

MENSTRUAL BLEEDING ACCORDING TO THE HIPPOCRATICS AND ARISTOTLE

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Hippocratic and Aristotelian models of a woman's interior space were inferred from observable phenomena such as menses and breasts, and analogy with such things as sponges and cupping instruments.¹ Insofar as the Classical Greeks did not dissect human bodies, they had no evidence to gainsay the societal assumption of female physiology and the extent to which it differed from the male. Comparisons with dismembered animals could give some testimony to what lay inside humans, but as there was no reason to think that humans bore any but a superficial resemblance to quadrupeds, the Greeks would naturally select those observations which confirmed their ideas about the human body and reject those that contradicted firmly established beliefs. E.g., other animals, such as pigs, were seen to have compartmentalized wombs, a fact which was thought to explain multiple births; this seems to have been taken as confirmation that the human womb had at least two compartments² (though, in fact, it is not divided at all) to accommodate twins. On the other hand, the sedentary nature of most animal reproductive organs was never brought forward to challenge the belief in the wandering womb in women.³ Such egregious errors in ancient theories about female anatomy were the result of wrong inferences stemming from

¹ Cf. G. E. R. Lloyd, *Science, Folklore and Ideology* (Cambridge 1983) 58–111; Aline Rousselle, *Porneia: On Desire and the Body in Antiquity* (Oxford 1987) 24–46; *Madre Materia*, ed. Silvia Campese et al., (Torino 1983) 83–170; Helen King, *From Parthenos to Gyne: The Dynamics of Category* (London diss. 1985) 117–50; Lesley Ann Jones, *Morbidity and Vitality: The Interpretation of Menstrual Blood in Greek Science*, (Stanford diss. 1987), 55–96; Ann Ellis Hanson, "The Medical Writers' Woman," in *Before Sexuality*, ed. David Halperin et al. (Princeton forthcoming).

² The Hippocratics frequently refer to the womb by the plural, e.g. *Mul.* I.1 and 12 (L. VIII.10 and 48), and Aristotle explicitly says it is double at *GA* 716b32–33, though this is because he is here assimilating female to male genitalia. [Unless otherwise stated all Hippocratic texts are taken from Émile Littre (L.), *Oeuvres complètes d'Hippocrate*, 10 vols. (Paris 1839–61; repr. Amsterdam 1962) and all Aristotle texts from A. L. Peck, *Parts of Animals, Generation of Animals, History of Animals*, 4 vols. (Loeb Classical Library: Cambridge, Mass. 1953–65). All translations are my own.]

³ Many passages in the Hippocratic gynecology (e.g. *Mul.* I.7 (L. VIII.32/4), *Mul.* II.123–26 (L. VIII.266–72), *Nat. Mul.* 2.3 and 8 (L. VII.312–316 and 322–24) describe the womb as moving around the body, not only in prolapse, but upwards as far as the heart, liver, lungs—and even the head. For a discussion of this belief cf. the sources referred to in note 1 and Mary Lefkowitz, "The Wandering Womb," *Heroines and Hysterics* (New York 1981) 12–25.

presuppositions which the individual never thought to challenge, rather than a wilful neglect of the facts before his eyes.⁴

However, menstrual blood itself does not remain part of a woman's internal environment: it becomes external and accessible to direct observation. As this information was available to the Hippocratics and Aristotle, they had more opportunity to rectify erroneous notions about when and in what quantity a normal woman bled; yet their statements on menstrual flow are frequently as mistaken as their pronouncements on more unverifiable matters.⁵ That women menstruate was the primary evidence upon which they based their theories of the unseen innards of a woman, but in turn these theories, themselves influenced by societal assumptions of the female, controlled their empirical observations of the amount, frequency and consistency of menstrual blood.

Both the Hippocratics and Aristotle posited what we would consider exceptionally heavy blood loss in normal, healthy women. The Hippocratic gynecological theories constructed a creature whose entire flesh had the same spongy consistency as the glands in a man's body which soaked up excess moisture:

Περὶ δὲ ἀδένων οὐλομελὴς
ὄδε ἔχει. φύσις μὲν αὐτέῃσι
σπογγώδης, ἀραιαὶ μὲν καὶ
πίονες, καὶ ἔστιν οὔτε σαρκία
ἵκελα τῷ ἄλλῳ σώματι, οὔτε
ἄλλο τι ὅμοιον τῷ σώματι,
ἀλλὰ ψαφάρᾳ καὶ φλέβας ἔχει
συχνάς· εἰ δὲ διατάμοις,
αἰμορραγίῃ λάβρος· τὸ εἶδος
λευκαὶ καὶ οἶον φλέγμα,
ἐπαφομένῳ δὲ οἶον εἶρη.

Concerning the general character of glands the following holds. They are by nature spongy, loose textured, plump and moist, and there is neither similar flesh in the rest of the body, nor anything else like them in the body; they are porous and have many vessels: and if you were to cut into one it would haemorrhage violently. They are white and look like phlegm, but they feel like wool.

⁴ A dramatic illustration of this human tendency is found in Vesalius' *Tabulae anatomicae sex* (Venice: B. Vitalis 1538) table 1, lowest part (reproduced in Oswei Temkin, *Galenism: The Rise and Decline of a Medical Philosophy* [Ithaca 1973] facing 108). His diagram of the human liver resembles more that of a cow because he had not yet thought to challenge the authority of Galen, though the Roman physician had never seen an un mutilated human liver on which to base his descriptions. That Vesalius himself had seen a human organ, and therefore had the evidence to challenge Galen, is proved by his drawing on the same page of human genitalia which incidentally includes a human liver.

