
Adriel M. Trott

INTRODUCTION

In *Gender: Antiquity and Its Legacy*, Brooke Holmes makes the controversial claim that sexual difference in Aristotle is contingent, belonging to a “realm more fluid and accidental than that of essence and principles – namely, the realm of matter.”¹ This position would see the difference between the male and female contributions – semen and menses – as a material one. If it is material, I maintain that it reveals something about how material operates in Aristotle. The effort to distinguish material from form requires affirming either a formal difference between them or a material difference. If the difference between them is formal, as it seems it must be (if form and matter are the contradictories that Aristotle suggests they are), then material is of a different form than form. If the difference is material, as the account of the difference between semen and menses on the basis of degrees of vital heat in Aristotle’s biology suggests, then form and matter differ along a continuum, more as contraries that at some degree of heat pass into one another than as contradictories with an excluded middle where the presence of one negates the other. Yet an account of generation that is modeled on artifice, where form is imposed on matter, would seem to require a distinction between the formal and material principles of generation.

In this essay, I frame this question in terms of feminist critiques of the form and material binary, critiques which can be encapsulated in disputes over whether Aristotle’s account of generation is a one-sex model or a two-sex model. I turn to Aristotle’s account of vital heat to suggest that it is a one-sex
model whose difference is on a continuum. I then explain how the difference between contradictories and contraries in Aristotle shows how the difference between material and form, explained through the higher degree of vital heat in semen than in menses, is a difference of contraries and not contradictories and thus a material rather than a formal difference. I conclude that since the two principles are related on a continuum, reproduction should not be conceived through a simple artifice model where form is imposed on matter.

**Gender’s Matter**

The concept of gender as it developed following Beauvoir – “one is not born, but rather becomes, a woman” – allowed feminists to open a space between the biological body and the cultural meaning and expectations of that body. This strategy unsutured gender from sex and liberated women from culturally designated roles otherwise disguised as “natural.” Yet the unfortunate consequence of this strategy was to reinscribe the natural at the site of biological sex, making sex what is given and material, the natural element that cannot be altered.

Judith Butler argues that Luce Irigaray falls prey to this problem in her reading of the history of philosophy. Irigaray accuses philosophers from Plato to Heidegger of basing their philosophical systems on a forgotten outside. In her reading of Aristotle, this forgotten outside is matter or nature as givenness. Irigaray accuses Aristotle of resting his conception of the body, the sexed body, on a more primordial forgotten material associated with the mother. As Butler reads her, Irigaray maintains that “the feminine is cast outside the form/matter and universal/particular binarisms” as the “permanent and unchangeable condition of both.” Irigaray’s strategy is to show the power of mother-matter by showing how the whole project is grounded in some more primordial matter that allows form to appear. Following Irigaray, Emanuela Bianchi argues that Aristotle treats material both as pure δύναμις for form’s work and as ἀδυναμία, impotential, having no capacity of its own. These dual roles of material show it to be what Bianchi calls a repressed and aleatory principle that, as repressed and other, returns to trouble the work of form.

Butler worries that Irigaray might be inscribing material and the material in this exterior position that makes it the original given, in the same way the gender/sex binary divides culture from nature to challenge what has been construed as natural but ends up more deeply entrenching nature on the other side of the binary. To Butler, Irigaray seems to establish material as the “sign of irreducibility” that bears and supports not only form but cultural construction altogether. Such a view seems to further isolate material and produce a division between what is changeable and cultural from what is natural or a true original ground.

Arguing against the view that constructedness is opposed to materiality, Butler observes that Irigaray’s strategy attempts to establish material as a
critical ground from which “to verify a set of injuries or violations only to find that matter itself is founded through a set of violations.” In this sense, the very natural givenness of material appears constructed.

Irigaray’s reading of Aristotle’s natural science poses a similar problem to one that arises when political community forms out of the opposition or hierarchization of nature in relation to reason: a fundamental exclusion results from the opposition. For Irigaray, the construction of the feminine outside is due to an opposition and hierarchization of matter in relation to form. Any attempt to recover a robust sense of material in Aristotle thus seems subjected to the problems that Butler finds in Irigaray’s reading: either we reinscribe material as this constitutive outside that is other and distinct from form, the “true ground” that is most genuinely given, the real nature, the ur-maternal; or we describe it as always already subjected to form. Or with Bianchi, as both.

Nature is form, actuality, Aristotle insists in Physics II.1; yet as an internal principle of movement, an ἀρχὴ κινήσεως, nature must move from within itself to fulfill itself. In sexual reproduction, if material does not have some way of giving rise to the form, then nature is not moving from within itself to fulfill itself, but imposing itself on something other and outside in order to come into being. If nature is form without relation to material, then nature seems to be τέχνη – artifice – where τέχνη is form imposed on matter. However, if, as I argue, nature is not τέχνη, then material cannot be some separate unformed thing that only appears through the imposition of form. Nature as form cannot stand opposed to nature as given material while remaining its own principle of movement; it then becomes τέχνη – a principle of movement in another form imposed on material, rather than form arising out of material.

When Butler maintains, “if matter never appears without its schema” in Aristotle, “that means that it only appears under a certain grammatical form and that the principle of its recognizability, its characteristic gesture or usual dress, is indissoluble from what constitutes matter,” she points to how positing separate principles of form and matter, which then conceives of matter as only showing up under the guise of form, is to already stack the deck in favor of form, thereby making it impossible to argue against the stridency of this view of material as stuff that needs form. This account of material’s need for form relies on an account of the material principle as already separable and distinct, other, and needing form. But if form comes to be in an intensification of heat in material, an intensification that also occurs in material but to a lesser degree, then there is both a necessary contribution of matter that is other than heat (which is not itself form) and a continuous relation between form and matter. As Holmes writes, “the idea that matter has a (feminine) gender becomes, in Butler’s hands, a myth to be exploded.” To explode the myth of the femininity of matter without denigrating either femininity or matter is to reconsider anew what material as such is.

