

Debating Design
From Darwin to DNA

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1. THE ORIGINS OF ID

Barbara Forrest has recently published a history of ID that is well documented and informative and yet, in several important respects, inaccurate and misleading (Forrest 2001). So it is necessary to set the factual record straight, and to explain why it is that highly qualified critics of ID, such as many of the contributors to this volume, are willing to engage it in serious debate.

According to Forrest, the ID movement is “the most recent – and most dangerous – manifestation of creationism” (Forrest 2001, 5). What ID really reflects is a “wedge strategy” – a proposal due to Phillip Johnson – which aims to drive a wedge between empirical scientific practice and methodological naturalism, allowing scientists to pursue the former without commitment to the latter. Although ID claims to offer scientific proposals, Forrest argues that its origin is entirely religious.

The “Wedge,” a movement – aimed at the court of public opinion – which seeks to undermine public support for teaching evolution while cultivating support for intelligent design, was not born in the mind of a scientist . . . or from any kind of scientific research, but out of personal difficulties . . . which led to Phillip Johnson’s conversion to born-again Christianity (6).

Furthermore, Forrest contends, ID “really has nothing to do with science” (30). The real goal, apparently, is to make scientists think of the religious implications of their work. However, “[n]ot a single area of science has been affected in any way by intelligent design theory” (30).

In fact, Forrest thinks that the idea that ID has something to contribute to science is a deliberately cultivated deception. The real strategy, she claims, is revealed in the so-called Wedge Document. This document outlines a five-year plan for implementing the wedge strategy under the auspices of the Center for the Renewal of Science and Culture² (13–14). Forrest thinks that the Wedge Document reveals the hidden agenda of the Intelligent Design movement, namely “the overthrow of materialism” and the promotion of “a broadly theistic understanding of nature” (from the Introduction of the Wedge Document, quoted in Forrest 2001, 14). It is apparently this view that leads Forrest and Paul Gross to suggest that ID is a Trojan horse, with religious warriors hidden by the trappings of science (Forrest and Gross 2003).

I see no good reason to deny the existence of the Wedge Document or of Phillip Johnson’s wedge strategy. Nonetheless, Forrest’s account is wrong on several matters of fact, and her interpretation of those facts trades on a number of fallacious inferences.

1.1. Stealth Creationism?

According to Forrest and other critics (Coyne 2001; Pennock 1999, 2001; Ussery 2001), ID is stealth creationism. However, it can be argued that ID

is significantly different from traditional varieties of creationism and that it has been quite public about its goals.

Of course, critics are entitled to argue that the creationist shoe ultimately fits, but for those who know little about ID, it is misleading to claim that ID is a creationist movement. It is not merely that proponents of ID do not refer to their movement as “Intelligent Design Creationism.” There are also substantial differences between the philosophy of ID and the view historically espoused by Young Earth and Old Earth creationists. As a scientific proposal, ID does not start from the idea of an inerrant biblical text, and it does not try to find evidence that backs up specific historical claims derived from a literal (or even poetic) reading of Genesis. Further, it is false as a matter of fact that all of the current members of ID derive, by descent with modification, from earlier forms of creationism. For example, before migrating to ID, Dembski was a theistic evolutionist, and Dean Kenyon thought that he had provided a thoroughly naturalistic account of the origin of life (Kenyon and Steinman 1969). Most importantly, ID never claims that an empirically based design inference by itself establishes the identity, character, or motives of the designer. This is because the design inference as developed by Behe and Dembski depends entirely on the empirical character of the effect – its irreducible or specified complexity – and not on the presumed character of the agent that caused it.

That we can make such a distinction is shown by our experience of making design inferences in the human case. Suppose that Colonel Mustard has died in mysterious circumstances at his country home. We are confident that his death was not necessary, a consequence of his worsening gout or some other ailment. The facts make it highly unlikely that Colonel Mustard’s death was the result of a chance event, such as a tragic accident while cleaning his military antiques. No, the evidence is that Mustard died because a crossbow bolt fired from twenty paces impaled him, and this has all the marks of design. Yet we do not know if the agent was Ms. Scarlet or Professor Plum, or if the motive was avarice or class warfare. We may, of course, find independent evidence that narrows down the list of suspects and homes in on the most likely motive. But none of that is necessary in order to infer design.

Now if we know how to detect design and are confident that no human could reasonably be responsible for it, there seems no reason in principle why we might not detect the marks of nonhuman (alien, artificially intelligent, or supernatural) design (Ratzsch 2001, 118–20). This is the premise of the Search for Extra Terrestrial Intelligence (SETI), of research in Strong Artificial Intelligence (which aims to make genuinely intelligent automata), and of those who think that only a being rather like God could explain the exquisite balance of the fine structure constants and the apparent fine-tuning of the cosmos for life. Nonetheless, according to ID, these suggestions about the likely identity of the designer are not necessary in order to detect design in the first place.

