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One, Two, or Many Sexes: Sex Differentiation in Medieval Islamicate Medical Thought

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Since the 1990 publication of Thomas Laqueur's book Making Sex, his proposed "one sex" model has served as the site of many spirited debates and discussions.[1] Joan Cadden was one of the first to criticize Laqueur's model in her book *Meanings of Sex Difference in the Middle Ages*, in which she explained why her analysis differs from Laqueur's: "Though there is much evidence in the present study that fits [Laqueur's] 'one-sex' model, medieval views on the status of the uterus and the opinions of medieval physiognomers about male and female traits suggest evidence of . . . models not reducible to Laqueur's."[2] More recently, Katharine Park has argued that there is no evidence to support the one-sex model for medieval Europe: "Before 1500 I could find no convincing expressions of the idea of genital homology at all, even as an alternative to be discarded, except for a few brief passages in the works of several late medieval surgeons, including Guy de Chauliac, who seems to have been one of the only medieval scholars to assimilate the full text of Galen's *On the Use of Parts*."[3]

While Galen's views on the similarities between male and female organs may have received little attention in medieval European medical literature, they certainly were evident in Islamicate philosopher and physician Ibn Sīnā's (Avicenna's) *al-Qānūn fī al-ṭibb* (The canon of medicine), completed in 1025. Ahmad Dallal has argued that "the ancient idea of

[1] Thomas Walter Laqueur, *Making Sex: Body and Gender from the Greeks to Freud* (Cambridge, MA: Harvard University Press, 1990).

[2] Joan Cadden, *Meanings of Sex Difference in the Middle Ages: Medicine, Science, and Culture* (Cambridge: Cambridge University Press, 1995), 3.

[3] Katharine Park, "Cadden, Laqueur, and the 'One-Sex Body,'" *Medieval Feminist Forum* 46 (2010): 98. For the most recent critique of Laqueur's model, see Helen King, *The One-Sex Body on Trial: The Classical and Early Modern Evidence* (Farnham, Surrey: Ashgate Publishing Limited, 2013). Both illustrate that even fourteen years after its original publication and despite the criticism it has garnered, Laqueur's suggested model continues to influence understandings of sex differentiation in the premodern world.

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inverse similarity between male and female sex organs" was common in Islamic medical writing of this period.[4] Yet such overarching conclusions are undercut by a lack of sufficient analysis of either earlier Islamicate writings or the diversity in views in Islamicate medical thought and the tendency to view Islamicate understanding of sex and sex differentiation as stable and monolithic. While significant work has been done in relation to the social history of different genders in medieval and early modern Islamicate contexts,[5] few have explored perceptions of sex differences and differentiation in Islamicate learned medical discourse.[6] Most existing contributions have focused on the work of Ibn Sīnā, his later commentators, and other physicians with markedly Aristotelian views.[7] Even less work has been done on ideas surrounding sexual differences and differentiation in the works of major tenth-century authors like Abū Bakr al-Rāzī (d. 925) and ʿAlī ibn ʿAbbās al-Majūsī (d. 982 or 994).[8] A deeper investigation into the variety and historical development of these views is needed to counter tendencies to overgeneralize about this discourse, and we need

[4] Ahmad Dallal, "Sexualities: Scientific Discourses, Premodern," in *Encyclopedia of Women and Islamic Cultures*, ed. Joseph Suad (Leiden: Brill, 2006), 401–7. Sherry Gadelrab agrees with Dallal's assessment of Ibn Sīnā's position, although she correctly cautions that Ibn Sīnā's view was not representative of all views on sex differentiation in Islamicate medical discourse ("Discourses on Sex Differences in Medieval Scholarly Islamic Thought," *Journal of the History of Medicine and Allied Sciences* 66, no. 1 [2010]: 43, 64).

[5] See, for instance, Afsaneh Najmabadi, *Women with Mustaches and Men without Beards: Gender and Sexual Anxieties of Iranian Modernity* (Berkeley: University of California Press, 2005); Kathryn Babayan et al., *Islamicate Sexualities: Translations across Temporal Geographies of Desire* (Cambridge, MA: Center for Middle Eastern Studies of Harvard University, dist. by Harvard University Press, 2008). Other examples include Julia Bray, "Men, Women and Slaves in Abbasid Society," in *Gender in the Early Medieval World*, ed. Leslie Brubaker and Julia M. H. Smith (Cambridge: Cambridge University Press, 2004), 121–46; Nadia M. El-Cheikh, "Gender and Politics in the Harem of Al-Muqtadir," in ibid., 147–62.

[6] Recent exceptions include Gadelrab, "Discourses on Sex Differences"; Dallal, "Sexualities"; Katharine Park, "Medicine and Natural Philosophy: Naturalistic Traditions," in *The Oxford Handbook of Women and Gender in Medieval Europe*, ed. Judith M. Bennett and Ruth Mazo Karras (Oxford: Oxford University Press, 2013), 84–100; and Basim Musallam, *Sex and Society in Islam: Birth Control before the Nineteenth Century* (Cambridge: Cambridge University Press, 1983).

[7] This is true of Gadelrab ("Discourses on Sex Differences") and Dallal ("Sexualities"). Neither author discusses earlier theories of sexual difference, nor do they discuss the fact that Ibn Sīnā's theories did not go unchallenged in his day. On the other hand, Park's article discusses Alī ibn Abbās al-Majūsī (d. 994) and Ibn al-Jazzār (d. 979), highlighting some of the "pre-Avicennan" views on sex and sex differences ("Medicine and Natural Philosophy").

[8] With the exception of Franz Rosenthal's translation of al-Rāzī's treatise "The Hidden Illness" (Franz Rosenthal, "Ar-Razi on the Hidden Illness," *Bulletin of the History of Medicine* 52, no. 1 [1978]: 45–60) and Peter E. Pormann's "Al-Razi (D. 925) on the Benefits of Sex: A Clinician Caught between Philosophy and Medicine," in *O Ye Gentlemen: Arabic Studies on Science and Literary Culture in Honour of Remke Kruk*, ed. Arnoud Vrolijk and Jan P. Hogendijk (Leiden: Brill, 2007), 115–27, al-Rāzī's work has gone virtually unnoticed in examinations of the history of Islamic views on sex differences.

recognition of the dynamic and diverse context in which Islamicate medical understandings of sex developed.[9]

This article investigates the medieval Islamicate medical discourse about the landscape of sexual difference and the attendant developments in medical traditions. The exploration of a variety of medical writings highlights the variety of divergent Islamicate views and theories about sex and fetal sexual differentiation. In what follows, I use the word "sex" to refer not to a fixed "biological" category that remains coherent throughout history but to a historically contingent category that is rooted in a specific discourse about nature, a discourse that was produced and dominated by particular groups whose claimed expertise was the human body—in the case of this article, learned physicians. This view of sex as a discourse on nature allows for consideration of parallel or competing discourses outside the Hellenistic-Islamicate context, and it gives voice to parallel or competing experts or specialists, such as atomistic philosophers and practitioners of Indian or Chinese medical traditions. Like the concept of gender, sex is historically contingent and socially conditioned; it lacks transhistorical coherence. In this article, however, I focus exclusively on sex, and I take sex to be distinct from gender. While the process of gendering occurs primarily within social and legal discourse, "sexing"—as I will call the process of medical sexual differentiation—operates within discourses on nature and the natural, and it occurs within a particular observational paradigm that declares certain morphologies to be sex characteristics. This observational paradigm, which controlled sex differentiation, did not necessarily depend on genital morphology. For instance, Cadden has explained how medieval European authors considered many anatomical, skeletal, and behavioral differences in distinguishing between different sexes.[10] In the medieval Islamicate period, this dynamic process of sexing was connected, though not identical to, the social and legal process of gendering, which situated individuals within specific gendered categories.

As will be seen below, a number of terms used by medical authors to describe particular sex categories were also used in literary, legal, and religious discourses to describe social practices, comportments, and expected behaviors and performance—or what we would call "gender." Terms like "masculine females," "feminine males," and "hermaphrodites" were used by medical authors to describe sex categories that result from specific processes of fetal development, manifest themselves in particular physiological and pathological presentations, and present specific morphologies. These

[9] In her review of Thomas Laqueur's *Making Sex* for the *Journal of the History of Sexuality*, Sally Shuttleworth argues that "although Laqueur's analyses are always interesting, the repetitive prominence accorded to his overarching theory tends to iron out contextual complexity" ("Making Sex: Body and Gender from the Greeks to Freud," *Journal of the History of Sexuality* 3, no. 4 [1993]: 634). Similarly, contextual complexity is often lost when certain works are held up as representative of the entire tradition.

[10] Cadden, *Meanings of Sex Difference*, 177–88.

same terms were used in legal, literary, or religious writings to refer to people who exhibited specific behaviors and performed in a particular manner. Although these two groups (the sexed and the gendered categories) overlap and intersect, they are not identical nor reducible to one another. For instance, people sexed as feminine males could perform socially as men or as gendered hermaphrodites. The fact that medical authors used such terms may indicate the appropriation of preexisting gender-related terms to reflect the translated and evolving medical discourse. This article focuses on the medical process of sexing rather than the process of gendering.

