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Science and Philosophy in a Thomistic Anthropology of Sexual Difference

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Abstract: This essay examines the relation between scientific inquiry and philosophical thought in the context of a Thomistic account of human sexual difference. I begin by considering Thomas's own view and its explicit though brief appeal to biological observation. In particular, I focus on his claim that being male or female stems more from a substance's matter than from its form. Then, I look at a fairly recent exchange between William Newton and myself, in which, drawing upon Thomistic thought in the context of contemporary science, we argued opposing positions. Mine held that sex stems more from form than from matter, while Newton maintained that Thomas's original position is better. In reviewing this exchange, I note strengths in Newton's argument and suggest a further distinction, even while concluding that my fundamental position is still a better account. Lastly, I turn to further questions and the necessity of continued partnership between philosophy and science.

Keywords: Thomas Aquinas; philosophy; biology; science; sexuality; sexual difference; soul; matter; powers; anthropology

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1. Introduction

The question of the difference between man and woman, especially from a philosophical point of view, provides an illuminating case study of the relation between Thomas Aquinas's thought and the scientific approach to reality. My consideration of that relationship in this essay will proceed in three steps. First, I will comment on the connection between the question of sexual difference in Thomas's own thought and the role of biological observation within his account.[1] Second, by way of turning to the state of the question squarely in the context of contemporary scientific research, I will note the contribution of science and consider an exchange between William Newton and myself, in a dialogue that hinges partly on what one makes of techno-scientific contributions to philosophical analysis of sexual differentiation. Third, I will turn to the remaining questions and indicate how scientific findings may affect philosophical reasoning on the nature of and distinction between man and woman. The philosophical thesis I wish to uphold is a confirmation of my original position, with an additional emphasis on maleness and femaleness as best accounted for by way of a unique sort of appeal to form and matter. Sexual identity thus serves as a particular kind of pointer to the unity of the human person even from a metaphysical standpoint. Notably for the purposes of this paper, the position I am arguing depends to some extent upon relatively recent scientific discovery. Further specification of the thesis, which I cannot advance here, along with subsequent questions, will rely partly on future scientific research.

2. Philosophy and Biology in Aquinas's Account of Sexual Difference

As I have argued elsewhere (Finley 2015), Thomas Aquinas's own articulation of the male–female distinction in human beings relies on a curious inclusion of scientific findings: positions maintained in Aristotelian biology as inherited by medieval thought. I say "curious" both because these scientific points are employed in passages from texts that we would tend to consider highly metaphysical, namely, *De ente et essentia* (*De ente*,

c. 6) and the *Commentary on Metaphysics* (*X Metaphysics*, lect. 11), and also because Aquinas could have argued for the conclusions that he does by remaining within a more strictly philosophical line of reasoning. His deliberate consideration of the biological alongside the philosophical raises the question as to why he proceeds this way. It alerts us to the possibility that the philosophical question at hand, in Aquinas's view, not only bears some relation to the properly biological realm but also benefits from attention to the biological way of investigating. What has often been a source of a dismissal of Aquinas's thought in this matter (and understandably so) might also be seen as an occasion upon which to note his own implicit regard for the "scientific enterprise", precisely in connection with a genuine pursuit of philosophical truth. At the same time, mistaken biological judgments alongside the immature condition of biology in relation to philosophy contribute to internal tensions within Aquinas's account of man and woman.[2]

Briefly, the details are as follows. In *De ente*, c. 6 Aquinas provides a metaphysical classification of accidents of substances, distinguishing various sorts of accidents in terms of their origins as primarily stemming from (*consequuntur*) either form itself, form as related in some way to matter, matter as related to a specific form, and matter as related to a more general form.[3] He notes that being male or being female is an accident that originates primarily from matter: matter considered in relation to a specific form, namely, the form of some kind of animal. Aquinas does not here give the reason for male and female as primarily material sorts of accident; instead, he directs us to Aristotle's *Metaphysics*. The *De ente*'s immediate textual silence on the matter is interesting, since the work provides a number of reasons to support the inference that male and female, as belonging to and thus sharing the same species, do not in themselves differ formally, as such distinction would constitute disparate kinds.

