To prepare for the session, I recommend doing the secondary reading and having a look through the set of extracts on rubies, with a view to thinking about the way descriptions of rubies changed over time – and about how much of the classical tradition (represented by the first extract, from Pliny) persisted into the sixteenth and early seventeenth centuries, in spite of changes introduced by goldsmiths (like Cellini) and travel writers (like Linschoten) - Michael

Secondary reading:

Bycroft, Michael. 'Boethius de Boodt and the Emergence of the Oriental/Occidental Distinction in European Mineralogy.' In Bycroft, Michael and Sven Dupré, *Gems in the Early Modern World: Materials, Knowledge, and Global Trade*. Palgrave, 2019.

Primary texts on gems, in order of date first published, which is also the order they appear in the extracts in the pdf:

1. Pliny the Elder. *Historia Naturalis*, c. 80 AD. Translation: *Natural History*, vol. 10., trans. D. E. Eichholz. Cambridge, MA: Harvard University Press, 1989, book 37

2. Leonardi, Camillo. *Speculum lapidum*. Venice, 1502. Translation: Anon. *The Mirror of Stones*, 1750.

3. Cardano, Girolamo. *De Subtilitate*. Basel, 1560. Translation: *The De Subtilitate of Girolamo Cardano*, trans. John Forrester. Arizona: Arizona Center for Medieval and Renaissance Studies, 2013

4. Cellini, Benvenuto. *Due trattati, uno dell' oreficeria, l'altro della scultura*, 1568. Translation: *The Treatises of Benvenuto Cellini on Goldsmithing and Sculpture*, trans. C. R. Ashbee, 1967.

5. Linschoten, John Huyghen van. *Itinerario: Voyage ofte Schipvaert van Jan Huygen van Linschoten naer Dost ofte portugaels Indien*, Amsterdam, 1596. Translation: *Voyage of John Huyghen van Linschoten to the East Indies*, trans. William Phillip, ed. Arthur C. Burnell. Cambridge, UK: Cambridge University Press, 1885.

6. De Boodt, Anselmus Boethius. *Gemmarum et lapidum*, 1609. Translation: *Lapidary, or the history of precious stones*, trans. Thomas Nicols, Cambridge, 1661.

CHAPTER 6

Boethius de Boodt and the Emergence of the Oriental/Occidental Distinction in European Mineralogy

Michael Bycroft

The list of gem species in Fig. 6.1 was the work of Antoine-Joseph Dezallier d'Argenville, a collector and writer whose books on shells and stones were partly responsible for the growth of natural history as a fashionable pursuit in eighteenth-century Paris. Like many other lists of gems published in early modern Europe, Argenville's had at least three functions. It divided gems into species and varieties, it delivered a report on their geographical origins, and it ranked them according to quality and price. It told the reader, for example, that there were four kinds of topaz; that they came from the Orient, India, Brazil, and Bohemia; and that as a whole these stones were probably more valuable than amethyst and certainly more so than chrysolite.[1]

A striking example of this early modern conflation of origin, value, and kind, and certainly the example with the greatest consequences for the classification of gems, was the distinction between "Oriental" and "Occidental" stones. D'Argenville explained this distinction in his *Lithologie et conchyliologie* of 1742:

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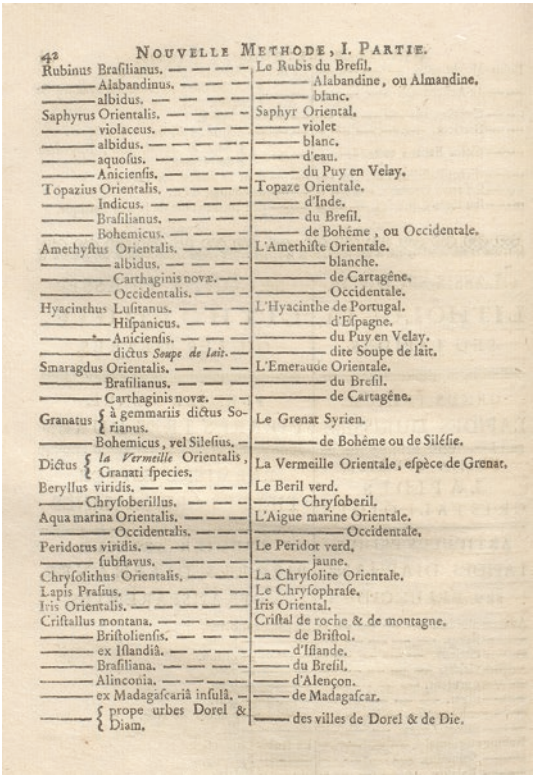

42 NOUVELLE METHODE, I. PARTIE.

Rubinus Brafilianus.	Le Rubis du Brefil.
——— Alabandinus.	——— Alabandine, ou Almandine.
——— albidus.	——— blanc.
Saphyrus Orientalis.	Saphyr Oriental.
——— violaceus.	——— violet
——— albidus.	——— blanc.
——— aquoſus.	——— d'eau.
——— Anicienſis.	——— du Puy en Velay.
Topazius Orientalis.	Topaze Orientale.
——— Indicus.	——— d'Inde.
——— Brafilianus.	——— du Brefil.
——— Bohemicus.	——— de Bohême, ou Occidentale.
Amethyſtus Orientalis.	L'Amethiſte Orientale.
——— albidus.	——— blanche.
——— Carthaginis novæ.	——— de Cartagêne.
——— Occidentalis.	——— Occidentale.
Hyacinthus Luſitanus.	L'Hyacinthe de Portugal.
——— Hiſpanicus.	——— d'Eſpagne.
——— Anicienſis.	——— du Puy en Velay.
——— dictus *Soupe de lait*.	——— dite Soupe de lait.
Smaragdus Orientalis.	L'Emeraude Orientale.
——— Brafilianus.	——— du Brefil.
——— Carthaginis novæ.	——— de Cartagêne.
Granatus { à gemmariis dictus Sorianus.	Le Grenat Syrien.
——— Bohemicus, vel Sileſius.	——— de Bohême ou de Siléſie.
Dictus { *la Vermeille* Orientalis, Granati ſpecies.	La Vermeille Orientale, eſpèce de Grenat.
Beryllus viridis.	Le Beril verd.
——— Chryſoberillus.	——— Chryſoberil.
Aqua marina Orientalis.	L'Aigue marine Orientale.
——— Occidentalis.	——— Occidentale.
Peridotus viridis.	Le Peridot verd.
——— ſubflavus.	——— jaune.
Chryſolithus Orientalis.	La Chryſolite Orientale.
Lapis Praſius.	Le Chryſophraſe.
Iris Orientalis.	Iris Oriental.
Criſtallus montana.	Criſtal de roche & de montagne.
——— Briſtolienſis.	——— de Briſtol.
——— ex Iſlandiâ.	——— d'Iſlande.
——— Brafiliana.	——— du Brefil.
——— Alinconia.	——— d'Alençon.
——— ex Madagaſcariâ inſulâ.	——— de Madagaſcar.
——— { prope urbes Dorel & Diam.	——— des villes de Dorel & de Die.

Fig. 6.1 List of gem species, from Argenville, *Oryctologie* (Paris, 1755). © The British Library Board, 459.a.17

> Fine stones are further divided into Orientals [*Orientales*], Occidentals [*Occidentales*], and factitious … The Orientals are the hardest and most beautiful, the word "Oriental" being the jewellers' word for "hard"; these stones come from the Oriental Indies [*Indes Orientales*], which are to be distinguished from the great Indies, which are called Occidental … All soft stones are called "Occidental," and such is the name, firstly, of stones from Peru, Carthage, and the great Indies, and secondly, of those found in several places in Europe, such as Bohemia, Silesia, Misnie, Saxony, Spain, and different parts of France …[2]

The identification of Oriental stones with hardness, beauty, and quality was not peculiar to Argenville. By mid-century, it had become the basis of a new classification of gems advanced by the naturalist Louis-Jean-Marie Daubenton in the distinguished pages of the *Mémoires de l'Académie*

Royale des Sciences.[3] Ten years later, the Oriental/Occidental distinction recurred in the *Encyclopédie* of Diderot and d'Alembert.[4] Ten years later again, the Anglo-French diplomat Louis Dutens used it extensively in a treatise that became popular among gem collectors.[5] The distinction persisted to the end of the century and beyond, even in the writings of leading mineralogists such as Mathurin-Jacques Brisson and René-Just Haüy.[6]

The emergence and persistence of this distinction is a puzzle for historians of early modern European natural history. On the one hand, the distinction seems to be a clear case of a branch of natural history being shaped by changes in the global circulation of natural bodies and in particular by the integration of Europe into the gem trade in Asia and the Americas. The connection between the circulation of gems on the one hand and knowledge about them on the other was not lost on contemporaries: according to Louis Dutens, ancient writers on gems "did not have, and could not have had, on this subject, all of the knowledge that we have acquired since the discovery of America [and] the advent of a regular commerce with the Oriental Indies."[7] On the other hand, the connections that historians of botany and zoology have drawn between global trade and natural history do not seem to apply to gems. In the case of plants and animals, two factors were crucial: the sheer quantity of new species that entered Europe and the strangeness of those species in the eyes of Europeans. The abundance of new species led to new taxonomic schemes, ones that were sufficiently capacious, flexible, and rigorous to contain the tide of novelty. The strangeness of these species—the fact that they had little in common with Old World species—obliged naturalists to devise new and more rigorous techniques for distinguishing accurate reports from fabulous ones and to find room in their conceptual schemes for rare, anomalous and inexplicable phenomena.[8]

The problem is that very few *new* species of gems came to the attention of Europeans in the early modern period. Many new specimens arrived in Europe, of course, often from locations previously unknown to Europeans. But these specimens were easily conceptualised as varieties of known species: the rich green stones encountered by Europeans in Columbia in the 1530s were quickly identified as emeralds; the hard, transparent stones discovered in Brazil a century later were just as easily slotted into the pre-existing category "diamond."[9] There was no gemmological equivalent to the avocado, the pineapple, and the bird of paradise, entities that were entirely unknown to Europeans prior to the sixteenth century, and entirely unlike known species of plants and animals. The number of precious stones

recorded in lapidaries—including transparent stones such as diamond and opaque ones such as agate and turquoise—remained stable in the 150 years after Columbus' arrival in the Americas. Pliny the Elder had recorded 32 species; Georgius Agricola listed 44 in 1543, Anselmus Boethius de Boodt listed 41 in 1609, Robert de Berquen listed 39 in 1667; and Argenville listed 42 in his 1755 work.[10] Nor was there a dramatic increase in new geographical locations known to produce gems. Pliny mentioned 6 localities for *adamas*, Agricola 6, and Boodt 8. The corresponding figures for *smaragdus* were 12, 12, and 4; for pearls they were 8, 2, and 13; and for sapphire they were 3, 4, and 7.[11] There was no equivalent in gemmology to the explosion of new species experienced by sixteenth-century botanists, who recognised ten times more species in the 1620s than they had in the 1540s and who introduced 20 times more new species into Europe in the sixteenth century than they had in the previous 2000 years.[12]

If the abundance and strangeness of new gems cannot explain the emergence of the Oriental/Occidental distinction, what can? A large part of the answer, I suggest, is new information about the geographical origin of gems. What changed in the wake of the voyages of Christopher Columbus and Vasco da Gama was not European beliefs about the number and kind of gems that existed but their beliefs about where the known species occurred. As argued in Sect. 1, ancient and medieval authors were well aware that many of the most valuable gems came from the East, broadly construed, and that many of these Eastern stones came from India. However the idea that Eastern stones form a single, coherent category was almost entirely absent in treatises on precious stones up to the middle of the sixteenth century (Sect. 2). Only in the latter part of the sixteenth century did gems become Oriental, as opposed to simply Indian. The "Oriental" character of gems was especially pronounced in *Gemmarum et lapidum historia* (1609), an influential treatise written by the Flemish physician Anselmus Boethius de Boodt during his time at the Prague court of the Holy Roman Emperor Rudolph II. Boodt built the Oriental/Occidental distinction into his classification of gems and into his explanation of their origin, and he did so while using new information derived from merchants and physicians who had travelled eastwards in the wake of Spanish and Portuguese voyages of discovery (Sect. 3). This new information lent itself to a new view of the global distribution of gems, one that enlarged the categories of "Oriental" and "Occidental" gems and sharpened the distinction between them (Sect. 4). Europe being part of the

globe, Boodt's views on the global distribution of gems were also shaped by his knowledge of gem sources in the Northern European regions that he knew best, especially Germany, Silesia, and Bohemia.