The question of belief in one, two, or many sexes in the medieval Islamicate context cannot be answered by simply surveying the writings of specific medical authors. Instead, it prompts an investigation into the presence of multiple, dissimilar, and changing contemporary "sexscapes"—by which I mean the context in which divergent medical discourses presented different models and argued for different understandings of sex categories.[11] Moving from the eighth and ninth to the thirteenth and fourteenth centuries, I begin by tracing competing views and theories on the reasons for and process of fetal sex differentiation, highlighting key differences and major theoretical trends in understanding sex differentiation. This historical survey will be used to determine just what kind of sexscape is constituted by these varying discourses. Can we, in other words, talk about the victory of either the one, two, or many sex model? In the process of answering this question, I also investigate the observational paradigms and epistemic priorities that governed the making of this sexscape along with the question of how such paradigms and priorities were negotiated among different authors with competing opinions.

Seeds, Heat, and Sex Differentiation

Al-Rāzī (d. 925, known in Latin as Rhazes) was greatly respected as an author and practitioner of learned medicine in the medieval Islamicate world, and his works remained influential as critical sources for medical knowledge and training well into the fourteenth century.[12] Yet his views on sex differences remain largely unexplored due primarily to the fact that his most comprehensive explanation of the issue can only be found in his treatise "Fī al-dā' al-khafiyy" (On the hidden illness), which was only edited and translated by Franz Rosenthal in the 1970s and which was never published

[11] My argument runs directly counter to Kathryn Keuny's insistence upon a monolithic interpretation of sex difference dependent upon definitions in the Quran (*Conceiving Identities: Maternity in Medieval Muslim Discourse and Practice* [Albany: State University of New York Press, 2013], 52, 54, 63, 70).

[12] For instance, Ibn Bajjah, known in the West as Avempace (d. 1135), wrote a commentary on al-Rāzī's magnum opus *al-ḥāwī*. Unfortunately, this commentary is now lost; see Miquel Forcada, "Ibn Bājja on Medicine and Medical Experience," *Arabic Sciences and Philosophy* 21 (2011): 113.

in the original Arabic.[13] Other detailed discussions can be found in his book *Kitāb al-bāh* (On coitus), which to my knowledge has not been published in an academic edition.[14] The treatment of these questions of sex and sex differentiation in his published texts—like *al-Kitāb al-Manṣūrī fī al-ṭibb* (The Manṣurī book of medicine)—is very limited and largely restricted to anatomy, with no discussion of sex differentiation. In his famous opus *al-Kitāb al-ḥāwī* (The comprehensive book on medicine), which was collected by his students after his death, many sections explicitly address issues of sex and sex differentiation. Despite the difficult and disorganized nature of *al-ḥāwī*, its value for scholarship is great, particularly because al-Rāzī compares his own views with other authorities, critiquing other influential theories of sex differences and differentiations such as those later published in Alī ibn ʻAbbās al-Majūsī's (known in Latin as Haly Abbas) *al-Kāmil fī al-ṣināʻah al-ṭibbiyyah* (The complete art of medicine) and Ibn Sīnā's (Avicenna's) *al-Qānūn*.[15]

Al-Rāzī's model of sex differentiation traces the process to the moment of conception, which he describes as the instant in which two seeds (*manī*) are coupled in the uterus. The sex of the fetus is determined by the relationship between the two seeds: "Femininity or masculinity occurs according to the dominance [*ghalabah*] of one of the two seeds over the other in quantity and quality, until one of them becomes the one that transforms [*muḥīl*] and the other the one that is transformed [*mustaḥīl*]."[16] Al-Rāzī thus affirmed the existence of female seed—(presumably different from menstrual blood),—which was similar in function and capacity to male semen. Both types of seed possessed the capacity to in-form (actively bear the form) or be in-formed by (passively receive the form) of the other. Therefore, the role played by either seed in the generation of a fetus was not prescribed by their inherent nature, nor was it determined by the sex

[13] Rosenthal relied on three identical manuscripts from Iran that he called the "Tehran T manuscript." I will rely on a manuscript from the Mijlis Shurā Millī in Iran that appears to be similar to the Rosenthal T manuscript, along with Rosenthal's edition: Rosenthal, "Ar-Razi on the Hidden Illness"; Abū Bakr al-Rāzī, "Risālah fī al-dā' al-khafiyy," Majlis Shurā Milli, no. 4679-38.

[14] I know of one nonscholarly publication of al-Rāzī's book on coitus, *Kitāb al-bāh,* which was published in Cairo in 1999 with Ibn Hishām's (d. 833) *Maḥāsin al-nisā'* (The beauties of women), and a third manuscript entitled "al-Rawḍah al-bahiyyah" (The beautiful garden), whose author could not be identified by the editors: Abū Bakr Muḥammad Ibn Zakarīyā al-Rāzī and Ābū Muḥammad ʻAbd al-Malik Ibn Hishām, *al-Nisā': Thalāth makhṭūṭāt nādirah fī al-jins*, ed. ʻĀdil ʻAbd al-ḥamīd and Hishām ʻAbd al-ʻazīz (Cairo: Dār al-Khayyāl, 1999).

[15] L. E. Goodman, "Al-Rāzī," in *Encyclopaedia of Islam*, ed. P. Bearman, Th. Bianquis, C. E. Bosworth, E. van Donzel, and W. P. Heinrichs, 2nd ed., Brill Online, http://referenceworks.brillonline.com/entries/encyclopaedia-of-islam-2/al-razi-SIM_6267, accessed 23 December 2013.

[16] Al-Rāzī, "Risālah fī al-dā' al-khafiyy," 1v. This was also quoted in Franz Rosenthal, "Ar-Rāzī on the Hidden Illness," *Bulletin of the History of Medicine* 52, no. 1 (1978): 52, but the translation here is mine.

of the corresponding parent; rather, the sex of the fetus depended on the circumstantial relation between the two seeds at the moment of conception. Because the two seeds were understood to be coming from two different persons, with two different sexes, they had a different impact on the fetus: the in-forming (*muḥīl*) seed was more likely to influence the nature of the fetus than the in-formed (*mustaḥīl*) one. Al-Rāzī substantiated his theory with reference to the differentiation of sex in mules: "The obvious proof for that is the fact that the female mule is better than the male mule, because the horseness is prevalent and the assness inferior in it. This is the case when the ass is the male. Conversely, if the horse is the male, as they do in some places (where they mate stallions with she-asses in order to produce hinnies), the male mule is better than the female mule."[17] Because the difference in the natures of the two parents was so apparent, the influence of their seeds on the sex outcome of offspring could be detected with ease, and sex differentiation could be explained with reference to the dominance of one seed over the other.

Al-Rāzī argued that this process of differentiation on the basis of relative dominance could yield various combinations:

> If the matter is as we have described it, it may happen in some cases that the seed of the man is very forceful and strong in transforming the seed of the female. Accordingly, it is necessary that the child born from such a seed will be very strongly masculine. . . . If it happens in some cases also that it is the seed of the female that possesses very great force and prevalence, then the newborn child will have the properties that are peculiar to females, which are the extreme opposites of what we have mentioned. Mostly it happens that one of the two seeds undergoes transformations between these [extremes]. Then, the newborn child, whether male or female, is not masculine in the extreme and not feminine in the extreme.[18]

The relationship between the two seeds is further complicated by the transient nature of dominance, meaning that the degree of effectiveness with which one seed dominates the other depends upon the state of each partner at the time of sexual intercourse. In this sense, al-Rāzī's theory adds nuance to his contemporaries' theories of sexual difference: he allows that offspring are not differentiated according to a simple male/female binary and that masculinity and femininity exist on a continuum. The degree to which each is expressed is determined by the relationship between the two seeds. At one end, absolute dominance of the male seed produces a male with extreme masculinity, while at the other end of the spectrum, dominance of the female seed produces a female expressing extreme femininity, with a number of other potential outcomes in between.

[17] Rosenthal, "Ar-Rāzī on the Hidden Illness," 52.
[18] Ibid., 54.

This understanding of sex differentiation, which posits the existence of a female seed (as distinct from menstrual blood) and asserts that sex was determined by the dominance of one seed over the other, appears to have been rather common in nonmedical writings of the ninth century. For instance, Aḥmad ibn Ḥanbal (d. 855), al-Bukhārī (d. 870), and Muslim ibn al-Ḥajjāj (d. 875), who were well-known and respected collectors of *ḥadīth* (reports of the sayings, teachings, and deeds of the prophet Muḥammad), reported ḥadīths that understood sex differentiation and women's sperms in the same way. In a ḥadīth reported in Ibn Ḥanbal's *Musnad* (collection),[19] Muḥammad said, "Do you know that a man's water [*mā' al-rajul*] is white and thick [*ghalīẓ*], and a woman's water is yellow and thin? Whichever exceeds [the other], it will determine [*lahu*] the sex and likeness [of the child]. If the man's water exceeds ['*alā*] the woman's, [the child] will be a male. And if the woman's water exceeds the man's, [the child] will be a female." The versions of this ḥadīth reported by al-Bukhārī (in number 3,938 of the collection) and Muslim ibn al-Ḥajjāj (in number 314) spoke not only of sex but also of resemblance between the child and the respective parent, and both authors used the verb "precede" (*sabaqa*) as opposed to "exceed" ('*alā*), which is used in Ibn Ḥanbal's ḥadīth cited above.[20] The different verbs connote different forms of physical hierarchy (one being literally on top of the other; in '*alā*, "exceed") or physical precedence (literally arriving first; in *sabaqa*, "precede"), as well as other less physical forms of hierarchy and dominance. These ḥadīth thus implied that this relation of dominance or precedence explained both the child's sex and the physical resemblance between the child and the parent with the earlier / higher / more dominant seed.

