystery because it is distinctly white in color today and there is no clear explanation why it would have had a reddish color in Ptolemy's time. The *Lapidario* includes five of these stars in its list as well (Beta Geminorum is not included). However, there is no mention of color in any of these descriptions. The *Lapidario* mentions the color of a star only twice: a red star for the 27th degree of Aries and a blue star for the 16th degree of Sagittarius. The reader should consult these degrees in the appendix for more information on star color.

The silence of the *Lapidario* regarding Ptolemy's color assessments and the inclusion of two colored stars that Ptolemy does not mention are examples of differing descriptions between the two sources. It is clear that the *Lapidario* descriptions are not strictly copied from the *Almagest*. There appears to be astronomical knowledge from sources other than Ptolemy in the *Lapidario*, although the *Almagest* is clearly the main source.

There certainly is an Arabic influence of some degree in the *Lapidario* astronomy, although this may have been added in during the translation into Arabic or at some other time after the work was first written. There are a number of stars in the descriptions that are named specifically with a proper Arabic name, actually the corrupted form of an Arabic name. Examples are Aldebaran (Al Debarān), Azubene (Al Zubanāh) and Elfeca (Al Nā'ir al Fakkah).

Ptolemy did not illustrate the constellations in the *Almagest*, but he had a clear vision of each figure in his mind. His concept of each constellation is revealed via the star catalog contained within the *Almagest*.

In my efforts to understand Ptolemy's vision of the constellations, I found it very helpful to reconstruct the figures from his catalog. This was done by generating star maps with grids of longitude and latitude. The stars were labeled with Ptolemy's descriptions, which allowed me to visualize the constellations. The maps were used to determine the orientation of each constellation figure. They were also used as a reference to reconcile differences between the *Almagest* and *Lapidario* (*e.g.*, in many instances it appears that the *Lapidario* astronomer preferred to describe a star on a different part of the figure than Ptolemy and the star maps helped me visualize each astronomers concept of the figure).

The *Lapidario* does contain a rich set of constellation illustrations, one illustration for each degree, which depicts the position of the star(s) on the constellation figure. Unfortunately, the illustrations are fraught with errors, so they are not very useful in aiding the reader regarding identification of the star. However, there are a few cases where the illustration is useful in the interpretation of the *Lapidario* star description.

In addition to the illustrations that accompany the text for each degree, there is a master illustration at the end of each sign of the zodiac. In the center of these master illustrations, the figure of the zodiac constellation appears, covered with many stars. These stars appear to be randomly positioned because they do not completely match the stars in the other illustrations of the zodiac constellation. Surrounding the central illustration of the zodiac figure, there is a ring divided into 30 sections. Inside the sections there are illustrations of the constellations and stars that are assigned to each of the 30 degrees.

The master illustrations for 11 of the signs of the zodiac are extant in the manuscript (Aquarius is missing). The availability of the master illustrations for Leo and Pisces provides the opportunity to attempt a recovery of the stars whose descriptions are missing from the manuscript. With the intention of

making such a recovery, I first compared the master illustrations to the individual illustrations and descriptions in sections of the manuscript that are complete. Unfortunately, the comparisons revealed some mismatches, which indicates that the master illustrations cannot be relied upon to fully recover the missing stars. In addition, without the *Lapidario* description for a star, an accurate illustration is not always sufficient to choose a star from a short list of candidates. These conditions persuaded me to abandon any attempt to recover the lost stars.

The constellation figures in the *Lapidario* illustrations are oriented like those on a celestial globe. This orientation can lead to a great deal of confusion because it is different than the orientation of the constellations as seen from Earth. It is apparent that even the *Lapidario* illustrator was confused regarding the rules of star placement on a figure that is illustrated with the celestial globe view. That is why there are so many errors in the illustrations.

During Ptolemy's time and the Middle Ages, the constellation figures were commonly illustrated on celestial globes. The oldest extant celestial globe and only surviving celestial map of Greek and Roman antiquity is known as the Farnese atlas, which is part of a second century AD sculpture. There are also a number of extant celestial globes produced by Islamic astronomers.

The celestial globe was the preferred medium of illustration because it did not require the complicated projection necessary for maps on flat paper. Ideally, a celestial globe should be hollow with the constellations drawn on the inside surface. Then the constellations could be viewed from the interior of the globe, as we view the constellations from Earth. This type of globe would have to be large enough for a person to sit inside and would have been very difficult to construct. Thus, the celestial globes that were produced were not of this type, but were small globes with the constellations illustrated on the **outside** surface.

When we view the constellations on a celestial globe, our view point is not the same as our view point on Earth. It is this change in viewing location that causes the confusion. On a celestial globe the constellations are viewed from a fictitious location deep in space, far removed from the Earth and on the other side of the stars. On Earth the constellations are viewed from inside the celestial sphere. On a celestial globe the constellations are viewed from outside the celestial sphere. The change in viewing location results in a different view of the constellation. What the viewer sees on his right side from Earth, he will see on his left side on a celestial globe. Therefore, if a star is located on the viewer's right in a constellation, as seen on Earth, the same star must be on the viewer's left if the constellation is viewed on a celestial globe. It is this reversal

of left and right that caused the *Lapidario* illustrator to be confused, as is clearly evident by a thorough analysis of his illustrations.

I would like to suggest a scenario that explains many of the illustration errors in the *Lapidario*. The illustrator set out first to orient the constellations as they appear on a celestial globe. In fact, it is likely that the illustrator used a celestial globe as a source for developing the drawings. On a celestial globe the backs of human figures should be seen if their front sides are seen from Earth. However, the illustrator preferred to show the front sides of human figures while maintaining certain aspects of celestial globe orientation. By turning the figures around, the illustrator created an orientation conflict, *i.e.*, with turned figures it is not possible to illustrate the star on the correct side of the figure (left or right) and maintain the correct coordinates of the star (relative position with respect to the cardinal directions, north, south, west and east). For example, if a star is on the left hand and is on the west side of a figure according to Ptolemy, and the *Lapidario* figure is turned around with the star still illustrated on the left hand, then the star will also be on the east side, which conflicts with the original position on the west side. In many cases the *Lapidario* describes a star on the left side of a human figure but illustrates it on the right side or vice versa. This illustration method preserves the correct coordinates of the star but creates a conflict between the illustration and the description. However, this is the proper method for illustrating the star and the conflict between the illustration and description should be understood as the acceptable condition. There are also many cases where a star is described on a right or left part of a human figure and illustrated there as well, which does not preserve the true star coordinates. This is not the acceptable condition. The failure to conform to a standard of illustration that preserves the coordinates of a star reveals that the illustrator was not very knowledgeable in matters of astronomy. And the inconsistency of star placement in the illustrations makes it difficult for the reader to identify the correct star, even if they are familiar with the constellations.

The constellation figures of animals did not cause so many problems for the illustrator because they are viewed from the side. If the right side of the animal is seen from Earth, the left side should be seen on the celestial globe. This was perfectly acceptable to the *Lapidario* illustrator and he did not need to turn the animal figures around. In fact, it is the illustrations of the animal figures in the *Lapidario* that establish the celestial globe view. If the head of the animal is seen on the viewer's right from Earth, it should be seen on the viewer's left on a celestial globe and vice versa. All of the animal constellations that are seen in side view have the left to right reversal in the *Lapidario* illustrations, which establishes the celestial globe view.

In the following paragraphs, examples of the *Lapidario* illustration errors are discussed. The first example is taken from the illustration for the first degree of Aries, which is of the constellation of Pisces. The *Lapidario* illustration of Pisces contains two fishing lines which can be distinguished because one of them has a U-shaped bend in it. This unique feature on one line provides an orientation marker for the constellation. Ptolemy's figure of Pisces is oriented as we see it here on Earth with the southern fishing line (with U-shaped bend) on the viewer's right. But the *Lapidario* illustration depicts the southern fishing line on the viewer's left, establishing the celestial globe view. The *Lapidario* illustrator placed the 3 stars of the 1st degree on the fishing line toward the left in the illustration. The left line is the correct line if the constellation is rendered as we see it here on Earth. But using the celestial globe view, the illustrator should have drawn the stars on the line towards the right side of the constellation.

The illustrator had difficulty positioning stars on the constellations of Eridanus, Draco and Hydra. Draco and Hydra are serpents that have long bodies with few distinguishing features. Eridanus is a river which also has few distinguishing features. The stars are readily identified in the *Almagest* for these constellations because they are listed in a sequential fashion. In contrast, the *Lapidario* does not supply a sequential list, which makes it difficult to determine the relative position of the stars on these figures. The illustrations of Hydra for the 29th and 30th degrees of Cancer are a good example of the illustration errors found in these constellations. In Ptolemy's figure of Hydra, the star HR 3750 is much closer to the head than the tail and it is close to Tau[1] Hydrae, the star illustrated very near the head in the *Lapidario*. The *Lapidario* illustrator removed the star of the 30th degree (HR3750) from its true location near the head and placed it about midway between the head and tail. If the illustrator were intimately familiar with the constellations he would not have made this illustration error. I suspect that the illustrator relied heavily on the *Lapidario* descriptions when placing stars on the figures. For the majority of the figures this method yielded stars positioned with acceptable accuracy. But in the case of the serpents, the body is very long without any features to assist in positioning the stars. In the 29th degree the star is described on the neck, and it was relatively easy for the illustrator to position the star in the correct place, because he knew it should be near the head. But in the 30th degree, the *Lapidario* description does not specify where the star is located on the body. The illustrator had to make an "educated" guess about where the star should be positioned. And his guess was off the mark.

Stars of the *Lapidario*

The stars of the *Lapidario* are compiled here and compared to the descriptions found in Ptolemy's *Almagest*. The stars are arranged according to the signs of the zodiac, just as they are in the *Lapidario*. The star descriptions found in the *Lapidario* are placed in *italics*, most of them abbreviated somewhat. Following the *Lapidario* description, in **bold** type, is the modern name for the star, as determined in Toomer's edition of the *Almagest*. Toomer includes an asterisk (*) after the modern name if the identification is not reasonably certain (*i.e.*, if a modern star name cannot be confidently applied to a star in Ptolemy's catalog). I have included Toomer's asterisk marks where they occur. If the *Lapidario* and *Almagest* descriptions do not match with reasonable certainty, the star assigned contains a question mark at the end of the name. If the longitude of a star, as given by Ptolemy in Toomer's edition, does not fit in the degree of a sign, the longitude is also given in parentheses. Following the modern star name, <u>in underlined text</u>, is the description of the star found in the *Almagest*. These were taken directly from the English translation done by G.J. Toomer (1984). In many cases the *Almagest* descriptions have explanatory parts in brackets [ ] {}. This is required because the descriptions are not always clear when they are isolated from the sequential list. Following Ptolemy's description there is a discussion, where needed, for clarification or to add additional information. I have included descriptions of the illustrations, where needed, to evaluate the accuracy of the illustration.

The modern star names used here are according to Bayer or Flamsteed. Bayer's system utilizes Greek letters followed by the genitive case of the constellation name (e.g., the North Star, or Polaris, in the constellation of Ursa Minor is designated **α Ursae Minoris** - in this appendix the Greek letter is spelled out: **Alpha Ursae Minoris**). For constellations with more stars than letters in the Greek alphabet, Bayer continued the naming sequence using Roman letters (e.g., for the 14th degree of Cancer, **c Puppis**). Bayer's list of stars was not as extensive as Ptolemy's, so it is necessary to use Flamsteed's system for some stars. Flamsteed used Arabic numbers combined with the genitive case of the constellation name to identify stars (e.g., the 16th degree of Aries is identified by the Flamsteed designation: **51 Andromedae**). Bayer and Flamsteed designations cover most of the stars in the *Almagest*. However, some of the dimmer stars are excluded from both lists. For these I have followed Toomer (1984) and use the Yale Catalogue of Bright Stars numbering system, which is a number preceded by the designation: **HR** (Toomer uses the designation BSC).

There are certain words used in the *Lapidario* and *Almagest* to denote relative positions of stars. These need to be clarified so that the reader can understand the descriptions. In the *Lapidario*, the word "front" is used to denote a more westerly star and the word "back" is used to denote a more easterly star. The words "which follow" can also mean a more easterly star. However, it is necessary to be cautious in interpretation because these words can have another meaning. Sometimes, a sequence of stars is described that are not in a west-east alignment. In this case, one star will be described at the start and the others will follow in sequence. The word "last" can mean the most easterly or the last star in a sequence. The words "toward midday" are used as a substitute for the word "southern." In the *Almagest*, the word "advance" means more westerly and the word "rear" means more easterly.

In the discussion for some stars I use the term "Ptolemy's figure," which is a reference to my own reconstruction of the constellation figures according to Ptolemy's star catalog. Ptolemy did not supply illustrations of the constellations in the *Almagest*.

Aries

1st Degree - *those three which are together and follow the line that divides the sign of Pisces, and one of which is at the end of the tail of one of the fish.* **Pi, Eta and Rho Piscium.** Stars in the northern fishing-line: the southernmost of the 3 stars following after that [after Omicron]; the middle one of these; the northernmost of the 3, which is also on the end of the tail. The figure is illustrated with a celestial globe orientation. There are three stars depicted on the fishing line with the U-shaped bend and one of the stars is positioned on the tail. The fishing line with the U-shaped bend is illustrated on the left side (viewer's left) of the figure.

In the *Almagest* figure of Pisces there are two fishing lines, one for each fish, which are joined with a knot (Alpha Piscium). The southern fishing line has a U-shaped bend near the knot and the northern fishing line is essentially straight. Both lines terminate on the tail of the fish to which they are connected.

I interpret the knot as the point that "divides the sign" in the *Lapidario* description. If the stars of the constellation are listed in sequence, from the southern, advanced fish to the northern fish, as Ptolemy lists them, then the northern fishing line "follows" the division (Alpha Piscium). Therefore, the *Lapidario* stars of the 1st degree belong on Ptolemy's northern fishing line.

The *Lapidario* text describes a group of three stars in the first degree. The only group of three stars in Ptolemy's list for Pisces that have longitudes fitting the first degree are Pi, Eta and Rho Piscium. And these stars are on Ptolemy's northern fishing line. Therefore, Pi, Eta and Rho Piscium are clearly the stars referred to by the *Lapidario*.

The *Lapidario* illustration places the stars on the southern fishing line, which is not the correct location for Pi, Eta and Rho Piscium. Why was the southern fishing line rendered correctly in the celestial globe view while the stars were drawn on the wrong side of the constellation? The illustrator probably used a celestial globe as a reference for his drawings. Assuming that the constellations were oriented correctly on the globe, the illustrator would have no difficulty in drawing the constellations with the parts oriented correctly. But when it came time to apply the stars to the figures, the illustrator applied them on the wrong side because he positioned them as they appear from Earth.

2nd Degree - *the middle star of the three which are on the waist of the figure of the Chained Woman.* **Mu Andromedae.** The middle one of the 3 stars over the girdle.

3rd Degree - *star on the right wrist of the Woman Seated in the Chair.* **Sigma Cassiopeiae.** The star on the right fore-arm. The illustration depicts the correct star position on the left wrist and the left hand is grasping the staff, which is part of the chair back. The *Lapidario* has transferred the star from the fore-arm to the wrist.

4th Degree - *southernmost one of the three stars that are on the waist of the Chained Woman Who never Knew Man.* **Beta Andromedae.** The southernmost of the 3 stars over the girdle. The southern side of the waist is the left side in Ptolemy's figure. The star is illustrated on the right side of the waist, which is correct for the celestial globe view of a turned figure.

5th Degree - *star that is in the bend of the River, the one that touches the chest of Caytoz.* **Tau[1] (5 1/6°) Eridani.** The first star in the bend of the river, which [star] touches the chest of Cetus. The star is illustrated on the first bend of the river, which is the correct position. The *Lapidario* illustration of Eridanus contains two distinct bends in the river. At the top of the illustration the water flows down vertically, following a slightly sinuous path to the first bend, where the flow curves sharply to the right (the viewer's right) and then flows in a horizontal direction to the second bend, where the flow curves down and terminates, forming a hook shape. The direction of the curves establishes that the constellation is illustrated with the celestial globe perspective.

6th Degree - *star that follows the one which is on the bend of the River.* **Tau[2] Eridani.** The one to the rear of the first star in the bend of the River. The star is illustrated on the first bend in the river, slightly downstream from the star illustrated for the 5th degree, which is the correct position.

7th Degree - *front one of the two stars on the horn of the sign of Aries and the one which is on the neck of the same figure.* **Gamma and Iota Arietis.** The more advanced of the 2 stars on the horn and the star on the neck. One star is illustrated at the base of the right horn and another on the neck. It is not possible to determine which horn the star belongs on due to a lack of specificity in the *Almagest* and *Lapidario* descriptions. Therefore, it is not possible to evaluate the illustration with regard to star position on the horns.

8th Degree - *star on the head of the Woman Seated on the Chair and one which is on the staff of the same figure and which is called the Red Palm.* **Zeta and Beta Cassiopeiae.** The star on the head and the star on the middle of the back of the throne. One star is illustrated on the head and another on the staff, just below the point where the left hand grasps the staff. The staff is part of the chair (throne) back. In Ptolemy's figure the throne back is on the viewer's left while the *Lapidario* illustration places it on the right, confirming the celestial globe view. The star on the staff is positioned so that the star coordinates are properly preserved.

In Ptolemy's descriptions of the stars in Cassiopeia there is no mention of a Red Palm. Allen (1963) sheds some light on the palm: "The *Alfonsine Tables* and *Arabo-Latin Almagest* described the figure as *habens palmam delibutam*, Holding the Consecrated Palm, from some early drawing that is still continued; but how the palm, the classic symbol of victory and Christian sign of martyrdom, became associated with this heathen queen does not appear." Somewhere between the time of Ptolemy and Alfonso X, the palm was associated with Cassiopeia, but the origin of this addition is unknown.

9th Degree - *front star of three in a row which are in the figure of the River.* **Tau[3] Eridani.** The most advanced of the next [group of] three (those that follow Tau[1] and Tau[2]). The star is illustrated near the beginning of the water flow.

The *Lapidario* description does not indicate where the star is located on the River. However, Ptolemy's catalog lists only one star in Eridanus that falls into the 9th degree, Tau[3] Eridani, which he groups with two other stars. If Ptolemy's description for Tau[3] Eridani is examined alone, it is impossible to identify the star. But Ptolemy's stars for Eridanus are described in sequence

along the water flow. It is the sequential listing that helps identify each star (in addition Ptolemy supplies the coordinates, which is the information that is most helpful in making a positive identification).

The *Lapidario* description is similar to Ptolemy's. However, the *Lapidario* has isolated this star and does not list it in sequence along the water flow. The loss of the sequence information contained in the *Almagest* makes it difficult to identify the *Lapidario* star. The *Lapidario* astronomer has adopted elements of Ptolemy's description but the omission of the sequence information yields a poor description. See the 15th and 25th degrees for more information.

The *Lapidario* illustration does not depict the star of the 9th degree in the correct position. The correct position should be near the downstream end of the first bend. It seems likely that the poor description in the *Lapidario* may have caused some confusion regarding the true location of the star. Later on, it will become apparent that the star of the 6th degree of Taurus fits the illustration supplied here.

10th Degree - *star on the right knee of the Chained Woman.* **Phi (10 1/6°) Andromedae.** The star on the right knee. The star is illustrated on the right knee but it should be on the left knee, assuming that Andromeda is a turned figure.

11th Degree - *two stars, one in the southern part of the triangle that is on the third bend of the figure of the Dragon, and that which is on the chest of the Woman who is seated in the Chair.* **Sigma Draconis and Alpha Cassiopeiae.** The southern star of [those forming] the triangle in the next [3rd] bend and the star in the breast. The illustration of the dragon shows it to be relatively straight with one tight coil near the head. The head is pointed to the viewer's left. The star is illustrated just below the coil.

The illustrator has mistaken Hydra for Draco (the dragon). It is not hard to imagine how the illustrator could make this mistake because both constellation figures are serpents. Nevertheless, it is distressing to find that this is just one of many errors in the *Lapidario* illustrations.

It has already been established that the *Lapidario* illustrations are rendered from the celestial globe perspective. Therefore, the illustrations are flipped left to right with respect to our view on Earth. On a celestial globe, the head of the dragon (Draco) should point towards the viewer's right while the head of Hydra should point to the viewer's left. Ptolemy's figure for Draco is strongly curved into an "S" shape while Hydra is fairly straight. On the basis

of these observations, I have concluded that the illustrator has mistakenly applied the drawing of Hydra here. Later on, in the 10th and 11th degrees of Virgo, the illustrator supplies the correct drawing for Draco, with the head pointing towards the viewer's right, and a sinuous body with three tight coils.

12th Degree - *two stars on the mouth of Aries, one toward the north, the other toward the south.* **Eta and Theta Arietis.** The northernmost of the 2 stars on the muzzle and the southernmost of them.

13th Degree - *two stars, the middle one of three on Caytoz' mouth; and the northernmost one of the stars which are above the eye and the eyebrow, the one that looks like it is on his hair.* **Gamma and Xi2* Ceti.** The three stars in the snout: the middle one, in the middle of the mouth and the one to the north of this [north of the star on the eyebrow and the eye], about on the hair.

14th Degree - *star that sets toward the north and is on the waist of the Woman who is Seated on the Chair.* **Eta Cassiopeiae.** The one north of that [north of the star in the breast], on the belt. In Ptolemy's figure it is not clear which side of the body Eta belongs on. The star is illustrated on the right side of the waist but the descriptions in the *Almagest* and *Lapidario* are not specific enough to allow an evaluation of the illustrated star position..

15th Degree - *middle star of the three on the bend of the River.* **Tau4 (13 5/6°) Eridani.** The middle one of the next [group of] three (those that follow the first star in the bend and the one to its rear). The illustration places the star on the downstream end of the first bend, but in my reconstruction of Ptolemy's figure the star is positioned slightly farther downstream.

Tau4 Eridani is a member of Ptolemy's group of three that includes Tau3 Eridani, which was assigned to the 9th degree. The *Lapidario* description for the star of the 9th degree does not specify a location on the river. But in the 15th degree, the *Lapidario* does specify a position on the bend. The *Lapidario* astronomer apparently omitted the bend specification by mistake in the description for the star of the 9th degree. Also see the 25th degree for more information.

16th Degree - *star that sets toward the south and is the one that is on the right foot of the Chained Woman.* **51 Andromedae.** The one south of the latter [south of the star in the right foot]. The illustration places the star on the left foot, which is the correct position for a turned figure.

17th Degree - *middle one of three stars which are on the base of the Triangle.* **Delta Trianguli.** The middle one of the three on the base. The symmetry of the triangle prevents an evaluation of the *Lapidario* illustration orientation.

18th Degree - *last star on the spine of Aries, and one on the right foot of the Chained Woman.* **Nu Arietis and Phi Persei.** The star on the rump and the star on the right foot [of Andromeda]. The illustration places the star on the left foot, which is the correct position for a turned figure. The latter star was removed from Andromeda and is presently placed in Perseus.

19th Degree - *star on the ankle of the back leg of Aries.* **Mu (15°) Ceti.** The star on the hind hoof [of Aries]. The star is illustrated on the right rear ankle, which is forward of the left rear leg. In Ptolemy's figure there are three stars described on the hind leg; one on the back of the thigh, one under the knee bend and one on the hoof. These stars appear to be on the same leg and there are no stars on the other hind leg. Therefore, it is not possible to evaluate the illustration regarding correct placement on a leg of the hind pair.

Mu Ceti was considered a star in Aries by Ptolemy but is currently considered a star in Cetus.

20th Degree - *star on rear haunch of Aries.* **Rho Arietis.** The star in the back of the thigh. The star could be described as being illustrated on the rump or the left upper thigh. See the 19th degree for more information.

21st Degree - *star on the knees of Woman Seated on the Chair.* **Delta Cassiopeiae.** The star in the knees. The star covers both knees in the illustration.

22nd Degree - *front star of two on base of the triangle which is formed in the third turn of the figure of the Dragon.* **Upsilon Draconis.** The more advanced of the other two stars of the triangle [in the third bend]. The star is illustrated on the body, closer to the tail than the head. Here again the illustrator has used a drawing of Hydra by mistake. See the 11th degree of Aries for a discussion of the error.

23rd Degree - *middle of three stars on the body of Caytoz.* **Tau (22° Pisces) Ceti.** The midmost of the 3 stars in the body. Here the *Lapidario* astronomer has placed a star in the incorrect sign of the zodiac. Tau Ceti is in the 23rd degree of Pisces, not Aries. Was this misalignment intentional or an error?

24th Degree - *front one of three stars against the tailbone of Aries.* **Delta Arietis.** The most advanced of the 3 stars in the tail. The star is illustrated in the same place as the star in the illustration for the 18th degree.

25th Degree - *last of four stars, which follow the three that come after the bend of the River.* **Tau^9 Eridani.** The last of the 4 stars, nearly forming a trapezium, the rear one on the rear side. The star is illustrated on the second bend of the river.

Now the *Lapidario* describes Tau^9 Eridani and states that it is included in a group of four that follow three that come after the bend. The three stars that "come after the bend" are Tau^3, Tau^4 and Tau^5. In the 9th degree Tau^3 was assigned, where the *Lapidario* describes a star as the front one of three in a row on the river. In the 15th degree Tau^4 was assigned, where the *Lapidario* describes a star that is the middle one of three on the bend. Now in the 25th degree we learn that these stars come after the bend. So which is it? Are these stars on the bend, do they come after the bend or are they just on the figure of the River? The *Lapidario* astronomer has not been consistent in describing the position of the group of three that includes Tau^3 and Tau^4. This is one example of several where the *Lapidario* astronomer is not consistent when describing the positions of stars.

