Michael Ruse, ed.
The Oxford Handbook of Philosophy of Biology.
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Writing in 1914, the biologist James Johnstone felt it necessary to provide a justification for the title of his book *Philosophy of Biology*—apparently the first, and certainly not the last, book published under that title. Arguing that the new physics provoked a need to reevaluate the philosophy of physics, Johnstone meekly asked, 'Should not Biology also revise its understanding of its descriptions?...This, then, is all we mean by the philosophy of Biology—the attempt to understand the descriptions of the science in the light of its later investigations.' Almost a century later, the need for Johnstone's apologia seems almost as quaint as the views of Hans Driesch and Henri Bergson that his book was concerned to expound. The philosophy of biology is thriving as never before, and the hefty *Oxford Handbook of Philosophy of Biology*—edited by the philosopher/historian Michael Ruse, who is as responsible as anyone for the field's current flourishing—is ample testament to the continuing vitality of what Ruse rightly describes in his introduction as 'an incredibly exciting area of research.'

After a brief introduction by Ruse inviting the reader to '[r]ead, learn, disagree, get excited, get involved, have fun,' there are two introductory essays that set the stage for the rest of the volume. David L. Hull reviews the history of the philosophy of biology, concentrating on Aristotle, thinkers in nineteenth-century Britain such as John Herschel, William Whewell, Charles Lyell, and John Stuart Mill, and the influence of Darwin on philosophers in the late nineteenth and early twentieth centuries, before turning to the rise of the philosophy of biology as a separate discipline, starting in the last third of the twentieth century. Surprisingly, there is no mention here of Kant, whose views on biology have increasingly been the subject of scholarly attention over the last twenty years, and little mention of non-Anglophone work in general. Ruse contributes a discussion of the structure and mechanism—viz., natural selection—of Darwinian theory, reflecting his view that it is not only of great philosophical interest but also central to the philosophy of biology.

Indeed, over a third of the remaining articles focus on philosophical issues in evolution. There are familiar issues covered here, although not always in familiar ways. Steven Hecht Orzack contributes a difficult but worthwhile essay on testing adaptive hypotheses. Denis Walsh discusses the status of teleology in biology, reviewing a range of positions before advancing his own: that teleology is indispensable in explaining adaptive evolution. Richard A. Richards provides a clear and useful discussion of the philosophical issues surrounding taxonomy and systematics. And André Ariew interrogates the idea of population thinking, arguing for a methodological understanding of the idea rather than Ernst Mayr's metaphysical understanding. Ariew's essay is not only historically and philosophically illuminating but also a good example of a productive examination of what might seem to be a simple and uncontroversial idea; it

might be rewarding to see the same attention paid to, for example, the idea of tree thinking, which stands to phylogenetic systematics as population thinking stands to population genetics.

There are also not so familiar evolutionary issues covered here, including elements of what Massimo Pigliucci and Gerd B. Müller have recently dubbed the Extended Synthesis. Roger Sansom discusses evolvability—'the propensity to mutate adaptively in an environment'—and argues that the concept lurks, if often undetected, at the heart of evolutionary theory. In a piece with the jokey subtitle 'Darwin, Simpson, *The Simpsons*, and Gould', John Beatty considers chance variation and evolutionary contingency, concluding that it is difficult to assess the actual importance of chance in the history of life. Jason Scott Robert provides a whirlwind tour of evolutionary developmental biology, suggesting that it is 'a field ripe for the philosophical analysis of concepts, methods, theories, and material culture,' although the details are somewhat left to the imagination. David Sepkoski's admirable essay on macroevolution addresses both familiar (such as the pace of evolution and the ontological status of evolutionary units) and not so familiar issues (such as whether microevolutionary mechanisms explain macroevolutionary patterns).