1 Gem Origin Before 1600

The idea that the most precious stones come from afar is as old as gemmology. "These stones are rare as well as beautiful," wrote the Greek philosopher Theophrastus in his *De lapidus* (c. 314 BC), "but those of Greece are of course less valuable."[13] According to Pliny the Elder, writing in the heyday of the Roman Empire, the island of Toylos (modern Bahrain) was "extremely famous for its numerous pearls," the island of Toprabane (modern Sri Lanka) was a place where "pearls and precious stones are held in honour," and the Indian subcontinent was the source of the finest rock crystal and the only known varieties of opal and beryl.[14] Indeed, "of all the lands that produce them [i.e. precious stones], India is the most prolific."[15]

Pliny's descriptions of particular gems bear out these generalisations. Of the 32 species he recognised as the "principal gemstones,"[16] he judged that 24 owed their best varieties, or their only varieties, to the lands East of the river Nile and the river Don.[17] These superior varieties came from many places—Arabia, Armenia, Babylonia, Egypt, the Red Sea, Carmania, Anatolia, Persia, Scythia, Bactria—but a full half of them came from India. Amber from the Baltic sea and coral from the Mediterranean were the only exceptions to the rule that the best gems had Eastern origins.[18]

A glance at two influential texts from a later period suggests that the association between gems and India persisted into the Middle Ages. Albertus Magnus' *Liber mineralium*, written in the latter part of the thirteenth century, contained what was perhaps the most comprehensive original treatise on gems produced in Christendom before 1600. Albertus' descriptions of gems were shorter than Pliny's and contained less data about their places of production. However, the basic point that many precious stones come from India was not lost on the Aristotelean philosopher: "Mostly it is produced in India," he wrote of beryl, "as many other gems are."[19] This generalisation is borne out by the details of Albertus' treatise. Out of 34 species of gem, he judged that 12 owed their best or only varieties to Eastern regions, that four of these high-quality varieties came from India, and that only three species owed their best or only varieties to locations in Europe.[20] The association between gems and the East

was just as strong in the eleventh-century *De lapidibus* written by Marbode, Bishop of Rennes. This 732-line poem was, in the words of its modern editor, "by far … the greatest 'best-seller' for many centuries" in the lapidary genre.[21] According to Marbode, Arabia was "The land of gems" and the lodestone was "culled from its copious store." As for India, it was still a "parent of gems" and "the mother of stones."[22]

2 The Missing Orientalism

Gems had been Indian since Pliny, but they had not been Oriental. The best ones may have come from the East, and not only from India but also from such places as Arabia and Bactria. But the idea that gems from the East form a single, coherent category was absent in the texts considered so far. If the authors entertained that idea at all, they did not express it in the names they gave to stones, in the way they divided them into species, in the way they divided species into varieties, or the accounts they gave of the origins of gems.

Consider Pliny again. He referred on numerous occasions to gems originating in *india*, and he wrote that rock crystal "comes to us from the East [*oriens*]." But the latter was the *only* occasion in the 37th book of his *Historia naturalis* on which he used *oriens*, *asia*, or cognate terms to express the idea that a given gemstone came from the East broadly construed.[23] He did use place names to refer to species of gems, but these were the names of nations (as in "Scythian" *smaragdi*), islands (such as *topazos*, named after an island in the Red Sea), and regions (as in "Arabian" *adamas*). They were not the names of entire points of the compass.[24] Pliny also used place names to refer to varieties of gems, as when he wrote that "as many as six kinds [of *adamas*] are recognised" and proceeded to describe varieties that he called "Indian," "Arabian," "Macedonian," and "Cyprian."[25] However, on no occasion did he lump all the Eastern varieties of a species into one category and all the other varieties into a second category. When he divided species into two, he did so by gender rather than geography: "male" varieties were darker and more brilliant than their "female" counterparts.[26]

There are hints of a different approach in some thirteenth- and fourteenth-century texts. Albertus described *saphirus* as follows:

> *Saphirus* is a very famous stone, and most of it comes from the East, from India [*ab Oriente ex India*]. It is [also] found in an underground mine in the neighbourhood of the city of [Le Puy], in Provence; but this is not so

> precious [*preciosus*] as to be exactly like the Oriental [*orientali*] [kind]. Its colour is a transparent blue like a clear sky, but the blue colour predominates; and the better [i.e. oriental] kind is not quite transparent.[27]

The second author is the anonymous thirteenth-century Picard scribe who wrote the following in a description of sapphire:

> Another kind of sapphire can be found in the Puy Notre Dame [*pui Nostre Dame*] … that does not fetch as high a price [as the first kind, from India] … There [i.e. Puy Notre Dame] one also finds amethysts [*ametistes*], but they are softer [*plus tenres*] than the oriental ones [*celes d'orient*].[28]

There is a similar phrase in an edict issued by King Jean II of France in 1355 and directed at the Paris guild of goldsmiths:

> No goldsmith may mount, in gold or in silver, Scottish pearls with Oriental pearls [*Pelles d'Ecosse avec Pelles d'Orient*] …[29]

In all these cases, the author used the term "Oriental," in Latin or in French, to refer to one variety of a species, or perhaps a group of varieties of that species, where the species in question were sapphire, amethyst, and pearls. The second reference is especially significant in light of later developments, since the scribe implies that French amethyst is *softer* than the Oriental kind.

But we must not get ahead of ourselves. Neither Albertus nor the Picard scribe used the term "Oriental" to refer to varieties of any other gems in their lapidaries. And that usage did not catch on, to judge from its low profile in two important lapidaries from the first half of the sixteenth century. Camillo Leonardi's *Speculum lapidum*, first published in 1502, was "one of the most widely read lapidaries of the time."[30] Leonardi used the word *orientalis* to describe varieties of pearl, carnelian, and topaz. In the latter two cases, he compared the *orientalis* favourably to a variety he referred to as *occidenta*, and in the case of topaz, his preference was based on the greater hardness of the Oriental variety.[31] But that is all. He did not use *orientalis* in his descriptions of amethyst, sapphire, or any other of the 55 gems he described.[32] This term is even harder to find in Georg Agricola's important textbook of mineralogy, *De natura fossilium* (1546). The Saxon physician relied heavily on Pliny for his data on gem origin—in his description of *adamas*, for example, he listed all and only the localities that Pliny

had listed 1500 years earlier.[33] So it is no surprise that Agricola's data on the localities of gems, taken as a whole, resemble those of Pliny in their frequent reference to the "Indian" origin of gems and the complete absence of references to gems that are "Oriental" or "Occidental."[34] The only hint of novelty is his reference to "European" (*europei*) varieties of quartz and jasper. Agricola did not even reproduce Pliny's statement that the best rock crystal "comes from the *East*."[35] Admittedly, there was change in the air in the middle of the sixteenth century. In his *De subtilitate* of 1550, the Italian philosopher Girolamo Cardano referred to four stones as "Oriental," reported the existence of emeralds in Peru and rubies in Pegu, and gave three separate explanations for the concentration of precious stones in the Orient.[36] But Cardano's chapter on gems was short and unsystematic. For a thorough-going exercise in the Orientalisation of gems we need to enter the seventeenth century and consider Anselmus Boethius de Boodt's *Gemmarum et lapidum historia*, first published in Hanover in 1609.

3 The Orient in Boodt's *Historia*

Boodt's *Historia* was easily the most influential lapidary published in Europe in the seventeenth century.[37] Its success lay in its fusion of the old and the new, the former represented by Boodt's single-minded focus on gems and the latter by his acquisition of new information from new kinds of source. He drew on a wide range of printed books, from travelogues to alchemical works to books of secrets. He also made use of his own experience as a collector of minerals and as keeper of the gem collection of the Holy Roman Emperor Rudolph II, whom he served as a physician while writing the treatise.[38] Finally, he was a close observer of the goldsmiths and stone cutters who laboured in the Emperor's workshops and who populated his Prague castle with cabinets encrusted in diamonds, vessels carved in jasper and chalcedony, landscapes made of inlayed gems, and other princely collectables.[39] The treatise that resulted from these varied ingredients was erudite, up-to-date, and multitudinous.

Boodt's chapter on the location of gems illustrates the breadth of his interests and the centrality of the Orient to his conception of precious stones.[40] Common stones grow all over the globe, Boodt writes—in the poles, the tropics, the equinoxes. And they can grow in any climate, as shown by the abundance of rock crystal in Nova Zembla, "as per the testimony of the Dutch, who were the first to reveal this land to Europeans."

And yet, "everyone knows that the most noble precious stones are born principally in the Oriental Indies." Why might this be? Because, Boodt continues, stones are formed from a hot exhalation raised from the earth by the sun; this exhalation is abundant in the Orient because, lying in the tropics, they are always close to the sun. To the obvious objection—Africa and South America also lie in the tropics but hold fewer precious stones than India—Boodt suggests that there really are precious stones in Africa and South America and that they simply have not been discovered yet, perhaps because of the "barbarous temperament" of the inhabitants of those landmasses. These reflections on the distribution of gems around the globe are particularly interesting given that they had no precedent in the lapidaries of Leonardi and Albertus. Though those lapidaries contain substantial chapters on the origins of gems, those chapters are concerned only with the types of terrain in which gems occur (on mountains, in rivers, deep in the earth, and so on) and not with the regions of the globe in which they occur.[41] We might say, anachronistically but usefully, that Albertus and Leonardi were concerned only with the geology of gems whereas Boodt was concerned both with their geology and their geography.