It is frequently replied, with a knowing nod and a wink, that proponents of ID still really think the designer is You Know Who. The suggestion is that the anonymous designer is a politically convenient fiction, a sugarcoating to make the underlying pill of creationism more palatable to those who would otherwise contest the relevance of religion to scientific practice. However, this response makes a number of doubtful assumptions. First, it assumes that all proponents of ID are religious believers, and this is false: some, such as Michael Denton, are agnostics. Besides this, as Ruse's introductory chapter points out, Aristotle accepted the design inference without the motivation of revealed religion. And we might add that Einstein thought that the success of mathematical physics depended on some ordering logos in the cosmos, even though he was far from being an orthodox Jew or Christian. But in any case, it is simply a fallacy to argue that since those proponents of ID who are believers identify the designer with God, this is what they are claiming can be inferred from the scientific evidence. Rather, this conclusion is drawn from a combination of the scientific facts and a theological and metaphysical interpretation. Theistic evolutionists and Darwinian Christians can see the fallacy in reverse when Richard Dawkins and William Provine claim to infer atheism from evolutionary theory, as if the unvarnished scientific evidence had established that atheological conclusion.

Given the clear contrasts between ID and traditional creationism, it seems plausible that the pejorative "creationist" label is used chiefly to encourage an attitude of dismissive rejection, which avoids engagement with ID's proposals.

The other main problem with Forrest's characterization is its suggestion that ID is really a conspiracy, that there is (or was, until her sleuthing uncovered it) a hidden agenda to undermine scientific materialism. This idea does not hold water, because there is nothing in the Wedge Document that has not been publicized elsewhere for quite some time. In fact, although Johnson did not use the term "wedge" in his first main book on evolution, *Darwin on Trial*, the idea of distinguishing the empirical methodology of science from a commitment to naturalism is already present in that book.

Naturalism and empiricism are often erroneously assumed to be very nearly the same thing, but they are not. In the case of Darwinism, these two foundational principles of science are in conflict. (Johnson 1993, 117)

And one cannot know Phillip Johnson and suppose that he is the sort of person who minces his words or keeps things under wraps. This is how he ends the same book.

Darwinian evolution . . . makes me think of a great battleship. . . Its sides are heavily armored with philosophical barriers to criticism, and its decks are stacked with big rhetorical guns ready to intimidate would-be attackers. . . But the ship has sprung a metaphysical leak. . . (Johnson 1993, 169)

More generally, it is hard to reconcile the picture of a secret society with the fact that proponents of ID have participated in so many public conferences, presentations, and radio shows, making their opposition to scientific materialism perfectly clear. Is it really a Trojan horse if all the soldiers are on the outside waving their spears? And how secret can the wedge strategy have been after Johnson published *The Wedge of Truth: Splitting the Foundations of Naturalism* (2000)?

1.2. Life before Johnson

Forrest contends that ID is fundamentally a religious movement, not a scientific one. Part of her reason for saying this is the clear Christian orientation and motivation of Phillip Johnson after his conversion. This makes Johnson seem like a man with a religious mission to attack evolution, and lends credence to the idea that the scientists he recruited were fundamentally of the same mind. But first, it is worth pointing out that this commits the genetic fallacy, since it is erroneously claimed that ideas cannot have scientific merit if they have a religious motivation. No one thinks it is a serious argument against the scientific discoveries of Boyle, Kepler, and Newton that they all believed in divine Providence. (Newton, in fact, thought the *primary* importance of his natural philosophy was apologetics for a Creator.) And likewise, one cannot show that ID is false or fruitless by pointing to the religious (or political) beliefs of its proponents. Contemporary history of science is actually almost univocal in maintaining that religious motivations have made extremely important contributions to science (Brooke and Osler 2001; Harrison 1998; Jaki 2000; Osler 2000; Pearcey and Thaxton 1994).

Furthermore, if religious commitments did detract from the legitimacy of ideas, one could easily point out that secular humanism is also a kind of religion and that Barbara Forrest is a member of the board of directors of the New Orleans Secular Humanist Association.³ One could then note that Forrest nowhere discloses this fact, either in her essay or in her biography (Pennock 2001, xviii). Is Forrest merely posing as a neutral investigator with the real aim of establishing secular humanism by stealth? Were one prone to conspiracy theories, one could waste quite a lot of time pursuing this line of thought. But it would be a pointless distraction from the real issue – whether or not people’s proposals have any merit.

More significantly, Forrest is led to the view that ID is fundamentally a religious movement by an erroneous prior assumption, namely, that the ID movement began with the wedge strategy. This reflects the perception that Johnson, who undoubtedly helped to organize the fledgling design movement, is the intellectual father of ID. But this is simply not the case.

