
PHILOSOPHY OF SCIENCE
IN AN AGE OF
NEO-DARWINIAN APOLOGETICS

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ABSTRACT. This paper is a reflection on the shift in the role of philosophers vis-à-vis scientists from 'philosophers of science' to 'philosophers for science', what I have called the 'underlabourer syndrome'. One consequence of this syndrome in the case of Neo-Darwinism is that the theory has become rife with internal interpretive tensions, which philosophers have tolerated by loosening their own criteria for a good scientific theory. This shift in philosophical standards probably reflects the strong cultural standing of Neo-Darwinism. Intelligent design theory, in its quest to achieve intellectual respectability as an opponent to Neo-Darwinism, has somewhat mimicked its opponent by adopting a conception of 'intelligent designer' just as open as that of the Neo-Darwinist conception of 'evolution'. I argue that neither strategy works well, either epistemologically or politically.

KEY WORDS. Neo-Darwinian synthesis, Neo-Darwinian apologetics, intelligent design, Evolution, underlabourer, philosophy of science, theology, theodicy, Creationism, Elliott Sober.

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1. THE UNDERLABOURER SYNDROME

When I was doing my Ph.D. in history and philosophy of science at the University of Pittsburgh, now over a quarter-century ago, I always wondered why so many otherwise quite interesting and intelligent philosophers insisted on portraying themselves as ‘underlabourers’ for science. I first encountered the term in an article by Jerry Fodor (1981), where he traced the view back to John Locke’s self-understanding vis-à-vis Newton, which was then updated by the logical positivists vis-à-vis the early twentieth century revolutions in physics and now further updated by philosophers like Fodor interested in the foundations of the (then) newly emerging field of cognitive science.

From the start, I found the idea of philosophers as underlabourers vaguely demeaning, since Locke’s contribution to Newton was clearly one of public relations: He converted Newton’s conceptually powerful but mathematically based theory into a respectable ideology, ‘Newtonianism’, that could be endorsed by the innumerate. However, with hindsight, I have come to believe that Fodor portrayed himself and his co-workers in cognitive science, as well as the positivists (and the Popperians, for that matter), in a needlessly unflattering light. While all of these philosophers were very interested in the foundations of the special sciences, they tended to propose theories and even methodologies that went against the grain of the scientists’ self-understanding of their everyday practice. The fact that the philosophers no longer talked about metaphysics ‘as such’ did not mean they had lost their philosophical scruples. If anything, their move from metaphysics as an autonomous discipline to metaphysics as scientific foundations was interpreted by many scientists as an aggressive move into their terrain.

It was the scientific backlash to such shamelessly critical philosophising that provided an audience for Michael Polanyi and Thomas Kuhn, two avowedly ‘post-critical’ philosophers who defended normal science as a philosophy-free zone. The sociology of scientific knowledge and its disciplinary successor, science and technology studies, have since that time followed Polanyi’s and Kuhn’s post-critical lead by presenting themselves in purely descriptive, not normative, terms (Fuller 2000). Although each of these developments appeared for a certain time to be placing the philosopher and the scientist at a level playing field—what Yang (2008) has recently dubbed a ‘fraternal’ rather than a ‘paternal’ relationship—it is not obvious that such a status of equality is really tenable. Rather, philosophers and scientists seem destined to exist in some sort of relationship of subordination, with either one or the other party on top.

2. 'THE NEO-DARWINIAN SYNTHESIS':
WHAT'S IN A NAME?

