The Mystery of Life's Origin

Book Review by Rod Reynolds

The Mystery of Life's Origin: Reassessing Current Theories

Authors: Charles B. Thaxton, Walter L. Bradley, Roger L. Olsen; Foreword by Dean H. Kenyon. New York: Philosophical Library, 1984. 228 pages

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Some admit it, others don't, but for evolutionists origin of life research has reached an impasse, a point of crisis. To find out why, read this book!

For more than 30 years scientists have been attempting to understand and simulate processes which they believe might have led to earth's first living organisms. This book is the first to correlate and critically evaluate the various lines of theoretical and experimental research in this field. Research in prebiotic or chemical evolution spans a number of scientific disciplines. Each of the authors has a Ph.D. and numerous professional credits in a discipline relating to problems involved in chemical evolution. Their backgrounds are in chemistry (C.T.), materials science (W.B.) and geochemistry (R.O.).

Some have doubted that questions about the origin of life are really even in the domain of legitimate science. Sometimes science is narrowly defined as a method of inquiry involving phenomena which can be repeated for observation. The authors refer to this kind of science as *operation* science. The planets continually revolve around the sun. Their motions can be observed on a recurring basis. Theories about the motions of the planets can thus be checked by observation. This is an example of operation science. But science can be more broadly defined to include non-repeatable, or singular, events. The authors refer to science that deals with nonrecurring events as *origin* science. Evidence may be brought to bear by which theories of origin science can be judged *plausible* or *implausible*. But such theories cannot be *falsified* by direct observation as in the case of operation science. Chemical evolution is a speculative attempt to explain a singular event — the origin of life. But is it plausible or implausible? That is a question science can answer, according to the authors.

Modern origin of life research is usually considered to have begun with the prebiotic simulation experiments first reported by Stanley L. Miller in 1953. Miller sent an electric spark through an apparatus containing hydrogen, ammonia and methane gases and water vapor. The mixture was supposed to simulate the hypothetical early earth atmosphere. Among the compounds produced by the experiments were some amino acids. Amino acids are the building blocks of proteins. Subsequent experiments using various compounds (often in solution, to simulate hypothetical ocean conditions) along with varying sources and levels of energy have succeeded in producing most of the twenty amino acids found in natural proteins and all of the five bases commonly occurring in ribonucleic acid (RNA) and deoxyribonucleic acid (DNA). Proteins and nucleic acids are critical information bearing constituents of living cells. The problem of their synthesis under prebiotic conditions must be hurdled before any further progress towards chemical evolution can be considered.

In addition to the amino acids and nucleic acid bases mentioned above, prebiotic simulation experiments have succeeded in producing polypeptides (chains of amino acids bonded together) of up to 200 units long (called "proteinoids"). Sugars, including fructose, ribose, deoxyribose and many others, have been synthesized. Also, short links of bonded nucleotides (oligonucleotides), averaging about six units each, have been formed. Globules or aggregates which superficially resemble organic cells in certain respects have been formed from proteinoids, lipids and other organic materials. These achievements have helped create an impression in the minds of many scientists and people in the general public that chemical evolution is a very plausible scenario for the origin of life, if not a certainty. These results are in fact the strongest evidence in support of evolution. A closer look, though, will reveal how truly weak a foundation the theory rests on.

If you were going to "simulate" in an experiment conditions of an early earth atmosphere or ocean, wouldn't it be reasonable to make them as realistic as possible? Otherwise, how would you know that your experiment reflects what might have really happened on the early earth? Yet, in prebiotic simulation experiments this *is almost never done!* In the Foreword Dean H. Kenyon, Professor of Biology at San Francisco State University and a leading figure in origin of life research, remarks, "In most cases the experimental conditions in such studies have been so artificially simplified as to have virtually no bearing on any actual processes that might have taken place on the primitive earth" (p. vi).

