

Chapter One

(The Wrong Kind of) Gonorrhoea in Antiquity

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Historiography and Methodology

Studying the relationship between disease and fertility in antiquity is challenging. The first difficulty is establishing the presence, and then prevalence, of any particular condition before an assessment can be made of its demographic impact. In the case of what are now called sexually transmitted infections (STIs), the empirical obstacles to identifying such infections in the classical world are exacerbated by the moralizing that attends discussions of sexual practice and that has so strongly characterized the ways sexual behavior and pathology have been, and continue to be, conceptually conjoined. Julius Rosenbaum's influential and exhaustive nineteenth-century exploration of the ancient history of syphilis (broadly construed), for example, is based on the assumption that venereal diseases are caused by the "abuse" of the genital organs for nonprocreative purposes. Their history is, therefore, the history of human "lasciviousness and debauchery," and there was so much of that in classical Greece and Rome that syphilis and all kinds of genital afflictions necessarily followed.¹

More methodologically reputable approaches to the problem of past disease presence are threefold.² The first is retrospective diagnosis, based primarily on the written sources surviving from a historical society, in which the descriptions of various ailments are critically assessed against modern clinical accounts and understandings. Paleopathology provides the second, focused

on the analysis of the biological remains of that society, mostly on osteological scrutiny of skeletal evidence, but also increasingly on the study of ancient DNA (aDNA). Third, the development of next-generation gene-sequencing technologies and advances in Bayesian phylogenetics over the past decade have led to a dramatic increase in molecular clock–dating studies, including various key pathogens: it is now possible to produce a reasonably robust evolutionary timeline for present populations of microbes from genomic data about those populations, and more historical samples are now available.³ All these techniques and approaches have their strengths and weaknesses; they are best combined and, of course, ultimately reliant on the availability and quality of the evidence itself.

In terms of retrospective diagnosis from ancient texts, there has been much debate among medical historians and physicians, often with a classical education and interests, about whether modern syphilis, gonorrhea, or any other genital affliction was present in antiquity. In the early years of the twentieth century, syphilis found no champions, but views were more divided on gonorrhea, which is the focus here.⁴ Parisian urologist Georges Luys opened the first substantial general medical treatise on gonorrhea to be published following the discovery of its causative agent by Albert Neisser in 1879 with the bold statement that “gonorrhoea is as old as mankind,” but others were more doubtful.⁵ British doctors Henry St. Hill Vertue and J. David Oriel rejected this assertion most strongly, finding no evidence for any venereal disease (except genital warts) in classical literature, medical or otherwise, and concluding that the often-cited passage from Leviticus about the “uncleanness” of a man with “running issue” completely lacked the necessary diagnostic specificity.⁶ Toward the end of the past century, Mirko Grmek, in his groundbreaking, truly interdisciplinary, *Diseases in the Ancient Greek World*, was more circumspect. The ancient literary sources are inconclusive: “On the one hand, the diagnosis of gonorrhea is compatible with certain ancient descriptions, and on the other, for none of these descriptions is it the sole interpretation possible.” But he preferred to think that the relevant pathogen was present in the classical Mediterranean world, as this provides a better fit, he suggested, with both the ancient texts and the “biological properties of the germ itself.”⁷

Paleopathology has yet to contribute much to these discussions, except in relation to syphilis.⁸ Gonorrhea and other STIs do not leave decisive skeletal traces, nor have these diseases been identified in any mummified tissue, and it is unlikely (though not impossible) they will be in the future.⁹ One aDNA study of the medieval oral microbiome, in which analysis was conducted on calcified dental plaque from four adult human skeletons buried at

a cemetery associated with the monastic site at Dalheim, Germany, has produced indications of the presence of both *Neisseria meningitidis* and *Neisseria gonorrhoeae* (also known as gonococcus)—that is, the bacteria that can cause meningitis and gonorrhea, respectively.¹⁰ However, not only is this evidence probably from the eleventh century at the earliest, but the application of shotgun DNA-sequencing techniques to this kind of material, even supported by other methods, generates sequences of variable length and thus identifications of variable security. The traces of *Neisseria gonorrhoeae* were too slight to inspire much confidence in this respect. The section on sexually transmitted diseases in the authoritative volume of Arthur Aufderheide and Conrado Rodríguez-Martín, *The Cambridge Encyclopedia of Human Paleopathology*, is entirely aporetic on the question of whether gonorrhea was an ancient disease.¹¹

Phylogenetics, on the other hand, is becoming an increasingly significant player in debates about the history of STIs, including gonorrhea. Research on chlamydia, and especially on the serovars causing lymphoma granuloma venereum, has added to the general sense of the changeability and adaptability of pathogens over time, including over very short timespans.¹² This work strengthens the impression that, contrary to what used to be assumed, diseases are often historically unstable entities as much because their causative agents, the microbes themselves, turn out to be pretty unstable as because of any conceptual shifts or environmental alterations.¹³ Gonorrhea is about to take center stage in these respects. The emergence and rapid spread of antibiotic-resistant gonococcus strains from the end of the twentieth century has set alarm bells ringing across the global public health community, and the collection and scrutiny of genomic data about *N. gonorrhoeae* is part of the internationally coordinated response to this situation.¹⁴ Research is massively ratcheting up as a result.

Unfortunately, a properly historical dimension to these genetic and epidemiological investigations has so far been missing. When this present reengagement with STIs is framed with reference to their past, this is done rather poorly, with far less rigor than attends any comparable scientific claim. Luys's assertion that gonorrhea is as old as humanity is uncritically repeated, though without attribution, while all previous and subsequent debates and discussions on the subject are ignored.¹⁵ If any evidence is supplied to support these statements, it is badly misrepresented, if not traduced; basic standards of scholarship are not attempted. It is clear, as Vertue bemoaned in the 1950s, that the actual texts themselves have not been read, or even looked at (whether in translation or the original languages); rather, it has been taken for granted that they say whatever the author wants.¹⁶ The worry is,

of course, that as well as spreading general misinformation, these unfounded assumptions about the long-term existence of *N. gonorrhoeae*, and therefore about the durability and nature of the pathogen-host relationship, impact the research agenda.

All this serves to underline, again, the importance of interdisciplinary historical projects such as represented by this volume, as well as adding some urgency to the content of this chapter. The evidence relating to the presence or absence of various STIs in the ancient Mediterranean world is rehearsed again, carefully scrutinized, with special attention paid to modern gonorrhea and chlamydia. After a brief brush with ancient Egyptian medicine from the second millennium BC, this analysis starts with the book of Leviticus from the Hebrew Bible (since this is perhaps the most often-cited ancient text in these respects), which probably took roughly its current form in the fifth century BC, though it casts the institution of the ritual laws it expounds back much further.¹⁷ The Palestinian and diaspora Jewish communities were mostly part of the Persian Empire at that time, as were the Greek cities of Ionia, centers of early natural philosophical speculation and contributors to the explosion of Greek medical writing that began as the century drew to a close.¹⁸ The many treatises generated in this outburst, later collected together as the Hippocratic Corpus, offer rather slight pickings for this discussion, however, and most weight falls on the abundant written remains of the Roman Empire. Learned medicine flourished in the imperial period, and a rich literature engaged with many aspects of social and erotic life. The ancient disease of *gonorrhoeia* had acquired an established place in the pathological landscape. The term, an abstract noun formed from the Greek for seed (*gonos*) and flow (*rhoos*), was inherited, not—as commonly claimed—coined, by Galen of Pergamum, the great imperial physician of the second century AD.¹⁹ While many Latin satirists enjoyed exposing all Rome's sexual foibles in explicit detail, if there is evidence of STIs to be found in antiquity, this is the best place to look.