⁵ I do not mean to give our society's observations on menstruation the status of raw data. We are not immune to the influence of cultural assumptions in our own scientific observations, cf. G. E. R. Lloyd, *Magic, Reason and Experience* (Cambridge 1979) 128. However, on the occasions on which the ancients' observations coincide with ours, e.g., that women do in fact menstruate, we feel no need to explain their statements, as we think the facts themselves explanation enough. It is therefore consistent at least to inquire what cultural forces influenced the ancient scientists on those occasions where their empirical observations do differ from ours.

Τῇσι μὲν γυναιξὶν ἀραιή τε ἢ φύσις κατὰ⁶ τῶν αδένων, ὥσπερ τὸ ἄλλο σῶμα...τοῖσι δὲ ἄρρεσι καὶ ἡ στενοχωρή καὶ ἡ πυκνότης τοῦ σώματος μέγα συμβάλλεται μὴ εἶναι μεγάλας τὰς ἀδένας...τὸ δὲ θῆλυ ἀραιὸν καὶ χαῦνον καὶ οἶον εἶριον ὁρέοντι καὶ ἐπαφομένῳ.

In women the nature of glands [in the breast] is loose textured, just like the rest of the body...but in males both the compactness and the solidity of their bodies contribute greatly to the glands not becoming big...the female, on the other hand, is loose textured and spongy and like wool to the sight and to the touch.

Gland. 1 and 16, L. VIII.556 and 572)⁷

A woman's body was one big gland, with even spongier flesh in those parts of her body corresponding to glandular parts in a man—hence her more prominent breasts. As a woman did less work than a man, she also had more unused nourishment to be soaked up which had to be discharged from her body in the form of menses. Because even the firm body of an active man produced some excess moisture⁸ (which was soaked up by the glands causing a slight swelling of the breasts even in a male), the Hippocratics would be looking for a woman to shed a large amount of blood.

Aristotle did not believe the female differed from the male to quite the extent the Hippocratics did. He insisted that woman belonged to the same species as man and differed only in having insufficient heat in her ἀρχή—her “principle”—to concoct fully the residue of her nourishment from blood into semen.⁹ Like the Hippocratics, Aristotle believed that woman used up a smaller proportion of her nourishment than a man did of his in building her smaller body and fueling her less active life-style. Moreover, “concoction” refined and reduced the volume of any residue, so the volume of a woman's seminal material, being initially more abundant and then less concocted, vastly exceeded that of a man. The degree of discrepancy is revealed at puberty by the descent of the seminal residues, heretofore lodged around the heart; the chest region became emptier in woman in proportion to her greater amount of residue and was therefore more inflated by the πνεῦμα—life spirit—emanating from the heart:

⁶ Robert Joly, *Hippocrate* vol. XIII (Paris 1978) 121, prints Zwinger's and Ermerins' text κάρτα, which would further emphasize how much more absorbent a woman was than a man.

⁷ *Mul.* 1.1, (L. VIII.12) also describes female flesh as being like wool and says a woman is ἀραιοσαρκότερην καὶ ἀπαλωτέρην than a man.

⁸ *Gland.* 3 (L. VIII.556/8). *Morb.* IV.45 (L. VII.568) says a man who is inactive becomes ill because of excess moisture in his body and *Salubr.* 5 (L. VI.78–80) advises even healthy men to purge themselves regularly to avoid a build up of excess fluids.

⁹ E.g. *GA* 725a 11–727a 1.

καὶ τὰ περὶ τοὺς μαστοὺς αἵρεται καὶ τοῖς ἄρρεσιν ἐπιδήλως, μᾶλλον δὲ τοῖς θήλεσιν· διὰ γὰρ τὸ κάτω τὴν ἔκκρισιν γίνεσθαι πολλὴν κενὸς ὁ τόπος γίνεται ὁ τῶν μαστῶν αὐταῖς καὶ σπογγός.

And the area around the breasts rises distinctly in males also, but more so in females: for in their case, on account of the abundance of the secretion which descends, the area around the breasts becomes empty and spongy.

(GA 776b 19–22)

Aristotle would expect the amount of blood lost in menstruation to exceed the amount of semen lost over the month by a quantity reflecting the difference in the size of male and female breasts.

The quantity of a woman's blood loss had to be calculated from the duration and intensity of her menstrual flow. *Mul.* I.6 (L. VIII.30) is the fullest description we have of the actual menstrual bleeding of a healthy woman:

Χωρεῖ δὲ τὰ καταμήνια παχύτατα καὶ πλείστα τῶν ἡμερέων τῇσιν ἐν μέσῳ ἀρχόμενα δὲ καὶ τελευτῶντα ἐλάσσονα καὶ λεπτότερα.

The menses flow thickest and heaviest during the middle days while at their onset and finish they are lighter and finer.

μέτρια δ' ἐστὶ πάσῃ γυναικὶ χωρεῖν. ἣν ὑγιαίνει τὰ ἐπιμήνια ἐλθόντα ὅσον κοτύλαι δύο ἄττικαι ἢ ὀλίγῳ πλέονα ἢ ἐλάσσονα ταῦτα δὲ ἐφ' ἡμέρας δύο ἢ τρεῖς· ὁ δὲ πλείων χρόνος ἢ ἐλάσσων ἐπίνοςος καὶ ἀφορός ἐστι.

In every healthy woman the proper amount of menstrual blood loss is about two Attic kotyls or a little more or less, and this in two or three days. A greater or a lesser amount of time [signals that the woman] is unhealthy and infertile.

