Book Review | Did Darwin Write the Origin Backwards? Philosophical Essays on Darwin’s Theory

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In his latest book, Eliot Sober draws on ideas and arguments he has developed over his career to give a novel take on Darwin’s thought in The Origin of Species by Means of Natural Selection. Sober approaches the project with his characteristic analytical clarity and precision, ably synthesizing philosophical, biological, and historical material. The work does due diligence to difficult ideas, presenting them in easily understandable fashion, without sacrificing any of the relevant nuance or detail inherent to the topics considered.

Sober’s book contains four more or less free standing chapters and a postscript. The eponymous first chapter focuses on some basic features of Darwin’s understanding of natural selection and common ancestry. According to Sober, the two concepts are logically distinct, but evidentially entangled. They are logically distinct in the sense that common ancestry does not logically entail that species evolved by natural selection, and natural selection does not logically entail that species are linked by common ancestry. They are evidentially entangled in the sense that common ancestry provides evidence for natural selection, though the converse does not hold. Natural selection does not necessarily provide evidence for common ancestry. So they are evidentially entangled in an asymmetrical way.

Sober clarifies the latter point by drawing attention to what he refers to as Darwin’s Principle. According to that principle, if a trait shared by two species is adaptive, it is less likely to be a consequence of common ancestry. Alternatively, if it is nonadaptive, it is more likely to be a consequence of common ancestry. With Darwin’s Principle in hand, Sober turns to the question whether The Origin is written backwards. Of course, the question is
not just one of style or rhetoric. For Sober, the answer depends on what sort of logical ordering one has in mind. As a matter of evidence for evolution, *The Origin* is, in fact, written backwards. As a matter of causes of evolution, *The Origin* is written forward.

Noting that Darwin could have ordered his exposition in *The Origin* differently is not all that important in its own right. Rather, its importance lies in its shedding some light on the central role thinking about common ancestry plays in evolutionary theory, which appears to be Sober’s underlying motivation for asking whether *The Origin* is written backwards. Still, there is an additional question that seems worth asking here. Should Darwin have ordered *The Origin* differently? Sober is silent on this question, and anyone who reads chapter one thinking Sober is defending an answer one way or another is mistaken. Nevertheless, it is safe to assume that he has an opinion on this matter. To avoid any misunderstandings then, it would have been helpful had Sober explicitly addressed that normative question.

Chapter two focuses on the controversial issue of group selection. Sober is motivated to correct what he takes to be a misconception on the part of contemporary biologists who treat the handful of appeals Darwin makes to group selection as an unfortunate but understandable confusion. Sober thinks such a view is mistaken, partly because he rejects negative assessments of group selection, partly because he thinks that Darwin’s reasoning in such cases was in fact quite subtle and deliberate. The negative assessments he considers are a series of arguments outlined by G.C. Williams in his famous book *Adaptation and Natural Selection* (Princeton University Press, 1966). Sober’s objections are interesting, but will not be rehearsed here. It is worth noting though that Sober’s discussion is still relevant given that Williams is so often cited by critics of group selection.

One example of Darwin’s subtle thinking on group selection that Sober addresses in some detail concerns the evolution of sterility among social insects. Sober points out that Darwin provides a rather ingenious solution to the puzzle by reframing the question as one about the adaptive benefits of a reproductive strategy that generates a mixed set of sterile and fertile offspring. That is, the evolved trait needing explanation is not sterility but a particular reproductive strategy. Apparently, Darwin was rather noncommittal about whether this sort of adaptation was the result of individual or group selection. Sober’s strategy here is interesting. Rather than saying why Darwin might have thought it was group level selection, Sober instead focuses on whether group level selection is a reasonable explanation. If Sober can show that group level selection is reasonable, then even if Darwin invoked group selection in this instance, it was not as many now believe an unfortunate blunder. A similar strategy underlies Sober’s treatment of Darwin’s views on human morality and the honeybee’s barbed stinger.
Chapter three provides a brief sketch of the history of sex ratio theory. Sober suggests sex ratio theory merits consideration since people are led to believe that one need apply only the smallest amount of effort imagining an adaptive explanation for any conceivable trait. Like the thick fur of polar bears, it is not hard to imagine a good adaptive explanation. Sex ratio theory is not intuitive in that way, so it serves as a useful corrective for people’s misunderstanding of the richness and complexity of biological explanations. The chapter begins with a discussion of the creationist motivations of early sex ratio theory before Darwin, drawing attention to the back and forth between Arbuthnot, Bernoulli, and DeMoivre. That discussion helps set the stage for Darwin’s own engagement with the issue and helps to explain why Darwin eventually excused himself from the debate, having conceded that he could not find an answer he felt sufficed for explaining variation in sex ratios. Sober then goes on to examine some later developments provided by Fisher and Hamilton. Where Fisher assumes random mating in an infinite population to show that parental expenditure correlates with sex ratio, Hamilton focused on situations where Fisher’s assumptions are not met, particularly in insect species, where female biased sex ratios are not uncommon. Both views Sober presents clearly and concisely. He then rounds off his historical sketch of sex ratio theory by discussing the role it might play as a test case in modern debates between advocates for evolution and advocates for creationism.

