

The wide scope of philosophy of biology

Michael Ruse (ed.): The Oxford handbook of philosophy of biology. Oxford: Oxford University Press, 2008, xiv+642pp, \$150 HB, \$49.95 PB

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The Oxford Handbook of Philosophy of Biology is a collection of 25 substantial essays which are “written especially to give the reader an introduction to one of the most vibrant areas of scholarship today, and at the same time to move the subject forward dramatically”. This *Handbook* largely succeeds at both of these tasks.

The *Handbook* is unlike a number of other companions or encyclopedia collections as its authors write opinionated pieces on topics which do not always attempt to be comprehensive. It begins with a helpful introduction by Ruse followed by a history of the philosophy of biology written by the late David Hull. It ends with a piece on the rhetoric of Stephen Jay Gould which I found quite interesting, even though perhaps not “philosophical”. In between, the essays showcase the large variety of topics and approaches that fall under the heading “philosophy of biology”.

The philosophy of biology is now a discipline in its own right and is a growth industry. The rising prevalence of the life sciences combined with the trend toward specialization in philosophy indicates that its phenomenal growth is likely to continue. The field is now large enough that it is undergoing its own divisions and trends of increased specialization as well. Like any field, much of the work resists classification, but there are rough categories of the kind of work that qualifies as philosophy of biology. There is a great deal of work that continues to be done dealing with problems where conceptual issues mix with empirical ones within the science itself. Sometimes, but not always, authors utilize these biological problems to address more general issues in the philosophy of science. In this *Handbook*, some central problems in the field are ignored—other than a brief historical section on group selection in Ruse’s chapter on “Darwinian Evolutionary Theory”, the levels of selection problem is not mentioned. Likewise, there is no direct discussion of the

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concept of fitness. However, a number of traditional topics are tackled by authors who advance their own conclusions in long-standing debates. This includes Ariew on Population Thinking, Orzack on Testing and Adaptationism, Walsh on Teleology, Richards on Species and Taxonomy, Beatty on Chance and Contingency, and Waters on Reductionism and Genetics. Readers interested in these particular debates will most definitely want to pick up this *Handbook* to see these new contributions.

Examining the science is just the first step in inquiry, and there are a number of ways to move forward from there. One such way is to use the examples from the science as test cases for more general philosophical views. Many of the entries are deserving of comments on this score, but size constraints dictate that I must focus on only a few, starting with Zachary Ernst's "Philosophical Issues Arising From Genomics". Ernst looks at the sequencing and annotation of genomes first, to examine the traditional conceptual question of what a gene is and second, to look at theories of explanation. While philosophers of biology have sometimes been happy to say that there are no genes, the phenomenal success of genomics which purports to be discovering genes calls this view into serious doubt. Ernst relies on a causal theory of reference to undermine several arguments for the non-existence of genes based on our historical conceptions of them, but does not put forward a positive proposal of his own. In the case of explanation, Ernst points out that the dominant views of scientific explanation, such as subsumption under laws, causal-mechanical accounts and unification accounts, do not fare well at all with respect to genomics. While it could be that genomics simply represents a novel explanatory strategy and we need to be pluralists about explanation, Ernst points out that Railton's ideal explanatory text theory fits well with the idea that genomics is about information and this concept is tightly linked to explanation. Finally, Ernst quite correctly argues that the philosophy of science has not yet come to grips with the fact that computer science has fundamentally transformed the practice and epistemology of science. For example, it may well be, as Ernst says, that the importance of simplicity, unification, and the like for scientific explanation may merely be based on our epistemic limitations which are now (or will be soon) rendered obsolete by technology.