All of this is by way of introducing a group of contemporary philosophers who I take to be true spiritual heirs of Locke's underlabourers, namely, the *Neo-Darwinian apologists*. There are several representatives of this species—including David Hull, Michael Ruse, Elliott Sober and Daniel Dennett, not to mention younger variants. Their tone, style and emphasis may vary significantly but they all share warm feelings for Kuhn, in whose name they labour under a paradigm called the 'Neo-Darwinian synthesis'. The very name is significant for three reasons, each of which raises a host of interesting historical and philosophical questions:

(1) '*Neo-*': There is no 'Neo-Newtonian' paradigm because for the two hundred years following the publication of *Principia Mathematica*, physics fully exploited Newton's theoretical resources to try to resolve standing anomalies in his original account of the cosmos, especially relating in matters relating to light and energy. But then in the early twentieth century, the discipline moved on to Einstein and beyond without returning to Newton for theoretical guidance (yet retaining a circumscribed version of his empirical achievements for practical purposes). However, prior to the emergence of experimental genetics as a research programme at the dawn of the twentieth century, Darwin's theory of evolution of natural selection was widely taken to have already run its course in biology. At that point, Darwin was being kept afloat largely as a political ideology and a suggestive sociological framework, what we now call 'Social Darwinism'. Thus, the phrase 'Neo-Darwinian' testifies to the role of Mendelian genetics in enabling Darwin's scientific resurrection: It finally provided an explanatory mechanism for natural selection, a process that had been previously understood only in terms of the shape of natural history that it allegedly produced. Nevertheless, we might still wonder about the exact point of grafting Darwin's original theory to a science, genetics, whose own research trajectory can be understood without any specific commitment to natural evolution, as it moved from a population to a molecular basis starting in the 1930s, which eventuated in the discovery of DNA as the genetic code and the routine sequencing of genomes (Morange 1998).

(2) '*Synthesis*': Of course, the Newtonian paradigm was itself a synthesis of disparate theories and phenomena, a point that William Whewell especially celebrated with such Latin coinages as 'colligation' and 'consilience', which laid the foundation for what is now called 'inference to the best explanation'. However, we do not normally refer to the 'Newtonian synthesis', because Newton and his successors removed the seams that originally divided the components of the synthesis, largely by homoge-

nising the methods by which disparate physical phenomena were studied. Before Newton physical motions on Earth and in the heavens—including light and magnetism—had not been persuasively presented as subject to the same research programme because, under the influence of Aristotle, they were seen as possessing different natures and hence had to be studied differently. But after Newton all of these fields shared a common ‘ideal of natural order’ based on the regular movement of the planets in the solar system (Toulmin 1961). This contrasts with the case of the Neo-Darwinian synthesis. Here, fundamental disagreements remain over which of the various constitutive disciplines should set the standard against which the contributions of the other disciplines are judged. For example, while both palaeontologists and molecular biologists call themselves ‘evolutionists’, their operational definitions of evolution differ markedly, with one field regarding as hypothetical (if not probably false) what the other field regards as established (if not incontrovertible), and vice versa. This particular disagreement was on clear public display in the final quarter of the twentieth century, courtesy of Stephen Jay Gould and Richard Dawkins. In the wake of this dispute, scientific creationists and intelligent design theorists have capitalised on it for their own purposes (Woodward 2003), while the Neo-Darwinian apologists have taken it as an invitation to settle the matter by philosophical means ‘once and for all’, sometimes quite explicitly (e.g., Sterelny 2001).

(3) ‘*Darwinian*’: The expression ‘Neo-Darwinian synthesis’ is perhaps most clearly associated with Theodosius Dobzhansky (1937), who actually embodied the synthesis. Originally trained as a natural historian in Russia, he migrated to the United States where he eventually succeeded his teacher T.H. Morgan at Columbia as head of the world’s leading genetics laboratory prior to the revolution in molecular biology. Throughout the middle third of the twentieth century, the term ‘Darwinian’ was used rhetorically to capture a sense of *natural* evolution that did not veer into the eugenically manipulative forms associated with other forms of evolution, notably the Soviet Union’s revival of Lamarck’s theory of inheritance of acquired traits. In morally abhorrent cases where there was a clear reliance on both Darwin and Mendel—notably Nazi racial hygiene—the phrase ‘Social Darwinism’ was extended to cover not only the treatment of natural selection as Adam Smith’s invisible hand writ large in nature (a reading justified by Darwin’s reliance on Malthus and the work of his own grandfather, Erasmus Darwin) but also deliberate policies of genocide, which Darwin himself clearly never advocated. (In fact, Darwin did not believe that our knowledge of heredity justified even the original eugenics proposals of his cousin, Francis Galton, to improve the species.) All of this was helped by Darwin’s own caution in excluding any substantive discus-