When we turn to Aquinas's exposition of Aristotle's *Metaphysics* Bk. 10, Ch. 9 in *X Metaphys*., lect. 11, nn. 2128–2134, we see that he follows Aristotle in taking up this question: How is it that male and female do *not* entail species differentiation, given that they are contraries found at the level of the essence, as opposed to differences like dark or light skin color which are not prescribed by the essence and are thus sheerly accidental? We should note that for Aristotle, Aquinas, and a reader taking their principles seriously, the raising of this question itself indicates something metaphysically peculiar about male and female. On the one hand, they are contraries or opposites demanded by the essence itself and in this way could be considered "essential differences": *per se differentia* (*X Metaphys*. lect. 11, n. 2128). Yet, on the other hand, they clearly belong to the same species and indeed together provide for the species' continuation, so could not be formal or essential differences in the sense that would entail different species of being. This metaphysical peculiarity, one might suppose, could account for why Aquinas wishes to provide biological evidence for the status of male and female, alongside philosophical deduction.

Aristotle—with Aquinas accepting his response—solves the question he raises by turning to a consideration that involves biological observation (*Metaphysics* 1058b21–24; *X Metaphys*. lect. 11, n. 2134). In the background is reasoning that finds more explicit expression in Aristotle's *On the Generation of Animals* and Aquinas's *Summa Theologiae*: the male, with his sperm as his natural effect, is the active principle in generation and so more closely contributes the formal principle to the generated being, while the female contributes the material principle.[4] Moreover, the sperm in and of itself, as produced by the male, would naturally tend to produce a male in turn. Yet, in fact, in any particular act of generation, as *X Metaphys.*, lect. 11, n. 2134 specifies, the sperm can give rise to a male or female depending on some passion it undergoes (*secundum quod diversimode patitur aliquam passionem*); specifically, depending on whether the operative heat is strong or weak, or even depending on various external causes (*STh* I, 91.2, ad 1). Biological reasoning thus indicates that accidental changes to the sperm can result in a male or female offspring, which enables Aristotle and Aquinas to conclude that male and female are differences which, while pertaining to the human essence itself, nevertheless pertain by reason of matter rather than form, and therefore could not in themselves constitute different species.[5]

Two questions can be raised at this point, both within the horizon of Aquinas's own biological and philosophical principles. The first (I) has to do with the status of the female. Elsewhere, Aquinas says that while the generated female is accidental in the context of any particular act of generation (owing to the fact that nature tends toward the male), she is nevertheless not accidental as regards the general intention of nature which equally seeks the male and the female for the sake of the preservation of the species (*STh* I, 92.1, ad 1). We can perceive a tension in this resolution. It is not that nature in the particular case is indifferent to male or female, which would allow for the general intention to result on a large scale in time and space; rather, nature in the particular case intends a male. In other words, the particular and general intentions of nature are to some degree contrary and not just ambiguous with respect to each other. Because the general intention of nature—that males and females are both intended for the preservation of the species—is more clearly evident than the supposed particular intention, one might wonder whether the biological findings supporting the latter are insufficient or mistaken, and then how the philosophical position would be affected.

The second question (II) presses the topic of the original inquiry: the status of male and female as attributes of the human being and the human essence. While the problem of potentially separate species through formal differentiation has been resolved through positing material distinction as the basis of sexual difference, it is still the case that male and female are essential (but not species-making) differences. Male and female, that is, are different from other material characteristics like dark and light skin colors, since male and female are entailed by the structure of the human essence itself, which is form and matter together. Aquinas's reasoning seems to consider both sex and skin color as "inseparable accidents" of the substance.[6] The question is, what is the difference between the kind of characteristic that sex is and the kind of characteristic that skin color or eye color is, such that even if both involve materiality at their root, the former pertains to the human essence itself, while the latter is sheerly accidental?

The philosophical and biological reasoning provided by Aquinas thus far does not explicitly answer this question. That there is a difference between the two sorts of characteristic is stated, but not explained. The natural response, based on other passages as well as Aristotle's fundamental anthropology, would be that sexuality has to do with specific powers of the soul—the reproductive powers—whereas other material characteristics do not. No essential power or capacity attaches to hair color or bone structure as such. Aquinas holds that there are distinctly male and distinctly female powers, but that the human reproductive capacity is more perfectly actualized in the male than in the female.[7] This notion corresponds with the idea that the female structure results at least somewhat from accidental, material variation in the generative process: back to the first problem noted above.

