

Theodora, Aetius of Amida, and Procopius: Some Possible Connections

John Scarborough

WHEN ANCIENT AND MEDIEVAL SOURCES speak of prostitutes' expertise, they frequently address the question of how they managed to keep free from pregnancies. Anyone unschooled in botanicals that were contraceptives or abortifacients might pose a question similar to that of an anonymous writer in twelfth-century Salerno who asks medical students: "As prostitutes have very frequent intercourse, why do they conceive only rarely?"¹ Procopius' infamous invective, describing the young Theodora's skills in prostitution, contains a similar phrase: she "became pregnant in numerous instances, but almost always could expel instantly the results of her coupling."² Neither text specifies the manner of abortion or contraception, probably similar to those recorded in the second century by Soranus of Ephesus (see below). Procopius' deliciously scandalous narrative is questionable

¹ Brian Lawn, *The Prose Salernitan Questions* (London 1970) B 10 (p.6): *Queritur cum prostitute meretrices frequentissime coeant, unde accidat quod raro concipiant?*

² Procop. *Anec.* 9.19 (ed. Haury): καὶ συχνὰ μὲν ἐκύει, πάντα δὲ σχεδὸν τεχνάζουσα ἐξαμβλίσκειν εὐθὺς ἴσχυε, which can also be translated "She conceived frequently, but since she used quickly all known drugs, a miscarriage was effected"; if τεχνάζουσα is the 'application of a specialized skill', the implication becomes she employed drugs that were abortifacients. Other passages suggestive of Procopius' interests in medicine and surgery include *Wars* 2.22–23 (the plague, adapted from Thucydides' description of the plague at Athens, with the added 'buboes' of Bubonic Plague, and an account of autopsies performed by physicians on plague victims), 6.2.14–18 (military medicine and surgery), and 1.16.7 (the infamous description of how the Persians blinded malefactors, reported matter-of-factly).

in terms of specific details, but the *Anecdota* does reflect the circumstances of the common profession of prostitution in sixth-century Byzantium.³ Moreover, Theodora emerged from the lowest class (a daughter of a bear keeper in the hippodrome, so we are told, 9.2–3), whose young women often plied talents quite different from those of the higher ranks who might become learned in the Classics or in the finer points of managing a well-appointed household; and John of Ephesus, who mostly admired the empress and was writing independently of Procopius, admits that she came “from the brothel.”⁴ That Theodora caught the eye of the middle-aged Justinian, that he took her in marriage, and that her influence in Byzantine history was a consequence of her feminine charms fused with a steely intellect, is the stuff of history and fiction.⁵

Behind the purported facts of Theodora’s career as a common prostitute and later as empress are the hidden details of what we might call feminine pharmacology: what *were* the drugs used by prostitutes and call-girls in sixth-century Byzantium? Were there ordinary pharmaceuticals employed by such professionals to stay in business? Is there evidence linking Theodora and her court with a doctor in her own time? Such a physician likely functioned as a resident doctor with special expertise and proficiency in obstetrics and gynecology, serving the empress and her attendants, some of whom we know from the sharply individualistic portrait-mosaics at Ravenna.

By considering the medical works by Aetius of Amida, a

³ Johannes Irmscher, “Η πορνεία στο Βυζάντιο,” in Ch. G. Angelidi (ed.), *Η καθημερινή ζωή στο Βυζάντιο* (Athens 1989) 253–258.

⁴ *Lives* 13: E. W. Brooks, *Patrologia Orientalis* 17 (1923) 189. Later, as empress, Theodora was an open supporter of Monophysite Christianity, and links to Amida may also be important: Witold Witakowski, *Pseudo-Dionysius of Tel-Mahre: Chronicle Part III* (Liverpool 1996) 30, 32, 102, 115–116, 122, and 124–125.

⁵ Out of a growing bibliography, see James Allen Evans, *The Empress Theodora* (Austin 2002) 16–19, a good balanced account, using—but not exclusively—Procopius’ *Secret History*.

contemporary of Justinian and Theodora, one may well be able to answer some of these questions. In Aetius' *Tetrabiblon*⁶ there is a unique and separate attention to obstetrics and gynecology,⁷ rather unusual among the handbooks of medicine produced in the Byzantine Empire before the coming of Islam.⁸ More intriguing is the likelihood that Aetius held a court title,

⁶ The *editio princeps* of Aetius' *Sixteen Books* (1522; the first eight books reprinted by the Aldine press, 1534) carried the title *Rerum medicinalium libri XVI*, but some unknown scholar decided, for ease of citation, to call this massive work the *Tetrabiblos* (or *-on*), thus four books in four separate blocks. When Janus Cornarius rendered his Latin translation of Aetius (Basel 1542), he provided the rather extended title—typical of the time—*Aetii medici Graeci contractae ex veteribus medicinae Tetrabiblos, hoc est quaternio, id est libri universales quatuor, singuli quatuor sermones complectetes, ut sint in summa quatuor sermonum quaterniones, id est sermones XVI*. Thereby, *Tetrabiblon* (or *-os*) has become the usual way in which one cites Aetius of Amida, even though the most recent editor of Books 1–8 (Alexander Olivieri [1935, 1950]) simply titles the work *Libri medicinales*. We still depend in large part on Cornarius' Latin translation for much of Books IX through XVI.

⁷ *Tetrabiblon* 16 = Cornarius pp.861–919, titled *De conceptus ac partus ratione, & de affectionibus muliebribus uteri praesertim & mammaram. Item de ungentorum pretiosorum, & potionum ac suffumigiorum praeparatione*. A German translation of Book 16 (from manuscripts in Berlin, and based on an earlier, partially edited Greek text by Ch. Weigel [1791]), was published by Max Wegscheider as *Geburtshülfe und Gynäkologie bei Aëtios von Amida (Buch 16 der Sammlung)* (Berlin 1901), but is complete only through ch. 113 (Cornarius' translation numbers 123 chapters, even as Wegscheider tabulates 146 chapters, presumably on the basis of his manuscripts and Weigel's edited text). The most recently presumably 'edited' Greek text of Book 16 is Skévos Zervos, *Aetii Sermo Sextidecimus et Ultimus. Erstens aus Handschriften veröffentlicht* (Leipzig 1901), renumbered into 153 chapters; but Zervos has collated three—at most four—manuscripts, and takes liberties with the text, rather obvious when compared with either Cornarius or Wegscheider.

