

Biophilosophy

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How Biology Shapes Philosophy: New Foundations for Naturalism. Edited by David Livingstone Smith. Cambridge: Cambridge University Press, 2017, 364 pages, \$99.99 hardcover.

How Biology Shapes Philosophy is a collection of thirteen new essays by leading, naturalistically inclined philosophers who draw on biology to answer traditional philosophical questions about the nature of mind, rationality, semantics, ethics, race, gender, and human nature. In his introductory essay, the editor David Livingstone Smith contrasts *biophilosophy* — using biology to answer philosophical questions — with *philosophy of biology* — using philosophical tools to help answer or clarify theoretical biology. To do biophilosophy well, one must get the science right, but one must also do philosophy of biology, since this helps us better understand the science. All of the contributors to this volume have made important contributions to both of these endeavors. The focus here is on biophilosophy.

To what extent can biology solve or transform philosophical problems? Skeptics will wonder about how much work the biology is doing. Computer scientists have a programming principle — *GIGO* — garbage in, garbage out. In his *Philosophy of Physics* textbook, Larry Sklar (1992, p. 22) coins a principle for philosophers, the *MIMO Principle* — metaphysics in, metaphysics out. Sklar's point is that if one looks to physics to answer metaphysical questions about the nature of reality (*physico*-philosophy, as it were), one must be careful that metaphysical assumptions aren't being snuck into one's understanding of a physical theory. One cannot simply look to a physical theory and "read off" substantive

metaphysical truths about determinism, if it turns out both deterministic and indeterministic interpretations of a theory are possible.

Smith is alive to the analogous worry for biophilosophy, recognizing (p. 4) that we cannot simply consult biology and draw substantial philosophical conclusions. Just as the data underdetermine scientific theories, scientific theories themselves underdetermine philosophical theories.

Philosophy is a notoriously open ended discipline. Epistemologists sometimes draw on Neurath's boat metaphor to emphasize that we're always holding some beliefs fixed when we examine or replace others. If we're all busy sailors aboard Neurath's boat, how can we decide which parts of the boat to examine and repair while continuing to sail along? Smith's suggestion is that biophilosophy can play a distinctive role. Why not try taking biology — especially evolutionary biology — seriously, and see what light it can throw on the standard litany of philosophical questions?

Smith distinguishes between ontological and methodological naturalism. Ontological naturalism is the view that only natural stuff exists whereas methodological naturalism favors a posteriori claims, synthetic truths, and expresses skepticism about necessity, thought experiments, and conceptual analysis. Many biophilosophers are inspired by Quine's naturalism in which philosophical and scientific questions are on a continuum.

My view is that one should think of biophilosophy as a *research program*, similar to a research program in science. A research program is not a particular hypothesis or theory; rather, it is a general approach to formulating many different kinds of particular hypotheses or theories (Lakatos, 1978). Standard examples include behaviorism, computationalism, or evolutionary psychology. These *isms* aren't refuted or disconfirmed when one particular hypothesis or theory fails; instead, they are tested only in the long run, and are eventually viewed as progressive or degenerating. We see what fruits biophilosophy yields only after many particular efforts.

Although Smith follows other philosophers in distinguishing between ontological and methodological naturalism, we can make further distinctions *within* methodological naturalism. One can appeal to either the *content* of biology or to its *methods* to address philosophical problems. Further, biology — whether its content or methods — can have consequences either for the *content* of various philosophical theories or for philosophical *methodology*. Many of the contributions to this volume do biophilosophy in these multiple ways. But enough of the theory, how does biophilosophy work in practice?

Biophilosophy and Mind

In his contribution, "Darwin and the Overdue Demise of Essentialism," Daniel Dennett argues that Darwin's undermining of essentialism casts doubt

on philosophers' talk of natural kinds. Here he develops an argument that Mayr (1975), Hull (1978), Sober (1980) and Kitcher (1999) have made — albeit in distinct ways — about the so called “population thinking” revolution. According to Dennett's version, since species have fuzzy boundaries, philosophers should take inspiration from this and similarly be skeptical of trying to define discrete concepts in terms of precise necessary and sufficient conditions — or essences.