Still, we should note that the priority of the male is crucial here precisely for solving the philosophical problem. If, in some way, the male can be regarded as the normative human structure, then the female as a kind of accidental departure from the male, but with a concomitant set of distinct generative powers, shows up as somehow intended by the nature for the species' preservation, yet not so thoroughly intended as to constitute a way of being human that would metaphysically rival the male. In other words, we do not really need to solve the question of essential differences that do not entail different essences. For male and female are not really essential differences—or if they are, the way in which they are is ultimately accounted for through possession and privation, respectively, which is to say, through that which is more truly essential and that which is less so.

In view of the tension (I) and incompleteness (II) in Aquinas's account, I would like to make a methodological comment and a biological one. Methodologically, we see in Aquinas's reasoning a blend of not just philosophy and biology, but also of philosophy and something like pre-philosophical observation, specifically in the idea that the male is the active principle in generation, while the female is passive. While some distinction along these lines may be warranted in a philosophical treatment of man and woman, the

active/passive distinction in Aquinas's treatment achieves further philosophical significance. It means that the male and female contribute by way of agent and material causality, respectively, with the male's contribution particularly linked to the formal principle.[8] The male is a more perfect generator as such, which accords with the notion that in any act of generation the semen seeks to reproduce its like: the male. These ramifications of the active male/passive female distinction are at the heart of the problem (question II) we have discussed above.

One might ask, then, about the way in which Aquinas's thought integrates these three modes of discourse—philosophical, scientific, and pre-philosophical. Is it simply the case that the biological contribution is both limited and mistaken (as repeatedly happens throughout history), owing to which pre-philosophical reasoning ends up being philosophically interpreted in a problematic manner? Is it also the case that pre-philosophical and philosophical discourse are already joined in such a way that biological consideration follows more from the former than from its own principles? Are both perhaps the case? While we cannot resolve these questions here, it is noteworthy that the fairly recent appearance and universal acceptance of certain biological discoveries (primarily sex determination as owing to the presence of X and Y chromosomes: see below) are what lead to the rejection of the Aristotelian version of the active male/passive female notion with its philosophical ramifications.

The biological comment is to point out that in Aquinas's embryology, the first generated being is not the human as such, but an embryonic organism possessing merely vegetative powers.[9] The male and female contributions, in other words, need only suffice for what is physically, organically present and need not directly account for a distinctly human spiritual soul with its faculties of intellect and will. Indeed, Aquinas could not have held that the active male force would supply for the formal principle of the human as such.[10] Thus, the notion of the initial generated being as merely a transitory organism helps allow for the view that the male is a superior principle to the female. This mistaken embryology may be a biological theory, but it also shows philosophical facets: Aquinas argues that the nature of the form/matter union precludes the possibility of an early embryo possessing, say, intellectual or even sensory powers, which leads to the further conclusion that such an embryo is not an intellectual or sensory kind of being. Again, therefore, the question arises as to whether this is simply a case of fallible biology providing philosophical reasoning with mistaken facts on the ground; or a case of philosophical reasoning over-extending to the biological provenance; or both.

We have seen Thomas follow Aristotle in wishing to attend to the biological realm as offering an important perspective on a philosophical question. Still, we can see even here the possibility that precisely the greater distinction between philosophy and science of the sort introduced by early Modernity ensures a relative autonomy belonging to each discipline, which in turn allows for correction of some of the errors we have seen. Let us then turn to Aquinas's vision of the human being within the context of today's science.

3. Contemporary Science: Assisting and Advancing the Philosophical Question

As regards the question of sexual difference from a Thomistic perspective, contemporary science solves one of the major difficulties in Thomas's account. In so doing, it illuminates the significance of sexual difference with regard to the human substance as a whole. Further, the philosophical question of how to account for male and female thus receiving added impetus, science seems to play an important role within such inquiry, as a recent scholarly exchange reveals. I will address these contributions in turn.

