

«AN EARTH BY ANY OTHER NAME»:
PRE-OTTOMAN SOURCES AND NAMES FOR LEMNIAN EARTH

I. Introduction¹

In 1480, emissaries of Sultan Mehmet II rediscovered Lemnian earth, a special clay from the island of Lemnos used in ancient times for its alexipharmic, medicinal, and pigmentary properties. Though the clay had fallen out of Greek medical manuals and doctors' use centuries earlier, the Ottomans dragged Lemnian earth back from the obscurity of classical medical encyclopedias and it was highly esteemed in the Ottoman pharmacopoeia against poison and plague for the next five hundred years. The medicinal earth, taken in the form of pastilles stamped with official seals, was called *tin-i makhtum* («sealed earth») by the Ottomans, and its fame and scarcity inspired a host of counterfeits and imitators.²

This paper examines the classical and postclassical sources treating Lemnian earth before the Ottomans, paying special attention to the terminology used to refer to it. A thorough examination of early sources on Lemnian earth offers us a window into the influence of ancient practices, both pagan and Christian, on the Ottomans. More generally, it presents a fine example of how an ancient pagan practice was carried forth *mutatis*

1. This article is an expanded version of a paper which I wrote for a seminar with Professor Heath W. Lowry at Princeton University in Spring 2004. I want to thank Prof. Lowry for his kind guidance and generous help, both in general and particularly for loaning me his copy of the rare Königsberg edition of Lubenau and for helping me with the Arabic translation of Galen.

2. Hasluck's article (1909-1910) talks about this at length, giving a list of earths which appeared all over Europe in the 150 years after the rediscovery of Lemnian earth. «They are known generically as "sealed earths", a local epithet being added, but most have no religious associations. The device of the seal is generally a coat of arms and the form of the tablet follows the Lemnian». He mentions the Bohemian, Strigonian (Hungarian), and Silesian earths (the last of which was used, like Lemnian earth, for plague in 1633), as well as various Italian earths. Hasluck talks about the earths of Malta and Bethlehem in particular detail, since they offer parallels to Lemnian earth (the Maltese earth for its alexipharmic properties, the earth of Bethlehem for its use among both Muslims and Christians). He also describes counterfeiting of Lemnian earth. F. W. Hasluck, «Terra Lemnia», *ABSA* 14 (1909-1910) 220-231, especially 227-230 (hereafter: *Terra Lemnia*).

mutandis into a Christian context, and then revived in response to contemporary concerns about poison and plague.

For purposes of comparison, this paper will examine the various pre-Ottoman texts on Lemnian earth in relation to one another, and will attempt to see what light these texts might shed both on the pre-Ottoman history of the earth and on its Ottoman revival. In particular, this inquiry narrows down to three questions:

- (1) What influence did Dioskorides and Galen have on later pre-Ottoman sources on Lemnian earth, and on its Ottoman rediscovery?
- (2) When and to what extent did the earth recede from actual use, regardless of its presence in literary pharmacopoeias?
- (3) How did the term *tin-i makhtum* («sealed earth») and calques thereof (such as *terra sphragis*) come to be the official terms for this product under the Ottomans?

Since no comprehensive listing of the pre-Ottoman sources on Lemnian earth exists in the secondary literature, I will go through the sources in chronological order, discussing aspects of the three guiding questions passim, before returning to address these three questions in summary. First, however, I present a brief overview of the secondary literature and travelers' accounts on Lemnian earth.

II. Secondary Literature and Travelers' Accounts

Though the Ottoman history of Lemnian earth is covered by a corpus of travelers' accounts covering the entire history of its Ottoman production, from 1485 to 1889,³ there has been relatively little scholarly work on the topic. Hasluck laid the foundation for modern research on Lemnian earth in a 1909-1910 article that was reprinted with additions in his *Christianity under the Ottomans*, which was prepared for publication posthumously in 1929 by his widow.⁴ Although Hasluck outlined the ancient provenance of Lemnian earth, the studies by Raby⁵ and Lowry⁶ focus on the Ottoman

3. Tozer, visiting Lemnos in 1890, notes, «Notwithstanding the long duration of this time-worn belief, it is evident from the neglect into which it has lately fallen, that ere long it will be a thing of the past». Henry Fanshawe Tozer, *The Islands of the Aegean*, Oxford, Clarendon Press, 1890, p. 265.

4. F. W. Hasluck, *Christianity and Islam under the Sultans*, ed. Margaret M. H. Hasluck, 2 vols., Oxford, Clarendon Press, 1929 (hereafter: *Christianity and Islam*).

5. Julian Raby, «Terra Lemnia and the Potteries of the Golden Horn», *ByzF* 21 (1995) 305-342.

6. Heath W. Lowry, «The Island of Limnos: A Case Study on the Continuity of Byzantine Forms under Ottoman Rule», in *Continuity and Change in Late Byzantine and Early Ottoman*

practice and concern themselves little with discussion of its classical origins.

The travel accounts mentioning Lemnian earth begin with Joos van Ghistele, who seems to confuse the elutriation pool with the actual source of the earth.⁷ The elutriation process is described in detail by Galen,⁸ and if van Ghistele did himself indeed see or hear about an elutriation pool, it suggests that Galen's text might have been used in the revival of the Lemnian earth. Lowry notes, however, that van Ghistele is questionable because of his appropriation of earlier written sources and because of his confusion on certain points of the extraction process.⁹

The first Ottoman self-description of Lemnian earth is in the first 1521 version of the *Kitab-i Bahriye*, the cartographer Piri Reis' navigational guide. Piri Reis was a native of Gallipoli on the Dardanelles, very close to Lemnos. His account, written less than forty years after Lemnos came back into Ottoman control through the 1479 peace treaty with Venice, clearly describes the Christian origins and associations of Lemnian earth. Lowry gives the text, which he notes was «unknown to Hasluck and underutilized by Raby», and I would add that details of Piri Reis' Christian etiology echo the pagan story of Philoktetes which Philostratus gave in his *Heroica* 1300 years earlier. In Piri Reis' account, the earth was created where Ferestin's holy tears fell, while in Philostratus, it is Philoktetes' companions who cry, and the earth was where Hephaestus had earlier fallen when thrown off of Olympus. Here is Piri Reis' account in full:¹⁰

This island [Ilimli] is a low, square-shaped island. The circumference of this island is 120 miles. In the history books [*tevarih* = works of Byzantine/Greek history] the following is said about this island: In the time of Jesus (Peace be upon him) a man called Ferestin, with the help of God, made this island his

Society, Anthony Bryer - Heath W. Lowry (ed.), Washington, D.C., Dumbarton Oaks Research Library and Collection, 1986, pp. 235-261. This article was followed by a chapter entitled «Was the Ottoman Interest in Limnos Linked to its being the Sole Source of *Terra Sigillata?*», in Heath W. Lowry, *Fifteenth Century Ottoman Realities: Christian Peasant Life on the Aegean Island of Limnos*, Istanbul, Eren, 2002, pp. 153-173 (hereafter: *Fifteenth Century*).

7. The *Voyage* of Joos van Ghistele, who visited Lemnos in 1485, cited in Hasluck, *Christianity and Islam*, op.cit. (note 4), p. 674.

8. *De Simplicium Medicamentorum Temperamentis ac Facultatibus*, Book 9, in Galen, *Opera Omnia*, Karl Gottlob Kühn (ed.), 20 vols., Leipzig, C. Knobloch, 1821-1833, 12.169-170.