The passage goes on to say that a doctor should ascertain from each female patient the duration of her own normal flow; but the parameters for variance appear very narrow. If a healthy woman bleeds for more or less than 2–3 days disease and barrenness follow. To lose two kotyls (about one pint) of menstrual blood over the course of 2–3 days implies heavy bleeding indeed, and if two to three days is meant to represent the entire period, it is difficult to give much significance to τῶν ἡμερέων τῇσιν ἐν μέσῳ—the mid-days. *Oct.* 4 (CMG I.2.1, 88) says that three days is the minimum length of a healthy period, *Mul.* I.37 (L. VIII.92) refers to τὰς μὲν ἐν ἀρχῇ ἡμέρας τρεῖς—the first three days of menstruation—as though more were to follow, and *Nat. Mul.* 53 (L. VII.394) advises inserting a pessary on the third or fourth day of a woman's period without any indication that the bleeding should have ceased by then. Aristotle too says that 2–3 days was an ὀλίγον χρόνον for a menstrual period.¹⁰ These figures for the shortest duration of healthy menstruation are a day or so higher than modern research would put it,¹¹ but as his contemporaries do seem to view it as a lower limit, the author of *Mul.* I.6 may have intended his remark

¹⁰ At HA 582b 5–6; Pierre Louis, *Aristote: Histoire des Animaux* v.II (Paris 1968) 136.

¹¹ *Illustrated Textbook of Gynaecology*, ed. E.V. Mackay et al. (Sydney 1983) 65.

on 2–3 days to refer solely to the heavy part of the flow—the mid-days—the length of the entire period to be calculated by adding the lighter days on each side.

The accepted upper limit for the duration of a menstrual period in antiquity is not clear, though references to periods lasting longer than normal indicate that there was one. Occasionally “longer than normal” might refer to a patient’s aberrant flow in comparison to her own healthy period, as at *Nat. Mul.* 13 (L. VII.330) or *Aph.* V.57 (L. IV.552) but the statement at *Ster.* 213 (L. VIII.412–14) that some women menstruate longer than normal by nature and not as the result of an illness shows that the number of days which constituted a normal period was an arbitrary figure set up for all women regardless of those who regularly went beyond it when they were not ill. The situation is similar in our own society. Modern research has set the upper limit for a regular, healthy menstrual period at about 8 days, but as the average and the mean is much nearer 5 days,¹² a woman who regularly menstruates for over a week might be said in layman’s terms to have an abnormally long period. The ancient evidence reflects the same attitude; there was an average length for a period around which most women clustered and which the Hippocratics and Aristotle continued to class as normal, though they knew that women could lie beyond the boundaries in each direction without being pathological. The number of days continued to be the most flexible of ancient criteria in determining whether a woman’s period was healthy or not. Soranus¹³ at *Gyn.* I.21 says a woman has menstruated in the right measure if she feels healthy afterwards, and this can cover anything from one to seven days. As his gynecological theories allowed for a woman using up much, and in some cases all, of her menstrual material in exercise, and therefore did not necessarily predict heavy blood loss, he could accommodate a shorter menstrual period in a healthy woman.

More important than the number of days a woman menstruated was that she should lose the right amount of blood during that time. The figure that *Mul.* I.6 gives as the normal amount of blood lost during menstruation is two kotyls—about one pint and therefore seven to eight times what is considered the normal amount today but fulfilling the Hippocratic expectation of heavy blood loss. Even Soranus mentions this inordinate quantity, though he does add that it is the absolute maximum amount of the flux.¹⁴ King remarks that this is “an excessively large amount by modern standards and most unlikely”.¹⁵ *LSJ* thought it so unlikely that they suggest that *kotylê* could be used to refer not only to the usual 1/2 pint measure, but in this case alone to an 1/8 pint, though a quarter pint would still give an overly high reading. Hanson recognised that this was an

¹² Doreen Asso, *The Real Menstrual Cycle* (Chichester 1983) 18. A World Health Organization report, “Women’s bleeding patterns: ability to recall and predict menstrual events,” *Studies in Family Planning* 12 (1981) 17–27, has suggested that cultural factors may affect the length of bleeding.

¹³ A Greek doctor writing at Rome in the first part of the second century A.D. under Trajan and Hadrian. He was a member of the Methodist sect of medicine and as such held somewhat different theories on female physiology from the Hippocratics and Aristotle (cf. Lloyd, *Science, Folklore and Ideology* [above, note 1], 168–200). He is generally believed to have paid more attention to women’s actual experience than most other ancient gynecologists.

¹⁴ *Gyn.* I.20.

¹⁵ *Parthenos to Gyne*, 135.

unsatisfactory explanation and commented "the discrepancy may be due to inaccurate methods of measuring or estimating the quantity of menses or any number of other factors."¹⁶ But an inaccurate method of collecting and measuring menses would be more likely to result in a failure to record all the 2–3 ounces rather than a magnification of them to 16. It is true that people tend to exaggerate their own blood loss,¹⁷ and women may have described their menstrual blood flow as being heavier than it actually was. Moreover, it takes only a small amount of liquid to produce a large stain, so estimation of blood loss based on menstrual cloths would also tend to the high side. However, the quantification at two kotyls is not an arbitrary figure used by the Hippocratics simply to represent "a lot."

The Hippocratics did not (and could not) know that menstrual blood was only the discarded lining of the womb. Their theories assume that in order to provide the best drainage of a woman's overly moist flesh the womb was filled to capacity with blood before each menstrual period. At *Mul.* I.1 the author remarks that women who have never been pregnant have difficulty in menstruation partly because their wombs have not been stretched; presumably they cannot accommodate all the blood that needs to be evacuated from the body. The Hippocratic doctors, therefore, estimated the amount of blood a healthy woman should lose by the amount of fluid they thought the average non-pregnant womb could hold. Now, one of the therapies recommended for various gynecological complaints was to irrigate the womb with a clyster administered through the cervix (N.B. *not* a vaginal douche). They regularly warn against administering a clyster to the womb of over two kotyls:

κλύσαι δὲ δύο κοτύλῃσι τὸ
πλείστον· πάντα δὲ τὰ κλύσ-
ματα μὴ πλεονί κλύζειν.

Administer a clyster of two kotyls at
most: do not use more when adminis-
tering any clyster.
(*Mul.* I.78, L. VIII.190)¹⁸

πλεον δὲ κλύσμα δύο κοτύλαι
μηδενὶ ὡς ἔπος εἰπεῖν.

