

THE DESIGN DETECTIVES

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Reviews of *Intelligent Design: The Bridge Between Science and Theology* by William A. Dembski, InterVarsity Press, 1999, ISBN 0-8308-1581-3, 312 pages and *The Wedge of Truth: Splitting the Foundations of Naturalism* by Phillip E. Johnson, InterVarsity Press, 2000, ISBN 0-8308-2267-4, 192 pages.

1. INTRODUCTION

Isaac Asimov once wrote, “An exoheresy may cause scientists to bestir themselves for the purposes of reexamining the bases of their beliefs, even if only to gather firm and logical reasons for the rejection of the exoheresy-and that is good.” By an exoheresy Asimov meant a challenge to scientific orthodoxy that arises from outside the scientific community. He was writing specifically about Immanuel Velikovsky, whose imaginative astronomical theories had the scientific community up in arms in the late sixties.

In William Dembski and Phillip Johnson we have two articulate exoheretics, each aiming his considerable rhetorical gifts at the prevailing Darwinian explanations for the complexity and diversity of living things. Though the “Intelligent Design” (ID) theory they promulgate is nothing more than a euphemism for Creationism, it is important to realize that they are making arguments fundamentally different from those offered by the young-Earthers. Therefore, following Asimov, it is worth our while to bestir ourselves and think clearly about why Dembski and Johnson are wrong.

2. INFORMATION INCREASE

Before addressing the more detailed arguments raised in the books under review, there is one pernicious bit of nonsense we must deal with first. Both books make the erroneous claim that the standard genetic mechanisms of Darwinism can not account for the increase in the information content of the genome that has undoubtedly occurred in

the course of life's history. Natural selection, runs the argument, acts on point mutations and genetic recombinations. But point mutations simply represent the change of one DNA base to a different base, while recombination is simply a reorganization of the existing genetic material. In neither case does the information content increase. It follows that Darwinism can not adequately account for the all the glories of nature.

If this argument has a familiar ring it is because British zoologist Richard Dawkins recently published a devastating critique of it (see *Skeptic*, Vol 7. No. 3). In this article he pointed out that genes don't simply replicate, they also duplicate. Thus, sometimes a daughter cell ends up with two copies of a gene sequence that appeared only once in the parent cell. These two copies are then free to diverge, via mutations, resulting in a daughter genome with a greater information content than the parental genome. A closely related process is polyploidy, in which gene replication takes place without cell division. There is nothing speculative about this; the process has been observed numerous times in the laboratory. Nor is there anything cutting edge about it. Gene duplication and its effects on the size of the genome are discussed by Julian Huxley in his 1942 book *Evolution-The Modern Synthesis* and by Theodosios Dobzhansky in his 1955 book *Evolution, Genetics, and Man*. Indeed, almost any book that discusses both evolution and genetics will address this question.

3. THE DESIGN INFERENCE

Dembski's goal is to reinstate intelligent design as a legitimate mode of explanation in biology, and his main tool for doing that is something called the "explanatory filter." The argument runs like this: there are essentially three sorts of explanation we could invoke to explain a particular phenomenon. It could be the result of regularity; in other words, the phenomenon is a consequence of some known natural law. For example, the elliptical paths of the planets around the sun is a simple consequence of Newton's law of gravity. Or we could attribute the phenomenon to chance. The drawing of the ace of spades from a well shuffled deck of cards, for example, does not require any explanation beyond mere luck. But if chance and regularity can be effectively ruled out, then design is the only remaining explanation.

If this premise is correct then design can be inferred by effectively eliminating regularity or chance. But how do we do this? Well, regularity implies that a particular event will always follow from a given

set of initial conditions. So if we could establish that the event in question was only one of many possible outcomes from a given set of conditions, then regularity is effectively eliminated. By contrast, eliminating chance requires two conditions. We need to show that the probability that the given event would occur is very low. This is necessary but not sufficient, since events of low probability happen every day. We also require that the event be specified in some way. In other words, it must display a pattern that we could have described independently of knowing the outcome of the experiment in question.