9. Lowry, *Fifteenth Century*, op.cit. (note 6), pp. 156-157.

10. A description of Piri Reis' account and the translated text are reproduced and given by Lowry, who also notes that the later, better-known version of Piri Reis' work from 1530 shortens the mention of Lemnian earth to a mere sentence: «On [Limnos] they dig up and extract *tin-i-makhtoum* (*Terra sigillata*) on August 6th». August 6th is conveniently the Feast of the Transfiguration, and Lowry suggests that Lemnian earth was well known enough by 1530 that it only needed to be mentioned, not described in detail. Lowry, *Fifteenth Century*, op.cit. (note 6), p. 158.

home. Day and night he cried and wept because of his separation from his master Jesus. One day on the seventh of August he was totally overwhelmed with pain due to his separation from his master Jesus. As he wandered around the island out of his senses he came to a certain place and because he was gasping and weeping he came there from the spot where he was showing his endless stream of tears to this place. On the spot where his tears fell (following the advice of the praiseworthy and all-powerful God) the sealed earth appears. Each year when it comes to that day, the population, as many as there are, go before daybreak to that place. And as long as the day lasts they dig out the earth looking for the vein and take out the reddish clay which they find. They mix it with pure water and make a kind of gruel. After it becomes similar to *ayran* [yogurt mixed with water], they leave it at a designated place for a period of time. When the mud sinks down, the watery part that remains is taken and put into another pan until it separates. Then the water is poured away and what remains is put into sacks and they leave it to drip like yogurt. Out of this they make pills and leave it in the shade to get totally dry. They set it aside for the Government. What is left over from this process the local population uses. [The pills] are stamped and sent to the Imperial commissariat. The *çamur* [residue] brings fevers down and cures many maladies. It is something blessed/Holy (*mübarek*).

The French traveler Pierre Belon du Mans visited Lemnos in 1546, and discusses Lemnian earth. Belon gives the Latin names *terra lemnia* and *terra sigillata* and says that the seal used on pastilles of the earth «did not contain anything except the two words in Arabic *tin imachtou* [sic], which also means sealed earth».¹¹ Belon took special interest in Lemnian earth and describes the site and process of extraction (although he did not witness it himself, not being present on August 6th, the day of extraction), as well as the ancient history of the practice and the flurry of important activity accompanying it in his day. Sixty-five years after the earth's rediscovery, it was being counterfeited *en masse* (often falsified using *bolus armenus*, Armenian bole), supervised by the local Ottoman official (*soubashi*), and given as diplomatic gifts by the government.¹²

Reinhold Lubenau, a pharmacist and town councilor of Königsberg in Preußen (today Kaliningrad, Russia), visited Lemnos in 1588 and discussed

11. Pierre Belon, *Voyage au Levant: Les Observations de Pierre Belon du Mans de Plusieurs Singularités & Choses Mémorables, Trouvées en Grèce, Turquie, Judée, Egypte, Arabie & Autres Pays Étranges (1553)*, Alexandra Merle (ed.), Paris, Chandeigne, 2001, p. 109. Belon found 18 varieties of seal, for four types of the earth. He gives images of seals he found, which are reproduced in Raby, *op.cit.* (note 5), plate 1.

12. Belon, *op.cit.* (note 11), pp. 110-125. On the issue of syncretism, Belon, *ibid.*, p. 125, was impressed by the Ottoman willingness to witness and assist the Christian ceremonies and prayers surrounding the earth and notes, «The Turks are less scrupulous than the Greeks and many other nations are».

Lemnian earth in his diary. His account squares with Belon's, describing the *soubashi's* control over the process and the ubiquity of counterfeiting. Lubenau was fascinated by the antiquarian history of the earth, as well as by the Turks' eagerness to appropriate Christian ceremonies.¹³ This account shows that the practices surrounding Lemnian earth were fairly stable for the first hundred years after its rediscovery. After Lubenau, there were many other travelers to Lemnos,¹⁴ notably the Reverend John Covel, an Englishman who visited Lemnos on 27 April 1677.¹⁵ The Reverend Henry Fanshawe Tozer, visiting Lemnos in 1889, found the tradition of the earth's extraction almost dead.¹⁶

I will now turn to my survey of the primary pre-Ottoman textual sources on Lemnian earth, beginning with a table listing the names of the sources, their dates, the terminology they use for the earth, and the uses they give for it.

Fig. 1. Table of Primary Sources

Author, Work	Date	Terminology	Earth's Use
Theophrastus, <i>De Lapidibus</i>	315-305 B.C.	reddle (μίλτος)	pigment
Celsus, <i>De Medicina</i>	fl. 14 A.D.	[Discusses only Eretrian earth]	emollient, against sycosis
Vitruvius, <i>De Architectura</i>	bef. 68	reddle (<i>rubrica</i>)	pigment
Dioskorides, <i>Materia Medica</i>	fl. ca. 50-70	Λημνία γῆ, αἰγὸς σφραγίς	anti-poison, dysentery
Pliny, <i>Historia Naturalis</i>	after 79	<i>lemnia rubrica</i> , <i>sphragidem</i>	anti-poison, aphrodisiac, pigment
Galen, <i>De Simplicium Medicamentorum</i>	ca. 100-160	Λημνία γῆ, Λημνία σφραγίς, ἰερόν γῆ, Λημνία μίλτος	anti-poison, for wounds, emetic

13. Reinhold Lubenau, *Beschreibung der Reisen des Reinhold Lubenau*, W. Sahn (ed.), 2 vols., Königsberg in Preußen, Fred. Beyers Buchhandlung, 1912-1930, 2.156-164, Book 5, Chapters 12-14. Discussed in Lowry, *Fifteenth Century*, op.cit. (note 6), pp. 161-164.

14. For a survey of travellers to Lemnos, see V. Tourptsoglou-Stefanidou, *Ταξιδιωτικά και γεωγραφικά κείμενα για τη νήσο Λήμνο. Travellers' and Geographers' Texts on the Island of Lemnos (15th-20th Cent.)* [Annual of the Faculty of Technology IX, Supp. No. 33], Thessaloniki, University of Thessaloniki, 1986.

15. On Covel, see Raby, op.cit. (note 5), p. 310.

16. Tozer, op.cit. (note 3), pp. 263-265. For a discussion of Tozer, see Lowry, *Fifteenth Century*, op.cit. (note 6), pp. 169-170.

Philostratus, <i>Heroicus</i>	ca.170-240	βῶλος (bole)	anti-poison, arrow-wounds
Isidore of Seville, <i>Etymologiae</i>	d. 636	[Gives examples of other earths]	[pigment, medicine]
Paul of Aegina, <i>Epitomae Medicae</i>	fl. 642	μίλτος (though given under the lemma γῆ)	anti-parasitic, vomiting blood
<i>Traité d'alchimie syriaque et arabe</i>	7th-10th cent.	<i>tin makhtoum</i> , <i>makro</i> (reddle), <i>ar'o limnous</i>	pigment
<i>Suda</i>	10th cent.	[no earth mentioned as medicine or pigment]	[none given]
Bartholomeus Anglicus	14th cent.	<i>Terra sigillata</i>	«cold» and «dry»medicine
<i>Sinonoma Bartholomei</i>	1387	<i>Lempnias, terra sigillata</i>	yellow dye
<i>Alphita</i>	1465	<i>Lempnias, Lemnia fragilis, lemnia frigdos, terra sigillata</i>	«cold» and «dry»medicine; yellow dye
Amirtovlat', <i>Useless to the Ignorant</i>	1482	Terra Lemnia	medicine, anti- poison

III. The Earliest Sources

(1) Theophrastus, *De Lapidibus* (Περὶ Λιθῶν)

Written between 315 and 305 B.C.,¹⁷ Theophrastus' *De Lapidibus* («On Stones») contains the first mention of earth being dug on Lemnos. The *De Lapidibus* is not a medical text,¹⁸ however, and Lemnos is only mentioned as being a source of μίλτος (reddle) as part of chapter 8 of the *De Lapidibus*, which discusses pigmentary earths. Neither the seal nor any word for «earth» occur, though, so Theophrastus can not give any information on the question of the earth's later name. Theophrastus does, however, foreshadow the division of reddle into the same three grades which appear often in later sources on Lemnian earth: ἔστι δὲ αὐτῆς [μίλτου] γένη τρία, ἡ μὲν ἐρυθρὰ σφόδρα, ὁ δὲ ἔκλευκος, ἡ μέση. ταύτην αὐτάρκη καλοῦμεν διὰ τὸ μὴ

17. Theophrastus, *De Lapidibus*, ed. and trans. D. E. Eichholz, Oxford, Clarendon Press, 1965, p. 12.

18. Theophrastus, *ibid.*, p. 7, makes only one medical comment, noting that the stone «smaragdus» is «good for the eyes».