sion of humans from his landmark work, *On the Origin of Species*. This was especially helpful after World War II, when Darwin's name could be easily invoked—unlike, say, Herbert Spencer's—to defend the idea that natural selection applied only prehistoric, not historic, time. This provided a politically correct division to the work of biological and social scientists that remained intact until the mid-1970s, with the publication of E.O. Wilson's *Sociobiology* (1975) and Richard Dawkins' *Selfish Gene* (1976). At the same time, the conceptual independence of genetics research from the rest of the 'synthesis' has come to be re-visited with the revolution in molecular biology, which for the past half-century has been the most active area of biological research, increasingly biotechnology, where matters concerning the actual history of the Earth and the original formation of species are not especially relevant.

It is an interesting sociological fact that the scientists who would normally be regarded as the main empirical researchers in the 'Neo-Darwinian synthesis' do not especially resonate to that phrase themselves. If anything, they tend to regard the invocation of 'Darwinian' as a Creationist ploy to conjure up all sorts of unsavoury cultural associations—especially heartless capitalism and vicious Nazism—that detracts from focusing on the 'real science'. Thus, biologists much prefer the neutral expression, *modern evolutionary theory* or *modern evolutionary synthesis*. These expressions serve a dual function for the scientists: they remove any historical trace and they keep the future open as to what 'evolution' might come to mean (i.e., not simply or even primarily Darwinian mechanisms).

Unfortunately, to the ears of an underlabouring philosopher, 'Darwinian' remains important to keep in the phrase for two reasons. First is the *positive* cultural association of Darwin with secularism, naturalism and even ecology. Second is the potential unclarity, if not unfalsifiability, of biological theory if specific mechanisms are not identified as primary in the evolutionary process. These two reasons reveal that, even in their underlabouring capacity, philosophers are still fond of Popper's conception of science as an 'open society'. Thus, for them the term 'Darwinian' symbolises at once science's progressive yet self-critical character. Nevertheless, one must admit that the Neo-Darwinian apologists find themselves in a peculiar rhetorical position, given that those for whom they provide apologetics do not see the need for their services!

So, what are we to make of philosophy of biology's unrequited love of biological science? First, philosophers are more invested than scientists in the idea that the synthesis remains intact, with Darwin's theory of evolution by natural selection functioning like Newton's Laws in the old 'covering-law' accounts of unified science favoured by the logical positivists. Thus, Daniel Dennett (1995) has literally applied William James' turn-of-

the-century quip that natural selection acted as a 'universal solvent' to remove superstition from every belief system it touches, in order to convert Darwin's theory—originally intended as a generalisation about Earth's natural history—into an all-purpose model that might even explain how we happen to live in the particular physical universe that we do. However, this continuation of Newton-sized philosophical ambitions by Darwinian means raises many problems—or, more optimistically, provides many opportunities—for Darwin's apologists. In particular, the semantically relaxed conception of evolution favoured by practising biologists leads in many different directions, which then become the source of deep hermeneutical tensions for philosophers that are comparable to the problems faced by those collating the differing accounts of Christ's life given in the Gospels.

In light of the above discussion, consider the several different senses of 'evolution' that biologists routinely move between, depending on their particular research speciality and topic of investigation:

1. *Common descent with modification.* Closely associated with Darwin himself and especially favoured by palaeontologists, though also easily contested by the presence of 'gaps' or 'leaps' in the fossil record, a point exploited by creationists and some intelligent design theorists—often aided by strongly antirealist evolutionary scientists, such as Stephen Jay Gould.

2. *Increasing differences in DNA.* The so-called molecular clock hypothesis, a version of (1) updated in light of molecular biology, which associates the differences in the genomes of two species with the number of mutations they have undergone since their ancestral populations divided from a common gene pool, which in turn enables inferences about the age of the species.