⁸ E.g. Alexander of Tralles, whose *Twelve Books on Medicine*, *Books on Fevers*, and *Letter on Intestinal Worms*, were set down sometime in the late sixth century, has no particular sections on gynecology and obstetrics, although one reads of drugs occasionally prescribed for female ailments. See Theodor Puschmann, *Alexander von Tralles I–II* (Vienna 1878–1879), and the French translation by F. Brunet, *Oeuvres médicales d'Alexandre de Tralles I–IV* (Paris 1933–1937).

and thus he personally may have actually tended medical care to Justinian and Theodora,⁹ and if so, the more probable to Theodora, given the unusual special details on gynecology and obstetrics in the *Tetrabiblon*. The few detailed encyclopedias of medical history that take up Byzantine medicine state that Aetius is a “court physician,” “royal doctor,” or sometimes a “medical attendant in the court of Justinian,” but no modern reference supplies the evidence for such a connection. Consulting the best-edited Greek text of *Tetrabiblon* I–IV reveals a brief quotation from an anonymous manuscript buried in the *apparatus criticus*, an *incipit* to a “synopsis” of the *Sixteen Books* of “Aetius of Amida, *komes* of the *opsikion*” (ΑΕΤΙΟΥ ΑΜΙΔΗΝΟΥ ΚΟΜΗΤΟΣ ΤΟΥ ΟΨΙΚΙΟΥ),¹⁰ a phrase that becomes Latinized as *comes obsequii*, and thus the “Leibarzt und Comes obsequii” of nineteenth- and early twentieth-century German accounts of sixth-century Byzantine medicine.¹¹

The title *komes tou opsikiou* is problematic. It is not attested for the sixth century, but was the name of the commander of the prestigious Byzantine theme formed in the seventh century, in the aftermath of the Arab conquests. *Obsequium* is the name acquired by one of the two praesental field armies, possibly under the emperor Heraclius (610–641); its name was eventually Hellenized to *Opsikion*, and its commander is indeed a *komes*.¹² Why would the author of a synopsis of Aetius give him

⁹ For Justinian’s use of doctors in other contexts see R. C. Blockley, “Doctors as Diplomats in the Sixth Century,” *Florilegium* 2 (1980) 89–100.

¹⁰ Alexander Olivieri, *Aetii Amideni Libri medicinales I–IV* (CMG VIII.1: Leipzig/Berlin 1935) 8 ap.crit. 14, noted also from MSS. sources by Wegscheider, *Geburtshilfe* v–vi.

¹¹ Du Cange et al., *Glossarium mediae et infimae Latinitatis* VI (Favre 1886) 20: *obsequium*, “famulorum et amicorum comitatus, pompa.” *Leibarzt und Comes obsequii*: E. Gurlt, *Geschichte der Chirurgie* I (Berlin 1898) 544; *Chef des kaiserlichen Gefolges*: Iwan Bloch, “Byzantinische Medizin,” in Th. Puschmann et al. (eds.), *Handbuch der Geschichte der Medizin* I (Jena 1902) 529.

¹² J. Howard-Johnson, “Heraclius’ Persian Campaigns and the Revival of the Eastern Roman Empire, 622–630,” *War in History* 6 (1999) 1–44, here 38; Warren Treadgold, *Byzantium and its Army* (Stanford 1995) 23.

this title? One possible explanation is that he confused him with the only other famous Aetius in Byzantine history, the eunuch supporter and general of the empress Irene, who, in fact, did hold the command of the Opsikion theme ca. 800.¹³

So our Aetius cannot have been Count of the Opsikion: the title is an anachronism. In his legislation, Justinian uses *obsequium* only in a generic sense, to indicate service owed to a superior, and the Greek form *opsikion* is not attested before the military reforms of the seventh century. If, however, our Aetius did hold the title *komes* (in whatever form), it is reasonable to suppose that the later Byzantine editor either made him *komes* of the Opsikion, or confused him with Irene's Aetius. The *komes* may have been authentic, and likely honorary, in that it did not suggest a military command. Moreover, one can point to the title of *comes* for Vindicianus, who was a physician in service to Valentinian in the late fourth century, and who turns up in the pages of Augustine as a crusty rhetorician of advanced years and a learned physician in Carthage, who advised the young Augustine to give up his interest in astrology.¹⁴ And if we direct

¹³ Warren Treadgold, *The Byzantine Revival, 780–842* (Stanford 1988) 112, 119, and 129.

¹⁴ August. *Conf.* 4.3.5, 7.6.8; cf. *Ep.* 138.3. Vindicianus' medical skills were good enough to win the emperor's extension of privileges to loyal court doctors who had attained the rank of *comes*: *Cod. Theod.* 13.3.12 (14 Sept. 379), cf. 13.3.17 (13 July 428). John Scarborough, "Helvius Vindicianus (ca. 350–410 CE)," in Paul T. Keyser and Georgia Irby-Massie (eds.), *Encyclopedia of Ancient Natural Scientists* (London/New York 2008) 829–830. Theodorus Priscianus (fl. ca. 364–375), a student of Vindicianus, had a colleague, one Victoria *Medica*, whose special expertise was in fertility drugs and abortifacients (see the Appendix below on *Dig.* 48.8.3.2), and see also John Scarborough, "Theodorus Priscianus," *Encyclopedia* 787–788, with reference to Priscianus *Gynaecia* 3.5 (*De conceptione*): *nosti itaque, Victoria, professionis communis hoc magis esse necessarium ministerium, quae extuis officiis sedulis in his magis rebus experimentum habes, quantam aut gratiae aut gloriae accrescat medicae promittenti a suspecta conceptione* (Valentin Rose, *Theodori Prisciani Euporiston* [Leipzig 1894] 233; German transl. Theodor Meyer, *Theodorus Priscianus und die römische Medizin* [Jena 1909] 285–286). An earlier empress with murderous intent used abortifacients and bribed a midwife, according to rumor:

our attention to the medical writings of Theophilus, traditionally dated to the reign of Heraclius, we see that he is Theophilus Protospatharius, another of those impossible attributes in terms of ‘offices held’.¹⁵ It seems that court doctors among the Byzantines were awarded titles by medieval editors, without regard for historical realities.