μίγνυσθαι, τὰς δ' ἑτέρας μίγνύουσι.¹⁹ In addition to attesting to the existence of three different grades of reddle in general, Theophrastus sets a precedent for Vitruvius' specific mention of Lemnos as a source of reddle.²⁰

(2) *Celsus, De Medicina*

Although he is silent on the specific topic of Lemnian earth, Celsus (fl. 14 A.D.) gives us an example of a parallel medical practice in the form of Eretrian earth. Eretrian earth comes up twice in Celsus' *On Medicine*, both in an external use. First, it is listed among the emollients,²¹ foreshadowing its topical use as an ulcer medication in Galen.²² The only specific use given for it is against a certain kind of ulcer called a «sycosis», to which it should be applied «liquefied with vinegar».²³ Paul of Aegina also recommends that Lemnian earth be applied topically for its drying virtues.²⁴ Celsus' text shows us that the use of medicinal earths was not a Lemnian innovation, and puts the practice in a greater classical context.

(3) *Vitruvius, De Architectura*

Like Theophrastus, Vitruvius' *On Architecture* refers to Lemnos only as source for a *rubrica* (reddle) used for coloring. Though Vitruvius' dating in the first century A.D. is a matter of some controversy,²⁵ the text nevertheless offers an interesting historical note on Lemnos' economic importance. It lists Lemnos among the sources for *rubrica*: *Lemno, cuius insulae vectigalia Atheniensibus senatus populusque Romanus concessit fruenda*.²⁶ Taxes on mining went to Rome, and it seems strange that Lemnos' revenues would be granted to Athens, the capital of the province of Achaëa, which was controlled directly by the Senate under Augustus' system of senatorial and imperial provinces. In giving this detail, Vitruvius gives an early example of

19. Theophr. *De Lap.* 8.53; Eichholz translates: «There are three kinds of reddle, one deep-red, one pale, and one medium, the last being termed 'self-sufficient', because, unlike the others, it does not need to be mixed with anything». Ibid. (note 17), pp. 76-77.

20. See section (3) below, on Vitruvius.

21. Aulus Cornelius Celsus, *Of Medicine, in Eight Books*, trans. James Greive, Edinburgh, Dickinson and Company, 1814, 192 (= Cels. 5.15).

22. *De Simplicium Medicamentorum*, Book 9, in Galen, op.cit. (note 8), 12.190.

23. Celsus, op.cit. (note 21), . 263 (= Cels. 6.3).

24. *Paul. Aeg.*, 8.3.

25. M. H. Morgan argued for a dating «in the time of Augustus», and H. L. Warren agrees, citing the mention of the kingdom of Cottius in *De Architectura* 8.3.21 as evidence for a dating before Nero, who destroyed that kingdom. Vitruvius, *The Ten Books on Architecture*, trans. M. H. Morgan - H. L. Warren, Cambridge, Massachusetts, Harvard UP, 1914, p. iv.

26. Vitruvius, *De Architectura*, Franciscus Semi (ed.), Pisa, Giardini, 1975, p. 208. Morgan, op.cit. (note 25), p. 214, translates «Lemnos, an island the enjoyment of whose revenues the Senate and Roman people granted to the Athenians».

the political importance of Lemnos' mining revenues, a subject suggested by Lowry as the reason for the Venetian and Ottoman interest in the island.²⁷

IV. Early Mentions of Lemnian Earth in Medical Sources

(4) *Dioskorides, Materia Medica* (Περὶ Ὑγιᾶς Ἱατρικῆς)

Dioskorides, active between 50 and 70 A.D., is our earliest source on Lemnian earth being used as a medicament. Hasluck says that Pliny the Elder is the earliest source, but the first ten books of Pliny's *Natural History* were published in 77 A.D., with the rest being published after his death in Pompeii in 79 A.D. Though Dioskorides and Pliny were almost contemporaries, their accounts show little evidence of a common source. Dioskorides gives a straightforward definition of Lemnian earth,²⁸ saying that it is dug out of a cave-like hollow, mixed with goat's blood, sealed with a seal with a goat on it, and called «goat's seal» because of this practice.²⁹ This shows that Lemnian earth was named by its seal from the very beginning of its medical use – though Dioskorides introduces the product as Lemnian earth, after describing the earth he notes that it is called by its seal. It is useful against arrowwounds, poisonous animal bites, and can be taken mixed in wine against poison as an emetic. The first two applications of these echo its use in the story of Philotektes by Philostratus, which I will discuss later. In this passage, Dioskorides sets the standard for the medical use of Lemnian earth both topically and internally, though his account will be expanded upon in later authors. Indeed, new uses for the earth crop up even in later manuscripts of his own text: a 1610 German translation follows the Greek text in Wellmann's critical edition in every respect, except that it prefers a reading (which Wellmann notes only occurs in a few manuscripts) at the end which notes that it is «also equally famed against red dysentery».³⁰

27. Lowry, *Fifteenth Century*, op.cit. (note 6), p. 153.

28. Dioskorides, *Materia Medica Libri Quinque*, Max Wellmann (ed.), 3 vols., Berlin 1906-1914, 3.67f (= Dsc. 5.97).

29. Berthelot suggests that the goat's blood account is «a story, owing to the analogy of color, attested both by the words "hematite" and "blood"». If the seal did indeed have a goat on it in early times, this seems like a reasonable inference to make on the part of Dioskorides or his contemporaries. M. Berthelot - Rubens Duval, *La Chimie Au Moyen Âge*, 3 vols., vol. 2, Osna-brück, Zeller, 1967, p. 8.

30. This and all other translations into English are mine except where otherwise indicated. «Etliche gebrauchen [sie] sich dieser Erden auch zu ihren Gottesdiensten / und wirdt gleichfalls auch wider die rohte Ruhr geruehmt». Dioskorides, *Kräuterbuch Pedacii Dioscordis Anazarbaei in Siben Sonderbare Bücher Vnderschieden*, trans. Joannes Datzius, München, K. Kölbl, 1968, p. 396. The mention of use in religious services is perhaps a reference to the ritual extraction of the earth.

(5) *Pliny, Historia Naturalis*

Pliny's *Natural History* (after 79 A.D.) introduces another use of Lemnian earth that plays an important role in its history up to the story of its re-discovery by agents of Mehmed II. In addition to the medicinal uses of the earth,³¹ he gives the first detailed discussion of its use as a pigment.³² Indeed, his primary term for the material is *Lemnia rubrica*, or «Lemnian reddle», though in his primary section on it, which is part of his book on earths, he says that it is also called «sealed» (*sphragidem*).³³ As a medicine, it included among the preparations against poisons, prepared into pastilles and taken with water. Though its main selling point is as an alexipharmic, Lemnian earth retains the same emollient nature which was present in Celsus' Eretrian earth, being effective against such inflammations and hemorrhages as spitting blood and excessive menstrual flow. Moreover, it is useful as an aphrodisiac if mixed with elephant's trunk, a use unparalleled in the rest of the literature.³⁴ Pliny also mentions a second grade of the earth, which is used as a pigment.

Finally, Pliny notes that Lemnian earth was greatly celebrated in antiquity (*multum antiquis celebrata*), though our earliest record of the earth's use in medicine (Dioskorides, 50-70 A.D.) is almost contemporary with Pliny. Though Hasluck says that we do not know how old the use of Lemnian earth is,³⁵ this passage from Pliny suggests that it was considered an ancient practice even in the first century A.D. The only other echoes of the earth's medical use before Dioskorides are Galen's mention of his having seen a book on Lemnos detailing the earth's uses and Philostratus' version of the myth of Philoktetes. No matter how old the medical use of Lemnian earth is, Pliny adds new information to the medical tradition that will continue to appear in the later accounts below.

(6) *Galen, De Simplicium Medicamentorum*

Galen (ca. 130-200) is our most extensive ancient source on Lemnian earth and, along with Dioskorides, the major source of information for the medical glossaries that perpetuate the knowledge of the earth. Galen himself, however, is explicitly linked to Dioskorides (whose story about goat's blood is

31. Pliny, *Histoire Naturelle*, 37 vols., Paris, Belles Lettres, 2003, pp. 50-51, 35.33.

32. Op.cit., 55, 39.104-105.

33. Op.cit., 50-51, 35.33.

34. The right side of the trunk, specifically, mixed with *Lemnia rubrica* and applied as a plaster. *Dextra pars proboscidis [elephantii] cum lemnia rubrica adalligata inpetus libidinum stimulat*. Op.cit., 28.87-88.