3. *Non-random change in the frequency distribution of traits in a gene pool.* The classic Mendelian definition of evolution, but also consistent with so-called 'neutral evolution', whereby most genetic change turns out to be the product of 'drift', that is, a statistical by-product of natural selection. Another sense in which this view is 'neutral' is that it can be used to understand evolution as either a natural or an artificial process, as in eugenics.

4. *Increasing complexity and adaptability.* An idea that Herbert Spencer carried over from Lamarck to Darwin, picked up again by Julian Huxley in the first book to use the phrase 'evolutionary synthesis', and which lives on in the writings of Richard Dawkins evolutionary psychology. Contrary to Darwin's own rather principled, proto-Peter Singer, views about the fundamental equality of all species under the eyes of natural selection, this

view hints at biological criteria for our species uniqueness, if not superiority.

5. *Increasing control over nature.* A stronger version of (3) that presumes that humanity will render natural selection a completely artificial process as we take more control of the environment. The heyday for this view was the cybernetic revolution of the 1950s and 1960s, especially the work of Gregory Bateson, who equally warned of backlashes. A diminished version survives in Dawkins' concept that the technological infrastructure of modern life constitutes our 'extended phenotype'.

6. *Convergent evolution.* A view that is outright counter-Darwinian in its suggestion that over time the possible forms of life narrows, indeed converging on increasingly similar forms that may involve the recurrence of atavisms—i.e. genetic throwbacks that effectively are recycled to produce new organisms or adaptations. Biologists who hold this view, such as Simon Conway Morris (2003), tend to be theists or Lamarckians, but in any case opposed to the Darwinian purism of Gould (1988), who argued that were evolutionary history replayed, a radically different array of species would result.

As of this writing, there is no agreed formulation of the Neo-Darwinian synthesis comparable to the deductive formulation of Newtonian world-system in its nineteenth century heyday. Instead, over the past quarter-century, philosophers of science have shifted their criteria of an adequate scientific theory from the Newtonian gold standard of a systematically unified, mathematically expressed account of nature to the much looser one, whereby a theory becomes no more than a collection of models, each of which provides a partial representation of nature's complexity that can together figure in a narrative account of evolution. In terms of philosophical homelands, one might call this the great shift from Vienna (in the 1930s) to Stanford (in the 1980s).

3. DOES INTELLIGENT DESIGN THEORY BENEFIT FROM NEO-DARWINIAN APOLOGETICS?

Perhaps the main—certainly most noticeable—challenger to the Neo-Darwinian synthesis today as an overall explanation for the nature of life and the origin of species is intelligent design theory, which proposes to treat nature as an artefact in a very robust and literal sense, namely, as implying the existence of an intelligence responsible for the design. This idea was fundamental to the Scientific Revolution's radical interpretation of the Biblical idea that humans are created 'in the image and likeness of God', which was read to imply that nature is God's machine, which we can understand by virtue of our own ability to make machines (Fuller 2007). This view was also central to English natural theology, a hybrid of scientific

and religious thought that flourished well into the nineteenth century. Its representatives included such figures as Joseph Priestley, William Paley, Thomas Malthus and William Whewell. These figures ranged over the entire political spectrum of the day, but they tended to treat nature as a single purpose-built functioning system that operates according to its own economic principles to make maximum use of the available energy. Indeed, these figures believed that a systematic vision of nature was required for the possibility of systematic scientific inquiry.

Kant famously began—and Darwin largely completed—the intellectual drive against natural theology by distinguishing the (strong) psychological compulsion behind its view of science from its (unproven) epistemological basis. Nearly two centuries later, intelligent design theory is now trying to reverse this Kant-Darwin move in thought, aided by a generation of theologically inspired scientists trained mainly not in Darwin's own field studies and natural history, but chemistry, engineering and applied statistics, often with a strong grounding in computer simulations. Intelligent design theory has run into many legal and political battles in the United States, whose limits on the expression of religion in publicly funded schools have been used against the theory by Neo-Darwinian apologists. For them, intelligent design theory is 'born again creationism'. One consequence has been that intelligent design theorists tend not to talk about the properties of the 'designing intelligence' behind nature, sometimes even suggesting that life could have been seeded from an extraterrestrial source, as was suggested originally by the great Swedish chemist Svante Arrhenius and updated by the co-discoverer of the double helix model of DNA, Francis Crick. In that respect, the theory's proponents have tried to treat the concept of 'intelligent design' very much as Neo-Darwinists have treated 'evolution', namely, as a 'big tent' for many different competing interpretations that do not necessarily add up to a coherent or compelling theory.