Ernst is well aware that he has ignored important ethical issues raised by genomics which are taken up by Lisa Gannett's "Genes and Society". One traditional model of the relationship between science and ethics is represented by the NIH/DOE Joint Working Group on the Ethical, Legal and Social Implications of Human Genome Research (ELSI). Here, the model is that we do the science first and then examine the consequences of these new empirical facts and new salient possibilities. Gannett argues that the thought that this is the only place ethics enters the picture represents a fundamentally flawed understanding of the possibility of a neutral, objective science which gains empirical knowledge independent of any norms or values. She makes her case in part by looking at historical examples such as the various guises of eugenics and argues that rather than simply being based on bad science or bad ethics, eugenics has changed right along with the development of genetics and can reasonably be considered part of the science. Gannett concludes that both scientific and ethical conclusions are mediated by the ways in which we

think about the relationship between science and society, suggesting that debates in ethics, science, and about the political organization of society are fundamentally intertwined. Carla Fehr's "Feminist Philosophy of Biology" comes to a similar conclusion by examining biological theories of sex, women, and gender, where gender biases have often led to us just getting the science wrong. In addition to examining particular biological claims, Fehr also shows how a feminist perspective can help when engaging in general debates in the philosophy of science about topics such as reductionism and mechanisms.

There is now a minor trend to look to empirical science to inform traditional philosophical debates outside of philosophy of science, for example, in studying free will or action theory. A broad understanding of the philosophy of biology will capture some of this work. In this vein, Karen Neander examines various attempts to use natural selection to provide a theory of functions which could ground a view about mental representations, thus solving the "problem of intentionality" and ultimately providing a theory of mental content. Neander concludes that no such teleosemantic theories that have so far been proposed are without problems and there are serious challenges to the entire project, but that some sort of teleological theory is required.

A number of authors have written about possible connections between natural selection and ethics or with normativity more generally. In "Evolution of Moral Norms", William Harms and Brian Skyrms do not engage with any of the literature in ethics, but instead look to evolutionary game theory as providing the beginnings of an account of the evolution of moral language and judgment which they hope might ultimately yield a theory of normativity.

If there are any trends within the whole of the philosophy of biology, one is that an increasing amount of contemporary philosophy of biology is motivated by paying very careful attention to the actual science—and not just to biological theories, but to the practice of working biologists. Taken as a whole, this is a step in the right direction. There is, however, a worry that by getting caught up in details, philosophers end up simply reporting on the current state of play on some biological issue or field. This may exemplify a certain strong naturalistic view which treats the job of philosophers as simply understanding and clarifying what scientists are up to or even perhaps contributing directly to the science. But this view packs weighty normative assumptions of its own that are seldom explicitly acknowledged. Also, although it is important not to underestimate the value of actually understanding the science, we can do good philosophical work while doing this. I will not enter into a debate here about what constitutes science, versus philosophy of science, or good versus bad ways of doing them, but I will say that in my estimation, none of the papers in the *Handbook* fall prey to this particular trap.

Jim Griesemer's "Origin of Life Studies" is an exemplar of careful scrutiny of an understudied field mined for philosophical lessons. Griesemer correctly points out the specialized nature of the discipline which perhaps paradoxically requires expertise in a great many different scientific fields. After all, much of the work in this field is done by astrobiologists who utilize their knowledge of geology to look for just the right sites to examine (whether on earth or in space) in order to look for the results of distinct chemical reactions to justify their claims about the history and

the very nature of life. Griesemer argues that a number of biological and philosophical conclusions need to be reexamined in light of origins research which challenges all possible theories about what life is and how evolution works by presenting boundary problems where our ordinary concepts like genes, cells, and organisms do not seem to apply.

In addition to the origin of life, there are careful examinations of the scientific work on Evolvability, Macroevolution, Evo-Devo, Animal Behavior, Neuroscience, and Ecology and the Environment. This *Handbook* is conspicuous in the number of papers which move in the direction of connections with the other human sciences. In addition to the numerous such papers mentioned above, to round out the volume, there are entries on “Sociobiology, Evolutionary Psychology, and Cultural Evolution”, on Race in Medicine, on Agriculture and Biotechnology, and on Biology and Religion.

I can happily recommend this *Handbook* for anyone with a professional interest in the philosophy of biology as well as a number of related fields. This is especially true given the very reasonable price for the paperback edition, making it worth picking up a personal copy. It is rare to find such a large number of worthwhile papers in a single volume. And while the papers each can stand alone for a quick browsing, seeing the full collection with all its variety is an effective antidote to the view that philosophy of biology produces narrow work or has little philosophical content.