Ptolemy does a much better job of maintaining consistency in his star catalog because the stars of each constellation are listed together. His format tends to eliminate inconsistencies. In the *Lapidario*, the stars of several constellations are intermingled into each sign of the zodiac. I believe that the discontinuous nature of the lists of stars for each constellation in the *Lapidario* fostered the inconsistency that is seen in the descriptions.

Once again the illustrator has positioned the star of the 25th degree in the wrong place. The star should be illustrated roughly midway between the first and second bends. It is not surprising that the illustrations for Eridanus contain errors because the *Lapidario* descriptions are inaccurate. The illustration for the 6th degree of Taurus shows a star in the position that fits Tau^9 Eridani (see the 9th degree of Aries for more discussion).

26th Degree - *middle star of the three on Aries' tail.* **Zeta Arietis.** The middle one of the 3 stars in the tail.

27th Degree - *red star at the end of the right hand of Perseus.* **NGC 869 and NGC 884.** The nebulous mass on the right hand. The star is illustrated correctly on the left hand, which grasps the sword.

Ptolemy lists the famous double cluster (NGC 869 and 884) on the right hand of Perseus. He also states that it is a nebulous mass, which is the way the naked eye detects these clusters. It is curious that the *Lapidario* describes these clusters as a red star. Perhaps there is some error by a copyist or translator here. Alternatively, it is possible that there is a star in the vicinity of the double cluster that was noted by an astronomer who succeeded Ptolemy.

There are a number of very dim stars near the double cluster, including **5, 7, 8** and **10 Persei**. Within this group, **5** and **10 Persei** have spectra that should make them appear bluish-white to the eye, but their magnitudes are probably below the detection limit of the naked eye. The remaining two stars, **7** and **8 Persei**, have spectra that would appear yellow or red to the eye, with magnitudes very near the detection limit of the naked eye. All of these stars are so dim that it seems unlikely that the *Lapidario* astronomer would choose one to represent the hand of Perseus. Furthermore, the human eye usually detects star color only in brighter stars.

Is the *Lapidario* describing an unusual type of star? There are various classes of stars that undergo changes in luminosity over time. These include different types of variable stars and those known as novae. Could there have been a variable star or novae that was noted by the *Lapidario* astronomer? There are classes of variable stars that are red. The most likely candidate I could identify is **KK Persei**. This is a red supergiant star, whose variations in luminosity during modern times probably exclude it from naked eye visibility. But this does not preclude the possibility that **KK Persei** was brighter during the time of the *Lapidario* astronomer. Perhaps it was bright enough to be selected as the red star of the hand?

Novae are stars that undergo periodic bursts of activity, resulting in dramatic increases in luminosity. Usually these stars are too dim to be seen with the naked eye. But during their temporary brightening, they can become easy naked-eye objects. However, novae should not appear red to the eye. When a star undergoes a nova outburst, its surface temperature is very high, and should be perceived with a white or bluish-white color.

Past reports of star colors and "new" stars (novae) hold interest among modern astronomers. They may be important observations regarding the past history of dynamic stars. For example, historians of astronomy have noted unusual descriptions of the color of Sirius from sources in antiquity. Ptolemy describes the brightest star in the heavens as having a reddish color. But today Sirius clearly shines with a white color. Now there is another curious reference to star color in the *Lapidario*. Could this be an important clue to the past

behavior of a star in the region of the double cluster? Or is it just an error of the copyist or translator? Or did the *Lapidario* astronomer truly perceive the color of the double cluster to be red?

28th Degree - *star on the leg of the Woman Seated in the Chair.* **Epsilon Cassiopeiae.** The star on the lower leg. The star covers both legs in the illustration, just below the knees. The description in the *Lapidario* does not include the position of the star on the leg. However, the illustration matches Ptolemy's position on the lower leg.

29th Degree - *second star of two which are together and beyond the bend of the River.* **Upsilon^3 Eridani.** The rearmost of the next 2 stars after the bend. The star is illustrated on the first bend of the river.

Once again the *Lapidario* description is inadequate. Upon consulting the *Almagest*, it is clear that Upsilon^3 should be assigned here. Upsilon^3 follows the second bend in Ptolemy's river. The *Lapidario* only specifies that the star is beyond the bend so the description in not complete. In isolation, Ptolemy's description is also incomplete. But it is clear that Upsilon^3 follows the second bend when the complete list for Eridanus is examined in the star catalog.

The *Lapidario* astronomer has delivered a poor description in the 29th degree because he adopted Ptolemy's description in isolation from the other stars in Ptolemy's list. This is just one of many examples where the *Lapidario* provides a poor description because Ptolemy's descriptions are copied without reference to other stars in the catalog.

The *Lapidario* illustration for the 29th degree also positions the star in the wrong place. The star of the 29th degree should have been positioned near the second bend of the river, not the first. The illustrator must not have been the person responsible for the descriptions. I envision a very confused illustrator who had to try his best to follow the incomplete descriptions. He probably knew the river had two obvious bends because it was depicted that way on a celestial globe. Then he had to decide which bend the star belonged on using the incomplete description in the *Lapidario*. Perhaps the illustrator arbitrarily chose the first bend as the place where the star should be illustrated.

30th Degree - *two stars united, one bright, the other dull, and which are on the head of Algol.* **Beta Persei.** Stars in the Gorgon-head: the bright one. The illustration contains two stars, one above each eye, on Algol's forehead. Perseus is illustrated with Algol's head held in the right hand. In Ptolemy's figure,

Perseus holds the head with his left hand. Therefore, the *Lapidario* illustration depicts a turned figure with the celestial globe view.

This is the famous eclipsing binary star which is still known today as **Algol**. The naked eye detects Algol as one star, and I believe the term "united" in the *Lapidario* description was selected to convey this condition. Even with a powerful telescope the two stars appear to be one because they are very close to each other. In a very real sense, the illustration of two stars is prophetic, even though the true nature of Algol was not understood until modern times.

Algol is a system of two stars which orbit around a combined center of mass. If the plane of their orbits is extended into space, it intersects the Earth. This chance alignment of the orbital plane with our location in space results in a cyclic pattern of the first star eclipsing (moving in front of) the second star and then the second star eclipsing the first star. The stars complete one orbit around their common center of gravity in 2.87 days. The orbit period is easily determined because it coincides with a cyclic period of changes in the luminosity of Algol. Every 2.87 days, Algol's brightness drops for a period of about 10 hours. This occurs when the dimmer star of the pair eclipses the brighter star. The change in brightness is distinct to the naked eye. The *Lapidario* description also indicates something of this nature by stating that one star is bright and the other dull.

It is interesting to note that Ptolemy's description for Algol does not include any mention of variation in brightness. So in the 30th degree, there is evidence that other astronomers have contributed to the knowledge found in the *Lapidario*.

Taurus

1st Degree - *bright star on the right upper arm of Perseus and the one that is on Algol's head.* **Eta (1 1/6°) and Omega (29 1/6° Aries) Persei**. The star on the right elbow and the one to the rear of this [to the rear of Beta Persei, on Algol's head]. The first star is illustrated on the left shoulder. The second star is illustrated in the center of Algol's forehead. The stars are illustrated on the correct sides of the figure according to a turned figure and the celestial globe view.

Ptolemy lists four stars on Algol's head. Of the four, two fall in the 30th degree of Aries (Beta and Omega). The other two fall in the 27th and 28th

degrees of Aries. Omega was selected for placement here because Beta clearly belongs in the 30th degree of Aries according to the *Lapidario* description.

2nd **Degree** - *star on Perseus' left upper arm.* **Kappa (0 1/2°) Persei.** The star on the left elbow. The star is illustrated on the right upper arm, which is the correct position.

Kappa falls into the first degree by position but belongs here by description. If the assignments for Eta and Kappa are exchanged, then they both fall into the proper degrees but the descriptions would be incorrect, confusing the left with the right. It is difficult to decide where the error resides here. One could argue that Kappa belongs in the first degree and Eta in the second. However, I prefer to favor the written descriptions over the longitude data in this case.

3rd **Degree** - *two stars, one of them meridional, the other septentrional, which are in the front line of Azoraya, which is called "the seven kids" and which are within the figure of Taurus.* **23* and 19* Tauri.** The Pleiades: the southern end of the advance side; the northern end of the advance side. Two stars are illustrated on the back, centered between the neck and tail. The "seven kids" is clearly a reference to the famous star cluster called the Pleiades.

4th **Degree** - *star on the left foot of Faycoz, which means "inflamed" or "burning," and is also called "the shepherd."* **Gamma Cephei.** The one on the left leg. The star is illustrated on the left foot, but it should be on the right foot in order to preserve the star coordinates for the turned figure.

There is no star listed for the left foot of Cepheus in the *Almagest*. The closest star would be the one on the left leg, Gamma Cephei. The *Lapidario* astronomer has apparently transferred the star from the leg to the foot.

The term Inflammatus has been associated with the constellation of Cepheus, possibly "originating from the fable that the tables of the Sun were spread in Aethiopia, the land where Cepheus reigned when on earth" (Allen, 1963). Gamma Cephei was known to the Arabs as Al Rāi, the Shepherd.

5th **Degree** - *shiny star on the right side of Perseus.* **Alpha Persei.** The bright star in the right side. The star is illustrated on the left armpit, which is the correct position for a turned figure.

6th **Degree** - *middle one of three stars which come after the two which follow the bend of the River.* **Omicron^2 Eridani.** The middle one of these [group of three

stars which come after a group of two, near the curve in the water next to Orion's shin]. The star is illustrated just downstream of the first bend of the river.

By examining Ptolemy's star catalog, it appears that the bend in the river described in the *Lapidario* is equivalent to the "curve" next to Orion's left leg in Ptolemy's figure. Following the flow of water from the "curve," Ptolemy describes a group of two stars (Psi and Omega Eridani) and then another group of 2 stars (Mu and Nu Eridani). Then comes a group of three stars (Omicron^1, Omicron^2 and Xi Eridani).

It is easy to become confused regarding the identity of various bends in the river, which makes it challenging to pick the correct stars. Perhaps Ptolemy should bear some of the criticism because he did not number the bends. The *Lapidario* astronomer did not do a very good job of describing the stars on the River either. In any case, Omicron^2 fits here based on the fact that it has the correct longitude and the fact that Ptolemy describes it as the middle star of a group of three which follow a group of two. This description matches fairly well with the *Lapidario* description.

Upon reaching the 6th degree of Taurus, the *Lapidario* describes the last star in its list for Eridanus. Adding to the growing list of errors in Eridanus, the illustration for the 6th degree does not position the star in the correct place. The star should be illustrated near the start of the water flow. The illustration for the 9th degree of Aries would fit very well here.

The *Lapidario* has listed 7 stars in Eridanus. Two stars (5th and 6th degrees of Aries) are illustrated in the correct position. One star appears to be slightly off in illustrated position (15th degree of Aries). Four stars (9th, 25th and 29th degrees of Aries and 6th degree of Taurus) are clearly illustrated in the wrong position. Why are there so many illustration errors?

It is clear that there is confusion regarding the location of bends in the river. However, if some of the illustrations are exchanged, most of the illustration errors can be corrected. I wonder if the *Lapidario* illustrator possessed a map of the river with the appropriate stars illustrated. If the stars were illustrated but not labeled, a common practice even at the time of Alfonso X, then the *Lapidario* illustrator would have to decide the identity of each illustrated star on the reference map. I can envision the frustration of the illustrator as he labored to match the poor *Lapidario* descriptions with the unlabeled stars on the reference map. If this is the correct scenario, it would account for the incorrect illustrations which can be corrected by exchange.

7th Degree - *star on right knee of Taurus.* **Mu Tauri**. The star on the right knee. The star is illustrated on the right knee, which is the correct position.

8th Degree - *southern one of two stars on the northern ear of Taurus.* **Kappa (11 2/3°) Tauri**. The southernmost of the 2 stars close together in the northern ear. The star is illustrated at the base of the right ear. By position, Kappa belongs in the 12th degree. However, the *Lapidario* and *Almagest* descriptions match if it is assigned here.

In the 8th degree, the first star in a series on the head of the bull is encountered. The *Lapidario* descriptions don't distinguish the sides of the head as left and right. Instead, the *Lapidario* follows Ptolemy in using the terms south and north.

In Ptolemy's figure, the head of Taurus is seen in front view, not from the side (*e.g.*, both eyes are seen, which is possible only with a frontal view). The bull is in a charging stance, with the horns pointing forward. In order to see both sides of the face, the head must be turned to the left side of the body. In this position, the left side of the face is north of the right side.

The *Lapidario* illustration places the bull's head on the viewer's right and the tail on the left, opposite from Ptolemy's figure, which confirms the celestial globe orientation. If the bull is looking toward Earth, then the back of his head should be seen on the celestial globe. But the *Lapidario* illustration shows the face of the bull. This is accomplished by making the bull turn his head toward his right side instead of the left side. Now the left and right sides of the face are reversed with respect to north and south. Therefore, the *Lapidario* illustrations should depict stars of northern parts on the right side of the face and stars of southern parts on the left side, if the stellar coordinates (longitude and latitude) are preserved.

The illustration for the 8th degree places the star on the right ear which is correct for the northern ear. In the 16th degree, the *Lapidario* illustrates a star at the base of the right horn, which meshes with the description *at the base of the northern horn.* However, the illustrations for the 11th, 12th, 13th, 18th, 21st and 28th degrees position stars on the wrong side of the face.

The *Lapidario* illustration errors in Taurus, where left and right are confused (*i.e.*, correct star coordinates are not depicted) are found elsewhere in the *Lapidario.* In the case of Taurus, it appears that the terms north and south were the cause of confusion. In any case, criticism is due because the

illustrations don't conform to one convention or the other, *i.e.*, two stars are positioned to preserve stellar coordinates and six are not.

9th Degree - *southern one of two stars on the front line of the quadrant that is on the neck of Taurus.* **44 Tauri.** The quadrilateral in the neck: the southernmost star on the advance side. The star is illustrated on the spine in the neck region, which is correct.

10th Degree - *of the stars on the face of Taurus, the one on the nose.* **Gamma Tauri.** The stars in the face, called 'the Hyades': the one on the nostrils.

11th Degree - *star which is between the one on Taurus' nose and one on his southern eye.* **Theta[1] Tauri.** The stars in the face, called 'the Hyades': the one between the one on the nostrils and the southern eye. The star is illustrated just below the right eye. The illustration should have positioned the star below the left eye. See the 8th degree for further discussion.

12th Degree - *star on the northern eye of Taurus.* **Epsilon Tauri.** The stars in the face, called 'the Hyades': the remaining one, on the northern eye. The star is illustrated on the left eye. The illustration should have positioned the star on the right eye. See the 8th degree for further discussion.

13th Degree - *star which is on the southern eye of Taurus, the one called Aldebaran.* **Alpha Tauri.** The stars in the face, called 'the Hyades': the bright star of the Hyades, the reddish one on the southern eye. The star is illustrated on the right eye. The illustration should have positioned the star on the left eye. See the 8th degree for further discussion.

The name Aldebaran, still accepted today, comes from the Arabic name Al Dabarān, the Follower. The adoption of this name is evidence of Arabic input to the astronomical knowledge contained in the *Lapidario.*

Aldebaran is one of a few stars assigned colors by Ptolemy. For some reason the *Lapidario* has not included a color specification in its description for Aldebaran.

14th Degree - *star on the left forearm of Taurus.* **88 Tauri.** The star on the left lower leg. The star is illustrated on the right thigh. The star should be illustrated on the left lower leg.

15th Degree - *second one of two stars on Perseus' crown.* **Star not identified.** The star is illustrated on Algol's head, above the right eye. There is no crown

described in the *Almagest* for Perseus. The only stars in Perseus that would fit by position here are on the right leg according to the *Almagest*. And there are no other constellation figures with crowns at the 15th degree of Taurus. The illustration places the star on Algol's head. The stars on Algol's head, according to the *Almagest*, have longitudes between 26 and 29 degrees in Aries. Therefore, none of the stars on Algol's head fit here by position.

16th Degree - *star at the base of the northern horn of Taurus.* **Tau Tauri.** The star on the place where the northern horn joins [the head]. The star is illustrated at the base of the right horn. The star is illustrated correctly. See the 8th degree for more discussion.

17th Degree - *star on the heel of the right foot of Perseus.* **58 Persei.** The star on the right ankle. The star is illustrated on the left heel, which is correct for the turned figure.

18th Degree - *star at the base between the base of the northern horn and the ear of Taurus.* **97 Tauri.** The star on the place where the southern horn and the ear join [the head]. The star is illustrated at the base of the left horn. The *Almagest* lists 97 Tauri at 17 1/6 degrees, so it fits the 18th degree of Taurus. If the word "northern" is changed to "southern" in the *Lapidario* description it clearly matches the *Almagest* description. If this change is made, the illustration would depict the star correctly. See the 8th degree for more discussion.

19th Degree - *third star of nine on the sleeve that hangs from the left hand of Orion and which is positioned at midday.* **Omicron^2 Orionis.** Stars in the pelt on the left arm: the 3rd from the northernmost. The star is illustrated on the sleeve that hangs from the right hand, which is the correct position.

20th Degree - *two stars, one southern, the other northern, which are in the front line of the quadrant that is on the ears of the Hare, and also the star which is on the left heel of the Man Who Has the Reins.* **Kappa and Iota Leporis and Iota Aurigae.** The quadrilateral just over the ears: the southern star on the advance side; the northern star on the advance side and the star on the left ankle. The first two stars are illustrated on the right ear of the Hare, which is forward of the left ear. The third star is illustrated on the left heel of Auriga, but it should be on the right heel in order to preserve the star coordinates. There are two extra stars illustrated on the figure of Auriga, one on the right thumb and one on the left thumb. These extra stars are small in the figure and it is not clear why they are included because they are not in the description.

Kappa and Iota are the more advanced stars of the ears in Ptolemy's figure. From Earth the head of the hare is seen on the viewer's right. With the head turned slightly toward Earth, the left ear would be in front of the right ear. Therefore, it seems reasonable to suggest that Kappa and Iota mark the left ear, although Ptolemy does not state this in his description. In the *Lapidario* illustration the head is on the viewer's left and the right ear is in front of the left ear. Accepting these orientations, the *Lapidario* illustration depicts the stars on the correct ear.

21st Degree - *two stars, one northern, the other southern, which are on the horn of Taurus which is toward the midday position.* **106 and 104 Tauri.** The northernmost of 2 stars on the southern horn and the southernmost. The star is illustrated on the right horn. The star should be illustrated on the left horn. See the 8th degree for more discussion.

22nd Degree - *two stars, one southern, one northern, which are in the quadrant of the ears of the Hare.* **Lambda and Nu Leporis.** The quadrilateral just over the ears: the southern star on the rear side; the northern star on the rear side. One star is illustrated on the right (forward) ear and the other on the left ear. The *Lapidario* description does not tell us whether the stars are on the forward or rear side of the quadrant. However, Lambda and Nu fit here by position and Ptolemy places them on the rear side of the quadrant. This being the case, the illustration should have placed both stars on the left (rear) ear. See the 20th degree for more information.

23rd Degree - *star on the left upper arm of the Man Who has the Reins and which is called the Goat, and the other two which are on the same upper arm and are called Kids.* **Epsilon, Zeta and Eta Aurigae.** The star on the left elbow. The more advanced of the two stars on the left wrist, which are called 'Haedi'; the rearmost of these. The illustration contains one star on the left upper arm, which is not the correct position for a turned figure.

Alpha Aurigae is well known as Capella, the Little She-goat star and Ptolemy lists the name Capella in his description of Alpha. The *Lapidario* describes the first star as a goat on the left upper arm. Ptolemy describes Alpha on the left shoulder. Since the left shoulder is very close to the left upper arm, Capella might fit here. However, Capella fits the 26th degree by longitude, where the *Lapidario* does describe a star on the left shoulder.

Epsilon fits the 23rd degree by position and is placed on the left elbow by Ptolemy. The *Lapidario* astronomer appears to have transferred the star from the elbow to the upper arm. In addition, there is Arabic authority for assigning

the name of He-goat to Epsilon Aurigae (Allen, 1963). Here is another clue that points toward Arabic influence in the astronomy of the *Lapidario.*

Zeta and Eta are well known as the kids (young goats). The *Lapidario* astronomer appears to have transferred them from the wrist to the upper arm.

The *Lapidario* illustration does not include the goats in the drawing but others have excluded them as well in their drawings.

24th Degree - *star on the handle of Orion's sword.* **Eta Orionis.** The star near the handle of the dagger.

25th Degree - *foremost one of four stars which are in a straight line on the spine of the figure of Orion.* **Psi Orionis.** The last and most advanced of the 4 stars almost on a straight line just over the back. The star is illustrated on the right side of the waist, just above the handle of the sword.

In Ptolemy's figure Psi Orionis is clearly on the left side of the figure. Therefore, the illustration has positioned the star correctly for a turned figure.

26th Degree - *star on the left shoulder of the Man who has the Reins and who is called Alayoz, and another one, which is on the right heel and which location that and the northern horn of Taurus have in common.* **Alpha Aurigae and Beta Tauri.** The star on the left shoulder, called Capella and the star on the tip of the northern horn, which is the same as the one on the right foot of Auriga. The first star is illustrated on the left shoulder, which is not the correct position for a turned figure. There is no illustration of the second star.

27th Degree - *two of the three stars which are at the hilt of Orion's sword, the northernmost and the middle one.* **42* + 45* Orionis and Theta^{1}* + Theta^{2}* Orionis.** The northernmost of the 3 stars joined together at the tip of the dagger. The middle one. The illustration shows three stars on the blade sheath; one in the middle (between base and tip), which represents 42 + 45; one near the tip, which represents Theta^{1} + Theta^{2}; and one very near the tip. The third star in the illustration is not included in the *Lapidario* description but matches Iota Orionis in Ptolemy's catalog. The illustration should have depicted all of the stars near the tip of the blade sheath.

28th Degree - *star at the tip of that horn of Taurus which points toward midday, and the one on the head of Orion.* **Zeta Tauri and Lambda* Orionis.** The star on the tip of the southern horn and the nebulous star in the head of Orion. The first star is illustrated on the tip of the right horn. The illustration should have

placed the star on the left horn. The star on the head of Orion is not illustrated. See the 8th degree for more discussion.

29th Degree - *rearmost star of the three on the waist of Orion.* **Zeta Orionis.** The rearmost of the three [stars on the belt]. The star is illustrated on the left side of the waist, which is correct for a turned figure.

30th Degree - *southern one of two stars on the hind feet of the Hare.* **Gamma Leporis.** The southernmost of the 2 stars in the hind legs. The star is illustrated on the left hind foot.

Ptolemy's figure of the Hare contains two stars on the "hind legs." The lack of specificity between the right and left rear legs in his descriptions prevents an evaluation of the *Lapidario* illustration with regard to the correct hind leg.

Gemini

1st Degree - *star at the end of the Little Bear, the one called "The Kid of Benanays".* **Alpha Ursae Minoris.** The star on the end of the tail. The star is illustrated on the tip of the tail. The *Lapidario* description should state that the star is at the end of the tail of the bear. See the 30th degree for more information.

2nd Degree - *star on the right shoulder of the Man who has the Reigns.* **Beta (2 5/6°) Aurigae.** The star on the right shoulder. The star is illustrated on the right shoulder, but it should be on the left shoulder in order to preserve the star coordinates.

3rd Degree - *two stars, one southern, one northern, which are on the head of the Man who has the reins, but with the northern star above his head.* **Delta and Xi Aurigae.** The southernmost of the two on the head and the northernmost [of these], over the head.

4th Degree - *star at the end of the tail of the Hare.* **Eta (2 2/3°) Leporis.** The star on the tip of the tail.

5th Degree - *front one of two stars on the rudder that faces the north side of the Ship.* **Eta Columbae.** The more advanced of the 2 stars in the northern advance steering-oar. The star is illustrated on the tip of the steering-oar that is attached to the port side of the stern (rudder on the left side of the ship).

This is the first star listed for the defunct constellation Argo. It is clear from Ptolemy's star catalog that his constellation figure contains stars only in the rear half of a ship. In contrast, the *Lapidario* illustration is of a complete ship. From our view on Earth, Ptolemy's ship sails across the night sky to the west with the stern end in front, *i.e.*, sailing backwards. This peculiar orientation is explained by Aratus in his *Phaenomena*, published ca. 270 BC (Lombardo, 1983) : "Down from the Great Dog's tail is the Argo, hauled sternwise through heaven, not as ships sail, but like one backing water into a harbor rowed by all hands till she surges to shore: so Jason's Argo is hauled by her stern. She moves partly in mist, and from prow to mast is stripped of her stars, but all the stern shines." This passage explains why the ship sails backwards and why we see stars only in the rear half of the ship.

As viewed from Earth, Argo sails across the sky with the stern on the viewer's right. In contrast, the illustration in the *Lapidario* places the stern on the viewer's left, revealing the correct orientation for a constellation illustrated on a celestial globe.

It is difficult to determine from the *Almagest* whether the northern steering oar is on the port or starboard side. The northern steering-oar sits above the southern one, suggesting that it is attached to the far side of the hull. If so, the northern steering-oar is the starboard one, which is opposite from the *Lapidario* illustration. The problem is one of view point. In order to render a drawing properly, the steering oar in the foreground should appear lower than the steering-oar attached to the far side of the hull. By viewing the ship from the perspective of the celestial globe, it becomes necessary to transfer the star from the starboard to the port steering-oar in order to maintain it on the more northerly one of the pair. In any case, the *Lapidario* has illustrated the star correctly by placing it on the higher steering-oar, which equates to the northern steering oar.