Aristotle provides us with both this difficulty and the possible recourse for rethinking it. On the one hand, he defines matter and form as separate principles. On the other hand, he traces their origin in generation to a process that
differentiates along a continuum. So, there is a dual effort in my project: on the one hand, to argue that matter is always already meaningful in Aristotle, and on the other, to show that this meaningfulness does not elide the significance of matter by reducing it to the meaning of form.

ONE-SEX AND TWO-SEX MODELS

Aristotle’s account of how semen comes to have the power to bring life into the female menses would seem to be the place to go to consider whether and how the difference between form and matter is material. Thomas Laqueur maintains that sexual difference in Aristotle is not material because semen moves the menses not by material interaction but by intellect. Yet Aristotle’s biological account of how semen comes to have the power to concoct suggests that there is something material at the heart of what looks like radical difference in Aristotle. It thus seems then that we need to investigate how semen comes to bring life into the menses to think about how the male contribution differs from the female, which is to say how form differs from material.

I frame this concern within the dispute over whether to read Aristotle’s account of sexual difference on a one-sex or a two-sex model. Classical scholarship associates the two-sex model with radical difference and the one-sex model with the failure to think a true contribution of the female, but these distinctions become complicated in any reading of Aristotle. The two-sex model, which seems to portray radical difference and otherness, depicts instead a hierarchy that involves a hidden dependence of the superior principle on the subordinate one, as Irigaray has shown.

The strategic response to the hierarchy traditionally inferred from radical difference has been to challenge how fundamental that difference is by exposing the fluidity of the poles of difference. In Aristotle, the fluidity follows from defining the male as male by a certain activity that is susceptible to fail or be overcome by the female. But affirming the “sliding scale” version of difference moves Aristotle into the one-sex model where the female is a mutilated version of the male. If the two-sex model is supposed to allow for true sexual difference, it does so in Aristotle by making form separable from and superior to matter. If the one-sex model is the solution, it results in a view of difference as simply distance from the norm. The two-sex model posits form and material as contradictories, while the one-sex model makes them contraries. Whatever one might think of Laqueur’s historical claims, his analysis of the one-sex and two-sex models is clear: the one-sex model shows that sex was something performed and not essential – male could slide into female – but the consequence of it is that woman is defined as not-man and is devalued. The two-sex model makes women more than just not-men, but then reproduction, and, consequently, matter and woman, are devalued. The one-sex model allows for fluidity without affirmative difference; the two-sex model allows for difference and thereby distinct accounts of the male and female, but introduces
a rigid and deconstructive essence of sex, because while it purports to establish distinct essences, the female remains defined in contrast to the male.\textsuperscript{19}

While Laqueur seems intent on criticizing the one-sex model, it has several conceptual advantages. As Holmes suggests, the one-sex model is not simply the degradation or distance of woman from the norm, but the recognition of a fundamental unity.\textsuperscript{20} If woman is defined in terms of distance from man, a fluidity exists between these positions, where the difference between them is not formal, not a difference of kind, but of degree because a difference in heat. The male has enough heat to concoct or cook the seed to the point where it can bring life into the menses; this concocting can fail or be overridden by the female and the heat that enables it can be found in both male and female bodies.

In what follows, I examine semen’s concocting capacity through heat to ask in what terms it divides form and matter. The two-sex model appears to slide into the one-sex model in Aristotle because form is dependent on material, following Irigaray, but the only way for the one-sex model to work in Aristotle (I argue on the basis of this analysis of heat) is if it is rooted in material. Only this account allows us to conclude with Aristotle that heat differentiates the semen from menses. If the feminine principle is the material principle and sexual difference is a material difference, then it would seem that the formal or masculine principle is rooted in and reliant upon the feminine principle. If form is fundamentally other, not on a continuum with the material but entirely differently, effecting change in the menses through the intellect, as Laqueur says, then we have a problem in explaining how the semen comes into contact with the menses so as to form it.\textsuperscript{21} Certainly Aristotle elsewhere explains that the form moves the material through the intellect,\textsuperscript{22} but that account does not seem to be on display in \textit{Generation of Animals}, where vital heat replaces or serves as the agent of soul in causing life. So the two-sex model makes form dependent on material, making the model itself appear to be a material one and thereby sliding into a one-sex model, which, as I have shown, would need to be material. As Holmes suggests, “if we reconsider the evidence with the idea of a continuum in mind, the binaries that structure sexual reproduction at the level of principle start to soften.”\textsuperscript{23}

CONTRADICTION AND CONTRARIETY

At \textit{Generation of Animals} I.18, Aristotle maintains that “all the products of semen come into being from contraries [ἐξ ἐναντίων], since coming into being from contraries is also a natural process, for some animals do so, i.e. from male and female.”\textsuperscript{24} Here male and female are contrary principles that come together to form a third. This is not the coming-to-be of one contrary from its opposite, but it is a becoming that results from the joining of two contraries, as warm comes to be from hot and cold. Three books later, in \textit{Generation of Animals} IV.1, Aristotle writes that the two sexes are opposed – τοῦτον ἀντικειμένα – in
their ability to “reduce the residual secretion to a pure form.” Not only are the sexes opposed, but the force of one sex or its failure can turn the offspring into the same sex or the opposite sex of the principle working on it:

We must understand besides this that, if it is true that when a thing perishes it becomes the opposite of what it was, it is necessary also that what is not under the sway of that which made it must change into its opposite. After these premises it will perhaps be now clearer for what reason one embryo becomes female and another male. For when the first principle does not bear sway and cannot concoct the nourishment through lack of heat nor bring it into its proper form, but is defeated in this respect, then must the material change into its opposite \( \tau \nu \tau \iota \nu \iota \). Now the female is opposite \( \epsilon \nu \tau \iota \nu \iota \) to the male, and that in so far as the one is female and the other male.