In itself, any connection adduced from the scholion regarding Justinian’s court and Aetius of Amida might not be significant, but as noted the *Tetrabiblon* directs unusual attention to women’s health and disease, concentrated in the lengthy descriptions and therapies given in Book 16. Not only are there detailed accounts of radical surgeries (mastectomies, what appear to be partial hysterectomies, and the commonly performed clitoridectomies, hernia repairs, and other procedures),¹⁶ but also several dozen compound formulas for abortifacients and contraceptives. Pharmaceuticals are primary in Aetius’ *Tetrabiblon* (in fact, Book 1 begins with a precise summary of the famous ‘drugs by degrees’ so influential in the history of pharmacy as a basic theory of how drugs work well into the eighteenth century),¹⁷ but it is only in Book 16 that

Amm. Marc. 16.10.18–19.

¹⁵ The most recent edition of Theophilus’ *On the Structure of the Human Body* is that by the admirable physician-classicist William Alexander Greenhill, *Theophili Protospatharii De corporis humani fabrica libri V* (Oxford 1842). Theophilus’ *On Pulses* is printed in F. Z. Ermerins, *Anecdota medica Graeca* (Leiden 1840) 1–77. Theophilus’ *On Urines* and *On Excrements* appear in J. L. Ideler, *Physici et medici Graeci minores I* (Berlin 1841) 261–283 and 397–408. Remaining very useful and perceptive is Greenhill’s “Theophilus Protospatharius,” in William Smith, *Dictionary of Greek and Roman Biography and Mythology III* (London 1870) 1036–1037, wherein Greenhill writes, “Everything connected with his titles, the events of his life, and the time when he lived, is uncertain.”

¹⁶ Radical mastectomy in *Tetrab.* 16.45 (Cornarius 884–885, Zervos 68 [ch. numbered 49], Wegscheider 60 [ch. 44]. Surgical procedures for removal of cervical abscesses: 16.86 (Cornarius 915, omitted by Zervos, Wegscheider 117–118 [ch. 90]).

¹⁷ *Tetrab.* 1 prooem. = 17–30 Olivieri; partial translation by John Scar-

there are special drugs and surgical procedures addressed specifically to and for women.

If Aetius, indeed, served as a court physician in the sixth century, one cannot escape the impression that Book 16 records his meticulous attention to the health and well-being of Theodora and her numerous attendants, an assumption borne out from consideration of the particular surgeries and compound pharmaceuticals. Occasionally, there are women who are named (e.g. “the *Domina* Romula, who devised a compound for fumigation”),¹⁸ clear evidence that the women themselves contributed to their own treatment. One can also presume the continual presence of experienced midwives attending births in the setting of the court,¹⁹ and the text suggests that Aetius either gave instructions followed by the women, or that he had female colleagues and qualified female apprentices who assisted

borough, “Early Byzantine Pharmacology,” *DOP* 38 (1984) 213–232, at 224–225 (rpt. *Pharmacy and Drug Lore in Antiquity: Greece, Rome, Byzantium* [Farnham/Burlington 2010] ch. 13). Characteristic is Aetius’ streamlining, editing, and clarifying disparate sections of Galen’s jumbled and scattered writings pertaining to a theory of drugs.

¹⁸ *Tetrab.* 16.122 (Cornarius 928–929); the *Domina* Romula becomes the “noble Romulus” in Zervos’ Greek (171, ch. 149).

¹⁹ *Tetrab.* 16.14 (Cornarius 866, Wegscheider 16 [same ch. no.]), Zervos 16 [same ch. no.]: τίνα δεῖ προπαρασκευάζειν καὶ ὅπως βοηθεῖν ταῖς κατὰ φύσιν τικτούσαις, περιττὸν ἡγοῦμαι γράφειν, ἐξ ἔθους οὐ μόνον τῶν μαιῶν, ἀλλὰ καὶ τῶν ἄλλων γυναικῶν ταῦτα ἐπισταμένων· ὅπερ δὲ ἐστὶν ἀναγκαῖον ἐπίστασθαι γραφήσεται, “What one ought to prepare for women about to give birth I consider unnecessary to put into writing, since traditionally such matters are known, not only by midwives, but also by other women; but whatever is necessary to be known and understood will be set out in my account.” In difficult births (δυστοκία), the physician and midwife work as a team: 16.22, Cornarius 871–872, esp. 872 lines 2–4: *Haec omnia de muliere aegrem pariente medicum percunctari ex obstetrice oportet, nec temere ad chirurgiam progredi. Neque vero obstetrici permittendum est ut in uterum diutius dilaniet*, “All these matters regarding the woman in difficulty it is necessary for the physician to inquire from the midwife, and he must not resort to surgery too quickly, nor should the midwife be allowed further to tear/injure the uterus.” Cf. the translation by Wegscheider 30.

in surgeries and drug-compounding, distant analogues to the female physicians at the Pantokrator Xenon of twelfth-century Constantinople.²⁰ If one also takes into account the generally good knowledge of medicine and pharmacology displayed by several famous monarchs in classical times (e.g. Attalus III of Pergamon, Mithridates VI of Pontus, Cleopatra VII of Egypt, and Marcus Aurelius),²¹ one can likely assume analogous conversant familiarity with the relevant pharmaceuticals by Theodora, much as the princess Anna Comnena prided herself on knowing current medical diagnoses, prognoses, and therapies in the era of the First Crusade.²² So-called ‘lay medicine’ was

²⁰ Paul Gautier, “Le Typikon du Christ Sauveur Pantocrator,” *REByz* 32 (1974) 1–145, at 85 line 942 and 101 line 1198; English transl. Robert Jordan, in John Thomas and Angela Constantinides Hero, *Byzantine Monastic Foundation Documents II* (Washington 2000) 757 no. 38, “Medical personnel ... female doctor, four certified female assistants,” and 763 no. 52, “salaries of the Hospital Staff ... The female doctor should receive three similar *nomismata* including her food allowance, and twenty-six *modioi* of grain.” For earlier Roman female doctors and midwives, see Rebecca Flemming, *Medicine and the Making of Roman Women* (Oxford/New York 2000), esp. 383–391 (Appendix 2: “*Medicae* and *Iatrinai* in Inscriptions”).