A clyster of more than two kotyls
should be used on practically no-one.
(*Mul.* II.209, L. VIII.404/6)

A clyster of more than two kotyls is used in the case of phlegmatic women, but then the author indicates that this exceeds the normal amount:

κλύζε δὲ ἥν δέῃ κλυσμῶ
πλεον ἢ δυοὶ κοτύλαις.

Irrigate the womb if necessary with
a clyster of more than two kotyls.
(*Nat. Mul.* 33, L. VII.370).

¹⁶ "Hippocrates: *Diseases of Women* I," *Signs* I (1975) n.12.

¹⁷ "There is...no correlation between measured menstrual blood loss and subjective assessments of blood loss," *Novak's Textbook of Gynecology, 11th ed.*, eds. Howard W. Jones III et al. (Baltimore 1988) 379.

¹⁸ On 194 in the same chapter a clyster recipe calls for four kotyls of wine or boiled milk to be mixed with wild cucumbers, but the mixture is to be strained before injection into the womb, and chapter 80 (200) repeats the same recipe with the instruction to strain off one kotyl to be mixed with narcissus oil before injection. For the ingredients of another clyster recipe (of two kotyls) cf. *Mul.* II.209 (L. VIII.404–6).

The average volume of a non-pregnant womb is 2–3 ounces, though it obviously can expand enormously.¹⁹ It would be possible to infuse a pint of fluid into a non-pregnant womb, although the woman would have to be practically upside down to prevent the fluid coming back out through the dilated cervix and a good part of the fluid would pass through the fallopian tubes into the body cavity.²⁰ The procedure would cause extreme discomfort long before the pint mark was reached, but this in and of itself would not deter the Hippocratics from using the full two kotyls because of the amount of material they knew a womb could hold when pregnant.

Aristotle does not state what he considers to be the normal volume of the blood, but at *GA* 728b 15 he does say that woman produces the largest amount of any animal. In the same passage he states explicitly that he believes that besides women all female quadrupeds who bend their hind legs inwards menstruate. In this he is obviously confusing the menstrual cycle of humans with the estrus cycle or “heat” of other mammals. Estrus serves a completely different purpose and does indeed involve much less blood loss than menstruation, so if Aristotle directly compared a woman’s menses to other animals’ estrus it is not surprising that he commented upon the abundance of the flux, especially as he expected there to be a large amount from the size of a woman’s breasts. It would have been possible for both the Hippocratics and Aristotle to make a more accurate estimation of menstrual blood loss from observation, if not collection, and from this to revise theories on how little of the nourishment she ingested a woman actually utilized compared to a man. Instead, they took society’s evaluation of the female²¹ as the fact that accounted for a heavy blood loss which they never thought to dispute.

The amount of blood a woman was thought to lose during her menstrual flow appears to have been constant no matter how long or short that period was. *Ster.* 213 (L. VIII.410 and 412) remarks that while a sparse flow can last many days an abundant menstrual flow lasts a short period. Aristotle says that the blood in a woman’s womb can flow away from her copiously or little by little.²² The speed of the blood loss depends on whether the στόμα (mouth of the cervix) of the womb is more open or closed, but the amount of blood that the womb could hold and could therefore discharge was finite. All orifices of a

¹⁹ P. Gohari et al., “Prediction of intra-uterine growth retardation by determination of total intra-uterine volume,” *Amer. J. Ob. and Gyn.* 127:3 (1977) 257, gives a normal volume towards the end of pregnancy as 4500 cm³, approximately 1521 fluid ozs.

²⁰ Personal communication from Austin Women’s Medical Center and Dr. John Maxwell. As this procedure is no longer practised it proved very difficult to get information on it.

²¹ It is true that female physiology is not generally discussed explicitly outside a non-biological context in Greek literature. However, it is clear that, with some exceptions (e.g. Spartan women—and they are described as having exceptional physiques in Aristophanes’ *Lysistrata* 80–83), women were expected to lead a more sedentary life than men, either through choice (e.g. Hesiod *Theogony* 590–602; Semonides *On Women* 2–6; 24; 46–47; 58–62) or nature (e.g. Xenophon *Oeconomicus* VII.23). Euripides’ *Electra* 527–529 suggests that the extra activity men undertook in the gymnasium was thought capable of changing even the nature of their hair.

²² *HA* 582b 7–8; Louis (above, note 10) 136.

woman's body were thought to be connected in some way to her womb, and if she discharged blood through any of them, because of the limited amount of blood to be lost, her menses were either depleted or completely suppressed:

ὥς γὰρ ἐπὶ τὸ πολὺ οὐθ' αἰμορροΐδες γίνονται ταῖς γυναιξιν οὔτ' ἐκ τῶν ῥινῶν ῥύσις αἵματος οὔτε τι ἄλλο μὴ τῶν καταμηνίων ἰσταμένων· ἐάν τε συμβῇ τι τούτων, χείρους γίνονται αἱ καθάρσεις ὥς μεθισταμένης εἰς ταῦτα τῆς ἀποκρίσεως.

For the most part, women do not suffer from haemorrhoids, nosebleeds or any other such discharge unless the menses are suppressed; and if any of these discharges do take place the menstrual flow is less in quantity, as if the secretion is being re-routed to these.

(GA 727a 12–16)²³

King, however, has drawn attention to a couple of remarks which seem to suggest that there was some divergence on this point among Hippocratic authors:²⁴

ἦν παρὰ φύσιν αἱ μήτραι χάνωσι, τὰ ἐπιμήνια χωρεῖ πλέονα καὶ γλίσχρα καὶ θαμινά.

If, contrary to nature, the womb gapes open, the menses flow more heavily, are sticky (congealed?) and frequent.

ἦν τὸ στόμα τῶν μητρέων ἀναχάνη μᾶλλον ἢ ὥς πέφυκεν ἐν τοῖς ἐπιμηνίοις, τὰ ἐπιμήνια γίνονται πλείω καὶ κακίω πάντα καὶ ὑγρότερα καὶ διὰ πλείονος χρόνου.