In fact, the contemporary conception of ID received its earliest sharp statement in a book entitled *The Mystery of Life’s Origin* (Bradley, Olsen, and Thaxton 1984). This book surveys the various attempts to explain the

appearance of life via naturalistic chemical evolution and finds all of them wanting. The idea that life resulted from random reactions in a primeval prebiotic soup is rejected because there is strong evidence of a reducing atmosphere, ultraviolet radiation, and a plethora of chemical cross-reactions, all of which would prevent the formation or stability of important organic molecules.

[B]oth in the atmosphere and in the various water basins of the primitive earth, many destructive interactions would have so vastly diminished, if not altogether consumed, essential precursor chemicals, that chemical evolution rates would have been negligible. (Bradley, Olsen, and Thaxton 1984, 66)

Thus it appears that simple chance is insufficient to explain the first appearance of life. This conclusion is only strengthened by an analysis of the complexity of the simplest self-replicating molecules, as many scientists who are not proponents of ID acknowledge. For example, Cairns-Smith had already noted that

Low levels of cooperation [blind chance] can produce exceedingly easily (the equivalent of small letters and small words), but [blind chance] becomes very quickly incompetent as the amount of organization increases. Very soon indeed long waiting periods and massive material resources become irrelevant. (Cairns-Smith 1971, 95)

At the same time, it is difficult to see how chemical laws could explain the complex aperiodic information found in biological molecules. Bradley, Olsen, and Thaxton argue that even in an open system, thermodynamic principles are incapable of supporting the configurational entropy work needed to account for the coding found in complex proteins and DNA molecules (Bradley, Olsen, and Thaxton 1984, Chapters 7–9). As Stephen Meyer later argued, appeal to a natural chemical affinity does not seem to help either.

[J]ust as magnetic letters can be combined and recombined in any way to form various sequences on a metal surface, so too can each of the four bases A, T, G and C attach to any site on the DNA backbone with equal facility, making all sequences equally probable (or improbable). Indeed, there are no significant affinities between any of the four bases and the binding sites on the sugar-phosphate backbone. (Meyer 2000, 86)

Considerations such as these made it seem that necessity or self-organization could not account for the origin of life either. Nor did it seem to help matters to extend Darwinism to prebiotic conditions and claim that life arose via the interaction of chance and necessity. For, as Theodosius Dobzhansky, one of the great architects of the neo-Darwinist synthesis, had long since pointed out, “prebiological natural selection is a contradiction in terms” (Dobzhansky 1965, 310), since natural selection presupposes the very kind of replicators whose emergence has to be explained.

Now suppose one thinks that there are exactly four possible explanations of the origin of life: chance, necessity, a combination of chance and necessity, and design. And suppose also that one believes one has reason to eliminate the first three candidates. However surprising or bizarre, design is then the rational inference. Along with this purely negative case for design, there is the positive observation that in our experience, intelligent agency is the only known cause of complex specified information.⁴ On uniformitarian grounds, therefore, it is plausible to infer that such agency accounts for the biological complexity that appeared in the remote past. Thus according to proponents of ID, it is not some desire to rejuvenate creationism but an emerging crisis in normal, naturalistic science that points to design. It is the discovery that pursuing naturalistic science leads to an unexpected breakdown and our increasing insights into the nature and source of information that put design back on the table for discussion.

A couple of years after Bradley, Olsen, and Thaxton's seminal work, the molecular biologist Michael Denton published a sustained critique of Darwinism, *Evolution: A Theory in Crisis* (1986). Denton pointed out that many of the great biologists who aided in developing systems of morphological classification (for example, Carl Linnaeus, Georges Cuvier, Louis Agassiz, and Richard Owen) held views antithetical to Darwin's.

The fact that so many of the founders of modern biology, those who discovered all the basic facts of comparative morphology upon which modern evolutionary biology is based, held nature to be fundamentally a discontinuum of isolated and unique types unbridged by transitional varieties . . . is obviously very difficult to reconcile with the popular notion that all the facts of biology irrefutably support an evolutionary interpretation. (Denton 1986, 100).

Denton's own position is close to Cuvier's typological view, according to which

each class of organism . . . possesses a number of unique defining characteristics which occur in fundamentally invariant form in all the species of that class but which are not found even in rudimentary form in any species outside that class. (Denton 1986, 105)

The invariance of these constraints on the biological classes argues that they did not gradually evolve by natural selection, but rather were somehow built in from the beginning. While one way of interpreting this idea is self-organization (Denton's own current position; see Denton 1998), it could also point to some form of design. At any rate, Denton defends his thesis with a number of considerations that proponents of ID have used in their critique of Darwinism. First, Denton notes that there are limits on the kinds of transformations allowed by a gradual series of small changes. Anticipating the work of Behe (1996), Denton notes that complex systems do not remain functional when subjected to local changes, because of the need for

compensatory changes in the other, coadapted parts of the system. Thus in a watch,

[a]ny major functional innovation, such as the addition of a new cogwheel or an increase in the diameter of an existing cogwheel, necessarily involves simultaneous highly specific correlated changes throughout the entire cogwheel system. (Denton 1986, 90)

How are such changes to be synchronized and coordinated, if not by design?