²¹ John Scarborough, “Attalus III of Pergamon: Research Toxicologist,” in Louise Cilliers (ed.), *Asklepios: Studies on Ancient Medicine (Acta Classica Suppl. II [Bloemfontein 2008])* 138–156. Although not particularly useful for the drug lore of the day, an enjoyable read is Adrienne Mayor, *The Poison King: The Life and Legend of Mithridates, Rome’s Deadliest Enemy* (Princeton 2010). Duane Roller, *Cleopatra: A Biography* (Oxford/New York 2010), esp. 44–45, 49–51, 124–125, and 143. The sources have left just enough evidence to demonstrate activities and practice of at least three doctors at the late Ptolemaic court: John Scarborough, “Pharmacology and Toxicology at the Court of Cleopatra VII: Traces of Three Physicians,” in Anne van Arsdall and Timothy Graham (eds.), *Herbs and Healers from the Ancient Mediterranean through the Medieval West: Essays in Honor of John M. Riddle* (Farnham/Burlington 2012) 7–18. Galen acknowledges that Marcus Aurelius knew as much about the opium poppy as *he* did: John Scarborough, “The Opium Poppy in Hellenistic and Roman Medicine,” in Roy Porter and Mikuláš Teich (eds.), *Drugs and Narcotics in History* (Cambridge/New York 1995) 4–23, esp. 17–18 with nn.102–110 (rpt. *Pharmacy and Drug Lore in Antiquity* ch. 7).

²² Georgina Buckler, *Anna Comnena* (Oxford 1929) 215–221.

sometimes of a high order, as we learn in the pages of the ninth-century patriarch Photius in his *Letters*,²³ as well as his critiques of Galen, Dioscorides, Aetius of Amida, and other medical writers in the ‘book reviews’ extant in his *Bibliothēke*.²⁴

²³ E.g. *Letter* 169 (II 45 Laourdas/Westerink): “To George, Metropolitan of Nicomedia” (responding to his thanks for medical wisdom that helped George recover from an unspecified illness), “Would that my deeds were a match for your words of praise, not in order that Galen and Hippocrates, who are the objects of glory among the Sons of the Healer, might give up to me all claims to their rights of supremacy, as you yourself write extolling me, not in order that the great name of the Sons of Asclepius might be buried in obscurity by my name, but in order that I might be, even if not for anything else, but in this turn of mine, at least a small help to my friends and companions in the struggle against their bodily sufferings.” Also 223 (II 135): “To Zachariah of Chalcedon,” suggesting drugs for Zacharius’ illness with citations from Dioscorides, as well as recommending some blood-letting, and 224 (II 136), “To Theophylactus Protospatharius,” who has thanked Photius for his recovery from an ailment, due to Photius’ sage medical guidance.

²⁴ *Bibl. cod.* 221 (III 140–152 Henry), a long summary of all sixteen books, which concludes (152), “[Aetius’ work gives] a complete synopsis that one can use in place of [the shorter summaries of Galen as there are in the writings of Oribasius], especially for those medical practitioners who have but a shallow knowledge of medical theory and have not studied the works of nature, whose goal is only the treatment of the body and are current on what is needed for that. Indeed, those who seek to show the healing treatments that drive away diseases ought continually to study and give close attention to this book.” Rather much a mouthful, garrulous to a fault, to be sure, but the Patriarch awards high marks to the *Tetrabiblon*. He was less than impressed by Galen: “he loads down his text with irrelevant items, digressions, and long periodic [sentences] that are confusing and render his meaning murky [and unclear],” after reading through Galen’s *Sects for Beginners* (cod. 164 [II 135–136]). By contrast, Photius thinks well of Oribasius, apparently grinding through *all* 70 books of a synopsis of medicine, prepared for his royal patron, Julian the Apostate (cod. 218–219 [III 134–139]). And as *Letter* 223 indicates (n.23 above), Photius greatly valued Dioscorides’ *Materia medica*, designating it as the best on the topic, compared with Galen, Alexander of Tralles, Paul of Aegina, Aetius, and Oribasius (cod. 178 [II 182–184]). If Photius had actually read through the works of Alexander of Tralles and Paul of Aegina, our texts of the *Library* lack any summaries. Photius was proud of his knowledge of medicine: Warren

Soranus of Ephesus (prob. fl. ca. A.D. 117) had set out a list of common contraceptives and abortifacients,²⁵ and many of the ingredients employed in second-century Rome appear in the multi-ingredient compounds recorded by Aetius four hundred years later. Soranus, however, gives many ‘simples’, whereas Aetius usually sets out complicated formulas requiring careful preparation, demonstrating that Byzantine pharmacy had improved upon both formulation and application. For example, Soranus recommends “grinding up the inner layers of a pomegranate peel and applying it [into the vaginal]” as a contraceptive suppository,²⁶ as contrasted with Aetius who replicates the “fresh pomegranate rind,” but adds, “grind up two parts of the inner peel of the pomegranate rind along with one part of oak gall, and fashion them [into] acorn-like vaginal suppositories, and use them, inserting the suppositories [to prevent pregnancies] after the menstrals have ended” (16.17 [Cornarius 867, Zervos 19]). An even more complicated formula follows: “take two drachmas of pomegranate flower calices, two drachmas of oak gall, one drachma of wormwood, compound these with cedar oil, and fashion vaginal suppositories the size of barley kernels, and insert them for two days, after the menstrals have ceased; take them out, and, once removed, a woman can have sex without fear of pregnancy” (16.17 [Cornarius 867–868, Zervos 19]). Pointedly, the physician adds, “This is always reliable, since this [formula/method] has been used for many years.”

And one wonders who the often quoted “Aspasia” might be:²⁷ perhaps the name is either a bogus attribution to the

Treadgold, *The Nature of the Bibliotheca of Photius* (Washington 1980) 103.

²⁵ Soranus *Gynecology* 1.19.60–65: J. Ilberg, *Sorani Gynaeciorum Libri IV. De signis fracturarum. De fasciis. Vita Hippocratis secundum Soranum* (CMG IV, Leipzig/Berlin 1927) 45–49; Owsei Temkin, *Soranus' Gynecology* (Baltimore 1956) 62–68; Paul Burguière et al., *Soranus d'Éphèse Maladies des femmes I* (Paris 1988) 59–65, with questionable ‘readbacks’ from Aetius’ text, 61–63.

²⁶ *Gynecology* 1.19.62 (Ilberg 46, Temkin 64).