If the mouth of the womb gapes wide more than is natural during menstruation, the menses are heavier, worse in every way, more liquid and flow for a longer period.

(*Mul.* II.166 & 167, L. VIII.344)

The menstrual flow resulting from the στόμα of the womb opening more than usual can be either πλέονα and θαμινά—more and occurring frequently—or πλείω and διὰ πλείονος χρόνου—more and extending over a longer period. It is easy to explain why a στόμα that was open too much should cause a heavier period than usual (the blood would gush out all at once instead of seeping out more gradually as at *Ster.* 213); but for a heavier blood loss than normal to occur frequently or to continue for a long time requires that there be a greater amount of blood to be discharged than usual. It is difficult to understand how an open στόμα could cause the body to produce more blood altogether or the womb to expand to contain it.

Part of the explanation may lie in the characterization of the blood in abundant menses that occur more frequently as γλίσχρα, and in those that flow over a longer period of time as κακίω and ὑγρότερα. In the first case the amount of actual blood the womb can hold is increased by the fluid being more sticky or congealed, making it seem thicker and heavier, while in the second case the volume of fluid produced by the body is increased by the blood being more dilute than usual. The latter would require the womb expanding more than it usually does in a non-pregnant woman to hold the extra fluid until the usual time for releasing the menstrual flow, and it should be noted that in this case the excessive opening of the womb is said to take place specifically during menstruation. In such a situation, even if the womb shed a large amount of

²³ Cf. also *Mul.* I.2 (L. VIII.20–22); *Aph.* V.32, 33 and 50 (L. IV.542, 544 and 550); *Morb.* I.7 (L. VI.152)

²⁴ *Parthenos to Gyne*, 135–36 and 142.

blood every day through the στόμα opening more *widely* than usual, it would still take longer for it to shed all its fluid. If, on the other hand, the blood was more than normally compacted the womb could hold more without having to expand, and if the στόμα was open more *often* than usual (and in this instance the womb's gaping contrary to nature is not confined solely to the time of the menstrual period) the blood could flow out at any point during the month when the womb reached its capacity—hence explaining the larger amount of blood flowing at a greater frequency. However, it is difficult to account for an open womb in and of itself causing the blood to be either ὑγρότερα or γλίσχρα. The author seems to have been describing the sort of menstrual flow that resulted from a too-open στόμα when it coincided with the production of blood of an abnormal type, and there is no evidence that he disagreed with Aristotle and the author of *Ster.* that normal blood in conjunction with an open στόμα would lead to a short but heavy period.

The theory that menstruation could take place more often than usual presupposes an accepted standard frequency for menstruation. Modern research has indicated that a normal menstrual cycle can take anywhere from 21 to 35 days to complete,²⁵ and although nowadays the average cycle lasts about 29.5 days, this is a phenomenon of improved nutrition in post-industrial society; in earlier periods of history the average cycle was probably much longer.²⁶ However, there must always have been many (which is not to say most)²⁷ women who did menstruate at fairly regular monthly intervals. It is only after a culture has identified menstruation as a monthly occurrence that it can then go on to connect it with the phases of the moon, as so many societies do.²⁸ Words for menstrual blood in Greek and Latin (καταμήνια and “*menses*”) show that ancient Mediterranean society did expect it to flow monthly. Soranus at *Gyn.* I.19 claims that they were given the name ἐπιμήνια because this was the word for a sailor's monthly rations and the menses acted as monthly rations for the growing foetus.

Both the Hippocratics and Aristotle thought women who menstruated more often than once a month were ill in some way.²⁹ If it is true that improved nu-

²⁵ Mackay, *Illus. Text. of Gyn.* 65. 1–2% of women can have regular cycles outside these limits.

²⁶ Asso, *Menstrual Cycle*, 17, 90 and 148.

²⁷ Rousselle (above, note 1) 37, implies that women in ancient Greece would not have had many menstrual periods at all because they would have spent most of their reproductive life in a state of pregnancy or breast-feeding. The Hippocratic gynecological treatises do not support this interpretation. And even in contemporary Western society, the infertility rate among otherwise healthy couples is about 15% (1 in 7); cf. Novak's *Text. of Gyn.* 263.

²⁸ Claire Préaux, *La Lune dans la Pensée Grecque* (Paris 1970) 89, argues that the ancient Greek connection between menses and the moon was originally one of sympathy (both were cycles of repletion and diminution) rather than observed periodic coincidence. However, to say women had a cycle like the moon's need not have led to saying that their cycle was synchronized with the moon's. Moreover, the Greek term for menstruation suggests the regular measure rather than the waxing and waning nature of the moon's cycle, cf. Préaux (above, note 27) 66.

²⁹ *Nat. Mul.* 16 (L. VII.336); *Mul.* I.57 (L. VIII.114); *HA* 582b 25; Louis (above, note 10) 137.

trition has shortened the average menstrual cycle, few women in antiquity were likely to have regular cycles which repeated in under a month, and medical and scientific opinion that bleeding twice in one month was an indication of disease was probably based on more than the culture's beliefs, though it is possible that they attempted to cure perfectly healthy women whose cycle was naturally shorter than four weeks.³⁰

The same ancient medical opinion, with perhaps less basis in the ancient world, firmly endorsed the cultural belief that women *should* menstruate regularly once a month:

τὰ δὲ θήλεα ὑγροτέρησι καὶ
ῥαθυμοτέρησι τῇσι διαίτησι
χρέονται, καὶ κάθαρσιν τοῦ
θερμοῦ ἐκ τοῦ σώματος
ἐκάστου μηνὸς ποιοῦνται.

But females use a more humid and
easy-going regimen and experience a
purging of the heat from their bodies
each month.