Such theoretical considerations are buttressed by a number of empirical arguments against Darwinism. The jewel in the Darwinian crown is the argument from homology, according to which the similarity in certain structures (such as the forelimbs of mammals), despite their varied uses and adaptations, points to a common ancestor and hence to the mechanism of descent with modification. However, Denton argues that the “organs and structures considered homologous in adult vertebrates cannot be traced back to cells or regions in the earliest stages of embryogenesis” (Denton 1986, 146), a point more recently defended by Jonathan Wells (2000). Indeed, “apparently homologous structures are specified by quite different genes in different species,” and “non-homologous genes are involved to some extent in the specification of homologous structures” (Denton 1986, 149). It has happened rather often that apparent cases of homology were really cases only of analogy or convergence, which cannot support common descent with modification.

Further, Darwin’s theory predicts the existence of numerous transitional forms, but the evidence of their existence seems to be poorly documented by the fossil record. Denton agrees with Stanley, who writes that

[t]he known fossil record fails to document a single example of phyletic (gradual) evolution accomplishing a major morphological transition and hence offers no evidence that the gradualistic model can be valid. (Stanley 1979, 39, quoted in Denton 1986, 182)

Most telling of all, Denton thinks, is the way the coordinated complexity of biological structures makes gradualistic narratives highly implausible. For example, Denton argues against both the “from the tree down” and “from the ground up” theories of the evolution of avian flight.

The stiff impervious property of the feather which makes it so beautiful an adaptation for flight, depends basically on such a highly involved and unique system of coadapted components that it seems impossible that any transitional feather-like structure could possess even to a slight degree the crucial properties. (Denton 1986, 209)

While defenders of Darwinism complain that this is no more than an “Argument From Personal Incredulity” (Dawkins 1996, 38), proponents of ID reply that they are actually giving an argument from probability grounded

in the known resources and the creative potential of gradualistic processes, and that it is the Darwinists who are guilty of an “Argument From Personal Credulity” – their belief in some poorly specified causal pathway (see, for example, Dembski 2002, 239–46).

1.3. Johnson and After

Firing a few scientific salvos at Darwinism was an important first step, but it did not by itself cause a discernible alternative movement to coalesce. Unquestionably – and here is the grain of truth in Forrest’s history – the ID movement started to take shape as the result of the leadership of Phillip Johnson, a professor of law at Berkeley and an expert on legal reasoning. Forrest’s mistake is analogous to supposing that the complete history of a football team starts with the moment that the coach gathers together the players, thereby ignoring the important work the players had already done. Before Johnson ever contacted them, many of the players selected for Johnson’s team had independently arrived at conclusions that pointed to Intelligent Design. Michael Behe, Michael Denton, Dean Kenyon, and Henry Schaefer had established scientific careers and were already sympathetic to the idea that design lay behind the universe. Indeed, that was precisely Johnson’s reason for recruiting them. It is therefore inappropriate for Forrest to insinuate that proponents of ID obtained their qualifications in order to infiltrate the academy. According to Forrest,

The CRSC creationists [sic] have taken the time and trouble to acquire legitimate degrees, providing them a degree of cover both while they are students and after they join university faculties. (Forrest 2001, 38)

Forrest gives no evidence to back this conspiratorial suggestion, and it surely constitutes an unseemly attack on the academic reputations of some senior scholars. For example, the quantum chemist Henry Schaefer is a CRSC fellow, yet he has been doing scientific research since 1969 (long before Johnson became interested in design), has over 900 science journal publications to his credit, and has been nominated five times for the Nobel Prize.⁵

Forrest is correct that Johnson’s involvement with design began shortly after his conversion to Christianity at the age of thirty-eight. In 1987, Johnson was on sabbatical in England.

[H]is doubts about Darwinism had started with a visit to the British Natural History Museum, where he learned about the controversy that had raged there earlier in the 1980s. At that time, the museum paleontologist presented a display describing Darwin’s theory as “one possible explanation” of origins. A furor ensued, resulting in the removal of the display, when the editors of the prestigious *Nature* magazine and others in the scientific establishment denounced the museum for its ambivalence about “established fact.” (Meyer 2001, 57–8)

Johnson then read two pivotal books: the first edition of Richard Dawkins's *The Blind Watchmaker* and Denton's *Evolution: A Theory in Crisis*. (Notice that both the contents and publication date of the latter book [1986] ought to have told Forrest that design did not begin with Johnson.) After reading these books, Johnson became fascinated with evolution and devoted himself to studying evolutionary theory and using his legal skills to analyze its arguments. He also benefited from conversations with Stephen Meyer, "whose own skepticism about Darwinism had been well cemented by this time" (Meyer 2001, 57) and who happened to be in Cambridge working on a doctorate in the history and philosophy of science.