²⁷ Aspasia occurs as a quoted source *only* in Book 16 of the *Tetrabiblon*,

famous concubine of Pericles; perhaps the name could be a coded reference to Theodora herself, since here was a *hetaira* now joined with the most powerful politician of the age (this sort of historical allusion would ‘fit’ easily enough); perhaps Aspasia is simply the name of an experienced midwife, then attending the needs of Theodora and her attendants; perhaps Aspasia was an experienced physician in her own right, and Aetius had consulted with her, respectfully quoting her prescriptions for contraceptives and abortifacients, as well as how to care for the woman who may have spontaneous abortions, or who desires to have children. At the very least, the role of medically experienced women is patent throughout *Tetrabiblon* 16. Whoever she might have been, Aspasia is quoted on “How to Care for the Pregnant Woman,” “How to Care for the Pregnant Woman who is Ill,” “Abortifacients,” “How to Care for Woman after an Embryotomy,” “How to Suppress the Menstrual Flowing,” “On the Uterus Leaning Backwards, Moving Sideways, and ‘Retreating,’” “Treatment for Spreading Ulcers of the Uterus,” “On Uterine Hemorrhoids,” “On the Female Hydrocele” [lit. ‘Water hernia’], “On Pudendal Hernia Varicosa,” and “On Condylomata.”²⁸

cited far more frequently than Soranus; she is unknown otherwise. Her name, writings, etc. appear in no other medical text, ranging from Hellenistic and Roman times, through the Byzantine centuries, leading one to conclude that she was contemporary with Aetius, and whose expertise included most of the techniques associated with obstetrics and gynecology, as well as the arts of preparing abortifacients and contraceptives. Paul T. Keyser, “Aspasia,” in *Natural Scientists* 173, carefully lists Aspasia’s abilities, but fudges the date (120–540? A.D.). See Heinrich Fasbender, “Aëtius von Amida,” in *Geschichte der Geburtshülfe* (Jena 1906) 58–61, esp. 60 n.2, for the 19th-century debate on just who was this skilled doctor/midwife called Aspasia in the pages of Aetius 16. See also Holt T. Parker, “Women Doctors in Greece, Rome, and the Byzantine Empire,” in Lilian R. Furst (ed.), *Women Healers and Physicians: Climbing a Long Hill* (Lexington 1997) 131–150, esp. 138 with n.36: Aspasia is “quoted as an authority” by Aetius.

²⁸ *Tetrab.* 16.12 (Cornarius 866), Pregnant Woman; 15 (867), Pregnant Woman who is Ill; 18 (868–869), Abortifacients; 25 (875), Embryotomy; 51 (887), Menstrual Flowing; 77 (905–906), Uterus Leaning; 92 (917), Ulcers;

Aetius provides specific information on contraceptives and abortifacients,²⁹ and almost all these pharmaceutical formulas are multi-ingredient, in contrast to the simples enumerated by Soranus in the second century. Occasionally, pure midwifely folklore mingles with straightforward botanical pharmacology, e.g. 16.17: “[The Woman who does not desire to become pregnant] can carry about a tooth that has fallen from a young child as long as it has not touched the ground, and is to be worn by the woman inside a signet ring,” or “Charred testicles of castrated mules, quaffed in decocted willow-juice, will prevent conception,” or 16.18 (final lines), “Also they say that ... ripe seeds of the wild cucumber having fallen by themselves from the bush, and gathered together on a piece of cloth before touching the ground, are abortifacients.” Aspasia, however, recommends a number of natural substances which *are actually* either contraceptive agents or abortifacients, including rue, wormwood (‘absinth,’ sometimes ‘mugwort’), pennyroyal, castor, ox gall, fenugreek, garlic, and a number of others.³⁰ She was an experienced midwife, since one reads:³¹ “Thus all attempts to induce an abortion are perilous [to the woman], especially if she has good health and a firm and muscular uterus. Therefore, it is necessary that one consider carefully [the procedures] and avoid an abortion in the second and especially the fourth month, since in both instances there may be a natural reason for delay and the difficulty, and the months

97 (920), Hemorrhoids; 100 (921), Hydrocele; 102 (921), Pudendal Hernia; and 106 (923), Condylomata.

²⁹ *Tetrab.* 16.16–18 (Cornarius 867–869, Wegscheider 17–24, [more or less] Zervos 17–24): 16 “Means for Maintenance of Sterility for Women who are Unable Safely to Become Pregnant,” 17 “Contraceptive Vaginal Suppositories/Pessaries,” 18 “Aspasia’s Abortifacients.”

³⁰ See John M. Riddle, *Contraception and Abortion from the Ancient World to the Renaissance* (Cambridge [Mass.] 1992), index s.vv. rue, pennyroyal, etc. John Scarborough, “Contraception in the Ancient World: The Case of Pennyroyal,” *Wisconsin Academy Review* 35.2 (1989) 19–25.

³¹ *Tetrab.* 16.18 (Cornarius 869, Wegscheider 22–23).

with the odd numbers likely allow the pregnant woman to be hardy and more able [to undergo the procedure]. Therefore, the only month to choose for an abortion is the third month: never before, never after.”

These details in *Tetrabiblon* 16.16–18 likely provide the context for the difficult and allusive lines of Procopius *Anec.* 9.19 quoted above. An ‘Aspasia’ not only would be present at court, but she also would represent what midwives and prostitutes knew, and what substances to employ to stay in business. That Theodora did bear children (a daughter, later married off to a descendant of the emperor Anastasius)³² and—perhaps—a son (supposedly named John, according to Procopius),³³ demonstrates that contraceptives in sixth-century Byzantium were not foolproof. Pennyroyal (*Mentha pulegium* L.), for example, requires that a woman drink her ‘tea’ of steeped pennyroyal leaves *every morning* ... and if Theodora had borne children in her adolescence or early twenties, perhaps some kind of botched procedure, either surgical or pharmaceutical, rendered her sterile thereafter (she had no children by Justinian), leading eventually to her death in 548.³⁴

³² Alan Cameron, “The House of Anastasius,” *GRBS* 19 (1978) 259–276, at 271–272.

³³ *Anec.* 17.16–23. Evans, *Theodora* 16, considers the account of ‘John’s’ re-appearance, after the death of his father, to be pure gossip.