6th Degree - *star on the right upper arm of Orion.* **Mu (4 1/3°) Orionis.** The star on the right elbow. The star is illustrated on the left shoulder, which is the correct position in order to preserve the star coordinates. The *Lapidario* astronomer appears to have raised the star from the elbow to the upper arm.

7th Degree - *two stars, the front one and the one next to it, on the southern line of the quadrant that is on the right palm of Orion.* **Nu and Xi* Orionis.** The quadrilateral in the right hand: the advance star on the southern side; the rear, double star on the southern side. The illustration shows one star on the left palm, which is the correct position.

8th Degree - *of the two stars which are on the northern line of the quadrant that is on the right palm of the figure of Orion, the one which is toward the back.* **72 Orionis.** The quadrilateral in the right hand: the rear one on the northern side. The star is illustrated on the left thumb, which is the correct position for a turned figure.

9th Degree - *star that follows the one which is on the foot of the front Gemini figure and which seems to be at the spot where the leg begins.* **Mu Geminorum.** The one to the rear of the star on the forward foot of the advance twin, on the same foot [the left foot]. The star is illustrated on the left leg of the front figure, just where it meets the foot.

It is clear from Ptolemy's star catalog that the forward twin of Gemini is to the viewer's right as seen here on Earth. The *Lapidario* illustration places the forward twin on the viewer's left, confirming the celestial globe orientation. The twins are illustrated with an interesting twist at the waist, which shows the legs primarily in side view and the body above the waist in front view. The drawing shows the twins in a walking stance, with the left leg in the forward position at the moment of illustration. In Ptolemy's figure, each twin is seen in a stationary stance *i.e.*, the legs are not crossed. The *Lapidario* illustration has the left and right sides of the torso reversed but the legs are in the correct position! In other words, a star illustrated on the legs can match the description while maintaining the correct stellar coordinates. This is possible because the legs are crossed, placing the left leg on the right side of the torso. .

Can we credit the *Lapidario* illustrator with devising the clever crossed-legs figure? I don't think it is likely. A complete appraisal of the illustrator's work reveals that he was not learned in astronomy, at least not at an adequate level. That is why the illustrations contain so many errors in star placement.

10th Degree - *star at the end of the Great Dog's right foot.* **Zeta Canis Majoris.** The star on the end of the right leg. The illustration places the star on the right rear foot. The *Almagest* and *Lapidario* descriptions don't stipulate a front or rear extremity here, but it is clear in Ptolemy's star catalog that the right rear leg is intended. Therefore, the star is illustrated in the correct position.

11th Degree - *star on right foot of the front Gemini figure.* **Nu Geminorum.** The star on the right foot of the advance twin. The star is illustrated on the right foot of the front figure, which is the correct position. See the 9th degree for more information.

12th Degree - *star at the end of the Great Dog's front paw.* **Beta Canis Majoris.** The star on the end of the front leg. The star is illustrated on the right front paw. The descriptions stipulate a front extremity, but which one? In Ptolemy's figure the stars that mark the right knee are the ones that appear to fit with Beta. Therefore, Beta marks the end of the right front leg, and the illustration depicts the correct position.

13th Degree - *star on the left foot of the second Gemini figure.* **Gamma Geminorum.** The star on the left foot of the rear twin. The star is illustrated on the left foot of the rear twin, which is the correct position. See the 9th degree for more information.

14th Degree - *star which is on the left knee of the front Gemini figure.* **Epsilon Geminorum.** The star on the left knee of the advance twin. The star is illustrated on the left knee of the front twin, which is the correct position. See the 9th degree for more information.

15th Degree - *star on the right foot of the posterior Gemini figure, as well as the front one of the two stars which are on the Great Dog's left knee, both being of the same nature.* **Xi Geminorum and Xi^1 Canis Majoris.** The star on the right foot of the rear twin and the more advanced of the 2 stars in the left knee. Both stars are illustrated on the figure of Gemini, both on the rear twin, one on the left knee and one on the right foot. The star on the right foot is illustrated correctly. The second star should be illustrated on the left front knee of Canis Major not the rear figure of Gemini. See the 9th degree for more information on Gemini.

16th Degree - *of the three stars that are on the Great Dog's right knee, the one which descends toward midday.* **Nu^2 Canis Majoris.** The southernmost of the 2 stars on the right knee. The star is illustrated on the right knee of the front leg, which is in front of the left leg. In Ptolemy's figure it is clear that the right front leg is also in front of the left one. Neither the *Almagest* or *Lapidario* description indicates that Nu^2 Canis Majoris is on the front leg. However, through an analysis of Ptolemy's star catalog it is evident that Nu^2 Canis Majoris is on the right knee of the front leg, which indicates that the *Lapidario* illustration has positioned the star correctly.

There are only two stars listed in the *Almagest* on the right knee. However, there is another naked-eye star in the same region, the dim star Nu^1. This star may have been added to the list in the *Lapidario* to make a total of three. If so, this is evidence that the *Lapidario* has incorporated astronomical knowledge from sources outside the *Almagest*.

17th Degree - *star which is on the left upper arm of the front Gemini figure, and the one which is at the base of the Little Bear's tail, both being of the same nature.* **Theta Geminorum and Epsilon (10 1/6°) Ursae Minoris.** The star in the left forearm of the advance twin and the one next to that [3rd from end of tail], before the place where the tail joins [the body]. The first star is illustrated on the left upper arm of the front twin. The second star is not illustrated.

This is the first star described above the waist of a twin. The stars above the waist must be exchanged left to right in the illustration because this part of the figure is turned (see the 9th degree). The illustration should depict the star on the right arm, not the left arm.

The *Almagest* lists a star on the left upper arm of the front twin, but at a longitude that fits the 19th degree. The *Lapidario* also describes a star on the left upper arm of the front twin in the 19th degree. Theta Geminorum is listed in the *Almagest* on the left **forearm**, with a longitude that fits the 17th degree. It appears that the *Lapidario* has confused the upper arm with the forearm in the 17th degree.

Toomer's (1984) translation of the *Almagest* lists Epsilon Ursae Minoris at a longitude of 10 1/6 degrees, which is quite far removed from the 17th degree. However, according to Toomer, there are Arabic and Greek versions of the *Almagest* that list Epsilon at 16 degrees, which would place it in the 17th degree of Gemini. See the 30th degree for more information.

The *Lapidario* description states that both stars are of the same nature. Ptolemy lists Theta Geminorum and Epsilon Ursae Minoris with magnitudes of 4 each. Magnitude 4 stars are fairly dim and it is difficult to detect their color with the naked eye. Therefore, it seems unlikely that the *Lapidario* term "of the same nature" refers to star color. In any case, these stars do not have the same spectral color according to our modern knowledge. Apparently the term is intended to equate the brightness of the two stars.

See the 9th degree for more information on Gemini.

18th Degree - *star on the Great Dog's mouth, and which is called Alaabor.* **Alpha Canis Majoris.** The star in the mouth, the brightest, which is called 'the Dog' and is reddish.

Alpha Canis Majoris has been known by the Arabic name of **al Abūr al Yamaniyyah**. Alaabor may be a corruption of the first part of the Arabic name. The appearance of Alaabor in the *Lapidario* description reveals the

Arabic input of a star name. Many star names accepted in modern times also come from Arabic sources.

The *Lapidario* has not included Ptolemy's color specification for Alpha Canis Majoris in its description.

19th Degree - *star on the left upper arm of the front Gemini figure.* **Tau Geminorum**. The star in the left upper arm of the advance twin. The star is illustrated on the left upper arm. The illustration should position the star on the right upper arm, not the left upper arm. See the 9th and 17th degrees for more information.

20th Degree - *star which is between the Great Dog's ears.* **Theta Canis Majoris**. The star on the ears.

21st Degree - *star which is on the Great Dog's chest.* **Pi Canis Majoris**. The star on the chest.

22nd Degree - *star on the right knee of the back Gemini figure.* **Lambda Geminorum**. The star over the bend in the right knee of the same [rear] twin. The star is illustrated on the right knee of the rear twin, which is the correct position. See the 9th degree for more information.

23 rd Degree - *star between the shoulders of the front Gemini figure.* **Iota Geminorum**. The one to the rear of that [star in left upper arm of advance twin], just over the place between the shoulders.

24th Degree - *star on the head of the front Gemini figure and the one on the left side of the back Gemini figure, both being of the same nature.* **Alpha and 58* Geminorum**. The star on the head of the advance twin and the star on the left side of the rear twin. The second star is not illustrated.

According to Toomer, most of the Greek manuscripts of the *Almagest* place 58 Geminorum at a longitude of 26 1/6 degrees. It is the Arabic versions and one Greek manuscript that place 58 Geminorum here.

The *Lapidario* description states that the stars are "of the same nature." Ptolemy lists the magnitudes of Alpha and 58 Geminorum at 2 and 5 respectively. Therefore, the term "of the same nature" could not refer to equal brilliance. It is interesting to note that these two stars have the same spectral color according to our modern knowledge, but it seems unlikely that the *Lapidario* astronomer could perceive the true color of 58 Geminorum because it

is a dim star. Thus, it is difficult to suggest a definition for the term "of the same nature" used in the 24th degree.

25th Degree - *star on the right shoulder of the front Gemini figure.* **Upsilon Geminorum.** ... on the right shoulder of the same [advance] twin. The star is illustrated on the right shoulder of the front twin, but it should be on the left shoulder in order to preserve the star coordinates. See the 9th and 17th degrees for more information.

26th Degree - *two stars, one in the mouth, the other in the eye of the Great Bear.* **Omicron and 2 Ursae Majoris.** The star on the end of the snout and the more advanced of the stars in the two eyes. The second star is not illustrated.

27th Degree - *two stars, one on the head, the other on the shoulder of the back Gemini figure.* **Beta and Kappa Geminorum.** The reddish star on the head of the rear twin and the star on the rear shoulder of the rear twin. The second star is illustrated on the left shoulder. Ptolemy does not specify a right or left shoulder but rather the rear shoulder for Kappa Geminorum. This is not consistent with his descriptions for the stars of 17th, 19th, and 25th degrees, where he uses the words left and right rather than rear and forward. However, it is clear that Kappa belongs on the right shoulder of the rear twin in Ptolemy's figure. Therefore, the *Lapidario* illustration should depict the star on the left shoulder in order to preserve the stellar coordinates, which it does.

In the 17th, 19th and 25th degrees the *Lapidario* illustrations positioned the stars on the wrong side of the body. Why does the illustration in the 27th degree position the star correctly? Because Ptolemy's description for Kappa does not specify a left or right side but a rear side. In Ptolemy's figure the rear side is the right shoulder and in the *Lapidario* figure the rear side is the left shoulder. Thus, the *Lapidario* illustrator could locate the correct shoulder without the confusion that arises by requiring a star of the right shoulder to be illustrated on the left shoulder. See the 9th and 17th degrees for more information.

The *Lapidario* description has not adopted Ptolemy's color specification for Beta Geminorum.

28th Degree - *star at the tip of the front ear of the Great Bear.* **24 (28 1/6°) Ursae Majoris.** The star on the tip of the advance ear. The star in the illustration covers both ears.

29th Degree - *star on the back part of the Little Dog, called Algumeyca.* **Alpha (29 1/6°) Canis Minoris.** The bright star just over the hindquarters, called Procyon. The star is illustrated at the junction of the tail and rump.

Alpha Canis Minoris has been known by the name of Algomeysa, which is similar to *Algumeyca*. Both names appear to be corrupt forms of an Arabic name.

Ptolemy lists only two stars for Canis Minor, one on the neck and one over the hindquarters. From this short list it is not possible to determine with certainty the orientation of the dog because the position of the legs is unknown. Nevertheless, it seems reasonable to depict the dog in an upright position (*i.e.*, not upside down). If an upright stance is adopted, then the head is on the viewer's right and the tail on the left as seen from Earth. The *Lapidario* illustration places the head on the viewer's left, which is correct for the complimentary celestial globe view. Therefore, the upright stance is adopted in the *Lapidario*, based on an assumed upright stance for the *Almagest* figure.

30th Degree - *of the two stars on the front line of the quadrangle that is on the body of Little Bear, the one that looks toward midday.* **Zeta Ursae Minoris.** The southernmost of the stars in the advance side of the rectangle. There are two illustrations supplied for the 30th degree. In both the star is illustrated on the front left thigh.

Ptolemy's list for Ursa Minor contains seven stars, three on the tail and four in the rectangle (of the body). The lack of stars on the legs makes it difficult to decide upon the orientation of Ptolemy's figure. However, the location of the tail is helpful in suggesting an orientation. In Ptolemy's figure the tail appears to join the body near Zeta. If so, Zeta marks the rear region of the back and the legs should protrude from Eta and Gamma Ursae Minoris. Adopting this orientation, the tail is turned upward, and this seems to be the popular choice. The alternative is to leave the tail hanging down (which seems more natural) and to connect the legs to the body at Zeta and Beta Ursae Minoris. I have also seen the bear illustrated in this fashion.

Let us adopt the figure with the upturned tail since it seems to be the popular one. In this case, the head is on the viewer's right and the tail on the left as seen on Earth. The *Lapidario* illustration has the head on the viewer's left, as it should be for the celestial globe view. Therefore, the *Lapidario* has adopted the orientation which places Zeta Ursae Minoris on the rear portion of the back.

The *Lapidario* illustration places the star on the front thigh while it should be illustrated on the rear thigh. I suggest that the *Lapidario* illustrator confused the term "front" in the description with the front part of the bear. The term "front" in the description is a reference to a more westerly location and the rear of the bear is west of the front of the bear.

There is another problem with the *Lapidario* illustration because it depicts the tail hanging down. The illustration should depict the tail in an upturned position. Apparently the illustrator preferred a more natural appearance and dropped the tail. By altering the tail, he created a figure that does not depict the correct position of the tail stars.

Cancer

1st Degree - *middle one of the three stars, which are on the curve at the base of the neck of the Valiant One.* **Iota (1 1/2° Taurus) Persei?** The star on the place between the shoulders. The star is illustrated on the upper chest of Perseus, just below the neck.

There must be some error here because there are no stars at all in Hercules that fall in any degree of Cancer. Furthermore, the *Almagest* does not identify any stars in the neck of Hercules (the Valiant One). The illustration places the star on the figure of Perseus, not Hercules. However, there are no stars in Perseus that fall into any degree of Cancer according to Ptolemy. Iota Persei is suggested as a possible candidate because it is the star in Perseus that is closest to the *Lapidario* description (if the constellation is changed from Hercules to Perseus). If this is the star that the *Lapidario* intended to identify, then the position of the star is off by two signs of the zodiac.

2nd Degree - *front one of two on the neck of the Great Bear.* **Tau (0 1/2°) Ursae Majoris.** The more advanced of the two stars in the neck.

3rd Degree - *star on the northern back leg of Cancer.* **Mu Cancris.** The star on the northern back leg. The illustration shows 6 legs on the crab. The star is illustrated on the left rear leg.

In Ptolemy's star list for Cancer, he describes the star cluster, the Praesepe, on the chest. If the underside of the crab is seen on Earth, then the crab's back should be seen on the celestial globe. However, every drawing of the Crab that I have seen illustrates the crab's back (*i.e.*, as seen from Earth or on a celestial globe).

When crabs are encountered in nature, our view is usually of their back. Should the back of Cancer be seen from Earth? Or does the crab crawl along the surface of the crystalline celestial sphere, so that the underside is seen on Earth? I believe one could make a case for each view. However, the *Lapidario* illustration is of the crab's back. Therefore, the crab's underside should be seen on Earth if the *Lapidario* orientation is followed.

The *Lapidario* illustration positions the star on the left rear leg. If Ptolemy's constellation figure shows the underside of the Crab, then his northern back leg is also the left rear leg. Then the position of the star on the *Lapidario* illustration is correct.

4th Degree - *northernmost of two stars on the beam which is on the curved end of the Ship.* **HR 2819*, 2823* and/or 2834*?** The northernmost of 2 stars in the stern keel. The star is illustrated high on the stern end of the keel.

Ptolemy's description for the eleventh star in the list for Argo is provided here. He lists the star at a longitude of 4 degrees. The modern identity of this star is not known for certain and Toomer (1984) suggests that it may be one or a combination of the HR stars listed. The *Lapidario* phrase "on the curved end" does not seem clear to me (is this the bow or stern end?). However, the illustration places the star at the stern end, as does the position of the 4th degree.

5th Degree - *northernmost of two stars on the front line of the quadrangle forming the body of the Little Bear.* **Eta (3 2/3°) Ursae Minoris.** The northernmost [of two stars] in the advance side of the rectangle. The star is illustrated in the same place as the star in the illustration for the 30th degree of Gemini.

The *Lapidario* illustrator positions Eta in the same location as Zeta, on the left front thigh. Eta should be lower on the thigh than Zeta. Furthermore, the star should be illustrated on the rear thigh, not the front thigh (see the 30th degree of Gemini).

6th Degree - *two stars on the right knee of the Great Bear, and one which is on the ham.* **18 and 15 Ursae Majoris and Iota Ursae Majoris?** The star above the right knee and the star below the right knee and the northernmost of the [two] in the front left paw. There is a star illustrated on each of the front knees. The third star is illustrated on the left rear heel.

The position data and descriptions for 18 and 15 Ursae Majoris clearly place them here. The identity of the third star is not clear at all. The *Almagest* description for Gamma Ursae Majoris is: on the left hind thigh, which is compatible with the *Lapidario* "on the ham." But the position of Gamma is in the 3rd degree of Leo according to the *Almagest*. Iota Ursae Majoris is listed at 51 degrees in Cancer, which fits by position here. But the description of Iota in the *Almagest* does not match the *Lapidario* description for the 6th degree. The *Lapidario* illustration places the third star on the left rear heel, which matches with Mu Ursae Majoris in the *Almagest*. However, the *Almagest* lists Mu at a longitude of 24 1/6 degrees, which does not fit here by position.

The best candidate seems to be Iota. If the illustration is corrected by transferring the star to the front left foot and the word "ham" is changed to "paw," then Iota would clearly be the correct star.

7th Degree - *brilliant star in the stern of the Ship*. **HR 2948 + 2949**. The bright star in the middle of the little shield. The star is illustrated high on the hull near the stern end.

Ptolemy does not tell us exactly where the little shield is in his description, but he does list a group of two stars that are "over the little shield in the poop-[deck]." Furthermore, HR 2948 + 2949 is close to the star that Ptolemy lists on the goose-neck (top of the post on the stern). Therefore, the little shield appears to be affixed to the ship near the poop-deck and very near the stern end. This is consistent with the *Lapidario* illustration and description.

8th Degree - *northern one of two front stars which belong to the quadrangle that surrounds the cloud of Cancer*. **Eta Cancris**. The quadrilateral containing the nebula [Praesepe]: the northernmost of the two stars in advance. The crab is illustrated with 6 legs. The star is illustrated on the back, near the attachment point of the left claw. The *Lapidario* description clearly matches that of Eta Cancris. In Ptolemy's figure for Cancer, it is evident that Eta is located on the body near the attachment point of the north (left) rear leg. Therefore, the illustration is in error by positioning the star near the left claw rather than the left rear leg. See the 3rd degree for more information.

9th Degree - *two stars: of the two stars in the front of the quadrangle which surrounds the cloud of Cancer, the one that is toward midday, and one on the front horn*. **Theta and Iota Cancris**. The quadrilateral containing the nebula [Praesepe]: the southernmost of the two stars in advance and the star on the northern claw. The crab is illustrated with 6 legs. The first star is illustrated on

the back near the attachment point for the right claw. The second star is not illustrated.

The horn of the *Lapidario* equates with the claw of the *Almagest* (see 17th degree of Cancer). Once again there is a problem with the illustration. In Ptolemy's figure it is evident that Theta is located on the body near the attachment point of the south (right) rear leg. As in the 8th degree, the illustration could be corrected by moving the star along the side of the body to the rear position. See the 3rd degree for more discussion.

10th Degree - *northern one of the two stars on the Great Bear's chest.* **Upsilon Ursae Majoris.** The northernmost of the two stars in the chest.

11th Degree - *northern one of the two lower stars in the quadrangle of Cancer, the one called Hamelin.* **Gamma Cancris.** The northernmost of the rear 2 stars on the quadrilateral, which are called 'Aselli.' The crab is illustrated with 8 legs. The star is illustrated on the back near the attachment point of the leg just in front of the left rear leg. Now for the third time the illustration for a star in Cancer is in error. The illustration should position the star near the attachment point for the northern (left) claw, not near the left rear leg. In addition, the crab now has 8 legs instead of the 6 illustrated in earlier degrees.

Gamma and Delta Cancris were known by the Arabic name Al Himārain, the Two Asses. Hamelin may be a corrupt form of this Arabic name. The Aselli in Toomer's *Almagest* is a Latin reference to the Asses.

12th Degree - *southern one of the two lower stars on the quadrangle of Cancer, the one called Hamelin.* **Delta Cancris.** The southernmost of the rear 2 stars on the quadrilateral, which are called 'Aselli.' The crab is illustrated with 8 legs. The star is illustrated on the back near the attachment point of the leg just in front of the right rear leg. In the 12th degree the final star in the quadrangle is listed and it, like the other 3, is not positioned correctly in the illustration. In Ptolemy's figure of Cancer, Delta is located on the body near the attachment point for the southern (right) claw. In analyzing all four illustrations for the quadrangle stars, it is evident that the *Lapidario* illustrator has confused the head end of the body with the tail end. This holds true regardless of the orientation accepted for Ptolemy's figure (*i.e.*, Ptolemy's figure could be oriented with the back or belly facing Earth). See the 11th degree regarding the name Hamelin.

13th Degree - *front one of three stars which are in the front of the Ship's shadow.* **HR 2961* + 2964*.** Stars in the poop deck: the most advanced of the

next 3 [after f Puppis]. The star is illustrated high on the ship at the stern end, in about the same position as the star illustrated for the 4th degree.

Here, as in a number of star descriptions for Agro, it is difficult to match the text descriptions in the *Lapidario* and *Almagest*. It is necessary to rely heavily on the position data (degree of the sign). The star selected, HR 2961 + 2964, seems to be the best match. Ptolemy places it on the poop deck while the *Lapidario* tells us it is in the front of the Ship's shadow. When I first mulled over the latter description, I thought the shadow referred to the part of the ship that was covered by Aratus' mist. Ptolemy does not tell us that the front half of the ship is hidden in a mist but he does mention a "cut-off." And the foremost stars (those closest to the bow) he lists are just slightly in front of the mast. These are the stars on or near the cut-off. The area of the deck cut-off is in the sign of Leo, so it is not possible to assign the star of the 13th degree of Cancer to the fore part of the ship. I would suggest that the shadow may be one envisioned by the *Lapidario* astronomer. It could be a shadow cast upon the poop deck by the sail. In any case, the illustration must be considered inaccurate because it places the star at the stern end in the same place as the star illustrated for the 4th degree.

14th Degree - *middle of three stars which are in the front part of the Ship's shadow.* **c Puppis**. Stars in the poop deck: the middle one. The star is illustrated on the bow.

The *Lapidario* illustration is clearly in error here. The star should be illustrated in the aft section of the ship, not the bow. According to the *Lapidario* descriptions, the stars of the 13th and 14th degrees belong together. Then why is one illustrated at the stern end of the ship and one on the bow? I envision a very confused *Lapidario* illustrator here. See the 13th degree for more discussion.

15th Degree - *star at the tip of the curved beam in the front of the Ship.* **HR 3113**. The star on the goose [-neck]. The star is illustrated on the bow.

The *Lapidario* illustration contains the same error found in the 14th degree. The star should be illustrated near the stern end of the ship, not on the bow. Why do the *Lapidario* illustrations contain these errors that confuse the bow with the stern? I suspect that it may have something to do with the fact that the ship is sailing backwards. Whitfield (1995) provides an illustration of Argo as depicted on a 13th century Islamic celestial globe. The drawing shows the sail filled with the wind but positioned on the aft side of the mast. Looking at this figure, it would be relatively easy to confuse the stern with the bow of the ship.

However, Aratus tells us the ship is moving backwards and if the figure is examined carefully, it is evident that the steering oars are attached near the stern end of the ship. I would suggest that the *Lapidario* illustrator (and astronomer?) may not have had knowledge of Aratus' description for Argo. If so, this could be the cause of confusion.

16th Degree - *two stars, one northern, one southern, which are on the head of the serpent called Hydra.* **Epsilon and Eta Hydrae.** The five stars in the head: the northernmost of the 2 to the rear, which is about on the skull; the southernmost of them, on the gaping jaws. Both stars are illustrated on the top of the head just behind the eye. The illustration correctly positions a star on the skull, but the second star should not be there as well, it should be on the jaw according to Ptolemy. The problem appears to be the *Lapidario* description. It does not specify that the southern star should be on the jaws.

17th Degree - *southern star called Azobene, which is on the front horn of Cancer.* **Alpha Cancris.** The star on the southern claw. The crab is illustrated with 8 legs. The star is illustrated on the back, near the attachment point of the leg just in front of the left rear leg.

The term "horn" in the *Lapidario* equates to the "claw" of the *Almagest.* Alpha Cancris has been known by the Arabic name Al Zubanāh, the Claws, and later in the corrupted form Azubene, which is very similar to the *Lapidario* name Azobene. Azobene is probably a scribe's error which can be corrected with the word Azubene. The adoption of Azobene by the *Lapidario* reveals an input of Arabic astronomical knowledge.