The argument is, however, that no such evidence is to be found. The symptoms of painful urination and some kind of vaginal or penile discharge, perhaps with swelling of the foreskin or lower abdominal pain, the conjunction of which would be taken to indicate modern gonorrhea (and, indeed, chlamydia), do not appear together in any ancient medical text, nor in any other part of the ancient literary record.²⁰ This is a significant absence, given the dense coverage of human ailments, injuries, and cures in written material from classical Greece and Rome. Nor are notions of the sexual transmission of disease to be found in antiquity; sexual encounters were not considered sites of pathological danger. But that is not the only way that sex and disease

can go together, and this chapter makes a positive argument as well as a negative one, tracing an ancient thematics of sexual sickness, shaped by contemporary understandings, values, and concerns, including around fertility. It is no accident that one of the main sexual diseases of the classical world—that is, conditions with a sexual dimension running through their causes, symptoms, and therapies—was *gonorrhoeia*, with its focus on seed, the substance of human generation, and its management and control.

While work on the evolution of human pathogens in historical time might be considered to provide theoretical support for the possible absence of modern gonorrhoea from the ancient Mediterranean world, such an absence may be, as it were, total or partial. It could be that *N. gonorrhoeae* had yet to come into being or had yet to reach this part of the globe. Perhaps it had yet to take its present form or was less virulent, producing a less symptomatic version of gonorrhoea, which left little trace. This possibility will be examined in a bit more detail at the end of this discussion, with some new phylogenetic evidence from a more historically conscientious genomic study, but it is worth bearing in mind throughout, along with the problems caused by the generally asymptomatic character of modern chlamydia.²¹

Searching for Ancient Gonorrhoea

Histories of STIs sometimes begin with a reference to the Ebers Papyrus, the longest of the surviving ancient Egyptian medical papyri, comprising a collection of different texts, written in hieratic and dating to the 1530s BC.²² The precise translation of much of its contents remains uncertain, but they definitely include a set of therapies for urinary problems, for regulating the flow of urine.²³ John Nunn renders the “rather enigmatic Ebers 265” as “another [remedy] to eliminate heat (*tau*) in the bladder, when he suffers retention (*hedbu*) of urine.”²⁴ He continues, “The first part suggests cystitis, and the second outflow obstruction due perhaps to urethral stricture or an enlarged prostate. Both parts would certainly apply to a urethritis.” Nunn does not specify, but such a urethritis could obviously be gonococcal or nongonococcal, and today chlamydia is thought to be the cause of a substantial proportion of the latter. There are no references to nonurinary penile discharges, however, nor to any of the nonmenstrual forms of female flux that will become a feature of later Greek and Roman medical writings. There is a mysterious segment in the Ebers Papyrus that deals with sufferings in connection to “secretions” (*setja*), and the shorter Kahun Papyrus, from around 1825 BC, includes remedies for “*khaau* of the uterus,” the verb *khaa*

generally meaning “throw, cast off, eject, or excrete,” though what sort of conditions are being treated here is entirely unclear.²⁵

Passages in the book of Leviticus in the Hebrew Bible are more standard fare in these historical outlines. This book recounts the rules regarding ritual and priestly conduct, and purity and impurity, imposed by Yāhweh on the Israelites through Moses and Aaron, and it covers male and female discharges as part of the regulatory system. Chapter 15 is the most important, though there are related references elsewhere in the book, and it follows a neat chiasmic structure. First the impurity of a man with a discharge—“his discharge being from his member”—is dealt with, then the lesser impurity of a man who has a seminal emission.²⁶ The same status applies to a woman with whom the man has intercourse, which marks the shift to female impurity.²⁷ First up is a woman with a discharge—“her discharge being blood from her body”—that is, menstruation, which renders her impure for seven days, then a woman who has a significant discharge of blood outside or beyond the time of her menstrual impurity.²⁸ She is impure until seven days after she has been healed, at which point sacrifices are offered and rituals performed. The same is the case for the man who has a discharge: he remains impure for seven days after healing, and sacrifices are then offered and rituals performed. All these impurities are contagious, to different degrees, passed by direct or indirect contact with other people, animals, and objects. Mostly this second-hand impurity is discharged by cleansing or washing and lasts only until evening, but intercourse with a menstruating woman makes a man impure for seven days.

Much has been written about this passage in Leviticus: in the context of wider explorations of the overall purity and pollution system of the Hebrew Bible and the notions of purity and pollution more generally, as well as in the context of examining sex, sexuality, and gender.²⁹ Here, however, the question is rather different and more specific: is there an STI in this text? There is disease, it seems. Both the man with a discharge from his member and the woman with the nonmenstrual discharge of blood are “healed” of their condition: the Hebrew verb *tāhar* here denoting physical, not ritual, purification.³⁰ The first, and to some extent the second, symptoms are compatible with modern gonorrhea (and chlamydia) as well as a range of other conditions; the gender differentiation of the character of the discharge is part of a wider pattern of equivalence but not symmetry between male and female impurities across the regulatory scheme.³¹ Whether these are meant to be viewed as the same ailment in men and women or not is left uncertain.

There is a sexual and generative dimension, at least on the male side. It is assumed that his discharge is seed, since its normal, healthy but still impure,

equivalent in the sequence is a seminal emission such as during intercourse. The same pattern occurs in the pairing of normal, healthy and abnormal, diseased discharges of the same substance—blood—on the female side. The point is made explicit in the Septuagint, the Greek translation of the Hebrew Bible produced in early Hellenistic Alexandria, which speaks specifically of “seed” (*gonos*) in this sequence and even renders the phrase “man with a discharge” as *ho gonorrhûês*, literally, “the seed-flowing-man.”³² And, of course, the sexual transmission of impurity is possible, though mentioned only in cases of normal discharge, where there is a particular gender asymmetry, but the general danger of physical touch is present in the aberrant situations too. There is, however, nothing other than impurity under discussion in this passage—that is, ritual impurity, where being impure is a ritual status, entailing exclusion from certain ritual acts and sacred spaces. There is, indeed, no sense of prohibition implied here. Yahweh is simply setting out the rules that must be obeyed, but that obedience is where the force of religious and thus moral obligation falls, not in the content.³³

Symptoms such as the flow of seed, urinary problems, and a range of vaginal discharges, both sanguineous and otherwise, also feature in the earliest surviving Greek medical writings, which emerged in the late fifth and early fourth century BC, less than a hundred years after Leviticus took its final form and in a more northerly sector of the Mediterranean world. Later collected under the name of Hippocrates of Cos, the legendary founding father of learned Greek medicine, the roughly sixty treatises that compose the Hippocratic Corpus include those that focus on describing diseases and their cures as well as those engaged with more abstract matters of causation and somatic composition, practical matters of regimen, surgery, and prognosis, not to mention the nature of the medical art itself.³⁴ The extant material is, then, rich and varied, but the cosigns of modern gonorrhoea never appear together; rather, they each form part of their own pathological packages, some recognizable in current medical terms, others less so. The question is, again, how to interpret this pattern, shaped as it is by the particular commitments and concerns, assumptions and objectives, of Hippocratic physicians as much as by their disease environment.

The fact that the individual symptoms of modern gonorrhoea (and chlamydia) were identified in classical Greece, roughly where they would otherwise be expected, but never described together, is telling. Painful urination, along with sharp pains in the kidney, loins, flank, and testicle on one side of the body is a sign of kidney stones, for example, in the Hippocratic treatise *Internal Affections*, where it forms part of a diagnosis that would be recognized in modern medicine too.³⁵ Bladder stones and strangury (*strangourîê*)—the

latter being a condition in which urine is passed a little at a time—can also conjoin pain and urination.³⁶ Flow of seed, during the night and even when out walking, also appears in *Internal Affections*, but as a characteristic of a kind of *tuphos*, caused by compaction and drying out of the moisture in the body.³⁷ Emaciation, weakness, a change of somatic color, excessive hunger, and enjoyment of the smell of extinguished lamps count among the other symptoms of this disease, which, if not effectively treated at the outset, will continue for twenty years.

