

BOOK REVIEWS

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MORE THAN YOU EVER WANTED TO KNOW ABOUT INTELLIGENT DESIGN¹

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The so-called evolution wars (Futuyma 1995; Pigliucci 2002) between the scientific understanding of the history of life on earth and various religiously inspired forms of creationism are more than ever at the forefront of the broader “science wars,” themselves a part of the even more encompassing “cultural wars.” With all these conflicts going on, and at a time when a potentially historical case on the teaching of Intelligent Design (ID) in public schools is being debated in Pennsylvania, it may be useful to consider a number of books that have come out recently to help scientists and the public at large to understand what all the fuss is about.

Let me make clear at the outset that creationism is not going to go away just because it will be defeated on intellectual grounds. If that were the case, we would not have this problem at the onset of the 21st century, long after Copernicus and Galileo ought to have paved the way. This is a problem deeply rooted in psychological fears, religious ideology, political opportunism and widespread anti-intellectualism, the latter itself with complex and profound roots (Hofstadter 1963). However, it is important to understand what the intellectual issues are, if one is to honestly make a case for science to the general public. Moreover, it is important for scientists to come to terms with the fact that most of the discussion is inextricably connected with issues about the very nature of science; that is, with philosophy. That is why the first book to be considered in this review is about philosophy of science, though it was written by a biologist. We will then examine what an actual philosopher has to say about the issue, and conclude with two edited volumes, one of which attempts to give a “balanced” view, the other unapologetically proscience.

Mayr and the Uniqueness of Biology

In his last book, the almost centenarian Ernst Mayr seems as fresh as when he was among the chief protagonists of the evolutionary synthesis of the 1930s and 1940s, for better and for worse. *What Makes Biology Unique* (2004) attempts to

tackle an important, albeit not exactly novel, question: is evolutionary biology a different kind of science from the queen and paragon of all modern science, physics? If so, is evolutionary biology a science at all, and what distinguishes science from nonscience?

In reality, only about two-thirds of the book deal with the stated question, as it isn't apparent to this reader what additional light can be shed on it by disquisitions on the evolution of humans or the likelihood of extraterrestrial intelligence. Furthermore, Mayr takes a rather odd approach to the problem: on the one hand, he (justly) chastises early philosophers of science for having taken for granted that all science reduces to the physics model; on the other hand, he largely ignores highly relevant philosophical literature of the last 20 years that makes exactly the points he wants to make about the nature of organismal biology. Similarly, it is somewhat amusing (or irritating, if you happen to be a philosopher) that Mayr attacks philosophers for their alleged ignorance of biology, but then turns around and attempts to write as a philosopher despite his own obvious limitations in that area.

The book starts out with a reasonable, if not original, critique of “physicalism,” pointing out, for example, the limited usefulness of mathematical formalism in partially historical disciplines such as evolutionary biology. Through a largely historical and informative approach, Mayr then goes on to argue that biology is sufficiently autonomous from the physical sciences that no useful “reduction” can be carried out beyond a fairly limited scope. To put it bluntly, the fact that all living organisms are made of quarks tells us very little of interest, and makes painfully clear that quantum mechanics is essentially irrelevant to evolutionary biology. Mayr goes on to explain why there are no laws in biology (in the same sense as there are in physics), and the difference between typological thinking (characteristic of the physical sciences) and the populational thinking that marks modern (though not pre-Darwinian) biology.

If one is not even superficially familiar with modern philosophy of science, Mayr's treatment represents a useful summary and introduction to the basic ideas. Then again, if one is seriously interested in philosophy of science, one's time would be better spent reading the insightful analysis of the difference between historical and ahistorical sciences found in Cleland (2002), or the critique of “greedy reductionism” articulated by Dupré (1993), neither of which is cited by Mayr. Similarly, chapter 9's critique of Thomas Kuhn's ideas about scientific revolutions has been present in the philosophical literature ever since the publication of Kuhn's book in 1970.