Here the offspring comes to be out of contraries, and in its coming to be, the material can change from resembling one or the other of the contraries that form it. Note that the embryo itself is called material as a substrate that is coming to be as one sex or the other.

After this passage Aristotle notes that certain parts are principles of the whole body, such that when they change, the whole body does. This leads Aristotle to pose a number of conditions which, if met, would explain when and how the heart and blood are formed:

The male is a principle and a cause, and the male is such in virtue of a certain capacity and the female is such in virtue of an incapacity, and \([ \ldots ]\) the definition of the capacity and of the incapacity is ability or inability to concoct the nourishment in its ultimate stage \([ \ldots ]\) and \([ \ldots ]\) the cause of this capacity is in the first principle and in the part which contains the principle of natural heat \([ \ldots ]\).

If we accept these conditionals, the male and female are contraries or opposites of a kind because of a presence or absence of a capacity to concoct, a capacity that comes about through having sufficient appropriate heat to achieve the right level of concoction.

An opposition is thus set up between the male and the female in reproduction, an opposition of contraries that is based on a capacity or incapacity, which is to say on a form and privation. But we have two accounts of the way that male and female are contraries: one makes male and female opposed as form and privation working on a third substratum – the embryo – and one makes male the form that works on female matter. The latter appears in Aristotle’s account of generation as such and the former in Aristotle’s account of sexual differentiation. This suggests that the difference that becomes the difference between form and matter is a difference that is located in the body, the material.
Katherine Park and Robert A. Nye explain that both medieval and Renaissance thinkers deny the possibility of a middle between male and female, not just biologically but because the legal landscape has no place for such a middle. But the two kinds of oppositions that Aristotle describes between form and matter show that they are related as both contradictories and contraries. In order for the mapping of form and matter onto male and female to work, they seem to necessarily be contradictories, and yet Aristotle characterizes the distinction more as contraries. In *Categories* 10, Aristotle describes two kinds of contraries: those in which one or the other contrary must belong to that of which they are contraries, as sickness or health must belong to animals’ bodies and odd or even must apply to numbers, and those in which neither extreme necessarily belongs to that of which they are contraries, as black and white need not belong to a body and bad or good need not be predicated of men. With the second kind of contrary, the one extreme can change into the other. This kind Aristotle simply calls “contraries.” The first maintains an uncrossable distance, and this kind of contrary Aristotle calls “contradictories.” In *Metaphysics* Iota, Aristotle writes that “contradiction [ἀντίφασις] admits of no intermediate, while contraries [ἐναντίων] admit of one.” Aristotle continues that while contradiction does not allow an intermediate, the change in matter is from contraries. Several chapters later, he writes, “since contraries [ἐναντίως] admit of an intermediate and in some cases have it, the intermediate must be composed of the contraries.”

Two chapters later, Aristotle addresses gender and contrariety:

One might raise the question, why woman does not differ from man in species, female and male being contrary, and their difference being a contrariety [ἐναντίωσεως]; and why a female and male belong to it *qua* animal. This question is almost the same as the other, why one contrariety makes things different in species and another does not.

After explaining that contraries that are in formula make a difference in species while contraries in the material do not, he concludes:

And male and female are indeed modifications peculiar to animal, not however in virtue of its substance but in the matter, i.e. the body. This is why the same seed becomes female or male by being acted on in a certain way. We have stated, then, what it is to be other in species, and why some things differ in species and others do not.

Aristotle begins the next chapter, “Since contraries are other in form [. . .].” Some kind of difference appears here at the level of material that produces the distinction between male and female, a distinction which is taken to be a difference between what is capable of generating *qua* form and what only contributes matter to generation, a difference that depends on how the seed is worked on. This view is complicated by the fact that male and female are contraries that
necessarily belong to animals, which would seem to make them contraries with an excluded middle, while that which makes them distinct – a degree of heat – would seem to have an intermediate. The female appears to be, or at least to offer, the material that is the underlying thing distinct from the contraries of form and privation, yet she is also the privation of male form in the embryo.

At Physics I.7, Aristotle explains generation as something that happens between contraries, “since it is impossible for the contraries to be acted on by each other. But this difficulty also is solved by the fact that what underlies is different from the contraries for it is itself not a contrary [ἐναντίον].” In Physics I.9, Aristotle clarifies how the material, as what underlies, differs from privation: “Now we distinguish matter and privation, and hold that one of these, namely the matter, accidentally is not, while the privation in its own nature is not; and that the matter is nearly, in a sense is, substance, while the privation in no sense is.” Aristotle continues to refine his definition of matter in this same chapter: “For my definition of matter is just this – the primary substratum of each thing, from which it comes to be, and which persists in the result, not accidentally.”

The shift from male to female occurs between opposites in a way that shows a difference not between form and matter but within the material body, as Aristotle describes the transition that occurs from the offspring being male to the offspring being female in Generation of Animals IV.3:

Now, when anything departs from type (ἐξίσταται [note that this is a verbal form of ἔκστασις]), it goes not into any chance thing but into the opposite (ἀντικείμενον), and so too in generation, what isn’t mastered necessarily departs from type and comes-to-be the opposite with respect to the dunamis with respect to which the generator and mover didn’t get mastery. If, then, it’s qua male, what comes-to-be is female.

Here the change is still at the level of material, as we established earlier, rather than the form as such. Within the material body there are contraries (necessary ones, which would seem to make them contradictories) – male and female – that in fact rise to the level of having the capacity to form the offspring from the generative principles of form and material. These are material contraries that become formal contraries in generation. They become formal contraries, as I will show in the next section, through a material difference: heat.