Seminal flux is also associated with *phthisis*—consumption—a different type of wasting away. The fullest description is provided by the Hippocratic author of *Diseases 2*, in relation to *phthisis* of the back, arising from the spinal marrow, a substance strongly associated with seed by the philosopher Plato and some Hippocratic writers.³⁸

It most frequently seizes those who are newly-married and fond of sexual intercourse (*philolagnos*). They are without fever, and eat well, but still waste away. And if you ask the patient, he will say that it feels as if, starting from his head, something is tiptoeing down his spine, like ants. And whenever he passes urine or stools, much watery seed comes forth. He produces no offspring, and has nocturnal emissions, whether he has intercourse with his wife or not. Whenever he walks or runs, especially uphill, he suffers breathlessness and weakness, and heaviness of the head, with ringing in the ears. When, eventually, violent fevers take hold, he will die from an intermitting fever.³⁹

So early medical intervention is advisable, beginning with upward and downward purging, then a diet of milk and a little gruel, followed by more substantial sustenance; the patient should abstain from drunkenness, sexual activity, and any exercise except walking (but not in the cold or sun) for a year.

Women can also suffer from a flow of seed, since, as Hippocratic writers variously presume and explain, both men and women produce seed that is necessary for the generation of offspring.⁴⁰ Issues of fertility are thus implicated, as a passage in *Diseases of Women 1* makes clear, one of the so-called gynecological texts in the Hippocratic Corpus in which female health and procreation are essentially aligned.⁴¹ Thus, in this passage a situation that favors conception in terms of a woman's wishes, seed, sexual activity, and uterine configuration is contrasted with one in which her seed runs out in a continual flow, without stopping; she does not welcome intercourse with her husband and does not become pregnant.⁴² She is also afflicted with pain in her loins, a slight fever, weakness, and fainting, and her womb is not in its proper place.

The flow of seed is, however, just one of a whole range of unhealthy female fluxes that feature in Hippocratic writings. The opening sequence of *Diseases of Women 2* describes therapies for eleven different flows (*rhooi*): two of blood, one red, one yellow red (*purros*, that is, fire or flame colored), two white, one like sheep's urine, two like egg, and two like the juice from roasted meat.⁴³ All are accompanied by a shifting set of other symptoms: often fever, pains, swelling, breathlessness, ulcers, and pustules; several are explicitly the result of miscarriage, a problematic birth, or incomplete purging thereafter, though general bodily imbalances can also cause such ailments. It is one of the "white fluxes" that is usually identified as modern gonorrhea by those inclined to do so. Neither bears much resemblance to the current condition, but perhaps closest is the case where "what is purged is a yellow-green white, and whenever she urinates it bites and stings, and the uterus is ulcerated, and she has acute fever, is very hot, thirsty and unable to sleep, and becomes delirious, and whenever she hurries, she has difficulty breathing, and her limbs loosen."⁴⁴ There is no indication here, or elsewhere in this sequence, that the flux is in any sense seminal, just as none of them are menstrual; if there is blood, it is not from menstruation.⁴⁵

Learned Greek medicine took a more orderly form in the Hellenistic period, in the expanded Greek world created by the conquests of Alexander the Great, contested and then consolidated after his death in 322 BC.⁴⁶ Almost none of the extensive and highly influential medical writings produced in this time survive, however, so the developments they enacted have to be reconstructed from later works, which variously absorbed, elaborated, and debated them. One such development was in the field of pathology, where the Hippocratic proliferation of symptoms and their intermingling with diseases was reined in and organized into a roughly shared categorical framework. A more or less settled catalog of diseases was established, each constituted by an essentially agreed-on set of symptoms, though their causes and cures remained more contentious.

Gonorrhoeia emerged as one of these established diseases. Its first extant appearance as such is probably in an anonymous medical handbook from the first century AD—that is, after the Hellenistic kingdoms themselves had fallen to Rome, while Greek medicine and culture had been absorbed into the Roman Empire, which now encompassed the whole of the Mediterranean world and more.⁴⁷ This is, however, a synoptic text, summarizing existing ideas and practices. So *gonorrhoeia* already had a history, though one that seems not to have reached back as far as Hippocrates, Diocles, Praxagoras, or Erasistratus, the four key medical authorities whose views on the causes of each disease the author liked to cite if he could.⁴⁸ The latest of them, the

great Alexandrian anatomist Erasistratus of Ceos was active in the early third century BC, so *gonorrhoea* was a late Hellenistic product, of the second or perhaps first century BC. It had, moreover, already been translated into Latin in the early first century AD. Around the AD 30s, the Roman gentleman Aulus Cornelius Celsus included mention of *profusio seminis*, “the flux of seed,” in the medical books of his great encyclopedia—his collection, organization, and presentation in Latin of all the technical knowledge a member of the Roman elite like himself should possess, knowledge often derived from Greek sources.⁴⁹

That these are the same disease can be confirmed by comparing their descriptions. Celsus spoke about a complaint located in the genital region, of excessive flow of seed, “which occurs without sexual intercourse, and without nocturnal imaginings, so that over time the sufferer is consumed by wasting.”⁵⁰ The anonymous Greek author provided a slightly fuller account: “In those suffering from *gonorrhoea* there is an involuntary, permanent flow (*rhein*) of seed (*gonos*), without pleasure. They waste away, lose their colour and strength; they become fevered, with loss of appetite, and even their pulse fades.”⁵¹ This is a chronic disease, which arises from paralysis of the seminal vessels, both issues Celsus avoids, since the most important division for him is between affections arising from the whole, or a specific part, of the body, and he is not much interested in etiology at all.⁵² There is more overlap again in respect to their therapeutic prescriptions, though the anonymous author offered a much longer, more detailed set of instructions. These begin with rest, fasting, and the application of cold sponges and vinegar to the lower abdomen, groin, and hips and end many days later with vomiting from radishes. He suggested that the patient should lie on a hard bed with a sheet of lead under his loins, while Celsus advises the patient against sleeping on their back.

Other Greek medical texts from the first and second century AD discuss *gonorrhoea* in very similar terms. All describe it as an ongoing, uncontrolled flow of seed, without desire, which results in loss of strength and color, a general wasting away. If the immediate cause is identified, it involves impairment of the seminal vessels, and there is also some repetition, as well as variation, in respect of therapeutic recommendations. Soranus of Ephesus, a prominent authority in the methodic school of medicine, active in Rome around AD 100, made it clear in his *Gynecology* that “*gonorrhoea* occurs not only in men but also in women,” a point echoed by the less renowned medical writer, Aretaeus of Cappadocia, in his work *On Acute and Chronic Diseases*, composed about the same time.⁵³ Other authors offer no real indications as to whether this is a disease affecting both sexes or not.⁵⁴ Galen of

Pergamum, for instance, the most influential physician and medical writer of the imperial period, operating later in the second century AD, provided such a male-focused discussion of the topic that the implication would seem that females are not affected, though he is deeply committed both to a universal human pathology and to female seed production across his oeuvre.⁵⁵

For Soranus *gonorrhoea* was essentially the same in men and women, but Aretaeus took a different view, part of a distinctive approach to the condition more broadly. His chapter opens with the statement that “*gonorrhoea* is not deadly, but it is unpleasant, and disgusting even to hear about,” in contrast to the neutral tone adopted in all the other surviving accounts. The distastefulness of the disease resides mostly in its emasculating effect on men, which is where the emphasis of his account falls: the condition specifically undermines key male qualities, such as courage, strength, and decisiveness, as well as being more generally enfeebling. Also repellent is its assault on female sexual restraint, since in women “the seed is poured forth by them with titillation of the parts and pleasure, and in shameless intercourse with men, but men are not at all irritated in this way.” Their loss of virtue was thus manifested in quite a different form.

