Philosophical Perspectives on Evolutionary Theory: A Sketch of the History

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Abstract

Discussion of Darwinian evolutionary theory by philosophers has gone through a number of historical phases, from indifference (in the first hundred years), to criticism (in the 1960s and 70s), to enthusiasm and expansionism (since about 1980). This paper documents these phases and speculates about what, philosophically speaking, underlies them. It concludes with some comments on the present state of the evolutionary debate, where rapid and important changes within evolutionary theory may be passing by unnoticed by philosophers.

Keywords: Darwinism, evolutionary theory, philosophy of biology.

Introduction

Darwin once said that he had no aptitude for philosophy: “My power to follow a long and purely abstract train of thought is very limited; I should, moreover, never have succeeded with metaphysics or mathematics” (Darwin 1958). This was not false modesty; it was the simple truth. Nevertheless, he was a great synthesiser of facts and theories, and he was very thoughtful about scientific methods (he especially valued Sir John Hershel’s *A Preliminary Discourse on the Study of Natural Philosophy*; see Gildenhuys 2004), so he was somewhat akin to a philosopher. One of his outstanding attributes was his

willingness to put forward prominently the main objections to his theory of evolution. Three objections stood out in 1859.

- There seemed to be a mismatch between the gradualism supposed by the theory and the discontinuities of the fossil record.
- There seemed to be a disconcerting lack of transitional species in the fossil record and in living biology.
- Many organisms and many of their organs seemed too perfectly adapted to their environments or too perfectly suited to their functions to have come about from the haphazard processes of mutation and natural selection.

Darwin thought that these objections could be answered, or would be answered in time. The other great absence from his theory was a coherent genetics, but there was no scientific genetics before Mendel, so Darwin and his followers were whistling in the dark on that matter. As things turned out, the neo-Darwinian synthesis of the 1930s supplied a form of genetics friendly to Darwinian theory. (For an analytical summary of contemporary Darwinian evolutionary theory, see Gregory.)

In more recent times, evolutionary theory has been expounded to non-specialist readers by various kinds of author. Biologists such as Richard Dawkins, Stephen Jay Gould, Steve Jones and Simon Conway Morris are prominent. So also are historians of science, such as Peter Bowler, Janet Browne, Adrian Desmond and James R. Moore. Equally likely, however, one might be introduced to evolutionary theory by a philosopher of biology, for example Michael Ruse, David Hull or Kim Sterelny. (For introductions to the philosophy of biology, see Lennox 2004: Sloan 2005; Griffiths 2008; other recent examples include Brandon 1996; Hull and Ruse 1998; Sterelny and Griffiths 1999; Hull 2001; Sterelny 2001; Pigliucci and Kaplan 2006: Hull and Ruse 2007; Rosenberg and McShea 2008.)

My subject in this paper is the relation between Darwinian evolutionary theory and the discipline of philosophy. I will divide the story of this relationship, much condensed and

inevitably simplified, into four parts. (Grene and Depew 2004 provides a grand survey of the history of biological thought; see also Grene 1986.)

Indifference

For about one hundred years after the *Origin* the leading philosophers of Britain, America, Germany and France – the leading countries in the field – showed almost no interest in Darwin or Darwinism. They simply ignored the subject altogether. They largely ignored biology itself. This was not because they were intellectually insular. The leading philosophers, men such as Frege, Russell, Moore, Wittgenstein, Husserl, Heidegger, Carnap and Quine, almost all had interests outside philosophy, but those interests were in logic, mathematics, physics, perception, language and ethics. They were also often reacting against the synthesizing evolutionism – a very non-Darwinian evolutionism – of 19th century Hegelian idealists. None of them saw Darwin's evolutionism as an antidote to Hegel's metaphysical evolutionism. But more probably the main reason why the philosophers were uninterested in Darwinian theory was that they did not regard biology as a leading science. Of course a few philosophers were interested in biology, but they were not Darwinian in outlook. They were the vitalists, of whom Hans Driesch is the best-known example. But none of the leading philosophers took vitalism at all seriously.

Nor were the philosophers interested in theology, least of all in creationist theology, as a potential world-view. To this day, philosophers almost universally disdain creationism and the theory of intelligent design. In this, they are the descendants of David Hume and Immanuel Kant.

It should also be said that none of the philosophers held any enthusiasm for the ugly side of the Darwinian movement – its espousing of radical individualism and, far worse, of eugenicist authoritarianism. Eugenicism was popular amongst many biologists but not at all amongst philosophers.

Criticism

With the molecular biology revolution of the 1950s, the status of biology as a science changed dramatically, and this might have led to an upgrading of its prestige amongst the philosophers. However, at first quite the opposite happened. Darwinian evolutionism came under attack. The assault was led by one man, Karl Popper, but since he was widely regarded as the world's leading philosopher of science, this was no small confrontation. By Popper's time, the Darwinians had put together a formidable system. Darwin's "descent with modification" acting through the mechanism of natural selection, now working in tandem with Mendelian genetics, had become the established framework for much of the discipline of biology. Then the breakthrough into the molecular domain by Watson, Crick and many others showed that biology could be integrated with chemistry and presumably with physics. There seemed to be no longer any good reason for not taking biology seriously as a great science.

