The mathematics of sex: one to two, or two to one?

Book Chapter

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The Mathematics of Sex: One to Two, or Two to One?

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Thomas Laqueur’s model of the defeat of the one-sex body in the eighteenth century has achieved canonical status in cultural studies. In *Making Sex*, he offered us “a world where at least two genders correspond to but one sex, where the boundaries between male and female are of degree and not of kind.”¹ Although we may assume that the maleness or femaleness of the physical body depends on its different genitalia, and thus on its reproductive capacity,² Laqueur argued that the dominant model from antiquity into the early modern period stressed not the difference but the similarity between male and female bodies; it was simply that while a woman had her genital organs inside, a man, because of his greater heat, had them on the outside. In this one-sex model, there was no such thing as the female body; instead, there was just one body, which if it was cold, weak, and passive was female and if it was hot, strong, and active was male.

Although arguing for the central role of the prolific second-century CE writer Galen in describing and in gaining authority for this body, Laqueur held that the images used to understand such a body were “hoary already in Galen’s time.”³ There is some truth in this claim. Laqueur showed how the emphasis on similarities between male and female bodies was assisted by linguistic imprecision, for example, the Latin term *venter* meaning both womb and an “unsexed belly”;⁴ here, his argument could be extended back to Greek texts written over seven centuries before Galen, where the term *gastêr* had a similar range.⁵ He also studied in detail the pronouncements of Aristotle in the fourth century BCE, arguing that despite stressing difference by using a one-seed model of conception in which man provided the form, woman only the raw
material, Aristotle worked with a one-sex model that was “still more austere” than that of Galen’s.⁶

For an ancient medical historian, however, one name remains conspicuously absent from Laqueur’s narrative: Hippocrates.⁷ Before (and after) Aristotle, there was the Hippocratic corpus. Wesley Smith has demonstrated how the version of Hippocrates transmitted to the medieval period and beyond was one created in Galen’s own image; for example, the common idea that the four humors are central to the entire Hippocratic corpus is a misapprehension, arising from Galen’s insistence that the treatise On the Nature of Man in which the theory features is one of the genuine works of the historical Hippocrates.⁸ But there is a Hippocrates beyond that fashioned by Galen; indeed, there are many different constructions of Hippocrates within the history of medicine.⁹ For the female body, I would argue, to invoke the name of Hippocrates has always been to claim radical difference from the male body: to argue for a two-sex, not a one-sex, model.

In many ways I agree with Laqueur’s position. I agree that science constructs rather than discovers, and that what we say about sex contains claims about gender.¹⁰ In particular, I agree with an assertion that occurs in the preface to Making Sex, which Laqueur describes as “the startling conclusion that a two-sex and a one-sex model [have] always been available to those who thought about difference.”¹¹ Criticism of Laqueur’s work has tended to concentrate on the early modern period and on moving the date back and forth for the shift from a one-sex to a two-sex body while providing reasons for why that shift occurred when it (allegedly) did. In this article I want to move before Making Sex and to argue that Laqueur’s picture of the one-sex body
misrepresents ancient medicine. As a direct result of this, it also misses what was happening in the sixteenth century, when there was a “Hippocratic revival” in which many ancient Greek texts, including those on women’s bodies, reentered the medical mainstream.\(^{12}\) In the first chapter, Laqueur asks his “readers to decide for themselves, whether the impressions they derive from these pages fit what they themselves know of the vast spans of time that I cover.”\(^{13}\) In the subsequent history of his book and in its effect on other disciplines, this generous invitation has been forgotten, and the one-sex body has been taken for granted. Here, however, I want to decide for myself.