On the other hand, Mayr's conceptual analysis of Darwin's

¹ *What Makes Biology Unique? Considerations on the Autonomy of a Scientific Discipline*. Ernst Mayr. 2004. Cambridge University Press, Cambridge, U.K. 232 pp. HB \$30.00, ISBN 0521841143. *Darwin and Design: Does Evolution Have a Purpose?* Michael Ruse. 2003. Harvard University Press, Cambridge, MA. 371 pp. PB \$16.95, ISBN 0-674-01631-9. *Debating Design: From Darwin to DNA*. William A. Dembski and Michael Ruse. 2004. Cambridge University Press, Cambridge, England. 405 pp. HB \$45, ISBN 0521829496. *Why Intelligent Design Fails: A Scientific Critique of the New Creationism*. Matt Young and Taner Edis. 2004. Rutgers University Press, New Brunswick, NJ. 238 pp. HB \$39.95, ISBN 0-8135-3433-X.

five theories of evolution shows rather elegantly that what we refer to as *the* theory of evolution is in fact a complex ensemble of logically distinct components, some of which may be (and indeed have been) challenged without necessarily leading to the crumbling of the whole edifice. According to Mayr, Darwin's theory comprises: (1) the very idea of evolution, which obviously was not original with him; (2) the idea of common descent (regardless of the particular mechanisms that explain it); (3) gradualism (as opposed to true saltationism, not to the modern theory of punctuated equilibria, which is in fact perfectly compatible with classical Darwinism); (4) an explanation of the multiplication of species (which for Darwin was simply a byproduct of continuous divergence through time); and (5) natural selection as the chief (or only) agent of adaptation. There is enough material here to develop a book-length treatise of the subject, and while we certainly do not need another tome like Stephen Gould's final opus any time soon, it would help biologists, philosophers, and even educators (especially those involved with the creationist controversy) to trace the history of these five theories, their challenges, and how they evolved through the time since Darwin.

And here lies perhaps the major problem with Mayr's book: it is too short. One can get annoyed at Mayr's well-known tone of sufficiency for other people's work, and it is disappointing to find out that most chapters are in fact slightly revised versions of material that the author has published elsewhere rather recently. But in the end one is left with wanting more of the sort of insight that can only come from a man who actually lived as a major protagonist through some of the crucial chapters of the history of evolutionary thought. Fortunately for the reader, Mayr in fact wrote extensively on all the topics whose surface is barely scratched in *What Makes Biology Unique?*, and it is well worth going back to re-read those earlier efforts. But if you have time only for the Cliff notes version, this book will by all means do the trick.

Ruse and the History of the Design Argument

Michael Ruse is a philosopher who has written extensively (some would say too extensively, given his productivity in this area) on Darwinism, its history, and its philosophical implications. It is no surprise, therefore, to see yet another book by him on evolution and creationism (in the specific guise of intelligent design "theory"). *Darwin and Design: Does Evolution Have a Purpose?* (2003) is more than a highly readable and reasonably complete history of the struggle to explain the appearance of design in nature. It makes a crucial, if subtle, distinction, between the commonly understood version of the "design argument" and how it ought to be properly understood from a philosophical perspective.

The idea is that the so-called argument from design (for the existence of God) is actually made of two logically distinct steps: the argument to complexity and the argument to design. The first one will encounter no opposition from any practicing scientist, while all the controversy really revolves around the (much more philosophically weak) second step. The argument to complexity depends in good measure on what one means by "complexity," not a small problem for either science or philosophy, as it turns out. However, we do

have an undeniable, strong intuition that living organisms are "complex" in a way that goes far beyond, say, the self-organized structure of a hurricane. The argument to complexity, then, essentially says that living organisms pose a special problem to be tackled, a problem that cannot be resolved by invoking only the explanatory arsenal available to the physicochemical sciences. Mayr would have liked that, and Darwin would certainly not have objected to such conclusion.