The southern claw is east of the northern claw in Ptolemy's figure. Therefore, the southern claw should be called the rear horn. The *Lapidario* description should specify the rear horn, not the front horn of Cancer. The *Lapidario* illustration is in error also because the star is placed on the body instead of a claw.

18th Degree - *star over the quadrangle of the Great Bear's body.* **Alpha Ursae Majoris.** The stars in the quadrilateral: the one on the back. The star is illustrated on the spine, just behind the front legs, which is the correct position..

19th Degree - *front one of two hidden stars in the east, which is in the shadow of the Ship.* **a Puppis.** The more advanced of the 2 faint stars under the bright one. The star is illustrated near the stern end of the hull, just aft of the place where the starboard steering oar is attached. In Ptolemy's figure of Argo, a

Puppis is located just under the poop deck, in a place that matches well with the *Lapidario* illustration. See the 13th degree for further discussion.

20th Degree - *hidden star which is between the two rudders of the Ship.* **P Puppis.** The faint star to the rear of this [to rear of a star between the steering-oars, in the keel]. The star is illustrated just below the position of the star illustrated in the 19th degree. In Ptolemy's figure of Argo, P Puppis is located under a Puppis, and matches the position illustrated in the *Lapidario* drawing.

21st Degree - *front one of two stars next to each other on the neck of Hydra.* **Omega Hydrae.** The more advanced of the 2 stars in the place where the neck joins [the head]. The star is illustrated on the neck, just below the head, which is the correct position. The illustration matches Ptolemy's description.

22nd Degree - *of the three stars in the shadow of the Ship, the brightest one.* **Zeta Puppis.** Stars in the poop-deck: the bright star on the deck to the rear of these [to the rear of the other stars in the poop-deck]. The star is illustrated in the same position as the star in the illustration for the 19th degree. Zeta Puppis is close to a Puppis, which fits the *Lapidario* illustrations. See the 13th degree for further discussion.

23rd Degree - *back one of two stars on the left hind foot of the Great Bear and which is called Salto Segundo.* **Lambda Ursae Majoris.** The more advanced of the [two stars] in the left hind paw. The star is illustrated on the right hind foot, but it should be on the left hind foot.

The *Lapidario* illustration depicts the left rear leg forward of the right rear leg, as it appears in Ptolemy's figure. This type of figure should cause no trouble in positioning the stars; if a star belongs on the left foot, it should be illustrated there. Why does the illustration place the star on the wrong hind foot? Apparently the illustrator had a difficult time remembering the orientation rules for the figures and was continually confused regarding the types of figures that required the left-right reversal of stars in the illustration. In the case of the bear's legs, the illustrator apparently applied the star using the rules for a turned human figure.

Mu Ursae Majoris fits here by description but the *Almagest* longitude places it in the 25th degree. Furthermore, Mu is assigned to the 26th degree where it fits with a higher degree of confidence.

Lambda Ursae Majoris fits here by position but not by description. The conflict is resolved if the word "back" is changed to "front" in the *Lapidario* description. This seems to be the best solution.

24th Degree - *second one of two stars at the base of the neck of Hydra.* **Theta Hydrae.** The rearmost of 2 stars in the place where the neck joins [the head]. The star is illustrated in the same position as the star illustrated for the 21st degree, which is the correct position.

25th Degree - *second one of two stars on the luziente of the Ship's shadow.* **h² Puppis.** The rearmost of the 2 stars over the above-mentioned bright one [Zeta Puppis]. The star is illustrated in the same position as the star illustrated for the 19th degree. h² Puppis is close to Zeta and a Puppis, which is consistent with the *Lapidario* illustrations, placing them all in essentially the same location on the drawing. See the 13th degree for more discussion.

26th Degree - *second one of two stars on the Great Bear's left hind foot.* **Mu (24 1/6°) Ursae Majoris.** The rearmost of the [two stars] in the left hind paw. The star is illustrated on the right hind foot, but it should be on the left hind foot (see the 23rd degree). Assuming that the word "second" in the *Lapidario* description means the rearmost star, the *Lapidario* and *Almagest* descriptions match if Mu is assigned here.

27th Degree - *front one of two stars at the top of the Ship's mast.* **Gamma (28°) Pyxidis.** The more advanced of the 2 stars by the tip of the mast. The star is illustrated on the mast just below the yard. The illustration should depict the star on the top of the mast, not near the yard.

28th Degree - *southern one of two stars in the middle of the Ship's mast.* **Beta (0 1/6° Leo) Pyxidis.** The southernmost of the 2 stars in the middle of the mast. The star is illustrated slightly lower on the mast than the star illustrated for the 27th degree. By position Beta belongs in the first degree of Leo. However, the *Lapidario* and *Almagest* descriptions match if Beta is assigned here. In addition, the illustration is consistent with Ptolemy's description for Beta.

29th Degree - *southernmost of three stars along Hydra's neck.* **Tau¹ Hydrae.** The southernmost of the following three in the bend of the neck [following the two stars at the place where the neck joins the head]. The star is illustrated in a position about the same as the star illustrated for the 21st degree, which is correct.

30th Degree - *dim star which is the northernmost one of the two stars on Hydra's body.* **HR 3750*.** The faint, northernmost star of the 2 close together to the south. The star is illustrated on the body, about midway between the tail and the head. The star should be illustrated much closer to the head than the tail.

Leo

The first 29 degrees are missing in the manuscript. While there are no stars described in Leo in the extant parts of the manuscript, there is one master illustration of Leo, which is located after the text for the 30th degree.

30th Degree - *star on the Jar's handle, which points toward midday.* **Epsilon or Eta (9 1/6° Virgo) Crateris?** The star on the northern rim or the star on the southern handle. The star is illustrated on the handle on the right side of the figure (viewer's right).

Epsilon fits here by position but not by description. Eta fits here by description but not by position. If the star is positioned correctly on the illustration, and assuming a celestial globe view, then the star is illustrated on the southern handle, which matches the *Lapidario* description. Therefore, Eta seems to be the strongest candidate for assignment here, even though it falls in the 10th degree of Virgo by longitude.

While Eta seems to be the better candidate upon first impression, further analysis adds support for Epsilon, which fits here by longitude. An inspection of the *Lapidario* figure suggests that Ptolemy's stars of the handles and rim may have been exchanged. If so, and if the *Lapidario* description for the 30th degree intended to identify the northern side of the jar, then Epsilon would be the star that belongs here by description and position. In the final analysis, there does not seem to be a clear choice between Epsilon and Eta. See the 2nd degree of Virgo for more information.

Virgo

1st Degree - *two stars, one northern, the other in the midday position, on the cape of Virgo.* **Omicron and Pi Virginis.** The northernmost of the 2 stars to the rear of these, in the face [to the rear of the stars on the top of the skull] and the southernmost of them. The illustration places the stars on the breasts.

It is not possible to match the *Lapidario* description with one in the *Almagest* because Ptolemy does not describe any stars on a cape. However, the position data in the *Almagest* places Omicron (0 2/3 degrees) and Pi (0 1/2 degrees) here. The *Lapidario* astronomer apparently decided that these stars should be moved from the face to a slightly lower position in the figure. In Ptolemy's figure, there are no stars in the neck, shoulder, or chest. Beta Virginis is described by Ptolemy at the tip of the left wing. Beta is about at the same level (top to bottom of the figure) as Omicron and Pi. But there is no way to determine if the wing tip is above or below shoulder level. Therefore, it seems reasonable to suggest that the *Lapidario* astronomer may have preferred to describe these stars on the cape rather than the face. This is just one of several instances where the *Lapidario* does not adopt Ptolemy's description and indicates that astronomical knowledge from sources outside the *Almagest* was incorporated into the *Lapidario*.

2nd Degree - *the northern star which is in the rim of the Jar.* **Theta or Epsilon (29 1/3° Leo) Crateris?** The star on the northern handle or the star on the northern rim. The star is illustrated on the rim of the jar, on the right side (viewer's right). Theta fits here by position and Epsilon by description.

In Ptolemy's figure, the stars of the handles are above the stars of the rim. In contrast, the *Lapidario* illustration has handles that are positioned below the rim. The illustration suggests that the *Lapidario* astronomer may have exchanged Ptolemy's stars of the rim and handles. If so, then the stars that Ptolemy describes on the handles should be described on the rim in the *Lapidario* and vice versa. If the *Lapidario* astronomer did make this exchange, then Theta should be assigned here. However, the exchange theory is not substantiated in the 7th degree, where Zeta Crateris fits by description and position. Therefore, there is no clear choice between Theta and Epsilon for assignment here. See the 7th degree for more information.

The symmetry of the jar is not of the type that allows for identification of a right or left side, but if the Jar is illustrated as it should be on a celestial globe, then the northern side of the jar should be on the viewer's left. The *Lapidario* illustration places the star on the right side of the jar, which is incorrect.

3rd Degree - *front one of three stars on the left hand of the Man who cries out.* **Kappa Boötis.** The most advanced of the three in the left arm. The star is illustrated on the right hand, which is correct.

There are no stars specified for the left hand of Boötes in the *Almagest*. However, it is clear that the three stars of the left arm are near the place where the hand should be in Ptolemy's figure. The *Lapidario* astronomer apparently decided these stars should be described on the hand rather than the arm. This seems to be a reasonable decision because the stars are close to each other and located in a position consistent with the hand. Kappa is the star in the group of three that has the proper longitude to fit here (22 degrees).

4th Degree - *middle one of three stars on the left hand of the Man who cries out.* **Iota (4 1/6°) Boötis.** The middle and southernmost of the three in the left arm. The star is illustrated on the right wrist, which is correct. See the 3rd degree for more information.

5th Degree - *northernmost one of the two stars which are at the bottom of the Jar and on the body of Hydra.* **Alpha (23 1/6° Leo) or Beta (1 1/2°) Crateris?** The star in the base of bowl, which is [applied in] common to Hydra or the northernmost of the 2 stars after [*i.e.*, to the rear of] the base of Crater. The star is illustrated on the pedestal, just above the base of the jar.

According to the *Almagest*, there are no stars in Crater or Hydra that fall into the 5th degree. However, the *Lapidario* description is similar to that for Alpha Crateris in the *Almagest*. If Alpha was intended for assignment here, there would be a substantial position error because the star is in Leo, not Virgo. Alternatively, the *Lapidario* may have intended to identify Beta Crateris here. If Ptolemy's stars are labeled on an atlas, one could envision Beta "at the bottom of the Jar and on the body of Hydra." Perhaps the *Lapidario* astronomer preferred to describe Beta on the base rather than after the base. Beta fits into the 2nd degree of Virgo, which positions it much closer to the 5th degree than Alpha.

6th Degree - *the last one of three which are on the left thumb of the Man who cries out.* **Theta Boötis.** The rearmost of the three in the left arm. The star is illustrated on the right thumb, which is correct.

The *Lapidario* description should read as follows: the last one of three, which is on the left thumb. See the 3rd degree for more information.

7th Degree - *star in the rim of the Jar, in the midday position.* **Zeta Crateris.** The star on the southern rim of the mouth. The star is illustrated on the rim of the jar on the left side (viewer's left).

Assuming a celestial globe orientation, the southern rim of the jar should be on the viewer's right, which is opposite from the illustration. Therefore, the illustrator has positioned the star on the wrong side. See the 2nd degree for more discussion.

8th Degree - *star which follows the last star of the shadow of the Ship.* **N Velorum.** The rearmost of 2 stars to the rear of these, near the cut-off. The star is illustrated at the bottom of the hull (on the keel), below the mast, and approximately centered between the bow and stern.

In the 13th degree of Cancer, I suggested that the *Lapidario* "shadow" falls upon Ptolemy's poop deck. Prior to the 8th degree, the *Lapidario* has described five stars in the "shadow" and the assigned stars are located in the region of Ptolemy's poop deck.

N Velorum is not located near Ptolemy's poop deck. In his figure, N Velorum is positioned at the bottom of the hull and in front of the mast. And this is approximately where the *Lapidario* illustration places the star. If the star of the 8th degree is to be accommodated with the other five stars described in the shadow, then the shadow must cover a substantial portion of the *Lapidario* ship. Alternatively, the *Lapidario* may be referring to another shadow here. Perhaps this is the shadow that is equivalent to Aratus' mist and Ptolemy's cut-off. If so, the *Lapidario* has done a poor job of distinguishing the two shadows. I suspect that the *Lapidario* astronomer was confused about the shadow(s) of the ship, inventing a poorly conceived shadow of his own in the process.

9th Degree - *front one of three stars which are the northern right arm of the figure of Virgo.* **Rho Virginis.** The most advanced of the 3 stars in the right, northern wing. The star is illustrated on the right upper arm, but it should be on the left upper arm.

The *Almagest* does not list any stars on the arms of Virgo but does list stars on the wings. The *Lapidario* illustration of Virgo includes the wings, but it appears that the *Lapidario* astronomer has transferred the stars from the wings to the arms..

10th Degree - *two of the three stars which are in a straight line and which follow the triangle on the Dragon, one of them pointing toward midday, the other being the middle one of the three.* **18 and 19 Draconis.** The southernmost of the next 3 stars in a straight line [these follow the stars in a triangle]. The middle one of the three. The stars are illustrated on the first tight coil of the body, very near the head.

Earlier, in the 11th and 22nd degrees of Aries, the *Lapidario* illustrator mistakenly provided an illustration of Hydra instead of Draco (the Dragon). Here the illustrator has depicted the figure of Draco correctly, in a sinuous "S" shape. However, the stars are incorrectly positioned on the drawing. In Ptolemy's figure for Draco, it is clear that 18 and 19 Draconis are not near the head, but half-way along the body from the head, after the first bend in the "S" shape. Once again the illustrator has had difficulty with a serpent figure because the description in the *Lapidario* does not specify a relative location on the body of the serpent.

11th Degree - *two stars which follow the three that are in a straight line on the west side of the figure of the Dragon.* **Eta and Theta (13°) Draconis**. The northernmost of the next 2 to the west [following 3 stars in a straight line]. The southernmost of these. The stars are illustrated on the head.

Eta fits here by position according to Ptolemy. However, he lists Theta at 13 degrees. Toomer (1984) notes that the Arabic manuscripts of the *Almagest* place Theta at a longitude of 13 degrees, which is the correct value. The Greek manuscripts contain the erroneous value of 10 1/3 degrees, which is the value that places the star in this degree.

As in the 10th degree above, the illustrator has supplied the correct figure for Draco. However, the stars are positioned on the head, which is clearly wrong. The stars should be positioned near the second bend in the "S" shape of the body (following the course of the body from head to tail).

12th Degree - *front one of three stars on the base of the Jar, and which are also on the triangular figure of Hydra.* **Xi (12 1/6°) Hydrae**. The most advanced of three stars after these, as it were in a triangle. The illustration places the star on the pedestal just above the base of the jar, similar to the illustration for the 5th degree.

The description in the *Lapidario* appears to identify Xi Hydrae. It is clearly a member of three stars on the body of Hydra, which form a triangle. However, the *Lapidario* description should read "*front one of three stars which follow the base of the Jar,...*". The illustration is also incorrect because it positions the star on the Jar rather than on the body of Hydra. Apparently the *Lapidario* astronomer did not know where this star belonged in Ptolemy's figures.

13th Degree - *northernmost one of the three stars which are on the left side of the figure of Virgo and which is called Alaabor.* **Epsilon Virginis**. The

northernmost of 3 stars in the right, northern wing, called 'Vindemiatrix'. The star is illustrated on the right side of the chest, but it should be on the left side.

The star of the 13th degree is described on the left side of Virgo. It is also described as one of a group of three stars. Upon examination of *Lapidario* descriptions for other stars in Virgo, it is apparent that the star of the 13th degree should be on the **right** side of Virgo. If the word "left" is changed to "right" in the *Lapidario* description, it becomes similar to the *Almagest* description for Epsilon Virginis. Furthermore, the altered *Lapidario* description is consistent with a group of three stars on the right or north side of Virgo, a group which also contains the star Rho Virginis, the star of the 9th degree. The *Lapidario* describes the star of the 9th degree as the front (most westerly) star of 3 stars on the northern right arm. After correcting the *Lapidario*, Rho is "*on the northern right arm*" and Epsilon "*on the right side.*" The descriptions are still somewhat inconsistent. Ptolemy's descriptions are better: Rho, "the most advanced of the 3 stars in the right, northern wing"; Epsilon, "the northernmost of 3 stars in the right, northern wing".

The name Alaabor is a mystery to me. In the 18th degree of Gemini, the *Lapidario* also uses this name for a star. Its use there may have a link to an Arabic star name. I am not aware of any Arabic name that fits with Alaabor for Epsilon Virginis.

14th Degree - *second one of the four stars which are in a line on Virgo's side.* **Gamma Virginis.** The one to the rear of this ſto the rear of the most advanced of the 4 stars in the left wing. The star is illustrated on the right side of the waist, which is correct.

Here is another example of inconsistencies in the *Lapidario*. The *Lapidario* descriptions for the 14th, 18th and 22nd degrees of Virgo are: 14th, "*second one of four in a line **on Virgo's side***"; 18th, "*third one of four **on Virgo's left side***"; 22nd, "*last one of four **on the back side of Virgo***". The stars of the 14th, 18th and 22nd degrees are three members of a group of four. But the *Lapidario* is not consistent in its descriptions: on Virgo's side, on Virgo's left side, and on the back side of Virgo! Once again, the *Almagest* displays more consistency: 14th (Gamma), "second star of 4 in the left wing"; 18th (46), "third star of 4 in the left wing"; 22nd (Theta), "fourth star of 4 in the left wing".

15th Degree - *star on the right side of Virgo's waist.* **Delta Virginis.** The star in the right side under the girdle. The star is illustrated on the left side of the waist, which is correct for the turned figure.

Toomer (1984) relates that the early Arabic manuscripts of the *Almagest* list Delta Virginis at a longitude of 11 1/3 degrees. The remaining manuscripts, Greek and Arabic, list a longitude of 14 1/3 degrees.

16th Degree - *star on the Crow's beak, and which is shared with Hydra.* **Alpha Corvi.** The star in the beak, which is [applied in] common to Hydra.

17th Degree - *two stars, one of them on the Crow's chest, and the front one on its left wing.* **Zeta and Delta Corvi.** The star in the breast and the more advanced of the 2 stars in the rear [left] wing. The illustration depicts the bird in side view, with the head on the viewer's left and the tail on the right. The wings are swept to the rear with the left wing covering most of the right wing. However, part of the right wing is seen above the left wing. The second star is illustrated on the tip of the right wing.

In Ptolemy's figure the head is seen on the viewer's right and the tail on the left. Therefore, the *Lapidario* illustration is rendered with a celestial globe view. Ptolemy lists stars on the advanced, right wing and the rear wing, so the rear wing is also the left wing. In his figure the star of the right wing is closer to the head than those of the left wing. If the *Lapidario* illustrator would have drawn one wing closer to the head than the other, he should have depicted the right wing in front. And the star should have been illustrated on the left wing. However, the *Lapidario* illustration does not place one wing closer to the head than the other. The wing tips are very close to each other in the illustration. One could choose to illustrate the star on either wing tip with little change in the stellar coordinates. This being the case, the illustration should depict the star on the left wing, not the right wing, because Ptolemy places Delta Corvi on the left wing.

18th Degree - *third one of the four stars on Virgo's left side.* **46* Virginis.** The one to the rear again of this [3rd of 4 in the left wing]. The star is illustrated on right side of the chest, which is correct. See the discussion for the 14th degree.

19th Degree - *of the two stars on the Crow's left wing, the one toward the back.* **Eta (17°) Corvi.** The rearmost of the 2 stars in the rear [left] wing. The illustration depicts the star on the trailing edge of the left wing, midway between the base and wing tip. The illustration positions the star correctly (see the 17th degree for more information).

20th Degree - *star on the end of the Crow's foot and which is shared by Hydra.* **Beta (20 1/2°) Corvi.** The star on the end of the leg, which is [applied in]

common to Hydra. The star is illustrated on the left foot. The descriptions in the *Almagest* and *Lapidario* do not specify which leg of the Crow Beta Corvi represents. Therefore, it is not possible to evaluate the illustration regarding star placement on the proper foot.

21st Degree - *middle one of three stars which are on the leg of the Man Who Cries Out.* **Tau Boötis.** The middle one of the 3 stars in the left lower leg. The star is illustrated on the right lower leg, which is correct for the turned figure. The *Lapidario* description should specify that the star is on the left leg as it does in the 23rd degree.

22nd Degree - *last one of four stars on the back side of Virgo.* **Theta Virginis.** The last and rearmost of the 4 stars in the left wing. The star is illustrated on the right side of the waist, which is correct for the turned figure. See the discussion for the 14th degree.

23rd Degree - *northernmost one of the three stars which are on the left leg of the Man Who Cries Out.* **Eta (21 1/3°) Boötis.** The northernmost of the 3 stars in the left lower leg. The star is illustrated just below the knee on the right leg, which is correct for the turned figure. The *Lapidario* description should specify that the star is on the lower part of the leg.

24th Degree - *front one of two stars on the waist of the Man Who Cries Out.* **Rho (25°) Boötis.** The more advanced of 2 stars in the belt. The star is illustrated on the right side of the waist.

In Ptolemy's figure it is evident that Rho belongs on the left side of the waist. The *Lapidario* illustrator turned the figure around for the celestial globe view, which requires that a star on the left side should be illustrated on the right side. Therefore, the illustration depicts the star on the correct side.

25th Degree - *star on the right buttock, below the waist of Virgo.* **Zeta Virginis.** The star under the apron, just about over the right buttock. The star is illustrated on the left buttock, which is correct for a turned figure.

26th Degree - *of the two stars on the waist of the Man Who Cries Out, the one that is toward the back.* **Sigma Boötis.** The rearmost of the two stars in the belt. Ptolemy's figure places Sigma on the left side of the waist. The *Lapidario* illustration places the star on the right side of the waist, which is correct for the turned figure (see the 24th degree).

27th Degree - *northernmost star on the front line of the left leg of Virgo.* 74* **Virginis.** The quadrilateral in the left thigh: the northern star on the advance side. The star is illustrated near the knee of the left leg. The star should be illustrated on the right leg for the turned figure.

28th Degree - *southernmost star on the front line of the quadrant on the left leg of Virgo.* **76* Virginis.** The quadrilateral in the left thigh: the southern star on the advance side. The illustration looks the same as the one for the 27th degree. The star should be illustrated on the right leg for the turned figure.

29th Degree - *southernmost star, which is on the second line of the quadrant on the left leg of Virgo.* **68* Virginis.** The quadrilateral in the left thigh: the southernmost star on the rear side. The star is illustrated on the left leg, just below the knee. The star should be illustrated on the right leg.

30th Degree - *star on Virgo's right leg.* **90* (28°) Virginis.** The star in the back of the right thigh. The star is illustrated on the right leg, about on the knee. The star should be illustrated on the left leg.

Libra

1st Degree - *star on the right side of the waist of the Man Who Cries Out.* **Epsilon Boötis.** The star on the right thigh, in the apron. The star is illustrated on the left side of the waist, which is correct for the turned figure.

Ptolemy describes Epsilon on the leg but his description suggests that the leg is hidden by clothing (apron). In Ptolemy's figure Epsilon is positioned at about the same level as Rho and Sigma, which are members of the belt. Therefore, it seems reasonable to suggest that the *Lapidario* astronomer may have preferred to place Epsilon on the waist rather than the thigh.

2nd Degree - *star on the left knee of the Man Who Cries Out.* **86 Virginis?** The star on the left knee. The star is illustrated on the right knee of Boötes, which is the correct side for a turned figure.

There are no stars in Boötes that fall into the 2nd degree of Libra according to Ptolemy. Ptolemy lists three stars on the left lower leg of Boötes but they fall into the 21st and 22nd degrees of Virgo. None of the three are described on the knee. The only other star on Boötes' legs is Zeta Boötis on the right heel at 52 degrees Libra.

After analyzing Ptolemy's list of stars for Boötes, it is clear that there is not a star there that will fit the 2nd degree. However, 86 Virginis, a star in Virgo, fits here by position. The descriptions of the *Lapidario* and *Almagest* also match if we ignore the fact that they describe the left knee of different constellations.

Apparently the *Lapidario* has associated the star of the 2nd degree with the wrong constellation. The error could be due to a scribe who copied the wrong constellation name. If so, the illustrator accepted the error because the figure of Boötes is depicted in the illustration.

3rd Degree - *front one of two stars on the left leg of the figure that is half man and half horse, and which looks like it is in front of the three stars at the base of the tail.* **Delta Centauri.** The more advanced of the 2 stars close together on the right thigh. The star is illustrated on the left rear knee.

According to the *Almagest*, there are only two stars in Centaurus that fit in the 3rd degree: Delta and Sigma Centauri. In Ptolemy's list for Centaurus there is one star on the front left knee at 24 1/6 degrees Libra, one on the frog of the left rear hoof at 11 1/6 degrees Libra and one under the left rear knee bend at 6 1/3 degrees Libra. None of these fit here by position and they are the only stars listed on the left legs.

It appears that the *Lapidario* has confused the left and right rear legs here. If the word "left" is changed to "right" in the *Lapidario* description, Delta Centauri would fit by description and position. In Ptolemy's figure, Delta is on the right rear thigh and is also forward of three stars in the rump, which is similar to the *Lapidario* description "*...in front of the three stars at the base of the tail.*" The illustration depicts the star on the wrong leg, probably due to the faulty description in the *Lapidario.*

4th Degree - *of the two stars which are on Cantoriz' right leg, the one toward the back.* **Rho Centauri.** The rearmost of the 2 stars close together on the right thigh. The star is illustrated on the right rear knee, which is correct. Now the *Lapidario* lists the other star of Ptolemy's pair on the right [rear] thigh. Unlike the 3rd degree however, the *Lapidario* description places the star on the correct leg.