HEAT IN GENERATION

Aristotle tells us that the male and female both contribute something in generation: residue concocted to various degrees of heat. Aristotle remarks in GA II.1 that the semen (σπέρμα) has the principle of motion that brings life into
parts, animating them so that they become the parts that they are. In *GA* I.18, Aristotle describes how semen (σπέρμα and σημεῖον) comes to have that principle, beginning, as the feminine contribution does, in nutriment. The nutriment can fail to become semen if the person is too fat because then the residue is being concocted into fat rather than semen (σπέρμα). Thus the process of making semen can fail even in the same body from one time to another. Such failure defines the female as female, “owing to the coldness of her nature.” According to this account, if the heat fails to concoct, this failure both signals that the concocting body was female – if what defines the male as male is the ability to concoct – and that what is being worked on will become female. The concoction that forms semen out of residue and that somehow imparts the power to concoct into the semen occurs in the semen through a certain kind of heat, a heat that comes only from other things that share this heat.

Keeping distinct what semen forms and what forms semen, it seems that a certain degree of heat can concoct homogeneous parts – blood, fat, even semen – in a way that thickens them. Still, this heat cannot organize the material into non-homogeneous parts; it cannot bring soul into the material. Aristotle explains that the qualities of these parts may be caused by heat and cold, “yet, when we come to the principle in virtue of which flesh is flesh and bone is bone, that is no longer so; what makes them is the movement set up in the male parent, who is in actuality what that out of which the offspring is made is in potentiality.” Semen (τὰ σπέρματα) has the capacity to work the blood up to the point where it has soul, animation, and breath, and to impart such a capacity into the offspring. Soul itself is the animating breath (πνεῦμα), which is heat. Such heat forms the body that will be capable of forming semen by working on the menses to fully concoct it. Successful concoction makes semen out of menses by heating the material to the level where it can generate heat in something else. Failed concoction works at two levels: first, the failure to achieve life; and second, the failure to impart this capacity to achieve life in another to the offspring. A certain degree of heat moves the menses from not having to having breath or soul, which is to say from being material to being form; more heat moves it from not having life to being capable of imparting life. In both cases, this capacity is vital heat.

Before turning to vital heat and its powers, let us review the perplexities that have arisen thus far. Semen is formed by becoming the kind of residue that has sufficient heat, a category of residue that also describes blood, fat, and nutriment. We can deduce that it becomes this kind of residue from another thing that has sufficient heat of the right kind, that is as a result of having been formed from the parent semen. I say deduce because Aristotle offers the account of how the offspring is formed, but the transition into how that offspring is later able to conjure up sufficient heat is not clear, except that it seems initially, by its nature, to have the heat of the father. This process of heat is not a certainty since even the body designated male can fail to produce this semen if it is using that heat to make fat because it has too much nutriment. The same body can both make and fail to make semen if the other nutriments are not
in the proper proportion, a proportion that one presumes would follow from having the right kind of heat.

Aristotle writes:

Now it is true that the faculty of all kinds of soul seems to have a connexion with a matter different from and more divine than the so-called elements; but as one soul differs from another in honour and dishonour, so also the nature of the corresponding matter. All have in their semen that which causes it to be productive; I mean what is called vital heat [\(\text{θερμόν}\)]. This is not fire nor any such force, but it is the breath [\(\text{πνεῦμα}\)] included in the semen [\(\text{σπέρματι}\)] and the foam-like, and the natural principle in the breath [\(\text{πνεῦμα} \text{φύσις}\)], being analogous to the element of the stars [\(\tau\'\) τῶν ἀστρῶν στοιχείων]. Hence, whereas fire generates no animal and we do not find any living thing forming in either solids or liquids under the influence of fire, the heat of the sun [\(\text{τοῦ ἡλίου θερμότης}\)] and that of animals does generate them. Not only is this true of the heat that works through the semen [\(\delta\'\) τοῦ \(\text{σπέρματος}\)], but whatever other residue of the animal nature there may be, this also has still a vital principle [\(\text{ζωτικὴν ἀρχὴν}\)] in it. From such considerations it is clear that the heat [\(\text{θερμότης}\)] in animals neither is fire nor derives its origin from fire.\(^{52}\)

Aristotle distinguishes the heat that causes semen to be generative from fire, “which generates no animal.” Only “the heat of the sun and that of animals” generates living things. This source is not simply fire, which is elemental and material, but proper (\(\text{oἰκείος}\)) heat, heat from the sun. Fire can form the homogeneous parts (the qualities), but not that which has a function (the ensouled parts). This is the heat proper to bodies that comes from the sun or the earth or the stomach. Aristotle describes this heat as breath, \(\text{πνεῦμα}\), and as the heat that is analogous to the heat in the stars, the element of aether. Much later in Generation of Animals, Aristotle writes, “animals and plants come into being in earth and in water because there is water in earth, and \(\text{πνεῦμα}\) in water, and all \(\text{πνεῦμα}\) is soul-heat [\(\text{θερμότητα ψυχικὴ}\)], so that in a way all things are full of soul.\(^{53}\) In joining Thales’ twin claims that everything is made of water and all things are full of soul, Aristotle associates soul-heat with water and earth in this passage, making it much closer to the elements, against the earlier passage wherein they are distinct. Similarly, in GA II.2, Aristotle defines semen (\(\text{σπέρμα}\)) itself as water and air after addressing the material properties of water and air in relation to heat.\(^{54}\)