(*Reg.* I.34, L. VI.512)

(Concerning a pregnant woman)
ἦν δὲ χάνωσιν αἱ μήτραι μάλ-
λον τοῦ καιροῦ, παραμεθίασι
τοῦ αἵματος κατὰ μήνα, ὥσπερ
εἶωθε χωρεῖν.

But if the womb gapes open more
than it should in the circumstances,
she will discharge some blood every
month, just as she is accustomed to.

(*Mul.* I.25, L. VIII.66)³¹

However, because amenorrhea can be one of the earliest signs of pregnancy, which the Hippocratics did all in their power to promote, it is unlikely that an extended menstrual cycle by itself would call down upon a woman who was sexually active the battery of Hippocratic measures for dealing with suppressed menses because they would want to make sure they were not going to cause an abortion.³² There would have to be a significant time lapse without any menstrual blood and without any other sign of pregnancy or with some signs of an illness before a woman was thought to require the services of a doctor. If there was no reason to believe a woman could be pregnant, these services might be called into play much sooner, simply to deal with a cycle that was longer than the canonical month.

There are indications in the texts that ancient theorists intended the menstrual period to take place at exactly rather than roughly monthly intervals. The author of *Oct.* states:

τὰ καταμηνία τῇσι γυναιξὶ
τῇσιν ὑγιαίνουσιν φαίνεται
καθ' ἕκαστον τῶν μηνῶν, ὥς
ἔχοντος τοῦ μηνὸς ἰδίην δύ-
ναμιν ἐν τοῖσι σώμασιν.

In healthy women the menses appear
every month, because the month has a
particular power over the body.

(*Oct.* 1, *CMG.* I.2.1, 78)

The Hippocratic authors do not direct their treatises at any one polis, so we must assume that when they use the term "month" they are referring to a lunar month (lunation) as this would be the only month universally recognized among the ancient Greek states (who all had their own calendars). *Pror.* II.24 (L. IX.54) says a woman should be so regular that she menstruates on *exactly the*

³⁰ There may have been a few women, as now, who bled fairly heavily at ovulation. If this is a regular phenomenon it need not be pathological.

³¹ Cf. also *Mul.* I.1 and II.133 (L. VIII.12 and 227); *GA* 767a 2–6.

³² Jones (above, note 1) 136–59.

same days each month. If she menstruated at irregular intervals, she might not only be unsure whether or not she was pregnant³³ but also have difficulty in conceiving. It would seem that because a woman's regimen (unlike a man's) did not vary enormously from month to month, her body was thought to produce and store menstrual blood at the same rate throughout the year, and therefore to reach the point where it needed to be emptied on the same day each month. Aristotle expected a woman to menstruate at regular monthly intervals because he believed that Nature aimed at measuring all things by "periods": day, night, month, year and times measured by these.³⁴ Again, as Aristotle refers to Nature's periods he must mean the lunar rather than any calendary month.

Many statements suggest that in antiquity it was widely believed not only that the lunar and menstrual cycles were the same length, but that the one controlled the other. The statement in *Oct.* on the month's ἰδίην δύναμιν (particular power) over the body would seem to suggest the correspondence of a woman's menstrual period to a particular phase of the moon—though it could also (less probably) mean simply that the period of 29.5 days was significant for the body. At *Gyn.* I.21 Soranus reports Diokles and Empedokles as saying that all women menstruated with the waning moon, though Soranus himself does not subscribe to this belief.³⁵ Now, the ideal for a respectable Athenian man (of the fifth and fourth centuries at least) was to keep his women confined to the home and there is some modern evidence that women who live in close quarters with each other, especially if they are confined and their day is controlled largely by artificial light, can become synchronized in their menstrual

³³ *Epid.* VI.21 (L. V.160–62).

³⁴ *GA* 777b 17–30. An early passage in Aristotle's biology, *HA* 582b 3–4, disputes the idea that all women menstruate regularly every month: καὶ ταῖς μὲν συνεχῶς καθ' ἑκάστον ὀλιγάκις τὰ κατμήνια φοιτᾷ, παρὰ δὲ μῆνα τρίτον ταῖς πλείεσταις, "And while in a few cases the menses come regularly every month, in the majority of cases they come every third month." In his commentary on this passage, (Louis above, note 10) explains this statement as a result of correct observation and inclusive reckoning. Aristotle noticed that women usually menstruated at intervals longer than 29 days. If a menstrual period was counted as marking the end of one month and the 29 days that followed without a menstrual period as the second month, the next period would be said to take place in the third month. While it is true that the Greeks did count inclusively in describing such things as the Penteteric festival, παρὰ μῆνα alone, "every second month," would describe the pattern of menstruating in alternate months. Arrian used καθ' ἡμέραν, παρ' ἡμέραν, παρὰ δύο, παρὰ τρεῖς to mean, "every day, every second, every third and every fourth day" (*Epict.* 2.18.13), and παρὰ τρία in *IG* 5 (2).422 probably means every fourth year. If a Greek said women menstruated παρὰ δὲ μῆνα τρίτον he would mean that she menstruated every fourth month, i.e. three times a year. Aristotle may have been aware of many women who did menstruate infrequently, and at an earlier period of his thought have tried to explain menstrual periodicity by tying it to the cycle of the seasons (i.e. spring, summer and winter). Whatever the reason for his calculation, it may be connected with Pliny's assertion at *NH* VII.15 that although women menstruate once a month, their flow is heavier every three months.