³⁴ Victor Tunnunensis *Chronica* 549 (*anno*): *post consulatum Basili V.C. anno VII.2: Theodora Augusta Chalcedonensis synodi inimica, canceris plaga corpore perfusa, vitam prodigiose finivit*; Antonio Placanica, *Vittore da Tunnuna Chronica* (Florence 1997) 48–49, with commentary 123. Although this short—and rather unusually public—source indicates Theodora’s death from some kind of uterine cancer that had spread throughout her body, scholars have rendered their own retrospective diagnoses from this slim bit of evidence. Breast cancer: Evans, *The Empress Theodora* 104. Gangrene: James Fitton, “The Death of Theodora,” *Byzantion* 46 (1976) 119. Syphilis and cancer: J. Körbler, “Die Krebserkrankung der byzantinischen Kaiserin Theodora,” *Janus* 61 (1974) 15–22. Simple cancer: Tony Honoré, *Tribonian* (Ithaca 1978) 12. Uterine cancer metastasis: John Scarborough, “Teaching Surgery in Late Byzantine Alexandria,” in Manfred Horstmanshoff (ed.), *Hippocrates and Medical Education* (Leiden/Boston 2010) 235–260, at 240. Procopius

In addition to the numerous and detailed formulas and recipes for contraceptives and abortifacients are Aetius' precise descriptions of surgeries for women, fitting well into the context of Theodora's court. Most of Theodora's 'ladies-in-waiting' were neither ex-prostitutes (although, it appears, some of them were just that),³⁵ nor experienced in the ways and manners of street life, as the empress had been. Custom dictated that young women might be honored to attend the empress for a time, while suitable matches were arranged, according to the rank and status of the marriageable candidate, and that her conduct could be certified as pure and virginal.

Aetius has a surgical procedure to assure just this: radical clitoridectomy.³⁶ He quotes another of the venerated 'Roman' sources (here Philumenus) to indicate both the procedure and the reasons for performing it: "In some women, the clitoris grows so large that it becomes deformed, thus bringing on shame. It is continually irritated by touching her clothing and [this] brings about thoughts of sex and copulation. Thus it appeared reasonable to the Egyptians to amputate the clitoris before it became too large, particularly before virgins are given in marriage." Then follow the details, describing the surgical

(*Wars* 7.30.4) reports the death of Theodora in 548 (calculated as 28 June), without comment, other than to write she had fallen ill and died.

³⁵ Note Procop. *Anec.* 17.34. Theodora, as empress, never forgot the dreadful life-style endured by the common prostitutes, and one reads in the pages of Malalas (18.24 [368 Thurn; Elizabeth Jeffreys et al., *The Chronicle of John Malalas* (Melbourne 1986) 255–256]) how she sought out brothel-keepers, had them proscribed, and freed the unfortunate young women who had been 'sold' for a pittance by poverty-stricken fathers, having, in effect, sold their daughters under the guise of a contractual agreement. Theodora's intent that there would no longer be πορνοβοσκοί in Byzantium was given the force of law, as one reads in Justinian's *Novellae* 14 *De lenonibus* (105–109 Schoell/Kroll; 'Preface' translated as "Justinian on Pimps," Mary Lefkowitz and Maureen B. Fant, *Women's Life in Greece and Rome*³ [Baltimore 2005] 211–212.

³⁶ *Tetrab.* 16.103 (Cornarius 922, Wegscheider 130 as ch. 106, more-or-less Zervos 152–153 as ch. 115)

excision of about half of what in Greek is called the *nympha*, by means of a toothed forceps and scalpel (the attendant here is specified as male). With proper applications of soothing drugs (frankincense, probably in powdered form), powdered calamine, oil of roses, the ashes made from the doum palm, and something called the ‘Phrygian stone’ (likely one of the common ‘earths’ so frequently prescribed in Byzantine pharmacology), the wound heals nicely in about a week. The surgery is quick, precise, and assured. And apparently very common. In the seventh century, Paul of Aegina incorporates a clitoridectomy among his recommended procedures,³⁷ and Paul’s account is generally replicated by Albucasis in the tenth century in his *Surgery* (2.71).³⁸ Lest it be assumed that this ‘barbarous practice’ was not characteristic of modern western surgery, the commentary by Francis Adams to his translation of Paul’s *Seven Books*³⁹ quotes a standard text (1846: Heister’s *Surgery*) indicating that British surgeons and midwives performed this surgical procedure as a matter of course in the first half of the nineteenth century.⁴⁰ Wegscheider, however, dem-

³⁷ *Epitome of Medicine* 6.70: I. L. Heiberg, *Paulus Aegineta* (CMG IX.2, Leipzig/Berlin 1924) 112.

³⁸ M. S. Spink and G. L. Lewis, *Albucasis On Surgery and Instruments* (London/Berkeley 1973) 456.

³⁹ Francis Adams, *The Seven Books of Paulus Aegineta* II (London 1846) 382, citing the 1846 ed. of Heister’s *Surgery* II §5 147. The curious phrasing by Adams indicates that both circumcision and clitoridectomy were presumably limited to “the East,” but he adds “The *cauda pudendi* was probably the cauliflower excrescence of the os uteri described by late authorities on midwifery.”

⁴⁰ Wegscheider, *Geburtshülfe* 130 n.1: “Diese Operation (Clitoridectomie) wird jetzt nur noch bei malignen Neoplasmen ausgeführt,” with citations of a contemporary handbook on surgery, although there was apparently a lengthy history of the procedure in German surgery as there had been among British surgeons. Wegscheider cites M. Saenger and O. von Herff, *Encyclopädie der Geburtshülfe und Gynäkologie* (Leipzig 1900) 244, to support the ‘modern’ view, contrary (*dagegen*) to the ordinary performance in the 1840s indicated by the multi-volume *Das Geschlechtsleben der Weibes* by D. W. H.

onstrates that ‘nymphotomy’ had fallen out of medical fashion by the first decade of the twentieth century, even as he cites the synopsis of the operation given by Gurlt as a historical document that suggested earlier German surgical procedures, in turn based on the account in Aetius of Amida. If this seems unbelievable, the references cited by Wegscheider that specify German surgical techniques in the early nineteenth century are simply in keeping with the medical ‘norm’ in western Europe, also documented in British surgical handbooks.

Among the many surgeries for women in *Tetrabiblon* 16 are mastectomies,⁴¹ inguinal hernia repair, bladder stone removal (lithotomy), excision of uterine and anal hemorrhoids (especially common after several births have occurred), uterine cancers, cervical abscesses, and several more. Each of these procedures (with the exception of the quick removal of anal hemorrhoids) would have engendered pain to the point that the patient likely could have died of shock, unless some kind of narcotic was concomitantly administered.⁴² Significantly, in ‘Aspasia’s’ account of surgery for the removal of uterine hemorrhoids, there are also provided a number of recipes for compounds that do include known natural anesthetics: “Two drachmas each of mandrake juice, finely ground alum, and acacia gum, to be ground in a mortar with wine, and fashioned into suppositories, [which are then] smeared/inserted” (16.97 end [Cornarius 920]). Aetius/Aspasia then adds (*sotto voce* ‘if

Busch (Leipzig 1844) V 222, “der Operation genau wie Aëtios beschreibt.” See also Gurlt, *Geschichte* 401 and 554–555.