Friedrich Solmsen ponders the strangeness of the constellation of vital heat, \(\text{πνεῦμα}\), and aether in Aristotle: each of these element-like forces are ways that Aristotle tries to think the material site of soul.\(^{55}\) Aristotle’s vacillation between speaking of these as material and at other places as immaterial or divine points to his need to find a material basis for soul while resisting a reduction of soul to material.\(^{56}\) Solmsen notes that just as Aristotle first defines \(\text{σπέρμα}\) as \(\text{πνεῦμα}\)
and water where πνεῦμα seems to be merely air, in some places he similarly seems to make fire capable of the kinds of concocting changes attributed to heat. In *Parts of Animals*, Aristotle speaks of fire, breath, and natural heat: fire is the tool the soul uses (such that all animals have an amount of this heat); breath feeds the “internal fire” (where fire or cognates of it are repeated three times in association with the breath); and natural, concocting heat comes from the soul, which is “as it were, set aglow with fire.” But Aristotle vociferously rejects their identity in other places (as in the passage above). Solmsen explains the shift from σπέρμα as principle or form in *GA* I to σπέρμα including some material contribution in *GA* II in terms of the shift in focus from the body of the offspring to its soul. It is striking that when the shift is made to the soul, the σπέρμα needs to contribute some material to cause it, that is it needs to be enmattered. So the soul is caused by vital heat, or as Gad Freudenthal argues, vital heat carries the soul, the enforming capacity, and this heat is manifested in πνεῦμα.  

Aristotle also says in this passage that vital heat is found in “whatever other residue of the animal nature there may be.” One place it is found is in the stomach of both male and female bodies because nutrition requires it. Aristotle explains that nutrition occurs in plants and animals when heat concocts food into blood. In *Parts of Animals*, Aristotle calls the stomach in animals “the internal substitute for the hearth,” since it is where food is concocted into blood, while the earth plays this role for plants. Citing *De Anima* II.4, Paul Studtmann draws a parallel between the heat in digestion and the heat in reproduction, since in both cases, there is a distinction between the kind of heat that causes something to move upward or downward (fire) and the kind of heat that causes matter to emanate it. Different degrees of vital heat seem to produce different degrees of concoction in material, but all things that have nutrition have a vital heat that causes concoction of food into blood. In *Parts of Animals*, Aristotle explains that moist and dry substance is concocted into nourishment “by the force of heat [δία τῆς τοῦ θερμοῦ δυνάμεως].” Since this process is needed for all living things, “it follows that all living things, animals and plants alike, must on this account, if on no other, have a natural source of heat [ἀρχὴν θερμοῦ φυσικήν]; and this, like the working of the food, must belong to many parts.” In the next chapter, Aristotle explains that anger produces heat (θερμότητα) and that blood is kept fluid by animal heat (διὰ τῆς θερμότητας τῆς ἐν τοῖς ζῶοις). Thus, Studtmann argues, the semen owes its becoming semen to the same process whereby food is converted into blood, and, we could add, whereby we become angry and our blood remains fluid. Aristotle names fire the source of the heat in the digestive process in *On Youth and Old Age*, where the soul depends upon the digestive processes which depend on natural fire and which can be lost through exhaustion (just as when there is too much heat in a thing burning without extra fuel added).

Vital heat does not seem to be of a different order than of the heat that belongs to all bodies, which turn moist and dry substances into nutriment. Studtmann argues that degrees of vital heat explain the different organizational
complexity of nutritive and perceptive organisms, on the basis of his argument that vital heat in the biological works parallels the different types of soul in *De Anima*. The difference between male and female is that less heat is required to maintain certain capacities than is required to generate them. Freudenthal, whom Studtmann appears to be following here, argues that there is thus a difference of degree within vital heat, but a difference of kind between vital heat and elemental heat. Some passages that discuss the difference between male and female seem to designate it as the difference between that which has vital heat and that which has either elemental heat or no heat at all, as when the difference is between what can bring life and what cannot (as when Aristotle says that woman is cold). Other passages, those that draw parallels between the concoction of menses in reproduction and the concoction of food into blood, make vital heat and the power to concoct present in all living things, as when Aristotle writes: “For the earth aids in the concoction by its heat, and the brooding hen does the same, for she infuses the heat that is within her.” And again:

The nourishment again of some is earth and water, of others a combination of these, so that what the heat in animals produces from their nutriment, the heat of the warm season in the environment puts together and combines by concoction out of the sea-water and the earth. And the portion of the vital principle which is either included along with it or separated off in the air makes an embryo and puts motion into it.

Even if a difference of kind between elemental and vital heat is granted, there would remain a strong case that the difference between male and female is a difference in degrees of vital heat. This difference is between the vital heat that can only achieve nutrition and the vital heat that can achieve reproduction, where both are ways of furthering life. If we agree that female bodies do have this nutritive vital heat, then the difference seems to be one of degree. If it is one of degree, then it seems that what is traditionally thought of as a strictly formal principle includes a material aspect, and what is traditionally considered a material principle includes something of what we traditionally attribute to form. On these terms, it seems that the difference between matter and form turns on a temperature – some degree of vital heat after which the soul is present and a degree below which it is not.

**ARTIFICE’S NECESSARY CONTRADICTORIES**

The account of vital heat presents a model of generation that has the form arising from material. This reading would be challenged in *Generation of Animals* I.22–3, where Aristotle speaks of generation in terms of artifice, where form is imposed on material. Aristotle explains that the carpenter must be connected to the wood and the workmanship. Movement from the carpenter to the material
must be connected to the material “as, for instance, architecture is in the building it makes.” As Aristotle says “we may also gather how it is that the male contributes to generation.” He then explains that the carpenter imparts the “shape [μορφή] and form [ἐἶδος]” to the material through motion. As Aristotle writes:

It is his hands that move his tools, his tools that move the material; it is his knowledge of his art, and his soul, in which is the form, that move his hands or any other part of him with a motion of some definite kind, a motion varying with the varying nature of the object made. In like manner, in the male of those animals which emit semen, nature uses the semen as a tool and as a possessing motion in actuality, just as tools are used in the products of any art, for in them lies in a certain sense the motion of the art.

