

What philosophy of biology should be

Rosenberg, McShea: Philosophy of biology. A contemporary introduction. Routledge, 2008

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Abstract This paper reviews Rosenberg's and McShea's textbook in philosophy of biology, entitled *Philosophy of Biology. A Contemporary Introduction*. I insist on the excellent quality of this textbook, then I turn to more critical comments, which deal mainly with what philosophy of biology is, and what it should be.

Keywords Adaptationism · Biological laws · Complexity · Humankind · Levels of selection · Philosophy of evolutionary biology · Philosophy of molecular biology · Reductionism

On reviewing Rosenberg and McShea's work, Frederic Bouchard, of the University of Montréal, commented enthusiastically:

This is what great philosophy of biology should always be: serious biologically informed philosophy and provocative philosophically informed biology. What one gets with Rosenberg and McShea's book is the most thought-provoking introduction to philosophy of biology to date.

While I share in this enthusiasm I would like to suggest that the philosophy of biology is everything that Rosenberg and McShea present in their book and more. After summarising the main arguments of the work, I will turn to more critical comments that draw comparisons with other textbooks of the philosophy of biology, particularly the widely-used Sterelny and Griffiths (1999) and Sober (2000).

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Overview

Rosenberg's and McShea's writing is striking for its overall clarity. Each technical concept is accompanied by a definition of lapidary lucidity; every biological theory, model, and mathematical formula is elaborated in detail; the philosophical references throughout are contextualized and thoroughly explained. A novice in the philosophy of biology would be challenged to find a passage of the book she could not understand: even difficult issues in biology and philosophy of biology, such as the Price equation, the discussion on group selection, and the debate over the transitions in evolution, are readily intelligible. The work is also remarkably concise, given the variety of topics it covers: a mere 240 pages, in contrast to Sterelny's and Griffiths' 440 and Sober's 235, which explores a more limited range of issues. The book perfectly fulfills the mandate of Routledge Contemporary Introductions to Philosophy to be accessible to non-specialists, without sacrificing the quality of the discussion on the altar of clarity.

The Introduction is both short and thought-provoking. Rosenberg and McShea open with a very Russellian definition of the domain of philosophy, as the sum of all the questions to which science cannot (yet) answer (see, for instance, Russell 1960). The authors consider this definition to open up a space for the philosophy of biology: since so many questions in biology are still 'open' questions, the collaboration of biologists and philosophers seems fruitful, even perhaps indispensable. Yet one could go further in describing this relationship: philosophers may help biologists to better frame their questions (see, for e.g. the issue of biological complexity, discussed in Chap. 5), and biologists may help philosophers to answer some of the classic questions of philosophy [for e.g. the problem of defining individuality, as Hull (1978) shows]. If this point of view holds, then philosophy does more than simply asking the questions to which science has no answer.

The book is divided into seven chapters. The first chapter, 'Darwin makes a science', claims that biology as a science originated with Darwin in 1859, and then proceeds to discuss the structure of the theory of evolution by natural selection, listing the most frequent misunderstandings of the theory. The second chapter analyses 'Biological laws and theories'. The analysis, although controversial, is particularly strong, exemplifying one of the major qualities of Rosenberg's and McShea's book, which is to make multiple comparisons between biology on the one hand, and other scientific fields, particularly physics (especially Chaps. 2, 4) and the social sciences (especially Chap. 7), on the other. The authors argue that there are no true scientific 'laws' in biology, in contrast to the physical sciences. The third chapter further explores Darwinism. It begins with an analysis of Gould and Lewontin's (1979) paper 'The Spandrels of San Marco' and then examines the role of constraints in shaping organisms, the contribution of random drift to evolution, and the two principle different conceptions (etiological and systemic) of function in biology. The fourth chapter raises the issue of reductionism in biology, asking whether or not biological explanations should always be completed by an explanation at the molecular level. Chapter 5, entitled 'Complexity, directionality and progress in evolution', asks whether evolution can be described as 'progressive'. It is undoubtedly one of the finer chapters of the book, as it brings into

question many ‘self-evident’ views of complexity, and consistently tries to offer precise and well-articulated definitions. The sixth chapter, ‘Genes, groups, teleosemantics, and the major transitions’ addresses the different levels of biological selection and organization. The final chapter, ‘Biology, human behavior, social science, and moral philosophy’, explores the relationship between biology and human nature.