35. Hasluck, *Christianity and Islam*, op.cit. (note 4), p. 672.

greeted with laughter by the locals whom Galen meets)³⁶ and echoes some of the points made in Pliny.

Galen devotes a long passage in book nine of his *De Simplicium Medicamentorum* to the discussion of Lemnian and other sealed earths, and I would venture to say that it is from him that the use of the name *terra sigillata* or calques thereof for the first-grade medical earth arose. Galen refers to the earth in general as «Lemnian earth», but he calls the second-grade pigment Λημνία μίλτος (Lat. *Lemnia rubrica*), echoing Pliny, and to the first-grade medical stuff as Λημνία σφραγίς,³⁷ after both Pliny (who called it «*sphragis*») and Dioskorides (who called it «goat's seal»). It was necessary for Galen to specify what kind of sealed earth it was, because the Samian earth was also sealed.³⁸ This trend of using σφραγίς to refer to the medical earth will continue in the other medical encyclopedias discussed below. In accordance with the tendency to conflate a «brand name» with a generic product to make it more saleable, it makes sense that the «brand name» of σφραγίς would become conflated with the Lemnian earth in general, especially in a medical context. Raby is right in calling Galen the first to refer to the first grade of earth ἱερὰ γῆ, which only the priestess may handle, but Galen uses this term only in that specific instance.³⁹ It is not a generic term for Lemnian earth, as Raby implies: Λημνία σφραγίς is the usual term for the medicinal, first-grade earth in Galen.⁴⁰ Also misleading is that oftentimes Kühn, who published the standard edition of Galen's works between 1821 and 1833, often gives the Latin translation *terra Lemnia* where only the adjective Λημνία occurs as a substantive in the original Greek.⁴¹ The implied noun could be either γῆ, μίλτος, or σφραγίς, all of which are feminine in Greek. So, we see that even as early as Galen, Lemnian earth goes by many names depending on the context. In Galen, as in many pre-Ottoman and all post-Ottoman sources, σφραγίς and related terms dominate γῆ and μίλτος.⁴²

36. Galen, op.cit. (note 8), 12.173-74.

37. Op.cit., 12.170.

38. Op.cit., 12.179.

39. Raby, op.cit. (note 5) 308. The passage in Galen is from *De Simp.Med.*; Galen, op.cit. (note 8), 12.170.

40. Galen, op.cit. (note 8), 12.173, 175, 179, 180. *Lemnio sigillo* appears in the Latin, Λημνία σφραγιῶς in the Greek.

41. Ibid., 12.174, 175 (twice), 176. Still, Λημνία γῆ appears in full in the Greek on 176 (twice) and on 179.

42. Though Lemnian earth is explained and treated on at greatest length in book nine of *De Simplicium Medicamentorum*, it also appears in various other works of Galen as an ingredient in medicines and antidotes (*De methodo medendi*, *De compositione medicamentorum secundum locos*, and *De antidotis*; see the index volume in Kühn's 1821-1833 edition of Galen, op.cit.).

Galen actually visited Lemnos himself and describes the ceremony as an eye witness. This is unparalleled except by Zosimus, who also describes the ceremony in the first person, though his account seems almost like a translation of Galen's.⁴³ As such, Galen gives a detailed account of the earth's extraction. This is a subtopic I'm not going to analyze myself, as most of the other ancient sources used here do not concern themselves with the earth's origin, and since Hasluck and Raby deal with it at length.⁴⁴ I will, however, reprint sections of a 1929 translation of the passage from Galen which describes his visit to Lemnos:

Earth, as I have said, is the name commonly given by all Greeks to that soil which, when put into water, becomes at once liquefied and turns into mud. That kind used in agriculture has certain varieties, a fat and sticky kind being quite dark in color, while another kind, not fatty, but more friable, is called white clay [potter's earth], this having a whitish tint. These [two] are the extreme varieties, and the other earths are between them, approaching either the one or the other... Some varieties of earth are formed by a mixture of heterogeneous substances of a stony and sandy nature; this combination becomes broken up by moistening and stirring with plenty of water until the whole is thoroughly soaked; then, when this is allowed to stand, all the contained stony and sandy matter settles, while the genuine earth remains on the surface.

Much the same thing happens in the case of Lemnian earth, which some call Lemnian *μίλτος* [reddle, Lat. *rubrica*], and others *Λημνία σφραγίς* (Lemnian Seal), owing to the holy seal of Artemis being stamped upon it. The priestess collects this, to the accompaniment of some local ceremony, no animals being sacrificed, but wheat and barley being given back to the land in exchange. She then takes it to the city, mixes it with water so as to make moist mud, shakes this violently and then allows it to stand. Thereafter she removes first the superficial water, and next the fatty part of the earth below this, leaving only the stony and sandy part at the bottom, which is useless. She now dries the fatty mud until it reaches the consistency of soft wax; of this she takes small portions and imprints upon them the seal of Artemis; then again she dries these in the shade till they are absolutely free from moisture.

This then becomes what all physicians know as the Lemnian Seal, being so named, as I say, by some on account of having the seal stamped on it, just as by others it is called Lemnian reddle (*μίλτος*) from its color; for its color is the same as that of reddle, although it differs from this in not leaving a stain when handled. It is also like the hills of Lemnos, which are entirely tawny in color, and on which there is neither tree nor rock nor plant, but only this kind of earth.

The words *γῆ* and *μίλτος* do appear in conjunction with *Λημνία*, but *σφραγίς* is still the most common. This tendency in terminology also appears in various references to Lemnian earth in the medical works of Oribasius, who relied heavily on Galen, in the fourth century A.D.

43. On Zosimus, see section (10) below.

44. Hasluck, *Christianity and Islam*, 672ff.; Raby, *op.cit.* (note 5), 307ff, 338ff, and *passim*.

Three varieties of it are found. One is the above-mentioned sacred earth, which nobody touches but the priestess. A second kind is the real reddle (*μύλτος*), mainly used by builders. The third is that which removes dirt, and which can be used, if desired, by those who wash linen and clothes.

Now, I had once read in the works of Dioskorides and others that the Lemnian earth is mixed with goats' blood, and that it is out of the mud resulting from this mixture that the so-called Lemnian seals are moulded and stamped. Hence I conceived a great desire to see for myself the process of mixture. So, as I had traveled to Cyprus in order to visit the mines there, and also to Coelo-Syria, a part of Palestine, to find bitumen and some other things worthy of observation, similarly I was in no way averse to sailing also to Lemnos in order to see in what proportion blood was mixed with the earth... (Galen here describes his sea voyage to the island of Lemnos.)

Now, taking the island of Lemnos as a whole, Hephaestias lies to the east, and Myrina to the west. As to what the poet said about Hephaestus, that he fell in Lemnos, it seems to me that the fable refers to the nature of the hill, which has every appearance of having been burned, both from its colour, and from the fact that nothing grows on it.

This, then was the hill to which, at the time I disembarked, the priestess came. She threw a certain quantity of wheat and barley on the ground, and did some other things in accordance with local ritual, then filled a whole wagon with earth. This she took into the town, as I have just said, and from it prepared the far-famed Lemnian seals.

I thought well then to inquire whether there was no tradition of goats' blood being mixed with the earth. All who heard this question of mine laughed, and they were not more chance individuals, but people well informed about the whole history of the locality, as well as in other matters. In fact, I got a book from one of them, written by a former native, in which all the uses of the Lemnian earth were set forth. Therefore I had no hesitation myself in testing the medicine, and I took away twenty thousand seals.

The man who gave me the book, and who was counted among the leading citizens of Hephaestias, used the medicine himself for many purposes: thus for old-standing wounds that were slow to heal, for viper bites and animal bites in general; he also used the seal for poisons, both in prevention and cure. He said that he had also tried a juniper preparation to which some Lemnian earth is added; this causes vomiting if drunk while the poison is still in the stomach. As a matter of fact, I have also myself had the experience of this in cases of poisoning by sea-hare and cantharides; when patients suspected they had taken something of the kind and were immediately made to vomit by the Lemnian seal preparation, they thereafter felt none of the symptoms that follow ingestion of hare or cantharis, although the taking of these poisons had been proved. I am not, however, certain whether the mixture of juniper and Lemnian seal has also the same potency against the other poisons which are called *deleteria*.