It seems that it is only after the initial moment of generation that nature functions according to an internal principle, but in that initial moment, it remains a model of imposition and mastery. The semen does not become part of the resulting embryo just as no part of the carpenter’s art exists in what he makes. The semen is not a part of the offspring, but just a tool of nature to impose form on the καταμήνια. Toward the end of this chapter which concludes Generation of Animals I, Aristotle writes, “in all this nature acts like an intelligent workman.”

Montgomery Furth argues that the semen itself is not even form, but the tool of the male parent’s form. As such, the semen has informational power:

The logos of a pre-determined sequence of physical and chemical formative activities (“movements” and “concoctings”) which, given catamenia to work upon, will effectuate a corresponding sequence of changes in the catamenial substrate, each change presupposing those before it, via the postulated physical and chemical mechanisms (as “efficient” or “moving causes”).

Furth cites Generation of Animals II.1, where Aristotle writes: “In a way it is the innate motion that does this [sets up the movement of form in the embryo], as the act of building builds a house.” Then in the next paragraph he continues:

What makes them [the non-homogeneous parts] is the movement set up by the male parent, who is in actuality what that out of which the offspring is made is in potentiality. This is what we find in the products of art; heat and cold may make the iron soft and hard, but what makes a sword is the movement of the tools employed, this movement containing the principle of the art. For the art is the starting-point and form of the product; only it exists in something else, whereas the movement of nature exists in the product itself, issuing from another nature which has the form in actuality.
Aristotle’s account of form as an organizing principle does not seem to allow for a principle of information that is separate from the form as shape. That account seems very much like an account of artifice where the form that generates is an idea in the mind of the artificer, distinct from the form that is the shape. For the account of artifice to work, not only is the information of form distinct from its shape, but also the form has to be a clearly distinct principle from matter. Only if matter is distinct can form be imposed on it. The account of vital heat suggests that the distinction between form and matter arises from out of material and proceeds along a progression from out of material. It proceeds in some material to work it up to the level where it is capable of working up future material, to the point where that future material can work up even further material. Some material must be worked up to a point that is concocted enough to develop nutritive soul, but not worked up sufficiently to be animal soul. This material joins to the other more worked up material to form a living animal offspring. Both kinds of material when they encounter each other have a certain amount of heat from within themselves that brings each to be what it is.

At the outset, it seems that in order for nature to really arise from itself, form in natural generation would need to arise from material. That indeed seems to be the case, though it is true that it arises, that it becomes form, from a vital heat that works the material up to a point where it can do the same to further material. But natural generation is not spontaneous generation; some unifying work is needed between a form that arises from material and a material that becomes form. So when the form comes together, having arisen out of material to join to other material, the form appears to join with its contrary, the contrary from which it has arisen, and in so doing come to some kind of intermediate.

All of this leads to the pressing question that Aristotle’s biology raises: is an artifice model of imposition possible, when the imposed form is worked up out of material and imposed on the very material that is also worked up, albeit not as fully worked up? The structure of imposition requires difference and hierarchy. But if the form is worked up from material and imposed and thus joined to material that is less or otherwise worked up, this fusion or joining would seem to collapse the distinction between them. And is not that what natural substance looks like, form that is well-nigh impossible to distinguish from its material?

CONCLUSION

Two points in conclusion. First, we tend to think of “true difference” as formal difference, difference in kind, even as we are pursuing true difference for the sake of elevating the feminine principle, material. We think of difference of degree, difference that is less truly different, as material difference. Where then are we left if the difference between matter and form is itself one of degrees
of vital heat, that is a material difference? Where are we left if the difference between the masculine and the feminine is not a formal one? Initially, it seems that this means we are in the one-sex model, the masculine is true sex because it is formal while the feminine aspires toward form. It seems like a less-than-true difference because it is not formal difference. I argue in this essay that the difference between male and female, between form and material, the one based on degrees of vital heat, is a feminine difference, a material one. The feminine principle, material, with its variable degrees of heat, thereby forms the difference between the feminine and the masculine.

Second, the difficult thing about talking about material is that trying to talk about it in any way other than how we have always talked about it requires that we already can talk about it in such an other way. It seems close to impossible to get from here to there without already being there. To challenge the ways by which we think about material in Aristotle requires distinguishing material from, well . . . material, and in this move, we propose that material in Aristotle is not non-form, but rather that it is formal, and therefore better because not as much like material. This is especially a problem for Aristotle, who is generally treated to be the source of the profound distinction between material (stuff, completely unformed, needing something outside of itself to give it shape and meaning) and form (the shape, the source of meaning that makes material show up). If menses is the material, its distinction from semen in terms of degrees of vital heat makes semen form through a material distinction. What this tells us about material is that it is capable of producing a distinction between form and material, which offers us a way to think about material without either elevating material’s worth (because it could become form) or devaluing form (because it is only distinct from material because of some power that is itself material). Such claims would use the language that assumes a great divide and hierarchy between form and material to challenge that divide and hierarchy.

Vital heat does some work for us in thinking through these questions because of its connection to both the elemental and the animate at once. Vital heat is not an on/off switch that makes the residue male or not, but rather a matter of degrees that can fail and be affected by other material. On these terms, material, which in some places Aristotle tries his darnedest to keep from having a crucial explanatory role (in generation specifically and change more generally), comes to have a vital role. In this vital role, material does not look like the material we thought we knew.

NOTES

[I am indebted to the organizers and audience members of the Pennsylvania Circle for Ancient Philosophy meeting in 2014 where I presented this argument for the keynote, especially Rebecca Goldner, Claire Griffin, L. Aryeh Kosman, Christopher P. Long, and Laura McMahon. I am also grateful to the...]
organizers and audience members at the Ancient Philosophy Society meeting in Lexington, KY in 2015 where I presented a version of this essay, especially Emanuela Bianchi and Mitchell Miller. Finally, I would like to thank my summer research student, Jonathan Bojrab, in conversation with whom I was motivated to pursue the distinction between contradictions and contraries to further my case.]