The issue of vagueness, however, is distinct from that of historicity. Sober (1980) argues that the real innovation of Darwinian thinking is that species are treated as historical entities, not that they have fuzzy boundaries. Essentialist accounts of natural kinds apply perfectly well to atomic elements — having one proton may be necessary and sufficient to be hydrogen as opposed to helium. Borderline cases may exist where it isn't clear whether a second proton is part of a given nucleus, and so it isn't clear whether something is hydrogen or helium. But the possibility of this vague boundary shouldn't count against an essentialist understanding of atomic elements: chemists still think intrinsic properties exist (the number of protons) that not only define an atomic element, but which are responsible for explaining many other properties. But the Darwinian revolution suggests that there are no underlying, intrinsic essences to species that explain their more superficial properties. Kitcher's “Essence and Perfection” (1999) details why appealing to having certain possible genotypes won't do the trick, for example.

And while Dennett notes that Darwin discovered that species have fuzzy boundaries and are historical entities rather than classes, he emphasizes the gradualism of Darwinism as most important in undermining talk of essences and in casting doubt on certain kinds of disjunction elimination arguments. Darwinism undermines dichotomous approaches to many concepts. We shouldn't assume that something is a believer or not, conscious or not, has understanding or not, has free will or not, and so on. All of these can have borderline or partial cases.

Dennett asks, somewhat rhetorically, “Are there interesting epistemic states that are almost knowledge” (p. 22)? One is tempted to answer “yes,” regardless of whether one is a naturalist or biophilosopher, however. Bayesian epistemologists often think that a high degree of belief (or even degree of belief with probability 1) is close to, but distinct from, knowledge. But it isn't clear why any of this requires the rejection of essentialism; one could think a high degree of belief is close to knowledge but still think there's an essence to knowledge.

Dennett notes that Strawson's skeptical argument about free will depends on a contentious assumption that “absolute responsibility” is the only kind relevant to free will that is worth having. This point is well taken, although it isn't clear what Darwinism or biophilosophy add to this argument. Many free will compatibilists reject Strawson's hard determinism on the basis of intuition pumps and thought experiments that motivate a certain understanding of “could have done otherwise.” So the skeptic about biophilosophy wonders, in the Sklarian spirit, how much argumentative work biophilosophy is doing.

A more convincing example of Dennett's brand of biophilosophy can be found in Peter Godfrey-Smith's contribution. In "Animal Evolution and the Origins of Experience," Godfrey-Smith provides a useful overview of the evolution of subjective experience, emphasizing both the early evolution and heterogeneity of various kinds of neural systems and cognitive complexity. It provides a suggestive case study of what Dennett encourages in his essay: a gradualist account of one aspect of minds — in this case subjective experience — that has been treated by many traditional philosophers as dichotomous in nature.

Alexander Rosenberg is also inspired by Dennett, but thinks he doesn't go far enough. Of all the contributors, Rosenberg is the one that thinks that biophilosophy has the most significant consequences for philosophical issues. He thinks Darwinian theory undermines most traditional answers to metaethical questions and casts doubt on the existence and nature of belief in philosophy of mind. His answer to his title question "Darwinism as Philosophy: Can the Universal Acid Be Contained?" is "probably not." At least, this is the research program biophilosophers should pursue. Rather than vindicating or "naturalizing" teleology or talk of reasons or beliefs, Rosenberg argues that a Darwinian approach undermines and eliminates the legitimacy of such talk.

Rosenberg recognizes that auxiliary assumptions are needed for his brand of biophilosophy. He mentions three: "science is our best guide to the nature of reality," "its methods are the most reliable means to secure knowledge," and that "philosophical theories need to be compatible with scientific ones" (p. 24). While these claims are, as Rosenberg notes, all naturalistically acceptable, naturalists sometimes disagree about what science tells us and hence what lessons we should draw. Rosenberg thinks naturalism and biophilosophy support reductionism and eliminativism about teleology, reasons, belief, and so on, whereas another biophilosopher who contributes to this volume — "How Philosophers Learn from Biology — Reductionist and Antireductionist 'Lessons'" — Richard Boyd, thinks that biophilosophy's lessons are that we should reject various kinds of reductionism or eliminativism, including the idea that teleology can be reduced to evolutionary considerations. Boyd would also likely accept Rosenberg's three naturalist principles, but comes to very different conclusions because he thinks reflection on biology supports anti-reductionism, rather than reductionism.

Boyd applies his views on multiple realizability and homeostatic property clusters to debates about philosophical methodology and philosophy of mind. He criticizes the "selected effects" accounts of functions as being inadequate for a naturalistic reduction of teleology in biology because it doesn't account for the "forward looking" features of function in biology. Boyd seems unaware, however, of work such as Walsh and Ariew's, which accounts for both forward and backward aspects of function (Walsh and Ariew, 1996), and hence could give the kind of "reduction sketch" that Boyd doubts biophilosophy can provide.