In any case the citizen of Hephaestias went so far as to declare that it would even cure the bite of a mad dog, if taken mixed with wine, or applied to the wound with very sour vinegar. In fact he said that, mixed with vinegar, it

was also a cure for the bites of other animals, if over it were applied the leaves of such plants as, we are taught, resist putrefaction. He especially advocated water-germander (σκόρδιον), then slender centaury, and next horehound (πράσιον). Indeed, whenever I have used Lemnian earth in malignant and putrid ulcers it has proved of great value; its use is here determined by the size of the ulcerating surface. If this be fetid, and very boggy and foul, it is checked by Lemnian seal dissolved in very sour vinegar, and brought to the consistence of mud, like these pastilles (τροχιχοις) which are made in various ways. I mean those of Polyeides, Pasio, and Andro, and that just mentioned which is called Betinian. All these have a powerfully desiccative action and also help malignant ulcers; they are dissolved either in sweet wine, boiled wine, mead, or one of the white, tawny, or yellow wines, as required (these will be distinguished in another book). Similarly they are sometimes dissolved in vinegar, or in wine, water, vinegar-and-honey (ὄξυμέλιτος), sour wine and water, and honey-mixture. The Lemnian earth dissolved in any of the above makes a suitable application to promote the closure of recent wounds, and to cure those which are chronic, slow to cicatrise, or malignant.

And similarly with every other medicinal earth. For just as I have already distinguished from the elemental earth, which contained stones, that which was dissolved into mud, so now it will be necessary to distinguish medicinal earth from that used in agriculture. There could be no greater mistake than to give this latter name to that which we use in medicine, although the fatty part even of agricultural soil is useful in the treatment of all parts needing desiccative treatment; hence many people in Alexandria and Egypt employ it of their own accord, and many also in consequence of dreams. Thus I have seen people in Alexandria who suffered from dropsy and splenic trouble use the mud of Egyptian earth. Many also who have used the mud of this earth for their legs, thighs, upper and lower arms, backs, ribs, and breasts, got obvious relief. Similarly, this mud helps chronic inflammations and flabby swellings; thus I have seen some people who had become swollen all over through immoderately bleeding piles derive marked benefit from this. Others who had chronic, persistent pains in some part have been perfectly cured. For every earth has a drying action, its body being naturally dry, and when it is entirely free from fiery essence it dries without burning; this action is also promoted by a preliminary washing [of the earth].⁴⁵

In the ninth century, Galen was translated into Arabic by Hunain ibn-Ishaq. Though the manuscripts of many of his translations remain unpublished, in 2002 Manfred Ullmann published a Greek-Arabic dictionary of ninth-century Galenic translations by reconstructing Greek lemmas from the Arabic texts. His entries for σφραγίς and μίλτος are pertinent to the history of the Turkish term *tin-i makhtoum*: Λημνίαν μίλτον is called *muğra limnin*, and

45. Galen, *De Simplicibus Medicamentorum*, 9.2, in Galen, op.cit. (note 8), 12.168-178. Extracted from the translation in Arthur John Brock, *Greek Medicine, Being Extracts Illustrative of Medical Writers from Hippocrates to Galen*, New York, E. P. Dutton, 1929, pp. 192-195.

Λημνία σφραγίς becomes (in the plural) *limiye khatim*.⁴⁶ *Muğra*, meaning «reddish» in Arabic, seems related to the Syriac term *makro* for «reddle». ⁴⁷ This links the Syriac and Arabic sources. The phrase *limiye khatim* («Lemnian seals») is also linked both to *tin-i makhtoum* and to the Syriac source, as well as to a later Italian gloss on the Arabic Galen. From the Arabic word *khatim* one can derive the Syriac root *ktm* (*kaph-taw-mim*) for «to seal, to make a mark on», linking this Arabic translation of Galen and the Syriac term *tin makhtoum*. The spelling *limiye* (with an «n» missing) links this Arabic translation to a similarly defective spelling of «Lemnian» in the Syriac source, as well as to the spelling «*lima fragis*» by the Italian Mattheus Silvaticus in his late medieval gloss on Galen.⁴⁸

(7) *Philostratus*, Ἡρωϊκός («*Heroicus*»)

Our next source after Galen, Philostratus (ca. 170-240), includes an etiological myth about Lemnian earth in his *Heroicus*, which hints at its medical applications.⁴⁹ Philostratus himself was from Lemnos, so he might have known the story from his childhood. The medicinal uses he lists harken back to those given by Dioskorides, but it is impossible to know whether their mythological underpinnings preceded the former account or whether they came later as an explanation. Philostratus says of the earth, «[i]t drives away diseases that cause madness and stanches bleeding, but the only snake bite it heals is that of the water snake». Though Pliny says specifically that it is useful for both land and water snakes,⁵⁰ this variation might be either a shift in its usage, a local belief, or even just a sophistic joke of changing a small element of the story. As terminology goes, the earth is only named once, with a usage unique for Lemnian earth in the entire corpus – Philostratus calls it βῶλος («bole»),⁵¹ the same word used for Armenian bole in Galen.⁵² This may be a local way of referring to the earth, or it could just be a recondite synonym for the more usual γῆ («earth»). This is interesting,

46. Manfred Ullmann, *Wörterbuch zu den Griechisch-Arabischen Übersetzungen des 9. Jahrhunderts* (Wiesbaden: Harrassowitz, 2002), 422, 663. Both entries are from Galen's *De Simp. Med.*, Book IX: the passage, the translation of which appears above.

47. For a discussion of the Syriac terms, see section (10) below on the *Traité d'alchimie syriaque et arabe*.

48. *Anecdota Oxoniensa*, J. L. G. Mowat (ed.), 2 parts in 1 vol., Oxford, Clarendon Press, 1882, 1887, 2.219. Also, see sections (11)-(13) below on the late medieval glossaries.

49. Philostratus, *Heroikos*, trans. Jennifer K. Berenson Maclean and Ellen Bradshaw Aitken, Atlanta, GA, Society of Biblical Literature, 2001, 44-46, section 28.

50. Pliny, *Histoire Naturelle*, 51, 35.34.

51. Flavius Philostratus, *Opera*, ed. C. L. Kayser, 2 vols., Leipzig, Teubner, 1870, 1.171-172.

52. *De Simplicium Medicamentorum* in Galen, *Opera*, 12.191.

because the Arabic word is «*tin-i*», related to the Syriac «*tino*» which is used six hundred years after Philostratus to refer to the earth. There is a perfectly common Syriac word, «*ar'o*», which is used for «land, earth», but in reference to Lemnian earth it is generally eschewed in favor of «*tino*». ⁵³ Perhaps the Arabic «*tin-i makbtum*» is a calque on a more local way of calling the earth by the word «bole» (as seen in Philostratus) rather than a calque on «terra».

V. Decline and Oblivion

(8) Isidore of Seville, *Etymologiae*

Isidore of Seville (d. 636)'s *Etymologiae* («Etymologies»), also known as the *Origines*, is both an etymological dictionary and a general encyclopedia. Its author, an important archbishop of Seville in Spain, arranged his explanations under topical headings and treated on all aspects of philosophy, including linguistics, arithmetic, music, political theory, theology, and natural philosophy (science and medicine). Isidore's works stood for centuries as repositories of Roman and Classical learning ⁵⁴ and a 1966 survey of manuscripts of the *Etymologiae* lists 967 copies scattered throughout Europe. ⁵⁵

Isidore does not refer to Lemnian earth at all, though his *Etymologiae* does mention a medicinal earth and does talk about the varieties of *rubricae*. Book IV of the *Etymologiae*, which discusses medicine, is rather short and focuses on the defining the aspects of medical science in general rather than discussing the treatment of specific ailments. Thus, it is no surprise that there is no mention of medicinal earth in that book at all. The only hint of earth being used as a medicament is in Isidore's description of the various kinds of earth (which does not mention Lemnian earth), when Samian earth is said to be «from the Island of Samos, viscous and white and soft to the tongue, a thing essential for [making] medicine and vessels». ⁵⁶ This white earth is not

53. On the Syriac terms, see section (10) below.

54. «Isidore of Seville was the principal intermediary between the Roman world and the German nations which had invaded the Empire: it was he who introduced them to the scientific and grammatical knowledge of Greece and Rome, knowledge which remained the basis of erudition in the Middle Ages up to the 12th century». J. Tardif, quoted (my translation) in Paul Séjourné, *Dernier Père de l'Église, Saint Isidore de Séville; Son Rôle dans l'Histoire du Droit Canonique*, Paris, Gabriel Beauchesne, 1929, p. 7.