Geography mattered as much to Boodt's classification of gems as it did to his account of their origins. His chapter on "The varieties, place of origin, and size" of turquoise is characteristic. The first sentence of the chapter stated simply that "There are two kinds of turquoise, the Oriental and the Occidental." Boodt went on to say that the Oriental kind was more blue, and less green, than the Occidental. This implied that the former were preferable to the latter, since as he remarked a few pages later, excessively green or white turquoise were "held in contempt."[42] Boodt's use of the term "Oriental" in the rest of the treatise was erratic but extensive. Sometimes his evaluations were implicit, sometimes they were brutally direct: "Among sapphires, some are Oriental, the others Occidental, and the latter are meaner than the Oriental ones."[43] Sometimes he substituted "European" for "Occidental," though he often used the latter term for stones that, as far as he was concerned, occurred only in Europe.[44] Sometimes he used neither term, referring only to an "Oriental" variety and leaving the reader to notice that all of the other localities he mentioned were in Europe.[45] Sometimes he was less explicit about the taxonomic import of these terms than he was in the case of sapphire and turquoise, as when he referred simply to "Oriental garnet" or to amethysts found in Arabia, Ethiopia, Cyprus, "and other Oriental locations."[46] In

one way or another, Boodt used the term "Oriental" to designate 18 of the 41 species of stone that he recognised as "precious" in the *Historia*.[47]

These references to the Orient appeared alongside new information from that very region. Much of this information concerned the geographical origin of gems, and much of it was derived from Europeans who had travelled to Portuguese Goa in the latter part of the sixteenth century. Boodt's chapters on diamond or *adamas* were typical in this respect. He began, as Agricola had, with a recital of the six kinds of *adamas* recognised by Pliny, each associated with a country or region. But then he dismissed the ancient author in a sentence: "These kinds of diamond established by Pliny are no longer known, and now there is only one kind of diamond." The only real diamonds, Boodt says, are "Oriental" diamonds, not to be confused with "false diamonds," or colourless rock crystal, which is found in abundance in Europe.

According to Boodt's Latin text, true diamonds are found in *Bisnager orientalis Indiae provincia*, in an area of *Decan Indiae provincia* not far from the *ditione Imadixa*, and in the *stretum Tanian in Malacca*.[48] Boodt owed these place names to Garcia da Orta, the Portuguese physician whose *Colóquios dos simples e drogas he cousas medicinais da Índia* was first published in Goa in 1563.[49] By *terra do imadixa*, Orta had meant the territory of the ruler Imad-ul-Mulk; by *bisnaguer* he meant what is now known as the Vijayanagara Empire; and by *malaqua* he meant the island of Borneo (not the town of Malacca or the straits of the same name).[50] Two of these names, "Bisnager" and "Malacca," appeared on maps that Boodt had probably seen, since he accurately cited passages from the book in which they appeared, namely Jan Huygen van Linschoten's *Itinerario*, a narrative based on the authors' voyage to Goa between 1583 and 1592.[51] Linschoten's maps also showed several other locations (such as Ormus, Calecut, Cananor, Cambaya, Balegat, Pegu, and Sumatra) that Orta identified as sources of precious stones (ruby, garnet, hyacinth, pearls, and sapphire) and which Boodt reported as such in his *Historia* (Fig. 6.2).[52] It must be said that Boodt's uptake of travellers' reports was not perfect: his descriptions of emerald and pearls suggest that he had not read José de Acosta's fresh account of those stones[53]; and there are errors and omissions in his descriptions of other stones which betray his reliance on Carolus Clusius' rather free Latin translation of Orta's treatise.[54] Boodt nevertheless assimilated a good deal of new information about the geographical origins of gems.

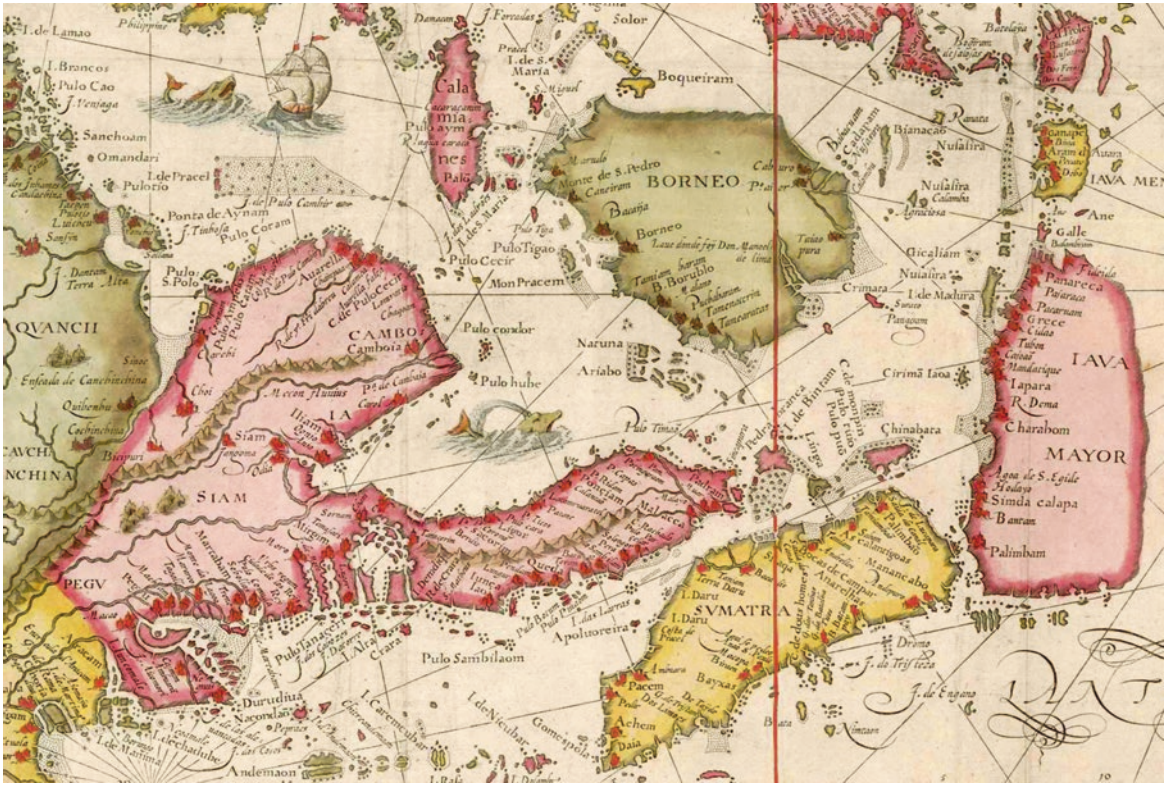

Fig. 6.2 Detail of "Map of Further India," from Linschoten, *Itinerario* (1596). The map includes places identified by Boodt as gem sources, such as Borneo, Malacca, Sumatra, and Pegu. Courtesy of Sanderus Maps

4 The Impact of New Geographical Data

It is natural to think that Boodt's data *from* the Orient played some role in his frequent reference *to* the Orient. But the precise nature of this connection is not easy to discern. As mentioned in the introduction, the connection cannot be understood in terms of the abundance of new gem species, nor in terms of the strangeness of new species, for the simple reason that there were very few new or strange species among the gem specimens that flowed into Europe in the sixteenth century. Another hypothesis that does not stand up to scrutiny is that Boodt recognised a higher proportion of high-quality stones from Eastern localities than his predecessors had done. If real, this trend in the *evaluative* distinction Eastern and Western stones could explain why Boodt placed so much *taxonomic* weight on that distinction. But the trend is not real. Recall that Pliny reported many times more Eastern gems than Western ones. That is to say, he reported 23 gems whose best or only variety came from East of the Nile and the Don, and only 2 gems whose best or only variety came from West of those rivers. Between Pliny and Boodt this ratio went *down*, not up. Whereas Pliny reported about 12 times more Eastern gems than Western ones, Magnus reported roughly 4 times more, Leonardi roughly 3 times more … and Boodt only about twice as many Eastern stones (17) than Western ones (7).

We need to look elsewhere for connections between the new data from the Orient and the new concept of an Oriental gem. One factor that may have played a role was the discovery that some of the very best stones came from the very far West, and in particular that there were emeralds in the New World. The term "Indias Occidentales" had been adopted by sixteenth-century Spanish administrators to distinguish the "Indias" discovered by Columbus from the "Indias" of the Old World. The term quickly made its way into printed books, including Nicolas Monardes' widely read work on the medical plants of the New World.[55] To anyone familiar with this term, and with the existence of emeralds in the New World, it must have been a natural step to label these new emeralds "Occidental" and from there to label the old variety "Oriental."

Another development was the decline of Africa as a source of gems. Pliny believed that "Ethiopia," by which he meant a region in North East Africa, was one source of *adamas*, *carbunculi*, *chrysolithus*, and *smaragdus*. In the case of the first three species, it is likely that the specimens Pliny had in mind came from India and that he was misled by the fact they reached

consumers in the Roman Empire by way of traders in North Africa.[56] In contrast to Pliny, Boodt did not report any localities in Africa for *adamas*, *carbunculi*, or *smaragdus*, for the simple reason that his sources (Orta and Linschoten) did not report any such localities for those stones. Three of the gems that Boodt prized most highly were now freed from their old association with the geographical grey area of Northern Africa. They now came—or were believed to come, which is what matters here—*either* from somewhere East of the Red Sea *or* somewhere West of Cyprus.

A third change wrought by new geographical data was a rise in the number of very fine Eastern stones that were known to originate outside India. Boodt reported that the diamonds of Borneo were "highly praised"; that pearls occurred in both Borneo and Sumatra and that the latter island was "very fertile" in these luxury goods; and that Pegu was a source of "excellent" rubies and "very perfect" sapphires.[57] On the other side of India, the Persian Gulf gained new prestige as a producer of gems when Orta and Linschoten established that the best pearls came from the Persian gulf rather than from India, a view that Pliny had held but that Albertus had rejected.[58] This change helps to explain why Boodt associated precious stones more strongly with the Orient in general than he did with India in particular.

These changes in ideas about how gems were distributed outside Europe went hand-in-hand with changes in Europeans' perceptions of *their own* gem deposits. Rudolf II had been sending stone cutters and goldsmiths to prospect for gems in Germany, Silesia, and Bohemia since the 1580s.[59] Boodt alluded to their discoveries not only in his chapter on the geographical origin of gems[60] but also in his descriptions of particular gems, where he displayed a detailed knowledge of their European localities, often giving the names of towns, waterways, or fields where they were found—examples are his descriptions of German agate and jasper, Silesian turquoise, and Prussian amber.[61] Boodt had acquired some of this knowledge during his own mineralogical expeditions, as attested by his references to a piece of chalcedony found in a field near Brussels, an Armenian stone from a mountain near Prague, and several "very beautiful" pieces of Bohemian jasper.[62] Boodt had searched especially hard for garnets in Bohemia, measuring their size with the help of a device for which he gave a detailed description and an illustration (Fig. 6.3).

