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Author(s) James L. Farmer

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Abstract Review of *The Case for Diving Design: Cells, Complexity, and Creation* (2006), by Frank B. Salisbury.

THE CLOCKMAKER RETURNS

James L. Farmer

Review of Frank B. Salisbury. *The Case for Divine Design: Cells, Complexity, and Creation*. Springville, UT: CFI, 2006. xv + 256 pp., with subject index, notes, glossary, appendixes, and bibliography. \$15.99.

For much of the twentieth century, few geologists believed, in spite of evidence to the contrary, that continents could drift. Continental drift was called “geopoetry” because there was no known mechanism to drive continents through the hard oceanic crust. Now continental drift is “geoscience” because the theory of plate tectonics explains the motion. Similarly, cosmology was once considered to be nonscience because there was no way to test hypotheses. Now there is powerful observational evidence and an impressive theoretical base for the science of cosmology.

Observational and experimental evidence for evolution are sufficient to justify the assertion that the origin of living species by evolution from ancient species is as close to being a fact as any historical description can ever be. The theory of evolution (especially with regard to the mechanisms that drive evolution) is very advanced, although not yet complete. But how did life begin in the first place? Is the origin of the first living cells a science? That is one of the major questions explored in Frank Salisbury’s book *The Case for Divine Design*.

James Farmer passed away suddenly on Sunday morning, 17 August 2008, not long after completing this essay.

Except for religious fundamentalists, including the Creationist¹ community, few informed people doubt that evolution has produced our biological world. This book largely ignores the debate on evolution per se and concentrates on a new version (“intelligent design,” or ID) of an old idea (namely, the watchmaker analogy made famous by William Paley in 1802; see appendix B in Salisbury’s book).

One of the basic premises of ID is that some essential structures or processes are too complex to have arisen by chance. The concept of “irreducible complexity” has been used by Creationists for a long time. A commonly cited example is the vertebrate eye. A structure or process that requires many different parts, not one of which is functional without all of the others, could not have arisen by sequential addition of the parts, one at a time. In the case of the eye, that argument failed when scientists discovered that each part made the light-detecting apparatus more adaptive, even in the absence of some or all of the other parts. More recently, the supposed irreducible complexity of subcellular processes and structures has attracted a great deal of attention (see examples in appendix C).

The Creationists have eagerly adopted the subcellular version of irreducible complexity in an attempt to force public schools to teach ID in science classes as a way to undermine the teaching of evolution. The one court case to date denied their attempts, ruling that ID is not science. Like nearly all other scientists, Salisbury agrees that ID is not science, since there is no apparent way to support it or refute it by observation or experiment. However, he apparently finds ID to be an attractive possible explanation for the origin of life.

1. In this review, the lowercased word *creationist* refers to anyone who believes that God was involved in some way in the creation of life. When I capitalize the word *Creationist*, I am referring to members of political groups who have attempted, for the last few decades, to persuade school boards, and subsequently courts, to mandate the inclusion of their religious views about evolution in public school textbooks and other teaching materials, as well as the teaching of those ideas in science classes. The Creationist community has tried to make a case for what they call “creation science” largely by ignoring the discoveries of science, by appealing to magic, or by dismissing those discoveries because they do not agree with an absolutely literal interpretation of the Bible, particularly Genesis. Salisbury briefly reviews some Creationist beliefs in appendix A.

In chapter 1, Salisbury briefly examines the nature of scientific research as a way to discover how the world works. He also discusses the role of scripture, belief, and revelation in discovering religious truth. In several places, he uses the differences in these two approaches to explain why ID is not science. He also makes a good case for why some scientists' statements about the origin of life are not *yet* science either. He points out that research on the origin of life *could* become science in the future if someone were to figure out how to do relevant experiments that address the crucial questions. He emphasizes the danger of basing belief in God on ignorance about something that might someday be explained.