55. José María Fernández Catón, *Las Etimologías en la Tradición Manuscrita Medieval*, León: Centro de Estudios e Investigaciones Científicas «San Isidro», 1966, p. 278.

56. *Terra Samia a Samo insula dicta, glutinosa et candida et linguae lenis, medicamentis et vasculis necessaria*. Isidore of Seville, *Etymologiarum sive Originum, Libri XX*, Wallace Martin Lindsay (ed.), 2 vols., Oxford, Clarendon Press, 1911, 16.1.7.

connected to the red Lemnian earth; the only mention of *rubrica* by Isidore is in his discussion of pigments: «It is called *rubrica* because it is red and [looks] like blood. This [*rubrica*] is found in many places, but the best [is found] in the Pontus – for this reason [this *rubrica*] it is called “Pontic”»,⁵⁷

The *Etymologiae* might omit Lemnian earth either because it had already fallen out of Isidore’s source material, or because Isidore chose not to include a defunct item in his book. The former is unlikely, since he cites Pliny’s *Natural History* six times,⁵⁸ and the list of pigments in which Isidore discusses *rubrica* might be based on Theophrastus’, Vitruvius’, or Pliny’s list of pigments. It seems that Isidore, who summarized a great deal of material for his *Etymologiae*, consciously chose to leave out Lemnian earth because it was no longer in use in the seventh century.

(9) *Paul of Aegina, Ἰατροῦ Ἀρίστου («Epitomae Medicae»)*

Paul of Aegina (fl. 642) shows that Lemnian earth was still included in Byzantine medical encyclopedias as late as the seventh century. The entry under γῆ («earth») in his encyclopedic *Epitomae Medicae* contains two brief references to Lemnian earth, both saying that it is inferior to another kind of earth.⁵⁹ In both cases, he just uses the adjective «Lemnian» substantively. In the first case he says, «the Sinopean *rubrica* (μίλτος) is much more effective than the Lemnian» in getting rid of [parasitic] worms and «the Samian is much more relieving than the Lemnian» for spitting up blood (a use for Lemnian earth given by Pliny).⁶⁰ While this reference adds little to the story of how Lemnian earth is named (both adjectives depend on the same instance of the word μίλτος as an antecedent), it does show that the use of Lemnian earth might well have been diminishing in the Byzantine world by this time. Isidore’s sole mention of medicinal earth refers only to Samian earth: perhaps Samian earth had supplanted Lemnian earth by the seventh century, and Paul of Aegina only mentions the Lemnian because of his also being in the Aegean. Finally, the use of the term μίλτος (along with reference to Armenian βῶλος) in an entry on γῆ underscores how easily these terms are associated and conflated with one another.

57. *Rubrica vocata quod sit rubra et sanguineo proxima. Haec plurimis locis gignitur, sed optima Ponto; unde et Pontica dicitur.* Ibid., XIX. xvii. 4.

58. All from Book XII of Pliny’s *Natural History*, which is on the subject of animals. See the index of *Loci Citati* in W. M. Lindsay’s edition of Isidore, op.cit. (note 56).

59. Aegineta, *Paulus Aegineta*, II.203-204, vii.3.

60. Pliny says that Lemnian earth should be «given as a drink with vinegar to those who are vomiting blood». (*sanguinem reicientibus ex aceto datur bibenda*) Pliny, *Histoire Naturelle*, 29.37.

(10) *Traité d'alchimie syriaque et arabe*

The *Traité d'alchimie syriaque et arabe* is a Syriac source which comes from some time between the 7th and the 10th century.⁶¹ It contains, among other things, a pharmacopoeia and a description of Zosimus' visit to Lemnos in the first person.⁶² Berthelot, who edited, translated, and published the text in 1893, wrote an article in 1895 where he asserts that Zosimus' voyage in the first person is a straight translation of Galen.⁶³

Even so, this is a significant text. First, it gives an example of Galen's work on Lemnian earth being translated and transmitted through the early Islamic world. It also gives us a window into the origins of the term «*tin-i makhtoum*». That very phrase occurs twice in the index of signs near the beginning of the treatise in the Syriac form «*tin makhtoum*»: once just next to the sign for «vermillion» and once next to Lemnian earth.⁶⁴ The word «*makro*» (*minium*, «red pigment»)⁶⁵ also appears closely linked with Lemnos – indeed, the only place where the word «Lemnos» appears in the symbol index is as part of the entry on «*makro*». The Syriac «*makro*» is also likely related to the Arabic «*muğra*», which was used to translate μίλτος.⁶⁶ The earth also comes up again in the description of the first of a list of seven earths, modeled on a list given by Dioskorides.⁶⁷ This time, however, the term used is not «*tin*» but «*ar'o*», the usual Syriac word for «earth». Interestingly, «Lemnos» is spelled differently: «*limnous*» rather than «*limis*», which was the spelling in the symbol index earlier in the book. The two varieties of the earth are described, the first being red and the second being

61. Berthelot - Duval, op.cit. (note 29), 2.v.

62. Op.cit., 2.210-266.

63. «It is there [in the description of the earth's extraction] that the author speaks of his voyages to Coelo-Syria, Rome, Thrace, the Troad, and the islands of the Aegean. The author speaks in the first person. Taking this text at its word, it would seem, then, that Zosimus, famous from his other works as a learned Greco-Egyptian, had traveled [to these places]. No mention of these voyages figures, however, in the works already known of this author [Zosimus]» M. Berthelot, «Sur les Voyages de Galien et de Zosime», *JS* (1895) 385.

64. Berthelot - Duval, op.cit. (note 29), 2.4 (lns. 4, 10), trans. 2.8-9. The instance of *makhtoum* in line 4 has a *teth* instead of a *taw*: the correct root is *kaph-taw-mim*, not *kaph-teth-mim*. Line 11 also uses the word *tin* in the phrase «*tin armeni*» to refer to Armenian bole.

65. R. Payne Smith - Jessie Payne Smith Margoliouth, *A Compendious Syriac Dictionary, Founded upon the Thesaurus Syriacus of R. Payne Smith, D. D.*, Oxford, Clarendon Press, 1903, ad loc.

66. The similarity of the Syriac and Arabic terms bespeaks their relation: the *ğayn* of Arabic *muğra* could easily be mixed up with the *kaph* of Syriac *makro*. While the Arabic «*muğra*» has a general meaning of «reddish», the Syriac term «*makro*» refers specifically to pigmentary red, and has no other related words in Syriac.

67. Berthelot - Duval, op.cit. (note 29), 2.7 (ln. 18), trans. 14. The actual listing of the earth appears in the Syriac text on p. 8, ln 4.

yellow. The first variety is said to be marked «*Limni*» («*tbe limni*», lit. «they seal [it] “Limni”»), though this is a different verb from that used in the phrase «*tin makhtoum*». I cannot say what significance this might have other than that perhaps «*tin makhtoum*» is an ossified phrase or a calque on Arabic and «*tbe limni*» is a description of the act of sealing.⁶⁸ This Syriac source is a very interesting one, which captures part of the early history of the transmission of knowledge of Lemnian earth in the Arab world.

(11) *Suda*

The *Suda*, the great 10th-century Byzantine encyclopedia, gives no mention to Lemnian earth at all, though it does include many other medicinal terms. It even gives various other idioms involving Lemnos,⁶⁹ but nothing at all about the earth. There is also nothing about medicinal earth, Lemnian or otherwise, under the entry for σφραγίς.⁷⁰ This is especially odd, because Lemnian earth is mentioned in Philostratus and the *Suda* is diligent about giving literary references (most of the entry on σφραγίς is spent discussing the σφραγιδο-νοχαρογοκομητάς, a comic character from Aristophanes' *Clouds*). Maybe the Philostratus reference was just too obscure, or perhaps he was too late in the corpus for the *Suda*'s taste. In either case, by the 10th-century it seems that Lemnian earth was not on the mind of the Byzantine encyclopedist.