Knowledge of local gems was relevant to the perception of foreign ones because the latter were often defined in comparison to the former. Recall the precocious remarks on Oriental gems by Albertus, the Picard scribe,

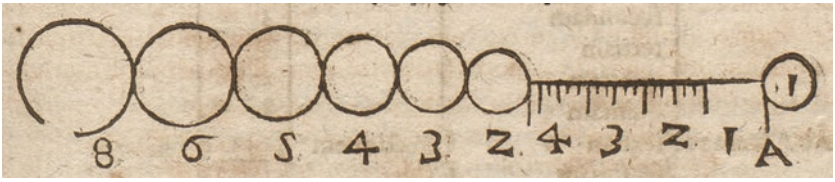

Fig. 6.3 Diagram of a device for determining the size, and hence the price, of garnets. The circles represent holes. Hole 2 is adjusted to fit a spherical garnet worth 1 *thaler*. The diameters of the other holes differ from their neighbours by the small divisions on the scale, that is, 1/6th the diameter of hole 2. A garnet of size 2 is worth 1 *thaler*; size 3, 3 *thaler*; size 4, 9 *thaler*; and so on. Boodt blamed the absence of hole 7 on the engraver. From Boodt, *Gemmarum et lapidum historia*. © The British Library Board, 458.a.31

the author of the 1355 goldsmith's edict, and Leonardi. Between them these authors referred to gems as "Oriental" on six occasions. On all but one of these occasions they explicitly compared the Oriental variety of the gem to an inferior variety from Europe, such as the pale French sapphire mentioned by Albertus and the soft French amethysts noted by the Picard scribe. Likewise, in the *Historia* we find a strong correlation between Oriental gems and local ones—that is, between gems with varieties that Boodt called "Oriental" and gems with one or more varieties that he identified as German, Silesian, or Bohemian. Of Boodt's 18 Oriental gems, all except two (emerald and asteria) was also local. Most of them were either entirely local (e.g., Occidental sapphire came only from Bohemia and Silesia) or nearly so (Occidental garnet came only from Bohemia, Silesia, and Spain). Of the remaining gems, that is to say, the 17 gems that Boodt did *not* label "Oriental,"[63] most were either only from the East (such as ruby and cat's eye) or only from the West (such as amber and the Armenian stone). Not many of these 17 gems came *both* from the East *and* from Germany, Silesia, or Bohemia—only opal and beryl fit into this category. Gems became "Oriental" for Boodt not just because they came from the East but also because they had local counterparts in the West.

5 Conclusion

Boodt's beliefs about the geographical distribution of gems did not act alone. They worked in in tandem with other forces to mould the Oriental/Occidental distinction into the rigid dichotomy that we find in

eighteenth-century treatises on mineralogy. It is significant that Argenville, in the passages quoted at the beginning of this chapter, attributed the "Oriental/Occidental" terminology to lapidaries. The distinction was not the exclusive property of naturalists, and indeed it seems likely that many naturalists, like Argenville, borrowed the distinction from artisans and merchants who handled gems, whether by speaking to them in person or reading the treatises that they published in significant numbers in the sixteenth and seventeenth centuries. Among Boodt's sources, Linschoten and Orta both used the term "Oriental" to refer to high-quality pearls originating in the East, including those from the Persian Gulf, and Linschoten noted that emeralds from Eurasia were sold in India as "Oriental" emeralds.[64] Similar language can be found in a mid-century appraiser's manual written in Portuguese, where "Oriental" emeralds are contrasted to "Peruvian" ones; in a narrative written by the English merchant Ralph Fitch and published in 1599, where the best pearls are described as "Oriental"; and, most strikingly, in a manual published in 1572 by the Spanish jeweller Juan de Arfe y Villafane, where we find a table of prices for *Diamant oriental, Rubi oriental, Esmeralda oriental,* and *Espinela oriental*.[65]

Jewellers and lapidaries supplied not only the distinction between "Oriental" and "Occidental" stones but also the means of making it. It was from jewellers or lapidaries (*gemmarii*) that Boodt learnt to identify "Oriental" diamonds by painting them with mastic and verifying that this improved rather than dulled their brilliance.[66] Probably Boodt also learned from lapidaries—such as the hardstone cutters at the imperial court of Rudolph II—that different species of gem could be distinguished by their different degrees of hardness.[67] Boodt went on to use hardness as the distinguishing mark of seven "Oriental" stones, and in his chapter on amethyst, he suggests that Oriental stones are hard by definition, since he refers to "the Oriental ones, that is to say the hardest ones."[68] In the eighteenth century, both Argenville and Dutens stated that lapidaries referred to the hardest gems as "Oriental" irrespective of their actual origins; these two authors may have had in mind a seventeenth-century treatise by the Parisian goldsmith Robert de Berquen, who endorsed hardness as the principal criterion for ranking species of gems and for splitting these species into varieties.[69] By the eighteenth century, then, the terms "Oriental" and "Occidental" referred primarily to the quality of a stone and only secondarily to its place of origin.[70] But this should not blind us to the role geographical considerations played in the emergence of the

terms in Boodt's treatise. Global trade may not have brought new species of gems to Europe, but it did bring new ideas about where the known species were found, and these ideas helped to install the Oriental/Occidental distinction as a mainstay of gem taxonomy in early modern Europe.

Notes

1. Antoine-Joseph Dezallier d'Argenville, *L'Histoire naturelle éclaircie dans une de ses parties principales, l'oryctologie* (Paris, 1755), 42. That the list is a ranking can be seen by comparing it to Argenville's descriptions of the gems in question, for example, 154 (diamond), 158 (ruby), and 161 (peridot), and to his division (180–1) of gems into two orders of different value.
2. Antoine-Joseph Dezallier d'Argenville, *L'Histoire naturelle éclaircie dans deux de ses parties principales: la lithologie et la conchyliologie* (Paris, 1742), 53. Cf. Argenville, *Oryctologie*, 180.
3. Louis-Jean-Marie Daubenton, "De la connoissance des pierres précieuses," *Mémoires de l'Académie Royale des Sciences, année 1750* (1753), 28–38, on 35–6.
4. Denis Diderot and Jean le Rond d'Alembert, *Encyclopédie, ou dictionnaire raisonné des sciences, des arts et des métiers*, vol. 12 (1765), 593–5, on 594; vol. 11 (1765), 644. Both articles bear the signature of Paul-Henry Thury, Baron d'Holbach.
5. Louis Dutens, *Des pierres précieuses et des pierres fines, avec les moyens de les connoître & de les évaluer* (Florence, 1782). Dutens considered the distinction misleading (18–19) but used it in his chapters on diamond, ruby, sapphire, topaz, amethyst, aquamarine, chrysolite, garnet, hyacinth, agate, and sardonyx. Cf. John Sinkankas, *Gemology: An Annotated Bibliography* (Metuchen, NJ: Scarecrow Press, 1993), vol. 1, 291–2, on 291.
6. Mathurin-Jacques Brisson, *Pesanteur spécifique des corps* (Paris, 1787), vi–vii, xvi–xviii. René-Just Haüy, *Traité de minéralogie* (Paris, 1801), vol. 2, 486–7, 489.
7. Dutens, *Pierres précieuses*, 5.
8. The following are notable examples from the large literature on early modern natural history. Brian Ogilvie, *The Science of Describing: Natural History in Renaissance Europe* (Chicago: University of Chicago Press, 2006), 208 (quantity), chap. 5 (quantity and strangeness). Lorraine Daston and Katharine Park, *Wonders and the Order of Nature, 1150–1750* (New York: Zone Books, 1998), esp. chap. 7 (strangeness). Henry Lowood, "The New World and the European Catalogue of Nature," in *America in European Consciousness, 1493–1750*, ed. Karen Ordahl

Kupperman (Chapel Hill: University of North Carolina Press, 1995), 295–323, esp. 295, 196, 298 (quantity).

9. Gedalia Yogev, *Diamonds and Coral: Anglo-Dutch Jews and Eighteenth-Century Trade* (Leicester: Leicester University Press, 1978), chap. 7 (Brazilian diamonds). Kris Lane, *Colour of Paradise: The Emerald in the Age of Gunpowder Empires* (Yale University Press, 2010), 101, 241–4 (early references to Peruvian "emeralds").
10. Pliny the Elder, *Natural History*, vol. 10, trans. D. E. Eichholz (Cambridge, MA: Harvard University Press, 1989), book 37, chaps. 15–53 (the 26 "principle gemstones," as per p. 277). For Pliny I also count pearl and coral (book 32); rock crystal, amber, and lyncurium (book 37, chaps. 9–13), despite Pliny's remark on p. 205; and agate (book 37, chap. 54). Georg Agricola, *De natura fossilium,* trans. Mark Chance Bandy and Jean A. Bandy (Geological Society of America, 1955), 118–39 (34 "transparent" gems, 139), 139–46 (9 vari-coloured opaque gems), 156 (pearl). Anselmus Boethius de Boodt, *Gemmarum et lapidum historia* (Hanover, 1609), 57–152 (38 transparent and opaque stones), 153, 161, 168 (coral, amber, agate). These last three stones Boodt did not formally consider to be precious (153), but many other early modern writers did consider them as such. Boodt's work was translated into French as Anselmus Boethius de Boodt, *Le parfaict joaillier*, trans. Jean Bachou, ed. André Toll (Lyon, 1644). The corresponding passages in this treatise are 143–385 (precious stones), 390, 413, 429 (coral, amber, agate), 389 (not precious). Pierre de Rosnel, *Mercure Indien*, vol. 1 (Paris, 1667), 11–31 (20 "pierres précieuses," as per p. 33), 33 (pearls), 46–58 (15 opaque stones), 60–5 (coral, crystal, amber). Argenville, *Oryctologie*, 42–4 (28 "pierres crystallines"), 44–5 (12 "pierres fines"), 67 (amber), 94 (pearl).
11. Pliny, *Natural History*, book 37, 207 and 209 (diamond), 213–25 (emerald); book 8, 101–25 (pearl); book 37, 261 and 263 (*cyanus*, the nearest equivalent in Pliny to sapphire). Agricola, *De natura fossilium*, 121–2 (diamond), 124–6 (emerald), 146–7 (pearl), 130 (*cyanus*). Boodt, *Historia*, 59–60 (diamond), 99–100 (emerald), 84–5 (pearl), 92 (sapphire); *Parfaict joaillier*, 149–52 (diamond), 248–51 (emerald), 213–5 (pearl), 232–3 (sapphire).
12. Alan G. Morton, *History of Botanical Science: An Account of the Development of Botany from Ancient Times to the Present Day* (London: Academic Press, 1981), 218 (introduced species). Ogilvie, *The Science of Describing*, 208 (known species).
13. Theophrastus, *De lapidibus*, ed. and trans. D. E. Eichholz (Oxford: Clarendon Press, 1965), 69–71, esp. 69 (translation from the Greek), 111–13 (Eichholz's commentary).
14. Pliny the Elder, *Natural History*, vol. 10, trans. D. E. Eichholz (Cambridge, MA: Harvard University Press, 1989), book 37, 180–1, 226–9.

