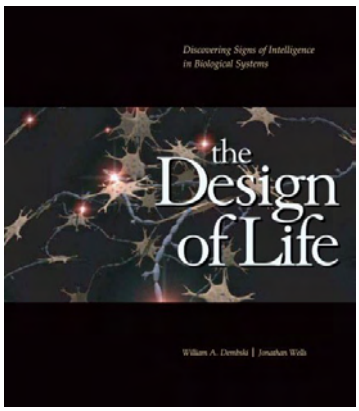
Book Review



William A. Dembski and Jonathan Wells

The Design of Life:
Discovering Signs of Intelligence in Biological Systems

Dallas: Foundation for Thought and Ethics, 2008
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Reviewed by U. Mohrhoff

At the time of writing this, Amazon has 74 reviews of *The Design of Life*. Of these 35 rate five stars, one rates four stars, two rate three stars, and 36 rate one star. This leaves three reviewers worth checking out. One of them is David Springer, who remarks that "any book with such a high sales rank at Amazon that causes this much polarization in the reviews must be worth reading just to see for yourself what's in it that's causing so much controversy."

In view of this peculiar state of affairs, I feel obliged to situate myself before reporting what I saw for myself. I do not subscribe to any religion (although my birth certificate says that I was "christened" in such and such church on such and such date — but this can't be helped now). All forms of dogmatism and fanaticism are equally repugnant to me, be it sectarianism, religious fundamentalism, scientism, materialism, or a reductive naturalism.

My first quarrel with this beautifully produced, well-designed (no pun intended) and well-illustrated book is its confusing use of the word "evolution." Having quoted geneticist Jerry Coyne — "There is only one going theory of evolution, and it is this: organisms evolved gradually over time and split into different species, and the main engine of evolutionary change was natural selection." — the authors announce that "[t]hroughout this book, we use the terms 'evolution' and 'Darwinism' interchangeably to denote this [Coyne's] view of evolution." (p. xxi)

The unfortunate implication is that if evolution takes place, it is driven by natural selection, and if it is not driven by natural selection, it doesn't take place. This false dilemma plays into the hands of both selectionists and young-earth creationists. Evolution is "stupid," either because it produces "complicated things that only give the

appearance of having been designed as Darwinists hold, or because the very idea that humans had ape-like ancestors (which descended from small furry mammals, which descended from reptiles, which descended from fish, etc.) is stupid as those creationists hold.

After stating that "[e]volutionary accounts of the history of the human race take for granted two things: that humans and apes evolved from an earlier common (ape-like) ancestor, and that their evolution did not require any guidance by intelligence," Dembski and Wells ask, "Does the fossil record support this view?" (p. 5) If "evolution" is *defined* so as not to require any guidance by intelligence, then the view in question is that natural selection has produced both humans and apes from an earlier common ancestor. This is not something the fossil record can either support or refute, inasmuch as the latter tells us nothing about the *mechanism* that produced humans and apes. (If you think it does tell us something, then stop to think again.)

Nor does the fossil record allow us to construct ancestor-descendant chains. The authors are right to conclude that

> even if we had a fossil representing every generation and every imaginable intermedia[ry] between, say, reptiles and mammals — if there were *no missing links whatsoever* — it would still be impossible, in principle, to establish ancestor-descendant relationships. (p. 89, original emphasis)

As fossil expert Gareth Nelson wrote in 1978,

> The idea that one can go to the fossil record and expect to empirically recover an ancestor-descendant sequence, be it of species, genera, families, or whatever, has been, and continues to be, a pernicious illusion. (p. 89)

Since then the discontinuities have, if anything, increased, in spite of the fact that new fossils are being discovered faster than they can be cataloged. (Some of the classic examples of Darwinian change in the fossil record, such as the evolution of the horse in North America, have had to be discarded or modified as a result of more detailed information.)