Popper, however, saw Darwinism as a pseudo-science, or at best as a "metaphysical research program". In his words, "To say that a species now living is adapted to its environment is, in fact, almost tautological. … Adaptation or fitness is defined by modern evolutionists as survival value, and can be measured by actual success in survival: there is hardly any possibility of testing a theory as feeble as this. And yet [he adds], the theory is invaluable. … Although it is metaphysical, it sheds much light upon very concrete and very practical researches" (Popper 1974; see also Hansson 2008). Popper was happy to accept the "modification by mutation" half of the Darwinian equation. What he attacked was the "natural selection" story, which he accused of vicious circularity. The problem turned on the definition of "fitness". If fitness is nothing other than survivability (as population biologists sometimes seemed to suppose), then survival of the fittest is merely the survival of those who survive. The Darwinian theory thus seems irrefutable, since even in principle no evidence could be given that would count against the theory. The attributes of fitness that might explain survival are, Popper claimed, nothing other than the fact of survival itself. Behind Popper's objection is a Humean assumption that,

wherever we have a causal story, the cause must be separately identifiable from the effect.

It was this argument that, I think, kick-started the philosophy of biology as a sub-discipline. I don't know to what extent Popper's argument was taken seriously amongst biologists (Hull 1999 suggests it was not), but it made an impact amongst philosophers, who set out to show that fitness could be identified separately from survival. The first generation of professional philosophers of biology, including David Hull, Michael Ruse, Michael Ghiselin, and Elliott Sober, were all defenders of Darwinism, defending it in part against the objection raised by Popper. This was a central topic of discussion amongst such philosophers in the 1960s and 70s. The end result was no doubt a victory for Darwinism. (See Sober 1984 and the essays in Sober 1994; more recently, chapter one of Pigliucci and Kaplan 2006.) Popper had few supporters, and he retracted his key argument in 1978 (Popper 1978; see also Popper 1976 and Hull 1999; Hull points out various ways in which Darwin exhibited his theory as falsifiable).

Enthusiasm and expansionism

Having weathered this storm, Darwinism's reputation amongst philosophers went rather rapidly from being clouded by Popper's objection to being a paragon of good science and a paradigm that should be applied even outside biology. This third stage has been dominant since about 1980. We can call this the period of Darwinian enthusiasm, perhaps even of expansionism. The movement to expand Darwinism has been carried out by many thinkers. From within biology, E.O. Wilson led the charge, but many psychologists, social scientists and even philosophers have joined in the battle (Wilson 1975). The disciplines to be colonised were mainly psychology and the social sciences, but gradually the expansion has come to include philosophy itself. Perhaps the key figure amongst philosophers has been Daniel Dennett. To explain this movement it may help to see how Dennett arrived at the odd position of being a trumpet-blower for what he called "Darwin's dangerous idea" (Dennett 1995; for reviews see Orr 1996 and Gould 1997).

In the 1960s it came to be fairly widely agreed that philosophy had failed in one crucial area. It had failed to give any plausible account of the nature of the mind, even though the question had been central to philosophy since Descartes in the 17th century and even though Cartesian mind–body dualism suffered from its seemingly anti-scientific commitment to inexplicable interaction between material bodies and an unknowable non-material mind-stuff that supposedly makes up the mind. To go forward philosophy would have to cut this Gordian knot. The cutting was done by a small number of Australian and American philosophers, one of whom was Dennett. Henceforward it would be taken as given that the mind just is the brain. Mind–body materialism would be taken as an axiom. Whatever difficulties there might be in this, it was assumed they can't be worse than the difficulties in the Cartesian dualist assumption. The difficulties would be fully debated, but the solutions to any problems would be materialist solutions. (As a footnote to this, it is worth noting that Popper's friend, the great neuroscientist John Eccles, was a mind-body dualist. As late as the 1960s, neuroscience was not necessarily committed to materialism.)

But, if the mind just is the brain, what then is the brain? It is of course a biological organ. In that case, whatever we say about the brain had better be based on biology, if we want to have any scientific credibility. And the only biology that can do the job is Darwinian biology. Hence philosophers such as Dennett, who had come out of the mind–body debate, declared themselves to be whole-hearted Darwinians. (A rival school of thought, the computationalists, led by Hilary Putnam and Jerry Fodor, modelled the mind–brain relation on the computer, a line of argument that left room for the claim that the mind is the brain but it is not simply the brain, since it involves something like an algorithm working in the brain by means of which the world is represented. In recent times Fodor has emerged as a critic of Darwinian theory; see Fodor 2007 and Fodor and Piatelli-Palmarini 2010.)