15. Ibid., 327.
16. See above, note 10.
17. For this definition of "Asia" see Pliny the Elder, *Natural History*, vol. 2, trans. H. Rackham (Cambridge, MA: Harvard University Press, 1942), book 6, 4–5.
18. Pliny, *Natural History*, vol. 10, book 37, 195 and 199 (amber). Pliny, *Natural History*, vol. 8, trans. W. H. S. Jones (Cambridge: Harvard University Press, 1963), book 32, 477 (coral). For the six other gems Pliny either gave no data on their origin or did not say which varieties were the most valuable.
19. Albertus Magnus, *Albert Magnus' Book of Minerals*, trans. Dorothy Wyckoff (Oxford: Clarendon Press, 1967), 76.
20. This data is based on 34 species that each correspond to one of the sections in Magnus, *Book of Minerals*, 68–126. I have only counted stones that correspond to one or more of Pliny's 32 "principal gemstones." This includes stones (such as *adamas*) that share their name with one of Pliny's 32 gems, as well as stones (such as *turchois*) that Pliny did not name but that he probably had in mind when describing one or more of his 32 gems.
21. John Riddle, "Preface," in Marbode of Rennes, *Marbode of Rennes' (1035–1123): De lapidibus*, ed. John Riddle, trans. C. W. King (Wiesbaden: Steiner, 1977), ix–xii, on x.
22. Marbode, *De lapidibus*, 51, 53, 58.
23. As opposed to the East narrowly construed, for example, Asia Minor. This claim is based on a search for the strings of letters "asia" and "orien" in Pliny the Elder, *The Natural History*, ed. Karl Friedrich Theodor Mayhoff (1906), book 37, online edition at Perseus Digital Library, accessed August 24, 2016, http://www.perseus.tufts.edu/hopper.
24. Pliny, *Natural History*, book 37, 215, 251
25. Ibid, 207, 209. Pliny did not mention the locality of the two other kinds of *adamas*.
26. Pliny, *Natural history*, book 37, 239, 245, 251, 263. Cf. Theophrastus, *De lapidibus*, 67, 69, 71, and Eichholz's commentary at 36–7, 108–9, 113.
27. Albertus, *Book of Minerals*, 115. Text in brackets in Roman type is from Wyckoff's translation. Text in brackets in italics is from Albertus Magnus, *Liber mineralium* (Cologne, 1518), f. 30r.
28. Joan Evans and Paul Studer, *Anglo-Norman Lapidaries* (Paris: Champion, 1924), 140–1.
29. Quoted in Pierre Leroy, *Statuts et privilèges du corps des marchands Orfèvres-Joyailliers de la ville de Paris* (Paris, 1734), 133.
30. Frank Dawson Adams, *The Birth and Development of the Geological Sciences* (Baltimore, MD: The Williams & Wilkins Company, 1938), 155, 157.
31. Camillo Leonardi, *Speculum lapidum* (Venice, 1502), f. 27r (carnelian), 36v–37r (pearl), 43v–44r (topaz).

32. Leonardi described 279 stones altogether; I have counted as "gems" only those that correspond to one or more of Pliny's 32 gems.
33. Similar points hold for emerald. Georg Agricola, *De natura fossilium,* trans. Mark Chance Bandy and Jean A. Bandy (Geological Society of America, 1955), 121–2 (diamond), 124–6 (emerald). Cf. Pliny, *Natural History*, book 37, 207–9 (diamond), 213–25 (emerald). Sinkankas, *Gemology*, vol. 1, 9, notes Agricola's reliance on Pliny.
34. "Indian" gems at eg. Agricola and Bandy, *De natura fossilium*, 113, 114, 131, 147. I read Bandy's translation and noted all occurrences of "Indian," "Oriental," "Occidental," "Eastern," "Asian," "Western," and cognate English terms.
35. Ibid., 114 (European), 118–21 (rock crystal). Agricola, *De natural fossilium* (Basel, 1558), 273 (*europei*).
36. Girolamo Cardano, *The De Subtilitate of Girolamo Cardano*, trans. John Forrester (Arizona: Arizona Center for Medieval and Renaissance Studies, 2013), 361 (Oriental topaz), 382 (Oriental jasper), 386 (Oriental onyx), 395 (Oriental amethyst), 362, 363, 384, 403 (explanations), 372 (Peruvian emerald), 377 (rubies in Pegu).
37. Robert Halleux, "L'oeuvre Minéralogique d'Anselme Boèce de Boodt 1550–1632," *Histoire et Nature* 14 (1979): 63–78, on 63. Cf. Sinkankis, *Gemology*, vol. 1, 127–9.
38. Wlodzimierz Hubicki, "Boodt, Anselmus Boethius de," *Dictionary of Scientific Biography*, ed. Charles C. Gillispie (Detroit: Charles Scribners' Sons, 2008), vol. 2, 292–3.
39. For examples of such objects see *Rudolf II and Prague: The Court and the City*, ed. Fučíková, Eliška, James M. Bradburne, Beket Bukovinska, Jaroslava Hausenblasová, Lumomír Konečný, Ivan Muchka, and Michal Šroněk (London: Thames & Hudson, 1997), esp. the chapters by Rudolf Distelberger and Beket Bukovinksa.
40. Boodt, *Historia*, 13–15; *Parfaict joaillier*, 31–5.
41. Albertus, *Book of Minerals*, 26–35. Leonardi, *Speculum lapidum*, 8r–9r.
42. Boodt, *Historia,* 134, 137; *Parfaict joaillier*, 339, 347.
43. Boodt, *Historia*, 93; *Parfaict joaillier*, 232.
44. For example, Boodt, *Historia*, 75–6 (garnet), 92 (sapphire), 104–5 (topaz); *Parfaict joaillier*, 192–3 (garnet), 232 (sapphire), 266–7 (topaz).
45. For example, Boodt, *Historia*, 59 (diamond), 80 (hyacinth); *Parfaict joaillier*, 149–50 (diamond), 203–4 (hyacinth).
46. Boodt, *Historia*, 75–6 (garnet), 81 (amethyst), cf. 102 (prase), 129 (jasper), 130 (heliotrope); *Parfaict joaillier*, 192–3 (garnet), 205 (amethyst), cf. 258 (prase), 325 (jasper), 328 (heliotrope).
47. See the last three notes, and Boodt, *Historia*, 84 (pearls), 99 (emerald), 117 (asterie), 118 (sardony), 120 (sardonix), 121 (chalcedony), 125

(agate), 239 (lapis lazuli); Boodt, *Parfaict joaillier*, 211 (pearls), 249 (emerald), 290 (asterie), 294 (sardony), 299 (sardonix), 304 (chalcedony), 315 (agate), 351–2 (lapis lazuli).

48. Boodt, *Historia*, 59–60; *Parfaict joaillier*, 151.
49. Boodt often cited Nicolàs Monardes when he clearly meant Orta, an error which suggests he read Clusius' Latin translation of Orta's book. Cf. Adrian Toll, at *Parfaict joailler*, 148 note b, 159 note a; Valentina Ball's note in Jean-Baptiste Tavernier, *Travels in India*, ed. Valentine Ball (London: Macmillan, 1889), vol. 2, 434. Boodt correctly cited Orta on at least one occasion: *Historia*, 73; *Parfaict joaillier*, 185. Cf. below, notes 52 and 54.
50. Garcia da Orta, *Colóquios dos simples e drogas he cousas medicinais da Índia* (Goa, 1563), 161. For the identification of *malaqua* and *bisnaguer,* see Valentine Ball's notes Tavernier, *Travels in India*, vol. 2, 87, n1 (cf. 462–4) and 433, respectively. For *imadixa,* see Orta, *Colloquies*, 345 n1.
51. John Huyghen van Linschoten, *Voyage of John Huyghen van Linschoten to the East Indies*, trans. William Phillip, ed. Arthur C. Burnell (Cambridge, UK: Cambridge University Press, 1885), xviii–ix (maps), and P. A. Tiele, "Introduction," in *ibid*., xxiii–xlii, on xxxi–xxxiii (maps, including those of India and further India, ie. South East Asia), xl (Latin translations). Boodt, *Historia*, 74 (Linschoten cited on ballas ruby), 101 (and on emerald); *Parfaict joaillier*, 188 (ballas ruby), 256 (emerald). Cf. Linschoten, *Voyage*, vol. 2, 154 (emerald), 157 (ballas ruby).
52. Boodt, *Historia*, 72 (ruby names and localities), 75 (garnet), 80 (hyacinth), 83 and 84–5 (pearls), 92 (sapphire); *Parfaict joaillier*, 180 (ruby names), 181 (ruby localities), 191 (garnet), 203 (hyacinth), 210 and 213–4 (pearls), 232 (sapphire). Orta, *Colloquies*, 354 (garnet, hyacinth, sapphire), 361, cf 355 (ruby localities), 357 (ruby names), 296–8 (pearls). Cf. Linschoten, *Voyage*, vol. 2, 133–4 (pearls), and 140 (two ruby localities, Calecut and Bisnager, that Boodt mentioned but not Orta).
53. Boodt, *Historia*, 83–92 (pearls), esp. 84–5 (localities), 100 (emeralds); *Parfaict joaillier*, 210–27 (pearls), esp. 213–15 (localities), 250 (emeralds). Cf. José de Acosta, *Natural and Moral History of the Indies*, trans. Frances Lopéz-Morillas, ed. Jane E. Mangan (Durham, NC: Duke University Press, 2002), 193–5 (emeralds), 195–6 (pearls).
54. Orta, *Colloquies*, 360–1 (amethyst and beryl present, cat's eye from Ceylon, ruby from Bramaa). Garcia da Orta, *Aromatum, et simplicium aliquot medicamentorum apud Indos nascentium*, trans. Carolus Clusius (Antwerp, 1567), 203 (cat's eye, not ruby, from Bramaa), 192–209 (no beryl or amethyst in chapter on gems). Boodt, *Historia*, 126 (cat's eye from Bramaa), 81 (none of Orta's localities for amethyst), 107 (ditto for beryl); *Parfaict joaillier*, 291 (cat's eye), 199–200 (amethyst), 273 (beryl).

55. Walter D. Mignolo, "Introduction," in Acosta, *Natural History*, xvii–xxviii, on xxi.
56. Pliny, *Natural History*, book 37, 208 note c (adamas), 238 note e (carbunculi), 215 note f and 218 note b (smaragdus), 267 note d (chrysolitus). In Pliny's time there were indeed productive emerald mines in North East Africa, near the town of Qift in modern Egypt.
57. Boodt, *Historia*, 60 (diamond), 72 (ruby), 85 (pearls), 92 (sapphire); *Parfaict joaillier*, 151 (diamond), 181 (ruby), 213 (pearls), 232 (sapphire).
58. Above, note 53 (references to pearl in Boodt, Orta, Linschoten). Pliny, *Natural History*, vol. 3, book 9, 235. Albertus, *Liber mineralium*, 105.
59. Robert J. W. Evans, *Rudolf II and His World: A Study in Intellectual History, 1576–1612* (Clarendon Press, 1973), 217–8. Rudolf Distelberger, "Thoughts on Rudolfine Art in the 'Court Workshops' in Prague," in Eliška Fučíková et al., *Rudolf II and Prague*, 188–208, on 188–9.
60. See above, section 4.
61. Boodt, *Historia*, 125 (agate), 127 (jasper), 134 (turquoise), 162–3 (amber); *Parfaict joaillier*, 315 (agate), 320–1 (jasper), 339 (turquoise), 414–5 (amber)
62. Boodt, *Historia*, 77–8 (garnet), 121 (chalcedony), 239 (Armenian stone), 127 (jasper); *Parfaict joaillier*, 195–7 (garnet), 304 (chalcedony), 352 (Armenian stone), 321 (jasper).
63. I ignore the six Oriental gems for which Boodt listed no localities.
64. Orta, *Colloquies*, 297 (pearl). Linschoten, *Voyage*, vol. 2, 133 (pearls), 140 (emeralds), 154 (emeralds), 157 (pearls).
65. Anon., *Cousas de Petraria*, cited at Lane, *Colour of Paradise*, 101. Richard Hakluyt, *The Principal Navigations Voyages Traffiques and Discoveries of the English Nation* (Cambridge: Cambridge University Press, 1903 [1599]), vol. 5, 468, 501. Juan de Arfe y Villafane, *Quilatador de la plata, oro, y piedras* (Valladolid, 1572), 50.
66. Boodt, *Historia*, 59; *Parfaict joaillier*, 144. This technique for distinguishing diamonds was not mentioned by Pliny, *Natural History*, book 37, 207–11; Marbode, *De lapidibus*, 35–6; Albertus, *Liber mineralium*, 70–1; Leonardi, *Speculum lapidum*, f. 21r-v; Agricola, *De natura fossilium*, 121–2; Cardano, *De subtilitate*, 374–5. Boodt's source may have been the Italian goldsmith Benvenuto Cellini: compare Boodt's recipe for the mastic with the one at Benvenuto Cellini, *The Treatises of Benvenuto Cellini on Goldsmithing and Sculpture*, trans. C. R. Ashbee (New York: Dover Publications, 1967), 35–6, 41. Cellini does not refer to the diamonds that pass this test as "Oriental."
67. On the importance of hardness for sixteenth-century stone cutters, see Suzanne B. Butters, *The Triumph of Vulcan: Sculptors' Tools, Porphyry, and*

the Prince in Ducal Florence, 2 vols. (Florence: Leo S. Olschki, 1996), vol. 1, chap. 12, esp. 190, 198–9, 202–4, 207.