1. First, the discovery in the early twentieth century of sex determination through the presence of X and Y chromosomes in male sperm cells showed that nature does not primarily intend the male in any given act of reproduction. Nature equally intends male and female, as the X/Y sperm ratio, common experience, and birth rate statistics show.[11] No opposition exists between the general and particular intentions of nature. Consequently, the Aristotelian–Thomistic interpretation of the active male/passive female distinction has

to be greatly modified. To whatever extent these terms remain valid, they entail neither that the male contributes through formal causality and the female through material causality, nor that the male is a truer agent—and thus nobler version—of the human essence.

On the one hand, then, this genetic discovery removes the internal tension within Thomas's view of sex differentiation. On the other hand, because male and female are equally intended by nature simply speaking, the second question raised above (II) presses itself in a new manner. Once appeal can no longer be made to accidental variation within the sperm to explain the presence of the female in an otherwise male-oriented process, we are left with male and female more truly as co-equal differences demanded by and within the essence itself. We need to account for them in a way that shows both what they are, philosophically, and how they differ from characteristics like dark and light skin color or large and small bone structure.

2. Before pursuing that inquiry, however, we should note the second contribution of contemporary science; namely, its detailed and ever-increasing manifestation of male and female as attributes that characterize the entire person. As we have seen, Aristotle and Thomas knew that maleness and femaleness differ from traits like hair color or bone structure, since the former have to do with particular powers, organs, and ends (*teloi*). To the extent that these thinkers perceived maleness or femaleness as affecting the whole person, such characterization tended to be in terms of the active/passive distinction described earlier. Today, from a scientific viewpoint, we can see in ways that pre-twentieth century thinkers never could just how deeply and extensively one's sex impacts the human substance at all levels. Anatomy, Biology, Endocrinology, Genetics, and Psychology reveal ways in which the sexual difference extends to not only body shape and size, reproductive organs, and organ systems, but also to secondary sex characteristics, gametes, hormone production and distribution, brain activity, and behavior.[12] The XX or XY chromosomal pattern is present in every cell of the body, and of the 20,000 genes possessed by all humans, around 6500 express differently depending on the sex of the person (Gershoni and Pietrokovski 2017). Indeed, "there are enough physiological differences between the sexes (from glial development in the central nervous system to immunoglobulin glycosylation, which regulates antibody function) to fill a textbook on sex-specific medical practices" (Buskmiller and Hruz 2022, p. 76), many of which do not directly concern the reproductive functions at all. Men and women tend to exhibit differences in sensory ability, spatial and verbal reasoning, aggression and risk-taking, emotional expression and recognition, body restlessness, sexual interest, mental illness, and personal relationality, to name a handful of many findings from psychological study (Sodergren 2022, pp. 99–178).

Science thus reveals man and woman as two ways of incarnating human nature. I do not mean to say that science itself explicitly speaks the language of matter and form. Rather, what science reveals to us accords with a view of the human as a hylomorphic (matter/form) composite. It should come as no surprise for an Aristotelian or Thomist that something as profound as an organ system like the reproductive would have substance-wide impact. That men and women should be so extensively characterized by their sexual identity, even if sometimes in subtle ways, accords well with a view of the human being as a substantial unity in the Aristotelian sense of that term, where the various powers of the substance flow from one source—the essence of the soul—and are ordered among one another so as to contribute to the life and fulfillment of the substance itself (*STh* I, q. 77, aa 4–6).

3. At this point, and to see the nature of science's third contribution to our inquiry, we can return full circle to the problem raised initially by Aristotle: how best to account for maleness and femaleness philosophically? Male and female are entailed by the essence of the species itself, and in this manner could be considered differences in the realm of the essential, while sharing the same species. As giving rise to distinct organs, organ systems, ends, and a host of other organismic features, male and female are radically different from other individual traits like eye color or vocal quality. How ought a Thomistic thinker to articulate this difference, and more importantly, the kind of reality that being male or female is?

