Studies in History and Philosophy of Biological and Biomedical Sciences 44 (2013) 419–432

Contents lists available at SciVerse ScienceDirect

Studies in History and Philosophy of Biological and Biomedical Sciences

journal homepage: www.elsevier.com/locate/shpsc

A dark business, full of shadows: Analogy and theology in William Harvey ☆

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ARTICLE INFO

Article history:
Received 30 October 2011
Received in revised form 9 May 2013
Available online 28 June 2013

Keywords:
Analogy
Early modern natural philosophy
Explanation
Generation
Teleology
William Harvey

ABSTRACT

In a short work called De conceptione appended to the end of his Exercitationes de generatione animalium (1651), William Harvey developed a rather strange analogy. To explain how such marvelous productions as living beings were generated from the rather inauspicious ingredients of animal reproduction, Harvey argued that conception in the womb was like conception in the brain. It was mostly rejected at the time; it now seems a ludicrous theory based upon homonymy. However, this analogy offers insight into the structure and function of analogies in early modern natural philosophy. In this essay I hope to not only describe the complex nature of Harvey's analogy, but also offer a novel interpretation of his use of analogical reasoning, substantially revising the account offered by Guido Giglioni (1993). I discuss two points of conceptual change and negotiation in connection with Harvey's analogy, understanding it as both a confrontation between the border of the natural and the supernatural, as well as a moment in the history of psychology. My interpretation touches upon a number of important aspects, including why the analogy was rejected, how Harvey systematically deployed analogies according to his notions of natural philosophical method, how the analogy fits into contemporary discussions of analogies in science, and finally, how the analogy must be seen in the context of changing Renaissance notions of the science of the soul, ultimately confronting the problem of how to understand final causality in Aristotelian science. In connection with the last, I conclude the essay by turning to how Harvey embeds the analogy within a natural theological cosmology.

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When citing this paper, please use the full journal title *Studies in History and Philosophy of Biological and Biomedical Sciences*

In a short work called *De conceptione* appended to the end of his *Exercitationes de generatione animalium* (1651), William Harvey developed a rather strange analogy. To explain how such marvelous productions as living beings were generated from the rather inauspicious ingredients of animal reproduction, Harvey argued that *conception* in the womb was like *conception* in the brain. It was mostly rejected at the time; it now seems a ludicrous theory based upon, at best, homonymy.

Harvey's explanatory resources were not up to the task of accounting for the complex yet orderly phenomenon of generation, even by his own standards. But his response, the analogy of womb as brain, is a fascinating attempt at explaining generation, and offers insights into how analogical reasoning worked in early modern natural philosophy. We might describe this analogy as psychological, but we must be careful in understanding what this means. In early modern Europe to speak of *psychologia* was to speak of the soul, all three faculties of the living body, rational, yes, but also the vegetative and sensitive souls. Indeed, I shall argue that Harvey's analogy must be seen in light of Renaissance debates about the science of soul and its proper method.[1] Understood in this context, Harvey's analogy allowed for a possible unification of the vegetative and rational souls, which operate alike in making their respective products. Both operations happen according to design, their products arranged by foresight and wisdom; *teleology* is of the utmost importance. But here the analogy comes to the limits of naturalistic explanation, for generation happens only *as if* it were

☆ I want to thank Peter Machamer, Charles Wolfe, Tawrin Baker, and an anonymous referee for their comments.
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[1] For some relevant discussions of changing conceptions of the soul, see Wolfe & Van Esveld (2013) and Henry (1989). For a more complete discussion, see Vidal (2006).

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http://dx.doi.org/10.1016/j.shpsc.2013.05.006

by foresight; the actual entities involved are not actually so competent. The apparent teleology of generation presented Harvey with an explanatory conundrum: how could generation happen in a rational way and yet not be rational? How could it be wisely designed but not wise?

In discussing the structure and aim of Harvey's analogy, I explore two points of conceptual change and negotiation important for our understanding of natural philosophy in this period. The first understands the analogy as a moment in the history of psychology, focusing on how explaining generation depended upon making sense of a process that was seemingly idea-driven. In Harvey's Renaissance intellectual context, this meant making sense of final causality, something bound up with his Renaissance conceptions of the soul. In fact, not just the meaning of *soul* but of *nature* itself is at stake, and here I expand upon the work of Guido Giglioni, whose (1993) "*Conceptus uteri/Conceptus cerebri*, note sull'analogia del conceptimento nella teoria della generazione di William Harvey" remains one of the few works dealing with this analogy. Giglioni notes Harvey's use of the concept of soul, but he dismisses an important element: the relation of soul to nature and God.[2]

Here then is the second point of conceptual change, where Harvey's analogy comes up against the boundary between the *natural* and the *supernatural*. My goal is to reconstruct Harvey's philosophical struggle to understand generation, understood in light of some of the history of attempts by natural philosophers to accommodate the seemingly *purposive* nature of living things. In Harvey's context, such purpose was often understood as divinely designed, and Harvey's account is embedded in a natural theological cosmology.[3] Harvey attempted to explain generation through natural, and somehow also psychological, causes—but to explain how those causes could be psychological-yet-not, he turned to the supernatural design of natural things themselves.