The bulk of Boyd's essay is a critique of evolutionary psychological theories that rely on massive modularity. His criticisms are sensible, though it is unclear in what sense the lessons we should draw here are really antireductionist, as Boyd suggests, as opposed to problems with particular assumptions or arguments such as massive modularity, or thinking that the most important features of the human mind evolved in the Pleistocene.

Several other essays touch on various aspects of the mind. In her essay "Neurophilosophy," Patricia Churchland raises standard naturalistic objections to thinking that humans have souls — if we evolved, just like other animals, why do only humans have souls? Churchland's particular brand of naturalism puts weight on the role and importance of neuroscience in explaining the mind, contra skeptics such as Fodor. She doesn't address Fodor's famous methodological arguments (Fodor, 1974) about the autonomy of psychology and whether by extension some parts of psychology (e.g., social psychology) might be autonomous from others (e.g., neuroscience). Her argument is a kind of induction on the history of recent sciences of the mind — what we used to think could not be explained naturalistically turned out to have a scientific explanation. So, do we have reason to think we will eventually be able to explain mental properties such as consciousness via neuroscience? It would be unwise to bet against some scientific theory of the brain being able to explain it.

Churchland cites the *Stanford Encyclopedia of Philosophy* (SEP) entry by Ichikawa and Steup (2017) on "Analysis of Knowledge" to support her claim that many philosophers of mind think that there's a substantial, interesting subject matter that deals primarily with conceptual necessities. Although I don't doubt that there are many such philosophers, it is unclear that the analysis of knowledge article is evidence for it. It is one thing to think that the mind is best studied empirically, it is another to think that knowledge is. Perhaps she has in mind approaches such as Kornblith's (2002) that treat knowledge as a natural kind. Are facts about what knowledge is straightforwardly discoverable in the way that we think facts about the mind are? She also claims these folks think intuitions trump empirical data, but it isn't clear whether this is a straw target.

Churchland points out that using thought experiments to identify necessary truths has a suspect history — pace Kant, space is not Euclidean. A more thoroughly naturalistic approach here would perhaps look to the way scientists themselves use thought experiments and see if any philosophical uses could be vindicated on those grounds (Sorensen, 1992).

One current project of many epistemologists is really linguistic. The debate about contextualism is a debate about when it is legitimate to say or assert that 'S knows that P'. This is primarily a semantic issue, as opposed to being an account of what knowledge is. Of course, it doesn't follow from some semantic theory about 'knows' that there is anything to which this word applies — there may be no knowledge in the world, just as an analysis of 'unicorn' or 'soul' or

'God' won't show that there are any such things. So Churchland writes "Thus, these philosophers convince themselves that they can dope out the deep — necessary — features of the world by conceptual analysis" and cites the SEP article on the analysis of knowledge as evidence that an analysis of knowledge should "at least be a necessary truth" (p. 92).

Part of what Ichikawa and Steup are up to in their SEP article, however, ought to be acceptable to a naturalist: a good definition or account must do more than get at the actual cases. If I define 'dog' merely by listing the current instances of it, or characterize only currently existing dogs, that doesn't help me get at a good analysis of 'dog.' Of course, even if you do give a good analysis of 'dog,' that doesn't tell you whether there are any such things, or what the essence of the thing is (or indeed if there is an essence). Perhaps looking to the way evolutionary biology identifies species is more helpful. But it isn't clear that trying to come up with better or more precise conditions plays no role — even on a naturalistic approach. After all, as Churchland recognizes, scientists themselves often do such conceptual housecleaning. This is unproblematic, as long as they don't over interpret what they've succeeded in doing when they provide a careful conceptual analysis.

David Papineau and Karen Neander, central figures in the teleosemantics programme, each contribute a chapter articulating and defending the approach. These two essays "Teleosemantics" and "The Methodological Argument for Informational Teleosemantics" do an excellent job of getting the reader up to speed on the pros and cons of teleosemantics. The fashion for teleosemantics has perhaps waned in recent years, but as these essays show, the research program is flexible enough to have the resources to address many of the standard objections. One of the most challenging puzzles for a naturalist is how to account for the intentionality of mental states — their aboutness and apparent normativity. Papineau and Neander each make a case that some version of teleosemantics is likely to play a role in understanding semantics from a naturalistic point of view.