VI. *Faint Traces: Late Medieval English Medical Glossaries*

The end of the trail of pre-Ottoman sources on Lemnian earth finally resurfaces in a seemingly unlikely spot: 13th through 15th-century England. There are no less than three such glossaries which have entries on Lemnian earth. The last two, the *Alphita* and the *Sinonoma Bartholomei*, comprise the two parts of a single volume of the *Anecdota Oxoniensia*. Tozer cites this

68. Indeed, the verb *ktam* (root *kaph-taw-mim*) does not fit the meaning «to seal» as well as *tba* (root *teth-beth-ayin*) does. Though Payne Smith gives *ktam*'s peal definition as «to mask, scar, make a mark», subsections (b) and (c) of his definition for *tba* give the meaning «to imprint a seal» and «to imprint, stamp money, to coin», with several exempla. I might also mention that there is a root *chtm* (*cheth-taw-mim*) which also means «to seal», but less in the physical sense of «to imprint» than in the sense «to conclude». Though *ktm* and *chtm* sound similar, these two roots are not linguistically related.

69. In the *Suda* Lemnian justice is «the worst», Lemnian fire is a volcano on Lemnos, «by a Lemnian hand» means «crudely and impiously», in reference to the «Lemnian harm», under which heading the *Suda* gives the story of the Lemnian women. Suidas, *Suidae Lexicon, Graece et Latine*, ed. G. Bernhardt, 2 vols. (Halle: Schwetschkiorum, 1843), vol. 1, cols. 564-65. The *Suda* also gives «Lemnian man» and «from Lemnos» as entries. Further on (ed. Bernhardt, vol. 1, col. 582) Λίμνη (note the iota instead of an eta) is given as the name of a sea in Homer, and Λήμνος (also with an iota) is given as the proper name of a sea. Suidas, *Suda*, vol. 1, col. 582.

70. Suidas, *Suda*, vol. 1, cols. 1001-1002.

edition of the *Alphita*, printed in 1887, but not the *Sinonoma Bartholomei*, even though it had been printed in 1882.⁷¹ Mowat's best guess at the nature of the *Alphita* (which has many glosses in common with the *Sinonoma Bartholomei*) is that it is «a series of glosses upon the *Antidotarium Nicolai* expanded by extracts from Simon Januensis, and other similar works».⁷² These glossaries are closely related to slightly earlier medical glossaries written in Italy: the *Clavis Sanationis* of Simon Januensis (Simon of Genoa) and the *Pandectae Medicinae* of Mattheus Silvaticus (Matteo Silvatico).⁷³ In particular, the *Sinonoma Bartholomei*'s and *Alphita*'s glosses on *Lempnias* are similar to Mattheus Silvaticus' entry under the spelling *Lima fragis* and to an entry under the spelling *Lempreneas* in the glosses of Petrus de Abano (Petrus Paduanensis) on the *Antidotarium Nicolai*: all four of them say that it is the same as *auripigmentum* (yellow dye). The *Alphita*'s gloss also includes *arsenicum* as a possible synonym for *Lempnias*, as does the gloss on *Lempreneas* by Petrus de Abano – this might be because both works are glossing the *Antidotum Nicolai*.⁷⁴ This inconsistency in spelling the Latin adjective meaning «Lemnian» suggests uncertainty in the authors' knowledge of the material itself.

(12) *Bartholomeus Anglicus*

The earliest of the three glossaries is that of Bartholomeus Anglicus,⁷⁵ whose glossary has an entry on *Terra sigillata* which does not mention Lemnos. Hasluck reports that Bartholomeus Anglicus makes specific mention of Dioskorides' discussion of *terra saracenic*a and *argentea*, and notes that it is white. This sounds like Bartholomeus Anglicus might have confused the sealed Lemnian earth, which was red (indeed, mixed with blood, according to Dioskorides), and other medicinal earths which are white. Hasluck, discussing the entry in Bartholomeus Anglicus, notes that «singularly colde and drie» seems to be a mistranslation of *frigidus*,⁷⁶ itself a transcription of

71. Tozer, op.cit. (note 3), 260.

72. *Anecdota Oxoniensa*, op.cit. (note 48), 2.vii.

73. Op.cit., 2.v.

74. Mowat's footnote gives citations from the other two works found in the *Anecdota Oxoniensa* volume, as well as «Matth. Silv. c. cccciii [sic], "*Lima fragis*, i. auripigmentum"» *Anecdota Oxoniensa*, op.cit. (note 48), 2.219. The abbreviation «i» stands for *idem*.

75. Cited in Hasluck differently in each printing of his article on Lemnian earth. The earlier (Hasluck, «Terra Lemnia», op.cit. (note 2), 222) gives the Bartholomeus Anglicus reference as «Lib. xv. cxxxix. lxxxxviii (ed. London, 1535)», while the later (Hasluck, *Fifteenth Century*, op.cit. (note 4), 673) gives it as «Lib. XV, ccxxxix, cap. lxxxxviii (ed. London, 1535)» (emphasis mine). Both references are inscrutable to me, and I've looked over a microfiche of that 1535 edition.

76. Tozer also fails to note that in the Sloane MS of the *Alphita*, which is older than the one

σφραγίς. I would add that the word «colde» might well translate Latin *frigidus* (suggested by the mistaken transcription *frigidos*), but «drie» was a property of earth from ancient times.⁷⁷

(13) *Sinonoma Bartholomei*

The second glossary, the 14th-century *Sinonoma Bartholomei*, contains two entries of interest. The first, under *Lempnias*, is a terse entry saying *auripigmentum idem*.⁷⁸ There's nothing nearby to identify with the *idem*, but it might be a way of saying see *auripigmentum*, which has its own entry in the *Sinonoma* that mentions no earth of any kind. *Auripigmentum* («yellow dye») also brings to mind the second grade of yellow Lemnian earth which we saw in the earlier Syriac source. This *auripigmentum* is distinct from the definition of Bartholomeus Anglicus, who calls *terra sigillata* white.

The second entry related to Lemnian earth in the *Sinonoma Bartholomei* is a set of entries under *terra*, which simply identify *terra sigillata*, *terra argentaria*, *terra saracenicica* and *chimolea* as *idem*, «the same». This echoes Bartholomeus Anglicus, who identifies *terra sigillata* with these other earths. Seeing as the *Sinonoma Bartholomei* is just a glossary from a larger work, the *Breviarium Bartholomei*,⁷⁹ it might be fruitful to look there to see how these terms are used in the larger work.

(14) *Alphita*

The latest English glossary is the *Alphita* (cited by Tozer), which has three definitions for Lemnian earth and *terra sigillata*, differing in some respects to the *Sinonoma*. The manuscript used for the 1887 edition of the *Alphita* cited by Tozer and used here is from about 1465, though it is one of only two exempla, the other of which is earlier and both of which «show signs of being copied from an original, the writing of which was illegible or indistinct».⁸⁰ Under *Lempnias* there is the definition *arsenicum uel auripigmentum*, similar to that in the *Sinonoma*, but there is a subentry for *lempnia frigidos* (a corruption of *sfragidos*) which notes that this earth is sealed, «although certain people explain *lempnia frigidos* for yellow dye».⁸¹ This seems to

used for the Oxford edition, there is the variant reading *frigides* for both instances of *frigidos*. *Anecdota Oxoniensa*, op.cit. (note 48), 2.96.

77. The first words of Paul of Aegina's entry on earth state, «Γῆ πάντα ξηραίνει» «Every earth dries». Paul of Aegina, VII.3, pp. 203-204. Galen also says that «every earth has a drying power» (ξηραντικὴν δύνάμιν). *De Simp. Med.*, in Galen, op.cit. (note 8), 12.177.

78. *Anecdota Oxoniensa*, op.cit. (note 48), 1.27.

79. *Ibid.*, 1.1.

80. *Anecdota Oxoniensa*, op.cit. (note 48), 2.v.

81. *Ibid.*, 2.96.

indicate that there is a distinction between the more yellow second-grade of the earth and the sealed earth, but that the *Alphita* notes that the two are sometimes confused.