An example should make this clear. Suppose I extend a deck of cards to a spectator and ask her to remove one card from the pack. She does so and finds that she has drawn the ace of spades. We would not attribute this to regularity, since repetitions of the experiment would surely have resulted in the spectator choosing a different card each time. Furthermore, the probability of choosing this specific card is one out of fifty-two. So we can reasonably describe this as a low probability event. But we do not yet infer design, as there is no specifiable pattern in drawing the ace of spades. Now suppose that I approach four spectators and have each of them choose a card. They do so, and it is found that each of them has drawn an ace. Drawing the two of clubs, four of spades, jack of diamonds, and seven of clubs would be an equally unlikely event. But the former event forms a clear pattern, four of a kind, whereas the latter event does not. Thus, my spectators would rightly suspect that their selection of the four aces was the result of some subterfuge on my part.

We conclude that it is the presence of complex, specified information (CSI) that indicates design. Natural laws by themselves can not create complex information, so the presence of CSI can not be attributed to laws alone. Chance can create complex information, but it can not account for specificity. So if we can establish that a particular system contains complex specified information, then we can conclude that it is the product of design.

Nature, according to Dembski, offers two general classes of CSI. One is found in the “fine-tuning” of the fundamental constants of the universe for life. This is known as the anthropic principle, and Dembski infers from it that the universe itself must be the product of intelligent design. The other resides in the irreducible complexity of various molecular machines within the body. A structure is irreducibly complex if it is composed of several parts working together to perform some function, such that the removal of any one part results in the non-functionality of the structure.

In his earlier book, *The Design Inference*, Dembski offers an elaborate mathematical justification for the validity and utility of the explanatory filter. It is neither possible nor necessary to summarize that work here. Unfortunately, most of *The Design Inference* represents wasted effort. Dembski's arguments fail for very fundamental reasons.

The arguments presented in *The Design Inference* and *Intelligent Design* are vulnerable on many fronts. In this essay I will focus on two main objections. The first is that Dembski has been sloppy in his application of the filter to the sort of information to be found in biological systems. The second is that even if the filter has some philosophical merit, it is almost impossible to apply to non-trivial, real-world situations.

Here is Dembski's justification for claiming irreducibly complex machines as examples of CSI:

On any formal complexity-theoretic analysis, they are complex in the sense required by the complexity specification criterion. Moreover, in virtue of their function, these systems embody patterns independent of the actual living systems. (pp. 149)

Both parts of this analysis are wrong.

Specification after the fact is a tricky thing. If I hold out my deck of cards to the spectator and tell her ahead of time that she will choose the ace of spades, we can reasonably infer subterfuge when she does so. But if I tell her after the fact the trick isn't so impressive. When Dembski uses the function of an irreducibly complex machine as its specification he overlooks an important possibility. Namely, the incipient stages of an irreducibly complex machine may have served some other function. This applies both to the individual parts themselves, as well as the relationship of those parts to each other. Furthermore, while it might be true that the wholesale removal of one part from an irreducibly complex machine might result in the non-functionality of that machine, it does not follow that a slight modification in one of the parts has the same result. There is ample evidence from paleontology and biochemistry to suggest that this sort of "evolutionary cooptation" underlies a great many complex biological structures. Cell biologist Kenneth Miller, among others, has documented numerous examples of this in his book *Finding Darwin's God*.

Dembski is also wrong to claim that irreducibly complex machines are complex in the relevant way. Complexity is intimately related to probability; the complexity of an event is inversely proportional to the likelihood of its happening. In this case, the low-probability event is

having all the fully-formed individual parts of the irreducibly complex structure come together, in one step, to produce the machine. Once we understand the idea of evolutionary cooptation, we see that there is no reason to believe that such an event ever happened.

As for the anthropic principle, I will accept that the fine-tuning of the universe for life represents specified information. But there is no way of establishing that it is complex. If we assume that the fundamental constants of the universe might have set themselves to any value, and that we are the only universe that has ever existed or will exist, then we might say that the fine-tuning represents an event of low-probability. If the former assumption is false then regularity is a plausible explanation for the values of the constants; and if the latter assumption is false we can chalk the whole thing up to chance. Dembski, by tacitly making both of these assumptions, is simply begging the question.

Using the explanatory filter to preclude a naturalistic origin of life fares no better. Since we have no way of assessing the complexity of the information present in the first life form, we are simply unable to apply the filter to this case.

4. USELESS FILTER

These considerations lead us to the second difficulty with Dembski's filter. As a practical matter it is almost impossible to apply.