Johnson's work produced two fruits. First, there was the publication of *Darwin on Trial* in 1991 (revised edition 1993), in which Johnson argued that the scientific establishment had appropriated the word "science" in order to protect their favored naturalistic philosophy. If science is about following the evidence wherever it leads, then why should scientists rule out a priori the possibility of discovering evidence for supernatural design? As we have seen, implicit in this book's thesis was the idea of a wedge that could be driven between the empirical methods of science and the commitment of most scientists to naturalism. This idea led to a movement, whose first major event was a conference held at Southern Methodist University in 1992, featuring Phillip Johnson together with Michael Behe, Stephen Meyer, and William Dembski. Johnson was responsible for making a number of important early contacts, but the movement very soon took on a life of its own and attracted a significant cadre of scientists and philosophers. In 1996, an official organization appeared, the Center for the Renewal of Science and Culture (CRSC), operating under the umbrella of a Seattle-based think tank, the Discovery Institute, which provided fellowship support for scientists critical of Darwinism and supportive of ID. From 1996 to the present, Discovery fellows have appeared at no less than six major conferences, at Biola (1996), the University of Texas at Austin (1997), Baylor University (2000), Concordia University Wisconsin (2000), Yale University (2000), and Calvin College (2001), in addition to many other smaller presentations and symposia. The Baylor and Concordia conferences were particularly significant in that proponents of design faced their best critics in debate.

Along with these conferences have come a number of significant books. Johnson himself has continued his polemical work, with such influential books as *Reason in the Balance* (1995) and *The Wedge of Truth* (2000). There is a substantial collection of philosophical, scientific, and cultural essays drawn from the landmark Biola conference of 1996, entitled *Mere Creation: Science, Faith and Intelligent Design* (Dembski 1998b). From the field of biochemistry, Michael Behe wrote *Darwin's Black Box: The Biochemical Challenge to Evolution* (1996). In this book, Behe argued that modern biochemistry was revealing a world of irreducibly complex molecular machines, inaccessible to gradualistic pathways. Dembski followed this with a rigorous formulation of the

conditions under which chance and necessity are insufficient to account for a phenomenon, *The Design Inference: Eliminating Chance through Small Probabilities* (1998a). This work was followed by Dembski's more popular exposition linking faith and science, *Intelligent Design: The Bridge between Science and Theology* (1999) and, more recently, by his rigorous attempt to show that Darwinian mechanisms are incapable of generating complex specified information, *No Free Lunch: Why Specified Complexity Cannot Be Purchased without Intelligence* (2002). Another collection, focused exclusively on the scientific case for design (in cosmology, origin-of-life studies, and biological complexity) is *Science and Evidence for Design in the Universe* (Behe, Dembski, and Meyer 2000). The textbook evidence for Darwinism is critiqued by Jonathan Wells in his *Icons of Evolution* (2000). Eugenie Scott, a well-known advocate of excluding design from biology curricula, admitted that this book would cause a lot of trouble, while strongly criticizing it (Scott 2001).

Alongside the scientific works, a number of philosophers have pressed the case that naturalism, and particularly the Darwinian variety, threatens human rationality and the very enterprise of science. Alvin Plantinga (1993, Chapter 12; 2000, Chapter 7) has suggested that evolutionary naturalism is epistemically self-defeating, because, if it were true, we could never have sufficient warrant to believe it. Michael Rea and Robert Koons (in Craig and Moreland 2000) both argue that naturalism cannot justify some assumptions required by scientific practice. For Rea, the problem is that naturalism cannot explain the modal qualities of particular physical objects. For Koons, the problem is that naturalism cannot account for the reliability of scientists' appeal to aesthetic criteria of theory choice (such as symmetry, coherence, and simplicity), and so cannot hope to resolve Nelson Goodman's famous riddle about the proper way to project observed features into the future. Here the target is not Darwinism but the assumption that naturalism is integral to scientific rationality. If, as Koons argues, theistic assumptions are necessary in order to ground the rationality of science, then, it may be argued, the possibility of empirically detectable, supernatural design can no longer be excluded in principle.

Aside from their purely academic work, proponents of ID have been quite busy with other activities. They have been instrumental in arguing for a broadened discussion of origins in the biology classroom, giving expert testimony, and developing legal briefs. Popularized versions of their work have appeared in magazines, mass circulation books, and on video, aimed at getting the basic ideas out to a wider audience and at influencing upcoming generations. Darwinists have responded at the same popular level, most notably in the recent seven-part PBS series *Evolution* (2001). There is no question that issues of cultural authority and power are important in motivating the current controversy. Some see naturalistic evolution as the very icon of progressive thinking, while others see it as a universal acid⁶ that eventually eats its way through every valuable cultural institution.

2. THE FUTURE OF ID

Forrest is quite correct to suggest that the ID movement has by no means fulfilled all of its goals. In the limited space available, I will outline some of the main areas in which ID still has much work to do.