Laqueur’s work has helpfully introduced Galen to readers previously unfamiliar with ancient medicine. As he noted at the beginning of chapter 2 of *Making Sex*, Galen described the female genitalia as the male genitalia but inside instead of outside, due to women’s insufficient level of heat, which is “Nature’s primary instrument.”\(^{14}\) Galen’s one-sex body is thus never an egalitarian one; instead, it is slanted in favor of the idea that the male is the primary form and that women are in some way inadequate. Some editions of the “best-selling guide to pregnancy and childbirth,”\(^{15}\) *Aristotle’s Masterpiece*, first published in 1684, include a poem that states

For those that have the strictest searchers been,

Find women are but men turn’d outside in:

And then if they but cast their eyes about,

May find they’re women with their inside out.\(^{16}\)
It is interesting that when Laqueur quotes the poem as “early nineteenth century,”\textsuperscript{17} he gives only the first two lines of this section; is this to avoid the disturbing implication that men “are” really women? While the first couplet suggests that there is a single male sex, of which women are a variant, the second restores the balance. Neither sex is primary: each is the other, topsy-turvy. However, even here, the gaze remains a male one; the subject, the “searcher,” is clearly gendered as male throughout. Roberta McGrath suggests that we should look to the “heterosexual visual economy” to explain why women are seen in terms of their difference \textit{from} men; it is man who is subject, woman who is object.\textsuperscript{18} In the poem from the \textit{Masterpiece}, it is men who survey “women’s secrets” only to discover the disturbing truth that from one point of view even men are women.

The ancient Greeks held a range of views on gender. Myth, medicine, law, and social practice explored what it was to be a man, or a woman. Laqueur’s book made use of the Hippocratic treatises \textit{On Generation} and \textit{Regimen}, which have a “two-seed” theory suggesting that gender is a continuum, where the degree of maleness or femaleness of the child depends on the balance between the seeds each parent contributes.\textsuperscript{19} The theory serves to explain not only gender but resemblance—or lack of it—between child and parents.\textsuperscript{20} Nicole Loraux’s work on gender in ancient Athenian myth has shown how the question of whether one comes from one, or from two, was an important one outside medical discourse, eventually expressed in Pericles’ citizenship law of 451–450 BCE, which laid down that the ancestry of \textit{both} parents must be Athenian for their son to claim citizenship.\textsuperscript{21} The myths of origin of Athenian culture heroes such as Erichthonios played with ideas about the male and female contributions to generation; if a child was born from Earth after the seed of the
lame god Hephaistos entered her, yet that act of ejaculation was stimulated by the sight of the goddess Athena, who then was the mother of the child? If the goddess Hera could conceive merely by eating lettuce, and the god Zeus could give birth to Athena from his head after eating her mother, Metis, then were two parents always necessary?  

The Hippocratic corpus is a multiauthored, diverse collection of texts on the body, disease, and treatment. Some of the texts within it, dating from the fifth and fourth centuries BCE, function with a model of the body that focuses not on the similarity between the sexes but on difference. This difference is understood in terms not of organs, or of the skeleton, but of flesh; it is not restricted to the genitalia but expressed in every part of the body. This is not “the same” flesh with different levels of moisture; it is “different” flesh, which is why it responds to moisture in a different way. When discussing the structure and functions of the female body, the main collection of gynecological writings—*Diseases of Women*, which probably dates in written form from the fifth century BCE—argues that women’s flesh is softer, wetter, and more spongy than male flesh; it therefore absorbs more fluid from the diet than does that of men’s flesh.  

Glands 16 explains that women’s bodies retain moisture because they are loose textured (*araios*), spongy (*chaunos*), and like wool (*eirion*). In addition, social factors come into play; because women do not take as much exercise as men, they cannot use up any accumulated excess. Galen agreed with this analysis. The social is natural, here, because it is believed that women are specifically designed to live sedentary lives at home, while men are made to deal with the “things outside.” Women’s fluid collects in the body and eventually comes out
as menstrual blood; the menstrual function is the evidence for, and the direct result of, the different texture of flesh throughout the female body.