5th Degree - *star on the right shoulder of the Man with Bent Knees.* **Delta (5 2/3°) Boötis or Beta (3 2/3° Scorpio) Herculis?** The star on the right shoulder or the star on the right shoulder by the armpit. The star is illustrated on the left shoulder of Hercules, which is the correct side for a turned figure.

There may be an error here regarding the identity of the constellation. The man with bent knees refers to Hercules but there are no stars at all in Hercules that come close to the 5th degree of Libra. However, Delta Boötis is listed at a longitude of 5 2/3 degrees in the *Almagest*, which places it in the next degree above this one. Delta Boötis is the best candidate for placement here by position. Alternatively, the *Lapidario* astronomer may have intended to place the star of Hercules' right shoulder here. If so, Beta Herculis was assigned to the wrong sign of the zodiac.

6th Degree - *two of three stars, the one in the middle and the backward one, which are on the rump of the Half Horse and Half Man.* **Tau and Gamma Centauri**. The middle one of the stars on the rump [3 stars]. The rearmost of the stars on the rump.

7th Degree - *two stars, one on the left shoulder, the other below the knee of the left leg of the Half Horse and Half Man.* **Iota Centauri and Delta Crucis**. The star on the left, advance shoulder and the star under the knee-bend of the left [hind] leg. The first star is illustrated on the left shoulder of the man. The second star is illustrated on the left front leg just above the hoof.

The descriptions in the *Lapidario* and *Almagest* match if Delta Crucis is assigned to the knee of the left leg. The longitude for Delta also places it here and all other stars of the legs fall outside the 7th degree.

Before the *Lapidario* illustration can be evaluated, it is necessary to know which leg Delta is located on, the front or hind left leg. The descriptions in the *Lapidario* and *Almagest* don't specify a front or hind leg, but it is clear from Ptolemy's figure that Delta belongs on the left hind leg.

The man portion of Centaurus is seen from Earth with the right shoulder in front of the left shoulder because the man has turned his torso toward the left side of the horse. The proper illustration on the celestial globe should show the man's back. However, the *Lapidario* illustration shows the front side of the man which is accomplished by having the man's torso turned toward the right side of the horse. In order to preserve the stellar coordinates, a star on the man's left shoulder must be illustrated on the right shoulder. Therefore, the *Lapidario* illustration has positioned the star on the wrong shoulder.

There is no confusing reversal of left and right for the horse portion of Centaurus. Thus, a star on the left leg as seen on Earth should also be illustrated on the left leg in the *Lapidario* illustration. The illustrator was successful in

positioning the star on the left leg, where it should be. However, the star should have been illustrated on the left hind leg, not the left front leg.

I suspect that the illustration error on the leg is due to the fact that Ptolemy did not distinguish between the front and hind legs in most of his star descriptions for Centaurus. A convenient way to assign the stars of the legs is by plotting the coordinates on a star atlas. Then it becomes clear where the front and hind legs are. If the *Lapidario* illustrator had prepared a star atlas like this, he would not have confused the rear and front left legs.

8th Degree - *two stars, one on the left shoulder and the other below the knee of the left leg of the Half Man and Half Horse.* d (9 1/6°) Centauri. Gamma (10°) Crucis? The star on the left shoulder-blade. The star on the knee-bend of the right [hind] leg. The first star is illustrated on the left shoulder but more toward the neck than the star illustrated in the 7th degree. The second star is illustrated on the left hind leg.

Iota Centauri and Delta Crucis seem to fit here by description. However, they both fit by position and description in the 7th degree, where they are assigned It is my opinion that the *Lapidario* astronomer intended to choose different stars for each degree of a sign. If this is true, then Iota and Delta cannot be assigned here if they belong in the previous degree. The best alternatives appear to be d Centauri and Gamma Crucis. Ptolemy places d Centauri on the left shoulder blade, which is close to the *Lapidario* description "left shoulder." The illustration also depicts the star between the shoulder and the neck, which suggests the shoulder-blade. If the *Lapidario* had intended to specify the rear right knee, instead of left knee, then Gamma Crucis would fit here by description. By position, d and Gamma fit in the 10th degree, which is not far from the 8th degree.

The first star should be illustrated on the right shoulder if it belongs on the left shoulder. The second star is illustrated in the incorrect position if the star belongs on the right hind leg. See the 7th degree regarding the illustrations.

Some of Ptolemy's leg stars for Centaurus have been transferred to the modern constellation of Crux, the Southern Cross.

9th Degree - *star at the end of the front leg of Cantoriz.* **Alpha (8 1/3° Scorpio) Centauri.** The star on the end of the right front leg. The star is illustrated on the left front hoof, but it should be on the right front hoof.

In the *Almagest* there are stars described on both front legs but only the right front leg has a star at the end. The star at the end of the right front leg, Alpha Centauri, falls in the 9th degree of Scorpio according to Ptolemy. The *Lapidario* has mistakenly assigned it to the 9th degree of Libra. The *Lapidario* has the correct placement for the degree but the wrong sign of the zodiac.

10th Degree - *two stars on Cantoriz, one on the right shoulder, the other on the horse's spine.* **Theta (15 2/3°) and f Centauri.** The star on the right shoulder and the star in advance of the place where the back joins [the horse's body], on the horse's back. The illustration depicts the star on the right shoulder, but it should be on the left shoulder in order to preserve the star coordinates. The second star is illustrated on the horse's spine, near the junction of horse and man.

11th Degree - *northern one of two stars on the right knee of the figure whose knee is bent.* **Upsilon Herculis.** The northernmost of the 2 stars under the right knee. The illustration contains two stars, one on the right shoulder and one on the left knee. The *Lapidario* illustration has an extra star on the shoulder which is not mentioned in the description. The illustration appears to be in error because there are no stars on Hercules' shoulders that fall into the 11th degree. However, the star of the right knee is correctly illustrated on the left knee of the turned figure.

12th Degree - *two stars which follow to the east of the figure called Elfeca and which are both in Corona Borealis, with one star more northern than the other.* **Beta and Theta Coronae Borealis.** The star most in advance of all and the one to the rear and to the north of this [to the rear and north of Beta]. The stars are illustrated on the left side of the crown (viewer's left).

Beta and Theta both fall into the 12th degree according to longitude data in the *Almagest*. However, they are both west, not east, of Alpha Coronae Borealis (Elfeca.). Ptolemy does list two stars which follow to the east of Alpha, Gamma and Delta Coronae Borealis. However, these stars are aligned in an east-west direction, which would not distinguish one as being distinctly north of the other (Ptolemy lists the latitudes at +44 3/4 and +44 5/6, which means one star is less than one sixth of a degree north of the other). In any case, the stars east of Alpha don't fit into the 12th degree. Furthermore, the illustration matches the positions of Beta and Theta if the celestial globe view is assumed. I would suggest that the *Lapidario* description should be corrected by replacing the word "east" with "west." See the 14th degree for more information.

13th Degree - *front one of three stars on Cantoriz' right side.* **Nu (13 1/3°) Centauri.** The most advanced of the 3 stars in the right side. The star is

illustrated on the right side of the man part, but should be illustrated on the left side because the man part is a turned figure.

14th Degree - *fourth star on the eastern part of Corona Borealis.* **Pi Coronae Borealis.** The star to the rear and north again of this [to the north and rear of Theta]. The star is illustrated slightly to the left (viewer's left) of the center of the crown. The center of the crown is midway between the tips (the illustration is that of a circle with a gap at the top).

The longitude data in the *Almagest* reveal that Pi Coronae Borealis is the only star of the constellation that fits into the 14th degree. However, the description in the *Lapidario* is similar to Ptolemy's description for Iota Coronae Borealis, which he lists at a longitude of 21 2/3 degrees. Pi is the terminal star on the west side of the crown and Iota is the terminal star on the east side. If the crown is divided into eastern and western halves, with the dividing line between Gamma and Alpha, and the stars are counted from the dividing line to the tips of the crown, then Pi is the fourth star on the western half and Iota is the fourth star on the eastern half.

The solution to the problem is to change the word "eastern" in the *Lapidario* description to "western." The problem found in the 12th degree is also solved with the same correction. Thus, it appears that the *Lapidario* has confused the west and east sides of the crown. Did the *Lapidario* astronomer want to choose stars on the eastern half or the western half for the 12th and 14th degrees? It is possible that the stars he wanted to assign are those of the eastern half but the stars of the western half fit better, all things considered.

The illustration is not correct because it positions the star near the center of the crown, where Alpha Coronae Borealis belongs. I would suggest that the illustrations for the 14th and 15th degrees be switched. If this is done, the illustration for the 14th degree would be consistent with Pi, assuming the celestial globe view.

15th Degree - *bright star on the Corona Borealis, which is called Elfeca.* **Alpha Coronae Borealis.** The bright star in the crown. The star is illustrated at the tip of the crown on the viewer's left. The illustration should have placed Alpha near the center of the crown (see the 14th degree).

Alpha Coronae Borealis was known by the Arabic name Al Nā'ir al Fakkah, the Bright One of the Dish, and by the corruption of this, Alphecca. Elfeca appears to be another corrupted form of the Arabic name.

16th Degree - *two stars, one on the right side of the figure of Cantoriz, the other on the hock of the horses leg ... (incomplete).* **Phi Centauri. Beta Crucis.** The rearmost of the 3 stars in the right side. The star in the hock of the same leg [right hind leg]. The first star is illustrated on the right side of the man part, but should be on the left side. The second star is illustrated on the right rear hoof, which is correct. See the 7th degree for more information.

17th Degree - *two stars, one on the right shoulder of the part that is man, the other, which is one of the two located on the belly of the part that is horse of Cantoriz.* **Theta (15 2/3°) and Epsilon Centauri.** The star on the right shoulder and the more advanced of the two stars under the belly. The first star is illustrated on the right shoulder of the man part, but should be on the left shoulder for the turned figure (see the 7th degree).

18th Degree - *of the two stars which are called Azubene and which are on the southern scale of Libra, the dark one that is more toward the north.* **Mu Librae.** Stars on the tip of the southern claw: the star to the north of the bright one and fainter than it. The star is illustrated on the left pan (viewer's left).

In antiquity the scales of Libra were the claws of the scorpion. Thus, the claws are equivalent to the scales. The name Azubene is a corruption of the Arabic word for claws, Al Zubanāh.

Before the illustrations for Libra can be critiqued, it is necessary to decide in which direction the scale pans hang from the beam. The *Lapidario* tells us that the star of the 25th degree is on the beam of the scale. All of the other stars on the scales are assigned to more westerly longitudes (lower degrees of Libra) by the *Lapidario*. Therefore, the beam of the scale is closest to the Scorpion and the pans of the scales hang from the beam in a westerly direction, the pans being closest to Virgo.

Accepting the suggested orientation, and assuming the celestial globe view, the northern side of the scales should be on the viewer's left. In the 18th degree the star of the southern scale is illustrated on the left pan. Therefore, the illustration depicts the star on the wrong pan.

19th Degree - *the shiny star of Azubene, which is on Libra's southern scale.* **Alpha Librae.** Stars on the tip of the southern claw: the bright one. The star is illustrated on the right pan (viewer's right).

The *Lapidario* descriptions for the 18th and 19th degrees indicate that both stars are located on the southern scale. Yet the illustration for the 18th

degree places a star on the left pan while the illustration here places a star on the right pan. One of the illustrations must be wrong and I have already suggested that the error is in the one for the 18th degree. Therefore, the illustration here places the star on the correct pan. See the 18th degree for further discussion.

20th Degree - *of the four stars on the branch of grapevine that Cantoriz holds in his hand, the southernmost one of the two front stars.* **HR 5378.** The 4 stars in the thyrsus [branch]: the southernmost of the advance 2.

21st Degree - *star on the snake's mouth in the figure which in Arabic is called Alhave, meaning "hunter of snakes."* **Kappa (21 1/3°) Serpentis.** Stars on the quadrilateral in the head: the one in the middle of the quadrilateral, in the mouth.

22nd Degree - *front star, which is in the middle of Azubene, on Libra's southern scale.* **Nu Librae.** The one in advance of the star in the middle of the southern claw. The star is illustrated on the right pan, which is the correct side of the figure. See the 18th degree for more information.

Nu Librae falls between the southern scale pan (Mu and Alpha) and the southern part of the beam (Iota). It would be more accurate to illustrate Nu Librae between the pan and the beam, somewhere on the chains that connect the beam and pan. This is exactly the star position in the illustration for the 25th degree. Therefore, I would suggest that the illustration for the 25th degree belongs here.

23rd Degree - *the more brilliant one of the two stars which are at the end of Azubene and are on Libra's northern scale.* **Beta Librae.** Stars on the tip of the northern claw: the bright one. The star is illustrated on the right pan, but it should be on the left pan. See the 18th degree for more information.

24th Degree - *northern star which is outside of the head of the Man Who has the Serpent.* **Pi Serpentis or Alpha (24 5/6° Scorpio) Ophiuchi?** The star outside the head, to the north of it [the head of the snake] or the star on the head [of the man]. The star is illustrated on top of the head of the man.

The *Lapidario* may have confused the head of Ophiuchus with that of the Serpent here. The descriptions of the *Lapidario* and *Almagest* would be perfect matches if the *Lapidario* would have specified the serpent's head rather than the man's. If the *Lapidario* intended to describe a star on the snake's head, then the star of the 24th degree should be Pi Serpentis, which also fits here by position. However, there are other stars in the *Lapidario* that are displaced by

one or more signs. Alpha Ophiuchi is the star on the head of the man, and its position is almost exactly one sign off from the 24th degree of Libra. Perhaps the *Lapidario* intended to assign the star of the man's head here, in which case there is a position error of one sign.

25th Degree - *star in the middle of Azubene, on the southern side, and is on the beam from which Libra's balance hangs.* **Iota Librae.** The star in the middle of the southern claw. The star is illustrated above the right pan (viewer's perspective) and about half way between the pan and the balance beam. The star is illustrated on the correct side of the scale. However, the star should appear on the beam, not between it and the pan. See the 18th degree for more information.

26th Degree - *star on the hind leg of the bear that is close to Cantoriz' hand.* **Alpha Lupi.** The star on the bend in the same leg [the hind leg, by the right hand of Centaurus]. The star is illustrated on the left hind paw. The left hind leg is grasped by the left hand of Centaurus.

Ptolemy describes stars on a front leg and a hind leg of the bear, which suggests that only two legs are seen. It is clear that the right side of the bear is seen in Ptolemy's figure, so the right legs could block our view of the left legs. Following this reasoning, Alpha Lupi belongs on the right hind leg but Ptolemy does not specify this. If the star does belong on the right hind leg, then the *Lapidario* illustration is in error. However, the star coordinates are preserved because the right and left legs of each pair are positioned in the same place in space. Therefore, it is acceptable to illustrate the star on the left leg for the celestial globe view when it belongs on the right leg according to our view from Earth. See the 7th degree regarding the orientation of Centaurus (Cantoriz).

27th Degree - *southernmost one of three stars that come after the bend in the neck of the snake which the Snake Charmer holds.* **Epsilon Serpentis.** The southernmost of 3 stars that follow the star after the first bend in the neck. The star is illustrated on the body of the snake, next to the right hand.

In Ptolemy's figures for the Snake Charmer and the Snake, it is evident that the left hand holds the snake near the head and the right hand holds the snake near the tail. The *Lapidario* illustration shows the right hand holding the snake near the head, indicating that the figure is turned in the celestial globe view. Therefore, the star should be illustrated near the right hand. This is where the illustration places the star, depicting the correct star coordinates.

28th Degree - *northernmost star on the front part of Virgo's left leg.* 74* (26 1/3° Virgo) Virginis? The quadrilateral in the left thigh: the northern star on the advance side. The star is illustrated on the left leg, just below the knee, but it should be on the right leg in order to preserve the star coordinates. Here the *Lapidario* has placed a star in the wrong sign of the zodiac. A star in Virgo is described, but this is the 28th degree of Libra, not Virgo. 74 Virginis was also assigned to 27th degree in Virgo where it is a better candidate.

29th Degree - *star on the arm, close to the elbow, of the Man with the Bent Knee.* **Kappa Herculis.** The star on the right elbow. The star is illustrated on the left elbow. The *Lapidario* does not specify which arm the star is located on. However, the illustration depicts the star on the left elbow, which is correct for a turned figure if the star is described on the right elbow. Ptolemy's description places the star on the right elbow, which certifies the illustration.

30th Degree - *star at the tip of the bear's hind foot, which is near Cantoriz' hand.* **Beta (28°) Lupi.** The star at the end of the hind leg, by the [right] hand of Centaurus. The star is illustrated on the left hind paw. The left hind leg is grasped by the left hand of Centaurus. See the 26th degree regarding the illustration. See the 7th degree regarding the orientation of Centaurus (Cantoriz).

Scorpius

1st Degree - *two stars, one on the stomach, the other on the leg of the bear that is in the figure of Cantoriz.* **Lambda and Pi Lupi.** The star in the belly, under the flank and the star on the [hind] thigh. The second star is illustrated on the left rear leg, near the knee, just below the left hand that grasps the leg. See the 26th degree regarding the illustration. See the 7th degree regarding the orientation of Centaurus (Cantoriz).

2nd Degree - *star on the muscle of the right upper arm of the Man of the Bent Knee.* **Gamma Herculis.** The star on the right upper arm. The star is illustrated on the left shoulder, which is the correct side for a turned figure.

3rd Degree - *southernmost one of the stars which are on the right forearm of the Man of the Bent Knee.* **Omega* Herculis.** The star south of the one in the right upper arm. The star is illustrated on the left upper arm.

While the *Almagest* and *Lapidario* descriptions don't match exactly, the *Almagest* lists the longitude of Omega at 2 2/3 degrees, placing it here by position. Ptolemy's star list for Hercules does not describe any stars below the

elbow on the right arm. However, he does list one star which is "outside the constellation" *i.e.*, not on the figure. He describes this star as being south of the one on the right upper arm (Gamma). If we envision that Hercules' right arm is bent sharply at the elbow, Omega could be placed on the right forearm. Perhaps the *Lapidario* astronomer decided that Omega should be described this way. In any case, the star is illustrated on the correct arm.

4th **Degree** - *star on the right side of the Man of the Bent Knee.* **Zeta Herculis.** The star in the right side. The star is illustrated on the left side of the waist, which is correct for the turned figure.

5th **Degree** - *two stars, the back one of the two which are on the bear's shoulder, and the northernmost one of the other two which are on his rump, both of them in Cantoriz.* **Gamma and Mu Lupi.** The rearmost of the 2 stars just over the shoulder-blade. The northernmost of the 2 stars near the place where the thigh joins [the body]. The first star is illustrated on the left shoulder (front leg). See the 26th degree regarding the illustration.

6th **Degree** - *two of the three shiny stars which are on the forehead of the figure of Scorpio, the middle one and the one in the midday position.* **Delta and Pi Scorpii.** The middle one of the 3 bright stars in the forehead and the southernmost of the three. One star is illustrated on the left side of the forehead and the other in the center.

It is difficult to determine the orientation of Ptolemy's figure for the Scorpion. Is the back or belly seen from Earth? The Scorpion is similar to the Crab (Cancer), and as with the crab, the popular view seems to be one that shows the back. Nevertheless, I will assume that the underside of the Scorpion is seen in Ptolemy's figure. I make this choice solely for the purpose of checking the correct orientation of stars on the *Lapidario* illustrations (see the 3rd degree of Cancer for a discussion of this issue).

In the illustration, one star is centered on the forehead and one is on the left side. Assuming a belly view, Pi is positioned on the left side of the forehead and Delta in the center according to Ptolemy's figure. Therefore, the *Lapidario* illustration is correct.

In Ptolemy's figure, the tail curves in a clockwise direction, base to tip. The *Lapidario* illustration depicts the tail curved in a counterclockwise direction, which establishes the celestial globe view. The *Lapidario* lists stars on the Scorpion for 13 degrees of the sign. In 11 of the illustrations the tail curves counterclockwise, as it should. In the other two (7th and 24th degrees) it curves

clockwise. Once again the illustrator has not been able to maintain consistency in the drawings.

7th **Degree** - *two stars, the northernmost one of the three shiny stars which are on the forehead of Scorpio, and the one which is in the midday position on the foot.* **Beta and Rho Scorpii.** The northernmost of the 3 bright stars in the forehead and the star south again of this [south of the 3 bright stars on the forehead], on one of the legs. Both stars are illustrated on the head. One star is illustrated on the left side of the forehead and the other on the right side.

The illustration shows a star on the right side of the forehead, which is the correct position for Beta. However, Rho should not be illustrated on the left side of the forehead. According to Ptolemy, Rho belongs on the leg (which is next to the forehead), and the *Lapidario* description is similar. The illustration is also in error by depicting the tail coiled clockwise instead of counterclockwise. See the 6th degree for more information.

8th **Degree** - *northern star that follows the star which is the northernmost one of the three shiny stars on the forehead of Scorpio.* **Nu Scorpii.** The northernmost of the 2 stars adjacent to the northernmost of the [3] bright ones. The star is illustrated on the right side of the back, near the center leg, which is approximately the correct position. See the 6th degree for more discussion.

9th **Degree** - *two stars, one on the left upper arm of the Man Who Holds the Snake, the other on the snake's left side, below the twist in its body.* **Lambda and Upsilon Ophiuchi.** The star on the left elbow and the star to the rear of those in the hand [the left hand of Ophiuchus]. The first star is illustrated on the right upper arm and the star on the snake is near the man's right hand. The illustration has correctly positioned the stars on the right side of the turned figure.

Ptolemy describes stars on the left shoulder, left elbow and left hand of Ophiuchus. The star on the elbow fits the 9th degree by position so it was selected for assignment here. Upsilon Ophiuchi has been depicted close to the snake's body, near where the left hand of Ophiuchus grasps the snake.

10th **Degree** - *the front one of two stars which are on the hind leg of Scorpio and which are located in front of its heart.* **13 Scorpii.** The advance star of the 2 under these, approximately on the last leg [in advance of 3 bright stars in the body, including Alpha Scorpii]. The star is illustrated on the right side of the back, near the rear leg, but it should be on the left side. In Ptolemy's figure, it

is clear that 13 Scorpii is on the left side of the body. See the 6th degree for more discussion.

The heart of the scorpion is the red supergiant star called Antares (Alpha Scorpii).

11th Degree - *the front one of the three shiny stars, which are on the body of Scorpio.* **Sigma Scorpii**. The most advanced of the 3 bright stars in the body. The star is illustrated on the center of the back, aligned with the center legs. The star is illustrated in approximately the correct position.

12th Degree - *the star which is on the ankle of the left leg of the Man of the Bent Knee.* **74 (15 1/3°) Herculis**. The most advanced of the 3 stars in the left foot. The star is illustrated on the right ankle of Hercules, which is correct for a turned figure.

Ptolemy lists three stars on the left foot of Hercules; the most advanced, the one in the middle, and the rearmost. The *Lapidario* also describes 3 stars on Hercules' left foot; one on the ankle (12th degree), one in the middle (17th degree) and the last one (20th degree). The *Lapidario* illustrates the star of the 20th degree on the toes. Using this orientation of the left foot (toe to the rear), the star of the 12th degree (and Ptolemy's most advanced star of the left foot) belongs on the ankle.

13th Degree - *middle one of the three brilliant stars which are on Scorpio's body, and which is Scorpio's heart.* **Alpha Scorpii**. The middle one of these, which is reddish and called 'Antares.' The star is illustrated on the left side of the back, near the center leg.

Alpha falls to the rear of Sigma on the body in Ptolemy's figure. In the 11th degree Sigma is illustrated in the center of the back. If this is the correct position for Sigma, then Alpha should be farther to the rear than where it is illustrated.

Alpha Scorpii is a brilliant star and has a color that is distinctive to the naked eye. Why does the *Lapidario* ignore Ptolemy's color specification for Alpha? Perhaps the *Lapidario* astronomer felt that the color should be understood by specifying the star as the Scorpion's heart.

The *Lapidario* description does not include a proper star name in its description of Alpha Scorpii. Why is there no Arabic name listed for the prominent Alpha Scorpii? The Arabians knew Alpha as Kalb al 'Akrab, the

Scorpion's Heart. It appears that the translators were able to provide a translation of the Arabic name rather than a corruption of the Arabic name.

14th Degree - *front one of the two stars which are on the left shoulder of the Hunter of the Snakes.* **Iota Ophiuchi.** The more advanced of the 2 stars on the left shoulder. The star is illustrated on the right shoulder, which is correct for the turned figure.

15th Degree - *farthest one of the three brilliant stars which are on Scorpio's body.* **Tau Scorpii.** The rearmost of the 3 bright stars in the body. The star is illustrated in the same position as the star in the illustration for the 11th degree. Here again the illustration should place the star further to the rear on the body. In Ptolemy's figure, Tau is to the rear of Alpha on the body. See the 13th and 6th degrees for more discussion.

16th Degree - *two stars, the middle one of the three stars which are on the left thigh of the Man of the Bent Knee, and one that touches it.* **69 and Pi (14°) Herculis.** The one to the rear of this [to the rear of Pi] and the most advanced of the 3 in the left thigh. There is only one star illustrated and it is on the right knee.

The phrase in the *Lapidario* "and one that touches it" probably means "one that touches the left thigh." Ptolemy lists 3 stars in a group on the left thigh; Pi, 69 and Rho Herculis. 69 Herculis clearly belongs here because it is the middle star of Ptolemy's group. Rho appears to fit with the *Lapidario* description for the 17th degree, leaving Pi for assignment here.