2.1. Acceptance by the Educational Mainstream

Unlike some of the more extreme creationists, who have wanted to ban the teaching of evolution, proponents of ID advance the more modest goal of having their ideas included for discussion in high school and college science classes. They argue that current legislation gives Darwinism a virtual monopoly, ruling substantial criticisms and alternative proposals out of court. According to the ID movement, this is bad for education, because teaching the controversy about a theory helps students to gain an understanding of the theory's strengths and weaknesses. Such open dialogue would also prevent the dogmatic retention of Darwinist theory in the face of strong counterarguments. If science is a critical enterprise analogous to a series of legal trials, then all relevant evidence must be allowed its day in court.

From an ID perspective, it does not help that some members of the scientific establishment appear to intimidate and censor highly qualified critics of Darwinism. In 1990, when the accomplished science writer and inventor Forrest Mims admitted that he questioned evolutionary theory, he was not hired to write the "Amateur Science" column for *Scientific American*. In the ensuing protest, which included many voices opposed to design but even more opposed to viewpoint discrimination, the journal *Science* printed the following:

Even today, some members of the scientific establishment have seemed nearly as illiberal toward religion as the church once was to science. In 1990, for instance, *Scientific American* declined to hire a columnist, Forrest Mims, after learning that he had religious doubts about evolution. (Easterbrook 1997, 891)

Similarly, in 1992, Dean Kenyon, a biology professor at San Francisco State University, was barred from teaching introductory biology classes after he shared his misgivings about evolutionary theory (including his own theory of chemical evolution) with his students.⁷

Mr. Kenyon . . . had for many years made a practice of exposing students to both evolutionary theory and evidence uncongenial to it. He also discussed the philosophical controversies raised by the issue and his own view that living systems display evidence of intelligent design. . . . [H]e was yanked from teaching introductory biology and reassigned to labs. . . . Fortunately, San Francisco State University's Academic Freedom Committee . . . determined that . . . a clear breach of academic freedom had occurred. (Meyer 1993, A14)

The same pattern has been repeated in several other cases, including the well-known removal of William Dembski from his position as director of the Michael Polanyi Center at Baylor University in 2000 (Menuge 2001).

One of ID's long-term goals is to place at major universities more scientists whose work is explicitly shaped by an ID research program. For that reason, it is essential for the ID movement to build bridges with its opponents and to find sympathetic ears in the academy. If sound scholarship produces results that attract the interest of already-established scholars, this will start to happen. There are signs that the younger generation of scientists is more open to pursuing ID than previous generations. These scientists are to be found at ID conferences and in on-line discussion groups.

Nonetheless, there remains a great deal of hostility. Indeed, some scientists are quite willing to defend the way critics of Darwinism have been treated. For example, Arthur Caplan gave the following reasons for siding with *Scientific American* against Forrest Mims:

Forrest Mims is a competent writer and amateur scientist. But his personal beliefs about creation limit what he can and cannot tell his readers about all the nooks and crannies of science. They also distort the picture he conveys regarding what scientific methodology is all about. (Caplan 1991)

And this takes us to the heart of the matter. Most Darwinists see science as inherently committed to methodological naturalism; they argue that this approach is therefore not up for democratic debate. One does not have to accept methodological naturalism, but if one rejects it, then one is no longer viewing the world as a scientist.

In their response to this, proponents of ID argue that a residual positivism makes Darwinists identify the scientific method with endorsement of a particular epistemology and metaphysics, and note that the scientific revolution succeeded with no such commitment. If Boyle, Kepler, and Newton did superb science while believing that the success of the scientific enterprise depended on God's Providence, it does not seem absurd to suggest that science again might flourish in a non-naturalistic framework. But it will be replied that the kind of teleology that once seemed indispensable was shown to be redundant by Darwin (1859). So ultimately everything depends on whether design can be shown to do any work that cannot be reduced to undirected causes.

It is here that critics press the case that ID has not generated significant scientific journal articles or data (Forrest 2001, 23–4). If what counts as science depends on the verdict of peer review, then, it is claimed, ID has yet to establish a track record. In response, proponents of ID have made a number of points. First, they argue that it is not so much new data as the interpretation of existing data that matters. The scientists within the ID movement do perform new experiments; they have published articles in scientific journals (which do not mention ID); and they have also published