As a general rule, the book focuses on arguments, rather than on references and name dropping. In common with the works of Sterelny and Griffiths, and Sober, the conclusion of each chapter collects together the most significant references in ‘Suggestions for further reading’ for those who wish to explore some issues further. In fact, because they concentrate on the argumentation rather than on the arguers, Rosenberg and McShea rarely focus on a single interpretation from any particular author, as, for instance, Sterelny and Griffiths do with Dawkins (Chap. 3 of their (1999) is entirely devoted to Dawkins’s views).

As surprising as it may seem in a field in which scientists and philosophers regularly collaborate and/or confront each other (as exemplified in this journal), Rosenberg’s and McShea’s book is the first generalist textbook in philosophy of biology written by a philosopher and a biologist. The entire work bears the marks of their enriching and long-lasting collaboration: Rosenberg and McShea both teach at Duke University, and they participate regularly in the same seminars, producing an intellectual environment which has led to the general consensus that Duke University is one of the best places in the world to do philosophy of biology. The book aims to be relevant to biologists and philosophers alike, and, thanks to the union of an outstanding philosopher and an outstanding biologist, this goal has been perfectly reached. Rosenberg’s and McShea’s book is a model of precise, well-informed, and interesting writing. It will certainly contribute to attracting newcomers to the field of philosophy of biology.

Tempered agitators

The primary aim of the series in which the book is published is ‘to educate students in the main problems, positions, and arguments of contemporary philosophy rather than to convince students of a single position’. In perfect accordance with this goal, Rosenberg and McShea present a rather ‘neutral’, ‘objective’ view of the philosophy of biology. They examine theses and arguments in great detail, but typically do not take sides. This is certainly a legitimate choice, yet the price of such a balanced presentation of the domain is a certain frustration at the lack of firmness in the authors’ own points of view. This is the case even for issues on which Rosenberg and McShea have made critical contributions, such as complexity for McShea, and reductionism for Rosenberg. It is particularly surprising to observe Rosenberg, who is usually quite definite and assertive in his own writings [including in his last book (Rosenberg 2006)], keep his audacious, sometimes provocative, ideas in the background. McShea has been known to be equally provocative, for instance in texts in which he criticizes unconsidered notions of biological complexity (see, in

particular, McShea 1991), but here a neutral presentation of the debate over biological complexity is given, leaving the reader to decide what to think.

This relative neutrality is perhaps the reflection of divergences of opinions between the two authors, as the Introduction makes clear:

the authors of this book have divergent views about almost all of the unavoidable questions biology raises and cannot (yet) answer. Our aim is to provide the reader with the resources to see how serious the questions are and what would count as good answers to them.

It may also reflect the remarkable honesty of two thinkers who have at times changed their mind on major subjects through the years, on the basis of new arguments and reflections (compare, for instance, McShea 1991, 2005 on complexity).

A new gateway?

Rosenberg and McShea's book is subtitled 'a contemporary introduction', which begs the question: does this textbook present new topics? After all, the works by Sterelny and Griffiths and Sober are already a little advanced in years, for a dynamic and fast-moving field such as philosophy of biology. Rosenberg and McShea do analyze topics absent from these works that have emerged as important domains during the last ten years, but they could go further. In the chapter on reductionism (Chap. 4), the authors examine the dynamics of complex systems, in particular gene networks, a topic that has been more and more appealing to philosophers of biology (see for instance Callebaut and Laubichler 2007, following, in particular, Kauffman 1993, 1995). They also examine teleosemantics and the way it influences the debate over genocentrism (Chap. 6). Finally, again in Chap. 6, they discuss levels of selection and transitions in evolution—a topic which was already tackled by Sterelny and Griffiths (1999) but which has recently flourished (Okasha 2006; Godfrey-Smith 2009).