The illustration shows one star on the right leg, which is correct because Hercules is a turned figure. Pi and 69 are fairly close to each other and so it seems reasonable that only one star is illustrated, representing both. However, the star should be on the thigh, not the knee.

17th Degree - *two stars, the farthest one on the left hollow of the knee, and the middle one of the three which are on the left foot of the Man of the Bent Knee.* **Rho and 77 Herculis.** The rearmost of the 3 in the left thigh [the one closest to the knee] and the middle one of the 3 stars in the left foot. The stars are illustrated on the right thigh and foot.

In Ptolemy's figure, Rho is positioned about half-way between the buttock and knee. This does not seem to fit very well with the *Lapidario* description "on the left hollow of the knee." Ptolemy does describe a star on the left knee, Theta, but it is assigned to the 1st degree of Sagittarius, where it

clearly belongs. Rho is the closest star to the knee in Ptolemy's list and it fits here by longitude. Therefore, it appears to be the best candidate. The illustration depicts the stars on the right leg, which is correct because the figure is turned.

18th Degree - *star on the left shoulder of the Man of the Bent Knee.* **Delta (16 2/3°) Herculis.** The star on the left shoulder. The star is illustrated on the right shoulder, which is the correct position for a turned figure.

19th Degree - *two stars, one on the first, the other on the second node that form part of Scorpio's body.* **Epsilon Scorpii. Mu^1 + Mu^2 Scorpii.** The star in the first [tail-] joint from the body. The one after this, in the 2nd joint.

20th Degree - *last one of the three stars on the left foot of the Man of the Bent Knee.* **82 Herculis.** The rearmost of 3 stars in the left foot. The star is illustrated on the right foot at the toes, which is correct for the turned figure.

21st Degree - *two stars, one on the bend of the third node of Scorpio's tail, which is the northern one, and the other, which is on the same bend but toward midday.* **Zeta^{2*} and Zeta^{1*} Scorpii.** The northern star of the double-star in the 3rd joint and the southern star of the double-star. There is no star in the illustration.

22nd Degree - *star on the left knee of the Man Who Has the Snake.* **Eta or Zeta (12 1/6°) Ophiuchi?** The star in the right knee or the star in the left knee. There is no star in the illustration.

Zeta Ophiuchi is the star that the *Almagest* describes on the left knee but at a longitude of 12 1/6 degrees. Eta has a longitude of 21 1/6 degrees according to the *Almagest* and is on the right knee. Eta fits here by position, and Zeta by description. If the word "left" is changed to "right" in the *Lapidario* description, then Eta fits here by position and description. Perhaps this is the *Lapidario* error.

23rd Degree - *star which is on the left upper arm of the Man of the Bent Knee.* **Lambda Herculis.** The star on the left upper arm. There is no star in the illustration.

24th Degree - *star which follows the bend which is on the fourth node of Scorpio.* **Eta Scorpii.** The one following, in the 4th joint [star following the double star in the 3rd joint]. There are two illustrations for the 24th degree. The first illustration depicts the tail curved in a counterclockwise direction, which is

correct. The second illustration depicts the tail curved in a clockwise direction, which is not correct for the celestial globe view. The first illustration contains the correct number of nodes on the tail but there is no star in the illustration.. The second illustration depicts the tail with 13 nodes (there should be only 7 nodes) and the star is on the 7th node.

25th Degree - *two stars which are united, one of them northern, the other, southern, and which are above the figure of the Hearth.* **Beta and Gamma (25 1/6°) Arae.** The northernmost of the other 2 [two of three in the brazier] which are close together. The southernmost of the other 2. One star is illustrated on the top rim of the hearth, where the flames begin, and is positioned just to the right (viewer's right) of the Hearth's center point. The second star is positioned in the flames, just above the rim, and to the right of the first star.

In Ptolemy's figure it is clear that the hearth is upside down in our sky. However, the *Lapidario* illustration depicts the hearth upright. If the hearth is rotated to an upright orientation, Beta and Gamma are on the right side as viewed on Earth. Therefore, from a celestial globe view, these stars should be illustrated on the left side. The illustration places the stars on the right side, which is incorrect.

26th Degree - *two stars, the third and the fourth ones of the four stars on the right foot of the Man Who Holds the Serpent.* **44* and 51* Ophiuchi.** The one to the rear again of that [3rd star of 4 on the right foot]. The last and rearmost of the 4. The stars are illustrated on the left foot, one on the toes, the other on the heel, which is correct for the turned figure.

27th Degree - *star that is on the right shoulder of Alhave, the hunter of snakes.* **Mu or Beta (28°) Ophiuchi?** The star on the right elbow or the more advanced of the 2 stars on the right shoulder. The star is illustrated on the right shoulder.

With a longitude of 26 2/3 degrees, Mu is the star that fits here by position. The *Almagest* lists two stars on the right shoulder, Beta and Gamma, with longitudes of 28 and 29 degrees. Beta is the closest of these two stars to the 27th degree, being one degree away. The *Lapidario* has either transferred a star from the elbow to the shoulder or there is a position error of one degree. In any case, the star should be illustrated on the left side of the man because the figure is turned.

28th Degree - *the stars which are on the sting where Scorpio has its poison.* **Lambda and Upsilon Scorpii.** The rearmost of the two stars in the sting and the more advanced of these.

29th Degree - *star on the fifth node of Scorpio's tail.* **Theta Scorpii.** The one after that, in the 5th joint.

30th Degree - *star on the seventh node of Scorpio's tail, close to the sting that contains the poison.* **Kappa Scorpii.** The star in the 7th joint, the joint next to the sting.

Sagittarius

1st Degree - *star which is on the left knee of the Man of the Bent Knee.* Theta **Herculis.** The star on the left knee. The star is illustrated on the right knee, which is correct for the turned figure.

2nd Degree -*two stars, the northernmost and the southernmost ones of the three that are on the left arm of the Man of the Bent Knee.* **Nu and Xi Herculis.** The northernmost of the other 2 [of 3 stars in the left wrist] and the southernmost of them. The illustration contains one star on the right forearm, which is correct for the turned figure.

The *Lapidario* appears to have transferred the stars of the left wrist of the *Almagest* to the left arm. It is not difficult to accept this transfer because the *Lapidario* illustration shows the stars on the forearm, not far from the hand. See the 6th degree for more discussion.

3rd Degree - *southern one of two stars located on the bottom of the Hearth.* **Theta Arae.** The southernmost of 2 stars in the base. In Ptolemy's figure it is clear that Theta is on the far right side of the base (viewer's right). The star is illustrated at the base of the hearth, on the right side, but it should be on the left side for the turned figure.

In the 3rd degree the final star of three in Ara is listed in the *Lapidario*. All three are illustrated on the wrong side of the hearth for a celestial globe view (see the 25th degree of Scorpio for the other 2 stars). I would suggest that the confusion may be due to the fact that the hearth is upside down in our sky.

According to Toomer (1984), the majority of Arabic manuscripts of the *Almagest* place Theta at 0 1/3 degrees but some of them place it here, where the Greek manuscripts place it as well.

4th Degree - *star on Alhave's right hand, which rests on the bend at the end of the snake's tail, for Alhave is known to be the Hunter of Snakes.* **Tau Ophiuchi.**

The rearmost of them [of 2 stars in the right hand]. The star is illustrated on the left hand, which is correct for the turned figure.

5th **Degree** - *star which is at the tip of Sagittarius' arrow.* **Gamma Sagittarii.** The star on the point of the arrow.

6th **Degree** - *northernmost one of the three stars which are on the left arm of the Man of the Bent Knee.* **Omicron Herculis.** The rearmost of the 3 stars in the left wrist. The star is illustrated on the right wrist, which is correct for the turned figure.

There are 3 stars on the left wrist according to the *Almagest.* I have already justified the transfer of these stars to the left arm in the *Lapidario* (see the 2nd degree). Ptolemy chose to distinguish Omicron as the rearmost in his description. However, his latitude data indicates that it is also the southernmost. In the second degree the *Lapidario* describes Xi Herculis as the southernmost of the three stars, which is not correct according to Ptolemy. Ptolemy lists Xi Herculis as the southernmost of the other 2 stars (*i.e.*, more southerly than Nu Herculis). Now in the 6th degree the *Lapidario* describes Omicron as the northernmost. But it has already described Nu Herculis as the northernmost in the second degree. The conflict is resolved if the word "northernmost" is changed to "rearmost" here. In addition, the description for Xi Herculis in the second degree should be corrected to indicate that it is only south of Nu Herculis.

7th **Degree** - *two stars, the northern one of the two which are on the same side of Sagittarius' bow, and the one which is on the right hock of that part of the figure which is horse* **Mu and Eta Sagittarii.** The northernmost of these [2 stars in the northern portion of the bow], on the tip of the bow and the star on the front right hock. The first star is illustrated on the bow, fairly close to the lower end, which is not correct. The second star is illustrated on the hoof of the right front leg, which intersects the bow very near the bow's lower end. The second star is illustrated correctly.

Ptolemy describes a group of two stars on the northern portion of the bow and one star on the southern portion. The *Lapidario* description does not tell us which side of the bow the northern star is on but it fits with Mu on the northern side. Therefore, the illustration should show a star on the upper tip of the bow, not on the lower portion of the bow. See the 9th degree for more information.

8th Degree - *star which is on the hand that holds the bow of Sagittarius.* **Delta Sagittarii**. The star in the [bow-]grip held by the left hand. The illustration shows the right hand gripping the bow, which is correct for the turned figure. The star is illustrated on the bow grip.

In Ptolemy's figure it is clear that the front of the horse is on the viewer's right. The human part is twisted at the waist so that the front side is seen, *i.e.*, the man is seen with his left shoulder on the viewer's right. The *Lapidario* illustration places the horse's front on the viewer's left and the man's left shoulder on the viewer's right. The orientation of the horse establishes the celestial globe view.

If the front side of the man is seen from Earth, the back should be seen on the celestial globe. But the illustrator wanted to show the front side of the man. This was accomplished by turning the man's body so that the right shoulder is in front (west) of the left shoulder. In order to preserve the correct stellar coordinates (east vs. west), the *Lapidario* must illustrate a star on the right hand if it is on the left hand as seen from Earth. The illustrator has made this switch. Ptolemy tells us that the left hand grips the bow. The *Lapidario* illustration has the right hand on the grip, as it should be.

9th Degree - *star on the upper part of Sagittarius' bow, pointing toward midday.* **Lambda Sagittarii**. The southernmost of the [2] stars in the northern portion of the bow. The star is illustrated on the upper part of the bow but not at the tip, which is the correct position.

Lambda and Mu are grouped by Ptolemy in the northern (upper) part of the bow. In the 7th degree the *Lapidario* failed to describe Mu on the upper part (northern) of the bow, but in the 9th degree the upper part of the bow is specified for Lambda.

10th Degree - *southern one of the two stars on the left side of Sagittarius.* **Phi (13°) Sagittarii?** The one in advance of this, just over the arrow [in advance of Sigma, which is on the left shoulder]. The star is illustrated near the left wrist, which is aligned with the right side of the body (the left hand holds the string of the bow).

Ptolemy does not describe any stars on the left side or right side. In his star list for Sagittarius, there are no groups of two stars on the body of the man (in which one could be distinguished as the southern one). Furthermore, the body of the man is located to the east of the 10th degree (*i.e.*, the stars of the body are located at higher degrees than the 10th).

The *Lapidario* illustration positions the star near the left wrist, which holds the bow string. In the 8th degree I have discussed the *Lapidario* illustration reversal of left and right for the man's body. Therefore, a star on the left wrist of the *Lapidario* illustration is equivalent to a star on the right wrist of Ptolemy's figure. Ptolemy does not describe a star on the right wrist, but Zeta seems to be approximately in this position, if the right hand is aligned with the left side (equivalent to the left hand aligned with the right side in the *Lapidario* illustration).

It is tempting to suggest that Zeta be assigned here, but it fits with the *Lapidario* description for the 17th degree. Lambda is the only star in Ptolemy's lists that fits by position. However, Lambda's true location in the figure does not match very well with the *Lapidario* illustration or description, even though Ptolemy describes it as the southernmost one of two stars. In addition, Lambda has already been assigned to the 9th degree, where it clearly fits.

By default I have suggested that Phi might fit here. It is the only star in Ptolemy's list that is close to the correct place on the figure and which does not clearly fit into another degree in the *Lapidario*. Unfortunately, Phi is very close to and in front of the left shoulder (Sigma), which is not a good fit with the illustration. Furthermore, Phi does not fit into the 10th degree by position. And I have suggested that Phi might fit into the 14th degree. Thus, there is not a good candidate for the 10th degree.

11th **Degree** - *two stars which are in the midday position, on the arch of Corona Australis that is toward the north.* **Lambda (11M°) Coronae Australis and HR 6942* (9B°).** The star quite some distance in advance of this [in front of HR 7129] and the one in advance again of this [in advance of Lambda]. The stars are illustrated on the left side of the crown (viewer's left).

The Southern Crown does not contain any distinctive parts that can be associated with specific stars. The *Almagest* describes 13 stars, in sequence, in a clockwise direction around the oval of the crown. The first star in the list is Alpha Telescopii, which Ptolemy describes as follows: "The most advanced of the stars on the southern rim, outside [the crown]." Then he lists seven stars without telling us whether they are on the southern or northern rim. The ninth star on the list, Epsilon Coronae Australis, is described by Ptolemy as follows: "The rearmost of the 2 stars after this [after Gamma], in advance, in the northern rim." Then he goes on to describe the remaining stars, again not telling us whether they are on the northern or southern rim. We are left to decide on our own which stars belong on the northern and southern rims.

If Ptolemy's stars are connected with a line on a star atlas, the figure is similar to the drawing in the *Lapidario*. The *Lapidario* illustration depicts a single, closed line with an oval-like shape. In the illustration the long axis of the oval is oriented vertically, with the bottom end pointed and the top end rounded. It is clear that Alpha Telescopii marks the pointed end and Alpha, Beta and Gamma Coronae Australis the rounded end.

An analysis of the *Lapidario* illustrations and descriptions suggest that the top half of the illustration is the "northern arch" and the bottom half the "southern arch." Because Ptolemy does not classify most of the stars into either rim (=arch?), we are left to wonder about his concept of the figure *i.e.*, which stars belong to the northern and southern rims.

Lambda and HR 6942 are assigned to the 11th degree. The *Almagest* lists their longitudes at 11 5/6 and 9 2/3 degrees respectively, so they bracket the 11th degree, one in the 10th degree and one in the 12th degree. The description of these stars on the southern part (midday) of the northern arch matches their positions. Therefore, they appear to be good candidates for assignment to the 11th degree.

On Earth, Lambda and HR 6942 are seen on the right side of the crown (viewer's right) and in the illustration they are on the left, which establishes the celestial globe view. Therefore, the illustration is consistent with the assignment of Lambda and HR 6942 to the 11th degree.

12th Degree - *front one of two northern stars which are on the northern arch of the Corona Australis.* **HR 7129 (14 2/3°).** The more advanced of these two faint stars [two stars in advance of Gamma, in the northern rim]. The star is illustrated on the upper left side of the crown (viewer's left) and outside the oval line which represents the crown.

In Ptolemy's list for Corona Australis, there is only one group of two stars. HR 7129 is a member of that group. The similarity between the *Almagest* and *Lapidario* descriptions places HR 7129 here even though it falls into the 15th degree by position. The illustration matches the position of HR 7129 if the illustrated star is moved over slightly so that it sits on the oval line of the crown (like the illustration for the 13th degree). See the discussion in the 11th degree for further information.

13th Degree - *star which follows the star that is outside the southern arch of Corona Australis.* **Eta^1 + Eta^2 (11 2/3°) Coronae Australis.** The star to the rear of this [to rear of the most advanced star on the southern rim], on the

crown. The star is illustrated in a position that is near the star illustrated for the 12th degree. However, the star here is illustrated next to the line of the crown. The illustration does not position Eta correctly. The star should be illustrated near the bottom of the crown on the right side, not the top left side. See the 11th degree for more discussion.

14th Degree - *star on Sagittarius' left shoulder and on the string of the bow.* **Phi or Sigma (15 1/3°) Sagittarii?** The one in advance of this, just over the arrow [in advance of the star on the left shoulder] or the star on the left shoulder. The star is illustrated on the left shoulder. The string of the bow passes near the right shoulder, not the left shoulder.

Sigma fits here by description but fits the 16th degree by position. Ptolemy tells us that Phi is "just over the arrow," but was it placed on the shoulder by the *Lapidario* astronomer? If so, Phi should be assigned here because its longitude falls into the 14th degree. However, I have also suggested that Phi might fit in the 10th degree.

The *Lapidario* description indicates that the bow string is next to the left shoulder. The string could be near the left shoulder if the man holds the bow in his left hand and draws back the string with his right hand. Ptolemy's figure places the left hand on the bow grip which leaves the right hand to hold the bow string. But Ptolemy does not describe a star on the right hand, so the position of the bow string is not established in his figure. Nevertheless, Ptolemy's figure of the constellation does not preclude a bow string positioned near the left shoulder. I would suggest that another person placed the bow string on the left shoulder and that decision was carried through to the *Lapidario*. If so, it is evidence that others besides Ptolemy contributed to the position descriptions of the stars in the *Lapidario*.

The star is positioned on the left shoulder in the illustration, which matches the *Lapidario* description. However, as I pointed out in the 8th degree, the right and left sides of the man portion must be exchanged. Therefore, the star should be illustrated on the right shoulder if it is described on the left shoulder. In the 8th and 25th degrees the *Lapidario* illustrator made the required left-right switch for other stars on the man's body. It is difficult to understand why the switch was not done in the 14th degree.

The *Lapidario* description places the bow string near the left shoulder and the illustration shows the bow string next to the right shoulder, displaying the correct left-right exchange. Why did the illustrator position the star on the shoulder that does not have the bow string near it? The illustrator probably had

a poor understanding of how stars should be positioned on a celestial globe. Apparently he used a celestial globe as a reference for the drawing, which insured the proper position for the bow string. But when it came time to apply the star, he was confused, and put it on the left shoulder, where the *Lapidario* description places it.

15th Degree - *two stars, both on the same arch of Corona Australis, but one toward the north, the other, toward the south.* **Epsilon (15 1/6°) and Zeta Coronae Australis.** The rearmost of the 2 stars after this [after Gamma], in advance, in the northern rim. The one to the rear again of this [to the rear of HR 7122]. Both stars are illustrated near the rounded end of the crown, one on the left side and one on the right side, which is correct.

Ptolemy lists the longitudes of Epsilon and Zeta at 15 1/6 and 14 5/6 degrees respectively, placing one here and the other just barely in the next degree. Ptolemy's latitudes for these stars are: -15 1/3 and -20 degrees respectively. Therefore, Zeta is clearly south of Epsilon. The *Lapidario* describes these stars on the same arch of the crown, but does not specify which arch. The illustration places the stars on the northern arch and matches well with the positions of Epsilon and Zeta on a star atlas.

16th Degree - *two stars, the blue star, and the one which, of the three stars that are in the head of Sagittarius, is the one on the eye facing the front.* **Sigma or $Nu^1 + Nu^2$ Sagittarii and Xi^2 Sagittarii.** The star on the left shoulder or the star on the eye, which is nebulous and double and the most advanced of the 3 stars in the head. One star is illustrated on the left eye and one on the forehead.

The *Lapidario* describes the first star as blue and tells us nothing further about it. However, the illustration places both stars on the head, one on the eye and the other above the eye on the forehead. If the *Lapidario* illustration is used in conjunction with the descriptions, $Nu^1 + Nu^2$ and Xi^2 Sagittarii should be assigned here. However, I am inclined to rely on the *Lapidario* illustrations only if they clearly resolve a problem with the description, which is not the case here.

$Nu^1 + Nu^2$ and Xi^2 Sagittarii have K-type spectra, which means they are yellow or orange in color. These stars are also dim to the naked eye, which makes it difficult to detect color. It is not clear why the *Lapidario* astronomer would consider one of these stars to be blue. Ptolemy describes $Nu^1 + Nu^2$ as nebulous, which may have confused the *Lapidario* astronomer. In the 27th degree of Aries, the *Lapidario* describes a red star. The description matches Ptolemy's, except that Ptolemy describes the star as a nebulous mass. Could it be that the *Lapidario* astronomer has not understood the word nebulous in

Ptolemy's descriptions? Has he interpreted the term nebulous as a color description? If so, Nu^1 + Nu^2 may belong here.

Sigma Sagittarii is classified as a B2 star according to modern spectral classification. Stars of this spectral class have bluish colors, which matches the *Lapidario* description. Sigma is also a fairly bright star, one in which color is detected more readily by the naked eye. If the *Lapidario* intended to identify Sigma here, then the illustration should depict the star on the right shoulder, not on the head (a star on the left shoulder should be positioned on the right shoulder in the illustration).

It is interesting to note here that the *Lapidario* astronomer may have made an observation that is independent of Ptolemy. Ptolemy does not specify a color for Sigma Sagittarii, yet the *Lapidario* does if Sigma is the correct star.

17th **Degree** - *star under Sagittarius' arm and is one of the three stars on his ribs.* **Zeta Sagittarii.** The 3 stars in the back: the other one [*i.e.*, not one of the other two described before it], under the armpit. In Ptolemy's figure it is clear that Zeta is located on the left armpit. The star is illustrated on the right armpit, which is correct for the turned figure. See the 8th degree for more discussion.

18th **Degree** - *star which is on Sagittarius' front left heel.* **Beta^{1}* + Beta^{2}* Sagittarii.** The star on the front left hock. The star is illustrated on the front left heel, which is the correct position.

19th **Degree** - *star on the spine of the Turtle, also called the Flying Vulture.* **Alpha (17 1/3°) Lyrae?** The bright star on the shell, called Lyra. The star is illustrated on the center of the shell.

It is difficult to compare Ptolemy's Lyra with the *Lapidario* figure because they are not exactly the same. Ptolemy's figure is a musical instrument, the lyre, whose frame is fashioned from a turtle shell. The constellation is not fully described by Ptolemy, but some of its parts are associated with stars. Thus, there is a reference to the (turtle) shell, horns (which may be a reference to the horns of cattle, used as part of the frame), and the instrument's bridge. In contrast, the *Lapidario* figure is that of a turtle.

Alpha Lyrae seems to be the best candidate in Ptolemy's list for placement here. It is the only star that Ptolemy describes on the shell (although it may be inferred that other stars are on the shell as well from their

descriptions). In addition, Alpha is closer to the 19th degree than any other star in Ptolemy's list for Lyra. Therefore, it is the best candidate for placement here.

20th Degree - *farthest one of the three stars which are on Sagittarius' head.* **Pi Sagittarii.** The rearmost of the 3 stars in the head. The star is illustrated on the knot of the headdress, at the rear of the head, which is correct.

21st Degree - *of the three stars on Sagittarius, the one between his shoulders.* **Psi Sagittarii.** The three stars in the back: the one just above the place between the shoulders. The star is illustrated on the chest near the base of the neck. The *Lapidario* description appears to be lacking the word "back," which should be inserted just after the word "Sagittarius."

22nd Degree - *middle one of the three stars on the northernmost one of the hanging parts of Sagittarius' headdress.* **43 Sagittarii.** The southernmost of the 3 stars in the northern cloak-attachment. The star is illustrated in the middle of the northernmost hanging part of the headdress, which is approximately correct.

By description, Rho Sagittarii should be placed here. However, the longitude given by Ptolemy places it in the next degree, where it is assigned. 43 Sagittarii does have the correct longitude to be placed here according to the *Almagest*. The best explanation seems to be that the *Lapidario* is in error and can be corrected by replacing the word "middle" with "southern."

23rd Degree - *two last stars of the three which are on the northernmost one of the hanging parts of Sagittarius' headdress.* **Rho and Upsilon Sagittarii.** The middle one of the 3 stars in the northern cloak-attachment. The northernmost of the three. Two overlapping stars are illustrated near the tip of the southernmost hanging part of the headdress, but they should be on the northernmost hanging part. Both of these stars are to the rear (east) of the third star of the group (43 Sagittarii) according to longitude data in the *Almagest*.

24th Degree - *star which is between the horns of the Turtle.* **Delta* Lyrae.** The one to the rear of these, in between the points where the horns [of the lyre] are attached. The star is illustrated on the front edge of the shell, where the right edge of the neck protrudes.

I find it curious that the *Lapidario* adopts the horns of Ptolemy here. The *Lapidario* illustration does not show any distinctive feature that could be called a horn.

25th **Degree** - *star which is on Sagittarius' right upper arm.* **51* + 52* Sagittarii.** The star on the right elbow. The star is illustrated on the left upper arm, which is correct for the turned figure. See the 8th degree for further discussion.

26th **Degree** - *hidden star, which follows the three stars on the northernmost one of the hanging parts of Sagittarius' headdress.* **55 Sagittarii.** The faint star to the rear of these [the 3 stars in the northern cloak-attachment]. The star is illustrated at the tip of the southernmost hanging part of the headdress. In Ptolemy's figure it is evident that 55 Sagittarii is close to the tip of the southernmost hanging part of the headdress (Ptolemy's cloak-attachment), as it is illustrated in the *Lapidario*.

27th **Degree** - *front one of the two stars which are on the Flying Vulture's right shoulder.* **Mu (29 2/3°) Aquilae.** The more advanced of the two in the right shoulder. The bird is illustrated in a perched stance with the wings folded but not tucked against the body. The star is illustrated on the leading edge of the right wing, about midway between the wing tip and the body.