For example, experimenters invariably select a few highly concentrated and purified reactants. These are isolated from any other possible reactants through the course of the experiment. Sometimes the products of the reactions are also quickly isolated as soon as they form to prevent further reactions which might destroy them. The authors point out, "This use of selected chemicals in simulation experiments is highly artificial, and creates a certain unrealism in our expectations of the early earth" (p. 106).

In a real environment many reactants would be present, setting up many competing cross-reactions. The net effect of all the reactants acting together would be destructive. The reactions would preclude the formation of most if not all complex macromolecules such as proteins and nucleic acids. And, the authors say, "If by some remote chance a true protein did develop in the ocean, its viability would be predictably of short duration" (p. 55). There are many reactions which would render the protein useless or destroy it altogether. For example, formaldehyde is used in all of the most significant experiments aiming at the formation of various sugars. But formaldehyde in the presence of protein would be disastrous for chemical evolution. It bonds permanently with protein and effectively prevents or retards it from entering into any further reactions. That's why morticians use it for embalming! The sea water itself would in relatively short time destroy any protein in it through hydrolysis (water molecules would combine with peptides and in so doing break them apart). Hydrolysis would destroy many amino acids as well.

Formaldehyde would also react with any nucleic acids managing to form, quickly inactivating them. "As with proteins, it is difficult to conceive of a viable nucleic acid existing in the primordial soup for more than a very brief period of time" (pp. 55-56). In a chapter entitled "The Myth of the Prebiotic Soup," the authors discuss a number of other destructive reactions that would occur, as well as other problems with the scenario. One of those problems is that there isn't a trace of geologic evidence that the organic soup ever existed. The authors conclude, "It is becoming clear that…the usually conceived notion that life emerged from an oceanic soup of organic chemicals is a most implausible hypothesis" (p. 66).

The use of isolated reactants is only one way in which investigators go about guiding the experiments unrealistically. In the chapter "Plausibility and Investigator Interference" the authors discuss these. They have developed a scale of geochemical plausibility, complete with a "threshold of illegitimate interference" by the investigator. The authors point out that chemists regularly employ "a host of manipulative interventions…to guide natural processes down specific…pathways…. Such manipulations are the hallmark of intelligent…interference and *should not be employed in any prebiotic experiment*" (p. 109, emphasis in the original). Yet, they are, in virtually every case. For this reason the authors write, "…most of these experiments are probably invalid" (p. 184).

The authors devote four chapters to the crucial question of how the laws of thermodynamics relate to the chemical origin of life. The first law demands an accounting of energy exchanges. The total energy in the universe must always remain the same. If heat is gained at one particular place, it must be accompanied by a corresponding loss of heat (or energy) at some other place. According to the second law the universe is moving toward a state of greater randomness (or maximum entropy). The theory of evolution flies directly in the face of the second law of thermodynamics, in particular. Evolution requires a continual progression from randomness to a high order of specified complexity. The second law (sometimes called "time's arrow") points directly in the opposite direction, from complex to simple, from order to disorder.

A system "at equilibrium" is at a state of maximum entropy (or randomness). There is general agreement that under such condition chemical evolution could not occur. But many evolutionists assert that the sun (or volcanoes, or high energy chemicals) provided sufficient energy to drive reactions which finally produced life from simple chemical precursors. The authors explain why raw energy is not enough to build even the complex macromolecules of life, such as DNA and protein, much less construct a living cell. Work–a flow of energy–is required to build a house. But placing dynamite under a pile of building materials would hardly suffice. The work must be *directed in a specific way* to achieve the desired result. The same is no less true when considering the construction of highly specific and complex molecules like DNA or protein.

DNA is an *information* carrying molecule. It carries the genetic code "engraved," you might say, in its structure. Its "alphabet" consists of the four bases that pair together forming rungs on a spiral ladder, as the molecule's shape might be likened to. The precise sequence of the bases as one ascends the ladder is what determines the information contained. The DNA in a human genome (separated into 23 chromosomes) contains about 3 billion rungs–or base pairs–and thus 3 billion coded instructions. That's enough information to fill 1000 encyclopedic volumes. Two genomes–one from each parent–make up the normal 46 chromosome complement of human somatic (body tissue) cells. So each somatic cell contains in its DNA two similar but not identical sets of coded information totaling about six billion instructions. Protein is another kind of highly specific information bearing molecule which has its code written in the sequence of 20 different amino acids.