Laqueur plays down the importance of menstruation in defining what it is to be female, describing menstrual blood as merely “a local variant in this generic corporeal economy of fluids and organs”; “what matters is losing blood in relation to the fluid balance of the body, not the sex of the subject or the orifice from which it is lost.” Although he is right to note that in humoral medicine both sexes have “fungible fluids and corporeal flux,” it is possible that he underestimates menstruation because his argument demands that he should play down any evidence for a “two-sex” model before the eighteenth century. Scholars writing subsequent to the publication of *Making Sex* have stressed that the humoral body retains gendered differences. Gail Kern Paster has shown that in early modern humoralism plethora is the natural state for a woman, because women have more blood in their body and their bodies are also more “leaky” than those of men.

The female body in the Hippocratic texts on women does not conform to a one-sex model. Instead, there is a statement of radical difference, extending beyond a few organs into every part of the flesh. In this world, menstruation is not a “local variant” but the center of what it is to be a woman; in the words of the writer of the Hippocratic text *On Generation* and *On the Nature of the Child*, it is “simply a fact of her original constitution.” Menstruation, as Soranus later put it, is “the first function” of the womb. The Hippocratic terminology of menstruation stresses its ideally “monthly” appearance, using the words *katamênia*, *epimênia*, and *emmênia*. However, the medical writers also use expressions that show how fundamental it is to
mature female identity: menstrual bleeding is gynaikeia, “women’s things,” and ta hōraia, “the ripe things.” By referring to it as hē physis, “nature,” and ta kata phisin, “the natural things,” the writers also stress that it is an unavoidable part of being a woman. They believe that if menstruation does not occur, then the surplus blood will come out through another orifice or continue to build up in the body, putting pressure on different organs until disease or even death results: “if the menses do not flow, the bodies of women become sick,” making regular heavy menstrual loss a necessity. Menstrual bleeding should occur every month, be sufficient in quantity, flow freely and in equal amounts, and occur on the same days of the month, according to Prorhetic 2, in the Diseases of Women treatises, too, menstrual loss is expected to be regular and heavy.

This image of the female body dominated by menstruation, where the difference from the male is so extensive that it reaches every part of her wet and spongy flesh, was never lost, but it came to the fore again after the publication in 1525 of Marco Fabio Calvi’s Latin translation of the complete Hippocratic corpus. This work made the Hippocratic Diseases of Women texts available in full for the first time since antiquity, although it took many years for their implications to filter through into medicine, assisted by the publication of the commentary on the first volume by Maurice de la Corde in the 1580s. Michael Stolberg has observed that sixteenth-century gynecological treatises stress the difference of women from men, and note the implications of this difference for their effective treatment; to support their argument, such writers looked to Hippocrates as the man who had finally devised the categories for the shifting body of the female.
One of the ways in which the model of female difference was given authority was through the selection of appropriate classical passages to cite on the title page of a new work, or to discuss in the preface; two passages, in particular, were taken from Hippocratic treatises in this context. The first of these is the Hippocratic *Diseases of Women* 1.62, which warns that women should not be treated as if they were men, because “the treatment (iēsis) of the diseases of women differs greatly from that of men.” This statement, which Paola Manuli described as the founding act of ancient Greek gynecology, suggests that gynecology should form a separate area of medicine. It appears, for example, on the title page of Maurice de la Corde’s commentary on the text *Diseases of Young Girls*, published in 1574, and is discussed at length in Israel Spach’s preface to the third edition of the compendium of ancient and contemporary texts on gynecology known as the *Gynaeciorum libri*. This collection was first published in 1566, with a second edition in 1586-88 and a third in 1597; Spach maintains that the third edition was needed because of continued demand for these texts devoted to the diseases of women. The second passage used in these claims for greater attention to female difference, *Places in Man* 47, states that “the womb is the origin of all diseases of women” and was cited, for example, in Caspar Wolf’s *Harmonia Gynaeciorum* of 1564. Unlike the first passage, which suggests a more extensive degree of difference spreading throughout the body, this statement shifts the medical focus on to one organ: the womb.