In Ptolemy's star descriptions it is difficult to visualize his concept of the figure of Aquila. He describes stars on both shoulders, the head, neck, between the shoulders and under the tail. He does not tell us where the feet are or the wing tips. Is the bird flying through the heavens or is it perched upon the crystalline sphere?

Aratus tells us that the bird is wind-blown, which seems to indicate that it is flying. On the other hand, the Farnese Atlas, the oldest surviving celestial globe from Greek and Roman antiquity, appears to depict Aquila in a perched position, with an image that is very similar to the *Lapidario* illustration.

While it is not possible to determine the stance of the Eagle from the *Almagest*, it is clear that the breast is seen, not the back, because the left shoulder is on the viewer's right. This is the same orientation depicted on the Farnese Atlas, which can only be accomplished if the bird is turned around, *i.e.*, the back of the bird should be seen on the globe if the breast is seen from Earth and since the breast is illustrated on the globe, the bird must be turned around. In order to maintain proper stellar coordinates on the Farnese Atlas (also the *Lapidario* illustration), it would be necessary to illustrate a star on the left shoulder if Ptolemy lists it on the right shoulder and vice versa.

In the 27th degree the star is described on the right shoulder. And it is clear that the *Lapidario* illustrations maintain a celestial globe orientation.

Therefore, the star for the 27th degree should be illustrated on the left shoulder in order to preserve the proper stellar coordinates. Thus, the illustration has positioned the star on the wrong shoulder (wing).

28th Degree - *two stars, one on the right hind leg, the other, which is the front one and toward the north and located in the square formed at the base of Sagittarius' tail.* **Iota (26 5/6°) and Omega Sagittarii.** The star on the right hind lower leg and the four stars [forming a quadrilateral] in the place where the tail joins [the body]: the advance star on the northern side. The first star is illustrated on the left hind leg, between the knee and hoof. The illustration should show the star on the right hind leg.

29th Degree - *two stars, both are in the quadrangle which is formed at the base of Sagittarius' tail: one of them follows the star which is on the northern side, the other is the first star on the southern side.* **60 and 59 Sagittarii.** The four stars [forming a quadrilateral] in the place where the tail joins [the body]: the rear star on the northern side; the advance star on the southern side.

30th Degree - *star which is on the southern side of the quadrangle that is formed at the base of Sagittarius' tail.* **62 Sagittarii.** The four stars [forming a quadrilateral] in the place where the tail joins [the body]: the rear star on the southern side. The *Lapidario* description is not complete. It should specify that the star is on the **rear** side of the quadrangle as well as the southern side.

Capricornus

1st Degree - *star that follows the one on the left shoulder of the Eagle (also called the Flying Vulture).* **Sigma (1 1/6°) Aquilae?** The rearmost of two in the right shoulder. The star is illustrated on the leading edge of the right wing, near the junction of the wing with the body.

There seems to be some problem with the *Lapidario* description. The *Almagest* describes two stars on the left shoulder, Gamma and Phi, at longitudes of 3 1/6 and 6 degrees respectively. However, Gamma and Phi fit the 4th and 7th degrees in the *Lapidario* and do not belong here.

I would suggest that the star of the 1st degree should be described as being in **front** of the stars on the left shoulder or the star that follows one on the **right** shoulder. Suppose the *Lapidario* should have specified the right shoulder. Then Sigma would fit here as the second star on the right shoulder, following the star of the 27th degree of Sagittarius. If this was the intent of the *Lapidario*,

then the illustrator should have placed the star on the left shoulder to preserve the proper stellar coordinates. See the 27th degree of Sagittarius for further discussion.

2nd **Degree** - *southern one of the two stars which are on the Turtle's eye.* **Theta Lyrae.** The southernmost of the 2 stars close together in the region to the east of the shell. The star is illustrated on the front edge of the shell between the right front leg and the head.

The *Lapidario* description for the 2nd degree establishes the figure of a turtle for Lyra. The *Almagest* describes a lyre fashioned from a turtle shell while the *Lapidario* describes a turtle, complete with eyes. The illustration in the *Lapidario* is also of a turtle, not a lyre made from a turtle shell.

There is no eye in the *Almagest* figure, which makes it difficult to match the *Lapidario* and *Almagest* descriptions. It is necessary to rely heavily on the position data, which indicates that Theta Lyrae belongs here. The *Lapidario* description does help to a limited extent because it indicates that the star is one of a group of two and is the southern one. This part matches the *Almagest* description. For some reason the illustrator applied the star to the edge of the shell rather than on the eye.

3rd **Degree** - *star on a feather of the lone arrow.* **Beta (3 1/3°) Sagittae.** The star on the end of the notch. The star is illustrated at the feathered end, on the notch, of an isolated arrow (*i.e.*, the illustration shows only an arrow, nothing else).

The *Lapidario* illustration depicts a lone arrow, which suggests the constellation Sagitta. Beta Sagittae is described by Ptolemy on the notch of the arrow and the *Lapidario* illustration shows a star there. The position of Beta Sagittae is just outside the 3rd degree, which is the final evidence needed to assign it here.

4th **Degree** - *front one of the two stars which are on the Eagle's left shoulder.* **Gamma Aquilae.** The more advanced of the 2 in the left shoulder. The star is illustrated on the leading edge of the right wing, midway between the body and wing tip. Now the *Lapidario* illustration positions the star in the proper place to preserve stellar coordinates. See the 27th degree of Sagittarius for further discussion.

5th **Degree** - *star on the Hen's mouth, called the beak.* **Beta Cygni.** The star on the beak. This star was known to the Arabians as Al Minliar al Dajājah, the

Hen's Beak. The *Lapidario* translator(s) has provided a translation of the Arabic name for this star rather than a corrupted form of the Arabic name.

6th Degree - *star at the tip of Capricorn's front horn.* Xi^1 + Xi^2 Capricorni. The star on the tip of the advance horn. The star is illustrated on the right horn near the tip. The right horn is slightly forward of the left horn in the illustration, which equates the right horn to the front horn in the description. Therefore, the star is illustrated on the correct horn.

According to Toomer (1984), most of the Arabic manuscripts and one Greek version of the *Almagest* place the Xi stars at a longitude of 5 degrees while most of the Greek manuscripts and one Arabic version list 9 degrees.

7th Degree - *second one of the two stars on the Flying Vulture's left shoulder.* **Phi Aquilae.** The rearmost of the 2 in the left shoulder. The star is illustrated on the leading edge of the right wing, near the junction of the wing with the body (illustration is similar to the one for the 1st degree). As in the 4th degree, the *Lapidario* illustration positions the star in the proper place to preserve stellar coordinates. See the 27th degree of Sagittarius for further discussion.

8th Degree - *two of the three stars which are on the back horn of Capricorn, one the southernmost, the other the northernmost.* **Beta and Alpha^1 + Alpha^2 Capricorni.** The southernmost of the 3 stars in the rear horn and the northernmost of the 3 stars in the rear horn. The stars are illustrated on the left horn, one at the base and one midway between the base and tip. The stars are positioned correctly in the illustration. See the 6th degree for further discussion.

9th Degree - *two stars, the first and the last ones of the three stars on Capricorn's mouth.* **Pi and Rho Capricorni.** The more advanced of the other two [of 3 stars in the muzzle] and the rearmost of these [3]. According to longitude data in the *Almagest*, Pi is the most advanced of the three stars.

10th Degree - *southernmost one of the three stars on the mouth of Capricorn.* **Omicron Capricorni.** The southernmost of the 3 stars in the muzzle.

11th Degree - *star which is behind Capricorn's right knee.* **Psi Capricorni.** The star under the right knee. The star is illustrated on the right knee, which is the correct position.

12th Degree - *two stars which are on Capricorn's neck, one northern, the other southern.* **Tau and Upsilon Capricorni.** The northernmost of the 2 stars in the neck and the southernmost of them.

13th Degree - *star on the hollow of Capricorn's left knee.* **Omega (11 2/3°) Capricorni.** The star on the left doubled-up knee. The star is illustrated on the left knee, which is the correct position.

14th Degree - *northernmost one of the three stars on the feathers of the Hen's right wing.* **Kappa (16 2/3°) Cygni.** The northernmost of the 3 in the right wing-feathers. The star is illustrated at the tip of the right wing.

The *Almagest* lists the longitude of Kappa at 16 2/3 degrees, placing it in the 17th degree. On a star atlas of Ptolemy's epoch, it is apparent that the 14th and 15th degrees have very few prominent stars. Due to a lack of prominent stars, the *Lapidario* astronomer may have been content with transferring nearby stars to these longitudes. The fact that the *Lapidario* and *Almagest* descriptions match helps support this suggestion. Furthermore, there are no stars in Cygnus that fit into the 14th degree according to the longitudes listed in the *Almagest*.

In Ptolemy's figure the bird appears to be in flight because the wings are fully extended. Furthermore, the underside (breast) is seen and it has a long neck, like a swan. But Ptolemy does not name a type of bird for the constellation.

The words used by the Greeks for this constellation have been interpreted to have various meanings, including bird and hen (Allen, 1963). The Roman concept for the constellation was a swan, which is also the figure accepted in modern times (Allen, 1963). In Arabia the constellation was usually known as Al Dajājah, the Hen, and finally, it was known as Gallina, a forlorn Hen, in the Alfonsine Tables (Allen, 1963). The *Lapidario* may have adopted the Hen of the Arabs, although it was also known earlier as the Hen according to some Greeks.

The *Lapidario* illustration depicts a hen and by careful inspection of the connection points for the wings, it is evident that the breast is seen, not the back. The Farnese Atlas (celestial globe) also depicts the breast side of the bird. As in the case of Aquila, the *Lapidario* and the Farnese Atlas allow us to view the breast of the bird by turning it around. Therefore, if Ptolemy lists a star on the right wing, it must be illustrated on the left wing in the *Lapidario* to preserve the stellar coordinates. Thus, it is evident that the *Lapidario* illustrator has applied the star to the wrong wing in the illustration for the 14th degree.

15th Degree - *star on the Hen's neck.* **Eta (16 1/3°) Cygni.** The star in the middle of the neck. The *Almagest* lists the longitude of Eta at 16 1/3 degrees, placing it in the 17th degree. However, the *Lapidario* and *Almagest* descriptions

match, which places Eta here. Furthermore, there are no stars in Cygnus which fit the 15th degree according to longitudes listed by Ptolemy. See the 14th degree for further discussion.

16th Degree - *star on Capricorn's left shoulder.* **24 (16 2/3°) Capricorni.** The star on the left shoulder. The star is illustrated on the left shoulder In Ptolemy's figure it is evident that the head and front legs of Capricorn are on the viewer's right and the tail on the left. The *Lapidario* illustration places the head and front legs on the viewer's left and tail on the right, which is the proper orientation for a celestial globe. The *Lapidario* illustration also places the star on the left shoulder, which is correct. There is no problem with illustrating a star on the left shoulder of Capricorn because the left side of Capricorn is viewed in the *Lapidario* illustration. In contrast, the right side of Capricorn is viewed here on Earth, according to Ptolemy. It is not clear how Ptolemy could label a star on the left shoulder of Capricorn when the right side of the animal is displayed in his figure. He may have considered 24 Capricorni to mark the left shoulder, even though that side of the animal was not visible from Earth. Or perhaps the body was positioned in such a way that it is possible to see the shoulder on the left side. In any case, Ptolemy's peculiar description allowed the *Lapidario* illustrator to position the star without any conflicts in position.

17th Degree - *two of the three stars on Capricorn's front horn, the northernmost one and the dim one.* **Alpha^1 + Alpha^2 (7 1/3°) and Nu (7 1/3°) Capricorni?** or **Chi and Eta Capricorni?** The northernmost of the 3 stars in the rear horn and the middle one of these or the southernmost of the other, advance 2 [of three in the middle of the body] and the northernmost of them. The stars are illustrated on the left horn, one at the base and one near the tip.

The *Almagest* lists 3 stars on the rear horn and only one on the front horn, at the tip. In earlier degrees of Capricorn, the *Lapidario* follows the *Almagest*: in the 6th degree the *Lapidario* describes a star on the tip of the front horn and in the 8th degree the *Lapidario* describes 2 of 3 stars on the back horn. Then in the 17th degree the *Lapidario* describes 3 stars on the front horn, but illustrates them on the left (rear) horn.

On the rear horn, the middle star is listed as magnitude 6 in the *Almagest*, which means that it is a very dim star. This matches the description in the *Lapidario*. Therefore, the *Almagest* and *Lapidario* descriptions match very nicely if the word "front" is changed to "back" in the *Lapidario* description. However, there is still a position problem. The horns of Capricorn are located in lower degrees of the sign, the front one at the 6th, the rear at the 8th. Why

does the *Lapidario* now describe another set of stars on the front horn for the 17th degree?

In the *Almagest* there are only 3 stars in Capricorn that fall into the 17th degree, 2 of 3 in the middle of the body and one in the back. The *Lapidario* may have intended to describe the 2 of 3 stars in the middle of the body. These are Chi and Eta Capricorni, which Ptolemy lists with longitudes of 16 2/3 and 16 2/3 degrees respectively. I would suggest that Chi and Eta are the stars that belong here.

18th Degree - *two front stars of the three which are on the eastern part of the Dolphin's tail and which belong to the group of four stars in the quadrangle that is on its body.* **Eta and Zeta Delphini**. The southernmost of the 3 stars between the tail and the rhombus. The more advanced of the other 2 to the north. The stars are illustrated at the base of the tail.

Ptolemy lists four stars in the quadrilateral (rhombus), three stars between the quadrilateral and the tail, and three stars in the tail. Unfortunately, these descriptions don't allow a determination of the location of the spine and belly. It is necessary to know the location of the spine and belly in order to evaluate the *Lapidario* illustration.

On the Farnese Atlas, the belly of the fish is on the side that faces Aquila. In the 20th degree, Theta Delphini is illustrated on the spine, which also places the belly of the fish on the side that faces Aquila. If this position is adopted for the *Almagest*, then the fish is oriented with the head on the viewer's right. The *Lapidario* illustration places the head on the viewer's left, which confirms the celestial globe orientation.

19th Degree - *last one of three stars which are in the middle of Capricorn's horn.* **Nu (7 2/3°) or Phi Capricorni?** The middle one of the 3 stars in the rear horn or the rearmost of the 3 stars in the middle of the body. The star is illustrated on the left horn, about midway between the base and tip. The error in the 17th degree is also found here. The *Lapidario* description and illustration fits Nu, but the position is correct for Phi. This is further evidence that the *Lapidario* has confused the stars of the horns with those of the body. See the 17th degree for further discussion.

20th Degree - *last one of three stars which are in the space between the eastern end of the Dolphin's tail and the four stars of the triangle which is on its body.* **Theta Delphini**. The remaining, rearmost of the 3 stars between the tail and the

rhombus. The star is illustrated on the spine, near the base of the tail. See the 18th degree for information regarding the illustration.

It is interesting to note that the *Lapidario* description is worded in a manner that is similar to the *Almagest*. Compare this with the *Lapidario* description for the 18th degree. The word "triangle" in the *Lapidario* description is an error and should be "quadrangle" (*i.e.*, "four stars of the quadrangle").

21st Degree - *foremost one of the two stars on Capricorn's belly.* **Zeta Capricorni.** The more advanced of the 2 stars close together under the belly.

22nd Degree - *of the two stars which are on Capricorn's spine, the one that is toward the back.* **Iota Capricorni.** The rearmost of the 2 stars in the back.

23rd Degree - *southernmost one of the three stars on the feathers of the Hen's right wing.* **Theta Cygni.** The southernmost of the 3 in the right wing-feathers. The star is illustrated on the trailing edge of the right wing, about midway between the body and wing tip. Once again, the illustration should depict the star on the left wing, not the right wing. See the 14th degree for further discussion.

24th Degree - *front one of the two stars which are at the base of the tail of Capricorn and which set toward midday.* **Epsilon Capricorni.** The more advanced of the 2 stars in the southern spine. The tail is illustrated with a v-notch at the end. The star is positioned at the bottom of the v-notch. See the 25th degree regarding the illustration.

Near the basal region of Capricorn's tail, there are two pairs of stars. Ptolemy describes one pair on the section of the body next to the tail. The other pair is placed on the southern spine, which is Ptolemy's term for a fin on the belly. The *Lapidario* does not adopt the southern spine of the *Almagest*. Therefore, there are two pairs of stars that can be confused without careful attention to the wording in the *Lapidario*.

The more advanced star of Ptolemy's southern spine is listed at a longitude of 23 1/3 degrees, placing it here. The pair of stars on the southern spine are south of the other pair. Thus, the phrase "which set toward midday" in the *Lapidario* is intended to set this pair of stars to the south of the other pair.

25th Degree - *front one of the two stars which are at the base of the tail of Capricorn.* **Gamma Capricorni.** The more advanced of the 2 stars in the

section [of the body] next to the tail. The star is illustrated at the base of the tail.

The *Almagest* lists the longitude of Gamma at 24 5/6 degrees, placing it here. With only a cursory examination of the *Lapidario* descriptions for the 24th and 25th degrees, one may have the impression that they are describing the same star. However, the 24th degree adds the phrase "which set toward midday," which is the distinguishing factor. See the 24th degree for further discussion.

Toomer (1984) notes that all but one Greek manuscript of the *Almagest* list the longitude of Gamma at 21 5/6 degrees, while the Arabic manuscripts and one Greek manuscript place it here.

If the illustrations for the 24th and 25th degrees are compared to Ptolemy's stars on an atlas, it is apparent that the *Lapidario* illustrations are switched, *i.e.*, the illustration for the 25th degree is more accurate for Epsilon than Gamma and vice versa for the 24th degree.

26th Degree - *front one of the two stars which are on the belly of the Fish and which points toward midday.* **Lambda (28 5/6°) Piscis Austrini.** The more advanced of them [of 2 stars in the belly]. The illustration depicts two fins projecting from the belly, one behind the gill and one near the base of the tail. The star is illustrated on the belly, just behind the base of the forward fin.

In Ptolemy's figure the fish is seen with the head on the viewer's right (assuming the fish is upright, in the sky it is actually upside down). The *Lapidario* illustration places the head on the viewer's left, confirming the celestial globe orientation.

27th Degree - *two stars, the first one and the first of the four toward the north, located on the base of Capricorn's tail.* **Delta and 42 Capricorni.** The rearmost of the 2 stars in the section [of the body] next to the tail and the most advanced of the 4 stars on the northern portion of the tail. Both stars are illustrated on the upper edge of the tail. One is centered between the tip and the base and the other is near the tip.

Delta and 42 fit here by position according to data in the *Almagest* (26 1/3 and 26 5/6 degrees respectively). The *Lapidario* description for the first star seems to identify Gamma Capricorni, not Delta Capricorni. The *Almagest* describes Gamma as the more advanced of 2 in the body section next to the tail, while Delta is described as the rearmost. However, Gamma has been assigned to the 25th degree, where it fits by position. It is my belief that the *Lapidario*

astronomer intended to use each star for only one stone. If so, Gamma cannot be assigned here for the second time. The problem can be fixed by changing the words "first one" to "second one" in the *Lapidario* description. Then Delta would clearly be the correct star.

The illustration appears to place a star in the approximate position of 42 Capricorni but Delta should not be illustrated on the upper edge of the tail.

28th Degree - *of the two stars on the mouth of the Piece of the Horse, the one toward the back.* **Delta Equulei**. The rearmost of the 2 stars in the mouth.

29th Degree - *two stars: one that sets toward midday and one which, of the four stars on Capricorn's tail, is at the tip of it.* **Mu and 46 Capricorni**. The southernmost of the other 3 [the fourth being: the most advanced of the 4 stars on the northern portion of the tail]. The northernmost of them, on the end of the tail-fin. One star is illustrated near the tip of the tail and near the top edge, the other near the tip but near the lower edge. The illustration provides a reasonable match to Ptolemy's figure.

30th Degree - *of the two stars on the head of the Piece of the Horse, the one toward the back.* **Beta (28°) Equulei.** The rearmost of the 2 stars in the head. The star is illustrated on the chest, between the front legs. The illustration clearly does not match the *Lapidario* description.

Aquarius

1st Degree - *the star on the head of Aquarius.* **25 Aquarii**. The star on the head of Aquarius.

2nd Degree - *southern one of two stars which are on the left loin of the Man Who Pours Down Water.* **Iota Aquarii**. The southernmost of the 2 stars in the left buttock. The star is illustrated on the right loin, which is the correct side for a turned figure.

This is the first star of a group in the region of the loins and buttocks of Aquarius. The terms used in the *Lapidario* and the *Almagest* to describe these stars are as follows: hip, buttock, thigh and loin. Because these parts of the body are in close proximity, it becomes difficult to decide which stars should represent the various parts. For example, should stars on the loins be higher on the body than those of the buttocks?

In the *Almagest*, Ptolemy lists one star on the right buttock and two on the left buttock. Below the buttocks he describes a star on the left thigh and above the buttocks he describes two stars "... in the hollow of the right [hip]." Toomer (1984) added the term "hip" in brackets in his translation of the *Almagest* to clarify Ptolemy's description. In the *Lapidario* there is one star described on the right loin and two on the left loin. These stars fit perfectly with Ptolemy's stars on the buttocks and it appears that the *Lapidario* astronomer transferred the stars from the buttocks to the loins. Ptolemy's star on the left thigh falls in the 5th degree, where the *Lapidario* describes a star on the left buttock. Then Ptolemy's rear star on the right [hip] falls in the 8th degree, where the *Lapidario* describes a star on the buttock. Then how is it possible that the *Lapidario* stars on the buttocks can be above and below the stars of the loins? The only way to accommodate buttock stars above and below the loins is by applying rather large buttocks to the figure and perhaps this was acceptable to the *Lapidario* astronomer. See the 8th degree for an alternative solution to the problem.

3rd **Degree** - *of the two stars on the right foot of the Hen, the one which is toward the back.* **Omicron² Cygni**. The one to the rear [of the more advanced of the 2 stars in the right leg]. The star is illustrated on the right foot. The *Almagest* does not describe any stars on the right foot of Cygnus. The *Lapidario* astronomer has apparently transferred the stars from the leg to the foot. The illustration should depict the star on the left foot because the figure is turned.

4th **Degree** - *northern one of the two stars on the left loin of Aquarius.* **38 Aquarii**. The northernmost of the 2 stars in the left buttock. The star is illustrated on the right loin, which is correct for the turned figure. For further discussion, see the 2nd degree.

5th **Degree** - *star which is on the left buttock of the man who pours water.* **53 Aquarii**. The star in the back of the left thigh. The star is illustrated on the right buttock and lower on the body than the stars illustrated in the 2nd and 4th degrees. This feature of the illustrations suggests that the buttocks should be considered lower on the figure than the loins. The star is illustrated on the correct side of the body. See the 2nd degree for more information.

6th **Degree** - *of the two stars on Aquarius' right shoulder, the dim one.* **Omicron Aquarii**. The fainter one, under it [under the brighter of the 2 stars in the right shoulder]. The star is illustrated on the left upper arm, which is the correct side for a turned figure. Here the illustration appears to accommodate Ptolemy's term "...under it..." by placing the star just below the shoulder, on the upper arm.

7th Degree - *of the two stars on Aquarius' right shoulder, the bright one.* **Alpha Aquarii.** The brighter of the 2 stars in the right shoulder. The star is illustrated on the left shoulder, which is correct for the turned figure.

8th Degree - *two stars: of the two stars on Aquarius' buttock, the one that is toward the back; and the more southern one of the two stars on Aquarius' left leg.* **Rho and 68 (8 1/3°) Aquarii.** The rearmost of the 2 stars close together in the hollow of the right [hip]. The southernmost of the 2 stars in the left lower leg. The first star is illustrated on the upper right thigh, slightly lower on the body than the star illustrated in the 5th degree. The second star is illustrated just below the left knee. By position, 66 Aquarii belongs here and 68 Aquarii in the 9th degree. However, the descriptions and illustrations clearly place 68 Aquarii here and 66 Aquarii in the 9th degree.

The illustration for the 8th degree provides an alternative to the "large buttocks" suggested in the second degree. In Ptolemy's figure Rho is clearly positioned above (north) the stars of the buttocks (which the *Lapidario* place on the loins). But in the illustration, the *Lapidario* positions the star of the (right) buttock below the loins. This suggests that the *Lapidario* astronomer may have believed that Rho was farther south than it really is. Could this have been due to a manuscript variation in the *Almagest* that was used by the *Lapidario* astronomer? See the 2nd degree for more information.

9th Degree - *two stars, one on Aquarius' right loin, and the other on his left leg.* **Sigma and 66 (7 5/6°) Aquarii.** The star on the right buttock. The northernmost of the 2 stars in the left lower leg, under the knee. The first star is illustrated on the right loin, similar to the stars illustrated in the 2nd and 4th degrees. The second star is illustrated on the left knee. The illustration depicts the stars on the wrong sides of the body. See the 8th degree for a discussion.

10th Degree - *the northern one of the two stars which are together and are located on Pegasus' head.* **Theta Pegasi.** The northernmost of the 2 stars close together on the head.

11th Degree - *star which is on the Hen's left foot.* **Nu Cygni.** The star on the left leg. The star is illustrated on the left foot. The *Almagest* does not list any star on the left foot. It appears that the *Lapidario* astronomer has transferred the star from the leg to the foot. The illustration should have positioned the star on the right foot because the figure is turned.