Dembski's rigid trichotomy between regularity, chance and design simply overlooks the possibility that chance plus regularity is capable of effects that neither one alone could achieve. Dembski is conflicted over what, exactly, chance plus regularity is capable of producing. He includes a brief section (167-170) in which he argues that chance plus regularity can't generate CSI. Compare that to this statement:

A system is cumulatively complex if the components of the system can be arranged sequentially so that the successive removal of components never leads to the complete loss of function. From this characterization of cumulative complexity it is clear that the Darwinian mechanism of selection and mutation can readily account for cumulative complexity. (pp. 147)

Now, Dawkins provided just such a sequential arrangement of the parts of the human eye in his book *Climbing Mount Improbable*. If we accept Dembski's statement we conclude that chance plus regularity can explain the origin of the eye. But surely the eye is as complex and specified as any of the irreducibly complex machines the ID theorists are so keen on. (Incidentally, an analysis of Dawkins' hypothetical

sequence shows just how simplistic the idea of irreducible complexity really is. The parts of the eye did not become fully formed individually before coming together to form an eye. There is no step in the transition where the proto-eye went from having no lens to having a fully-formed lens, for example. Rather, the transition was from an eye with nothing that was lens-like, to something that sort of had a structure that in some sense is kind of like a lens, and so on.)

Thus, chance plus regularity is a fourth mode of explanation fundamentally different from the other three Dembski considers. And if we add it to the filter, the result is an algorithm that is almost impossible to apply, outside of a handful of trivial examples.

Creationists routinely use combinatorics to argue against the naturalistic formation of certain complex molecules. A typical argument might start with hemoglobin and argue as follows: Hemoglobin is made of four chains of amino acids, each chain possessing 146 links. Since there are twenty known amino acids at work in the human body, we conclude that there are 20^{146} possible amino acid chains of the appropriate length. Since only a very small number of these would form a viable molecule, it is impossible that the molecule could have been brought about by chance.

Of course, this only shows that hemoglobin is very unlikely to form itself spontaneously from an ocean of randomly colliding amino acids. But what if we consider the possibility that certain acids are more likely to collide with each other than others, or that some sort of primordial selection process could have preserved the incipient stages of the hemoglobin molecule? How can we then assign a probability to a naturalistic formation of hemoglobin? Given that our knowledge of the environment of the early Earth is fragmentary at best, and given that it is entirely possible that we have not yet discovered all the possible regularities that could underlie biological creation, we are in no position to assign probabilities to events that happened long ago.

Similarly, contingency is not enough to eliminate the possibility of underlying regularity. Many natural laws show an extreme sensitivity to initial conditions (this idea is more popularly known as “the butterfly effect”). Thus, when we determine that a particular event was only one of many that might have occurred from a particular starting point, it is possible that we are detecting the absence of regularity. On the other hand, it is equally possible that we simply don’t have an adequate understanding of all the relevant initial conditions. One of the most exciting developments in mathematics over the last few decades has been the growth of chaos theory. What we have learned is that simple,

deterministic natural causes can lead, in defiance of all common sense, to breathtakingly complex effects.

So I agree with Dembski that if we effectively eliminate chance, regularity, and some combination of the two as possible explanations for a particular phenomenon, then design becomes the most likely candidate. But since Dembski has not offered a reliable method for eliminating chance and regularity, I fail to see how his ideas advance our knowledge.

Despite this, I do give Dembski credit for two things. He does not simply sling mud at evolution in the hopes of establishing creationism by default. Rather, he makes an affirmative case for what he actually believes. His work is also relatively free of the righteous invective so typical of creationist literature. For these reasons I believe his books are worth reading and considering. Dembski is precisely the sort of exoheretic Asimov had in mind.

5. PHILLIP JOHNSON IN TWILIGHT

The wedge in the title of Phillip Johnson's latest tract refers to the strategy that will, it is hoped, allow intelligent design theory to unseat evolution, and more generally will allow theistic science to triumph over methodological naturalism. In his introduction Johnson writes,

This book is not about the thicker parts of the Wedge, although I will describe some of them. The scientists and scholars who are doing that work should have the opportunity to speak for themselves, and so I will write of what is coming only briefly, leaving the reader to go on for further details to the books and collections as they become available. My own continuing work is with the thin edge, which continues to burrow into the log as the thicker parts open up the crack. (pp. 15-16)

Pretty much says it all, doesn't it? The intellectual heavy-lifting of the ID movement is now being done by people like Dembski. Johnson has been reduced to the role of propagandist.