A late antique latinization of Soranus’s work *On Acute and Chronic Diseases* preserves only a fragmentary version of the chapter on “discharge of seed (*lapsus seminis*), which the Greeks call *gonorrhoea*.” It includes the statement that bodies affected by long-term weakness or impacted by sexual overactivity are particularly susceptible. Though no such claim appears in Soranus’s *Gynecology*, that sexual excess might be implicated is hinted at by the therapies prescribed. Not only is it recommended that the woman sleep with a lead sheet under her loins; but they also enjoin the avoidance of anything sexually “provocative.” The patient is not to be shown erotic paintings or told stories about sexual encounters; rather, her entertainment is to be somber and austere in tone and content.⁵⁶ This emphasis on sexual restraint, on closing down the production of seed as means to regain control of the processes of seminal manufacture, accumulation, and emission, is certainly suggestive of the opposite as a possible underlying cause of the disease.

Aretaeus concurred, in a more gendered way. The cure of *gonorrhoea* is an urgent matter, for the affection is unpleasant and the consumption dangerous. There is the lack of offspring to consider, the threat to the continuation of humanity, so the flow of seed must be stopped immediately.⁵⁷ Along the same lines as other authors, cooling and astringent applications to the genital region are accompanied by efforts to dry out the body more broadly and gradually restore strength. But manliness and self-mastery are what is most

at stake in all this: “If he is self-controlled in sexual matters and takes cold baths, the hope is that the patient quickly returns to manhood.”

The same texts and authors continued to record painful urination as a symptom of various kidney and bladder diseases, most especially bladder stones.⁵⁸ Soranus provided a full discussion of different typologies of female flux, mentioned more briefly elsewhere.⁵⁹ The general appearance of male and female genitals also received some sustained attention, with issues around the foreskin and some testicular swellings noted, explicated, and treated, as well as a variety of ulcerations and growths.⁶⁰ All these signs and conditions can then be traced, on their separate tracks, through the surviving medical writings of the later Roman Empire and beyond. Versions of these same accounts of *gonorrhoea* appear, for instance, in Greek medical encyclopedias from the fourth into the seventh centuries AD and, calqued as *lapsus* or *fluxus seminis* and *effusio spermatis* (that is, “flow of seed” or just transliterated as *gonorrhoea*) feature in Latin medical texts over the same period and thereafter.⁶¹ There is some variation of emphasis, of anatomical and etiological detail or precise therapies, but also more repetition and compaction.

It is clear, then, that while *gonorrhoea* became, and persisted as, a well-established disease in classical medical discourse, it was not modern gonorrhoea, either in concept or actuality. The ideas and understandings that shaped and drove *gonorrhoea* were quite distinct, and the symptomatic match with any modern STI is poor. From the messy beginnings of Hippocratic medicine to the well-structured contents of late antique medical encyclopedias, though all the individual symptoms of gonorrhoea and chlamydia were recorded, they never appear in combination. Indeed, there is a sense in which the basic point about absence can be pushed back to the medical papyri of ancient Egypt, but the omission becomes increasingly significant as the amount of surviving evidence increases, and its type and focus shift, in classical Greece and especially the Roman Empire. Now there is reasonable expectation that if modern STIs were present, they would be recognizable in the texts in some form. But, despite the richness of pathological descriptions, the wealth of detail, painful urination was never associated with any kind of penile or vaginal emission. Moreover, while there are historical reasons to think that the discursive focus would be on seed in these settings, there is nothing that would prevent genital discharge and urinary troubles from occurring together in writing if they did in life. Signs more rarely seen in modern gonorrhoea or chlamydia, such as various swellings, lower abdominal and testicular pain, or bleeding between periods, are all duly noted in their places, but these are by and large separate from one another and from *gonorrhoea*.

There were what might be called “sexual diseases” in classical medicine: diseases in which sexual behavior might play a causal role and that had effects on sexual activity and manifested sexual symptoms. But this is sexual behavior in a quantitative sense: who with and of what kind is irrelevant, and no single encounter can be damaging. Moreover, this is part of a wider package of moderation, a world in which any excess or imbalance threatens health, and for *gonorrhoeia* the symptoms and effects are as much about generation as about sex.

Still Searching

Medical writers have, of course, no monopoly on ancient discourses of either sex or disease. There are many other descriptions of bodies that survive from the classical world and especially from Rome. Members of the Roman elite wrote to one another about their ailments and treatments, and those of their friends and family, and offered advice and encouragement, while satirists scrutinized the social and sexual comportment of a wider segment of the city’s population in more hostile fashion. This was a world of public nakedness, in the baths, gymnasium, and brothels, in which power and status determined the rules of sexual conduct, so there was always something at stake in any erotic activity. It produced an array of art and poetry, visual and literary representations, which later viewers and readers would label pornographic and obscene, cover up and confine to the “secret cabinets” of museums, and bowdlerize and refuse to translate: from the typology of sex acts depicted in the frescos from the Suburban Baths of Pompeii to the so-called *Carmina Priapea*, the collection of verses dedicated to Priapus, the phallic god.⁶²

Women were regularly attacked for wrinkled flesh and withered breasts; for cut, worn, and lumpy genitals; and, most persistently, for their spacious and sagging cunts (the Latin *cunnus* bears no other translation).⁶³ They were blamed for sexual overactivity, for a lasciviousness that became embedded in their anatomy, and for a desire that long outstripped their desirability to men.⁶⁴ “Lydia is as roomy as the arse of a bronze horseman” is the first of ten such similes in an epigram of Martial, composed toward the end of the first century AD, the last being her anatomical alignment with the “ugly throat of a pelican from Ravenna.”⁶⁵ The poem closes with the couplet: “I am said to have fucked her in a fishpond. I don’t know, I think I fucked the fishpond.” Smooth and worn anuses and buttocks were the main male failing, the signs of a man who enjoyed being penetrated in anal intercourse rather than doing the penetrating, as he should.⁶⁶ Martial had Charinus go one step further:

his anus is ripped up to his middle, but he still wants more; the point of entry is destroyed, but Charinus still needs to be entered.⁶⁷ Circumcised and infibulated penises were also alluded to, hidden or revealed in the baths or gymnasium, along with the genital proportions of slave attendants in some of the same contexts.⁶⁸

Disease occasionally strikes as part of this mocking supervision of Roman gender and sexual norms, mostly orally. For Roman citizen men to make sexual use of their mouths was not only unmanly but also polluting, and all kinds of odium followed. An “unseemly disease” took hold of Nannius’s “fornicating tongue” while he was deep in the act, Martial explained, and he can no longer get it up.⁶⁹ More has been made of the “figs” that blight several satirical bodies, variously understood as hemorrhoids, warts, or other anal growths.⁷⁰ The verses are unclear, but there is certainly emphasis on the lack of fertility signified by the human version of a fruit that otherwise symbolizes fecundity and abundance and a corresponding implication that certain sexual activities, as well as bareback horse riding, might be a cause.⁷¹ Testicular hernias and hydroceles were also derided, at least until their poetic assailant caught sight of himself in Nero’s baths, so the joke was on him.⁷²