³⁵ The belief, however, was still current in later antiquity. Galen reports it as a fact at *Dieb. Dec.* III.2 (K. IX.903).

cycles.³⁶ It is therefore conceivable that the wife, concubine, daughters and female slaves of many families did menstruate at about the same time, and as it is unlikely that the average Greek man inquired into the menstrual cycle of households other than his own this may have given support to the belief that all women menstruated at the same time. But even if we allow that women within a household became synchronized in their menstruation, this is not sufficient to explain the further notion that menstruation tended to coincide with the waning moon. Even Aristotle accepts this as the norm:

καὶ τὸ γίνεσθαι δὲ τὰ
καταμήνια κατὰ φύσιν φθι-
νόντων τῶν μηνῶν μάλλον διὰ
τὴν αὐτὴν αἰτίαν συμβαίνει.
ψυχρότερος γὰρ ὁ χρόνος οὗ-
τος τοῦ μηνὸς καὶ ὑγρότερος
διὰ τὴν φθίσιν καὶ τὴν ἀπό-
λειψιν τῆς σελήνης.

And the fact that the menses tend to
occur naturally during the waning
moon is attributable to the same
cause. For this time of the month is
colder and more humid because of the
wasting and disappearance of the
moon.

(GA 767a 2–6)

He rationalised this belief by saying that the moon's waxing and waning caused temperatures on the earth to rise and fall respectively and that women released their blood at the coldest time of the month. He does admit that some women do not conform to this pattern, but rather than using them to challenge his culture's assumption he classes them as exceptions to the rule.³⁷

The Hippocratics never explicitly refute the belief that all women menstruate at the same time, but they are less willing to commit themselves to supporting it. This could be a direct result of their having intimate knowledge of more than one household. It should have become obvious to them very rapidly that whether or not one woman was menstruating could not be used to predict whether another woman would be. Whenever their therapies have to be administered just before or at the onset of menstruation they advise action with regard to the regular time or the actual appearance of the menses without any reference to the moon to indicate when this time should be.³⁸ As they do not appear to have believed in synchronicity between all women it would seem even less likely that they would posit synchronicity between women and the moon. The author of *Nat. Puer.* 15 (L. VII.494), however, explains that a woman's menstruation is controlled by the environment beyond herself:

πρῶτα μὲν ταρασσεται τὸ αἷμα ἐν
τῷ σώματι κατὰ μῆνα ἕκαστον, ὑπὸ
ἀνάγκης τοιῆσδε· ὅτι μὴν μηνὸς
διαφέρει πούλῳ καὶ κατὰ φύσιν καὶ
κατὰ θερμασίην, καὶ τοῦτου αἰσθά-
νεται τῆς γυναικὸς τὸ σῶμα, ὑγρό-
τερον γὰρ ἔστιν ἢ τὸ τοῦ ἀνδρὸς.

To begin with the blood in the body
is necessarily disturbed each month for
the following reason, that one month
differs from another a great deal both
in coolness and warmth, and the body
of a woman perceives this for she is
more fluid than a man.

This not only suggests that all women menstruated at the same time, but that the time was controlled by the temperature change from month to month. It would therefore seem legitimate to assume that the author was referring to the

³⁶ Asso, *Menstrual Cycle*, 7.

³⁷ GA 738a 17–21.

³⁸ E.g., *Mul.* I.74 (L. VIII.154); cf. *Nat. Mul.* 53 and 59 (L. VII.394 and 398).

same tradition as Aristotle, and believed that a woman lost her blood during the coldest part of the month, i.e. during the waning moon.

Oct. 4 (CMG I.2,1 88) is another Hippocratic passage which implies synchronicity of menstruation without stating it in so many words. The author argues that most women conceive after their menstrual period (which takes at least three days, usually a lot longer) and that the process of conception itself takes the same amount of time.³⁹ Beginning his calculations from the new moon (νεομηνίη) he concludes that most women conceive around the full moon (διχόμηνιη). If νεομηνίη and διχόμηνιη are used in their usual sense, it would seem that this author thinks women begin menstruating on the new moon. And even if the terms are here being used in the technical sense (found nowhere else) of "the beginning of the menstrual cycle" and "the middle of the menstrual cycle" and have no bearing on the actual phase of the lunar cycle, the two cycles must have been thought to coincide at one time for the medical sense of the terms to develop.⁴⁰ The author counts the first day of menstrual bleeding as the first day of the menstrual cycle; and if the author thought this coincided with the first day of the lunar month he would expect women to menstruate with the *waxing* moon. His aim in including this chapter is to contradict popular opinion and demonstrate that most women conceive in the second part of the month. This implies that popular opinion held that most women became pregnant at the beginning of the month, i.e., that they had finished menstruating at the end of the previous month.⁴¹ This would indicate that the common belief

³⁹ There are several indications that ancient theorists thought that the completion of conception took place some time after insemination, e.g., *Mul.* I.11 and 17 (L. VIII.46 and 56); *Sem.* 5 (L. VII.476); *Nat. Puer.* 12 (L. VII.486); *HA* 583a 25. None of these passages define the time lapse needed, but *Oct.* 1 (CMG I.2, 1 78) remarks that if a woman loses a foetus within seven days it is not called a miscarriage (τρῶσιμός) but an effluxion (ἐκρυσις), as if the matter was not truly an entity. Hesiod, *Op.* 780/1, says that the thirteenth day of the month is bad for sowing but good for planting. Plutarch, *Schol. ad loc. (Moralia, Loeb XV, ed. F. H. Sandbach 212–214)*, explains that the light of the full moon is bad for new seeds which need to grow with the waxing moon, but that once sprouts have appeared the moon's rays are good for a plant. Animal conception may have been thought of along the lines of a seed's germination. Just as a seed needs to be hidden in the earth for a while to transfer its power and produce an embryonic plant, so the male semen has to be some time in the female womb before it can engender a viable fetus.

⁴⁰ The author makes a point of commenting that the νεομηνίη lasts one day, which suggests that the term held primarily astronomical connotations. It would be tautologous to remark that the first day of a woman's period lasted one day, but the period of the new moon could be defined as anything from when the actual conjunction of the moon and sun took place to the first observed appearance of the new crescent. This was usually one or two days, but in exceptional cases could be three, cf. B. L. Van der Waerden, "Greek Astronomical Calendars and their Relation to the Athenian Civil Calendar," *JHS* 80 (1960) 169.