The authors differentiate two distinct kinds of work that must be done in constructing a macromolecule like DNA or protein. There is the *chemical and thermal entropy work* which can be calculated on the basis of the laws of thermodynamics. The other kind of work is the work of arranging the molecule's constituents into a *specific sequence*. This the authors call the *configurational entropy* work. Doing the configurational entropy work requires not only a specific quantity of work–which can be calculated–but it also requires *a mechanism to couple the energy flow to the specific work required*. As the authors write, "It is one thing to get molecules to react; it is quite another to get them to link up in the right arrangement" (p. 163).

The authors analyze the various energy sources used in the experiments in terms of the laws of thermodynamics and what is produced. At best the forces are sufficient to form random polypeptides and oligonucleotides. "In no case, though, has anyone been successful [in prebiotic simulation experiments] in doing the additional configurational entropy work of coding necessary to convert random polypeptides into proteins" (p. 162). The authors conclude, "The early earth conditions appear to offer no intrinsic means of supplying…the configurational entropy work necessary to make the macromolecules of life" (p. 184). Some theorists have alleged that complex macromolecules were "self-ordered" through "preferential bonding" of components (such as amino acids). There are a couple of problems with such a concept. First, if such "preferential bonds" were the rule one would get a single sequence or no more than a few sequences, as in crystals. Crystals are highly ordered structures but carry little or no information because of their redundancy. If preferential bonding played a significant role in the formation of proteins or nucleic acids they would be incapable of carrying significant amounts of information.

Secondly, experimental evidence indicates that if there are bonding preferences between amino acids, they are not the ones found in natural organisms. There are three basic requirements for a biologically functional protein. One: It must have a specific sequence of amino acids. At best prebiotic experiments have produced only random polymers. And many of the amino acids included are not found in living organisms. Second: An amino acid with a given chemical formula may in its structure be either "right-handed" (D-amino acids) or "left-handed" (L-amino acids). Living organisms incorporate *only* L-amino acids. However, in prebiotic experiments where amino acids are formed approximately equal numbers of D- and L-amino acids are found. This is an "intractable problem" for chemical evolution (p. vi). Third: In some amino acids there are more positions than one on the molecule where the amino and carboxyl groups may join to form a peptide bond. In natural proteins only *alpha* peptide bonds (designating the location of the bond) are found. In proteinoids, however, *beta, gamma* and *epsilon* peptide bonds largely predominate. Just the opposite of what one would expect if bonding preferences played a role in prebiotic evolution.

Similar results are found in experiments involving nucleotides. In DNA the nucleosides (base plus sugar) are joined to the phosphate groups at the 3′-5′ carbon atom locations of the pentoses (sugars). In prebiotic simulation experiments, however, 2′-5′ links predominate. Again, just the opposite of what one would expect if bonding preferences played a role in chemical evolution. Also, in DNA only D-deoxyribose occurs. No such preference is found in prebiotic experiments.

The authors discuss other concepts of self-organization as well. The common weakness is that none provides a realistic means of coupling the energy flow to the configurational entropy work required. They note also the frequent reversion to chance for solutions, using Manfred Eigen's model (which they review) as an example. Hans Kuhn provides another, more graphic, example. He writes, "…we may recognize what time and again governs self-organization: *the game of chance*…leads to the formation of increasingly organized structural and functional units" ("Self-Organization of Molecular Systems; Evolution of Genetic Apparatus," *Synthesis of Life*, Charles C. Price, Ed., p. 357, emphasis added). But by now we should be able to recognize this as a mere statement of faith in goddess Fortuna, a *belief* not supported by the evidence.

Other chapters examine additional issues relating to the origin of life, such as questions about the early earth atmosphere, and the relevance of "proto cells" produced in experiments to true living cells. In the epilogue the authors discuss various suggested alternatives to chemical evolution, including Special Creation.