Assorted genital afflictions appear beyond the realms of satire. The Roman senator Pliny the Younger wrote, at the end of the first century AD, to his colleague Calpurnius Macer about a couple from his hometown of Como, in northern Italy, who had thrown themselves into the lake together.⁷³ The husband had been suffering from a rotting ulcer in “those parts which modesty conceals” for a long time before his wife prevailed on him to allow her to examine the sore and provide an honest opinion on its curability. Upon inspection she determined that the case was hopeless, and so, since his ability to live a good life was thus irrevocably compromised, he should bring his existence to a close. She helped her husband achieve that goal by tying herself to him before they both leaped into the water, a deed as laudable as the better-known actions of Arria, who famously led her husband to a noble end.⁷⁴ The story is mainly about the rules of Roman death, but it also indicates that, while rotting genitals impeded marital intimacy, this was essentially a pragmatic issue. There is no mention of cause or blame, the discussion between husband and wife was full and frank, and Pliny willingly shared the details with a fellow senator and indeed the world.⁷⁵ He used a circumlocution to refer to the parts in question, but there is no hint that this disease itself was judged any differently from any other. Around the middle of the second century AD, the future emperor Marcus Aurelius wrote to his tutor and friend, Fronto, that his sister had been “seized with such a pain in her female parts that it was horrible to see.”⁷⁶

Once again, therefore, the point is that the silence about genital discharges and the lack of reference to the symptoms of modern gonorrhea and chlamydia comes not as part of a wider set of silences or neighboring omissions but rather the reverse. Genital afflictions were by no means off-limits in polite conversation, and they were pretty central to the concerns of those whose verses operated in a different register. The size, shape, texture, integrity, and elasticity of both male and female genitals were all recurrent themes in Roman satire, all evoked to comic and censorious effect, without any mention of drips. It is hard not to agree with, and expand on, Vertue's verdict on Juvenal, a younger contemporary of Martial, whose longer poems covered essentially the same ground: he (and his fellow social critics) "would have been by no means ignorant of a contagious urethritis if it had been beneath his eyes, and he would have made eloquent use of his knowledge in exposing what was abhorrent to him and obnoxious."⁷⁷

But what about *gonorrhoeia*? These omissions also cover the symptoms of the ancient disease, which must raise questions about relations between descriptions and reality on one side or the other, if not both. Nor indeed is *gonorrhoeia* itself to be found outside medical texts, with one exception. This expression does fit in with wider patterns, since Roman discussions about health and sickness not involving professionals tended to be vague and symptom-based rather than in terms of the specific diseases that appeared in medical handbooks—and the exception is instructive.⁷⁸

In his Greek account of the first Judean revolt against Rome, the Jewish historian Josephus used *gonorrhoiōi* and *gonorrhōiikoi*, both ways of referring to those suffering from *gonorrhoeia*, as terms roughly equivalent to those with abnormal genital discharges in Leviticus.⁷⁹ There had been some wider reworking of the biblical regulations, at least as Josephus described the range of exclusions from sacred space and sacrifice that obtained before the sack of Jerusalem, which essentially ended the revolt in AD 70; as the scion of a priestly family he should have been cognizant of the rules. *Gonorrhoeia* was then aligned with *lepra*, a generic Greek term for assorted skin diseases that translated the Hebrew *šara'at* (scale disease) of Leviticus chapter 13; affliction with either entailed exclusion from the whole city.⁸⁰ The abnormal female discharge of blood had dropped out of the equation, but menstruating women were barred from the Jerusalem Temple and had only limited access when they were not, like other impure men. It may be, therefore, that, in assimilating the biblical condition with the disease of *gonorrhoeia*, Josephus takes this as something both men and women suffer from: both have seed and both can therefore be troubled by improper flows in this respect.

Still, even if Josephus provides evidence for awareness of *gonorrhoea* beyond medical writing, its symptoms remain missing from the sustained somatic scrutiny enacted by Roman satirists and letter writers. Or, at least, its eponymous permanent flow of seed is missing. The weakness and wasting, and loss of color and vigor, which were also fundamental to the condition, are more often reported to attend sexual overindulgence of various sorts. There are, moreover, reasons to think that the permanence of the seminal flux might well have been exaggerated in the medical accounts for definitional purposes: Soranus, indeed, offers a more episodic version of uncontrolled emission.⁸¹ It might even be the case that the looser Hippocratic collection of signs including, but not organized around, lack of control over seed and its discharge was more accurate, and the emergence of *gonorrhoea* as a disease entity was driven by more structural and ideological concerns. It made sense to have an affection focused around the management of generative seed. The poetry reflected those concerns in its own ways and picked up more directly on the moralizing discourse around the necessary alignment of sexual behavior and social status and around fertility, the need to produce legitimate offspring for the good of the community.

Moreover, while Vertue's argument that the Roman moral system was "incompatible" with the presence of untreated, unregulated venereal infection may be somewhat optimistic, he made a valid pragmatic point that needs some attention to finish.⁸² It is the Roman promotion of prostitution as an institution that protected marriage and the production of legitimate children that Vertue found most problematic in this respect.⁸³ Thus, the stern champion of traditional Roman values, Cato the Censor, is reported to have congratulated a well-known gentleman he met coming out of a brothel, for he had done the right thing with his lusts and kept well away from other men's wives.⁸⁴ It is also recorded that, after repeated encounters in the same location, Cato added that his approbation extended only to the occasional visit, not to making the brothel home: the man had obligations to his patrimony, to his family's fortunes as well as to the families of others, not to mention to his dignity and self-control.⁸⁵ Still, the easy recourse of men from all levels of society to prostitutes in Rome and the size and openness of the sex industry in the city is indisputable, and Vertue is surely right to raise the question of whether that free and favored position would have been sustainable in the face of unchecked gonococcal contagion, especially given the vigorous pronatalism of the Roman state.

He is surely wrong, however, in the categorical confidence of his negative answer. While it seems likely that some anxieties, debates, and even action would have been stirred in such a situation, the sex trade was so integral

to the Roman sexual, social, and economic order that the barriers to any restrictions, reorganization, or rethinking would have been very powerful. Around AD 40 the emperor Gaius even brought in a prostitution tax that proved so lucrative that, centuries later, Christian emperors could not bring themselves to repeal it, despite now publicly abhorring the activities they were profiting from.⁸⁶ Vertue thus reverses Rosenbaum: the presence of such flagrant debauchery in a functioning society oblivious to the dangers of STIs proves the absence of those infections rather than mandating their proliferation. His thesis is no more valid than the original, though the objections are of a somewhat different order. Still, the fact that the Roman Empire enjoyed growth and prosperity over the period most under scrutiny here and that prostitution, power, and population flourished in the first two centuries AD does seem to favor a scenario without modern sexually transmitted diseases.⁸⁷

Absence of Evidence Is Evidence of Absence

This chapter has argued that there is no evidence for modern gonorrhea in the ancient Mediterranean world, in a strong sense. In this case the absence of evidence does equate to evidence of absence. There are numerous places where, if the symptoms of modern gonorrhea had been present together, all the indications are they would have been recorded: there are extensive surviving medical, satirical, and epistolary writings from ancient Greece and especially Rome that describe and assess bodies, disease, and sexual activity. These themes are indeed conjoined on occasion, but disease plays a rather slight part in connections between the other two. Excess in any area of human behavior was considered potentially damaging to health and somatic fitness and function, with sex no exception, but nor was it particularly prominent; other aspects of life and the environment receive greater attention. Fertility was more of a medical concern; generative failure was a pathological as well as ideological problem. Again, sexual misconduct kept a low profile in these discussions, despite looming larger in wider moralizing discourses and indeed state action in the Roman world.

These findings, which follow the earlier arguments of Vertue and Oriel, gain further support from a much more current source. Results now emerging from genetic research driven by the renewed public health concerns around *N. gonorrhoeae*, and its antibiotic resistance strains in particular, include “time to most recent common ancestor” (tMRCA) estimates for the current bacterial population. The Pathogen Genomics group at the Wellcome Trust Sanger Institute sequenced as large a number of *gonorrhoeae*

isolates as possible, drawn from more than fifty different countries and from roughly the past fifty years, and calculated a tMRCA of 1589, with a confidence interval of 1544 to 1622.⁸⁸ The sampling in this study is, of course, biased, selected through antibiotic usage, but, still, it is a significant new datum to consider: the most systematic investigation currently available into the emergence and rapid global spread of *N. gonorrhoeae*, using the most up-to-date methods of genomic sequencing and phylogenetic analysis, locates that emergence in the sixteenth century.