Islamicate views on sex differentiation were directly influenced by Hippocrates's "On the Generating Seed and the Nature of the Child." This text was translated into Arabic under the title *Kitāb al-Ajinnah* (On embryos) sometime during the ninth century. Hippocrates described the female seed as having a nature and function similar to that of the male seed.[21] He also attributed resemblance in appearance to the relationship between the two seeds. Here, though, Hippocrates emphasized relative

[19] During this period, many books were known only by the author's names and had no identifiable titles, unlike the medical texts from a later period cited above.

[20] The question of the authenticity of these traditions (whether they could indeed be traced to Muḥammad or even to late sixth- or seventh-century Arabia) is beyond the scope of this article. I cite them only to reference the prevalence of certain ideas in the ninth and tenth centuries and not to make any assumptions about Muḥammad or his times. On the development of al-Bukhārī's and Ibn al-Ḥajjāj's collections and their "canonization," see Jonathan Brown, *The Canonization of Al-Bukhārī and Muslim: The Formation and Function of the Sunnī Ḥadīth Canon* (Leiden: Brill, 2007).

[21] Hippocrates, *Kitāb al-ajinna li-Buqrāt: Hippocrates: On Embryos (On the Sperm & On the Nature of the Child)*, ed. M. C. Lyons and J. N. Mattock (Cambridge: Published for the Cambridge Middle East Centre by Pembroke Arabic Texts, 1978), 45. See also Musallam, *Sex and Society in Islam*.

quantity as opposed to strength or quality, writing, "If the woman's seed was more [plentiful] than the man's, the child will resemble his mother." However, he attributed sex differentiation to the relative strength of the generative seed, which is composed of the mixture of male and female seeds during copulation: "Based on the strength and weakness of the seed, are males and females [differentiated]. If the woman's seed is strong, it will generate a male, and if it is weak, it will generate a female. Similarly, if the male seed is weak, it generates a female, and if it is strong, it generates a male. [In general,] if the seed is strong, it generates males, and if it is weak, it generates females."[22] In this view, both seeds were seen as capable of generating males and females. Although this formulation differed from al-Rāzī's, it too allowed for the existence of multiple degrees of masculinity and femininity. These varying degrees of masculinity and femininity impact only sex differentiation, with little effect on a person's gendered position. For instance, a (gendered) man may have varying degrees of masculinity based on his fetal differentiation. Hippocrates further explained that if the strong seed, whether male or female, is less in quantity than the weaker one, then the weaker will dominate (*ghalaba*), thus generating a female. In other words, Hippocrates allowed both male and female seeds to become carriers of masculinity or femininity, based on their strength. A weak male seed that is more plentiful than a strong female seed will generate a female, but that female will resemble the father; conversely, a strong female seed that is more plentiful will generate a male child who physically resembles the mother. Quantity of seed, then—whether strong (generating males) or weak (generating females)—ultimately determines the sex of the offspring, but the child (whether male or female) will always resemble the parent whose seed was more plentiful. It appears that the popularized medical knowledge in the ḥadīth collections, whose authors and compilers probably relied on *Kitāb al-Ajinnah* in addition to other texts, focused more on the notion of one seed's dominance over the other as the cause behind sex differentiation and resemblance, flattening some of the details of Hippocrates's explanation.

In Islamicate medical writings of the eighth and ninth centuries, similar views on the existence of a female seed and its overall role in the formation of fetuses could also be found. Sex differentiation, however, was explained by the influence of heat on the mixture of the two seeds. For instance, ʻAlī ibn Sahl Rabban al-Ṭabarī (b. ca. 770—, d. after 850), who was a well-known physician in the Abbasid court and who composed one of the earliest extant Arabic medical compendiums, known as *Firdaws al-ḥikmah* (Paradise of wisdom), accepted the existence of a female seed as well.[23]

[22] Hippocrates, *Kitāb al-ajinna li-Buqrāt*, 42, 39.

[23] ʻAlī ibn Sahl Rabban al-Ṭabarī was a Christian physician and polymath of Persian origin (from Tabaristan) who converted to Islam when he was seventy years of age, during the caliphate of al-Mutawakkil (r. 847–61). Many sources, such as al-Qifṭī, Ibn Abī Uṣaybiʻah, and Ibn Khilkān, reported that al-Rāzī first studied medicine with al-Ṭabarī. This is very

Following Hippocrates, he explained that the two seeds mix in the uterus and that a fetus is composed of both of them.[24] As for sex differentiation, al-Ṭabarī reported two opinions. The first, which he attributed to Hippocrates, explained that if the two seeds were strong, the fetus would be male, and if they were weak, the fetus would be female. The second opinion was attributed to Aristotle: if the seeds were "mostly hot [*ghalabat ʿalayha al-ḥarārah*]," the fetus would be male, and if they were "mostly cold," it would be female, a view that is comparable to Galen's explanation as laid out in his *On Semen*.[25] For this reason, al-Ṭabarī argued, following Aristotle and Galen, the offspring of the elderly (*al-shuyūkh*) and of the very young (*al-ṣibyān*) are mostly female, while those of youth (*al-shabāb*) are mostly male. This is because the elderly and the very young were generally thought to have had cooler bodies and seeds than those of people in their prime, who enjoyed hotter bodies and seeds.[26] The role of heat in sex differentiation also implied differences between seeds originating in the left or the right testicle, with right testicles considered to be hotter due to their proximity to the liver. Likewise, the two horns of the uterus would carry different potencies due to differences in heat. Following Galen, al-Ṭabarī explained that a male seed coming from the right testicle and moving to the right horn of the uterus would produce a male; a seed from the male left testicle moving to the uterine left horn would produce a female. Even other variations were possible. A seed coming from the right testicle and moving to the left horn would produce a feminine male, while one moving from the left side to the right horn would produce a masculine female.[27]

ʿAlī ibn ʿAbbās al-Majūsī (d. between 982 and 995; known in the West as Haly Abbas) hailed from al-Ahwāz. He later lived in Shirāz and then moved to Baghdad to serve the Buyid ruler ʿAḍud al-Dawlah (d. 983). His famous book *al-Kāmil fī al-ṣināʿah al-ṭibbiyyah* (The

unlikely, since al-Rāzī was born in 864, and al-Ṭabarī, whose date of death cannot be determined, would have been extremely old when al-Rāzī started learning medicine. But al-Ṭabarī was prominent as a practitioner and an author in the ninth century, and al-Rāzī depended on al-Ṭabarī's writings in his own works. See D. Thomas, "Al-Ṭabarī," in Bearman et al., *Encyclopaedia of Islam*.

[24] ʿalī Ibn Sahl Rabban Ṭabarī, *Firdaws al-ḥikmah fī al-ṭibb*, ed. Muḥammad Zubair Siddiqi (Berlin: Afitab, 1928), 31.

[25] Galen followed Hippocrates in explaining a child's resemblance to his or her parents by the dominance of one sperm over the other, though he did not reference quantity as explicitly as Hippocrates did. However, Galen complicated this view by explaining how some parts of a child may resemble one parent and others may resemble the other parent. To explain this, Galen allowed for partial dominance of one sperm over another in certain parts that generate certain organs. When it comes to sex differentiation, Galen argued that a male is different in all of his body from a female; therefore, his sex cannot be attributed to partial dominance at the site of genital organs. Instead, heat, which affects the entirety of the generative semen, is the proper explanation. See Galen, *On Semen*, ed. Phillip De Lacy (Berlin: Akademie Verlag, 1992), 179–87.

[26] Ṭabarī, *Firdaws al-ḥikmah fī al-ṭibb*, 34.

[27] Ibid., 35. Al-Ṭabarī copied this elaboration from Galen's *On Semen*, 187.

complete [book] in the medical art) was also known as *al-Kitāb al-malikī* (The royal book), in reference to ʻAḍud al-Dawlah, to whom the book was dedicated. It remained a noteworthy source for medical training and education over the centuries. The book was translated into Latin by Stephan of Antioch in 1127 and called the *Liber Regius. Al-Kitāb al-kāmil*, as well as the career of its author, was directly tied to the work of Abū Bakr al-Rāzī (Rhazes), who had also worked in the Baghdad hospitals. In fact, al-Majūsī intended his *al-Kāmil* as an elaboration of the more concise *al-Manṣūrī* (The Manṣūrī book), though he was also trying to provide a more practical guide than al-Rāzī's extremely long and difficult *al-ḥāwī* (The comprehensive).[28]

Al-Majūsī shared the same views as elaborated previously on the existence of the female seed, its difference from menstrual blood, and its similarity in role to the male seed.[29] However, he was more explicit about the differences between the two seeds than al-Ṭabarī or al-Rāzī. In al-Majūsī's system, the female seed is thinner and colder than the male seed. Therefore, the mingling of the two seeds is necessary for the generation of a human being: the male seed is too thick and too hot to form a human fetus on its own.[30] At another level, and in a more physical sense, the spatiality of the mixing of the two seeds—because the male seed comes from the bottom, shooting up through the middle of the uterus, while the female seed enters from the sides—allows the mixture of seeds to coat the entire space of the uterus, forming the necessary protective membranes around the fetus.[31] Al-Majūsī later described the mixing process in more detail, precisely following Galen's scheme: "When the two seeds mix with one another, bubbles form from the heat of the blood [in the uterine wall] similar to the bubbles that occur in thick viscid things when they boil, if they are cooked on fire. The spirit, which is mixed with the seed, gathers in these bubbles. [The bubbles] gather with each other, creating a great hollow in the seed, [where] a large quantity of the spirit is collected. The outside of the seed hardens so that the spirit cannot be disintegrated."[32] Once the two seeds had met, al-Majūsī shifted to using the word *manī*, in the singular, because he was then

[28] C. Elgood, "'Alī b. al-'Abbās" in Bearman et al., *Encyclopaedia of Islam.*

[29] Al-Majūsī did not refer explicitly to al-Ṭabarī's book in *al-Kāmil*'s introduction. However, a closer look at *al-Kāmil* shows that al-Majūsī was deeply indebted to the ideas expressed in al-Ṭabarī's *Firdaws al-ḥikmah* and that he copied entire paragraphs from al-Ṭabarī.