To consider this question further, and in the light of philosophy's relation to science, I would like to call attention to an earlier article I wrote on this topic and an insightful response to it written by William Newton (Finley 2015; Newton 2020). My claim was that because being male and female involves not just fixed physical accidents like eye color, but the presence of distinct organ systems each with their own proximate *telos*, we need to have recourse to the soul as a substantial form of matter in order to account for one or the other sex. Distinct organs point to distinct powers, which point to a distinction at the level of substantial form, or soul. As Aquinas says, "the soul constitutes diverse parts in the body, even as it fits them for diverse operations."[13] In the case of woman, the soul sources the female generative powers, and in its actualizing of matter forms corresponding female organs; in the other case, the soul originates male powers and organs. The correspondence of, for example, the male and female generative powers with, respectively, the XY and XX chromosomes present throughout the body is a striking biological confirmation of the Thomistic idea of the mutual proportion of soul and body. My argument emphasized that it is not the soul that is sexed, but rather the entire human person, similar to the way in which the soul, while originating the sensory powers, does not itself possess vision or hearing: the person does. Still, my conclusion was that one's sex stems more from soul than from matter, in opposition to Thomas's own view that we examined earlier, which holds sex to stem more from matter than form. I argued that despite this opposition, my view accorded better with Thomas's fundamental anthropological principles, especially in the context of contemporary scientific knowledge.

A natural objection to my argument is that giving the soul, or substantial form, a primary responsibility for maleness in one case and femaleness in another seems to introduce precisely a formal distinction between man and woman. How, then, as Aristotle asks, would they not differ in essence or species? My response was to point out that male and female powers are not distinct in the way that, say, vision and a sixth sense would be. The presence of the latter would indeed indicate a distinct species of human, like some popularly-imagined aliens, since the two sensory powers would have distinct objects: color and, say, infrared. Yet the co-generative powers, while distinct by way of their own activities and proximate objects, share an ultimate object: reproduction. Thus, they are distinct in a manner analogous to parts of a whole. The human reproductive system is only fully present in both man and woman together. Hence, this kind of distinction, even as originating at the level of form (albeit only in relation to matter), would not be such as to entail two distinct essences. Quite the opposite: they together form the complete essence.

In responding to my article, William Newton argues that the better position is still Aquinas's; namely, that being male or female originates more from matter than from form. Newton holds that philosophical and scientific reasoning supports his view. I am grateful to Newton's response, which has forced me to think through some of these questions more deeply. In light of such reflection, I would like to comment briefly upon his argument.

Newton raises some concerns at the philosophical level which I find thought-provoking and worthy of serious consideration, though not fatal to my original position. For example, he thinks my view grants too much to the soul and makes too little of matter and its contribution, as opposed to Aquinas's approach, which in Newton's words 'might be characterized as "let matter do what matter can and only appeal to the form if need be"' (Newton 2020, p. 202). While I think this principle correct and worthy of emphasis, the question at hand is precisely, "what can matter do in the case of human nature as male and female?" Thus, on its own, this particular charge from Newton does not constitute an objection to my position. We need a reason given for why my appeal to the soul is gratuitous. Newton argues that the information already contained in matter prior to the presence of the human soul "fully determines" whether the organ that the soul builds is male or female (Newton 2020, p. 201). Presumably, this would be analogous to the way in which matter's prior characterizations, received from parents, determine a person's eye color, hair color, and qualities of this sort. Again, however, while it may be that matter is responsible in the way Newton describes, the question is precisely whether this can be

the case. My argument hinges largely on the fact that the male and female reproductive systems are qualitatively different sorts of characteristics than hair or eye color, in that they involve distinct organs and *teloi*, and thus a distinction in powers. This is the reason, in my view, that appeal to the soul is not gratuitous here.

Newton provides evidence for his view by raising three objections of a more scientific or technological nature. The first speaks of the possibility that the SRY gene on the Y chromosome could be altered or neutralized in some way such that the zygote on track to develop as male would in fact develop as female (Newton 2020, p. 202). Second, Newton discusses intersex conditions wherein an individual's sex is ambiguous owing to the presence of partial or imperfect female and male characteristics (Newton 2020, p. 202). Third, he considers the future possibility of producing testes from a woman's stem cells and transplanting these functional gametes into the woman such that for all practical purposes she becomes male. Such a person, Newton notes, though not a man in the truest sense on account of the externally imposed character of the masculinization, would appear to have switched from one co-generative power to another (Newton 2020, p. 204). In all three cases, my position would have difficulty accommodating the scenario, since the idea that the soul originates one or the other generative power does not seem to allow for the changes or ambiguity described. By contrast, Newton's view ostensibly would not have a problem, since he posits the generative power of the soul as unsexed in itself, and as able to form the organs of either sex (or both, limitedly) depending on the matter with which the soul is united (Newton 2020, pp. 201, 203–4).