To return to the point made at the outset, this emergence is of the gonococcus in its present form. The current population of the microbe can apparently be traced back to a common ancestor around 1590, but the genetic lineage may continue further into the past. A more distant, divergent ancestor of *N. gonorrhoeae* may have existed prior to this juncture, even back as far as 500 BC, though it might have gone through several significant genetic shifts in the intervening period. Based on the historical evidence scrutinized here, any of these earlier bacteria around the Mediterranean would likely have been less virulent, producing fewer discernible symptoms or, at least, fewer distinctive symptoms; they might have been closer to chlamydia in their manifestations, about which it has been harder to be at all conclusive in the discussion so far. The impact of this proto-gonorrhea and any chlamydia on fertility remains deeply hidden and can thus only be guessed at. It seems quite possible that they had some detrimental effects in this respect, though there has been a retreat (including as reported in chapters in this volume) from some of the more extravagant claims linking STIs with infertility in the present day that characterized the field just a few decades ago.⁸⁹ All in all, then it seems most likely that other factors were more important in determining the size of Greek and Roman families.

Notes

Research for this paper has been undertaken within the framework of the Cambridge University Generation to Reproduction Project, supported by a strategic award from the Wellcome Trust (Grant no. WT 088708).

1. Julius Rosenbaum, *Geschichte der Lustseuche im Alterthume*, 5th ed. (Halle: Schmidt, 1892), 46–47; see also Mirko D. Grmek, *Diseases in the Ancient Greek World*, trans. Mireille and Leonard Muellner (Baltimore: Johns Hopkins University Press, 1989), 142–44; and Daniel Orrells, *Sex: Antiquity and Its Legacy* (London: Tauris, 2015), 83–89.

2. Piers Mitchell, “Retrospective Diagnosis and the Use of Historical Texts for Investigating Disease in the Past,” *International Journal of Paleopathology* 1 (2011):

81–88; Evilena Anastasiou and Piers Mitchell, “Paleopathology and Genes: Investigating the Genetics of Infectious Diseases in Excavated Human Skeletal Remains and Mummies from Past Populations,” *Gene* 528 (2013): 33–40.

3. Charlotte Roberts and Rebecca Redfern, chap. 3; and Ian N. Clarke and Hugh R. Taylor, chap. 4, both in this volume, provide case studies of the latter methods with respect to syphilis and chlamydia, respectively.

4. For summaries of these debates see, for example, Grmek, *Ancient Greek World*, 142–46; and J. D. Oriel, *The Scars of Venus: A History of Venereology* (London: Springer-Verlag, 1994), 4–6.

5. Georges Luys, *A Textbook on Gonorrhoea and Its Complications*, trans. Arthur Foerster (London: Baillière, Tindall and Cox, 1913). The first French edition—*Traité de la blennorrhagie et de ses complications*—was published in 1912. For a national overview of developments in the field in the decades after Neisser’s discovery, see Michael Worboys, “Unsexing Gonorrhoea: Bacteriologists, Gynaecologists and Suffragists in Britain,” *Social History of Medicine* 17 (2004): 41–59.

6. Henry St. Hill Vertue, “An Enquiry into Venereal Disease in Greece and Rome,” *Guy’s Hospital Reports* 102 (1953): 277–302; J. David Oriel, “Gonorrhoea in the Ancient World,” *Paleopathology Newsletter* 4 (1973): 7; Oriel, *Scars of Venus*, 4–8; see also R. H. Boyd, “Origin of Gonorrhoea and Non-specific Urethritis,” *British Journal of Venereal Diseases* 31 (1955): 246–48.

7. Grmek, *Ancient Greek World*, 144–45.

8. See Roberts and Redfern, chap. 3, in this volume.

9. Arthur C. Aufderheide and Conrado Rodríguez-Martín, *The Cambridge Encyclopedia of Human Paleopathology* (Cambridge: Cambridge University Press, 1998), 289. *N. gonorrhoeae* can, rarely (in less than 3 percent of cases), cause septic arthritis or the more diffuse “disseminated gonococcal infection,” which may affect the joints as well as producing skin lesions. These conditions could, therefore, leave skeletal traces, but they would be the same as those resulting from septic arthritis produced by other pathogens. In the absence of genital symptoms, diagnosis requires that the pathogen be identified. See, for example, Peter A. Rice, “Gonococcal Arthritis (Disseminated Gonococcal Infection),” *Infectious Disease Clinics of North America* 19 (2005): 853–61.

10. Christina Warinner et al., “Pathogens and Host Immunity in the Ancient Human Oral Cavity,” *Nature Genetics* 46 (2014): 336–46.

11. Aufderheide and Rodríguez-Martín, *Cambridge Encyclopedia*, 288–89.

12. See Clarke and Taylor, chap. 4, in this volume; though note that mutations may also revert back to the genotype consensus.

13. That pathogens evolve, is of course well known, even in the ancient historical community, but it was largely taken for granted that the amount of change likely between, say the Roman imperial period and today, was quite small, at least in comparison to what went before. But see J. C. F. Poole and A. J. Holladay, “Thucydides and the Plague of Athens,” *Classical Quarterly* 29 (1979): 282–300.

14. See, for example, World Health Organization, *Global Health Sector Strategy on Sexually Transmitted Infections, 2016–2021*, June 2016, <http://apps.who.int/iris/bitstream/10665/246296/1/WHO-RHR-16.09-eng.pdf?ua=1>; and the US Centers for Disease Control, *Gonococcal Isolate Surveillance Program (GISP): Protocol*, May 2016, www.cdc.gov/std/gisp/gisp-protocol-may-2016.pdf.

15. The editorial introducing a special journal issue dedicated to STIs—Didac Carmona-Gutierrez, Katharina Kainz, and Frank Madeo, “Sexually Transmitted Infections: Old Foes on the Rise,” *Microbial Cell* 3, no. 9 (2016): 361—claims that gonorrhea is found in the bible, for example, citing the same claim in William M. Shafer and Elizabeth A. Ohneck, “Taking the Gonococcus-Human Relationship to a Whole New Level: Implications for the Co-evolution of Microbes and Humans,” *Microbiology* 2, no. 3 (2011): e00067-11. The article on gonorrhea in the same special issue—Stuart A. Hill, Thao L. Masters, and Jenny Wachter, “Gonorrhea: An Evolving Disease of the New Millennium,” *Microbial Cell* 3, no. 9 (2016): 372—cites a hundred-year-old authority to the same end: C. J. Hastings, “Public Health Aspects of Venereal Diseases,” *Public Health Journal* 8 (1917): 37–41.

16. Vertue, “Enquiry into Venereal Disease,” 278.

17. For a summary of debates about the chronology of biblical composition, see, for example, John Van Seters, “Historiography in Ancient Israel,” in *The Oxford History of Historical Writing*, vol. 1, *Beginnings to AD 600*, ed. Andrew Feldherr and Grant Hardy (Oxford: Oxford University Press, 2011), 76–96.

18. On the emergence of Hippocratic medicine, and much else, see Vivian Nutton, *Ancient Medicine*, rev. ed. (London: Routledge, 2013).