The book's style is cautious and non-polemical, but tellingly effective in elucidating major problems with the chemical evolution theory. The untold story of prebiotic simulation experiments is not one of success but of failure! "The *uniform failure* in literally *thousands* of experimental attempts to synthesize protein or DNA under even questionable prebiotic conditions is a monument to the difficulty in achieving a high degree of information content, or specified complexity from the *undirected* flow of energy through a system" (p. 164). The experiments have exposed a boundary between "what can be expected from matter and energy left to themselves, and what can be accomplished only through what

Michael Polanyi has called 'a profoundly informative intervention' " (p. 185). What science knows about biological development and function is minute compared to man's ignorance about it. But it's important to realize "that the sharp edge of this critique is not what we *do not* know, but what we *do* know" (p. 185). The authors conclude, "The advance of science itself is what is challenging the notion that life arose on earth by spontaneous…chemical reactions" (p. 185).

A number of researchers have concluded that the spontaneous origin of life cannot be explained by known laws of physics and chemistry. Many seek "new" laws which can account for life's origin. Why are so many unwilling to simply accept what the evidence points to: that the theory of evolution itself is fundamentally implausible? Dean Kenyon answers, "Perhaps these scientists fear that acceptance of this conclusion would leave open the possibility (or the necessity) of a supernatural origin of life" (p. viii).

What it finally comes down to is a matter of faith. Those prepared to believe the gospel, repent and obey God find it easy to discover abundant evidence of God's power and intellect in His creation. But seemingly no amount of evidence will dissuade those who have set out beforehand to reject the supernatural, and place all their faith in a totally materialistic "method" of approaching knowledge. They reject the testimony of an eyewitness to Creation–God. And they reject the physical evidence which corroborates the testimony of that eyewitness. Because to do otherwise would be to admit that man's methods of discovering knowledge have limits, that man cannot be a law unto himself, and that he is ultimately dependent on a greater power and a greater intellect.

Jesus said to Thomas, "…because you have seen Me, you have believed. Blessed are those who have not seen and yet have believed" (John 20:29). Believing God without having to see Him carries great rewards for all of His people. But the day is coming when "every eye will see Him" (Revelation 1:7), then even the diehards will be convinced.

Meanwhile, the book reviewed contains some very useful and enlightening information that has been deliberately suppressed by many of the popularizers of the theory of evolution (see Romans 1:18). The book can strengthen your understanding of some important details of chemistry and physics that make the theory of evolution an absurdity.

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Mystery of Life's Origins is one of those quintessential books that anyone who studies intelligent design must read. I first read it during my internship at Probe before graduate school. Essentially, this books discusses all of the problems with the theory of chemical origins. Although it was published in the 1980's these are the same issues that keep coming up in current prebiotic or chemical evolution literature. I gave this book a good rating, but with one caveat: It is a little heavy on the chemistry. There are reaction mechanisms and three chapters on thermodynamics. While I fin The authors have prepared this book in conjunction with the publishing program of the Foundation for Thought and Ethics. Library of Congress Cataloging in Publication Data. Thaxton, Charles B. The mystery of life's origin. Bibliography: p.220 Includes index. 1. Life-Origin. 2. Chemical evolution. 3. Life-Origin-Research. 4. Chemical evolution-Research. I. Bradley, Walter L. II. Life was also claimedto be eternal. Life always existed and didn?t have to arise from matter. Inthis way, the problem of the origin of life was explained away.? Fry pointsto scientists such as Hermann von Helmholtz in Germany, Lord Kelvin in England, and Svante Arrhenius in Sweden,who promoted the idea of sperms of life wandering the universe and taking rootin any planet with the appropriate conditions.Â Fry saysthat the current usage of the term ?Panspermia? ignores the history of ideas onthe origin of life and the specific meaning of this term. ?Certainlyscientists today do not believe that the universe is eternal, they do notbelieve that life is eternal,? says Fry. ? The cosmology changed.