I proceed as follows. I first provide some context for the analogy (Section 1), before moving on to introduce the analogy itself (Section 2). I then articulate my novel interpretation (Section 3). There I discuss why it was rejected, how Harvey systematically deployed analogies, how the analogy fits into contemporary discussions of analogies in science, and how the analogy must be seen in the context of late Renaissance humanism and the science of soul. In connection with the last, I discuss how we can complete our analysis by shifting from analogy to (natural) theology (Section 4).

1. Background

It is clear from *De generatione* that Harvey turns to analogical explanation because no other explanation based upon his observations was forthcoming: it was a last resort. It is less clear that this move was forced upon him by some of those very observations. Two were most pressing: first, Harvey could find no matter from the male in the womb prior to conception; and second, he observed that development happens part by part, over time.[4]

The first major problem for Harvey's explanation of generation concerns the causal efficacy of the male's contribution: though Harvey knew the male provided semen, he never saw any trace of it in the womb after coition.[5] All he knew was that, once transmitted to the female, the male's seed—somehow—caused the egg[6] to become fruitful and begin the process of development, all *without* direct contact. Its action, he concluded, must be immaterial.[7] He writes:

> From the male proceeds only the procreative or plastic power [*vis procreativa, sive plastica*] that renders the egg fertile but constitutes no part of that egg. For the geniture[8] which is emitted by the male . . . in no wise enters the womb[9] (in which the egg is perfected), nor indeed . . . can it by any means penetrate into such places, much less reach the ovary near the middle of the body . . .[10]

So the male's semen imparts what Harvey calls a plastic power (*plastica vis*) that acts upon the female's womb and, from there, upon the unfertilized egg, but never upon the egg itself.

This lack of material presented a deep epistemological and ontological problem for *every* theory of generation available: all philosophers argued that there must be *some* material transmission of the fertilizing power of semen. In agreement with both Aristotelians and even most mechanical philosophers, Harvey refused to countenance action at a distance, and thus he was at a loss as to how the male's sperm fertilizes the egg. It must act immaterially, transmitted through the medium of the female's body, somehow rendering her whole uterus fertile and able to transmit its fertility to the egg.[11] Harvey writes: ". . . it will at the same time be apparent that everything that has been handed down to us from all antiquity concerning the generation of animals is erroneous, and that the foetus is made neither from the seed of the male nor of the female, nor from a mixture of both of them, nor is constituted out of menstrual blood . . . ."[12] The analogy, as we shall see, helps explain this mysterious action of the sperm.

This is a confusing point, and it is important to avoid a common misunderstanding that Harvey turned to analogy because he had shown that there was no *material* cause of generation. Elizabeth Spiller asserts that, ". . . Harvey introduces a new analogy to explain how reproduction can occur with only an efficient but not a material cause."[13] A similar mistake seems to underlie Eve Keller's analysis: "Harvey's determination that the semen has no material contact with the egg surely threatens the nature of paternity, since without physical continuity between father and fetus the role of the father in generating the fetus becomes ambiguous."[14] Keller's

[2] Giglioni (1993, p. 11). I have been assisted with the Italian by Marina Baldissera Pacchetti. All other translations are my own (unless noted), though I have of course benefited from past translations.

[3] For an excellent recent discussion of natural theology see Peterfreund (2012).

[4] I note that one might frame Harvey's observations here in terms of Kuhnian anomalies, and, indeed, this might be a profitable mode of analysis. However, as my focus is here upon analogies, and not on the status of Kuhn's account of science, I set aside these issues.

[5] See Harvey (1651, Ex. 6).

[6] This is in the case of chickens, of course. The case of non-egg laying animals was more mysterious since the mammalian egg would not be discovered until von Baer. Harvey does introduce his own concept of an egg as a stage found in all animal generation, but I have not here space to fully describe it.

[7] Of course, because he worked without a microscope, Harvey's observations here led him astray, as Leeuwenhoek and others would show towards the end of the seventeenth century.

[8] Harvey uses the term geniture since, strictly speaking, semen is not a true seed, a term Harvey reserves for his new concept of the egg and for plants.

[9] One must distinguish between the vulva and the womb, the latter of which is where the egg is located. Harvey's research convinced him that the male's semen could not pass from the vulva to the womb. See Harvey (1651, Exs. 5–6). I use 'womb' and 'uterus' interchangeably.

[10] Harvey (1651, Ex. 26, p. 80). See also Harvey (1651, Ex. 27, p. 82ff) and Hirai (2007, p. 379).

[11] Here Harvey also uses another analogy, between the semen and contagion. This analogy is interesting in itself, as is the relation between it and the one under consideration in this paper, but I have not room here to discuss these issues.

[12] Harvey (1651, Ex. 40, p. 109).

[13] Spiller (2004, p. 98)

[14] Keller (2007, p. 105).

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