19. The claim that Galen invented the name is one of the most often repeated historical errors in the literature; see, for example, Richard B. Rothenberg, “Gonorrhea,” in *The Cambridge World History of Human Disease*, ed. Kenneth F. Kiple (Cambridge: Cambridge University Press, 1993), 759; Shafer and Ohneck, “Gonococcus-Human Relationship”; and Carmona-Gutierrez, Kainz, and Madeo “Sexually Transmitted Infections,” 361.

20. Despite its many historical errors, I have used Richard Pattman et al., eds., *Oxford Handbook of Genitourinary Medicine, HIV, and Sexual Health*, 2nd ed. (Oxford: Oxford University Press, 2010) as a guide to the modern manifestations of the diseases discussed here.

21. Current estimates are that 70–80 percent of women and 40–50 percent of men infected with chlamydia experience no symptoms; see, for example, Pattman et al., *Oxford Handbook*, 150. And for more on chlamydia, see Clarke and Taylor, chap. 4, and Michael Worboys, chap. 5, both in this volume.

22. See John F. Nunn, *Ancient Egyptian Medicine* (London: British Museum Press, 1996).

23. Ebers 261–83; Nunn, *Ancient Egyptian Medicine*, 91–92.

24. Nunn, *Ancient Egyptian Medicine*, 91–92.

25. Ebers 530–42 (*setja*); Kahane, 3, 7 and 10 (*khaau*); and Nunn, *Ancient Egyptian Medicine*, 197.

26. Leviticus 15:2–15 (discharge); and 15:16–17 (emission). Translations are by Joseph Milgrom: *Leviticus 1–16: A New Translation with Introduction and Commentary* (New York: Doubleday, 1991), 902–3, and I am indebted to the extensive commentary and discussion in his volume also.

27. Leviticus 15:18.

28. Leviticus 15:19–24 (menstruation) and 15:25–30 (nonmenstrual discharge of blood).

29. It was, of course, Mary Douglas's *Purity and Danger: An Analysis of Concepts of Pollution and Taboo* (London: Routledge and Paul, 1966) and then *Leviticus as Literature* (Oxford: Oxford University Press, 1999) that added a whole new dimension to biblical scholarship on purity and pollution. The theme was developed by, for example, Jonathan Klawans *Impurity and Sin in Ancient Judaism* (New York: Oxford University Press, 2000) and Thomas Kazen, *Issues of Impurity in Early Judaism* (Winona Lake, IN: Eisenbrauns, 2010). For more gendered approaches, see Tarja S. Philip, *Menstruation and Childbirth in the Bible: Fertility and Impurity* (New York: Lang, 2006); Dorothea Erbele-Küster, *Körper und Geschlecht: Studien zur Anthropologie von Leviticus 12 und 15* (Neukirchen-Vluyn: Neukirchener, 2008); and Eve Levavi Feinstein, *Sexual Pollution in the Hebrew Bible* (New York: Oxford University Press, 2014).

30. Milgrom, *Leviticus 1–16*, 921.

31. Bleeding between periods is a rare symptom of modern gonorrhea in women. It is more common in chlamydia, in the 20–30 percent of women who are symptomatic at all, but other causes of such bleeding are more likely.

32. LXX (Septuagint) Leviticus 15:3 (*gonos*) and 15:4, 6–9, 11–13 (*gonorrhûês*). The translation of the Hebrew *tâhar* by the Greek *kathairein*—purge, cleanse, or purify—rather than a more specific verb of healing, on the other hand, rather weakens the sense of physical disease.

33. The relationship between the moral system of the Hebrew Bible and its ritual regulation, between impurity and sin, pollution and prohibition, is one of the key topics in the scholarship; see, for example, Klawans, *Impurity and Sin*.

34. See Elizabeth M. Craik, *The Hippocratic Corpus: Content and Context* (London: Routledge, 2015).

35. *Internal Affections* 14. Greek text and English translations of works in the Hippocratic Corpus are most easily accessible in the eleven Hippocrates volumes of the Loeb Classical Library (Cambridge, MA: Harvard University Press, 1923–2018). Here 6:118–21 (Potter).

36. *Affections* 28: strangury (5:50–51 Potter); *Diseases* 4 24 (55L): bladder stones (10:172–75 Potter). Strangury has fallen out of favor as a disease, though it remains a symptom; bladder stones are still considered to cause painful urination.

37. *Internal Affections* 43 (6:214–9 Potter). Ancient Greek *tuphos*, from which the modern disease name of typhus is misleadingly derived, covers a range of acute diseases involving fever and eventually delirium of some kind.

38. *Diseases 2* 51 (5:284–87 Potter); see also *Epidemics* 6.8.29 (7:286–89 Smith). On the spinal marrow as seed, or its immediate precursor, see, for example, Plato, *Timaeus* 91a–b; and the Hippocratic treatise *Generation 2* (10:8–11 Potter).

39. This translation is adapted from that of Paul Potter, in Loeb, volume 5. Translations are my own unless otherwise noted.

40. This seed production is most famously explained at *Generation 5–8* (10:14–21 Potter).

41. Ann Ellis Hanson, “The Medical Writers’ Woman,” in *Before Sexuality: The Construction of Erotic Experience in the Ancient Greek World*, ed. David M. Halperin, John J. Winkler, and Froma I. Zeitlin (London: Routledge, 1990), 309–38.

42. *Diseases of Women 1* 24 (Loeb 11: 64–67 Potter).

43. *Diseases of Women 2* 1, 3–13 (110, 112–22 L)(11:262–69 and 268–99 Potter).

44. *Diseases of Women 2* 8 (117 L) (11:282–8577 Potter).

45. The nonmenstrual nature of this blood is made clear at *Diseases of Women 2* 5 (114 L) (11:274–77 Potter).

46. See, for example, Nutton, *Ancient Medicine*, 130–59.

47. The author of this anonymous handbook is called, after the location of the main manuscript, Anonymus Parisinus. On this and the other Roman imperial medical texts to be discussed, see Rebecca Flemming, *Medicine and the Making of Roman Women: Gender, Nature, and Authority from Celsus to Galen* (Oxford: Oxford University Press, 2000).

48. See Philip van der Eijk, “The Anonymus Parisinus and the Doctrines of ‘the Ancients,’” in *Ancient Histories of Medicine: Essays in Medical Doxography and Historiography in Classical Antiquity*, ed. Philip van der Eijk (Leiden: Brill, 1999), 295–331.

49. On Celsus and his translation project, see David Langslow, *Medical Latin in the Roman Empire* (Oxford: Oxford University Press, 1999).

50. Celsus, *On Medicine* 4.28. There is, again, an accessible, if somewhat dated Loeb edition and translation in three volumes (Cambridge, MA: Harvard University Press, 1935). The note on this section, provided by the translator, W. G. Spencer oddly asserts that “Greek and Roman medical writers refused to recognise this as an infection, in opposition to all popular knowledge,” this “popular knowledge” apparently being contained in Leviticus (Loeb of Celsus 1:450).

51. Anonymus Parisinus 47: *Anonymi Medici De Morbis Acutis et Chroniis*, ed. Ivan Garofalo, trans. Brian Fuchs (Leiden: Brill, 1997), 240–43.

52. Celsus, *On Medicine* 3.1.3.

53. Soranus, *Gynecology* 3.45. The English translation by Owsei Temkin is easily accessible (Baltimore: Johns Hopkins University Press, 1965), with the chapter on what he renders as “Flux of semen” at 168–70. In note 80 Temkin seems to agree with a much earlier scholarly assertion to the effect that “the ancient concept of gonorrhoea covered spermatorrhea, masturbation, and gonorrhoea,” though spermatorrhea had already ceased to be a disease recognized by modern Western medicine by the 1960s. Aretaeus, *Causes and Signs of Chronic Diseases* 2.5. Francis Adams’s

(rather archaic) English translation is easily available, with the relevant chapter at pages 346–47 (London: Sydenham Society, 1856). On these texts and authors more generally, see Flemming, *Making of Roman Women*, 187–89, 228–46.