The scenarios Newton describes are, respectively, anomalous, ambiguous, and still hypothetical. They call for greater attention to the biological realm, and for this reason, I do not dismiss them. Still, I am struck by Newton's proposal of an unsexed, generic generative power of the soul, which is "actualized as male or female on account of matter", but which remains generic even after such actualization (Newton 2020, p. 201). On the one hand, such a notion could seem better suited to explaining the three scenarios just described, which all involve some kind of changeability in function owing to material conditions. On the other hand, it is unclear how to understand a generic power that is ordered to actualization as male or female, but that remains generic in itself. Newton avoids speaking of the male and female powers, presumably because he views these as different instantiations or modalities of the same power. Yet, considering the human being from the ground up, so to speak, we infer powers from corresponding organs and their activities. Just as there is no "sense power" concretely speaking, but rather five external and four internal powers (for Aquinas) that share the *ratio* of sensation, so the "reproductive power" is a name denoting the shared object toward which the male and female powers are oriented.

Some of the disparity in our positions may have to do with a subtle difference in what one might take "stemming from the soul" ("stemming from": literally, "following upon" [*consequitur*]) to mean and to entail. One might understand this notion in such a way as to emphasize sex as something unchanging in itself and dominating matter "from above" regardless of prior and posterior material conditions. Here, I share Newton's concerns, partly in light of the three scenarios he has raised. Alternatively, one could take "stemming from the soul" to emphasize the way in which a formal principle, along with proportioned matter, is needed to explain powers and distinction among powers. After all, the male and female structures are proper to and demanded by human nature, which is form-and-matter together, but more primarily form. Newton claims that maleness and femaleness are present primarily in matter, which is accordingly "read" by the soul (Newton 2020, p. 201), but as indicated above, there is good reason to think the reverse. Moreover, the male and female genetic structures present in matter—which structures point toward the actualization of specific organs and *teloi*—are only there in the first place on account of the human sort of form.[14]

I acknowledge that Newton's argument helps indicate the way in which matter and its inherited characteristics are the occasion for the soul's sourcing of the male or female powers. As stated in my earlier article, "[w]hile temporal priority exists in the material dis-

position [. . .] the actuality and character of the being itself originates more from substantial form" (Finley 2015, p. 599). As to the way in which there may be a kind of changeability in, or partial presence of, the powers in exceptional cases, I would suggest that this calls for greater inquiry at the philosophical and especially scientific levels into the nature of the co-generative powers themselves and their proportionate matter. Specifically, one might consider anew, in light of contemporary science, Aquinas's principle that the inferior powers (the nutritive and augmentative) serve the superior ones (the generative), even as the former precede the latter in the order of generation (*STh* I, q. 77, a. 7). It may be that a proper application of this principle could shed light on the nature of the generative powers themselves. As well, it may be that potencies exist in the very early stages of development that do not characterize the powers and the organism in their maturity.

4. Further Considerations and Conclusions

In light of the above, I do not see that Newton's arguments undermine my fundamental position. I think that the kind of reality that sex is is better articulated in my interpretation, even though some of Newton's considerations point to the need for greater inquiry into particularly challenging scenarios. Whether my argument or Newton's is ultimately correct, we agree in some important respects, one of which is that form and matter both need to be considered when attempting to account for sexual difference in a philosophical manner. For even if, as Newton holds, one or the other sex owes its origin primarily to matter and not to form, this origin has to be conceived in such a way as to illuminate the relation between sex and the soul's generative power, which would be "bi-potent" toward male and female expressions (Newton 2020, p. 203). More broadly, our exchange has brought to light two points in particular that I would emphasize: the holistic nature of sex as regards the human substance or organism, and the significance of the male and female generative powers, since these lie both at the heart of sexual difference and at the intersection, one might say, of form and matter. Concerning each of these points, science will continue to make an important contribution.