peer-reviewed work (which does mention ID) outside of scientific journals. However, their main case rests on a reassessment of existing research, much of it performed by Darwinists. After all, it is fallacious to argue that scientific experiments motivated by Darwinism must always support Darwinian theory. If work that is guided by naturalistic assumptions meets with repeated failure, and if one is convinced that there is some principle to this failure, one that excludes all undirected causes, then this work may be used to support ID conclusions. As we have seen, this is precisely the reasoning used by Bradley, Olsen, and Thaxton, and by Denton and Kenyon. Similarly, Behe's claims about irreducible complexity are based in part on recently published work that has unlocked the mechanical structure of the bacterial flagellum. That is one reason that ID scientists are not impressed with the objection that the term "intelligent design" is rarely mentioned in scientific journals. Another reason is, they claim, that many scientific journal editors refuse to publish articles and even letters that explicitly defend ID (see web postings in Behe 2000a and Wells 2002). From the perspective of ID, claiming that no journal articles explicitly support ID is like pointing out that published Chinese government statistics do not support allegations of human rights abuses. Besides that, before the advent of peer review important but highly unpopular scientific work was done outside of journals. (Copernicus' *De revolutionibus*, Newton's *Principia*, and Darwin's *Origin of Species* are examples.) And finally, defenders of ID claim that Darwinists have also failed to publish in important areas; in particular, they have provided few if any causally specific reconstructions of the pathways that lead to the formation of irreducibly complex structures.

Having said all this, proponents of ID keenly feel the sting of the charge that they need more scientific publications. There are results in the pipeline. For example, there is currently research by ID scientists affiliated with the International Society for Complexity, Information and Design (ISCID). According to its web site,⁸

ISCID is a cross-disciplinary professional society that investigates complex systems apart from external programmatic constraints like materialism, naturalism, or reductionism. The society provides a forum for formulating, testing, and disseminating research on complex systems through critique, peer review, and publication. Its aim is to pursue the theoretical development, empirical application, and philosophical implications of information- and design-theoretic concepts for complex systems.

For example, ISCID scientists are studying evolutionary algorithms, aiming to show that Darwinian mechanisms are unable to generate certain kinds of information. One such project is the Monotonic Evolutionary Simulation Algorithm (MESA).⁹

Of course, critics may claim that the real reason that proponents of ID find it difficult to publish is that they are mixing science and religion. This was commonplace in the writings of Newton, but modern science believes that

the objectivity of its results depends on excluding religious interpretations. Scientists can of course be religious, but their religious perspectives have no objective validity as science, since scientific statements must be amenable to public verification by everyone, regardless of religious persuasion. To this, proponents of ID reply that their claims do meet standards of public verification, because the criteria for detecting design are empirical and do not depend on a specific metaphysical interpretation. They also point out that naturalism is not a religiously neutral position, and that by excluding non-naturalistic insights, Darwinists are open to the charge of establishing their own naturalistic religion, at least for purposes of intellectual inquiry.

2.2. Theoretical Refinements

At the scientific level, proponents of ID have argued that Darwinian processes are insufficient to account for certain kinds of complexity manifested by biological systems. Behe (1996) has famously argued that some biological structures are irreducibly complex (IC), having a number of well-matched, interacting components, the removal of any one of which disrupts the structure's function. Candidates for IC systems include the cilium, the bacterial flagellum, and the blood-clotting cascade. Behe's main point is that Darwinism requires gradual increments of complexity, each one of which is sufficiently functional to be selected. Yet any supposed precursor p of an IC system s would lack one of s 's components, making p nonfunctional and therefore unavailable for selection. So it would seem that irreducibly complex systems would have to be developed all at once, which is beyond the resources of the undirected bottom-up mechanism of Darwinism, but not beyond goal-driven, top-down design.

Critics have responded in a number of ways. They have pointed out that the fact that a precursor system p lacks the function of an IC system s does not show that p has no function. Perhaps p had some *other* function and was simply co-opted. After all, natural selection is a satisficer and works with the materials actually available, not ones it hopes to find later (Miller 1999, 152–8). But others, such as Allen Orr, argue that co-optation is too unlikely to account for highly complex systems with parts delicately adapted to one another: "You may as well hope that half your car's transmission will suddenly help out in the airbag department" (Orr 1996/97, 29). Orr instead prefers a solution that Dembski (2002, 256–61) has dubbed "incremental indispensability":

Some part (A) initially does some job (and not very well, perhaps). Another part (B) later gets added because it helps A. This new part isn't essential, it merely improves things. But later on A (or something else) may change in such a way that B now becomes indispensable. . . . [A]t the end of the day, many parts may all be required. (Orr 1996/97, 29)

Still others have argued that “scaffolding” can support the construction of an otherwise inaccessible structure, such as an arch; when the arch is completed, the scaffolding atrophies, leaving a structure that is IC. Yet others claim that irreducible complexity is an illusion, because in any system that appears to be IC, there is some hidden form of redundancy. For example, John McDonald (web site, 2002) claims that candidate IC systems are actually reducibly complex: provided the reduced set of parts is reconfigured, the same function can be performed. Similarly, Shanks and Joplin (1999) claim that candidate IC systems are in fact redundantly complex.

Proponents of ID have responded to all of these proposals in detail (Behe 2000b, 2001; Dembski 2002). Most fundamentally, they have argued that demonstrating the conceivability of a scenario falls short of establishing its realistic probability. At issue here are rival hermeneutics for the assessment of probability. If Darwinian evolution is accorded a high degree of initial probability based on the many successes that (it is claimed) it has had in other areas, then it does not take much more than a plausible narrative to convince one that it probably works in a difficult case. On the other hand, if Darwinism is given a lower degree of initial probability, because one doubts the standard case for it, then only strong evidence that a causally specific Darwinian pathway actually exists is going to convince.