The second step, the argument to design, builds on the argument to complexity, and argues for a much stronger proposition: that the complexity of living organisms is such that it admits only (or at least points strongly toward) an explanation in terms of intelligent agency. It is then a short step (though technically it would require a third argument, a point that Ruse seems to ignore or discount) to go from "intelligent agency" to supernatural agency, at least in the mind of ID proponents and of a large sector of the American public. Together, then, the argument to complexity and the one to design form the argument from design for the existence of God. Of course, it is the argument to design that is rejected by evolutionary biologists—although I hasten to add that such rejection is by no means equivalent to a profession of atheism (because God might exist even if any specific rational argument for Her existence fails).

As Ruse puts it at the beginning (p. 16): "That is the question that concerns us in this book—whether, having made the move to complexity, one is committed to making the subsequent move to design." The answer, more than 350 pages later, is no. However, this "long argument" (as Darwin would put it) is worth following in detail, even for practicing biologists, because along the way Ruse clears the air of all sorts of philosophical misconceptions about intelligent design and the nature of biological (and more broadly scientific) research. Considering the constant attacks against the practice and teaching (and probably soon the funding) of evolutionary biology, I think it would pay us as biologists to be more aware of the philosophical land mines so clearly exposed by Ruse.

Ruse, Take II (with Bill Dembski)

As I mentioned above, Michael Ruse is very prolific, so I need to spend some more time discussing another of his productions, this time a book co-edited with ID proponent William Dembski, entitled *Debating Design: From Darwin to DNA* (2004). The book is a collection of essays by various authors, divided into four parts, the titles of which say a lot about the content of the volume: "Darwinism" (notice the use of a typical creationist term to refer to what should more appropriately be called the Modern Synthesis), "Complex Self-Organization," "Theistic Evolution," and "Intelligent Design." Although I actually recommend the book for scientists and graduate students interested in really understanding the arguments (no matter how silly they may get), I feel that I have to warn the potential rational reader that the book is organized along an almost steady gradient of increasing imbecility, resulting in an equally steady progression toward an ulcer, if one takes things too much at heart. But let me proceed in order.

The four chapters on “Darwinism” do a reasonable job at attacking Intelligent Design (though it is interesting that the editors have chosen to present the attack first, and an explanation of what is being attacked last—a rhetorical device that surely favors Dembski over Ruse). While Francisco Ayala’s essay is remarkably uninspired, Kenneth Miller, Elliott Sober, and Robert Pennock (the first one a biologist, the other two philosophers) cover most of the bases very well, and Miller’s prose in particular stands out as at the same time witty and incisive.

The following four chapters deal with the field of self-organizing complexity, seen at times as an alternative (it is not) and at other times as a complement (more likely) to the standard Modern Synthesis paradigm. Within this section, however, there is a curious intellectual heterogeneity: Stuart Kauffman’s and Bruce Weber and David Depew’s chapters make interesting arguments about complexity, while cosmologist Paul Davies (why is a cosmologist writing about evolution?) produces a very eloquent amount of irrelevancies about teleology and the allegedly inevitable emergence of complexity during cosmic history. Finally, we have an elaborate, but close to nonsensical, essay by James Barham in which he presents a sort of neovitalistic view of the distinction between inorganic and organic matter.

The five chapters under the heading “Theistic Evolution” are largely irrelevant to the actual debate. For one thing, no serious evolutionary biologist would argue that the Modern Synthesis is in principle incompatible with the existence of a supernatural being, not even with one who somehow controls the unfolding of events in the universe through the natural laws that She established in the first place. This is a purely theological matter, and as such of no interest to the debate about science or science education that is at the core of the evolution-creation controversy. The only chapter of this group that I recommend reading is Michael Roberts’s, because of its proper historical background and the geological perspective that it adds to the issues on the table.