One striking omission is ecology. Following the growing recognition of its importance in philosophy of biology (see, for e.g. Maclaurin and Sterelny 2008), ecology has made a conspicuous and very welcome entry in recent 'companions' to the field (e.g. Mikkelsen 2008; Plutynski 2008). It is therefore, surprising to find no analysis of ecology in Rosenberg's and McShea's book, although the field was examined, at least partially, in Sterelny and Griffiths (1999). Another exclusion is developmental biology. The subject is barely examined, including the very dynamic domain of evolutionary developmental biology or 'evo-devo'—not to mention the recent and promising field of ecological developmental biology, called 'eco-devo' or 'eco-evo-devo' (Gilbert 2001; Gilbert and Epel 2009).

Correspondingly, some of the books which have generated the most comment in recent philosophy of biology, such as Odling-Smee et al. (2003) and Jablonka and Lamb (2005) (see the special issues of *Biology and Philosophy*, January 2005 and June 2007, respectively) are surprisingly absent from Rosenberg's and McShea's examination. This is a shame, because it deprives newcomers to the field of some of

its hottest topics. I would not dream of reproaching Rosenberg and McShea for omitting to cover these subjects in such a slim, concise volume, but would suggest that the book offers less ‘a new gateway to philosophy of biology’ than it does an excellent synthesis of more well-known paths in the domain. In a recent review of trends in the philosophy of biology by Rosenberg and Brandon, the authors insisted on the continued longevity of the most classical aspects of the discipline but concluded that new topics will soon emerge and that ‘A similar review article written 25 years from now will, we predict, look much different’ (Brandon and Rosenberg 2003: 177). Similarly, I think a textbook in philosophy of biology written 25 years from now will look significantly different from Rosenberg’s and McShea’s. The next section will, I think, further sustain this claim.

Philosophy of biology and philosophy of evolutionary biology

The authors act as if philosophy of biology amounted to philosophy of evolutionary biology. This is, I believe, a mistake, and one with far-reaching consequences. Although it is certainly the case that philosophy of biology has devoted more time to evolution than to any other biological topic, studies in non-evolutionary aspects of philosophy of biology, and especially in philosophy of molecular biology, have multiplied considerably in the last 20 years: ideally a textbook would reflect these new approaches, and perhaps also contribute to their emergence—particularly, again, when the claimed intention is to offer ‘a new gateway to philosophy of biology’. Instead molecular biology is analyzed only through the debate over reductionism and a brief examination of the huge issue of biological information (for more details, see Sarkar 1996; Godfrey-Smith 2000; Oyama 2000; Griffiths 2001), which is certainly insufficient. Significant contributions have been made in the philosophy of molecular biology during the past 20 years, and the domain is currently expanding quite rapidly [see the reviews by Griffiths (2002) and Darden and Tabery (2005)]. The philosophy of molecular biology is perhaps best exemplified by the works of Burian (2005) and Sarkar (2005). Important subfields include molecular genetics (Beurton et al. 2000; Morange 2001; Burian 2005), molecular developmental biology (see Burian 2005; Gilbert and Burian 2006; but also, for instance, Rosenberg 1997!), the study of epigenetic mechanisms (Jablonka and Lamb 1995), research on the molecular origins of life (Brack 1998; Morange 2008), neurology (Craver 2007), immunology (Schaffner 1992; Tauber 1994; Darden 2006), microbiology (O’Malley and Dupré 2007), and experimental molecular biology (Weber 2005). Several of these works may have been of critical interest to philosophy of evolutionary biology, but they deal first and foremost with molecular aspects of biology.

Despite their full participation in the evolution-centered philosophy of biology, several key actors of the field have expressed doubts on the adequacy of this hegemony (e.g. Sterelny 1995a; Hull 2002; for a critique of the exclusive focus on evolution in philosophy of biology, see also Müller-Wille 2007), and some have suggested that evolutionary approaches should be complemented by molecular approaches. The relative absence of philosophy of molecular biology in Rosenberg

's and McShea's book is all the more surprising since Rosenberg has, in recent decades, been one of the researchers deeply involved in this field. For example, Rosenberg (1985) has been cited as the only textbook dealing extensively with molecular biology (see Hull 2008: 25); and (Rosenberg 2006) is subtitled "How to Stop Worrying and Love Molecular Biology".