[30] Abū Bakr al-Razi, ʻalī Ibn ʻabbās al-Majūsī, and Ibn Sīnā, *Trois traités d'anatomie arabes*, ed. P. De Koning (Leiden: Brill, 1903), 396. Al-Ṭabarī emphasized the importance of moderation in heat or coldness, but, unlike al-Majūsī, he did not suggest that the two sperms can correct each other's extreme qualities (Ṭabarī, *Firdaws al-ḥikmah fī al-ṭibb*, 31–33).

[31] Al-Razi, al-Majūsī, and Ibn Sīnā, *Trois traités d'anatomie arabes*, 396.

[32] Ibid., 402. This description of the mixing and of the formation of the soul in the bubbles of the sperm mixture is very similar to, though more detailed than, Hippocrates's description in *On Embryos* (Hippocrates, *Kitāb al-ajinna li-Buqrāt*, 48–50). In this description, al-Majūsī precisely followed Galen's scheme on the development of the fetus. See Galen, *On Semen*, 85–91.

describing the actions of two seeds acting as one, with no real difference in their roles. After the formation of this seed body—with a semihard membrane around the spirit-filled hollow—the membrane attaches to the uterine wall, opposite the opening of vessels: "When the formation of this membrane, which contains the seed, is completed, the menstrual blood flows to it in the nonpulsating vessels, whose mouths [open] in the [rough] areas [in the wall of the uterus] known as the pits; [also] thin blood and animal spirit flow to it from the arteries, which go to the uterus. Both penetrate through the membrane before it hardens . . . so that . . . passages are made in the membrane, and [these passages] continue to widen and do not conjoin, because the flow of blood continues."[33] Eventually, the menstrual (venous) blood forms all of the fetus's "red organs" (*al-aʿḍāʾ al-ḥamrāʾ*) except for the heart, which is formed by the arterial blood. The seed, on the other hand, forms the "white organs" (*al-aʿḍāʾ al-bayḍāʾ*) of the brain, bones, cartilage, and nerves.[34]

Like Galen and al-Ṭabarī, al-Majūsī presented a system of sex differentiation that relied almost entirely on heat, and which was based on the premise that male bodies are hotter than female bodies. Male fetuses, therefore, are formed when the male and female seeds are hot, and female fetuses form when they are cold. Al-Majūsī also maintained Galen's view that male fetuses develop faster than female fetuses—five days faster, to be exact—since the seed forming them is hotter.[35] For this reason, female fetuses are more likely to develop in the left horn of the uterus (which is colder because it is closer to the spleen), while male fetuses develop in the right horn (which is hotter because it is closer to the liver).[36] Furthermore, seed originating from the right side of the body of either partner will be hotter and thicker and thus more likely to produce males than seed produced on the left side of the body.[37] While al-Rāzī asserted that the dominance of one seed over the other produced a fetus's sex, al-Majūsī argued that such dominance was only responsible for the resemblance between the fetus and a particular parent.[38]

This view of the female seed (namely, that it was similar to male seed in function and necessary for the development of the fetus) differed markedly from Ibn Sīnā's (Avicenna's) later discussions of the subject, in which he argued that the female seed originated from menstrual blood. Ibn Sīnā disagreed with "Galen and the physicians," who believed that both males and females have a seed that is called "sperm" (*manī*) and that the similarity

[33] Al-Razi, al-Majūsī, and Ibn Sīnā, *Trois traités d'anatomie arabes*, 398.

[34] Ibid., 402–4.

[35] Ibid., 408. Al-Ṭabarī believed that male fetuses developed twelve days faster than female fetuses (*Firdaws al-ḥikmah fī al-ṭibb*, 33).

[36] Al-Razi, al-Majūsī, and Ibn Sīnā, *Trois traités d'anatomie arabes*, 408, 14.

[37] Ibid., 414.

[38] Ibid., 416.

between the two seeds lay not only in name but also in function.[39] Both, in other words, held the capacity to actively create forms, or *to in-form*, and to passively receive forms, or *to be in-formed* (*mabda' al-taṣwīr wa-l-taṣawwur*). Ibn Sīnā sided instead with the philosophers who thought that the female seed was able only to passively receive the form (to be in-formed). He objected to the use of a common name for male and female seed and wrote that "if a male's fluid [*dafq*] is called a *manī*, then a female's fluid is not a *manī*. In reality, a man's *manī* is hot, cooked, and thick, and a woman's is a type of menstrual blood slightly cooked and not as removed from baseness [*al-dhumūmah*; meaning low and primitive nature] as a man's sperm."[40] So while Ibn Sīnā concurred with his predecessors that a female seed existed, he stressed its dissimilarity to male sperm and its lack of generative force. He therefore argued that calling the female seed a sperm was inaccurate and confusing.[41] In Ibn Sīnā's view, male and female seeds have inherent and incommensurable roles in the formation of the fetus: The male sperm possesses an in-forming nature (*muḥīl*), making it responsible for form generation (*tawlīd al-ṣūrah*), while the female seed has the capacity only to be in-formed (*mustaḥīl*) and thus can only act as the substance for the generation of matter (*tawlīd al-māddah*).[42] This view, favored by Ibn Sīnā, was more in line with Aristotelian views espoused by philosophers. He favored the philosophical position but explained that, for most physicians, knowledge of the detailed arguments behind the philosophical position was unnecessary.[43]

Though he argued that the female seed is not actually a seed but rather a type of menstrual blood mistakenly called sperm, he continued to use the term *manī* in his writings to describe the female seed, perhaps to avoid confusing his readers. Moreover, Ibn Sīnā still located the origins of this "pseudosperm" in the female testicles;[44] these, he believed, were smaller, rounder versions of male testicles and were located on both sides of the vagina connected to the uterus by ligaments. His belief in equivalence of male and female testicles led him to acknowledge the necessity of female

[39] The word *manī* can be translated as "sperm," "semen," or "seed." It was used to describe both male and female "seeds." I chose to translate it as "seed" to avoid the modernist connotations attached to words such as "sperm" and "semen."

[40] Avicenna, *Kitāb al-qānūn fī al-ṭibb* (Rome: Typographia Medicae, 1593), 553.

[41] Jon Mcginnis, *Avicenna* (Oxford: Oxford University Press, 2010), 241.

[42] Avicenna, *Kitāb al-qānūn fī al-ṭibb*, 574; Gadelrab, "Discourses on Sex Differences," 66–67; and Mcginnis, *Avicenna*, 238–43.

[43] Gadelrab argues that Ibn Sīnā thought of the seed's role in conception as something "of concern only to the natural philosopher" ("Discourses on Sex Differences," 66). But given his later statements on the matter (see, for example, Avicenna, *Kitāb al-qānūn fī al-ṭibb*, 553), it is more accurate to say that he took the philosophers' position as the correct explanation but thought that doctors—since medicine is dependent on physics—should simply rely upon the philosophers' explanations rather than coming up with their own. On the place of medicine in the hierarchy of knowledge in Ibn Sīnā's view, see Mcginnis, *Avicenna*, 229–32.

[44] "Testicles" were used to describe both male and female seed-generating organs.

orgasm and ejaculation for conception to occur. When female ejaculation occurs, the testicles pull on the uterus, bringing its horns closer to them—a uterine position ideal for receiving the female seed from the female testicles. This act also shortens the neck of the uterus, which aids reception of the male sperm.[45] For this reason, Ibn Sīnā argued that simultaneous ejaculation is necessary for conception. If the male ejaculates before the female, the two seeds will not meet, "because he will leave her and she will not ejaculate"; the situation becomes even more complicated if she ejaculates first. In that case, Ibn Sīnā explained, the uterus would "escape" (meaning recoil) after contracting to receive the female seed, making it difficult for the male sperm to reach the uterine fundus. He added that there were two possible explanations for uterine contractions during female ejaculation. The first is that these contractions are intended to draw the male sperm into the uterus as the female seed is ejaculated. The second, which Ibn Sīnā preferred, is that these contractions are intended to draw out the female seed, since the uterine horns are not directly attached to the female testicles. If male ejaculation happens at the same moment as female ejaculation, the male sperm will be drawn inside the uterus by its contractions. If the male ejaculates after she does, however, the female may not even feel his ejaculation.[46] For this reason, Ibn Sīnā gave detailed instructions for sexually stimulating the female by extended foreplay and manipulation of the clitoris during penetration. Once it becomes clear that the woman is in the process of ejaculation—"when her eyes start to redden, her breath hastens, and her speech becomes mixed, . . . then he should send the sperm close to the mouth of the uterus." The man should then wait until her body is at rest before leaving her, while she should bring her legs together and hold her breath. "If she falls asleep after this, it is more assuring of conception."[47]

Despite differing on the nature of and the role played by the female seed, al-Ṭabarī, al-Majūsī, and Ibn Sīnā all agreed that sex differentiation was determined by heat. Ibn Sīnā explained that, at the practical level, anything that can increase the heat of a woman's seed—like living in a cold region, which requires the body to be warmer to resist the cold—would enhance the chances of conceiving a male child. He also reiterated al-Ṭabarī's list of different possibilities for fetal sex based on the origin of the male and female seeds.[48] If the male seed came from the right testicle and mixed with a female seed originating in the left testicle, the result would be a feminine male; the converse (male left sperm and female right seed) would result in a masculine female.[49] Finally, Ibn Sīnā mentioned others' theories about

[45] Avicenna, *Kitāb al-qānūn fī al-ṭibb*, 567–68. Here, Ibn Sīnā was following Galen (*On Semen*, 75).