For sixteenth-century medical writers, these two Hippocratic passages suggested that women were particularly difficult to treat and therefore needed a separate branch of medicine. While *Places in Man* concentrates the difference into one organ, *Diseases of Women* goes further, claiming in addition that the diseases of
women are difficult to recognize because they are experienced only by women. These women do not understand what is wrong with them if they lack experience of “the diseases coming from menstruation,” but “time and necessity” teach them the cause of their diseases. Women who fail to understand the origin of their illness call on a healer too late, while those who do understand are reluctant to talk to one. The healer must always bear in mind that the cause of women’s diseases is different, and therefore the treatment must also be different.  

I would locate these sixteenth-century writers within a tradition of the female body that existed alongside the one-sex model but which saw women as radically unlike men, their bodies so different that they demanded different therapies; Hippocratic gynecology, particularly the treatise Diseases of Women, could be used to support calls for a separate branch of medicine to treat women. Perhaps the line of cause and effect operated in the opposite direction, with sixteenth-century writers who wanted to stress female difference casting around for some classical authority and eventually finding the newly available Hippocratic evidence. The Hippocratic texts were called Gynaikeia, a word meaning not only “menstruation” but also “female genitalia,” “diseases of women,” and “treatments for diseases of women.” Thus, their female body was not at a different place in the continuum of a single humanity but was something requiring its own special medicine: gynecology. The origin of gynecology is usually dated to the nineteenth century; for example, McGrath traces the use of the word to between 1820 and 1850, while Jeanne Peterson and Ornella Moscucci have shown that the institutional expression of the discipline, through specialist hospital departments and subject diplomas, did not occur until the second half of the nineteenth century. In this period, the claim that gynecology was
necessary—that women were sufficiently “different” to need a medical specialty—could have economic as well as theoretical implications; the treatment of women was a contested field between surgeons, physicians, and the new hybrid of the gynecologist.

The existence of Hippocratic texts exclusively devoted to the female body and the publication of three editions of a compendium of gynecological texts in the sixteenth century should make us think again about the origin of gynecology. Although in the early modern period the distinctiveness of the field may not have been expressed in separate hospitals or training, the explanations for publishing such a collection make it clear that women’s difference was the central issue. Again, we could consider economic imperatives; for example, when performing a Caesarean section in which both mother and child survival seemed possible, women’s reproductive bodies started to enter the surgeon’s sphere of interest. Insisting on women’s difference may be a way of gaining the edge in the medical marketplace. Although in the classical world one healer would be most unlikely to earn a living by treating only women, in general medicine there may still have been some mileage to be gained by claiming that the female body needed to be read according to different criteria known only to particular healers.

Both Londa Schiebinger and Laqueur have argued that it was not until the late eighteenth century that the sexuality of the body was thought to extend to all its parts, including the mind. Only then did the uterus cease to be an internal analogue of the penis, becoming instead an organ with no male counterpart. Sexuality came to be seen “as penetrating every muscle, vein, and organ attached to and molded by the
But before the second century BCE, when Galen wrote, there were several competing images of gender and the body, one of which—following the Hippocratic imperative—saw woman as fundamentally different in every centimeter of her flesh, not just as having a few different organs or being an outside-in male. In addition to making us think again about what we mean by the origin of gynecology, this should lead us to challenge some of the explanations for the alleged demise of the one-sex model; for example, McGrath attributes the rise of the two-sex body to a renewed interest in women as “different” because of the need of an industrializing society to increase the population of workers. Similarly unsatisfactory is Laqueur’s claim that the longevity of the one-sex body was due to the dominance of the male in the public sphere: the two-sex body could send just as strong a message about the superior merits of the male. If we return to Laqueur’s original invitation to engage with his argument from our own knowledge of different historical periods, we will find an awareness of coexisting models of the body more compelling than the “Grand Divide” between the sway of the one-sex and the two-sex model. Our task then becomes not to explain any eighteenth-century divide, but to read the subtle shifts of earlier history with greater sensitivity. Indeed, as Meryl Altman and Keith Nightenhelser noted in their review of Making Sex, Laqueur himself undercuts his “Grand Divide”; while he asserts that “in or about the late eighteenth [century] . . . human sexual nature changed,” he also insists that “the play of difference never came to rest.”
On the nature of the child,” “Diseases IV”

indoors are a woman's task, and the outdoors are the man's.‖

also Roy Porter, “‗The Secrets of generation display'd':

 value (p. 241).