The philosophical issues in areas of biology beyond evolution are not neglected. C. Kenneth Waters discusses the impact of the discovery of the structure of DNA, arguing, provocatively, that its importance was not theoretical but practical, prompting 'a retooling of the investigative strategies used in genetics.' James Griesemer addresses studies on the origins of life, sketching the state of the science and, as with Robert's tour of evo-devo, offering interesting suggestions about where philosophers may be able to contribute. Stephen J. Crowley and Colin Allen consider animal behavior—comparative psychology, ethology, and cognitive ethology—and offer a useful historical overview of the 'spiraling' development of the science. Ian Gold and Adina L. Roskies pose the question, 'Is there a philosophy of neuroscience?' and they answer, 'Yes and no'—emphasizing that the topic isn't limited to neurophilosophy à la Patricia Churchland. And Matteo Mameli discusses the methodological and conceptual issues involved in sociobiology, evolutionary psychology, and cultural evolution.

Applied biology receives a modicum of attention, too. Lisa Gannett contributes a thoughtful discussion on genes and society, focusing on the implications of the Human Genome Project; she recommends John Dewey's pragmatism as a way to think about the relations of science and society. Anya Plutynski discusses ecology and the environment through a case study of the history of the idea of the balance of nature, ending with a brief discussion of environmental decision making. David Castle makes a plea for the philosophical interest of agriculture and agricultural biotechnology. While Gannett's essay and Robin O. Andreasen's essay (mentioned below) touch on medical issues, it is perhaps regrettable that there is no separate treatment of the philosophical issues of medicine, especially given the current spate of interest—provoked in part by works such as Randolph M. Nesse and George C. Williams's *Why We Get Sick* (1996)—in Darwinian medicine, which attempts to incorporate evolutionary principles in the theory and practice of contemporary medicine.

If biology can learn from philosophy, as the majority of the essays in *The Oxford Handbook* attempt to demonstrate, can philosophy learn from biology in turn? Zachary Ernst considers the extent to which genomics forces a reevaluation of traditional philosophical arguments; particularly interesting was his information-theoretic account of scientific explanation prompted by the use of computers in genomics. Karen Neander offers a clear and useful survey of teleological theories of mental content and their discontents. William Harms and Brian Skyrms all too briefly discuss the evolution of moral norms, arguing for 'the real possibility of a materialist theory of norms which avoids the pitfalls of relativism.' Surprising, perhaps, is the absence of any discussion of the relationship of political philosophy and biology, a subject recently under discussion across the political spectrum, from Larry Arnhart's *Darwinian Natural Right* (1998) to Peter Singer's *A Darwinian Left* (2000).

When it comes to the topics traditionally not welcome in polite conversation, *The Oxford Handbook* is not silent. Robin O. Andreasen considers the concept of race in medicine, concluding that although the issues are complex, 'there are good reasons to retain race as a research variable'. Nancey Murphy and Jeffrey P. Schloss address the implications of evolution, neurobiology, and (briefly) exobiology for religious belief, with a predictable if not exclusive emphasis on Christianity. Carla Fehr attempts to 'demonstrate that feminist and nonfeminist philosophy of biology are complementary endeavors and, further, that nonfeminist philosophy of biology is significantly advanced by attending to feminist work in this area.' And speaking of conversation, the volume ends with Ana Barahona and Vladimir Cachón's discussion of 'The Rhetorical Discussion of Stephen Jay Gould's Work,' a case study in the rhetoric of science focusing on the effective if sometimes florid rhetoric of the Harvard paleontologist.

The copy on the jacket flap suggest that the book 'will give the more experienced scholar much to think about and will also be of great value to the new student of the subject.' Perhaps, but different essays seem to be aimed at different audiences; where teachers might be happy assigning Ruse's or Richards's or Sepkoski's essays to a class of undergraduates, they won't want to do so for, say, Orzack's. It is likely that a selection of classic papers in the philosophy of biology, such as Ruse and Hull's *Philosophy of Biology* in the Oxford Readings in Philosophy series (1998), or a volume containing papers debating various issues in the field, such as Francisco J. Ayala and Robert Arp's *Contemporary Debates in the Philosophy of Biology* (2009), will serve the pedagogical purposes of the average instructor better. Among comparable volumes attempting to survey the landscape of the discipline, Hull and Ruse's *The Cambridge Companion to the Philosophy of Biology* (2007) is probably the chief rival: not ranging quite so widely as *The Oxford Handbook* but with a comparable (and overlapping) set of contributors, and at US$105.00 for the hardcover edition, somewhat better value for the money.

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