[46] Avicenna, *Kitāb al-qānūn fī al-ṭibb*, 572.

[47] Ibid. See also Park, "Medicine and Natural Philosophy," 89.

[48] Ibn Sīnā did not mention al-Ṭabarī by name here. He referred only to "some physicians."

[49] Avicenna, *Kitāb al-qānūn fī al-ṭibb*, 574.

how the actual day of conception would influence sex: between "the day of bathing" (referring to the last day of menstruation) and the fifth day afterward it would result in a male; between the fifth and eighth days it would result in a female; between the eighth and eleventh days it would result in a beardless boy (*ghulām*); and anytime after that it would result in a hermaphrodite. Ibn Sīnā did not appear to personally endorse these theories, but they were likely common enough that he felt he needed to include them in his writings.[50]

Contrary to al-Ṭabarī's, al-Majūsī's, and Ibn Sīnā's views on the central role of heat in sex determination, al-Rāzī rejected this idea on two grounds, both empirical and theoretical. At the empirical, experience-based level, al-Rāzī argued that sex differences being based on heat would require all men to be hotter than women, which experience contradicts: "We see many women with hotter complexions than many men. This indicates that [differentiation into] males and females is not [caused] by heat but by the dominance of type." He also commented on Galen's view that males are developed when conception occurs in the right horn of the uterus (because the right horn is hotter due to its proximity to the liver). Al-Rāzī commented: "[For] me: this [view] requires that there never be a woman hotter than a man." The second theoretical argument is rooted in al-Rāzī's view of nature. He believed that acts of nature are always directed toward preserving balance and health at both individual and universal levels. According to this view, nature seeks to maintain a balance of males and females, so the process of their sexual differentiation would have to protect this balance and guarantee the continuance of both males and females. Heat, as a tool of sex differentiation, is not sufficient to protect this balance. Instead, there must be "a thing in the principle of [each] water [*mā'*] that would necessitate this differentiation."[51] It is, therefore, vital that the female seed carry in its principle the female quality and that the male seed carry the male quality.

In view of these different opinions on sex differences and the process of sexual differentiation, how can we map a reasonably coherent sexscape? Can these different views lend themselves to a common conclusion on what sexes are, how many there are, and how we can differentiate them? This brings us back to the question in the title of this article: One, two, or many sexes?

[50] Ibid. It is worth noting here that Ibn Sīnā did not use the term *ghulām* to describe young male children in *al-Qānūn*, which is why I chose to translate it as "beardless boy," especially given that the term *dhakar* (male) was used in the same description. The term *ghulām* in the quote above should not be translated as "male child," since Ibn Sīnā used the word *dhakar* to describe a male boy in this and previous mentions.

[51] Abū Bakr al-Rāzī, *al-Ḥāwī fī al-Ṭibb*, ed. Muḥammad Muḥammad Ismail (Beirut: Dār al-Kutub al-'Ilmiyyah, 2000), 3:51.

ONE, TWO, OR MANY SEXES

In spite of much criticism, Making Sex has exerted considerable influence over our understanding of sex differentiation in the premodern world.[52] Scholarly criticism of Laqueur's one-sex model by scholars of the Western world has not, however, been duplicated in the Islamicate context. There, its main premise has been accepted as a given due to quotes from Ibn Sīnā, whose text echoed in vivid detail Laqueur's evidence from Galen. Take, for instance, Ibn Sīnā's explanation in *al-Qānūn* about how male and female genitals resemble one another:

> We say that the tool of reproduction in females is the uterus. And it [the uterus] is similar in the principle of creation [*fī mabda' al-khalq*, literally beginning of creation] to the tool of reproduction in males, which is the penis and what accompanies it. However, one is complete and directed outwards, and the other is incomplete [*nāqiṣah*] and trapped inside, as if the inverse of the male's tool: as if the scrotum is the uterine peritoneum, and the penis the neck of the uterus. The [two] testicles in women [are] like [those] in men, but in men they are big, outwardly located and elongated . . . , and in women [they are] small, rounded . . . , and inwardly inside the pudendum [*al-farj*], placed on its sides, one at each side. Each of them has a membrane and is not gathered in one sac.[53]

Ibn Sīnā's major medical commentator, Ibn al-Nafīs (d. 1288), who was a famous and respected physician in his own right, accepted Ibn Sīnā's analogy but added refinements. Commenting on Ibn Sīnā's first sentence, he explained that it was the vagina (called "the neck of the uterus" by both Ibn Sīnā and Ibn al-Nafīs) that resembled an inverted penis and not the uterus itself; Ibn Sīnā had followed Hippocratic usage in using the term "uterus" to refer to both the uterus and the vagina. As for the uterus resembling the scrotum, Ibn al-Nafīs explained that the uterus does indeed resemble a scrotum—both are sacs that contain things (the scrotum contains testicles, and the uterus contains the fetus). Like Ibn Sīnā, Ibn al-Nafīs believed that the female testicles are located inside the body so that they could be heated by the surrounding organs to hasten female ejaculation. Echoing Ibn Sīnā, Ibn al-Nafīs believed that this placement made simultaneous ejaculation with the male—and thus conception—possible. Although he modified and refined some details of the idea of the sexual organs as complements, Ibn al-Nafīs did not reject Ibn Sīnā's explanations.[54] As Ahmad Dallal has argued

[52] Brooke Holmes observed recently that *Making Sex* conditioned how perceptions and understandings of sex are "mapped onto—and authenticated through—the past" (*Gender: Antiquity and Its Legacy* [London: I. B. Tauris, 2012], 27).

[53] Avicenna, *Kitāb al-qānūn fī al-ṭibb*, 567.

[54] ʿalī Ibn Abī al-Ḥazm Ibn al-Nafīs, *Kitāb sharḥ tashrīḥ al-qānūn*, ed. Salmān Qaṭāyah and Paul Ghaliyunji (Cairo: al-Hayʿah al-Miṣrīyah al-ʿĀmmah lil-Kitāb, 1988), 439–40.

in reference to Ibn Sīnā's account, "Islamic medical writings adopted the ancient idea of inverse similarity between male and female sex organs."[55] Sherry Gadelrab agrees with Dallal that "in his *al-Qānūn*, Ibn Sina adopted the Galenic one-sex model." Gadelrab usefully points to "the diversity of opinions and lack of consensus on a single authoritative model for interpreting sex differences in medieval Muslim scholarship."[56] However, these views attributed to Ibn Sīnā and Ibn al-Nafīs require further examination.

Indeed, the argument for an inverted similarity between the sexes that Ibn Sīnā presents in *al-Qānūn* seems to have been entirely unique in the Islamicate medical literature of his day. Other comparisons of male and female reproductive organs, such as the one Al-Rāzī provided, were differently framed and did not reference Galen. In describing the neck of the uterus, for instance, al-Rāzī echoed al-Ṭabarī in arguing that "the neck of the uterus extends to the bottom of the woman's pudendum, and it is similar in the woman to the [penile] meatus [*al-iḥlīl*] in the man."[57] The analogy rests upon the role of these openings for excretions. Other than this, there is no mention of inversion or any other similarities between genitalia. In al-Majūsī's writings, we find yet a different analogy likening the uterus

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I disagree with Sherry Gadelrab's assessment that Ibn al-Nafīs objected to Ibn Sīnā's model and that he thought of the uterus as a uniquely female organ ("Discourses on Sex Differences," 73). Ibn al-Nafīs only refined Ibn Sīnā's model by explaining how the uterus could resemble both the penis and the scrotum. Ibn al-Nafīs explained that Ibn Sīnā's fist mention of the uterus refers to the vagina, while Ibn Sīnā's second mention refers to "where the fetus is kept." He did not reject Ibn Sīnā's suggestion that the uterus and scrotum are similar. In fact, he agreed with Ibn Sīnā's argument that the uterus's "similarity to the scrotum is that it is a sac [*kīs*] that contains something inside it, yet what is inside the scrotum is the two testicles, and what is inside the uterus is the fetus." In his discussion of how the penis is similar to an inverted vagina, Ibn al-Nafīs added to Ibn Sīnā's account by explaining that the hymen is the remnant of the common sac that contained both female testicles—that is why it covers the base of the vagina, blocking it. It is thin so that it can be penetrated: "[In] his [Ibn Sīnā's] saying, 'Before a girl is deflowered, there are membranes in the neck of the uterus': The purpose of these membranes is not to block the mouth of the neck [of the uterus] in young age as they think, but rather the purpose is that the two eggs in women be in one sac, as they are in men. This is [only] possible if the sac crosses the neck of the uterus, and therefore blocks it. This membrane has to be very thin so that it is easily torn [*tukhraq*] during intercourse to allow penetration. The vessels in this membrane are the vessels in a man's scrotum" (Ibn al-Nafīs, *Kitāb sharḥ tashrīḥ al-qānūn*, 440). Although I object to the common understanding that both Ibn Sīnā and Ibn al-Nafīs were advocating a one-sex model, there is no evidence that Ibn al-Nafīs rejected Ibn Sīnā's model of sex differentiation. He simply expanded on the descriptions in *al-Qānūn*, and his text helps us to better understand Ibn Sīnā's propositions.