This of course is no reason to discount the notion that new species arise from old, nor is that what Dembski and Wells suggest. Following a discussion of the "98 percent similarity" of human and chimpanzee DNA, they conclude:

> The lesson here is that small changes can have very significant effects on biological systems *if those changes are just the right changes*. In particular, because the gene expression system operates holistically, large-scale reworking of it would require more than the trial-and-error tinkering characteristic of standard evolutionary theory. Rather, its reworking would require multiple coordinated changes. Such changes indicate the activity of a designing intelligence. (p. 9, original emphasis)

But this comes to saying that there *can* be a *non-standard* evolutionary theory *not* based on natural selection. We can have *both* evolution *and* a designing intelligence. So much for the author's initial definition of "evolution." Evolution by intelligent design is on the table, yet it has to contend with biblical creationism:

> once intelligence is allowed as a possible factor in the emergence of humanity, it becomes an open question whether humans are both modified monkeys and modified dirt (as with evolution) or merely modified dirt (as with biblical creation). . . There may be good reasons for thinking that humans are redesigned monkeys. . . there may also be good reasons for thinking that. . . humans were built from the ground up. . . (p. 22)

(If there are good reasons for thinking that humans were built from the ground up, you won't find them in this book.) At one point the authors object to the following standard maneuver:

> many evolutionists, upon identifying a similarity between humans and apes (or other animals more generally), use this similarity not to elevate apes but, rather, to lower humans. . . In the same way, evolutionists tend to downgrade human intelligence when comparing it with ape and animal intelligence. From the vantage of contemporary evolutionary theory, intelligence is not a fundamental feature of reality but a product of evolution acquired by us and other animals because of its value for survival and reproduction. (p. 15)

Yet what could be more "lowering" or "downgrading" than being classified as "merely modified dirt"? I'd rather think of myself as a modified monkey. But I agree with Dembski and Wells that the modification was ennobling. Whatever are (or were) the mental skills of a chimpanzee (or our ape-like ancestors), we have not just more brains (which doesn't seem to be of the essence[1]) but mental skills that brook no comparison. Were did those skill come from? As the authors point out,

> What we have are correlations between brain images and conscious mental states. What we do not have is a causal mechanism relating the two. Quite the contrary. There are now good reasons for thinking that no such causal mechanism exists and that mind is inherently irreducible to brain. (p. 13)

Quite so. Hence the question of how our powerful minds — powerful enough to destroy the earth — came to be correlated with our brains. That physically I am a modified monkey does not mean that mentally I am as well. On July 3rd, 1992, the *Times Literary Supplement* carried a piece by philosopher Jerry Fodor titled "The big idea: can there be a science of mind?", in which Fodor mentions

> three major questions to which a theory of mind is required to find answers: (i) How could anything material be conscious? (ii) How could anything material be *about* anything [the problem of intentionality]? (iii) How could anything material be rational?

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1 The authors quote anthropologist Roger Lewin reporting a case study by John Lorber, a British neurologist and professor at Sheffield University: "There's a young student at this university," says Lorber, "who has an IQ of 126, has gained a first-class honors degree in mathematics, and is socially completely normal. And yet the boy has virtually no brain." The student's physician at the university noticed that the youth had a slightly larger than normal head, and so referred him to Lorber, simply out of interest. "When we did a brain scan on him," Lorber recalls, "we saw that instead of the normal 4.5-centimeter thickness of brain tissue between the ventricles and the cortical surface, there was just a thin layer of mantle measuring a millimeter or so. His cranium is filled mainly with cerebrospinal fluid." (p. 12)

Here is how Fodor continuous (and don't imagine any significant process has been made since this was written):

> I can tell you the situation in respect of the first question straight off. Nobody has the slightest idea how anything material could be conscious. Nobody even knows what it would be like to have the slightest idea about how anything material could be conscious. So much for the philosophy of consciousness.

Promissory materialists believe that the "hard problem of consciousness" will be solved once enough "easy problems" have been solved reductively. In his article "There are no easy problems of consciousness" (in this issue), Philosopher E. J. Lowe explains why this strategy won't work.

If there is a hard problem of life, it's the problem of its origin: how to get cells in their full jaw-dropping complexity out of a pre-biotic soup or sludge? (And more specifically: What is the origin of the complex molecular machines that are inside every cell and that are necessary for life? How did a coded language come to form the basis of life?) Here, too, promissory materialists believe that the problem can be solved by solving enough easy problems. That this divide-and-conquer strategy has proven singularly ineffective is amply documented by *The Design of Life*.