The following entry for *Lemnia fragilis* gives a definition which notes its digging and its being mixed with goat blood, but not its sealing. If the mention of blood were taken directly from Dioskorides, one would expect mention of the seal, unless the «σφοαγίς» had been turned into the term *fragilis* («brittle»). Mowat's note on this entry refers to the *Simon Januensis*, which has a definition which also mentions goat's blood.

Finally, the *Alphita* has a terse entry under *Terra sigillata*, which reads, «calx est odorifera».⁸² *Calx* is odd because it refers to white lime rather than the red or yellow Lemnian earth, but a white color was given in Bartholomeus Anglicus' definition of *terra sigillata*, which also did not mention Lemnos by name. A good smell, however, was associated with Lemnian earth.⁸³ Perhaps this definition for «*terra sigillata*» and Bartholomeus Anglicus' definition both come from a common source which at some earlier time had lost the toponym «Lemnian».

From these glossaries, we're able to see how faint the trail has become by the 15th century. Though there are still references to Lemnian earth, they confuse the two grades of the earth and the *Alphita* even perpetuates the goat's-blood story which Galen had disproven more than a millennium earlier. Also, the earlier Sloane manuscript of the *Alphita* shows so many fewer entries than the later Bodleian manuscript that there must have been substantial additions made to it. Perhaps it would be fruitful to figure out where these additions came from and to try to create a stemma for the *Alphita*.⁸⁴ Still, there is no single obvious source for any of the definitions which make *terra sigillata* out to be chalky or white, except to note that it might be a conflation of Eretrian earth.

VII. Rediscovery

(15) *Amirtoulat'*, «Useless to the Ignorant»

Before I return to my guiding questions, it would be useful to consider two of our earliest sources on Ottoman Lemnian earth and see how they fit into the

82. *Anecdota Oxoniensa*, op.cit. (note 48), 2.184.

83. Raby, op.cit. (note 5), 309.

84. More broadly, Mowat suggests that «[i]t would be interesting if the source could be discovered of those glosses which are common to the Selden MS. [of the *Alphita*], the glosses of Petrus de Abano, the *Sinonoma Bartholomei*, and Vincent of Beauvais». *Anecdota Oxoniensa*, op.cit. (note 48), 2.v.

pre-Ottoman tradition which had not yet, in the 1480s, been subsumed by these later traditions. Raby gave the following new translation of a postscript on Lemnian earth in *Useless to the Ignorant*, a pharmacopoeia written in 1482 by Amirtovlat', an Armenian doctor and longtime member of Sultan Mehmed II's entourage:⁸⁵

I the useless servant will make a brief note about *Terra sigillata*. In the year of the Armenians 929 [22 November 1479-20 November 1480 inclusive] in the reign of Sultan Muhamat Khan, who was the emperor (*kaysr*) ruling in Constantinople, he heard about *Terra sigillata* that it was salutary. They sent a doctor from the race of the Saracens to that island which is called Lemnos, to go and find the place where *Terra sigillata* is. He went but did not find any of that clay. But he found some of another clay which is coloured [i.e. *rubrica*]. He brought it to the king. They examined the doctor and he did not accept it. Our king again ordered three men to go and find the *Terra sigillata*. Of these three men one was a doctor from the land of Persia, one was a Greek doctor, and one was from the population of that place who possessed the art of painting. They went to that island, found elders, and questioned them. They found writings concerning the history of *Terra sigillata* and discovered the place where it derived from. They dug and took some of that clay which is *Terra sigillata*. They took it to our king and received a reward from the king. That place where the clay was they secured, and posted guards; and no one can get that clay gratis.

From this clay our king had many mugs made made from which people drink. And the rest he put in the treasury and preserved it. Now it is available to us and we can conveniently obtain that clay. After this a year passed and our king died. And in Constantinople there was much damage and destruction, and afterwards peace. Glory to Christ for ever. Amen.

The term used for the earth is *terra sigillata*, which is ambiguous as to whether the original Armenian was a transcription of the Latin *terra sigillata* (unlikely, since the tradition behind Amirtovlat' was Armenian, Arabic, and Greek) or, more likely, an Armenian calque on the Greek or Arabic for «sealed earth». If so, then the term could have been taken from any number of the ancient sources, particularly Galen. Moreover, the extract ascertains that the rediscovery of Lemnian earth was spurred by research on it – research both to reject the first sample of *rubrica* as unfit and to find where the place of the real earth was. The sources I have examined above also explain a strange point in the text. The sultan employed a local painter to

85. Raby, op.cit. (note 5), 325-326. The translation was prepared for Raby by Professor R.W. Thomspson, and Raby gives further notes on the text and on Amirtovlat' in general. The Armenian text was edited and published in 1926: Amirtovlat'. *Angitats' Anpaet (Inutile aux Ignorants)*. K. H. Basmajian (ed.), Vienna, Imprimerie des P. P. Mechitharistes, 1926.

help find the earth because Lemnian earth was known as a pigment as well (going all the way back to Theophrastus, 315-305 B.C.), and painters had to be their own chemists. Finally, the Armenian source shows us that Middle Easterners (a Saracen and a Persian doctor), Greeks, and even local Lemnians were enlisted to help find the earth. This makes it more believable that an Arabic translation of Galen could have been available to the research team.⁸⁶

VIII. Conclusion

This paper began with three questions. The first was, «What influence did Dioskorides and Galen have on later pre-Ottoman sources on Lemnian earth, and on its Ottoman rediscovery»? I have given a diachronic summary of ideas surrounding the earth, and in most cases, the information given is derivative of the early sources (Pliny, Dioskorides, and Galen). Where there is a difference between later and earlier sources, it proves either to be a conflation with something else (e.g., the white earth in Bartholomeus Anglicus), a local addition (e.g., Philostratus), or even a correction on an earlier mistake (e.g., Galen's dispelling the goat's-blood story). After Galen, though, the pool of information about Lemnian earth stagnated and little was changed except by omission or conflation of earlier information.

This ossification of data is also informative regarding the second question: «When and to what extent did the earth recede from actual use, regardless of its presence in literary pharmacopoeias»? By the time of Paul of Aegina it probably had become less common (as evidenced by Paul's predilection for other earths over the Lemnian and Isidore's omission of it), and it was most likely sometime after the 7th century that it fell into disuse. The *Traité d'alchimie syriaque et arabe*, which is slightly later than Paul of Aegina, has truncated its description of Lemnian earth so much that it might well have fallen out of use. By the time of the 10th century *Suda*, Lemnian earth had certainly dropped from the literary Byzantine medical consciousness.

The final question is, «How did the term *tin-i makhtum* («sealed earth») and calques thereof (such as *terra sphragis*) come to be the official terms for this product under the Ottomans?» This paper has shown an important predecessor to the Ottoman term though the Syriac term «*tin makhtoum*». The word *khatim* («seals») was used in Arabic translations of Galen to translate σφραγίς, and Galen himself often used the word σφραγίς in his discussion of Lemnian earth. While it is not impossible that *tin-i makhtoum* might be a calque on a Venetian *terra sigillata*, the evidence given above

86. This is discussed in Raby, op.cit. (note5), 327-329.

suggests that the term *tin-i makhtoum* is a calque on Λημνία σφραγίς (or the Syriac equivalent) from Galen. I disagree with Lowry and say that *tin-i makhtoum* is just as Galenic a term as *tin-i Limni*.⁸⁷ Since the Ottomans were interested in Lemnian earth as a medicament rather than as a pigment, the emphasis on the seal in the earth's name is especially appropriate and is part of a tradition going back all the way to Dioskorides, Pliny, and Galen. In the end, though, the terms *terra Lemnia*, *terra sigillata*, and even *rubrica Lemnia* are used together so often that we must be wary of drawing any final conclusions about Lemnian earth from nomenclature alone.

The objective of this paper has been to reexamine the nearly 1800 years of pre-Ottoman textual sources on Lemnian earth, something which has been largely overlooked in the recent articles by Raby and Lowry in favor of discussing the Ottoman period of the earth's production. This paper also serves as a bibliographic compilation of the various sources on Lemnian earth which, to this point, were not available in any one convenient place. I hope that I have shed some light on the questions around which I organized my inquiry, or at least shown a fertile patch of earth for others to dig in search of the answers which still lie hidden, buried below a Lemnian field.

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87. Lowry, *Fifteenth Century*, op.cit. (note 6), p. 171.