More generally, Dembski (1999, 2002) has argued that irreducible complexity is only a special case of complex specified information (CSI), that is, information that has a very low probability (hence high content) and that is specified by an independent pattern. Dembski argues that chance and necessity are unable to explain the appearance of CSI. Darwinists concede that neither chance alone nor necessity alone is capable of generating CSI, but they argue that the Darwinian interaction of chance and necessity is sufficient. However, Dembski has recently argued that the “No Free Lunch” theorems show that even Darwinian resources cannot account for the generation of CSI, only for its relocation and recombination (Dembski 2002, Chapter 4). Obviously, this claim will be much debated.

Much work remains to be done responding to the many critical reactions that ID proposals have provoked. Defenders of ID hope that this work will reveal that ID is a robust and fruitful paradigm, capable of significant refinements and precise enough to generate specific experiments designed to test the powers and alleged limitations of undirected causes.

2.3. Good and Evil

Even in Darwin’s day, opinion was divided between those who praised the theory as licensing a progressive world order (or free market economics) and those who feared that it would rationalize racism, eugenics, and the abolition of human dignity. Today, the debate is at least as polarized, with those who defend the Darwinian contribution to ethics (Arnhart 1998; Ruse 2001) and

those who denounce it as something positively pernicious (Wiker 2002). In the middle are some – including Darwinists such as the late Stephen Jay Gould, Richard Lewontin, and Kenneth Miller – who argue that there is no important connection between biology and ethics. Although these cultural debates are not directly relevant to the scientific issues, there is no question that they contribute to the very strong feelings on either side. Some see traditional values slipping away; others say “good riddance”; and yet others vie for a nuanced synthesis that holds the best of tradition and science in balance. These debates are far from settled, and much work remains to be done if ID is to convince people that its philosophy is required to support sound ethics.

Another long-standing debate is the theological problem of evil. From Hume (1779) until the present, many have argued against design in science on the grounds that it makes the designer responsible for natural evils such as parasitism. This suggests that either the designer lacks some of the traditional attributes of God or does not exist at all. Rather than be forced to this conclusion, would it not be wiser to suppose that the designer grants his creation a degree of autonomy, thereby avoiding direct responsibility for all that goes on in it?

In response, proponents of ID would agree that there are theological difficulties in understanding how the existence of evil can be reconciled with the existence of God. But, they would insist, these are not valid scientific objections against an empirical method for detecting design, such as Dembski’s filter (Dembski 1998a). Defenders of ID have questioned both the correctness of Darwinian theology and the legitimacy of using it to exclude design as a scientific category (Hunter 2001; Nelson 1996). Nonetheless, a great deal of work remains to be done to show that ID does not have the unintended consequence of making the problem of evil even harder for the theologian to resolve.

3. CONCLUSION

The ID movement did not begin with Phillip Johnson. It is inaccurate to describe it as stealth creationism, both because of its clear public expression and because its philosophy is significantly different from that of traditional creationists. In fact, the ID movement began when some scientists encountered what they believed was a crisis in normal science that forced a reevaluation of the assumption that science must observe methodological naturalism. As the movement gained structure and numbers, its public voice became unavoidable. The rigor of the challenges to Darwinism in particular and to naturalism in general compelled a response, leading to the energetic and fruitful controversy that continues today. While critics may see design as a reactionary throwback to an outmoded model of science or as a confusion of science and religion, defenders of ID see themselves as revolutionaries

who can build bridges between science and theology. The exchanges have not always been pretty. And much work remains to be done by ID and also (I suggest) by its critics. But perhaps no one has done more to move the debate forward than my colleagues and friends Bill Dembski and Michael Ruse.

Notes

1. My thanks to William Dembski, Stephen Meyer, and Michael Ruse for their comments on earlier versions of this essay.
2. Recently this center has simplified its name. It is now called the Center for Science and Culture. See <www.discovery.org>.
3. See the NIOSHA "Who's Who" web page at <<http://nosha.secularhumanism.net/whoswho.html>>.
4. Stephen Meyer pursues this positive case for design in his chapter in this volume.
5. See Dr. Schaefer's biography at <<http://www.leaderu.com/offices/schaefer/docs/biosketch.html>>.
6. The term "universal acid" derives from Daniel Dennett (1995), himself an enthusiastic supporter of naturalistic evolution.
7. Kenyon was interviewed about his experiences by Mars Hill Audio in 1994. See audiocassette volume 7, available from <<http://www.marshillaudio.org>>.
8. The ISCID home page is at <<http://www.iscid.org>>.
9. Information on MESA is available at the ISCID web site, <<http://www.iscid.org/ mesa>>.

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