54. [Galen], *Medical Definitions* 288 (19:426 Kühn); Rufus of Ephesus, *On Satyriasis and Gonorrhoeia* (Daremberg-Ruelle, 64–86); Flemming, *Making of Roman Women*, 186–91.

55. Galen, *On the Affected Parts* 6.6 (8:437–41 Kühn). The English translation of Rudolph E. Siegel (New York: Karger, 1976), though easily accessible, is very unreliable. See Flemming, *Making of Roman Women*, 336–37.

56. Soranus, *Gynecology* 3.46 (Temkin, 169–70).

57. Aretaeus, *On the Cure of Chronic Diseases* 2.5 (Adams, 488–89).

58. See, for example, Aretaeus's discussion of chronic bladder conditions, including the stone, in *Causes and Signs of Chronic Diseases* 2.4 (Adams, 344–46).

59. Soranus, *Gynecology* 3.43–44 (Temkin, 165–68).

60. Celsus is most fulsome on these matters, especially when discussing possible surgical interventions: *On Medicine* 7.18 (testicles and scrotum); 7.25 (penis and foreskin); 7.28 (ulceration of female genitals).

61. Greek: Oribasius, *Synopsis for Eustathius* 9.37; Aetius of Amida 11.33 and 16.68; Alexander of Tralles 11.7; Paul of Aegina 3.55. Latin: Caelius Aurelianus, *On Chronic Diseases* 5.6 and *Gynecology* 2.56–7; Muscio, *Gynecology* 138; Theodorus Priscianus, *Euporista* 2.11, 3.10.

62. See, for example, John R. Clarke, *Looking at Lovemaking: Constructions of Sexuality in Roman Art, 100 BC–AD 250* (Berkeley: University of California Press, 1998); and Christiane Goldberg, *Carmina Priapaea: Einleitung, Übersetzung, Interpretation und Kommentar* (Heidelberg: Winter, 1992).

63. See, for example, Horace, *Epode* 8; Martial, *Epigrams* 3.72, 9.37, 10.90; *Priapea* 12, 46.

64. See Amy Richlin, *The Garden of Priapus: Sexuality and Aggression in Roman Humor*, rev. ed. (New York: Oxford University Press, 1992).

65. Martial, *Epigrams* 11.21.

66. Martial, *Epigrams* 9.57 develops this theme along the same lines as 11.21; see also, for example, 9.27; and Juvenal, *Satires* 2.11–13.

67. Martial, *Epigrams* 6.37.

68. Martial, *Epigrams* 7.35, 82; 6.67; 11.63, 75; *Priapea* 77.

69. Martial, *Epigrams* 11.61, see also 11.85.

70. J. D. Oriol, "Anal and Genital Warts in the Ancient World," *Paleopathology Newsletter* 3 (1973): unnumbered pages; Judith Hallett, "Something in Excess? *Priapea* 50.2," *Mnemosyne* 31 (1978): 203–6. Fig terminology does wider sexual work in Latin (and Greek) too; see J. N. Adams, *The Latin Sexual Vocabulary* (London: Duckworth, 1982), 113–14.

71. Martial, *Epigrams* 1.65, 4.52, 7.71, 14.86; see also Juvenal 2.13; and *Priapea* 50.2.

72. Martial, *Epigrams* 12.83.

73. Pliny, *Letters* 6.24; for background, see Roy Gibson and Ruth Morello, *Reading the Letters of Pliny the Younger: An Introduction* (Cambridge: Cambridge University Press, 2012).

74. Arria features in Pliny, *Letters* 3.16; and see also 1.22 for another episode of serious illness that requires discussion of suicide, though with a different outcome.

75. Though styled as “private” letters, Pliny did “publish” this collection; see Gibson and Morello, *Reading the Letters*.

76. Fronto, *Letters to Marcus Caesar (Ad M. Caes.)* 5.23 (Loeb 1 196–97).

77. Vertue, “Enquiry into Venereal Disease,” 288.

78. Marcus Aurelius and Fronto mainly tell each other about localized pain; see J. E. G. Whitehorne, “Was Marcus Aurelius a Hypochondriac?,” *Latomus* 36 (1977), 416–18; and Rebecca Flemming, “Experience,” in *A Cultural History of Medicine*, ed. Laurence M. V. Totelin, vol. 1 (London: Bloomsbury, forthcoming).

79. Josephus, *Jewish War* 5.227, 6.426; compare the slightly different formulations in his summary of Mosaic legislation at *Jewish Antiquities* 3.261–64.

80. *Lepra* translates to *ṣāraʿat* in the Septuagint (e.g., Leviticus 13:25, 27, 44 and 45) and, despite medieval usage of latinized versions, does not include leprosy (Hansen’s disease) within its wide remit of skin blotches, patches, and encrustations—neither does *ṣāraʿat* (Milgrom, *Leviticus 1–16*, 816–20). There is some archaeological evidence for Hansen’s disease in the ancient Mediterranean world; see, for example, Mauro Rubinia, Paola Zaiob, and Charlotte Roberts, “Tuberculosis and Leprosy in Italy: New Skeletal Evidence,” *HOMO: Journal of Comparative Human Biology* 65 (2014): 13–32, but it is described under the label of *elephantiasis* in the medical texts of the Roman Empire. In Leviticus (13:45–46) sufferers from “scale-disease” are removed “from the camp.”

81. Soranus, *Gynecology* 3.45 (Temkin, 168–9).

82. Vertue, “Enquiry into Venereal Disease,” 271, 289–91.

83. The Roman partnership of prostitution and marriage is stressed particularly in Rebecca Flemming, “*Quae corpore quaestum facit*: The Sexual Economy of Female Prostitution in the Roman Empire,” *Journal of Roman Studies* 89 (1999): 38–61; see more generally on Roman prostitution, Thomas McGinn, *Prostitution, Sexuality, and the Law in Ancient Rome* (Oxford: Oxford University Press, 1998); and McGinn, *The Economy of Roman Prostitution: A Study of Social History and the Brothel* (Ann Arbor: University of Michigan Press, 2004).

84. Horace, *Satire* 2.1.31–35.

85. This anecdote is in the marginal scholia on Horace’s satires, collected together under the name of Pseudo-Acron. O. Keller, *Pseudoacronis scholia in Horatium vetustiora*, vol. 2 (Leipzig: Teubner, 1904), 20. For the general point see Flemming, “*Quae corpore quaestum facit*.”

86. On the tax, see McGinn, *Prostitution*, 248–87; and Flemming, “*Quae corpore quaestum facit*,” 50–56. The allegation that financial dependence prevented successive Christian emperors from ceasing tax prostitution is made by Evagrius,

Ecclesiastical History 3.39, on the occasion of the final repeal in AD 498, over a century and a half after the conversion of Constantine.

87. Details are debated, and figures vague, but there is a scholarly consensus that the population and economy of empire expanded over the period from the end of the civil wars in 31 BC to the first outbreak of the Antonine Plague in AD 165: see, for example, the range of population figures used by Myles Lavan, “The Spread of Roman Citizenship, 14–212 CE: Quantification in the Face of High Uncertainty,” *Past and Present* 230 (2016): 3–46; and the relevant chapters in Walter Scheidel, Ian Morris, and Richard Saller, eds., *The Cambridge Economic History of the Greco-Roman World* (Cambridge: Cambridge University Press, 2007).

88. Leonor Sánchez-Busó et al., “Antimicrobial Exposure in Sexual Networks Drives Divergent Evolution in Modern Gonococci,” preprint at *bioRxiv*, <https://doi.org/10.1101/334847>.

89. See, for example, Worboys, chap. 5, in this volume; these claims were in part about funding and politics.