Evolutionary explanations
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Evolutionary explanations In the philosophy of biology, two opposing interpretations of Darwin’s ‘one long argument’ are defended. The first interpretation, advocated for example by Michael Ghiselin or Michael Ruse, understands the argument in terms of a Hempelian account of historical explanation. The second interpretation, advocated by Stephen J Gould, emphasizes the historical dimension of the argument and regards it as implying a narrative historical methodology. According to the Hempelian account, a scientific explanation is only given if the event which is to be explained can be subsumed under a law-like universal hypothesis. According to Ghiselin and Ruse, the argument of the ‘Origin of species’ is to be reconstructed in that way. Gould, by contrast, stresses that evolutionary events are “particulars of history, rather than necessary expressions of law” (Gould, 2002, p.1333). With this conflict in the background, two different, more or less tacitly presupposed methodologies of historical explanations – the Hempelian account and Arthur C. Danto’s narrative account of historical explanation – are presented in general and then transferred to an explanation of an evolutionary event: the endosymbiosis. According to the theory of endosymbiosis, recent eukaryotic cells evolved because of symbiosis events that led to the development of the organelles (mitochondria and plastids) of eukaryotic cells. More specifically, I argue that the Hempelian account – apart from the fact that it faces general difficulties such as the problems of overdetermination, of full description and of prediction – falls short of capturing a specific aspect of natural history: the particularity of evolutionary events. By contrast, a narrative account which draws on Arthur C. Danto’s explanation model avoids the problems of the covering law model and does justice to this aspect of natural history. Consequently, a historical explanation of evolutionary events is defended, which is in tune with Danto’s historical explanation.

Evolution by Natural selection did not take teleology and Evolution to be so disjointed from one another as later architects of the Synthetic Theory pictured them to be. Secondly, I shall raise a philosophical question concerning the role of teleology in current interpretations of Evolution and Natural Selection. I shall contend that if any sort of teleology is excluded from Biology the concept of Selection would cease to make sense in explaining evolutionary processes. Much debate has recently arisen in Philosophy of Biology over the status of Selection as a natural force with various philosophers and biologists alike arguing that Natural Selection is not to be interpreted as a real cause directing the evolutionary change of populations. I contend that in absence of teleology they are actually right. I will suggest that Natural Selection stands or falls with teleology. In turn, I defend, if there is a place for teleology in our understanding of Evolution by means of considering the ethological operations of animal organisms in the wild as the real agents guiding the process of organic change, the concept of Selection would be epistemologically safe. Finally I will discuss specific cases of pairwise coevolution I which different individuals actively select one another thus guiding evolution by way of their behavior.

Explanatory unification and statistical interpretations of natural selection and drift
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The debate between the dynamic and the statistical interpretations of natural selection is centered on the question: Are explanations that employ the concepts of natural selection and drift reducible to causal explanations? The proponents of the statistical interpretation answer negatively and also claim that selection/drift arguments in evolutionary biology are explanatory but remain unclear on where does the explanatory power come from. The proponents of the dynamical interpretation answer positively and try to reduce selection/drift arguments to some form of causal explanations.

I'm defending a statistal position. My claim against causal analyses is that they are bound to use current accounts of causality in a very lose manner or have to violate them in some of their core conditions. In order to defend my claim I'm focusing on explanatory power. I'm proposing to convey selection/drift explanations within the unificationist model of scientific explanations. Thus selection/drift explanations' explanatory power does not have to come from “getting the causal story right” but instead is a result of succesful theoretic unification. In turn the causal notion that is admissible within selection/drift explanatory arguments is exactly the type of causation that proponents of the unificationist model believe will appear as a by product of succesful theoretic unification. Thus the inconsistency between the notion of “vernacular fitness” as causal process and “predictive fitness” as a statistical artefact disappear if we note that both concepts do not violate the general explanatory pattern of Darwinian evolution and are a result of consistent additions to the general Darwinian explanatory pattern.

Finally I'm going to give more substance to my discussion by an interpretation of the recent results of Lenski's long-term experiment with E. coli.
Functions at the interface of biology and technology: synthetic biology, cultivated biology and coevolution
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Synthetic biology is the designing and building of new biological parts and processes. This in principle allows for the production of completely human-intended, purposefully designed biological organisms. It can be tempting to think of such an organism as organic or biological machines. This places synthetic biology at the interface of the biological and the engineering world – and makes it an interesting perspective from which to reconsider existing philosophical analyses of function.

It is uncontroversial that functional analyses are appropriate in both engineered systems and organisms, but they are analysed differently in each domain; biological functions are often explicitly analysed in terms of natural selected effects, whereas engineering functions often appear the designer’s intent or human use. In this context, synthetic biological organisms appear to present a problem: they are not the product of natural selection, so how can they possess biological functions?

In this paper I analyse function judgments in synthetic biological organisms and compare them to cultivated and co-evolved organisms. I argue, first, that functional analysis in artifacts and organisms is far more continuous than one might presume; we can and should bridge the gap that has opened up between biological and technological function. Second, I shall argue that the aetiological analysis of biological function need to be interpreted more flexible than is usually proposed; in a way that encompasses selective and reproductive processes other than natural selection. Moreover I shall argue that agriculture and domesticated animals provide us with reasons for doing this independent from synthetic biology.