Stars in the water flow of Aquarius

Both the *Lapidario* and the *Almagest* describe a number of stars in the stream of water that Aquarius is pouring from a jar. Unfortunately, the descriptions in the *Lapidario* are not structured the same way as those in the *Almagest*. In the *Almagest* there are 20 stars listed on the water flow. Among the descriptions of those 20 stars, Ptolemy uses the word "bend" twice to denote a bend in the path of the water. And it is unclear whether these two notations refer to the same bend or two separate bends. In any case, there are a maximum of two bends described in the *Almagest*. In contrast, the *Lapidario* describes four bends: the first, second, third and last. The descriptions in the *Almagest* are primarily sequential, starting at the northern end of the water flow and following its course from the jar. In contrast, the descriptions in the *Lapidario* rely heavily on the bends to describe the positions of the stars.

The water flow can be visualized by labeling all of Ptolemy's stars on a star atlas. When this is done, it is possible to draw a water flow that has four bends. Using a sketch of the water flow with four bends and Ptolemy's longitude data, most of the stars in the *Lapidario* can be identified. Those in the third and last bend are identified fairly easily. Those in the first and second bend are difficult to identify.

12th Degree - *two stars, the northern one of the two stars on the left foot of the man who pours water, and the first one of the three stars on Aquarius' last bend.* **Tau Aquarii? 86 Aquarii.** The northernmost of the 2 stars in the right lower leg, under the knee-bend. The most advanced of three stars in the remaining [last] group. One star is illustrated on the right lower leg and one below the right foot on the water flow.

The *Almagest* does not describe any stars on the left foot, only two stars on the left lower leg, 68 and 66 Aquarii. These stars have already been assigned to the 8th and 9th degrees and do not fit here by position. Therefore, it is necessary to examine other stars in Aquarius to find a candidate for placement here. There are two stars described on the **right lower leg** in the *Almagest* that fit here by position: Delta (11 2/3 degrees) and Tau (11 1/3 degrees). Tau is the best choice because the *Lapidario* describes a northern star of two. However, one could also argue for Delta because it is closer to the foot.

If Tau (or Delta) is the star that the *Lapidario* intended to identify here, then the description should have specified the right foot, not the left foot. The illustration should have placed the star on the left leg, not the right leg, in order to preserve the stellar coordinates.

The *Lapidario* illustration of the water flow starts at the mouth of the jar, which is held in the left hand. The water drops vertically in a straight path to a position just below the feet, where it curves to flow under the left foot and then the right foot. It is curious that the illustrator did not make a better effort to illustrate the water flow with four distinct bends, which would match the *Lapidario* descriptions. Instead, there is only one obvious bend near the left foot, which should correspond with the 3rd bend in the *Lapidario* descriptions. In my sketch of the water flow, using Ptolemy's stars and configured with four bends, 86 Aquarii is positioned on the 4th (last) bend, just below the left leg. Thus, the *Lapidario* illustration has positioned the star correctly under the right foot, but there is no bend in the water flow illustrated there.

13th Degree - *two stars, the southernmost one of the three which are on the right palm of the man who pours water, and the southernmost one of the three stars on the last bend of the water being poured, both of them in Aquarius.* Pi (11 2/3°) **Aquarii? 89 Aquarii.** The northernmost of the three stars on the right hand. The southernmost of the other two [the southernmost of the pair 88 + 89, which are to the rear of a third star in the group, 86, all three being members of the last group on the flow of the water]. The first star is illustrated on the right palm and the second star is not illustrated. The illustration should depict a star on the left palm, not the right palm, because the figure is turned.

In the 13th and 14th degrees there are three stars described on the right hand. Ptolemy also lists three stars on the right hand, but his descriptions are not structured the same way as the *Lapidario* descriptions. Ptolemy lists one star as the northernmost, one as the rearmost of the two southernmost and one as the more advanced of the two southernmost stars. In contrast, the *Lapidario* describes one star as the southernmost and the other two stars are described on the back right palm. Clearly the *Lapidario* does not describe the stars with enough detail to match them easily with Ptolemy's stars.

It is my opinion that the *Lapidario* astronomer intended to use all three of Ptolemy's stars on the right hand. If so, Pi seems to fit better in the 13th degree than the 14th degree. It falls just short of the 13th degree by position. And if the word "southernmost" is changed to "northernmost" in the *Lapidario* description, Pi would fit here by description. Thus, I would suggest the *Lapidario* description is in error here and should specify a northernmost star.

Ptolemy groups the other two stars, Eta and Zeta. They are described as the rearmost and more advanced of the stars to the south of Pi. Eta fits the 14th degree by position and Zeta the 13th degree. If these stars are kept together, then one will be out of position in either the 13th or 14th degrees. I prefer to

assign Eta and Zeta to the 14th degree because the *Lapidario* description there seems to be specifying a group of two stars and Ptolemy groups Eta and Zeta in his descriptions.

The star 89 Aquarii is close to 86 Aquarii. 86 Aquarii was assigned to the 12th degree on the 4th (last) bend of the water flow, therefore, 89 Aquarii also belongs there. The *Lapidario* description describes the star of the 13th degree as the southernmost of three stars. But Ptolemy describes 89 Aquarii as the southernmost of the two stars to the rear of 86 Aquarii. Thus, the *Lapidario* description is not an exact match to the *Almagest* description. However, the latitude data in the *Almagest* places 89 Aquarii to the south of the other two stars in the group, so the *Lapidario* description is compatible with information contained in the *Almagest*.

14th Degree - *two of the three stars on the back right palm, and the northernmost one of the three on the last bend, all of them in Aquarius.* **Eta and Zeta (12°) Aquarii? 88 Aquarii.** The rearmost of the 3 stars on the right hand. The more advanced of the other 2 [more advanced than Eta] to the south. The northernmost of them [the northernmost of the pair 88 + 89, which are to the rear of a third star in the group, 86, all three being members of the last group on the flow of the water]. One star is illustrated on the right hand and one on the water flow next to the right foot. The stars of the hand should be illustrated on the left hand, not the right hand, because the figure is turned. See the 13th degree for a discussion of Eta and Zeta.

The previous two degrees have described two stars belonging to a group of three on the last bend of the water (86 and 89 Aquarii). The 14th degree describes the other star of the group, 88 Aquarii. The illustration places this star on the water flow, near the right foot, which is the correct position (see the 12th degree for a discussion). The *Lapidario* description describes the star of the 14th degree as the northernmost of three stars. But Ptolemy describes 88 Aquarii as the northernmost of the two stars to the rear of 86 Aquarii. Thus, the *Lapidario* description is not an exact match to the *Almagest* description. However, the latitude data in the *Almagest* places 88 Aquarii to the north of the other two stars in the group, so the *Lapidario* description is compatible with information contained in the *Almagest*.

15th Degree - *the second star of the southern stream of water, which is close to Aquarius' hand.* **Lambda Aquarii.** The one next to the latter towards the south [next to the most advanced {in the section} beginning at the hand]. The star is illustrated on the water flow just below the jar, which is held in the left hand.

16th Degree - *star which is on the Hen's left knee.* **Xi (14 1/2°) Cygni** The star on the left knee. The star is illustrated on the left knee. The illustration should depict the star on the right knee because the figure is turned.

17th Degree - *the star which is on Pegasus' left knee.* **Iota (17 1/3°) Pegasi** The star on the left knee. The star is illustrated on the left knee, which is the correct position.

18th Degree - *two of the three stars on Aquarius' second bend, the middle one and the one toward the back.* **83 and 99 Aquarii?** The one next to this [next to Lambda Aquarii], after [the beginning of] the bend and the middle one of three [of the group that comes just before the last group on the water flow]. Two stars are illustrated on the vertical section of the water flow, about midway between the jar and the bend near the left foot.

There are only two stars in Ptolemy's list for the water flow that fall into the 18th degree. One of these, 83 Aquarii, appears to be between bends one and two according to my sketch (see the discussion before the 12th degree regarding the sketch). It could be assigned to either the first or second bend. The *Almagest* description does not help very much because it only states that 83 Aquarii is positioned after [the beginning of?] the bend. In any case, 83 Aquarii is the strongest candidate for placement here.

If we look at where the 18th degree falls on the water flow, it might be better to describe this location as the end of the first bend. Perhaps this was the original intent of the *Lapidario*, which has been lost in transcription or translation.

The only other star that falls into the 18th degree according to Ptolemy is 99 Aquarii. However, this star is clearly positioned between bend number three and the last bend. If the *Lapidario* astronomer intended to place 99 Aquarii here, he should not have described it on the second bend of the water flow.

The *Lapidario* illustration places the stars in a position that is consistent with my sketch for the second bend. However, the *Lapidario* illustration does not depict a bend anywhere near the illustrated location of the star, *i.e.*, the illustrator does not illustrate the second bend in the water flow. See the 21st degree for further discussion.

19th Degree - *southernmost one of the three stars on Aquarius' third bend.* **101 Aquarii.** The southernmost of the next 3 [arranged] likewise [of the group that

comes just before the last group on the water flow]. The star is illustrated in a position similar to the star illustrated in the 18th degree.

The *Almagest* lists the longitude of 101 Aquarii at 18 1/3 degrees, which also places it here. Using my sketch of the water flow (see the discussion before the 12th degree regarding the sketch), 101 Aquarii is located near the third bend, which is compatible with the *Lapidario* description.

The *Lapidario* illustration does include a bend in the water flow which is consistent with the third bend in my sketch. However, the *Lapidario* illustration does not position the star on the bend, as it should be for the 19th degree.

20th Degree - *two stars, the northernmost and the southernmost ones of the stars on the second bend of the flowing water in the figure of Aquarius.* **Chi (20 1/2°) and Psi^3* Aquarii?** The one in the bend to the south of this [to the south of Phi]. The southernmost of the two to the south of this [south of Chi]. The illustration places two stars on the water flow near the position of the stars illustrated in the 18th degree, but slightly closer to the jar.

If Chi and the Psi stars belong in the second bend, then Chi and Psi^3 should be the northernmost and southernmost of the group of three. Psi^3 fits here by position according to the *Almagest* and Chi falls just outside the 20th degree. See the 18th and 21st degrees for further discussion.

21st Degree - *two stars, both of them in Aquarius: one which, of the two stars that follow the first bend of the water, is located toward the back; the other, apart and far away, is toward midday and below the second bend of this water.* **Phi Aquarii? HR 8958*.** The one to the rear again of this [to rear of 83 Aquarii]. The lone star at some distance from these [Psi^1 and Psi^3] towards the south. The first star is illustrated in about the same position as those illustrated in the 20th degree. The second star is illustrated near the bottom of the vertical section of the water flow, on the bend.

If 83 Aquarii follows the first bend of the water flow, then Phi fits here by description (see the 18th degree for further discussion on 83 Aquarii). Phi also falls here by longitude. However, I would be more inclined to describe Phi on the second bend of the water flow, where it is positioned in my sketch (see the discussion before the 12th degree regarding the sketch).

The first star of the 21st degree is illustrated higher on the water flow than the stars of the 18th degree. This matches well with the *Lapidario*

descriptions which place the star of the 21st degree following the first bend and the stars of the 18th degree on the second bend. But I have already assigned 83 Aquarii to the second bend in the 18th degree. And 83 Aquarii clearly comes before Phi along the course of the water flow. If 83 Aquarii belongs on the second bend, then Phi must also belong there or following the second bend.

There does not appear to be any clear solution to stellar assignments for the first and second bends of the water flow. The confusion is the result of a poor correlation between the descriptions in the *Lapidario* and the *Almagest*. The *Lapidario* astronomer has discarded Ptolemy's descriptions in favor of a water flow with four bends. But in the process, he has not developed descriptions that can be traced accurately back to stars in Ptolemy's catalog. Therefore, the stars I have assigned in the region of the first and second bends must be considered tentative and uncertain.

In contrast to Phi, HR 8958 appears to be a solid candidate for the 21st degree. The *Lapidario* and *Almagest* descriptions have a similar element, which describes the star as isolated and far-removed to the south from the stars on the water flow that precede it. The similarities in the descriptions and the proper longitude clearly place HR 8958 in the 21st degree.

22nd Degree - *the northernmost one of the three stars which are on the third bend of the water of the sign of Aquarius.* **103* + 104* Aquarii.** The northernmost of the 3 stars in the next group [following the 2 stars that are close together, this group of 3 is the second group of stars upstream from the last group of 3]. The star is illustrated near the bottom of the vertical section of the water flow, just before the bend. 103 + 104 Aquarii is clearly positioned in the region of the third bend on my sketch (see the paragraph above the 12th degree for a discussion of the sketch). Furthermore, Ptolemy and the *Lapidario* describe the star as the northernmost one of three. This evidence along with a proper fit in longitude indicate that 103 + 104 Aquarii is the correct star.

The *Lapidario* illustration positions the star near the third bend, which is consistent with 103 + 104 Aquarii. See the 24th degree for more discussion.

23rd Degree - *middle one of the three stars which are on the third bend of the flowing water of Aquarius.* **106 Aquarii.** The middle one of the three [of the group following the two stars that are close together, this group of 3 is the second group of stars upstream from the last group of 3]. The star is illustrated just downstream of the bend in the water flow, next to the left foot.

106 Aquarii is positioned in the region of the third bend on my sketch (see the paragraph above the 12th degree for a discussion of the sketch). Furthermore, Ptolemy and the *Lapidario* describe the star as the middle one of three. This evidence along with a proper fit in longitude indicate that 106 Aquarii is the correct star.

The illustration places the star on the water flow near the left foot, which is consistent with a star near the third bend. However, the illustration for the 22nd degree star (103 + 104 Aquarii) is somewhat upstream of the star illustrated in the 23rd degree (106 Aquarii). 103 + 104 and 106 Aquarii are very close to each other and should be illustrated in the same position in the *Lapidario* illustrations.

24th Degree - *of the two stars which are together and which follow the second bend of the water, it is the star toward the back.* **Omega^2 Aquarii.** The rearmost of the 2 stars close together after the latter [after the lone star at some distance from these {Psi^1 and Psi^3}]. The star is illustrated on the bend near the left foot.

In my sketch the Omega stars are positioned just upstream of the third bend. I would suggest that the illustration provided in the 22nd degree should be exchanged with the one for the 24th degree (see the paragraph above the 12th degree for a discussion of the sketch).

25th Degree - *front one of the two stars which are together on Pegasus' chest.* **Lambda (26 1/6°) Pegasi.** The more advanced of the two stars close together in the chest.

26th Degree - *star which is on the heel of Pegasus' right foot.* **Pi (23 1/3°) Pegasi.** The star in the right hock. The star is illustrated on the right foot, which is the correct position.

27th Degree - *star which is between the Horse's shoulders.* **Alpha Pegasi.** The star on the place between the shoulders and the shoulder-part of the wing.

28th Degree - *of the two stars which are together on the Horse's chest, it is the back one.* **Mu Pegasi.** The rearmost of the two stars close together in the chest. The illustration is missing. At this point there is a missing section in the manuscript. The illustration for the 28th degree is presumably on the first page of the missing section.

The last two degrees of Aquarius are missing.

Pisces

The first 28 degrees of Pisces are missing. Before the text for the 29th degree, there is an illustration which presumably belongs to the 28th degree of Pisces.

29th Degree - *the last of the three little stars on the head of the fish, which, in the figure of Pisces, is toward the back.* **68 Piscium**. The rearmost of the 3 small stars in the head [of the rear fish]. The star is illustrated on the head of the fish that is connected to the fishing line with the U-shaped bend.

As the *Lapidario* nears full circle on the zodiac, it returns to Pisces. As in the first degree of Aries, the *Lapidario* illustration has placed the star on the wrong fish. The fish that is attached to the fishing line with the U-shaped bend is the front fish, not the rear one. See the 1st degree of Aries.

30th Degree - *southern one of the two stars on the stomach of the fish which, in the figure of Pisces, is the one toward the back.* **Phi Piscium**. The southernmost of the 2 stars in the belly [of the rear fish]. The star is illustrated on the belly of the fish that is connected to the fishing line with the U-shaped bend. Once again, the *Lapidario* illustration is in error as it is in the 29th degree. See the 1st degree of Aries.

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SELECTED BIBLIOGRAPHY

Alfonso el Sabio. *Lapidario and Libro de las formas & ymagenes.* Eds. Roderic C. Diman and Lynn W. Winget. Madison: Hispanic Seminary, 1980.

Alfonso X. *Lapidario.* Ed. María Brey Mariño. Madrid: Editorial Castalia "Odres Nuevos," 1970.

Alfonso X. *Lapidario.* Photolithographic Reproduction by José Fernández Montaña. Madrid: La Iberia, 1881.

Alfonso X. *Lapidario (Según el manuscrito escurialense H.I.15)* Ed. Sagrario Rodríguez Montalvo. Madrid: Editorial Gredos, 1981.

Allen, R.H. *Star Names: Their Lore and Meaning.* New York: Dover Publications, 1963.

Amador de los Ríos, José. *Historia crítica de la literatura española.* Tomo III. Madrid: 1863.

Amasuno, Marcelino V. "La materia médica de Discórides en el Lapidario de Alfonso X el Sabio. Literatura y ciencia en la Castilla del siglo XIII." *Cuadernos Galileo de historia de la ciencia,* 9. Madrid: Consejo Superior de Investigaciones Científicas, 1987.

Atkinson, Donald T. *Magic, Myth and Medicine.* New York: The World Publishing Company, 1956.

Ballesteros Beretta, Antonio. *Alfonso X, el Sabio.* Barcelona, 1963. Reprint, Barcelona: El Albir, 1984.

Barrington, M. "The Lapidario of King Alfonso X." *Connoisseur XIV* (1996): 31-6.

Burns, Robert I., S.J., ed. *Emperor of Culture. Alfonso X the Learned of Castile and His Thirteenth Century Renaissance.* Philadelphia: University of Pennsylvania Press, 1990.

Calcott, Frank. *The Supernatural in Early Spanish Literature.* New York: Instituto de las Españas, 1923.

Cárdenas, Anthony. "Alfonso X's Libro de las formas & de las ymagenes: Facts and Probabilities." *Romance Quarterly 33* (1986): 269-74.

———. *A Study and Edition of the Royal Sciptorium Manuscript of* El Libro del saber de astrología by Alfonso X el Sabio. 4 vols. Doctoral Dissertation. Madison: University of Wisconsin, 1974.

Cardoso, Gonçalves, J.O. Lapidario del Rey Alfonso X el Sabio. *Estudo deste manuscrito iluminado do seculo XIII da Biblioteca de S. Lorenço do Escorial.* Lisboa: 1929.

Darby, George O.S. "An Astrological Manuscript of Alfonso X." Diss. Harvard, 1932.

———. "The Mysterious Abolays." *Osiris* I, (1936): 251-9.

Domínguez Rodríguez, Ana. *Astrología y arte en el Lapidario de Alfonso X el Sabio.* Madrid: Edilán, 1982.

El Libro de Calila e Digna. Eds. John E. Keller and Robert W. Linker. Madrid: Consejo Superior de Investigaciones Científicas. 1966.

Evans, Joan. "Magical Jewels of the Middle Ages and the Renaissance." *Modern Language Review* (1922): 16-25, 38-50.

———. "The 'Lapidary' of Alfonso the Learned." *Modern Language Review* (1919): 424-6.

García Ballester, Luis. "La circulación de las ideas médicas en la Castilla de Alfonso X el Sabio." *Revista de Occidente* 43 (1984): 85-107.

González, Juan, Jr. *La sociedad medieval española reflejada en la obra de Alfonso el Sabio.* University of Texas, 1969.

Haskins, C.H. *Studies in the History of Medieval Science.* 2nd ed., 1927.

Kasten, Lloyd, John Nitti, and Jean Anderson. *Concordances and Texts of the Royal Scriptorium Manuscripts of Alfonso X el Sabio.* 2 vols. Madison: Hispanic Seminary, 1978.

Katz, Israel and John E. Keller, eds. *Studies on the Cantigas de Santa María. Art, Music and Poetry.* Madison: Hispanic Seminary, 1987.

Kealey, E.J. *Miracles, Marvels, and Monarchs.* Baltimore: The Johns Hopkins University Press, 1981.

Keller, John Esten. *Alfonso X, el Sabio.* New York: Twayne Publishers, Inc., 1967.

———. "The Lapidary of the Learned King," *Gems and Gemology,* (Winter 1957-58), 105-10, 118-21.

———. "Daily Living as Presented in the 'Canticles' of Alfonso the Learned." *Speculum* XXXIII (1958): 484-9.

Kunz, Georg Frederick. *The Curious Lore of Precious Stones.* New York: Halcyon House, 1938.

Lapesa, Rafael. "Símbolos y palabras en el Setenario de Alfonso X." *Nueva revista de filología hispánica* 29 (1980): 247-61.

Las Siete Partidas. Trans. Samuel P. Scott. New York: Commercial Publishing House, 1931.

Las Siete Partidas del Rey Don Alfonso el Sabio. Ed. Real Academia de la Historia. 3 vols. Madrid: Imprenta Real, 1801.

Libro de los engaños e asayamientos de las mugeres. Ed. John E. Keller. Chapel Hill: University of North Carolina Press, 1959.

Libros del saber de astronomía del rey d. Alfonso X de Castilla. 5 vols. Ed. Manuel Rico y Sinobois. Madrid: Aguado, 1863-1867.

Llampayas, José. *Alfonso X, el hombre, el rey, el sabio.* Madrid: Biblioteca Nueva, 1947.

Lombardo, S. *Sky Signs: Aratus' Phaenomena.* Berkeley: North Atlantic Books, 1983.

London, Gardiner. "Bibliografía de estudios sobre la vida y obra de Alfonso X el Sabio." *Boletín de filología española* II (1960): 18-31.

Mély, F. de. "Du rôle de pierres gravées au moyen age." *Revue de l'art chretién* IV, 5 série, (1893): 98.

Menéndez Pidal, Gonzalo. "Cómo trabajaron las escuelas alfonsíes." *Nueva revista de filología hispánica* (1951): 364-80.

Mitchell, Grace. "Cures from the Lapidario." *Estudios alfonsinos y otros escritos. En homenaje a John Esten Keller y a Aníbal A. Biglieri.* Edición y prólogo de Nicolás Toscano Liria. National Endowment for the Humanities. New York: National Hispanic Foundation for the Humanities, 1991.

Múñoz, José. "Las piedras preciosas en la medicina." *Anales de la Universidad Central de Ecuador* XCIV, no. 349.

Nunemaker, John Horace. "The Lapidary of Alfonso X." *Philological Quarterly* VIII (1929): 248-54.

———. "Noticias sobre la alquimia en el Lapidario de Alfonso X." *Revista de filología española* XVI (1929): 161-8.

———. "The Chaldean Stones in the Lapidary of Alfonso X." *Publications of the MLA of America* 45 (1930): 444-53.

———. "Nota adicional sobre la alquimia en los lapidarios alfonsinos." *Revista de filología española* XVIII (1931): 261-2.

———. "Magic in Medieval Spanish Literature." *Speculum* VII (1932): 556-64.

———. "An Additional Chapter on Magic in Medieval Spanish Literature." *Speculum* VII (Jan. 1932): 556-64.

———. "The Madrid Manuscript of the Alfonsine Lapidaries." *Modern Philology* XXIX (1931): 101-4.

———. "Note on Abolays." *Hispanic Review* II (1934): 242-6.

———. "In Pursuit of the Sources of the Alfonsine Lapidaries." *Speculum* XIV (1939): 483-9.

O'Callaghan, Joseph F. *The Learned King: The Reign of Alfonso of Castile.* Philadelphia: University of Pennsylvania Press, 1993.

Peters, C.H.F. and E.B. Knobel. *Ptolemy's Catalogue of Stars; A Revision of the Almagest.* Washington, D.C.: The Carnegie Institution of Washington, 1915.

Procter, Evelyn S. "The Scientific Works of the Court of Alfonso X of Castile: The King and His Collaborators." *Modern Language Review* 40 (1945): 12-29.

———. *Alfonso X of Castile, Patron of Literature and Learning.* Oxford: Clarendon Press, 1951.

Robbins, F.E. *Tetrabiblos.* Cambridge: Harvard University Press, 1940.

Rodriguez, Lapa, Manuel. *Cantigas d'escarnho e de mal dezir dos Cancioneiros medievais galego-portugueses.* Coimbra: Galaixa, 1970.

Segura Graiño, Cristina. *Semblanza humana de Alfonso el Sabio en Alfonso X el Sabio, vida, obra, y época*, 11-29. Presentación de Manuel González Jiménez. Edición preparada por Juan Carlos de Miguel Rodríguez, Angela Múñoz Fernández y Cristina Segura Graiño. Sociedad Española de Estudios Medievales.

Solalinde, Antonio. "Intervención de Alfonso X en la redacción de sus obras." *Revista de filología española* 2 (1915): 283-8.

Steiger, A. "Tradición y fuentes islámicas en la obra de Alfonso el Sabio." *Revista del Instituto Egipcio de Estudios Islámicos* 3 (1955): 93-110.

Steinschneider, M. "Arabische Lapidarien." *Zeitschrift der deutschen Morgenländischen Gesellschaft* XLIX (1895): 266-70.

Ticknor, George. *History of Spanish Literature*, Vol. 1. 1853.

Toomer, G.J. *Ptolemy's Almagest.* New York: Springer Verlag, 1984.

Valbuena Prat, Angel. *Historia de la literatura española*, Vol. 1. Barcelona: Editorial Gustavo Gili S.A., 1964.

Vernet Ginés, Juan, ed. *Nuevos estudios sobre astronomía española en el siglo de Alfonso X.* Barcelona: Consejo Superior de Investigaciones Científicas, 1983.

Whitfield, P. *The Mapping of the Heavens*. San Francisco: Pomegranate Art Books, 1995.

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