Johnson exploded on to the scene in 1989 with *Darwin on Trial*. The book's success had little to do with its merit as a work of science, and had much to do with Johnson's status as a law professor at a prestigious university. But this was, at least, a serious book. It represented a genuine attempt to discuss important scientific issues, and his philosophical arguments on the role of naturalism in science were well worth taking seriously. He followed this up with *Reason in the Balance*.

Much of this book dealt with the role of naturalism in modern legal discourse (Johnson's specialty) and made for interesting and worthwhile reading. But with *Reason* Johnson seems to have run out of things to say. Now, apparently, Johnson is only capable of producing the sort of short, large-print books that litter the aisles of Christian bookstores across America. *Reason* was followed up with *Defeating Darwinism by Opening Minds* and *Objections Sustained*. The former was a watered down version of *Darwin on Trial* intended for teenagers, the latter a collection of very superficial essays. *The Wedge* is the nadir of a career that has been in decline for several years now. It represents the final step in Johnson's descent from serious social commentator to circus side-show.

Like Dembski, Johnson is very fond of information theory. He is quite emphatic that natural selection acting on chance variations can not significantly increase the information content of the genome. Johnson offers a crude caricature of the arguments made in Dawkins' article (41), but offers no explanation of why gene duplication with subsequent divergence can not account for the growth in genetic information. The closest he comes to addressing the subject is the following quote, in which he recounts a discussion with mathematical physicist Paul Davies:

When I asked Davies about this, his reply gave me the impression that he thinks that natural selection increases genetic information by preserving copies that are made in the reproductive process. I am afraid this misses the point. When two rabbits reproduce there are more rabbits, but there is not any increase in information in the relevant sense. If you need to write out the full text of the encyclopedia and have only page one, you cannot make progress toward your goal by copying page one twenty times. (59)

In reply I will simply quote John Maynard Smith and Eors Szathmary, from their book *The Major Transitions in Evolution*: "The mere duplication of a gene adds no new information, but the divergence of the two copies does so."

What is particularly delicious about this is that Johnson gloriously contradicts himself later in the book. Kenneth Miller, in *Finding Darwin's God*, challenged Johnson to show how intelligent design theorists explain the extensive collection of fossil elephants. If each of the dozens of elephant species represents a separate act of creation, you see, then we can only conclude that the designer is not very good at his job.

Johnson's answer is typical of the genre. He writes, "[I] would say that elephant variation is yet another example of the pervasive pattern that we see both in the fossil record and in the living world. Variation and diversification occur, probably to a greater extent in the past than in the present, but only within the confines of the basic type (p. 132).

Very well. If the elephant sequence represents accumulated microevolution then we conclude that microevolution is capable of transforming the oldest elephants, such as the small, tapir-like, trunkless *Moeritherium*, into the enormous, beautifully betrunken, modern African elephant. But the elephant's trunk is just the sort of complex machine Johnson claims is out of the reach of natural selection. Paleontologist Jeheskel Shoshani describes it this way: "The trunks of living elephants have no bones, but consist of up to three hundred pounds of hair, skin, connective tissue, fat, blood, lymph vessels, and networks of muscles and nerves." Thousands of individual muscles and countless nerves must work in concert to give the trunk its tremendous dexterity and sensitivity. All of these parts must form together if the trunk is to be functional at each phase of its development. Further, there must be corresponding changes in the size and structure of the skull to accommodate the trunk's weight. By any reasonable measure the genome of the modern African elephant has a significantly greater information content than the genome of the primitive *Moeritherium*. Either natural selection has more power than Johnson usually admits, or he will have to find a different answer to Miller's challenge.

Another example of breathtaking Johnsonian ignorance revolves around Dawkins' now famous "Methinks it is like a weasel" experiment. The idea is that if a computer is programmed to spew out random, twenty-eight character strings, then it will effectively take forever for the computer to produce the phrase "Methinks it is like a weasel." But if the computer is programmed to spew forth several such strings, choose the one that, merely by chance, has some slight resemblance to the target phrase, then use that as the starting point for subsequent generations, then the target phrase will emerge rather quickly.

The point, *obviously*, is that cumulative selection achieves very quickly what random selection achieves not at all. If the eye, to choose a favorite example of both Dawkins and Johnson (albeit for different reasons), could only emerge by having all of the necessary mutations emerge in one generation then we could effectively rule out the possibility of a naturalistic explanation of its emergence. But if there was some mechanism that preserved the favorable mutations when they occurred while we waited for the next mutation to happen, then we can

reasonably conclude that a naturalistic explanation is possible. Natural selection provides precisely that mechanism. Dawkins was making a simple plausibility argument by illustrating the power of cumulative selection in a context where it was easily understood.

