

# Review of: "Femmes finales: natural selection, physiology, and the return of the repressed"

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The article addresses one of the hottest topics in the life sciences: the use of teleological language to describe and explain the genesis and structure of living beings. As is well known, teleology is still a source of embarrassment for the natural sciences and in particular for biology that seems unable to describe and explain the genesis and structure of living beings without it. How is it possible for something not yet existing (*telos*) to determine the occurrence of what is temporally prior to it? How can the future cause the present and the past? The author reconstructs the British debate at the turn of the 19th and 20th centuries between physiology and the emerging theory of evolution, identifying a decisive shift between two recurring metaphors, in which teleology is seen through a female figure: in this transition, teleology from a "barren virgin" (Bacon, mechanism) becomes a compromising "mistress" of which, however, the life scientist cannot do without, not even modern genetic biology and the theory of evolution that presents itself as its articulation. I find the genealogy of the latter figure proposed by the author, which traces it back to E. T. Brücke, to be absolutely original and convincing.

The author rightly identifies the heart of the problem in the plurivocity of meanings and uses that have been attributed to teleology throughout the history of the life sciences:

"Final cause and teleology are not univocal terms. A final cause (end) can be a thing's usefulness (utility) or the destination (goal) toward which it moved. The two are, of course, related: the use of a hammer in hitting a nail has the driven-in nail as its goal. Another distinction is between a Platonic teleology in which final causes are the intentions of a divine mind as opposed to an Aristotelian teleology in which final causes are the usefulness of an attribute to its possessor without implications of rational intent (Lennox and Kampourakis 2013). All of these senses are muddled together in nineteenth-century arguments about the role of final causes in biology".

In my opinion, a closer study of the history of the meanings and uses of teleology might make it possible to dispel at least some controversies, without solving the biggest problem: the metaphysical roots of teleology. In my opinion, what is lacking is a rigorous determination of the meaning of Aristotelian teleology. A lack that is difficult to fill given the many interpretations of this theme that have been produced within the specialized studies devoted to this topic. However, it seems to me that the distinction between Platonic and Aristotelian teleology appears very simplistic: While it is true that in *The Parts of Animals* Aristotle uses the teleological description from a functionalist perspective, one cannot evade the fact that it is in *Physics B* that one finds the definition of *telos* as the cause of what "is by nature," along with the motor cause, the material cause, and the formal cause. Thus, one cannot evade the ontological function of teleology (and ultimately metaphysical because it is oriented, set in motion by love for divine perfection). For Aristotle, form is the end that triggers

the process of the constitution of what is by nature, in close analogy with human technical behavior (an analogy that will also structure Kantian teleology, though only in a heuristic key), as such the end-the form-must be present as the cause that triggers and guides the process of its realization (The author of the article refers to it in a later passage, but without drawing the consequences that seem to me necessary, at least with respect to the distinction argued above: "Darwin showed no discomfort in using teleological language to describe the behavior and structure of living things. He saw natural selection as an undirected process, without goal or intention, that gave rise to beings with purposes. His teleology was akin to Aristotle's conception of organisms containing their end within themselves (entelecheia) although Darwin is unlikely to have been directly influenced by Aristotle (Gotthelf 1999)."). From this point of view, it seems to me that the use of finalistic reasoning for the description of the functions of an organ or behavior (and not for the determination of their ontological cause, their genesis) is fully legitimate and need not fear compromise with metaphysical teleology. As the author rightly shows, the problem remains untouched by the notion of "teleonomy," coined by Pittendrigh and used by Mayr and Monod, and more generally by genetic biology, which has thought to attribute to genes the function of a program such that it contains all the instructions necessary for the genesis of a living being thus presupposing its final form virtually present already at the beginning of the process for which it would be solely responsible, as is well known this is a privilege radically challenged today.

I cannot dwell any longer on a topic that would require major in-depth study, and which still constitutes a difficult challenge not only for the life sciences but for philosophy itself, I hope to have contributed at least a little to the debate that this article certainly has the merit of reintroducing and enriching in both historical and conceptual terms. I apologize for my approximate English.