⁴¹ See esp. Michael Harstad, “Saints, Drugs and Surgery: Byzantine Therapeutics for Breast Diseases,” *Pharmacy in History* 28 (1986) 175–179.

⁴² For medieval use of narcotics in surgical procedures, see Piers D. Mitchell, *Medicine in the Crusades* (Cambridge/New York 2004), esp. 198–202 (“Anaesthesia During Operations”), with commentary by John Scarborough, “Drugs and Surgery in the Crusades,” *Pharmacy in History* 47 (2005) 27–28, and review in *Times Literary Supplement*, August 19 & 26, 2005, 33. Available as a pre-print is John Scarborough, “Roman and Byzantine Surgery for Hernia Repair,” *Sudhoffs Archiv* [forthcoming].

that doesn't work, try this"), "two drachmas each of hemlock juice, henbane juice, chips of alum, red chalk, one drachma of cinnabar; grind all of these ingredients in a mortar with red wine." Note the presence of mandrake,⁴³ henbane, and hemlock, all of which have long histories of use as anesthetics in surgical procedures documented from classical Greek days through the Crusades.

Court physicians and their less renowned and generally anonymous colleagues, who practiced among the common people in the cities and the far more numerous country folk, usually provide us with seemingly straightforward details of a practice of medicine, often bereft of either a religious context or the always-present folk medicine with its panoply of botanical and magical tokens and ingredients. How much of this represents a 'pagan heritage' is the subject of continuous contention among students of Byzantine culture,⁴⁴ but some of the hagiographical texts testify to a fusion—sometimes openly, sometimes grudgingly—of a saintly medicine that carried the wrappings of a popular Christianity infused with occasional practical procedures that can only be described as 'professional'. Not only do the famous miracles of Sts. Cosmas and Damian incorporate rather appropriate procedures in surgical treatments of breast cancers,⁴⁵ but the splendidly intricate and quite pointed miracles of St. Artemius focus on the healing of hernias, mostly in men, but with an occasional 'case history' of

⁴³ Mandrake (*Mandragora* spp.) is especially prominent: see Dioscorides *Materia medica* 4.75 (II 233–237 Wellmann) for antiquity's best and fullest description of dosage, properties, and uses. Available as a pre-print is John Scarborough, "Mandrake in Ancient Surgery," currently in submission.

⁴⁴ A masterly summary of the texts, sources, and questions is Owsei Temkin, "Hippocratism Encounters Christianity" and "Hippocratic Medicine and Triumphant Christianity," chs. 6 and 7 in *Hippocrates in a World of Pagans and Christians* (Baltimore/London 1991). See also Gary Ferngren, *Medicine and Health Care in Early Christianity* (Baltimore/London 2009).

⁴⁵ Harstad, *Pharmacy in History* 28 (1986) 175–179, using various passages in Ludwig Deubner, *Kosmas und Damian* (Leipzig 1907).

a woman's similar affliction,⁴⁶ reminiscent of the surgical techniques for hernia repair found in Aetius' *Tetrabiblon*.⁴⁷ In fact, saints' lives have long been understood as rich lodes of information on how the Church absorbed some aspects of 'professional' medicine,⁴⁸ and the texts which offer details of Christian-magical healing suggest another intertwining dimension of what constituted medicine in the Byzantine centuries.⁴⁹

⁴⁶ Virgil S. Crisafulli and John W. Nesbitt, *The Miracles of St. Artemios* (Leiden/New York 1997), esp. 140–145, "Miracle 24: The Betrothed Woman"; see also the "Supplementary Essay" by John Haldon, "The Miracles of Artemios and Contemporary Attitudes: Context and Significance," 33–73, which takes up the tension between saintly healing powers and traditional 'rational' medicine (very full bibliography contained in the 148 footnotes).

⁴⁷ *Tetrab.* 16.101 (Cornarius 921, Wegscheider 129 [ch. 104]), "On Inguinal Hernia among Women."

⁴⁸ H. J. Magoulias, "The Lives of the Saints as Sources of Data for the History of Byzantine Medicine in the Sixth and Seventh Centuries," *BZ* 57 (1964) 127–150, an article drawn from Magoulias' Harvard dissertation (1961) of the same title. See also Susan Ashbrook Harvey, "Physicians and Ascetics in John of Ephesus: An Expedient Alliance," *DOP* 38 (1984) 87–95 (for some Syriac texts and sources); Peregrine Horden, "Saints and Doctors in the Early Byzantine Empire: The Case of Theodore of Sykeon," in W. J. Shiels (ed.), *The Church and Healing* (Oxford 1982) 1–13; Dominic Montserrat, "'Carrying on the Work of the Earlier Firm': Doctors, Medicine, and Christianity in the *Thaumata* of Sophronius of Jerusalem," in Helen King (ed.), *Health in Antiquity* (London/New York 2005) 230–242; and Véronique Boudon-Millot, "De l'homme et du singe chez Galien et Némésius d'Emèse," Béatrice Caseau, "Parfum et guérison dans le christianisme ancien et byzantin: des huiles parfumées des médecins au myron des saints byzantins," Marie Hélène Congourdeau, "Médecine et théologie chez Anastase le Sinaïte, médecin, moine et didascale," and Patrick Laurence, "La faiblesse féminine chez les Pères de l'Église," in Véronique Boudon-Millot and Bernard Pouderon (eds.), *Les Pères de l'Église face à la science médicale de leur temps* (Paris 2005) 73–88, 141–192, 287–298, and 351–378. Cf. the numerous medical miracles in Alice-Mary Talbot and Scott Fitzgerald Johnson, *Miracle Tales from Byzantium* (Cambridge [Mass.]/London 2012).