In chapter 2 and elsewhere, Salisbury shows that evidence for evolution of living organisms from more primitive forms over vast periods of time is very strong. However, he correctly points out that it cannot be shown that God had no hand in the history of life. Salisbury suggests that perhaps God occasionally tweaked the process to accomplish what he had in mind. Salisbury repeatedly uses a probability argument (especially in chapter 4) to suggest that it is reasonable to infer that a designer occasionally crafted new DNA sequences to produce novel kinds of proteins during the history of life. He does not make the claim that this proves the existence of God, but apparently he finds it a compelling argument that strengthens his own belief. I am not so convinced by this part of the book. Probability arguments are always treacherous since they depend so strongly on assumptions about the nature of things that we do not know and, in many cases, cannot know.² I am also troubled by the fact that, so far at least, there

2. These are *post hoc* probability arguments. Salisbury calculates the probability that something could have happened, even though we now know that it did happen. Once something has happened, then the probability that it *could have* happened is 1 (certainty). For instance, roulette wheels have occasionally produced a very long sequence of red (or black). Consider a run of twenty blacks in a row. If we make the slightly simplifying assumption that the probability of black is 0.5, then the probability of twenty in a row is $(0.5)^{20} = 0.00000095$, or about one chance in a million. Someone who observes such an unlikely run might conclude that it could not be due to chance, but of course it can be. One should also be aware that, if the roulette wheel is unbalanced, the chance of such an unlikely run might be much higher (or lower). Is our universe "unbalanced" in that formation of unlikely DNA sequences is more likely than we think?

is no convincing evidence of directionality, steady progression to an end, in the evolutionary record. Although *Homo sapiens* is the only species of our genus to survive, there were many other species, now extinct, that diverged from our direct-line ancestors.

Human beings and every other living thing we have looked at carefully are continuing to evolve, and recently mutated genes that make organisms better adapted to their environment have been described. For instance, a mutation appeared in humans in a town in Italy just a few hundred years ago that prevents cholesterol from damaging the arteries of those who have the mutant gene. These people routinely live for about a century.³

Chapter 5 may be the most important chapter in the book. Salisbury shows quite convincingly that, with regard to the origin of cellular life, there is no scientific hypothesis that is supported by experiment or observation. Since the book was written, more work has been published, but in my opinion it does not invalidate Salisbury's arguments.⁴

Just as I dislike false claims made by Creationists, I dislike false claims or misstatements made by some scientists and textbook writers who say that we *know* how life began. In fact, we do not. The claims are made because of the philosophical beliefs of the people who write and adopt the texts and because of pressure from the general scientific community. In my experience, many scientists are atheists or are indifferent to religion.⁵ If one believes there is no god, it is obvi-

3. "A Rare Protein Mutation Offers New Hope for Heart Disease Patients," *Berkeley Lab Research News*, 17 May 2002, <http://www.lbl.gov/Science-Articles/Archive/LSD-Milano-Bielicki.html> (accessed 21 August 2008).

4. These are a few of the more interesting recent articles: Claudia Huber and Günter Wächtershäuser, "α-Hydroxy and α-Amino Acids Under Possible Hadean, Volcanic Origin-of-Life Conditions," *Science* 314 (2006): 630–32; Jeffrey L. Bada et al., "Debating Evidence for the Origin of Life on Earth" (letter), *Science* 315 (2007): 937–38 (see in *Science* 315 Günter Wächtershäuser and Claudia Huber's response, 938–39); Irene A. Chen, "The Emergence of Cells During the Origin of Life," *Science* 314 (2006): 1558–59; W. M. Napier, J. T. Wickramasinghe, and N. C. Wickramasinghe, "The origin of life in comets," *International Journal of Astrobiology* 6 (2007): 321–23; Philipp Baaske et al., "Extreme accumulation of nucleotides in simulated hydrothermal pore systems," *Proceedings of the National Academy of Sciences of the United States of America* 104 (2007): 9346–51.

5. An interesting recent book review discusses several aspects related to this subject: Olle Häggström, review of *Irreligion: A Mathematician Explains Why the Arguments for*

ous that life *must* have originated spontaneously because there is no other possibility, and it is only a matter of time until we discover how it occurred. It would be much more honest for textbooks to say that while we do not know how life originated, future research may shed light on the matter—and perhaps it will.

There are scientific hypotheses about prebiotic (chemical) evolution, based on experiments showing that complex organic molecules can arise spontaneously, in the laboratory and in nature, from a mixture of simple molecules and a source of energy. The prebiotic hypotheses seem credible and worthy of more research.⁶ The origin of living cells is a much more difficult problem. Although the term *irreducible complexity* has become a red flag to many scientists, it seems appropriate in this context. A cell worthy of the name must have both an information storage mechanism (presumably RNA or DNA) that contains useful information and a translation mechanism to put the information into usable forms. In Salisbury's opinion, and mine, the "RNA world" hypothesis does not solve the problem. The problem is difficult enough that Nobel Prize-winner Francis Crick coauthored a paper with Leslie Orgel suggesting that perhaps the first living cells were carried to earth from some other place.⁷ It is also not clear how eukaryotic cells (the kind found in plants, animals, fungi, etc.) could have arisen from the apparently earlier prokaryotic cells (bacteria and Archaea), although there is good evidence that some parts of eukaryotic cells were derived from symbiotic prokaryotes.