Not easily enough for Johnson, alas. Referring to the computer program Dawkins wrote to illustrate his experiment, Johnson writes, “Of course, both the selection program and the target text itself are products of intelligent design. The error is elementary but it is one that countless Darwinists continue to make.” For the record, here’s how Dawkins describes the point he was making. “If evolutionary progress had to rely on single-step selection, it would never have got anywhere. If, however, there was any way in which the necessary conditions for cumulative selection could have been set up by the blind forces of nature, strange and wonderful might have been the consequences.” Shows you what a dumbass atheist he is.

But wait! It turns out that Johnson is aware of cumulative selection. Philosopher Robert Pennock made the point about cumulative selection in his book *Tower of Babel*. Buried in the endnotes of *The Wedge* we find Johnson’s reply. “Cumulative selection is just continuing natural selection, and it doesn’t “select” any correct letters unless the computer is programmed with the target sequence (p. 179).” He goes on to say, “That leading Darwinists regularly make such an elementary logical error and obtusely persist in it after correction indicates the enormous mystifying power that an ideology can generate (p. 179).” I suppose we Darwinists can only dream of being as free of blinding ideology as Johnson is.

Of course, cumulative selection is not “just continuing natural selection.” Rather, it is the end result of a consistent selection mechanism being applied to several generations of imperfect replicators. In Dawkins’ experiment, the imperfect replicators were the sequences of letters and the selection mechanism always favored those variants that brought the sequences closer to the target phrase. In nature, the imperfect replicators are living organisms and the selection mechanism always favors those variants that provide greater reproductive success to their bearers. This is called an analogy, it is intended simply to explain rather than prove a point, and apparently it is utterly beyond Johnson’s comprehension.

No one familiar with Johnson’s writings will be surprised to hear that he grossly distorts modern scientific arguments. What is new here is the sheer magnitude of his arrogance and dishonesty. Johnson frequently complains that his opponents try to seek a rhetorical advantage by stereotyping creationists as religious fundamentalists, but he thinks

nothing of branding evolutionary biologists as atheists. The books of Pennock and Miller are described as being “an offensive in a culture war rather than a serious attempt to grapple with scientific issues (p. 139),” despite the fact that both gentlemen are open about their theism, and both argued that Johnson’s theology is as misinformed as his science. He writes, “*If the evolutionary scientists were better informed or more scientific in their thinking, they would be asking about the origin of information.* The materialists know this at some level, but they suppress their knowledge to protect their assumptions (emphasis in original) (p. 167).” Johnson knows perfectly well, though he routinely denies it, that evolution is not a theory of origins. Furthermore, there are plenty of scientists asking the question; the origin of life could fairly be described as the hottest open question in biology today. And notice how nonchalant Johnson is about stereotyping large groups of people and ascribing unsavory motives to their work. He writes, “If you think there may be a difference in some cases between natural explanations and logical explanations for certain features of life, then you are well on your way to becoming a creationist. Within the community of evolutionary scientists, naturalism and rationality are considered to be virtually the same thing (p. 68).” This is one of Johnson’s standard ploys to present himself as the bemused freethinker shaking his head sadly at the deluded antics of those silly godless scientists. In reality it is just a slur against evolutionists.

Simply put, *The Wedge* is a terrible book. Responding to it is an act of grim necessity, not something one does in the hope of intellectual enrichment. Johnson, I’m sure, will continue to peddle his creationist snake oil for many years to come. He will go on publishing the same book over and over, and it will continue to be lapped up by his small cadre of devoted fans. But his days as a serious intellectual force in the creation/evolution battle are over.

6. CONCLUSIONS

The intellectual legitimacy of the ID movement rests on the validity of the explanatory filter as a means for detecting design in nature. It is the difference between a legitimate theistic science and ye olde God of the Gaps. Dembski’s books are a serious, though deeply flawed, attempt to defend the philosophical legitimacy of the filter as a means for detecting design. His arguments deserve a fair reading, but should ultimately be discarded. Johnson, by contrast, is just an intellectual poseur desperately trying to remain relevant to a movement that left him behind long ago.

Let us conclude where we began, with the words of Isaac Asimov. “An exoheresy that is patently in error cannot change the universe to conform to itself. However popular it may be and however irritatingly it may survive refutation, its falseness condemns it-in the end-to nothingness.”

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