⁴⁹ On this often amorphous topic, see the perceptive analyses by Gary Vikan, "Art, Medicine, and Magic in Early Byzantium," *DOP* 38 (1984) 65–86, and *Early Byzantine Pilgrimage Art*² (Washington 2010), esp. 55–58

It is clear that Aetius of Amida was a gifted and skilled physician, who possibly served in some capacity at the court of Justinian and Theodora, likely perhaps even as a court gynecologist and obstetrician in special service to Theodora, who—if Procopius and John of Ephesus are to be believed—was talented in her own right in the pharmaceutical arts of contraceptives and abortifacients, and was intimately acquainted with the life of a prostitute. That prostitutes knew their aphrodisiacs, contraceptives, and abortifacients as important aspects of their business is verified by notices such as are found in the legal texts (see the Appendix), and that the women attending Theodora would require the best obstetrical and gynecological care then available goes without saying. Book 16 of Aetius' *Tetrabiblon* is a priceless source for both the medical practice followed at court, as well as what was commonly known by women and their physicians, whether specialist midwives or male surgeons and physicians, exemplified by Aetius, who had been a medical student at Alexandria.⁵⁰

(“Health and Healing,” 52–53), a short, heavily illustrated book replete with indisputable evidence of the continual links and crossovers of miracle and medicine among the so-called common folk. Interpretations, e.g. of the ‘Solomon’ and Mandrake Root Pilgrim Tokens (42, fig. 29) could easily range from the purely rational to the quintessentially magical, in turn fused with the well-known anesthetic properties of this, the first herb depicted in the famous A.D. 512 Vienna Codex of Dioscorides' *Materia medica*. See also Marvin W. Meyer and Richard Smith (eds.), *Ancient Christian Magic: Coptic Texts of Ritual Power* (Princeton 1994), a collection of translated spells and incantations, some medical, most not, an assembly to be treated as supplementary to Hans-Dieter Betz, *The Greek Magical Papyri in Translation Including the Demotic Spells*² (Chicago 1992), wherein there are numerous ‘medical’ spells, curses, incantations, and putative cures for a large panorama of diseases, from impotence and sterility to swollen testicles and spells to keep a woman's uterus from bouncing about, e.g. 123–124 “For Ascent of the Uterus,” transl. by John Scarborough, rpt. in Lefkowitz and Fant, *Women's Life* 299.

⁵⁰ Scarborough, in *Hippocrates and Medical Education* 236–242.

APPENDIX: Drugs and the Law

Aelius Marcianus, quoted at *Dig.* 48.8.3, makes it clear that there were explicit legal distinctions between what were poisonous drugs and those that were not, especially aphrodisiacs—and it would appear that the jurists found such distinctions rather fluid, depending on who used them and why, thus 48.8.3.2 *adiectio autem ista 'veneni mali' ostendit esse quaedam et non mala venena. ergo nomen medium est et tam id, quod ad sanandum, quam id, quod ad occidendum paratum est, continet, sed et id quod amatorium appellatur*, “The addition of the words ‘harmful drugs/poisons’ demonstrates that there are [some drugs] which are not poisonous, [and] therefore the word[s] are neutral, encompassing [both] a [drug/poison] prepared for healing purposes as well as one prepared to kill, [and] also [the term] encompasses [a drug] which is called an aphrodisiac.” The law certainly made a distinction between aphrodisiacs (*amatoria*) and poisons (*venena*), but the law also made note of some of the substances that could be touted as one kind (beneficial) and others that could be harmful, thus some of the aphrodisiacs commonly employed by call-girls—and apparently midwives—in serving their customers. The list of substances that follows were easily purchased on the open market, but sometimes tragedy must have occurred, since (48.8.3.2) *ex senatus consulto relegari iussa est ea, quae non quidam malo animo, sed malo exemplo medicamentum ad conceptionem dedit, ex quo ea quae acceperat decesserit*, “As ordered by a *senatus consultum* [a woman] who, in poor judgment, but not disclosed as [having] malicious intent, has given a fertility drug, and she who has taken it dies, shall be remanded.” Then come the items, apparently most troublesome to prostitutes and their customers (note that one bought these substances from *pigmentarii*, merchants who sold paints, cosmetics, drugs, and spices), and they are, indeed, dangerous, if used improperly (48.8.3.3): *alio senatus consulto effectum est, ut pigmentarii, si cui temere cicutam, salamandram aconitum pituocampas aut bubrostim mandragoram et id, quod lustramenti causa dederit cantharidas, poena teneantur huius legis*, “In another *senatus consultum* it was enacted that those who sell paints, drugs, spices, and cosmetics are liable to penalty under this statute if they carelessly sell/give out hemlock, a salamander, aconite, urticating caterpillars or the blister beetle called the *bouprestis*, mandrake, or, except for lustrations, [other] blister beetles called the *cantharis*.”

Mandrake (*Mandragora* spp.) not only was a common anesthetic, but was also used to lessen one’s inhibitions, quite suitable for any

call-girl to add to a customer's wine—but too much simply killed the one who quaffed it (Dioscorides is rather firm about this, see nn.43, 49 above); used in very small amounts, again in wine, hemlock (*Conium maculatum* L.) and aconite (sometimes called monkshood [*Aconitum napellus* L.]) are mild stimulants, but both were notorious poisons (Plato's account of the death of Socrates from hemlock is antiquity's most famous description of the effects), and each could easily mean the death of a potential customer of any prostitute who administered either monkshood or hemlock in a pre-copulative drink. The two blister beetles (*Lytta* spp. and *Mylabris* spp.) were supposed to be powerful aphrodisiacs, with *cantharis* still around as the rather nasty stuff called 'Spanish fly' (a tiny bit will cause sharp pains in the bladder), and the urticating caterpillars (the larvae of the pine processionary moth *Thaumetopoea pityocampa*) were prepared as a caustic treatment for skin rashes and *not* to be taken internally, thus another quasi-poisonous substance prepared from insects (our sources associate *pityocampae* with the blister beetles, so that someone ignorant of negative potency would naturally assume 'just another aphrodisiac'), in turn linked with various salamanders. On blister beetles as aphrodisiacs, stimulants, and poisons, see John Scarborough, "Some Beetles in Pliny's *Natural History*," *Coleopterists Bulletin* 31 (1977) 293–296, and "Nicander's Toxicology, II: Spiders, Scorpions, Insects, and Myriapods," *Pharmacy in History* 21 (1979) 3–34 and 73–92, at 73–80 ("Remedies: Blister Beetles"), rpt. in *Pharmacy and Drug Lore* as ch. 6. See also Ian C. Beavis, *Insects and Other Invertebrates in Classical Antiquity* (Exeter 1988) 168–175 (the blister beetles) and 148 (urticating caterpillars).

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School of Pharmacy and
Department of History
University of Wisconsin
Madison, WI 53705
beetle9204@yahoo.com