[55] Dallal, "Sexualities," 401–7.

[56] Gadelrab, "Discourses on Sex Differences," 64, 43.

[57] Al-Razi, al-Majūsī, and Ibn Sīnā, *Trois traités d'anatomie arabes*, 86, 88; and Ṭabarī, *Firdaws al-Ḥikmah fī al-Ṭibb*, 31. The term *'iḥlīl* refers literally to the penile meatus. However, it was also used as a generic term for the penis when discussed more generally and in issues not related to reproduction or coitus. Alternatively, it was called *dhakar* when discussing reproduction or coitus. Al-Ṭabarī used both terms in these two capacities.

to the bladder: "The uterus is similar in its creation to the creation of the bladder, especially at its base. However, it [the uterus] differs from [the bladder] in that it has two appendages [*zā'idatayn*] on its sides that resemble two horns."[58] Having described all the organs of reproduction, al-Majūsī then writes: "You should know that these organs in males and females are one thing, but they differ in their shape and essence. [For instance,] the two testicles in women are rounded and hard, and in men, elongated and soft; the sperm vessels in men are long and hard, and in women short and soft; and the penis in males is rectangular and hard, and the neck of the uterus in women is short and soft; and the clitoris in women stands in place of the prepuce in men."[59] Al-Majūsī's detailed comparison appears to be the source for Ibn al-Nafīs's understanding and explanation of Ibn Sīnā. However, in al-Majūsī's scheme, there is no analogy involving the uterus suggesting that it is a uniquely female organ—like a second bladder. This might explain Ibn al-Nafīs's attempt to locate a rudimentary sac that gathered both female testicles and passed across the vagina. What to make of Ibn Sīnā's view, then? Did he believe in something similar to the one-sex model that Laqueur has described?

In order to determine whether or not Ibn Sīnā believed in a one-sex model, we must examine his understanding not only of anatomy but also of physiology and pathology. Ibn Sīnā's physiology provided clear statements on the difference between males and females. As we have seen, his assertion that female seed is categorically different from male seed and that it was misleading to use the same name for both was a minority view for Islamicate physicians of his time. He believed that not only the roles but also the origins of the seeds were different and that the male seed was far more refined than the female seed, which was composed of menstrual blood.

The organization of *al-Qānūn*'s sections on anatomy were also remarkably different from other compendiums like al-Rāzī's *al-Manṣūrī* or al-Majūsī's *al-Kāmil*, both of which were well known at the time Ibn Sīnā composed his text. Both al-Rāzī and al-Majūsī wrote chapters on individual reproductive organs (both male and female) rather than grouping the organs by sex. For instance, chapter 24 of *al-Manṣūrī* discusses the testicles and the penis, chapter 25 discusses the breast, and chapter 26 discusses the uterus. In al-Majūsī's *al-kāmil*, the chapter 33 is entitled "On the description of the organs of reproduction. First, on the description of the uterus."[60] This is followed by the description of the pregnant uterus and the formation of fetuses (chapter 34), the breast (chapter 35), the testicles (chapter 36), and the penis (chapter 37).

[58] Al-Razi, al-Majūsī, and Ibn Sīnā, *Trois traités d'anatomie arabes*, 404. See also Park, "Medicine and Natural Philosophy," 97. Galen also compared the uterus and its neck to the stomach and esophagus (*On Semen*, 75–77).

[59] Al-Razi, al-Majūsī, and Ibn Sīnā, *Trois traités d'anatomie arabes*, 430.

[60] Ibid., 386.

Ibn Sīnā, in contrast, grouped all discussion of reproductive organs into two main sections: the first is titled "On the conditions of the organs of reproduction of males and not of females"; the second is "On the conditions of the reproductive organs in females."[61] This unique division demonstrates Ibn Sīnā's conviction of the qualitative difference between the male and female organs. In each of the two sections, he delineates his arguments for why one sex is unique from the other. For instance, the section on male organs includes chapters on erection, penile ulcers (whether sexual or nonsexual), treatment of impotence, and the best and worst times for coitus for men. There is also a chapter on *ubnah* (known as the hidden illness), which was uniquely a male disease, and on the formation of sperm (in which Ibn Sīnā explained that only male sperm is true sperm). In the section related to female organs, we find that along with discussion of the uterus, there are chapters on the making of the fetus, a number of chapters on pregnancy, care for pregnant women, labor, abortion, contraception in women, pseudocyesis (false pregnancy), and menstruation, as well as discussions of other disorders and conditions seen as uniquely female. Ibn Sīnā's organizational structure and the way that he discusses physiological and pathological questions betray his deep belief in a clear difference between males and females—a distinction that he makes even more forcefully than does al-Rāzī or al-Majūsī or even his most important commentator, Ibn al-Nafīs.

Ibn Sīnā's views on sexual differentiation were consistent with the strong Aristotelian bent to his medical writings in *al-Qānūn*. But although he seems to be endorsing what Laqueur would call a one-sex model, the way that he compares male and female reproductive organs is simply analogous to the types of comparison he makes throughout his book. For instance, when he argues that "the essence of the testicle is a glandular organ, white in flesh that resembles to the greatest [degree] the flesh of the fat breast," he is not arguing that the breasts are, in fact, testicles or vice versa.[62] Rather, he is using a familiar organ to explain the appearance of a less familiar one—an argumentative technique much like his later uterus-penis comparison. Similarly, al-Majūsī's comparison between the uterus and the bladder was not an attempt to argue that the uterus is indeed a second bladder but rather a way of teasing out similarities between two hollow organs with double walls, each of which can expand to hold masses larger than its original size. Both comparisons simply serve to facilitate visualization and memorization.

At another level, al-Majūsī's description of the similarities between the sexual organs in males and females and his admonition to "know that [they] are one thing" simultaneously raises questions and provides clarification. Superficially, his words would seem to support a one-sex model. But a deeper look allows us to discern some of the governing principles in

[61] Avicenna, *Kitāb al-qānūn fī al-ṭibb*, 552, 567.
[62] Ibid., 552.

medieval Islamicate anatomy and medicine, where discussions of the similarities between humans and animals, between different human organs, between races, between people of different ages, and between males and females were common. Animals and humans were commonly depicted as similar in their composition, in the natures of their organs, and in the functions of these organs. Humans were essentially animals who possessed superior humoral balance, as well as divinely endowed abilities. However, the anatomical details described by physicians and veterinarians and the rules for medical treatment for both animals and humans were essentially the same.[63] Even within the discussion of human anatomy, similarities were constantly drawn between upper and lower limbs, or between different types of fleshy organs, bony organs, and glandular organs. In essence, all organs were understood as being composed of the same humors and originating from the same matter; they were singular only in their routes of development and differentiation. Organs could also be categorized as muscular, nervous, membranous, or bony. This provides context for al-Majūsī's comparison of the uterus to a bladder "in the origin of creation" and for Ibn Sīnā's comparison of male and female organs "in the beginning of creation," since both sets of organs originated from the same materials but developed differently based on the forms that their matter would accept.

This view of the common origins of similar human organs, which lends itself easily to equivalence in the reproductive organs of males and females, cannot be described as a belief in one sex, just as arguments about the common origins of humans and animals cannot be described as a belief in one species. Just as medieval Islamicate thinkers viewed humans as a particular species of animal, they viewed different sexes as particular types of human. In fact, Ibn Sīnā explained that an individual's biological masculinity or femininity was a necessary accident of human existence.[64] By this he meant that although reproductive organs are not necessary for survival (like the heart or the brain) and therefore do not represent the essence of the human being as an animal, they are far more important than unnecessary accidents of biology, such as hair or eye color, because they are necessary for the survival of the species. Even his descriptions of change and movement from one sex category to another is not an indication of a one-sex model but rather a sign of his belief in the common origin of all sexes and of all species. It is instructive to consider that modern and contemporary discussions of embryology focus on how male and female sexual organs develop similarly and from the same origin but then move in different

[63] For instance, Abū Bakr ibn Mundhir al-Bayṭār, who was the chief veterinarian and horse trainer for the Mamluk sultan al-Nāṣir Muḥammad ibn Qalāwūn (r. 1293–1341), explained in the beginning of his treatise on horses, "Nukhbat al-afkār," that horses were given the same medications as people but in stronger doses. See Abū Bakr Ibn Mundhir al-Bay. tār, "Kitāb Nukhbat al-Afkār," MS Arab, no. 396, Houghton Library, Harvard University.

[64] Avicenna, *Kitāb al-qānūn fī al-ṭibb*, 9–10.