Finally, we come to the purest form of nonsense in the last four chapters of the book, devoted to allegedly explaining what Intelligent Design theory is all about, but that in fact turn into a trite rehearsal of attacks against evolutionary theory in particular and “materialistic” science in general (as if one could have a nonmaterialistic science to begin with). Three of the authors, William Dembski, Michael Behe, and Stephen Meyer, are among the prime movers of the ID brigade, and they present complex arguments with a degree of rhetorical effectiveness made possible by years of polishing the same few ideas. It makes for excellent reading to sharpen graduate students’ critical thinking abilities, but don’t expect much substance here. By and large, the best ID argument is that evolutionary theory falls short of giving a full and detailed account of the history of life on earth, and that *therefore*, the only alternative we have is to embrace the idea of a (supernatural) intelligent designer as the author of at least some (but not all) biological features—the infamous bacterial flagellum first and foremost.

Of course, it is true (though not universally acknowledged by evolutionary biologists) that the current evolutionary paradigm is incomplete. Despite protestations to the contrary, we still do not have a satisfactory conceptual (let alone em-

pirical) handle on several aspects of evolution, primarily the so-called evolutionary novelties that give rise to new body plans. But, of course, this is typical of scientific theories in general: both quantum mechanics and general relativity—by most accounts the two most successful scientific theories of all time—are well known to be incomplete, and may have to be modified in important respects, or even replaced by something better. This, however, has not caused physicists (or the general public, for that matter) to infer that *therefore* God must have done it. It is that last inference, what Dembski pompously refers to as “the design inference,” that makes an intellectual mockery of the whole ID enterprise.

Why ID Fails: Another Take

Finally, a good extended treatment of why ID is indeed a farcical intellectual enterprise is to be found in yet another edited book, *Why Intelligent Design Fails: A Scientific Critique of the New Creationism* (2004), put together—interestingly—by two physicists, Matt Young and Taner Edis. There is here, refreshingly, no pretense of “balanced” treatment, and Intelligent Design is exposed for what it is: a thinly veiled version of creationism, a pseudointellectual enterprise that has nothing to do with science or philosophy (or, indeed, good theology), and everything to do with inserting a religious wedge into public school education.

The book focuses on the science of ID, and especially on biology, but there are chapters that are more philosophical in flavor (e.g., “Is Intelligent Design Science?” by Mark Perakh and Matt Young), and others that deal with physics and cosmology (“Is the Universe Fine-Tuned for Us?” by Victor Stenger). Perakh’s chapter on the so-called free-lunch theorems, while a bit difficult to follow for the mathematically disinclined, is essential in order to be able to reject the most ambitious theoretical challenge posed by ID, William Dembski’s insistence that one can demonstrate mathematically the impossibility of natural selection to bring about adaptation (something that had already unsuccessfully been tried by the late cosmologist Fred Hoyle; see Pigliucci 2001). Another must read is Ian Musgrave’s chapter on the bacterial flagellum, biochemist Michael Behe’s quintessential example of the alleged empirical verifiability of the impossibility of natural evolution of complex structures. Musgrave both unmasks Behe’s argument for what it is, a new version of the old and trite argument from ignorance (including Behe’s own), and simply untenable once one considers what we actually know from comparative biology about the evolution of flagella.

All in all, the Young and Edis slim volume ought to be a vade mecum for graduate students and colleagues who are serious about understanding ID, for all its worth.

These four books are but the tip of the iceberg if one is interested in the evolution wars, and of course an even smaller percentage of what has been written more generally about the culture wars. Nonetheless, each volume (even the one co-edited by Ruse and Dembski) offers valuable insights to the serious reader.

The important thing to understand about all of this, however, is that the problem will not go away. The scientific community cannot hide its head in the sand (or in the pro-

verbial ivory tower), not only because it would be intellectually dishonest to do so, but because the very survival of science as a human enterprise depends on it. As Carl Sagan (1995) famously put it, science (and, more generally, reason) is a candle in the dark. It needs constant attention and protection, and it is up to all of us to provide it.

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