Evolutionary Biology and the Axiomatic Method Revisited

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Abstract

In evolutionary biology there has never been reached a consensus regarding the manner of presenting a theory, be it the theory of natural selection or the genetics of populations. According to the skeptical view, biological theories of evolution cannot even be presented as proper scientific theories because of their lack of uncontroversial laws. This skepticism, however, is not shared by the logicians of science, who claim that biological explanations can be molded into proper theories by means of logical reconstruction, *i.e.* by using the methods of formal logic. The logical properties of biological language might tell the important difference between empirical observations and theoretical laws in a way that would not require anything else but an adequate understanding of the biological language itself. This approach is a traditional formal approach, and it draws from the works of Alfred Tarski's and Rudolf Carnap's on the axiomatization of natural science. In the following, I will address three developments of the axiomatic method in evolutionary biology: the hypothetical-deductive, the semantic and, perhaps the most recent one, the natural deduction method. I will point out that the key concepts in figuring out the logical structure of a biological theory concern truth and deductive consequence. Then I will argue that a minimalistic concept of truth and a syntactic understanding of deduction might be the best option in formalizing a biological theory of evolution. Eventually, this would do half justice to the skeptical view that there are no fully uncontroversial laws in evolutionary biology.

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