68. Boodt, *Historia*, 81 (amethyst), 99 (emerald), 105 (topaz), 112 (asterie), 118 (sardony), 121 (chalcedony), 139 (lapis lazuli); *Parfaict joaillier*, 200 (amethyst), 249 (emerald), 267 (topaz), 286 (asterie), 294 (sardony), 304 (chalcedony), 352 (lapis lazuli).
69. Argenville, *Lithologie et conchyliologie*, 53, cf. Argenville, *Oryctologie*, 180. Dutens, *Pierres précieuses*, 18. On Berquen, see Michael Bycroft, *Gems and the New Science: Craft, Commerce and Classification in Early Modern Europe* (unpublished monograph), chap. 3.
70. This trend was already underway in the sixteenth century, when Colombian emeralds were sold in India as "Oriental" and when it made sense to say that pearls from the East coast of India were "not so Oriental" (ie. not so valuable) as pearls from the Persian Gulf. Lane, *Colour of Paradise*, 101. Hakluyt, *Voyages*, vol. 5, 501.

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component of the name it shares with the onyx;[a] and as we make our way to this topic, we must describe the properties of all the other fiery red gemstones.

Red stones. Carbunculi.

XXV. The first rank among these is held by 'carbunculi,' so-called because of their fiery appearance,[b] although they are not affected by fire and are therefore sometimes known as 'acaustoe,' or 'incombustible' stones.[c] Two kinds of 'carbunculi' are the Indian and the Garamantic: the latter was called in Greek the Carthaginian because it was associated with the wealth of Great Carthage.[d] To these varieties are added the Ethiopian[e] and that of Alabanda, the latter being found, it is said, at Orthosia in Caria, but treated at Alabanda.[f] Furthermore, in each variety there are so-called 'male' and 'female' stones, of which the former are the more brilliant, while the latter have a weaker lustre.[g] Among the male stones, moreover, are to be observed some that are clearer than usual or of an unusually dark red glare, and some that shine from deep beneath their surface and blaze with exceptional brilliance in sunlight, while the best are the 'amethyst-coloured stones,'[h] namely those in which the fiery red shade passes at the edge into amethyst-violet, and the next best, known as 'Syrtitae,' or

From Alabanda are derived the terms 'almandine,' 'almandite.' Alabanda and Orthosia are roughly 40 and 60 miles E. of Miletus respectively. No garnets have been reported from this district in modern times, but the geological conditions are said to be favourable.

[g] As in the case of other precious stones, the 'male' is generally the more brilliant, and also the darker.

[h] Violet almandine, sometimes known as Syriam garnet, Syriam being a town in S. Burma.

'Stones of Syrtis,' have a bright feathery lustre.[a] All these stones are said to reveal themselves in ground where sunlight is reflected most powerfully. Satyrus asserts that Indian 'carbunculi' lack brilliance and look generally flawed, with a 'parched' lustre; and that the Ethiopian stones look greasy and shed no lustre at all, but burn with a fire that is compressed within them. Callistratus holds that a 'carbunculus' ought to cast a brilliant, colourless refulgence, so that when placed on a surface it enhances the lustre of other stones that are clouded at the edges, thanks to its own glowing brilliance. Hence many people call such a stone the white 'carbunculus,' and the kind that shines more faintly the 'lignyzon,' or 'murky' stone. Callistratus adds that Carthaginian 'carbunculi' are much smaller than others, and that the Indian stones can be hollowed into vessels holding as much as a pint. Archelaus writes that the Carthaginian stones have § 46. a somewhat swarthy appearance, but light up more intensely than the rest when they are viewed by firelight or sunlight, and at an angle. He mentions also that they appear purple indoors in shadow, and flame-red in the open air; that they sparkle when they are held against the sun, and that, when they are used as signets, they melt the wax, even in a very dark place. Many writers state that the Indian stones are brighter than the Carthaginian, and that conversely they become dull when viewed at an angle. They add that the male Carthaginian stones have a blazing star inside them,[b] while the female stones shed all their radiance externally; and that the 'carbunculi' of Alabanda are darker than the

rest, and rough. Around Miletus also, the earth produces stones of the same colour, which are not at all affected by fire.[a] Theophrastus assures us that ' carbunculi ' are found both at Orchomenos in Arcadia and in Chios, the former, of which mirrors are made, being the darker. According to him, there are variegated stones, interspersed with white spots, from Troezen, and likewise from Corinth,[b] although the white in these Corinthian stones is yellowish.[c] He mentions that ' carbunculi ' are imported also from Marseilles.[d] Bocchus writes that they are dug up too in the neighbourhood of Lisbon, but only with great difficulty, because the soil, which is clay, is baked hard by the sun. *de Lap.* 33. *de Lap.* 18; 34.

XXVI. Nothing is harder than the attempt to distinguish the varieties of this stone, so great is the scope that they afford for the exercise of cunning, when craftsmen force the opaque stones to become translucent by placing foil beneath them. The duller stones, it is said, when steeped in vinegar for fourteen days shine with a lustre that persists for as many months. ' Carbunculi ' are counterfeited very realistically in glass, but, as with other gems, the false ones can be detected on a grindstone, for their substance is softer and brittle. Artificial stones containing cores[e] are detected by using grindstones and scales, stones made of glass paste being less heavy. On occasion, moreover, they contain small globules which shine like silver.

XXVII. There is also a stone called ' anthracitis,' *Anthracitis.*

[e] Reading *centrosas* (sc. *gemmas*). Possibly to heighten the deception, some glass garnets were manufactured with internal flaws which would simulate characteristic inclusions of quartz.

plexion is cold and dry. It is an excellent Remedy in Peſtilential Fevers and Fluxes of the Belly. It helps Emoptoics, the Splenetick, and ſuch as are diſorder'd in the Stomach. It is very much adulterated, and there is ſcarce any true and genuine to be had, nor did I ever ſee any good.

Belocculus, is a white Stone, having a black Pupil. For its Beauty the *Syrians* put it in the Ornaments of the Sacrifices to the God *Belus*. It is ſaid to render the Bearer of it inviſible in a Field Battle.

Baſanites, or *Baſaltem*, is a Stone of an iron Colour, is found in *Egypt* and *Ethiopia*, and when bruiſed in Water emits a Saffron Colour.

Bronia, has the Likeneſs of the Head of a Shell; its Virtue is, to reſiſt Lightnings.

Balanites, is a Stone of two Species; the one is green, the other has the Colour of Braſs, with a flaming Vein running thro' the Middle of it.

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Carbuncle, and by ſome called *Anthrax*, brandiſhes its fiery Rays, of a Violet Colour, on every Side; and in the Dark appears like

like a fiery Coal. It is eſteemed the firſt among burning Gems, both for Colour, Beauty, and Price. There are Twelve Species of it. The nobler Sort are found in *Libia* among the *Troglodites*. It is not hurt by Fire, nor does it take the Colour of another Gem that is put to it, tho' other Gems receive from it. It is alſo Male and Female; in the Males, the Stars appear burning within them; but the Females throw out their Brightneſs; and ſome ſay that thoſe of *India*, are more valuable than the reſt. Altho' we have ſaid that there are twelve Species of the fiery Sort, yet we ſhall take Notice only of five of the moſt remarkable of them. The *Carbuncle* obtains the firſt Place, the *Ruby* follows; the *Balaſius* is likewiſe reckon'd of this Species; the *Rubith* is the ſame as the *Spinella*, and has the fourth Place; and the *Granate* is number'd among the laſt. The virtual Power of the *Carbuncle* is to drive away poiſonous and infectious Air, to repreſs Luxury, to give and preſerve the Health of the Body. It takes away vain Thoughts, reconciles Differences among Friends, and makes a mighty Increaſe of Proſperity.

Calcedonius, or *Calcedon*, as ſome call it, is of a pale Colour, but the Saphirine is the beſt;

Lodovico de Varthema[135] relates that the king of Pege[136] (a state in India) possesses Pyropos of such size and splendour that anyone who has set eyes on the king himself in darkness sees him shining with clear illumination, just as if he were illuminated by the Sun's rays. People have got used to calling the nobler kind of carbuncle "Pyropus"; there are three kinds of it—the best shines in the dark, which Albertus[137] bears witness that he has seen, so they call it "Pyropus."[138] Next to it comes one that, while being placed in a grand shiny-black vessel, shines in the dark when water is poured over it. The third kind is less valuable, and its light is only visible with illumination from elsewhere, such as daylight or candle-light. It is a property of carbuncle to stimulate the mind and make it lively; its colours benefit the spirits. However, its usefulness is not in evidence,[139] when the stone has been faulty or tiny, or its wearer whimsical,[140] as a boy is, or impeded by excessively great and serious anxieties, as princes and wise men are.

&454 Carchedonii[141] are carbuncles too, such as Germany produces, beautiful but soft, and consequently almost useless. They are ranked along with the "fluors"[142] because of their tenderness.[143] Theophrastus[144] thinks they come into being ἐκ συῤῥοῆς, that is, by a combining flow—some are of a watery colour, some the colour of an amethyst, some the colour of a hyacinth stone, some reddish, some are called carbuncles. It is a feature of all carbuncles that when chased[145]

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[135] Ludovicus Vartomanus Romanus (1465–1470), an Italian traveller in the Middle East and Asia whose account of his travels became celebrated. Scaliger (*Exercitatio* 131 [448]) regarded him as a "vir divinus." For full reference see Nenci, 609 n. 38 and the quotation there, which certainly refers to "pyropos" as jewels the king of Pege has, and that he shone in the dark, as Cardano reports here.

[136] Pegu in Burma, about 40 km NE of Rangoon.

[137] Albertus Magnus.

[138] Greek πυρωπός, "fiery red, shiny," for instance in Aeschylus, *Prometheus Bound*, 667.

[139] "latet."

[140] "inconstans."

[141] I.e. the "Carthaginian" stones. Pliny (*Nat. Hist.* 37. 104) says they were once exported to Carthage from mountains in which they were deposited by a "divine shower," and his Loeb translator (10: 249) calls them garnets.

[142] "fluores."

[143] Tender consistency; i.e. they melt easily.