My personal guess is that, in the coming years, works in the philosophy of molecular biology will become increasingly numerous, and even more interesting. Indeed, molecular biology dominates general biology; evolution is certainly everywhere in a sense, but it represents quite a limited number of the papers published in leading scientific journals such as *PLoS*, *Nature*, *Science* or *PNAS*. If the philosophy of biology continues to stick to the agenda of contemporary biology, as I suppose it will, then it will need to be enriched by a greater number of contributions to the subfield of philosophy of molecular biology (see also Barberousse et al. 2009). In my view, a truly 'contemporary' introduction to philosophy of biology should devote more space to philosophy of molecular biology than do Rosenberg and McShea.

Philosophy and humankind

Philosophers of biology have found a very effective way to justify their existence and, incidentally, to work their way onto bestseller lists: they assert that what they do is relevant to every philosopher, because when one speaks of the living world, one speaks in particular of the human animal. According to this claim, the philosophy of biology is useful, even indispensable, for any reflection in philosophy, and more generally in the 'humanities'. Let us call this the 'anthropocentric strategy'. It is undoubtedly the most attractive of the two faces of the Janus-like philosophy of biology, to use an image from Williams (1991). By this strategy, philosophers of biology usually distance themselves from the classical philosophy of science, particularly the branch dominated by the philosophy of physics, against which philosophy of biology was historically constructed (Mayr 1969; Hull 1969). The Introduction of Rosenberg's and McShea's book conveys the impression that their take on the philosophy of biology is a way to answer concerns about human affairs, and to illustrate the impact of biology on human capacities, social institutions, and ethical values. Although this strategy is certainly tempting and powerful, it is misleading and I do not believe that Rosenberg and McShea actually endorse it.

Firstly, philosophy is much more than the philosophy of humankind. Philosophy is interested in humans, certainly, but it is not interested only in humans. An excellent example is provided by metaphysics, or general ontology. Hull (1989) and others have shown very convincingly how the philosophy of biology can be critical to answer classical metaphysical problems. When Rosenberg and McShea discuss physicalism (Chap. 4), they do metaphysics, not human-centered philosophy. What is more, adopting an anthropocentric view in the philosophy of biology is much more likely to obscure than to provide a helpful vantage point. When trying to understand biological individuality, for instance, biologists and philosophers are

better off rejecting the bias due to a human view of individuality (Hull 1978, 1992; Buss 1987). Biological complexity provides another salient example: in one of the most illuminating discussions of biological complexity I have read, McShea (1991: 318–320) took as one of his starting points the critique of the view that humans should consider themselves as obviously at the top of a mountain which reflects the growing complexity of evolution. The point was not only that humans are not necessarily the most perfect living beings, but, more fundamentally, that a human-based notion of biological complexity can hinder us from examining other, and possibly more fruitful, definitions of this notion.

Finally, it is not clear at all that the analyses of philosophy of biology in general are easily applicable to humans. In other words, the idea that, when philosophers of biology speak of living beings, they speak of human beings in particular is not well-grounded. Humans are certainly animals, but they seem to be quite special animals. The explanation of social actions, of behaviours and of culture may imply a Darwinian dimension without boiling down to this Darwinian dimension. And even if one wants to offer a Darwinian explanation of these phenomena, it must be a specific and fairly elaborate one (Sterelny 1995b, *forthcoming*). Rosenberg and McShea believe that human behaviors and human institutions with a function should receive a Darwinian explanation: but they are not actually talking about all functions, but rather latent functions, that is, unintended social functions (for e.g. following Levi–Strauss, marriage rules permitting or forbidding unions among maternal versus paternal cousins function latently to ensure social solidarity). Moreover, the end of Rosenberg's and McShea's book evinces in great detail that the strategy of applying general Darwinian principles to society and morality, although tempting, proves to be very difficult in practice.

Conclusion

From the above it should be clear that Rosenberg's and McShea's textbook is admirable. The question, most crucial for professors is, certainly Rosenberg and McShea wrote an excellent textbook, but did they write *the* best textbook, the one to recommend to students taking a philosophy of biology class? My answer would be yes. Their book is certainly, in 2009, the best place to start. It is more accessible and more 'neutral' than Sober (2000) and Sterelny and Griffiths (1999). In this respect, it is highly appealing. The best tribute a young philosopher of biology could pay to Rosenberg and McShea, though, is to use the work as a jumping off point. In my view, what Rosenberg and McShea offer in this book is certainly not all that philosophy of biology should be; but it is to date the best way to launch oneself into this domain.

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