1. Brooke Holmes, *Gender: Antiquity and Its Legacy* [Holmes], p. 43.
3. Luce Irigaray, “How to Conceive (of) a Girl,” in *The Speculum of the Other Woman* [Irigaray], p. 164.
7. Ibid. p. 5.
11. Aristotle uses the term σπέρμα sometimes to refer to seed as such, any contribution to generation, and sometimes to refer to the specific male contribution. Thus some passages where A. Platt (in *The Complete Works of Aristotle*, ed. Jonathan Barnes) translates σπέρμα as semen (such as *Generation of Animals* [GA], 725b26ff.) might seem confusing because what is under dispute is not whether the male contribution is much or little, but whether both male and female contributions together are much or little depending on what in the blood is pulled away for nutrition instead of reproduction. (If σπέρμα here means the male contribution, then it does seem to follow that the male contribution is dependent on the availability of material.) Mayhew translates σπέρμα as seed and γόνη as semen. To complicate things, Dean-Jones translates γόνη as both seed and sperm and σπέρμα as semen in the Hippocratic corpus. Dean-Jones, *Women’s Bodies in Classical Greek Science* [Dean-Jones], pp. 154, 155n25, 155n26, 165n60, 166n61. James Lennox argues that Aristotle uses σπέρμα somewhat interchangeably with γόνη in GA I; in GA II and for the rest of *Generation of Animals*, Aristotle seems to use σπέρμα as the generic for seed or contribution and γόνη to refer to the male contribution or semen and καταμηνία to refer to the female contribution or menses.
12. In *Making Sex: Body and Gender from the Greeks to Freud* [Laqueur], pp. 54–5, Thomas Laqueur writes:

Sperma, for Aristotle makes the man and serves as synecdoche for citizen. In a society where physical labor was the sign of inferiority, sperma eschews physical contact with the catemenia and does its work by intellection. The kurios, the strength of
the sperma in generating new life, is the microcosmic corporeal aspect of the citizen’s deliberative strength of his superior rational power, and of his right to govern. Sperma, in other words, is like the essence of citizen.

Laqueur’s account is useful for setting up this distinction between a one-sex and two-sex model, but it is not without serious flaws. As Katherine Park and Robert A. Nye note (in “Destiny is Anatomy”), Laqueur tries to force a distinction between ancient and modern models without sufficient evidence; they help show that it was Aristotelians who were responsible for several views associated with Aristotle, such as the view that the women contribute no seed and that there is a profound incommensurability between the male and female. Helen King dedicates a monograph to responding to and criticizing Laqueur: Helen King, The One-Sex Body on Trial: The Classical and Early Modern Evidence [King].

13. As noted by, inter alia: Laqueur pp. 28–9; King pp. 40–2; Holmes pp. 39–44.
16. Helen King and Rebecca Flemming maintain that these are not loaded terms for Aristotle and for Galen as they are for us. King argues that “deformed” and “less perfect” do not carry the judgements for the Greeks that they do for us – though this is somewhat dubious given the centrality of teleology in their work (King p. 41). King quotes Rebecca Flemming who argues that these terms are their way of describing women’s “critical inability” to heat their material to the degree where it could impart life-giving breath; see Flemming, Medicine and the Making of Roman Women, p. 119.
17. Robert Mayhew’s two-sex, two-seed model might complicate this reading of Aristotle. Mayhew attempts to redeem Aristotle by arguing that Aristotle sometimes uses seed in a neutral way to refer to any contribution to generation, that is both semen and menses, so both male and female contribute seed but in different ways (see Mayhew, The Female in Aristotle’s Biology: Reason or Rationalization [Mayhew], p. 38).
21. This problem is at work in Aristotle’s account of how the semen as form works. Lesley Dean-Jones suggests that Aristotle could have allowed that there was material in the semen without detracting from the male superiority he wanted to support, but to do so would make the male hylomorphic, not completely form (in Dean-Jones p. 188).
23. Holmes p. 43.
This dual conception of material is invoked by Emanuela Bianchi in this volume, “Aristotle’s Organism, and Ours.” James Bogen argues that Aristotle’s use of the term “complete privation” at \textit{Meta.} 1055a33 suggests that there can be partial privation (in “Change and Contrariety in Aristotle,” pp. 13–14). See also Mary Louise Gill who argues from \textit{Physics} \textit{I.} and \textit{Generation of Animals} I.18 that material as the \( \uppsi okei\mu\nu o \) in generation has its own proper identity and it remains at work when formed by the form and seed (\textit{Aristotle on Substance: The Paradox of Unity} [Gill], pp. 106–7).

Park and Nye, “Destiny is Anatomy,” p. 56.


\textit{Meta.} 1055b1–2.

Ibid. 1057a18–19.

Ibid. 1058a29–36.

Ibid. 1058b21–5.


\textit{Physics} 192a4–6. Gill argues that as the substratum material has an identity of its own and it is the subject of generation (not merely of destruction) with reference to \textit{Physics} I.7.

\textit{Physics} 192a31–3.

\textit{Meta.} 1033a25–6.

\textit{GA} 768a2–5. From Montgomery Furth’s translation in \textit{Substance, Form and Psyche: An Aristotelian Metaphysics} [Furth], p. 130. Emphasis by translator; brackets are my own.

Whether they both contribute something is contested in the literature. Helen King, p. 40, argues that woman does not contribute seed. Mayhew, pp. 34–40, argues that she does.