In "Biology and the Theory of Rationality," Samir Okasha focuses on the evolution of rationality and the rationality of evolution. Traditional economic models define rationality as that which maximizes expected utility, where utility is determined by an agent's subjective preferences. Biological rationality, by contrast, is an external objective matter about what will maximize fitness. We can evaluate an organism's behavior — assuming it is an organism with a mind — from either perspective, and wonder about the extent to which natural selection favours rationality in the economic sense. Psychologists such as Gigerenzer and Goldstein (1996) look to biology to revise economic norms about what counts as rational — relying on ought-implies-can considerations to suggest that humans' apparent irrationality (as revealed in Kahneman and Tversky's work, for example) can be understood as a result of following rational principles in a different (evolutionary) context. Evolution by natural selection also appears to favour irrationality in a

more traditional sense in cases where it (or a combination of bio-cultural evolution) favours religious belief.

Utility is notoriously subjective and flexible. In traditional economic approaches, no restrictions exist on the content of an agent's preferences. One way in which a biological approach can help is to give predictive teeth to standard economic models by restricting the content of utilities. If utilities must be conducive to survival, economic models won't suffer from the objection that they're "too flexible" and "untestable." We might expect selection to favour preferences for things that correlate with survival and reproductive success, although as Okasha notes, an interesting question is: Why didn't selection design us so that we only care about survival and reproductive success? Authors such as Sober and Wilson (1999) address this question by arguing that engineering and phylogenetic constraints play an important role in how organisms with minds formulate preferences.

Biophilosophy and Ethics

Rosenberg's, Ronald de Sousa's and Phillip Kitcher's contributions each focus primarily on the impact of biology on ethics and metaethics. All three authors are skeptical of simple inferences from "this is how it is or has been" to "this is how it ought to be."

Although Rosenberg's essay mostly discusses biophilosophy of mind, he also raises a version of the "Darwinian dilemma" that has been much discussed lately in metaethics (Joyce, 2006; Street, 2005) but doesn't directly discuss Street or Joyce. Suppose some naturalistic account of the evolution of our moral sense is true. It doesn't really matter how much of our morality is a result of biology versus culture. It is plausible, as Kitcher argues in his contribution "Evolution and Ethical Life," that selection played a key role in developing our basic intuitions behind seeking pleasure and avoiding pain, wanting to help close relatives, and in cooperating with people who have cooperated with us, and so on.

The problem is this. What explains the coincidence between what selection has favoured and what is true? The moral theorist faces a tri-lemma here. One could argue that selection has favoured our moral sense because those moral beliefs are true. Just as we might think that selection favours our mathematical sense that $2 + 2 = 4$ is true because knowing how many tigers are in the cave has survival value, one might argue that our moral sense is what it is because having true moral beliefs increased our probability of survival.

The problem with this horn of the tri-lemma is that we seem to lack independent criteria for what makes the moral claims true. Rosenberg also mentions that selection often doesn't do a good job of favouring what is true. So taking this horn depends on working out a good adaptationist account where true belief is essential to survival. Alternatively, one might specify some Platonic account of

moral truth, but then it is unclear why this would be connected to survival value. So it appears possible that moral *skepticism* could result: no particular reason may exist to trust that the moral truths would be favoured by natural selection, just as we don't think knowing the truths about quantum mechanics would be favoured by natural selection. So embracing the second horn offers no explanation for the coincidence between what selection has favoured and our moral sense. Finally, one might argue that the coincidence between what selection favours and our moral sense is due to the fact that we have the moral sense we do *because* it is a result of evolution. If evolution had favoured different intuitions and values about altruism or cooperation, then we'd have different moral intuitions and values. This last horn is the one that constructivists such as Street favour.

De Sousa's chapter "Nature's Purposes and Mine," takes a naturalist approach to questions of value, and he is well aware of the relevant MIMO principle that applies here: one cannot make substantial inferences about norms merely from claims about facts. So what should we make of the naturalist project in this area? De Sousa points out that evolutionary biology has made humans with culture, and that with our culture we can transcend a simple biological determinism about what we think and care about.