The Darwinian philosophers, led by Dennett, then set out to convert the academic world – in psychology, the social sciences and philosophy – to their new world-view. This step marks an important change, I think, in the nature of how philosophy is done. Since the

mid-19th century, when the Hegelian synthesis collapsed, the leading English-speaking philosophers had tried to avoid speculation like the plague. It was not their job, they insisted, to provide mankind with a synthesis of all knowledge. They saw themselves in two ways: either as searching for the foundations of knowledge (in logic or mathematics or perception) or as interpreters of language and of the ways that language shapes our shared social practices and world-view. Dennett and others broke with this self-imposed embargo on speculation. They supported Darwinism much like punters might support a horse: they took it to be the best horse in the field, and they backed it to the hilt. Darwinism will, they think, eventually explain to us not only the brain but also much of our social life and our morality and even our misbegotten tendencies towards religious enthusiasm. Darwinism will be, for all intents and purposes, a new theory of almost everything biological, social, and ethical. (For examples, see Millikan 1984; Sober and Wilson 1998; on religion, see Wilson 2003; on the theory of cultural evolution, see Boyd and Richerson, 2005.) Dennett describes it as a "universal acid; it eats through just about every traditional concept and leaves in its wake a revolutionized world-view". He does not deny that cultural evolution occurs, but he denies that it displays any features inexplicable by evolutionary theory.

In some ways this is a reversion to Humeanism. It was David Hume's main ambition in the 18th century to naturalise the mind, to see it as part of nature. Today Humean naturalisers are the dominant party in the English-speaking philosophical world, which dominates the discipline. But today we have moved beyond Hume's naïve Newtonianism; instead we have what might be called naïve Darwinian naturalism. How productive this strategy has been is a matter of controversy. Few even of its supporters could claim that it has made the great questions of philosophy very much less intractable. And certainly some philosophers have argued in favour of a more modest form of Darwinism, most notably Mary Midgley (1985) and Philip Kitcher (1985). In any case, Darwinian philosophy as practised today turns philosophy into an explanatory discipline, whereas its traditional role has been the rational analysis of normative questions, especially the questions of epistemology and ethics. In that respect Popper was doing

something traditional – analysing the rational credentials of Darwinism – whether or not he did it successfully.

Reasons for rethinking?

Dennett-style Darwinism still dominates amongst philosophers. But in the last decade, it seems to me, much has happened to the Darwinian paradigm that the philosophers and social scientists have been so enthusiastically backing. Here I have to be very tentative. I'm not a biologist of any sort, so I can speak only as an observer. But what I seem to detect within biology is perhaps a paradigm shift, of the sort described by Kuhn. This time, however, it is not the selection and fitness part of the equation that is threatened, as Popper had supposed. It is the modification story that is being shaken up.

The genomic revolution was generally expected to be the completion of the Darwinian synthesis. Knowledge of the genome would finally show us in detail how the system works. Genes code for proteins, and knowledge of the genome will decode the code. But it has not turned out that way, for at least three reasons.

- Most – almost all – of the genome is non-coding. Thus, far from being a lean-and-mean reproducing machine honed by relentless competition, the genome looks more like a flabby couch potato unlikely to be competitive at any level.
- The coding part of the genome seems insufficient to do the work expected of it. There is no strong correlation between genotype and phenotype (on this "C-value enigma" see Gregory 2005). Thus, much of the work assumed to be performed by genes is now seen as lying in the province of epigenetics.
- The genome is not the stable hard-drive that ensures the smooth running of the biological software. Pieces of code move around within the genome and move between genomes in disconcerting ways (see Oliver and Greene 2009).

What does all mean for the Darwinian system of ideas? That is beyond my competence. One obvious question is whether an unstable genome is consistent with the gradualism that is the default assumption of Darwinism (even though it has been denied by some

Darwinians, such as Huxley and Gould). It seems clear that much is happening at the level of the genome that we do not at all understand. Given what we do know, it is quite possible that large-scale evolutionary modification might occur not incrementally but very abruptly. This possibility has the attraction that it might be seen as matching the radical discontinuity of the fossil record. Abandoning gradualism will be seen by some as abandoning Darwin; others will portray it as a revamped Darwinism, despite Darwin's insistence from the start on incremental changes only. (For one unorthodox viewpoint, reporting on very recent research, see Ryan 2002 and Ryan 2009.)

How does all this relate to philosophy? I'm not sure. Recent public debate about Darwinism has been driven by the challenge from creationism (aka "Intelligent Design"), but that is not an angle that interests many philosophers. Few if any philosophers have any sympathy for or interest in creationism (Fuller 2008, though a secular humanist, is a partial exception). A more interesting question is how far are they aware of the unorthodox happenings within biology? The leading names in the philosophy of biology seem to be unperturbedly Darwinian. We will have to wait and see how all this plays out. I hope the philosophers do take the new genomics seriously. There is every reason why they should do so, since they might help us to think through the issues a little more systematically. (See, for one example, Griffiths & Stotz 2006.) But to do so will perhaps require dropping the Darwinian triumphalism that has been dominant for so long and making room for consideration of non-Darwinian theories of evolution. Darwin himself said at the end of his 1859 "Introduction": "I am convinced that natural selection has been the main but not the exclusive means of modification" (Darwin 1968: 69). The present question is whether the Darwinian theory of evolution is only one amongst a number of plausible evolutionary theories.

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