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directions under the influence of hormones—a fate already sealed in their genetic makeup. While this view regards the two sets of organs as essentially the same and draws similarities between them, we do not describe this as a one-sex model. Similarly, for medieval authors, the fate of the developing fetus was mostly decided either by relative dominance or heat of the two seeds at the moment of conception and/or by the site of implantation. Thereafter, sexual organs develop differently, even though they begin from similar origins and have similar qualities. While this article argues for the lack of evidence supporting the one-sex model in Islamicate medical writings and thus mirrors arguments made by Joan Cadden and Katharine Park for the European context, there is no evidence suggesting even the possibility of this model in nonmedical writings such as legal, religious, or literary writings. To my knowledge, there has been no scholarly analysis of this possibility in nonmedical texts, including those popularizing medical knowledge. This absence suggests that a one-sex model reading of medical texts for this period would be contrived because they were not understood this way at the time.

However, to deny the existence of a one-sex model is not to suggest that any of the texts under investigation here support a two-sex or binary model. For one thing, hermaphrodites, who cannot be reduced to males or females or even to the idea of feminine males, represent an important category in all of these descriptions of sex differentiation.[65] For instance, al-Rāzī's description of sex differentiation as based on the comparative dominance of one of the seeds yielded a sex space with many possibilities:

> If the matter with regard to this subject is as we have described it, it is possible that in some cases it happens that a male child's masculinity or a female child's femininity is extremely weak. We therefore find masculine women, as we find feminine men. Among masculine women, it may go so far that they have light menses or none at all, and occasionally, they will grow beards. . . . This is not the only thing that may occur. Rather, when the two sperms are equivalent and the one has little superiority over the other, hermaphroditism [*khunth*] will occur, and a child may even be born with both penis and vulva.[66]

Al-Rāzī's hermaphrodites thus represent a third rare possibility (along with males of extreme masculinity and females of extreme femininity), where the male and female seeds are of equal power. He described different types of

[65] Paula Sanders, "Gendering the Ungendered Body: Hermaphrodites in Medieval Islamic Law," in *Women in Middle Eastern History: Shifting Boundaries in Sex and Gender*, ed. Nikki R. Keddie and Beth Baron (New Haven, CT: Yale University Press, 1991), 74–95; Everett K. Rowson, "The Effeminates of Early Medina," *Journal of the American Oriental Society* 111, no. 4 (1991); Everett K. Rowson, "The Categorization of Gender and Sexual Irregularity in Medieval Arabic Vice Lists," in *Body Guards: The Cultural Politics of Gender Ambiguity* (New York: Routledge, 1991), 50–79.

[66] Rosenthal, "Ar-Rāzī on the Hidden Illness," 54.

hermaphrodites, some with full sets of functioning male and female organs, but most with only one of the two and remnants of the other.[67] Al-Rāzī's sexscape also included males with such weak masculinity that they could be called feminine males and females with such weak femininity that they could be called masculine females.

It is important to note here that descriptions such as feminine males or masculine females in the works of al-Rāzī and other medical works analyzed here do not describe behaviors, comportments, characters, legal obligations, or social status, among other questions that would form a gendered position. Instead, these terms refer to medicalized sex categories where these individuals manifest their weak masculinity or femininity only through specific diseases and in particular incidences in life, not in their social performances. Some of the examples that al-Rāzī mentions relate to women who saw their beards grow and saw their bodies acquire masculine characteristics as advanced age weakened their constitutional femininity. However, these women were (and apparently continued to be) gendered as women with all the attached characters, behaviors, comportments, and legal obligations. At the same time, these same terms (masculine women, feminine men, etc.) were also used to describe gendered categories of social behavior. Although these sex and gender categories take the same name, they do not necessarily refer to the same people. It is possible to assume a certain overlap, but evidence suggests that these sex-related descriptions applied to people performing a number of variable genders. It is likely that authors and translators (from the Greek) of medical texts were appropriating existing Arabic terms that referred to specific genders and using them to describe the expanding sex continuum. The context of the discussion allows for the proper identification of the meaning.

The same applies for those termed hermaphrodites. Here, the term describes a specific medical sex category, as well as a particular gendered performance. At the level of sex, these individuals are sexually differentiated in a particular manner (from two seeds of equal strength in al-Rāzī's view, for instance). In some cases, both male and female tissues might be present, and the individual would have been thought of as a hermaphrodite. In other cases, their sexual morphology may not be as obvious. In all cases, they suffer from specific diseases, such as sterility, that are specific to their constitution. This is to be differentiated from the gendered use of the term to refer largely to feminine men. There were definitely degrees of overlap, especially in cases of hermaphrodites who had either two sets of developed genitals or ambiguous genitals. Paula Sanders has discussed the gender-related aspect of this question in her analysis of the legal debates surrounding hermaphrodites with ambiguous genitals. But while both legal and medical discourses on sex difference encompassed individuals without these obvious genital signs, medical definitions of hermaphrodites distin-

[67] Ibid.

guished between this category and feminine males; physicians had more categories for sexual difference than jurists.

These different sex configurations were not theoretical possibilities (as a one-sex model would have eventually been) but were rather clinical and diagnostic categories that influenced how physicians thought about their practice. For instance, feminine males, or males with weak masculinity, would be susceptible to *ubnah*—hidden illness, so-called due to its embarrassing nature. People affected with this disease complained of severe itching in their rectums and uncontrollable desire for anal penetration. Al-Rāzī argued that these patients' spermatic vessels were located close to their rectal wall and that the movement of sperm in these vessels caused the severe itching that forced the patient to seek anal penetration. This penetration did not have to be sexual in nature, as patients reported needing to use sticks or cucumbers or other things to perform this penetration and relieve their itch.[68] In al-Rāzī's view, weak masculinity was responsible for the odd positioning of the spermatic vessels leading to this condition. In his book on coitus, Isā ibn Māssah explained that these individuals with weak masculinity would prefer to be penetrated and not to penetrate and that they could achieve ejaculation only if penetrated.[69]

Similarly, al-Rāzī explained that medically identifying masculine women is important for medical diagnosis of illnesses that afflict only women. For instance, failure to menstruate could lead to complications such as uterine suffocation, a dangerous and sometimes fatal condition that resembled epilepsy or stroke in its symptoms. Uterine suffocation could also result from the accumulation of female seed inside the uterus in cases of women who did not have regular sex, such as widows or "young mature females who desire men." However, if the woman complaining of light or no menses is identified by the physician as a masculine woman, the physician would know that she was in no risk of uterine suffocation, because masculine women normally have no seed and light or no menses. Yet, this does not apply to all masculine women, because the degree and manifestations of masculinization differ from one person to another. Al-Rāzī admitted that some masculine women did menstruate, and many were even very fertile, giving birth to many children, but they were likely to acquire "the nature of males" (*intaqalat ilā ṭab' al-rajul*) after menopause or after they stopped having regular sex. Al-Rāzī describes three examples of women who had

[68] Ibid. Rosenthal characterized the disease as "passive homosexuality," which is an anachronistic characterization fraught with methodological problems. On this subject, see Khaled El-Rouayheb, *Before Homosexuality in the Arab-Islamic World, 1500–1800* (Chicago: University of Chicago Press, 2005).

[69] 'īsā Ibn Māsah, "Maqālah fī al-jim' wa-mā yata'allaqu bihi," no. 071015, Abdel Rahman Badawi Collection, Library of Alexandria. This manuscript was published in Mohamed Walid Anbari, *Streitfragen über die Zeugung, Nachkommenschaft und über den Geschlechtsverkehr Verfasst von 'īsa Ibn Māssah Masā-Il Fī Al-Nasl Wa Al-Ḏurrīya Wa Al-Ġimā* (Erlangen: Medizinische Fakultät der Universität Erlangen-Nürnberg, 1971).

been fertile but who stopped menstruating after being widowed. Of one of them he writes: "Her body became like the bodies of men, the hair in her body became more prominent, [she] grew a beard, and her voice became rough. Then she died."[70]

Al-Majūsī and Ibn Sīnā made similar arguments. As we have seen, Ibn Sīnā followed al-Ṭabarī in explaining that the heat of the seed influences the sex of the fetus, resulting in a variety of sexual anatomical and psychological outcomes. There were hermaphroditic (feminine) males (*dhakar khunthā*), generated by right-sided male seed and left-sided female seed, as well as masculine females (*unthā mudhakkarah*), generated by left-sided male seed and right-sided female seed. These categories appear to resemble al-Rāzī's categories, which were important diagnostic tools. Hermaphrodites, in Ibn Sīnā's view, varied in their morphology: "Some hermaphrodites [*khunthā*] have [neither] a male organ nor a female organ. Others have both, but one is more hidden and weaker as opposed to the other, and he urinates from one and not the other. In others, the two [organs] are the same [in size and appearance]. I was told that some of them can penetrate and be penetrated, but I can hardly credit this account. In many cases, they are treated by cutting the hidden organ and treating the wound."[71] Here, Ibn Sīnā's view of hermaphrodites shows that they were not seen as one coherent category but rather viewed as representing various morphologies and various medical and disease presentations. Although Ibn Sīnā's distinctions between hermaphrodites and other sexes were focused on the genital organs, it is significant that a number of the hermaphrodites he described had only one set of conspicuous, functioning sexual organs, while the other was more rudimentary. The function of a patient's sexual organs, then, did not remove him or her from the category of hermaphrodite, and treatment of the second set of organs did not necessarily move the patient into the category of either male or female at the medical level. There was, in other words, no insistence upon creating a sexual binary. Instead, medical practice as described by Ibn Sīnā accepted the coexistence of multiple, ambiguous sex categories regardless of sexual function or medical intervention.