[144] For reference to Agricola who attributes this to Theophrastus, see Nenci, 610 n. 40.

[145] "caelati"—a jewellers' process.

they carry off the wax[146] with them, which makes it wrong to engrave[147] them, especially because they lose that lively glint.

Opal is more beautiful than carbuncle. In the case of such a magnificent thing, to prevent your being unaware of its estimated value if you happen to find one, I shall add Pliny's words:[148] "Opal possesses the finer[149] fire of a carbuncle, the gleaming purple of an amethyst, the green sea[150] of an emerald, and all shining together in an unbelievable medley."[151] Some people have compared the colours of its pigments to the supreme evidence of lightning, to others the resemblance is to the burning flame of sulphur, or even that of a fire fed with oil.[152] Its size is a hazelnut's; Pliny recounts that the senator Nonius was proscribed by Antony on account of this stone.[153] Nothing, then, among the gemstones can be more beautiful. It is found in the island Ceylon[154] of the East Indies, with art lending a hand to nature, rather than its coming into existence like that on its own; such a variety of colour is produced by fire treatment, so it is said.[155]

But it seems to me to be a specific sort of stone, if it is the one that I now possess. Seven points identify it: the first is, as I said, that it glints with different mixed colours, such as green and gold, and red especially, which is not found in any other gemstone. But it also glints a great deal and glows. In the middle of its rounded surface[156] we can see a line &455 more glistening white than snow, but a small change in the viewpoint makes it hide, like many other things, and it is not to be seen anywhere. It is also a very heavy gemstone; though ours is shorter than a bean, and in no way larger, it still weighs two denarii — nearly fifty grains of corn.[157] This makes it a kind all on its own. It is not embellished by some

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[146] This wax was probably a coating on the jeweller's worktable, and some of it tended to attach to the gemstone, spoiling its appearance.

[147] "scalpere."

[148] Pliny, *Nat. Hist.* 37. 80.

[149] "tenuior"; the Loeb translator renders this word as "more subtle."

[150] "virens mare."

[151] "incredibilis mistura."

[152] The syntax of this sentence is unclear and the translation speculative.

[153] Pliny, *Nat. Hist.* 37. 81. Mark Antony (Marcus Antonius, ca. 83–32 B.C.) was in 43 B.C. made one of the three triumviri who were in control of the Roman republic, and subsequently was Cleopatra's lover. Antony proscribed Nonius, who fled, of all his wealth carrying out only the ring with this stone, valued at "two millions of sesterces."

[154] "Zeila." There is possible confusion with the port of the same name in Somalia, a little south of Djibouti, but here the place is clearly called an island in the East Indies. This sentence first appears in 1554.

[155] The following three paragraphs first appear in 1560.

[156] "convexitas."

[157] Evidence mentioned in Book II at 130 (1560) derived from information about the *French* grain indicates that it weighed about .056 grammes, and fits quite well evidence in Book VI at 411 (1560) derived from information about the scruple as equivalent

CHAPTER XI. ABOUT WHITE RUBIES AND CARBUNCLES.

I PROMISED to tell you something about the finest sort of rubies, but before doing this, I want you to know something about another sort of ruby, called the white ruby. This stone is white by nature, not by any heating process like the other stones mentioned above, & its whiteness may be likened to the chalcedony, the twin sister of the cornelian. The latter has a sort of unpleasing livid pallor, & for this reason is not used much.

I have oft found many such in the bellies of wild fowl, so also the loveliest turquoises. I used to be very fond of going out shooting. I made my own powder, and became such a rare fine shot, that I should be ready to stand any test you like. I always shot with the simple ball, & as for the powder, well, I'll talk of that in its right place, but it was quite different from the powder commonly used. In this wise did I use to march over the Roman Campagna, at the time when the birds of passage return, and in their bellies I found stones of all sorts, turquoises, white & coloured rubies, also emeralds, & every now and again a pearl. But, as I said, these white rubies are of very little use; only you know them for rubies because of their great hardness.

Of carbuncles: according to promise I'll tell you of these, & first of what I have seen with my own eyes. In the time of Pope Clement VII. there turned up a certain Raugeo, who was called Biagio di Bono. This man had a white carbuncle, similar to the white ruby mentioned above, but possessing so delightful a brilliance, that it shone in the dark, not so splendidly perhaps as the coloured carbuncles, but still so that when you put it into a very dark place it seemed as a glowing ember, and this did I see with my own eyes—but I must tell you in this connection an anecdote of a little old Roman gentleman—old, did I say?—nay, very old, for his grandson was one of my shop assistants. This man came often to my place, & always had lots of pretty things to chat about. One fine day we fell a-talking about gems, and the old gentleman spake thus: 'Once when I was a young man, I happed to be in the Piazza Colonna, and I saw one Jacopo Cola, a distant kinsman of mine, coming along; he was beaming all over, and he held out his closed fist to some friends who had been sitting on a bench hard by, and were just getting up. He spake thus to them: "What d'ye think, my friends? I've made a good day to-day, for I've found a little stone so beautiful that it is worth many scudi, and I found it in my vineyard, and I suppose it must have belonged to our ancestors, because as you know this vineyard lies beneath the great ruins

familiar to all of you. Well, when I was coming home from work, & had gone about 200 yards, I was prompted to make water. As I was doing this and looking towards the vineyard, I fancied I saw a spark glowing at the foot of one of my vines; it seemed to me a perfect age before I could finish what I was about. When I did, I'm blessed if I could find anything, however hard I tried; so I thought I'd go back again & have another look, and keep my eyes fixed upon it, so back I went the same way, and then all of a sudden out burst the spark again. Well, I kept looking & looking at it, till, see here! I found this,"—so saying he opened his fist and showed his treasure. While he had been talking, a Venetian ambassador, who was coming along on his mule with a few servants, had stopped to listen. After a bit this gentleman came up close, as if he wanted to hear all about this wonder of a fire being transformed into a stone; then, very politely accosting my poor kinsman, "Gentlemen," said he, "If I am not presuming upon you, or appear to be taking too great a liberty, might I beg of this gentleman to allow me to look at the beautiful stone that he says he found in his vineyard." At these words Cola opened his fist, which he had kept locked up tight, & said to the ambassador: "There he is, look at him as much as you like!" The Venetian gentleman, who was a man of perfect manners, continued with the politest language: "If I am not appearing too presumptuous," he said, "I would make so bold as to ask if you, sir, are disposed to part with the stone, & if so, at what you esteem its value?" The poor Roman, whose coat was somewhat frayed & out at elbows—a fact which had given the Venetian pluck to drive his bargain—said: "Well, it isn't exactly that I've got to sweat for my daily bread, but if you're ready to pay the stone's value, I don't mind obliging you. Look at him well now, and see if you like him. I shall require ten ducats of the Camera for him." The Venetian simpered satisfaction for a bit, & then spake in the fashion of those polished gentlemen, much more polished than your Roman, who, though they are examples to the world in glory, are not up to your consummate Venetian in speech—they can't *out* with it fast enough: "One favour only I beg of you; I never carry much money in my purse, may I entreat you to send the jewel to me by some trusty servant of yours, & I will give him what you have asked." The poor Roman, who knew no trustier friend than himself, said he would go along with him personally, and winking to one of his mates, to whom he had told all his adversity, he strode off with the ambassador, who dismounted & walked beside him. Then the Venetian, in order to prevent the latter from repenting of his bargain, began chatting in the most delicious manner, in a manner such as only your Venetian can, & enough to take any Roman's breath away. The one listened, enjoying these exquisite nothings, the other prattled along as hard as he could, the journey really seeming an eternity to him. At length he reached his house, and

putting his hand into a purse in which he had a great pile of ducats of the Camera, he spread them out with open hand before the astonished gaze of the poor Roman; the latter, who had gone many a long year without seeing the like of such, feasted his eyes on this delicious looking gold, & then put the jewel in the ambassador's hand. One, two, three, the latter counted out the ten ducats, shouted in haste to his servants that they should saddle his good horse, & taking out two more ducats, called out to the Roman, who was just going off: "Here, I say, these two gold ducats I give you over & above our bargain, to buy a rope to hang yourself with!" The proud Roman couldn't make out why he was thus spoken to; he fired up, & wanted to make for the ambassador, but our fine gentleman quickly mounted his horse, and sped away from Rome. Later on it transpired that he had had the jewel beautifully set, and gone off with it to Constantinople, where a new prince had ascended the throne. Owing to the rarity of the stone, he asked and received for it a fabulous sum, with which he afterwards betook himself again to Venice.' That is all I ever heard of this kind of carbuncle.

The 86. Chapter.

Of Rubies, Espinelles, Granades, Emeralds, and other precious stones.

Rubies are of manie sorts, but the best are those that are called Carbunckles, which are Rubies that waigh above 25. quilates, wherof there are verie few and seldome to be found. The best Rubies that are of the best colour and water are in India called Tockes, which are like Carbunckles, there are others called Ballax, which are of a lower price then the first, and they are red.[1] There are others called Espinellas, that are of colour like fire, and are lesse esteemed then the other two sortes, because they have not the right water of Rubies. There are Rubies also of manie other sorts, wherof some are white like Diamonds as I said before: other of a Carnation colour or much like white Cherries when they are ripe. There are Rubies found halfe white, halfe red, some halfe Rubies, halfe Safires, and a thousand such other sortes. The cause thereof is because that in the rockes and hils where they grow, their first colour is white, and by force of the Sunne, are in time brought to their perfection and ripenesse, and beeing perfect they are of colour red, like the Carbunckle and Tockes aforesaid, but wanting somewhat of their perfection, and being digged out before that time, they are of divers colours as I said before, and how much paler they are, and lesse red then the Tockes, so much are they less in valew: for[2] as they are in beautie and perfection, so are they esteemed every one in their kinde. Those that are halfe Rubies, and halfe Safires, which the Indians call Nilcandi, that is to say, halfe Safier, and halfe Rubie, proceed of this that the Rubies and Safiers grow alwaies in one rocke, whereby they

[1] Orig. Dutch: "reddish".
[2] Orig. Dutch: "however".

are oftentimes founde, halfe one, halfe other. The Rubies by the Arabians and Persians are called Iacut,[1] by the Indians Manica.[2] The Safiers are of two sortes, one of a darke blew, the other of a right[3] blew, the Iacinth, Granades, and Robasses are likewise certaine kinds of Rubies, but little esteemed, the Indians call them the yellow and carnation Rubies, and so foorth, according to their colour. These Iacinthes, Granadoes, and Robasses, are in so great numbers in Cananor, Calecut, and Cambaia, that they are to sell in everie Market, and corner of the streets, by whole corgias, each corgia having twentie peeces [at the least in it], they sell the corgia for one stiver or two at the most, as many as you will desire, but you must understand, they are of the smallest sort. The Safier is not of so great estimation as the Rubie, and yet is one of the most precious stones that are next the Diamond, and the Rubie: the Rubies, Safiers, and other stones aforesaid, doe grow and are found in rockes [and hilles] like Diamonds: they come out of Calecut, Cananor, and from manie places in the land of Bisnaga, but most out of the Island of Seylon, which are the best: but those of the Countrie of Pegu are esteemed the finest, whereof there is great store.