Consider this: materialistic research into life's origin is supposed to restrict itself to realistic prebiotic conditions and non-intervention by intelligent agents. Yet without lifting this restriction, origin-of-life research as currently practiced would have gotten nowhere. Summarizing research into the "RNA world" — the scenario that has attracted the most attention since the 1990s — philosopher of biology Michael Ruse observes that "[a]t the moment, the hand of human design and intention hangs heavily over everything."

The need for outside help in origin-of-life research suggests not a materialistic but a designer-assisted origin of life. It has been suggested that origin-of-life researchers line their labs with mirrors to remind themselves of their role as intelligent designers in feeding their experiments with information and guiding them along paths that nature, operating under "realistic prebiotic conditions," would never have taken.

The irreducible complexity of such biochemical machines as the bacterial flagellum poses another hard problem. So does the evolution of integrated adaptational packages, the parts of which are carefully coordinated with one another. Take the giraffe:

> To fit successfully into its environmental niche, it presumably needed long legs. But in possessing long legs, it also needed a long neck [to drink from a river or lake, for example]. And to use its long neck, further adaptations were necessary. When a giraffe stands in its normal upright posture, the blood pressure in the neck arteries will be highest at the base of the neck and lowest in the head. The blood pressure generated by the heart must be extremely high to pump blood to the head. This, in turn, requires a very strong heart. But when the giraffe bends its head to the ground it encounters a potentially dangerous situation. By lowering its head between its front legs, it puts a great strain on the blood vessels of the neck and head. The blood pressure together with the weight of the blood in the neck could produce so much pressure in the head that without safeguards

> the blood vessels would burst. (p. 41)

Unsurprisingly, such safeguards are in place:

> Pressure sensors along the neck's arteries monitor the blood pressure and can signal activation of other mechanisms to counter any increase in pressure as the giraffe drinks or grazes. Contraction of the artery walls, the ability to shunt arterial blood flow bypassing the brain, and a web of small blood vessels between the arteries and the brain (the *rete mirabile*, or "marvelous net") all control the blood pressure in the giraffe's head. The giraffe's adaptations do not occur in isolation but presuppose other adaptations that all must be carefully coordinated into a single, highly specialized organism. In short, the giraffe represents not a mere collection of isolated traits but a package of interrelated traits. It exhibits a top-down design that integrates all its parts into a single functional system. (pp. 41–42)

According to neo-Darwinian theory, such an adaptational package evolved to its present form by the accumulation of individual, random genetic changes that were sifted and preserved piecemeal by natural selection. The problem is how such a piecemeal process, acting with no view to the future benefit of the organism, could bring about such an adaptational package, especially when the parts that make up the package are useless, or even detrimental, until the whole package is in place?

> As Dawkins characterizes the Darwinian mechanism, each generation in an organism's evolutionary history constitutes a round of random variation and natural selection. . . As with all trial-and-error mechanisms, the Darwinian mechanism hinges on slow, gradual improvements. Insofar as it succeeds, it does so by numerous divisions and numerous small conquests. This is how evolution is supposed to scale Mount Improbable. (p. 177)

This mechanism works if and only if Mount Improbable can be scaled in baby-steps. What if Mount Improbable is sheer on all sides and getting to the top via baby-steps is effectively impossible? To see whether this is the case, we need the concept of specified complexity.

For something to exhibit specified complexity it must (i) have a low probability (high "probabilistic complexity") and (ii) be describable in relatively few words ("low descriptive complexity"). An example that came to my mind was the digital expansion of $\pi = 3.14159265358979323846264338327 95\ldots$ The probability of selecting this number by chance from the real numbers between, say, 3.0 and 4.0 is actually 0, while its descriptive complexity is not higher than that of "the ratio of the circumference of a circle to its diameter."