Attention to the generative power(s) in particular will be important in coming to a greater philosophical understanding of man and woman. Note just a few of the questions that would be relevant: First, how should we think of these powers as both distinct from but also related to each other? Are they different versions or expressions of a more general power of the soul, and if so, in what way? Second, how should we think of the female powers in their asymmetry to the male, comprising gamete production, menstruation, reception of the male, conception and pregnancy, the production of the placenta, and lactation? Aside from bringing philosophical attention to these realities, especially that of pregnancy, greater understanding of these powers is likely to be helpful in attending to ethical issues like embryo adoption. Third, what light does increased understanding of the generative powers shed on the various intersex conditions? Or conversely, how might greater understanding of these conditions shed light on the male and female powers themselves? For in such cases, we see exceptional—albeit partial—limits or possibilities involving the powers and thereby come to fuller comprehension of their nature and causes. Here, too, we see an especially significant way in which science will be helpful for philosophical reasoning.

In these and related inquiries, science and Thomistic philosophy must continue to work together. It is striking that a proper biological view of woman and man is as recent as it is, compared to the antiquity of Aquinas's metaphysics and natural philosophy. Equally striking is the relative lack of attention to human sexuality from the Thomistic tradition up until the twentieth century, when the pertinent biological discoveries became broadly accepted. We have an opportunity to appreciate in new ways the possibility for the mutual enlightenment of philosophical and scientific thought. That the identity of and relation between man and woman should be a central locus of this partnership among the disciplines may be at least a happy accident, in light of the many controversies and widespread confusion surrounding this topic today. To conduct such inquiry will involve Thomistic thinkers and scientists spending time learning each other's languages

and developing a sense for what in the other's fields are important for the sake of their own. When it comes to certain questions of human significance, a philosophically inspired biology and a scientifically informed philosophy are crucial and not merely optional, as I hope to have shown in this article.

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Notes

1 When using the term "biology" and its derivatives in the context of Aquinas, I am employing them in a somewhat extended sense, since biology as the kind of inquiry we recognize it to be today did not exist in the thirteenth century. Thanks to an anonymous reviewer for this point.

2 For studies on Aquinas, biology, and gender, especially the status of woman, see (Hartel 1996; Nolan 2000; Allen 2002; Johnston 2013; Carrasquillo and De Romero 2013).

3 *De ente*, c. 6: "Quia enim partes substantiae sunt materia et forma, ideo quaedam accidentia principaliter consequuntur formam et quaedam materiam. Forma autem invenitur aliqua, cuius esse non dependet ad materiam, ut anima intellectualis; materia vero non habet esse nisi per formam. Unde in accidentibus, quae consequuntur formam, est aliquid, quod non habet communicationem cum materia, sicut est intelligere, quod non est per organum corporale, sicut probat philosophus in III de anima. Aliqua vero ex consequentibus formam sunt, quae habent communicationem cum materia, sicut sentire. Sed nullum accidens consequitur materiam sine communicatione formae. In his tamen accidentibus, quae materiam consequuntur, invenitur quaedam diversitas. Quaedam enim accidentia consequuntur materiam secundum ordinem, quem habet ad formam specialem, sicut masculinum et femininum in animalibus, quorum diversitas ad materiam reducitur, ut dicitur in X metaphysicae. Unde remota forma animalis dicta accidentia non remanent nisi aequivoce. Quaedam vero consequuntur materiam secundum ordinem, quem habet ad formam generalem, et ideo remota forma speciali adhuc in ea remanent, sicut nigredo cutis est in Aethiope ex mixtione elementorum et non ex ratione animae, et ideo post mortem in eis remanet".

4 *STh* I, q. 92, a. 1, ad 1; III, q. 31, a. 5, resp., ad 3; III, q. 31, a. 4, resp., ad 1; III, q. 32, a. 4, corp., ad 2; *ScG* II, c. 89. For the male's active causality in generation as connected with the formal principle, see *ScG* II, c. 89, esp. nn. 7–8; *STh* III, q. 33, a. 1, ad 4; III, q. 33, a. 4, corp.