The failure of intelligent design theory to specify the intelligent designer constitutes both a rhetorical and an epistemological disadvantage. Neo-Darwinian opponents have derided theory as, in principle, allowing for a 'flying spaghetti monster' to count as a possible intelligent designer. The epistemological disadvantage is subtler, namely, that intelligent design theory is unnecessarily forced to adopt an instrumentalist philosophy of science, whereby its theory is treated merely as a device for explaining particular phenomena (i.e., as products of intelligent design) without allowing inferences to the best explanation (i.e., the properties of the implied designer). Meyer (2009) is a recent systematic attempt to inject a more scientific realist perspective into intelligent design theory, but he too stops short of introducing what I believe is a *necessary* return to theology

as the source of theoretical guidance on the nature of the intelligent designer (Fuller 2008).

By way of conclusion, to make this point, consider Elliott Sober's recent forensic investigation of the epistemological warrant for both Neo-Darwinism and intelligent design theory, *Evidence and Evolution* (2008). Two of his main arguments against intelligent design theory may be obviated if the theory was more open about its theological commitments. I list them below:

1. *Intelligent design theory invents assumptions on an ad hoc basis to explain the allegedly designed character of aspects of nature, such as the panda's thumb, that most probably did not arise by design.* Sober's argument works as long as there is no theory of how the designer designs, namely, the principles behind the deity's handicraft governing different levels of nature, say, comparable to how we infer the architectural principles underlying an ancient edifice. This would involve imputing to the deity a psychology of sorts, one akin to Herbert Simon's (1977) 'bounded rationality', which portrays the rational agent as a constrained optimiser, that is, someone who works toward the best possible overall outcome, which in turn may require the tolerance of suboptimal outcomes along the way. This mode of thinking was common in the late seventeenth and early eighteenth century heyday of theodicy, the branch of theology concerned with justifying the horrors of nature and evils of humans in a world supposedly created by an omnibenevolent and omnipotent God. However, theodicy always had a borderline heretical status because it presupposes that humans can second-guess God's motives.

2. *Even if intelligent design theory were correct that every event must have a cause, and every species must have an intelligence behind its design, it does not follow that the cause or the intelligence need be the same in all cases.* Sober's argument here cuts very deep—perhaps even too deep for Sober himself, since it potentially undercuts the idea that there is an intelligible unity to nature that provides science with its goal and guiding impulse. In this respect, Humean scepticism towards the cosmological argument for the existence of God, whereby all causal chains are traced back indefinitely with no convergence at an ultimate source, also cuts against the point of Newton's project of unifying the diversity of nature under the fewest number of laws: why engage in Newton's project at all, if there is not a single source to all things? (In this respect, 'big bang' cosmology, the product of the twentieth century Jesuit natural philosopher Georges Lemaître, might be seen as trying to bridge the gap between Hume and Newton, especially if the origin of the universe is seen as arbitrary.) However, this scepticism could be mitigated, if not completely overturned, if additional theological arguments were presented that favour monotheism over the sort of poly-

theism that is consistent with the Hume but would have unlikely issued in Newton's science.

In short, by studiously avoiding the appeal to theological arguments as part of their scientific explanations, intelligent design theorists inhibit their own ability to meet the opposition of Neo-Darwinian apologists like Sober. Admittedly, this would mean not only re-opening old theological debates but also making them part of secular academic debate. A test of our collective intellectual maturity will lie in our ability to tolerate such a newly charged situation. But in any case, intelligent design theory does itself no favour by keeping the identity of the intelligent designer as vague as Neo-Darwinians keep the identity of evolution.

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