Both the bacterial flagellum and the giraffe (among many other integrated adaptational packages and instances of irreducible complexity) exhibit specified complexity. Assuming they did evolve by the slow, gradual process of natural selection, the prior probability of this to happen would be the product of a huge number of small probabilities, and thus an extremely small number. The particular sequence of heads and tails you obtained the last time you tossed a billion coins also has an exceedingly low probabilistic complexity. This didn't prevent that sequence from occurring. However, it will be exceedingly unlikely that that sequence has a low descriptive complexity, as inte-

grated adaptational packages and biological instances of irreducible complexity do, in addition to their exceedingly high probabilistic complexity. In these cases getting to the top of Mount Improbable via baby-steps *without* intelligent foresight *is* effectively impossible. There's no doubt in my mind that specified complexity is the "smoking gun" of some other-than-human intelligence at work, as the authors maintain. Such other-than-human intelligence, however, could be very different from how it is conceived by theists. No matter what, it is beyond the intended scope of this richly annotated textbook — which comes with a useful list of discussion questions at the end of each chapter and a CD containing additional material — to go beyond making the case for an intelligence being the source of at least some biological information, and this it does very well indeed.

Federal education policy as articulated by the U.S. Congress favors teaching students the scientific controversy over biological evolution. *The Design of Life* is eminently suited to serve as textbook for teaching this controversy. It ought to be adopted across the board.

Appendix: The Santorum Amendment

As said, federal education policy favors teaching students the scientific controversy over biological evolution. Support for this even-handed approach to science education is clearly expressed in the "Santorum Amendment" adopted by Congress in 2001 as part of the Conference Report of the No Child Left Behind Act. Offered on the Senate floor on June 13, 2001, the original resolution by Sen. Rick Santorum of Pennsylvania was worded as follows:

> It is the sense of the Senate that —
>
> (1) good science education should prepare students to distinguish the data or testable theories of science from philosophical or religious claims that are made in the name of science; and
>
> (2) where biological evolution is taught, the curriculum should help students to understand why this subject generates so much continuing controversy, and should prepare the students to be informed participants in public discussions regarding the subject.

Senator Santorum stated that the purpose of this language was to promote intellectual freedom, and he was supported by other members of the Senate from both political parties. In the end the amendment passed the Senate by an overwhelming vote of 91-8. Because there were differences between the Senate version of the overall education bill and the House version, the two houses, as is customary, appointed a "conference committee" — a group of members from each house whose job is to reconcile the two versions of the bill and produce a uniform piece of legislation that could be approved by both houses and sent to the President for his signature. A conference committee typically produces a "conference report," a document that contains both the final statutory language of the bill and "report language" that provides authoritative guidance on how the final statutory language is to be interpreted and applied.

After the Senate vote on Sen. Santorum's resolution, those favoring a Darwin-only approach to science education campaigned to have the conference committee remove the Santorum language or to water it down by deleting any reference to "biological evolution." Their efforts failed. The conference committee included the following modified Santorum language in its conference report:

> The Conferees recognize that a quality science education should prepare students to distinguish the data and testable theories of science from religious or philosophical claims that are made in the name of science. Where topics are taught that may generate controversy (such as biological evolution), the curriculum should help students to understand the full range of scientific views that exist, why such topics may generate controversy, and how scientific discoveries can profoundly affect society.

While the wording in the conference report was revised slightly from the original Santorum Amendment, the changes made actually strengthened support for a "teach the controversy" approach. The Santorum statement put Congress on record as affirming that state science assessments ought to ensure that students "understand the full range of scientific views that exist" and "why such topics may generate controversy." The report language in a conference report is so important that the President's decision to approve or veto a bill has on several past occasions depended on his agreement or disagreement with that bill's report language. The main reason the language is in the report, not the main body of the new law, is that it does not include any characteristic financial incentives — or penalties — for states or local school boards. Also, the spirit of the new act is to avoid dictating specific curriculum to the states. The Santorum language comes as close to breaching that policy as Congress was willing to go on any topic, and it was adopted because the language itself is a plea for openness and academic freedom on controversial topics.[2]

2 Adapted from "Why the Santorum Language Should Guide State Science Education Standards" by Bruce Chapman and David DeWolf. Retrieved on February 6, 2008, from http://www.discovery.org/articleFiles/PDFs/santorumLanguageShouldGuide.pdf.