The sex systems described in these writings all assume the existence of multiple sex categories—, all of which originated at the moment of conception. Medieval Islamicate authors tended to assume that sex was normally stable throughout life but that it could change in rare cases and only between sex categories close to one another. These categories were not exclusively theoretical assumptions found in elaborations on embryology; they were medically, physiologically, and pathologically relevant categories significant for medical practice. Further investigations can show whether and how these different medical categories impacted social practice or legal and religious norms.

[70] See al-Rāzī, *al-Ḥāwī fī al-Ṭibb*, 3:1430–33, 1496, 1495.
[71] Avicenna, *Kitāb al-qānūn fī al-ṭibb*, 580.

Conclusion

The writings I have surveyed—by Ibn Sahl Rabban al-Ṭabarī, Abū Bakr al-Rāzī, ʻAlī ibn ʻAbbās al-Majūsī, and Abū ʻAlī al-Ḥusayn ibn Sīnā—represent some of the principal medical attitudes on the issue of sex differentiation from the eighth to the eleventh centuries. These attitudes continued to influence medical theory and practice well into the fourteenth century and beyond, largely because of the work of later commentators like Ibn Bajjah and Ibn al-Nafīs, who were noteworthy physicians and medical thinkers in their own right. I have demonstrated that al-Rāzī's denial of the role of heat in sex differentiation and his attribution of differentiation entirely to the inherent qualities of male or female seed was quite singular when compared to the views of other physicians before and after him. Al-Rāzī's logic is most easily understood through comparison with the arguments of al-Ṭabarī, his predecessor and alleged teacher. Citing Aristotle, al-Ṭabarī had explained that both male and female seed possessed inherently masculine and feminine qualities but that only one of them manifested under the influence of heat, guaranteeing the maintenance of male and female in good proportion in nature.[72] Al-Rāzī took issue with this main assumption, arguing instead that each of the two seeds held the principle of only one sex (that of the respective parent) and that it was only this difference that could explain the balance in proportion of males to females in nature.[73] Surprisingly, the argument on nature does not reappear in the writings of either al-Majūsī or Ibn Sīnā.

All medical authors aside from al-Rāzī viewed heat as the main factor determining the differentiation of sexes; they operated, in other words, under the Galenic assumption that male bodies were hotter than female bodies. Ibn Sīnā, however, took a singular position when he denied the existence of a female sperm, asserting rather that the female seed is different in nature and role to the male sperm, a view that failed to garner much support or have significant influence even with his major commentator, Ibn al-Nafīs. He insisted that male and female bodies developed in different ways because they had different levels of heat: male fetuses developed faster because their seed was originally hotter; girls reached maturity faster than boys because their bodies were colder and needed less heat to mature; and women became old and infertile faster than men for the same reason. For authors who advocated heat-based differentiation, many of the differences between males and females followed from the difference in the heat of their bodies. These differences included hair distribution and differences in digestion, as well as in the nature of their urine. Yet, the discussion of the difference in the sites and functions of genital and reproductive organs was not reduced to heat in a language of causality (like attributing males'

[72] Ṭabarī, *Firdaws al-Ḥikmah fī al-Ṭibb*, 34.
[73] Al-Rāzī, *al-Ḥāwī fī al-Ṭibb*, 3:51.

stronger digestion to their hotter constitutions). Instead, the language used was often one of purpose and divine Providence. In that sense, the different locations of the gonads were not said to have been caused by the difference in heat; instead, they were understood to have been intended by nature or by the Creator to optimize the chances of conception. For instance, Ibn al-Nafīs explained that the presence of female gonads inside the body was necessary to hasten female ejaculation in order that it correspond to male ejaculation.[74]

Despite the divergence of opinion in explanations of sex differentiation and differences, all the authors appeared to have worked from within a similar observational paradigm and from within a unified—yet dynamic and not necessarily coherent—body of knowledge of pathology, pharmacognosy, and pharmacopeia. For all these authors, the chief signs of masculinity and femininity were largely the same: hair distribution (being possibly the most important feature), voice, menstruation or lack thereof, shapes of joints and muscles, urine, pulse, fertility, sexuality and sexual preferences, and the shape and function of genital organs. Males had distinguishable hair distribution, larger joints, and stronger muscles, and their urine and pulse differed from those of females. Also, individuals at the extremities of the sex continuum (such as masculine males or feminine females) were more fertile and had stronger sexual desires with regular menstruation (for females). Those close to the middle (such as masculine females, feminine males, or hermaphrodites) were less fertile if not sterile, had weaker sexual desires, and had little to no menses (for females). Although differences in the shape, size, and function of genitals were also noticed, they were not the most important signs for diagnosing a person's place on this sex spectrum. For instance, Ibn Sīnā explained that some feminine males might have genitals larger (ajal) than more masculine males.[75] Instead, the main indicators of sex, as well as of sex change or modification, were changes in hair distribution (growth of a beard on a woman, for instance), changes in voice, and lack of menstruation.

This common observational paradigm allowed for the creation of a similar sexscape in the writings of all these authors. Each one described the major sex categories to include males (of considerable or extreme masculinity), females (of considerable or extreme femininity), hermaphrodites, masculine females, and feminine males. None of these categories were circumscribed or thoroughly articulated, however, because they presented in different morphologies and were by no means the only possible categories. Authors identified the possibility of other categories and emphasized how individuals in each of these named categories themselves differ in degrees of masculinity and femininity. It could be argued that this observational paradigm sanctioned the creation of a large and dynamic sexscape, where despite

[74] Ibn al-Nafīs, *Kitāb sharḥ tashrīḥ al-qānūn*, 439–41.
[75] Avicenna, *Kitāb al-qānūn fī al-Ṭibb*, 562–63.

possibilities for sex difference being nearly unlimited, specific categories possessed particular discursive significance in anchoring the paradigmatic space and defining its boundaries.

Regardless of their different views on sexual difference, however, these authors shared similar knowledge of pathology and pharmacognosy. They agreed upon the prevalence of the major complaints their patients suffered from and upon the major disease categories. They divided diseases affecting genital organs into two main categories based on whether or not the disease was related to the organ's reproductive function. Ulcers, tumors, and injuries affected the penis, male testicles, and uterus in a manner analogous to how they affected other organs around the body, and they were largely treated with the same methods. Other conditions, like failure to achieve erections or weak erections, disorders of menstruation, and uterine suffocation, were specific to the organ's reproductive function and thus differed between males and females. Pharmacopeia and pharmacognosy were also common bodies of knowledge that developed largely outside the control of Galenic practitioners and through the work of herbalists and druggists. A brief glance at the types of drugs and healing techniques used by these authors reveals many similarities and that differences in understanding how and why drugs acted were not necessarily sufficient ground for rejecting specific drugs or specific procedures.[76]

Moreover, these authors shared a number of significant physiological assumptions, many of which relied on the observational paradigm discussed above but also on the social and cultural environment and a received Greek heritage. The most significant is the shared belief in the presence of a female seed, a belief shared by the nonmedical public. Although Ibn Sīnā rejected the use of shared terminology for male and female seeds, he nevertheless continued to use the word *manī* throughout his writings to refer to both. Similarly, all of these authors and many outside of the medical profession were convinced that female orgasm was necessary for conception and that pleasure and excitement during coitus were thus essential. This deep conviction about the importance of female pleasure and orgasm provided ethical justification for medical discussions about enhancing sexual pleasure, leaving behind fascinating evidence about what was considered pleasurable during this period—a fact that should inspire future research.

In his *On Semen*, Galen laid out a comprehensive sex morphology in which sex categories were identifiable through a number of morphological characters and were not limited to genital morphology; beards, physical build, and voice, for instance, were all key in determining gender. He explained that one is able to recognize males and females without looking at their genitals because their entire bodies are different. This was his reason

[76] A clear example is the treatment of uterine suffocation discussed above. While authors and practitioners differed in explaining the disease and its causes, they used similar medical preparations to treat it.

for rejecting the idea that sex differentiation is based on the dominance of one seed over the other in the battle for the formation of genitals, arguing instead that sex differentiation must be connected to a more comprehensive factor (like heat) that would affect the fetal body as a whole.[77] I have argued that Galen's account had a significant influence upon medieval Islamicate medical thinkers; their reliance on his morphology encouraged them to theorize a continuum of masculinity/femininity in which multiple sex categories coexisted and where some remained ambiguous or could only be readily identified when they came to light during the investigation of medical pathologies. Even in the realm of medieval medical thought, we can therefore see evidence for Judith Butler's argument that "sex by definition will be shown to have been gender all along."[78] Yet even if we accept that no natural transhistorical sexed body has ever existed, this investigation has demonstrated that medical discourses have long played a critical role in establishing the epistemic categories that structure our understanding of bodies and the meaning of nature. The category of hermaphrodite was foundational to the expansive landscape of sex and its possibilities in this period, and it provided medical discourse with explanatory devices to dispel anxiety related to the multiplicity of sex categories. Even the small selection of medical texts upon which I have focused here testifies to the variety of views about sex differences and differentiation in the medieval Islamicate period. More work is needed to uncover the extent of these ideas and their implications for other spheres of life, such as the social construction of gender, sexuality, and sexual practices.

About the Author

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[77] Galen, *On Semen*, 185.

[78] Judith Butler, *Gender Trouble: Feminism and the Subversion of Identity* (New York: Routledge, 1999), 8.