⁴¹ The belief that the best time for conception, or at least insemination, was right at the end of the menstrual period seems to have been widespread, e.g. *Mul.* I.17 (L. VIII.56); *Nat. Puer.* 15 (L. VII.494); *GA* 727b 10–14 and 23–25; *HA* 582b 11–12. The new moon was considered the best time for marriages at Athens, cf. Préaux (above, note 27) 99.

was that menstruation took place during the *waning* moon and identify νεομηνίη (the first day of the menstrual cycle if the term had a specialized sense in common parlance) as the first day *after* the menstrual bleeding. This seems instinctively more likely as the Greeks looked on menstruation as the end result of a process rather than itself causing the next stage of the cycle. It would also seem more likely that the Greeks would use the terminology of the new moon (an auspicious day)⁴² to refer to the more auspicious segment of the menstrual cycle. It therefore seems likely that any popular synchronization of νεομηνίη and διχομηνίη with the menstrual cycle reflects the same theory as Diokles, Empedokles, Aristotle and the Hippocratic *Nat. Puer.*, that women menstruate with the waning moon.

The theory that women's bodies were influenced by the external environment explained why all women should be expected to menstruate at the same time; but the fact remains that although the women in a Greek household could all have menstruated around the same time, it would only be by coincidence that this synchronization would coincide with the waning moon. Nor does the admission that not all women conform to this norm have the same force as similar disclaimers. Preconceived notions of the "normal" duration of a menstrual period or length of a menstrual cycle could have been confirmed by observations of the majority of women, which would mean that those falling outside the mean or average could legitimately be classed as exceptions. There is, however, nothing inherent to the menstrual cycle which would confirm the expectation that the majority of women bled during the waning moon. That Aristotle, and perhaps some Hippocratics, adhered to this ideology in spite of what they saw raises the possibility that the belief had been absorbed into Greek culture at a very fundamental level and still played an important role in the structure of that society.

The moon had always been associated with women in popular mythology; *HA* 582a 34 says that some would argue that the moon itself was female from the fact that menses always occur during its waning phase. The waning of the moon was considered to be the most inauspicious time of the month for living things in general.⁴³ The presumed coldness of the month probably influenced this belief as warmth was considered necessary for generation. Generally, the least fertile period for a woman was thought to be when her womb was full of blood, just before and during the first part of her menstrual period,⁴⁴ and husbands who wished to either promote or inhibit the production of heirs would presumably try to ascertain when this actually took place in the case of their particular wives. It would therefore seem that the linking of women with lunar phenomena filled an important function in the culture of the period, which encouraged Greek men to assent to the belief that menstruation generally took place during the waning moon. The Hippocratics and Aristotle were, on occasion, willing to reject what they considered mistaken superstitious beliefs. Those that they never thought to challenge but rather attempted to accommodate and explain must have been more deeply rooted. It may be that the efficacy of

⁴² Cf. Préaux, (above, note 27) 86–87.

⁴³ The author of the *Geoponica* remarks at I.6 and V.10 that many people believe that nothing should be planted during a waning moon, though he himself disagrees with them.

⁴⁴ E.g., *Mul.* I.24 (L. VIII.64); *Ster.* 213 (L. VIII.410); *Nat. Puer.* 15 (L. VII.494).

many female rituals (which were often of extreme importance to the state in promoting fertility) depended upon the women being physically in harmony with each other and the moon. For whatever the reason, the cultural need for this belief was so strong that it influenced the theories of the Hippocratics and Aristotle, though their incidental remarks show that they had observed that synchronicity was not universal.

Ritual considerations may also have influenced the "scientific" observation of the consistency of menstrual blood once it had left a woman's body. *Mul.* I.6 (L. VIII.30) states:

<p>χωρείει δὲ αἷμα οἷον ἀπὸ ἱε- ρείου, καὶ ταχὺ πηγνύται, ἢν ὕγιαίνῃ ἢ γυνή.</p>	<p>[Menstrual] blood flows as from a sacrificial animal, and it congeals quickly if the woman is healthy.⁴⁵</p>
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Menstrual blood is provided with an anti-coagulant and therefore quick clotting should give rise to concern rather than optimism. However, it is the failure of menstrual blood to clot which is taken as a sign of illness in Hippocratic gynecology.⁴⁶ It is the author's choice of simile that supplies the clue to this mistaken observation. If the blood of a sacrificial victim clotted quickly it would signify that the animal had been healthy and would be an auspicious sign for the well-being of the city. The blood of a healthy man who was injured would presumably also clot quickly, but his bleeding would not be a predictable, regular event and clotting would be good news primarily for the man himself, so the clotting of male blood is never likened to that of a propitious animal sacrifice. A woman's healthy blood had wider, civic significance; it affirmed that she could replenish the citizen body as well as her own. The Hippocratics therefore expected it to behave in the same way as the blood of a healthy sacrificial victim.

It is in areas such as these, where an author takes for granted "facts" which are open to direct contradiction, that we can see most clearly the contours of the cultural construct of the female within which the "scientific" texts were being produced. Women in the fifth and fourth centuries B.C. did not bleed more heavily, more often or more thickly than contemporary Western women; the theories that were developed to explain why they menstruated at all predicted a heavy, frequent and quickly coagulating blood loss, and wherever possible "scientists" interpreted their observations to support their theories and classed contrary evidence as deviations from the norm.

⁴⁵ *Mul.* I.72 (L. VIII.152) and *Nat. Puer.* 18 (L. VII.502) make the same observation, almost verbatim, on lochial blood. On this topic cf. Helen King, "Sacrificial Blood: The Role of the *Amnion* in Ancient Gynecology," *Helios* 13 (1987) 117-26.

⁴⁶ E.g., *Mul.* I.30 and 61 (L. VIII.74 and 124).