Michael Behe, a biochemist at Pennsylvania's Lehigh University, is the foremost spokesman for ID in the scientific community, where his ideas have had a very hostile reception. In chapter 6 Salisbury reviews Behe's ideas and the responses of his critics and then discusses his

God Just Don't Add Up, by John Allen Paulos, *Notices of the American Mathematical Society* 55 (2008): 789–91, <http://www.ams.org/notices/200807/tx080700789p.pdf> (accessed 20 August 2008).

6. An excellent, short commentary on this work is available on the Internet: Eugene V. Koonin, "An RNA-making reactor for the origin of life," *Proceedings of the National Academy of Sciences of the United States of America* 104/22 (2007): 9105–6, <http://www.pnas.org/content/104/22/9105> (accessed 20 August 2008).

7. F. H. C. Crick and L. E. Orgel, "Directed Panspermia," *Icarus* 19/3 (1973): 341–46.

own views on the matter. Behe continues to publish, and his critics continue to respond.⁸ Although Salisbury has a lot of sympathy for Behe's ideas, he makes it very clear that he does not consider ID to be science or to be appropriate for the science classroom.⁹

To be sure, feelings within the scientific community about ID and irreducible complexity are strong. To illustrate, a research paper on the origin of eukaryotic cells¹⁰ provoked a critical letter that, after a technical discussion, ended with this paragraph:

Finally, and most disturbing, if contemporary eukaryotic cells are truly of "irreducible nature," as Kurland *et al.*'s title declares, then no stepwise evolutionary process could have possibly brought about their origin, and processes other than evolution must be invoked. Is there a hidden message in their paper?¹¹

What I find most disturbing about this paragraph is that it sounds very similar to comments made by some Latter-day Saint Creationists about Latter-day Saint scientists who are perceived to be friendly to the theory of evolution. Are scientists justified in being so thin-skinned when it comes to ID? Perhaps they are. The Creationists have been so dishonest, so aggressive, and so single-mindedly antiscience for over a hundred years that scientists generally detest them and all that they stand for. It is not surprising that many scientists (including me) are very wary about anything the Creationists say. Unfortunately, ID *per se* has come to be seen as guilty by association with Creationist literature. I do not condemn members of the scientific community for

8. Michael J. Behe, *The Edge of Evolution: The Search for the Limits of Darwinism* (New York: Free Press, 2007); Sean B. Carroll, "God as Genetic Engineer," *Science* 316 (2007): 1427–28; Michael J. Behe, "Addressing Cumulative Selection" (letter), *Science* 318 (2007): 196 (see in *Science* 316 Sean B. Carroll's response, 196).

9. For a current summary of Salisbury's position, see Frank B. Salisbury, "Simple answers to creation" (letter), *Deseret News*, 2 May 2008, section A14.

10. C. G. Kurland, L. J. Collins, and D. Penny, "Genomics and the Irreducible Nature of Eukaryote Cells," *Science* 312 (2006): 1011–14.

11. William Martin *et al.*, "The Evolution of Eukaryotes" (letter), *Science* 316 (2007): 542–43 (see in *Science* 316 C. G. Kurland *et al.*'s response, though it does not address the quoted paragraph). Both letters are available at <http://www.sciencemag.org/cgi/content/full/316/5824/542c> (accessed 21 August 2008).

their reaction, but I wish they were more aware of the identity of their true enemies.

In chapter 7 and appendix D, Salisbury makes his personal scientific and religious views explicitly clear. They are interesting, and for what it is worth, I feel much the same way.

Salisbury's book is a sound introduction to most of the topics related to the origin of life. It contrasts the possibilities of spontaneous generation of life with a creationist view. It is written for an intelligent reader who is not necessarily well-grounded in science. I strongly recommend the book to anyone who is troubled by the often acrimonious debate concerning evolution and creation.