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REVIEW

Creating Life in the Lab: How New Discoveries in Synthetic Biology Make a Case for the Creator

by Fazale Rana
Grand Rapids (MI): Baker Books, 2011. 235 pages

reviewed by Juli Peretó

The chemical origins of life are the ultimate target of creationists, and the latest book by Fazale Rana provides us with a nice illustration. Rana holds a PhD in biochemistry from Ohio University and is currently vice president of research and apologetics at Reasons to Believe, an old-earth creationist organization. According to the self-promotional text included at the end of the book, "research in biochemistry provided him with evidence that life must have a Creator," which is reminiscent of the "intelligent design" (ID) movement, but without redacting the reference to a personal God. Throughout 13 chapters, an epilogue (the only text with Biblical references), an appendix, and 21 pages of notes with a rich selection of bibliographic references, mostly from peer-reviewed journals, Rana explores studies on the origins of life and concludes that "these research efforts provide direct, empirical evidence that apart from the work of an intelligent agent, this prebiotic chemistry could not occur in a way that leads to the origin of life" (p 162). This is the central idea of the book: the human contribution to all the experiments of prebiotic chemistry and the emergent field of synthetic biology shows that nothing could have happened on the early earth under the control of natural forces alone. Instead, God was in action, purportedly designing processes, purifying enantiomers, condensing monomers in polymers, and igniting biological evolution in a sort of a primordial lab on a lifeless planet. All in all, this offers us with a very pedestrian image of the Omnipotent as a busy lab tech.

Prebiotic chemists know very well—and publicly accept and acknowledge in journals and meetings—that one of the major problems they face is the geochemical relevance of the reactions under scrutiny. Since our knowledge about the earliest terrestrial environments is so fragmentary and incomplete, deciding which component of abiotic chemistry—that is, geo- or cosmochemical compounds or processes—is prebiotically relevant—that is, was on the way to the most primitive cells—has been, and always will be, the biggest challenge.

Over the last sixty years, scientific opinions have changed about what chemicals and reactions were plausibly involved in prebiotic chemistry. One of the most beautiful examples involves the very first experiment published by Stanley L Miller (Miller 1953). Miller and his coworkers showed afterwards that the quality and quantity of the products obtained during the electric discharge experiments were highly dependent on the mixture of gases used. It worked better on a reducing atmosphere—that is, one composed of hydrogen-rich gases. Since geochemists advocated for a more neutral atmosphere—mainly composed of carbon dioxide—the prebiotic relevance of the original experiments was questioned for many years. In 2008 there appeared a paper (Cleaves and others 2008, on which Miller

had collaborated before his death) showing that two important modifications in the experimental design—the acidic control of the aqueous solution where organic products accumulate, and the prevention of oxidation during the analyses—make the classic experiment independent of the atmospheric model. In other words, a geochemically plausible neutral atmosphere is *also* good for organic synthesis. It is a pity that the fifteen pages of chapter 9 in Rana's book are devoted to the geochemical unlikelihood of Miller's approaches. Why doesn't Rana refer to this remarkable paper published in 2008? This scientific article alone makes chapter 9 worth less than the paper it's written on. (The most recent reference in the book corresponds to a webpage accessed on July 30, 2010.)

At any rate, in the future we will continue to come up against serious difficulties when it comes to assessing the prebiotic significance of our lab experiments. Since research into the origin of life is a historical science, it will be impossible to demonstrate the exact chemical nature of the processes involved, although there is a minimal scientific consensus that the natural transition from geochemistry to biochemistry took place on our planet more than three billion years ago. There is an insurmountable gap in the ways scientists and creationists confront this challenge: with more work by the former and a renunciation of scientific explanations by the latter. The most curious thing about this book is that, if Rana is right, absolutely all quoted scientists are wrong regarding their research and the conclusions they draw from their experiments. Doesn't that seem a little odd? Even the most skeptical authors, like Robert Shapiro, author of a celebrated account on the origins of life (Shapiro 1986), used and abused by Rana for his own interests, have remained firmly inside scientific boundaries.

Although it is not commonly observed in the creationist literature, there is nothing new in this illegitimate use of scientific evidence in favor of a particular group of believers. Confronted with the excellence of Pasteur's experiments against the spontaneous generation of microorganisms under lab conditions, some Catholic scientists who accepted the evolutionary theory at the end of the 19th century made an exception when it came to the natural origin of life. For them, the existence of a personal creator was a real postulate of science (Peretó 2007). More than a hundred years ago, those neovitalistic authors categorically rejected the possibility of an artificial synthesis of cells. Conversely, Rana now proposes that the imminent synthesis of life in the chemistry lab will be definitive proof of the necessary intervention of an intelligent agent in the origin of life. Maybe he is unaware of those illustrious historical precedents, but his position can be regarded as a mere change of strategy under the weight of contemporary scientific endeavors.

The author also devotes chapter 3 to J Craig Venter and his colleagues' work on the chemical synthesis of bacterial genomes and potential biotechnological uses—the so-called top-down approach to synthetic biology. As spectacular and advanced as these technologies may appear, they actually teach absolutely nothing about life's origins on the primeval earth. On the contrary, they speak much about the speedy development of genetic engineering methods in the post-genomic era and the ambitions of some biotechnological companies.

Reading Rana's book, I had the same feeling of frustration as with Michael Behe's *Darwin's Black Box*: at first sight satisfactory scientific descriptions are followed by strained and implausible arguments for the religiously significant conclusions. As with Behe and other ID

authors, the arguments will appear compelling only if you are willing to desert the scientific domain. You must abandon the idea that, for a scientific explanation, you must remain within the boundaries of material, exclusively natural, causes. In other words, you must be prepared to desert the scientific domain. Since many Christians, scientists and laypeople alike, accept this idea, Rana's book will not appeal even to all Christians. It is thus only of sectarian, not scientific, interest.

But if Rana's book fails as a scientific account, does it serve at least as a theological contribution? Several authors, including Francisco J Ayala, have already dealt with the theological weakness of the creationists' proposals. "A theologian should not cast doubt on a scientific consensus, but should see how he can deal with it." This is the recommendation of the distinguished German theologian Hans Küng (Heneghan 2006), and it calls for just the opposite of what ID proponents do. Küng adds, "As soon as one tries to intellectually force scientists to recognize God, one is on the wrong track." Thus let scientists continue their never-ending and passionate search for life's natural origins, and let theologians look on and accept science for what it is.

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