5 "[M]asculus et femina sunt proprie passiones animalis, quia animal ponitur in definitione utriusque. Sed non conveniunt animali secundum substantiam et formam, sed ex parte materiae et corporis" (*X Metaphys*. lect. 11, n. 2134).

6 That is, accidents which flow from the principles of the individual in a permanent manner, unlike, say, sitting and walking, which can come and go and are thus separable accidents. *Quaestio disputata de anima*, a. 12, ad 7; Porphyry, *Isagoge*, c. 5; *De ente*, c. 6; *I Post. Anal*., lect. 14.

7 *STh* I, q. 77, a. 6; III, q. 31, a. 5, ad 3. Aristotle's original account is in *On the Generation of Animals*, especially I, cc. 1, 2, 19–23; II, cc. 1, 3–5; IV, cc. 1–3, 6, 8. See also Aristotle's *History of Animals*, especially IV, c. 11; IX, c. 1. For Thomas's use of Aristotle in this context see Johnston (2004).

8 See note 4 above.

9 See the extended discussion in *Summa contra Gentiles* II. 89.

10 See note 9 above, II. 87–89.

11 See, for current worldwide population data, (Central Intelligence Agency 2024). For the roughly equal numbers of X and Y sperm cells, see (Rahman and Pang 2020).

12 (Buskmiller and Hruz 2022; Sodergren 2022), and the bibliographies to both chapters.

13 "[a]nima constituat in corpore diversitatem partium, prout congruit diversis operationibus" (*Q. D. De Anima*, q. 10, ad 17).

14 Thanks to a reviewer for this point.

References

Allen, Prudence. 2002. *The Concept of Woman*. Grand Rapids: Eerdmans, vol. 2.

Buskmiller, Cara, and Paul Hruz. 2022. A Biological Understanding of Man and Woman. In *Sexual Identity: The Harmony of Philosophy, Science, and Revelation*. Edited by John Finley. Steubenville: Emmaus Road Press, pp. 59–97.

Carrasquillo, Francisco, and Hilaire De Romero. 2013. Aquinas on the Inferiority of Woman. *American Catholic Philosophical Quarterly* 87: 685–710. [CrossRef]

Central Intelligence Agency. 2024. *The World Factbook 2024*. Available online: https://www.cia.gov/the-world-factbook/countries/world/#people-and-society (accessed on 31 July 2024).

Finley, John. 2015. The Metaphysics of Gender: A Thomistic Approach. *The Thomist* 79: 585–614. [CrossRef]
Gershoni, M., and S. Pietrokovski. 2017. The Landscape of Sex-differential Transcriptome and its Consequent Selection in Human Adults. *BMC Biology* 15: 7. [CrossRef] [PubMed]
Hartel, Joseph. 1996. The Integral Feminism of Thomas Aquinas. *Gregorianum* 77: 527–47.
Johnston, Eric. 2004. The Role of Aristotelian Biology in Thomas Aquinas's Theology of Marriage. Ph.D. dissertations, Catholic University of America, Washington, DC, USA.
Johnston, Eric. 2013. The Biology of Woman in Thomas Aquinas. *The Thomist* 77: 577–616. [CrossRef]
Newton, William. 2020. Why Aquinas's Metaphysics of Gender is Fundamentally Correct: A Response to John Finley. *The Linacre Quarterly* 87: 198–205. [CrossRef] [PubMed]
Nolan, Michael. 2000. The Aristotelian Background to Aquinas's Denial that 'Woman is a Defective Male'. *The Thomist* 64: 21–69. [CrossRef]
Rahman, Md Saidur, and Myung-Geol Pang. 2020. New Biological Insights on X and Y Chromosome-Bearing Spermatozoa. *Frontiers in Cell and Developmental Biology* 7: 388. [CrossRef] [PubMed]
Sodergren, Andrew. 2022. The Psychology of the Sexual Difference. In *Sexual Identity: The Harmony of Philosophy, Science, and Revelation*. Edited by John Finley. Steubenville: Emmaus Road Press, pp. 99–178.

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