The Emerauldes which the Indians call Pache,[4] and the Arabians Samarrut,[5] there are none throughout al India, yet it is reported yt some have bin found there, but [verie] few & not often: but they are much brought thether from Cairo in Ægypt, and are likewise called Orientall: they are much esteemed in India, because there are but few of them. There are many also brought out of ye Spanish Indies, and carryed into the lande of Pegu, where they are much worne,[6] and

[1] Yâqût (Arab.).

[2] Cfr. Sanskrit, *māṇikya*; Tamil, *māṇikkam*.—[K.]

[3] Read: "light".

[4] Malayālam, "pačča", from the green colour *(pačča)*.—[K.]

[5] Zomorrad (Arab.), whence the European names—smaraude, smaragd, emeraude, emerald.

[6] Orig. Dutch: "ghesleten", *i.e.*, sold.

esteemed of, wherby many Venetians (that have travelled thether with Emeraldes and bartered them for Rubies) are become very rich, because among them men had rather have Emeraldes than Rubies: All the said stones are likewise used[1] in medicines, and Apoticarie drugges. Turqueses are found in great numbers in [the Countrey of] Persia, and[2] brought into India from [beyond] Ormus, by hundreth pounds at once, earth and altogether, which in India are little esteemed, for that the Indians and Portingals do not weare many of them, and make small account of them. The Iaspar[3] is much found in the land of Cambaia, but not much regarded: they make[4] dishes and cups thereof: it is of colour greene like the Emeralde. Chrisolites and Amatistes are many in the Island of Seylon, Cambaia, and Ballagatte, [and] the stone called Alakecca, [which] is also called Bloodstone, because it quickly stancheth blood, and other stones called Milke stones, which are good for women that give milke or sucke. These and such like stones are in great numbers found in Cambaia, and Ballagatte, and are brought to Goa, to bee solde, whereof they make Beades, Seales, Ringes, and a thousand such like curiosities: they are much esteemed, for that a seale of such a stone is worth two or three Pardaws the peece: there is also in Cambaia much Alambre, or[5] wherof they make many rings, beades, and such like things, which are much used: there are likewise stones, by the Portingalles called Olhos de Gato, that is to say, Cattes eyes, because they are like them (which is the Agat) and are of colour and fashion like Cattes eyes: they come out of Cambaia, but the best out of Seylon and Pegu: they are little brought into Portingal, for there they are not esteemed, and likewise

[1] Orig. Dutch: "much used".
[2] Orig. Dutch: (add) "some times".
[3] Orig. Dutch: "Jaspe".
[4] Orig. Dutch: (add) "in Cambaia".
[5] Orig. Dutch: "of barnsteen" (or amber).

because they are worth more in India then in Portingall, for the Indians esteeme much of them, specially the Chinos, and thether they are caryed, better esteemed, and sold there then any other stones: the Indians say that this stone hath a certaine propertie and vertue to preserve and keepe a man in the riches which he hath, and that they shall not lessen, but stil increase: the Loadstone, which the Portingalles call Pedra de Cevar is found in great quantity, and in many places of India, the Indians say, that if a man use dayly to eate a little of that stone, it preserveth him and maketh him look yong, and that he shall never looke olde: wherefore the Kinges and great Lordes of India use it in[1] pottes and vesselles, therein to [eate and] seeth their meate, thereby as they beleeve to preserve their youthes.

The 87. Chapter.

Of the Bezar stones, and other [stones good] against poyson.

The Bezar stone commeth out of Persia, from the land or Province called Carassone,[2] and also out of other places in India: they grow within the maw of a sheepe or Goat, about a little straw, that lyeth in the middle [of the maw], for by experience the straw is often found within them:[3] the stone is very slicke & smooth without, of a darke greene colour. These Goats [or sheepe] are by the Persians called Pazan, whereupon they call the stone Pazar,[4] and the Portin-

[1] Orig. Dutch: "use it for fabrication of".

[2] *I.e.*, Khorasan.

[3] This is De Orta's account of the origin of this biliary concretion. See f. 169*b* of his *Colloquios*.—[B.]

[4] This is a mistake. The name is originally Persian—*pādzahr*—which means "preservative from" *(pād)* or "expelling poison" *(zohr* or *zahir)*. The Arabs wrote this *bādizahr* or *bāzahr*, which is the source of the Spanish-Portuguese *bezar* or *bezoar*, from which it has been adopted in

CHAP. II.

Of the Carbuncle or Ruby.

Deſcription of the ſtone.

THe *Carbuncle* is a pretious ſtone or gemme, which for its innate glory containeth within it ſelf the reſemblance of a flame of fire.

The true *Carbuncle* or *Ruby* is a tranſparent jewell of the colour of pure vermilion or crimſon; by how much the more fiery it doth appear in its extremity, ſo much the better it is; if it have any yellowneſſe in it, it is of the kinds of *Granates*, or *Hyacinths:* from its excellent flame it is diſtinguiſhed from other gemms which have like repreſentations and reſemblances; a *Carbuncle* is nothing elſe but a great *Rubine*, and a great *Rubine* is thought worthy of the name of a *Carbuncle*; if a *Rubine* be found ſo bigge as that it may weigh twenty *Ceratia*, that is a drachme and a ſcruple, then may it worthily be called by the name of a *Carbuncle*. Ludovicus Vartomannus a Romane, reporteth that the king of Pege a city in India, had a *Carbuncle* of ſo great a magnitude and ſplendour, that by the clear light of it, he might in a dark place be ſeen, even as if the room or place had been illuſtrated by the ſunne beams.

Of its tincture or foyl.

THis though it be a very glorious ſtone and of excellent beauty, yet a foyl is uſed to it, as to all other gemms of tranſparency & perſpicuity. The foyl is either made of tinctured Maſtick, or of a dyed

dyed vitreous ſubſtance, or elſe a red gold foyl is uſed about it.

Of its Adulteration.

IT may be adulterated by a *Rubine* of a very dilute redneſſe, by putting a red gold foyl tincture, or colour under it, or by putting ſome ſplendent glaſſe dyed with a red colour under it; And thus without diligent caution it may be taken for a true jewell, and the rather becauſe all are helpt with a foyl. Another way of its adulteration is by a white *Saphire*, or a *Cryſtall*, or a *Topaz*, or an ordinary *Diamond*, with a red gold foyl placed under it, in its encloſing, either in ouch or ring. Another way they have of adulterating of it, and that is, by glewing two fair *Cryſtals* together with a little maſtick tinctured with a red or crimſon colour: In this manner I have ſeen two pieces of *Cryſtall* ſo glewed together, as that they being once ſet with a foyl, they could hardly be diſcerned from a true *Ruby*.

The adulteration of this gemm may be thus diſcovered, Firſt by the want of ſparkling and ſending forth of lively rayes. Then by bringing the gemm to the triall of the file. A true *Rubie* will endure the file; but a factitious ſtone, or a ſoft counterfeited adulterated ſtone will not. Another way of diſcerning the falſhood will be this: take the jewell you ſuſpect, and direct your eye from the verge or margine of its incloſure, through the gemm unto the oppoſite ſide of its encloſure; and if it conſiſt of two parts with a tinctured foyl betwixt, you will eaſily

eaſily perceive the upper part to be void of colour, from whence you may gather that it doth receive its glory from the foyl. Such Artificiall angles and corners will jewellers cut and excavate in the bottome of ſoft tranſparent ſtones (as I have ſeen) that by the manifold reflection of theſe lower *ſuperficies*, into every part of the uppermoſt *ſuperficies* of the jewell, a skilfull jeweller ſhall hardly perceive their craft.

There is an adulteration of the *Ruby* with boiled orpement, but theſe are fit for nothing elſe but ſtatues, of this mention is made in *Baptiſta Porta* in his *Magia. lib. de gem.*

Of its Names.

IN Hebrew ברקת *Barakath*, that is, *Carbunculus, vel Pyropus*, the Hebrew word cometh of the verb ברק *barak*, which ſignifieth *fulgurare*, and indeed this ſtone doth caſt forth the glory of its ſplendour and its ſparklings like lightning. Of the Greeks it is called ἄνθραξ from the ſplendour which it hath in its ſelf like unto a fire-coal: hence alſo in Latine it is called *Carbunculus:* it is alſo called *Pyropus*, from the Greek word πῦρ which ſignifieth fire, and *Apyrauſta, quod ignem ſentire non videatur.* In Latine, *Carbunculus.* In Germane, *ein Rubyn.* In Italian, *Un Rubino, Carbunculo.* In French, *eſcar boucle.* In Spaniſh, *el carvoncol piedra.* In Engliſh, *Carbuncle.*

The

The kinds of it.

THere are divers kinds of it as the *Rubine, Granat, Almandine, Red Hyacinth,* which all are to be ſhewed in order as followeth.

Of the places wherein they are found.

THe beſt of theſe are found in the Iſleland called Zeilan, ſome ſmall ones are found in *Coria, Calecut, Cambaya, Biſnager*; there are excellent ones found in the River *Pegu*, the inhabitants there try them with their mouths and tongues: the colder and harder they are, the better they are; they grow in a certain ſtony *matrix* of a roſie colour, which if it be tranſparent is called *Balaſium Rubinum*; for the moſt part it is found in the ſame mine where the *Saphire* is found: and according to the varietie of its nouriſhment it is found of a mixt colour. Hoc eſt, *Palatium.*

Boetius ſaith that Rodolphus the ſecond the Emperour had one of the bigneſſe of a ſmall hens egg. *Anſelm. Boetius. p. 72.*

Of its properties.

THis gemm which Ariſtotle calleth *Gnomonem, Sigillum,* and *Gemmarum regulam,* if it be great and very excellent, it doth emulate the bright ſhining of a flame of fire. It is of ſo great luſtre and of ſo excellent a ſplendour, that S. Epiphanius ſaith of it that if it be worn, whatever garments it be covered withall it cannot be hid; this ſpeaketh Andreas Baccius of S. Epiphanius in his book *de natura gemmarum,*

rum, in the chapter of the *Carbuncle*. It is reported of it by Baccius, Boetius, and others, that if it be worn in an *Amulet*, or drunk, it is good againſt poiſon, and againſt the plague, and to drive away ſadneſſe, evil thoughts, terrible dreams, and evil ſpirits. It is alſo ſaid of it, that it cheareth the mind, and keepeth the body in ſafety, and that if any danger be towards it, it will grow black and obſcure, and that being paſt, return to its former colour again.

Of its value and dignity.

THis is a gemme that in former times hath been eſteemed of very great worth and value for its ſacred uſe, in that it was commanded of God to be ſet in the ouches of the Breaſtplate of Judgement, as Exod. 28. 17. If it weigh two ſcruples which is the greateſt, (for ſeldome any of the excellent ones are found of greater magnitude then a filberd) becauſe of its gratefull colour with which it feedeth the ſight; and becauſe of thoſe glorious beams which it ſeemeth to dart forth of it ſelf, it is eſteemed of as great worth as the moſt excellent *Diamond*. If it be found in the weight of four *Ceratia*, that is, of ſixteen grains, it is of the ſame value with a *Diamond* which weigheth ſo many *Ceratia*.

The round ones which are of no exact form, are of the leaſt value.

Thoſe that are ſo big that they may be brought into Tablets, are of the greateſt value; according to the value and worth of the beſt *Diamonds*, ſo are theſe to be eſteemed and valued, if of equall proportion and weight.

CHAP.