\textit{GA} 725a1–2, 726b2–11, 727a3–4, 727a31–727b5, 728a26–7. Aristotle describes the process of concoction in great detail in \textit{Meteorology} 379b18–35, 381b29–38a25, 38a32–4, 383a1–14, 383b25–6, 384a9–10, 384b4–5. In \textit{Meteorology}, Aristotle describes the work of heat as concoction: “a process in which the natural and proper heat \( \tau o\iota\psi o\sigma i\kappa o\delta\) και \( \omicron\omicron\kappa\iota\iota\iota\iota\,\theta\epsilon\rho\mu\omicron\omicron\omicron\omicron\) of an object perfects the corresponding passive qualities [the dry and moist], which are the proper matter [\( \eta\omicron\iota\kappa\iota\iota\iota\,\,\epsilon\kappa\alpha\sigma\iota\epsilon\iota\) of any given object” (\textit{Meteor.} 379b18–20). Aristotle has divided the active work of hot and cold from the passive work of dry and moist and argues that concoction, this heating process, is rooted in the body – “the primary source is the proper heat [\( \theta\epsilon\rho\mu\omicron\omicron\omicron\omicron\) of the body” (379b24) – and the end of concoction can be the nature of a thing – “nature, that is, in the sense of the form and essence” (379b26).
Having associated dry and moist with matter and heat and cold with form, Aristotle concludes, “concoction ensues whenever the matter, the moisture, is mastered. For the matter is what is determined by the natural heat in the object, and as long as the ratio between them exists in it a thing maintains its nature” (379b33–5). What is noteworthy in this passage is that form and material are both understood through material processes – heat and cold (both!) are forming processes, and dry and moist (both!) are material that are formed (hot and cold form the passive qualities: Meteor. 382a32–4, 383a1–14, 383b25–6, 384a9–10, 384b4–5; dry and moist are both acted on: Meteor. 381b29–382a5). Thus the process of formation seems to have worked up from the material level. Because there is considerable dispute regarding whether that account is consistent with the account of Generation of Animals, a dispute that would take some space to adjudicate, I have refrained from addressing the Meteorology here. Mary Louise Gill argues that either the passive or active element can be at work in elemental change from one element to another: when fire works on earth, its active heat makes it fire, but when fire works on air, the passive dryness makes it fire (in Gill pp. 81–2). Moreover, Gill argues, the elements themselves appear as material that is underlying yet already and always formed, not made up of any simpler ingredients, yet having a distinct character (ibid. p. 82).
56. Solmsen, p. 122, writes that “all things are full of soul” replaces Thales’ “all things are full of gods.”

57. Aristotle, *Parts of Animals* [PA] 652b8–16, 473a4–9, and 469b11–17, respectively; cited also by Solmsen at p. 121.

58. Gad Freudenthal argues that the πνεῦμα in Aristotle is a unifying force that keeps a substance together and prevents all the elements from flying in separate directions (Gad Freudenthal, *Aristotle’s Theory of Material Substance* [Freudenthal], pp. 137–8). Freudenthal argues that vital heat works on the blood in such a way as to transform it into πνεῦμα which remains in the blood (ibid. p. 125). Freudenthal argues against the view he attributes to Solmsen, that πνεῦμα is the instrument whereby heat is carried through the blood. Freudenthal argues that such an interpretation makes πνεῦμα into a *deus ex machina* since it seems unrelated to any other part of Aristotle’s physical theory (ibid. p. 108). Freudenthal’s solution is to show that vital heat is not an instrument of the soul that forms; rather vital heat carries the enforming movement, which is to say that it is soul, at once an efficient cause and a formal cause, not merely an efficient cause or tool (ibid. pp. 23–32). Balme argues that πνεῦμα is formed when heat acts on moisture as a result of the body’s natural activity, arguing that there is at least a continuum of difference between heat and vital heat, in his commentary of Aristotle’s *De Partibus Animalium I* and *De Generatione Animalium I*, pp. 160–4. Consider also, Aristotle, *GA* 703a25ff., *De Anima* 416a6–9.

59. PA 650a25.

60. Ibid. 650a2–9, 23–7:

Now since everything that grows must take nourishment, and nutriment in all cases consists of moist and dry substances, and since it is by the force of heat that these are concocted and changed, it follows that all living things, animals and plants alike, must on this account, if on no other, have a natural source of heat; and this, like the working of the food, must belong to many parts [. . .] But animals, with scarcely an exception, and conspicuously all such as are capable of locomotion, are provided with a stomachal sac, which is as it were an internal substitute for the hearth. They must therefore have some instrument which shall correspond to the roots of plans, with which they may absorb their food from this sac, so that the proper end of the successive stages of concoction may be attained.

61. Paul Studtmann, “Living Capacities and Vital Heat in Aristotle” [Studtmann], pp. 367, 368, 373. Consider *De Anima* II.4, 416b28–9: “All food must be capable of being digested, and what produces digestion is warmth; that is why everything that has soul in it possesses warmth.” See also *Meteorology* 379b11, 381b7.
62. PA 650a1–5  
63. Ibid. 650b36.  
64. Ibid. 651a11.  
67. Studtmann p. 372. This view appears traceable to Freudenthal who argues that vital heat produces the *scala naturae* determined in Aristotle by the degrees of complexity of the soul (Freudenthal p. 4).  
68. Studtmann p. 373.  
69. Freudenthal p. 110.  
70. GA 753a17–20.  
71. Ibid. 762b12–17.  
72. Ibid. 730b5–8.  
73. Ibid. 730b9–10.  
74. Ibid. 730b14–15.  
75. Ibid. 730b16–22.  
76. Ibid. 730b10–14.  
77. Ibid. 731a25.  
78. Furth p. 117.  
79. GA 734b17–19.  
80. Ibid. 734b35–735a4.

**BIBLIOGRAPHY**