In chapter four, Sober takes the opportunity to offer some reflections on methodological naturalism, a popular hobbyhorse that tends to stir up passionate disagreement among philosophers. Sober defines methodological naturalism as the injunction that scientific theories, evidence, and arguments “should not make claims about the existence of a supernatural deity” (129). After a cursory investigation of Darwin’s own naturalism, Sober turns to a discussion of the relation between theism and evolutionary theory. He then moves on to consider whether science ought to appeal to supernatural entities, whether the supernatural is untappable, and finally whether violations of methodological naturalism are a science-stopper.

Unlike the previous chapters, it is hard to see what work chapter four is supposed to be doing. Sober works very hard to show that no modus ponens leads from Darwin to the death of God, and I for one accept his claim. What I do not understand is why a naturalist should care that such a deduction is not forthcoming. Darwin’s theory does just fine without invoking a deity. It also does just fine without invoking unicorns and leprechauns, but no one bothers showing that they are consistent with Darwinism. Arguing for the consistency thesis is a bit like arguing for the consistency of wearing a blindfold and planting a tree. Who would want to deny someone the right to do so? But then again, why should we not just look askance at blindfolded gardeners? Sober is saying, in a manner of speaking, that a person can consistently wear blindfolds and plant trees and consistently endorse theism and
Darwin’s theory. The sort of naturalism I endorse does not deny that, it just wants to know why someone would go through all the trouble of wearing a blindfold when it does not help the tree. That is, why go through all the trouble of invoking God when Darwin’s theory does just fine? In that light, Sober’s painstaking attempts to unravel the supposed inconsistencies between evolutionary theory and theism end up looking like so much labor lost and quite beside the point. But supposing this were not a problem for the chapter as a self-contained essay, it still remains to be seen what work it is doing in the context of the book as a whole.

I have similar misgivings about the postscript. The first section on parsimony and the test of adaptive hypotheses makes interesting claims that follow nicely from Sober’s discussion of Darwin’s Principle in the first chapter. But the second and third sections on the problem of units of selection and the possible objective status of probabilities in modern evolutionary theory do not seem to fit well with the rest of the work, though they do nominally coincide with chapters two and four, respectively. Both of these latter sections tend to focus on philosophical scruples about realism in the context of evolutionary theory. So it would have been helpful had Sober said something more about how these realist issues relate to the ideas and arguments he developed earlier in the book. For example, Sober distinguishes between realists and conventionalists about the units of selection. Realists think there is some fact of the matter about whether some trait has evolved by group, individual, or genic selection. Conventionalists think it might be useful to describe traits as evolving by group or individual selection, but the one true explanation is genic selection. Although Darwin did not know about genic selection, does Sober think that Darwin was a realist about group and individual selection? Did Darwin think there was some fact of the matter about whether some trait evolved by group or individual selection? Or was he a sort of pre-Mendelian conventionalist who thought group selection was useful, but the one true explanation was individual selection? Sober does not say, but it would have been helpful, given that the book is nominally about Darwin, if he had. That being said, anyone interested in these topics will find a wealth of interesting claims and arguments being made.

In sum, readers will find in Sober’s book a number of important contributions to the issues under consideration. Biologists and philosophers alike will find the book helpful for its conceptual clarifications, especially in chapters two and three. Historians will also be helped by many of Sober’s insights into Darwin’s careful reasoning regarding the relations between natural selection and common ancestry as outlined in the first chapter. Whatever my misgivings about chapter four, naturalism is an important topic, and Sober’s specific arguments deserve further consideration. Finally, the postscript like chapter four is a bit out of place, but readers, especially philosophers of biology, ought to find the discussion there of interest. All in all, the book is an important contribution to Darwin scholarship and to the philosophy of biology more generally. As I said at the
outset, Sober demonstrates his analytical prowess quite well in these pages, and readers have much to gain from engaging with his ideas and arguments.