De Sousa focuses on the way in which a process of reflective equilibrium is informed by our knowledge of humans as biological agents and the extent to which we are products of evolution. He appeals to the content of biology to draw philosophical conclusions. Reflection on game theory leads us to expect strategic variants, and anthropological variation — such as societies without marriage — can provide "proofs of possibility" informing us about other ways of living, and shaking us from the confidence that our own particular culture reflects the way things must be. Rather than thinking that reflection on biology leads us to essences and determinate ways of living — as perhaps old 1970's style socio-biology did — de Sousa reasonably emphasizes that reflection on biology leads us to understand the importance of variation and undermines a biological (genetic) determinism. It is clear that evolution does not, by itself, tell us what our goals should be or how we should live. Thus, de Sousa says that a biological reflection should lead us to some kind of existentialism.

Kitcher's paper distinguishes two ways of thinking about the importance of an evolutionary approach to ethics; the first relates to the much discussed debunking arguments of Street and Joyce, and the responses by various realists such as Shafer-Landau (2012). The second approach, which is Kitcher's primary focus, is a genealogical one — trying to understand how morality and our moral sense emerged evolutionarily. Kitcher also articulates a sense in which a Darwinian approach to ethics can account for moral progress — in an instrumental sense of solving certain kinds of problems. This is pragmatic progress, analogous to the way doctors can make progress in curing diseases and improving health without thinking a Platonic ideal of perfect health exists.

Humans are social animals, and a broadly Darwinian approach can explain how evolution has improved our capacity to cooperate with one another, thus decreasing the frequencies of social disruptions. Kitcher suggests (p. 200) that evolution (whether biological or cultural or a combination) could favour talking about morality as if it is objective. That is, evolution might favour believing that the moral rules a society comes up with “conform to an independent moral order” (p. 200). Although Kitcher defends this move on behalf of the moral realist, it is unclear why this wouldn’t simply vindicate a kind of moral fictionalism (see Joyce, 2006).

A second option that Kitcher considers requires realists to specify the moral capacity and how it accesses the realm of moral truths. These are familiar problems for moral realism. Kitcher thinks that there’s an additional problem here — does one think that everyone develops such a capacity, or just some folks (here it is useful to think of the analogy with mathematics). He says the latter, “elitist” version is more problematic, because it introduces the idea of a moral judgment that could override the best collective attempt at resolving conflicts. But isn’t this typically what realists assert in other domains, such as mathematics or science? Nagel (1978) defends such a position. Evolution might have given us some proto-mathematical beliefs, but we are then able to use our big brains and make progress in finding mathematical truths in a way that is autonomous from our evolutionary endowment. Mathematicians can override the judgment of the lay reasoners. Analogously, Nagel thinks that we can use reflective equilibrium on our (perhaps evolutionarily given) moral sense to make progress on moral questions, and discover that slavery is immoral, and so on. This might entail that some folks, who have thought more carefully about moral matters, are closer to the truth than others. Perhaps the difference between Kitcher and Nagel can be accounted for by their focus on different aspects of morality. Some issues in morality — such as whether slavery should be allowed or women should have the right to vote or whether it is wrong to eat animals — are not best thought of as a pragmatic, instrumental bargaining problems that is solved by coordinating in the Deweyian way that Kitcher prefers.

Biophilosophy and Human Nature

As remarked earlier, the Darwinian “population thinking” revolution is well known for causing problems for essentialist accounts of species, including ours. This has led some philosophers to defend a general skepticism about the idea of a biologically based human nature (Hull, 1986).

In “Human Nature,” Edouard Machery sets out to defend a notion of human nature that respects the lessons of the Darwinian revolution. He defends what he calls a “nomological” rather than “essentialist” notion of human nature. The extent to which humans are similar is a contingent, empirical issue. He thinks

the nomological notion of human nature better captures the way many evolutionarily informed scientists use the notion. The nomological notion focuses on common properties among humans that result from evolutionary processes. So on Machery's nomological notion, human nature doesn't tell us what is or isn't possible for humans; rather, it tells us what is typical. He then discusses the connection between this notion of human nature and the extent to which traits that are part of our nature will be easy or difficult to change, and argues that many traits that constitute our nature have a long phylogeny and may be difficult to change by cultural means.