approximately three to four times as much information on women as on men and argues for its ―erotic‖

women and naked truths‖; and Vern L. Bullough, “An early American sex manual, or, Aristotle who?‖

Sexual Behavior during the Enlightenment

England‖ in

also

Laqueur, pp. 28–35.

Hippocratic material features in Laqueur's discussion of the two-sex theory (Making Sex, pp. 39–

n.37 shows his awareness of the multiple authorship of the corpus; however, regarding the body, the issue of whether there is one sex, or two, is not addressed. This must be, in part, a matter of

language; the treatises on the seed have been available in English translation since 1981, while the

Hippocratic gynecological texts are not yet translated. See also Michael Stolberg, “A woman down to

her bones: the anatomy of sexual difference in the sixteenth and early seventeenth centuries,” Isis 94

(2003), 274–99, p. 285 and n.27.


Laqueur, p. 11.

Laqueur, p. viii.

See, for example, Vivian Nutton, “Hippocrates in the Renaissance,” in Die Hippokratischen


Laqueur, p. 23.

Laqueur, pp. 25–26; Galen, Use of Parts, 2.630, cited p. 28.

Mary Fissell, “Hairy women and naked truths: gender and the politics of knowledge in Aristotle’s


1791, 15, quoted in Janet Blackman, “Popular theories of generation: the evolution of Aristotle’s

Works; the study of an anachronism,” in Health care and popular medicine in nineteenth-century


Early American Literature 7 (1972–73), pp. 236–46. Bullough notes that the work contains

approximately three to four times as much information on women as on men and argues for its “erotic”

value (p. 241).

Laqueur, p. 4.


Laqueur, p. 39.

King, Hippocrates’ Woman, pp. 8–9.

Nicole Loraux, The Children of Athena: Athenian ideas about citizenship and the division between


DW 1.1, ed. Littré, 8.14.


Ps-Xenophon, Oikonomikos, 7.22–23; “I believe that the god arranged that the work and supervision

indoors are a woman’s task, and the outdoors are the man’s.”

Laqueur, pp. 35, 37.

Laqueur, p. 35; see also Barbara Duden, The Woman beneath the Skin: a doctor’s patients in


Gail Kern Paster, The Body Embarrassed: drama and the disciplines of shame in early modern


*Superfetation* 34, Littré 8.504–6.


*King*, *Hippocrates' Woman*, pp. 234–44. Here, she briefly summarizes the fortunes of Hippocratic gynecology in the Greek East, Latin West, and Arab world.

Marco Fabio Calvi, *Hippocratis Coi medicorum omnium longe principis, Octoginta volumina . . .* (Rome, 1525).

Stolberg, “woman down to her bones,” pp. 288–89.


Littré 8.126.


*Loeb* VIII, 94.

McGrath, *Seeing her Sex*, p. 34.


Galen does not appear to have written a text devoted to women, making the reconstruction of a “Galenic gynecology” a difficult task; see Rebecca Flemming, *Medicine and the Making of Roman Women: Gender, nature, and authority from Celsus to Galen* (Oxford, 2000).


McGrath, *Seeing her Sex*, pp. 31–32.

Laqueur, p. 61.

Laqueur, pp. 5, 193, quoted in Meryl Altman and Keith Nightehenler, review of *Making Sex: Body and Gender from Greeks to Freud*, by Thomas Laqueur, *Postmodern Culture* 2, no. 3 (1992), http://www.iath.virginia.edu/pmc/text-only/issue.592/review-6.592