John Dupré's "A Postgenomic Perspective on Sex and Gender" defends a position similar to that of de Sousa: contra earlier sociobiological approaches to human nature, today's enlightened biophilosopher recognizes that a biological approach undermines the idea of essentialism with respect to sex and gender. Sex is a biological notion whereas gender is mostly a developmental outcome in which culture plays a substantial role. This means that no interesting sense exists in which there are genes for hetero- or homosexuality, or for stereotypically masculine or feminine traits. The distinction between male and female itself isn't sharp: individuals exist between these two kinds. Dupré draws a couple of interesting philosophical conclusions from a biophilosophical approach. One is about metaphysics. Instead of a traditional, static metaphysics, biological features are better understood as a kind of *process* metaphysics. Furthermore, biological boundaries are vague as well as slippery and shifting (p. 246). Whether the boundaries are vague is different from whether they are malleable, as Dupré recognizes. So the features of gender are a result of a developmental process, rather than a simple "genetic" approach.

Luc Faucher's chapter, "Biophilosophy of Race," discusses two main issues. The first concerns traditional debates about biological notions of race. Faucher points out that biological approaches are making a comeback due to recent work in human population genetics. In particular, Rosenberg et al (2002) sampled human populations and found interesting genetic clustering. Substantial debate exists about whether this new work vindicates or undermines any sort of biological notion of race. There is little in this work that vindicates much if any of the traditional biological approaches to race, however. Even whiter skin colour has apparently evolved independently more than once (Norton et. al. 2007), and so biological approaches to race which rest on shared ancestry will clash with traditional folk conceptions. Faucher usefully surveys this literature.

The second topic of Faucher's contribution concerns psychological essentialism. Humans categorize and stereotype races and social groups in various ways, often attributing an underlying "essence." To what extent can an evolved, domain specific module explain these categorizations? This is a fascinating area, with connections to debates about massive modularity and innateness.

Conclusions

Each of these essays has something interesting to say about biophilosophy. What general lessons can we draw? Philosophers such as Dennett and Godfrey-Smith emphasize the gradualism of evolution. Several authors — including Rosenberg, de Sousa, Kitcher, and Machery — emphasize the way in which evolutionary thinking undermines essentialism. Dennett and Churchland focus on methodological lessons: biophilosophy provides additional reasons to be suspicious of traditional philosophical methods. In some cases, contradictory conclusions are reached: Rosenberg and Churchland draw reductionist conclusions whereas Boyd draws antireductionistic ones. Machery and Faucher hold out more hope than Boyd for a philosophically significant human nature; in particular, one in which evolutionary psychology plays a substantial role. Given that biology itself is heterogeneous, it should not surprise us that different biophilosophers draw these different conclusions.

One criticism of the collection as a whole is that certain topics that have been fruitfully pursued by biophilosophers are missing. No separate chapter exists on biophilosophy's consequences for religion or religious belief (although God gets passing mention by Dennett, Churchland, and de Sousa). Is there, for instance, a successful evolutionary debunking argument about religious belief (see Wilkins and Griffiths, 2013). What are the implications of evolution for the traditional design argument or the problem of evil (Sober, 2008)?

No chapters are devoted to evolutionary epistemology (de Cruz, 2011) or David Hull's (1988) work developing a general theory of how science progresses that is modeled on evolutionary processes. Nor, finally, is there a chapter on the burgeoning field of evolutionary aesthetics. To what extent can evolutionary considerations shed light on our aesthetic sense (Davies, 2013)?

Another limitation of the collection is that no chapter — or even an introductory discussion — exists on the history of biophilosophy. One conceptually important feature of evolutionary theory is the significance of history: if this asteroid had landed at a different place and time, or this predator had not gone extinct before that one, evolution would have taken a different path. Some biologists (Gould, 2002; O'Hara, 1988) and philosophers (Beatty, 2017; Beatty and Desjardins, 2009) have taken this historicity to be one of the most distinctive features of evolutionary biology as a science. Given this, it would have been interesting to see an essay on the history of biophilosophy itself, examining whether the distinctive historical methods have any lessons for philosophical methods. Although most of these authors make passing references to thinkers such as Darwin, there is no sustained engagement with how philosophy as a field got here, or how past thinkers such as Darwin or Peirce or Dewey did biophilosophy (see e.g., Godfrey-Smith 2002).

Of course, an anthology like this cannot include every topic, but when it contains two essays focused just on teleosemantics, one can't help but wonder if the

average reader would be better served by replacing one of these chapters with one on an alternate topic. Despite these limitations, this collection has a lot to offer the budding biophilosopher. It would be an excellent choice for a course that surveyed evolutionary approaches to philosophical issues. If you are looking to get up to speed on any of the topics addressed herein, this book provides an excellent entry to the relevant subfield.

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