MINI-SYMPOSIUM

CREATIONIST INTERPRETATIONS OF CHEMICAL ORGANIZATION IN TIME AND SPACE

Overview

In recent years there has been considerable work performed by chemists on the development of so-called chemical organization. The approach generally taken is that although nature "drives" systems toward equilibrium according to the second law of thermodynamics, this does not account for all of the chemical order seen in the world. For instance, many non-equilibrium systems, particularly living organisms, exist on the earth. Underlying much of this work are implications that the second law (degeneration processes) is not all pervasive. The second law has been and can be circumvented naturally.

Creationists have recognized that other principles operate in nature besides degeneration processes.[1] There are principles that tend to conserve the natural order—first law of thermodynamics (conservation processes). The creationist understands the interplay of these degeneration and conservation processes and realizes that natural order continues in spite of the second law.

The basic disagreement between the naturalist and the creationist is the origin of natural order. The naturalist seeks to use the present processes of conserving order and organization to explain their origin. The creationist claims that natural order originated by the act of a Creator and could not have evolved.

Thus the present work[2] should be viewed in this light. The author does not deal with origin of chemical organization, he simply assumes that it exists. The worn-out, unsuitable example[3] of how order and complexity can be generated in an open system, such as the earth being flooded with sunlight (p. 142) is used. An already-created universe has been assumed. The author only discusses how order can be produced in an already-ordered (nonequilibrium) world—obviously not a problem when one understands the interrelation of conservation and degeneration processes.

However the definition of organization should be viewed with skepticism. For instance, turbulence is given as an example of elaborate spatial organization (p. 145). Often organization seems to be identified with dynamic confusion. Thus anything that does not exhibit uniform distribution can be called spatially organized. For anyone interested, a good discussion of order and *arrangement* was written by Harold Armstrong in a CRS publication.[4]

Spontaneous generation of a universe and all of its order and complexity by natural processes is still scientifically impossible regardless of fluctuations and kinetic behavior. Genesis 1:1 is the best and most accurate statement of the origin of natural order.

References

1. Williams, E. L. 1976. A creation model for natural processes. *Creation Research Society Quarterly* 13:34-37 also in Williams, E. L., editor Thermodynamics and the development of order, Creation Research Society Books, Norcross, GA pp. 114-19.
2. Field, R. J. 1985. Chemical organization in time and space. *American Scientist* 73:142-50.
3. Williams, E. L. 1985. Book review. *Creation Research Society Quarterly* 21:205-6.
4. Armstrong, H. L. 1981. Order: arrangement and uniformity in Williams, E. L. (editor) Thermodynamics and the development of order. Creation Research Society Books, Norcross, GA pp. 23-33.

Contributed by Emmett L. Williams

Chemical Order

The first concern from a creationist perspective might be whether chemical systems can actually spontaneously change (evolve) to organized states as claimed in the subtitle of the article: "Chemical systems can spontaneously evolve to organized states, and such processes may have been associated with the beginning of life." It is well known that for many simple processes occurring in open systems, the change in enthalpy (ΔH) is negative and the change in entropy (ΔS) is positive, which results in a decrease in the Gibbs free energy (ΔG). (The second law of thermodynamics states that $\Delta G = \Delta H - T\Delta S$ at constant temperature and pressure.) Thus the process occurs spontaneously, but the degree of organization *decreases*. However it is also known that in some instances a spontaneous *increase* in organization occurs, still in agreement with the second law, because of a large decrease in enthalpy which dominates the process. (For example, the freezing of water vapor to produce a snow flake.) These are the kinds of processes discussed, although they must be "high energy" rather than "low energy" like the snow flake, presumably so that the organization process can continue to occur and order can accumulate at the expense of continually decreasing enthalpy.

As far as I can tell, there is nothing in this article which actually suggests a violation of the second law, although some of the wording at first seems to be a little misleading i.e. the subtitle mentioned earlier. The misleading statement is that "such processes may have been associated with the beginning of life," (p. 142) because it implies a spontaneous, irreversible, successive accumulation of order over long periods of time. This is actually a tremendous extrapolation of data obtained on relatively simple chemical systems to supposedly far more complex processes presumed to be involved in the hypothetical organization of complex organic chemicals into living systems. It seems that such an extrapolation of the data which is presented is unwarranted and misleading.

Secondly, the definition of chemical organization (p. 142) is more restricted than would normally be implied by the terms, probably because of a desire to limit its use to more complex chemical systems such as oscillating reactions. The requirements "to evolve in response to environmental changes and to repair itself" are not inherently necessary and are apparently added to stress the previously *assumed* relationship of this phenomenon to the hypothetical spontaneous generation of life.

Furthermore, I suspect that Field would like to define life or the living cell as "chemical organization" or an "organized chemical system." While I would agree that the living cell contains a highly organized chemical system, I believe that it is more than just an organization of complex chemicals (vitalism).

He seems to have an accurate understanding of the second law of thermodynamics, as any physical chemist should, but apparently fails to recognize that if the universe is an isolated system which is spontaneously increasing in entropy, it must have had an origin as a highly organized (low entropy) system some time in the past. This universal low entropy state could not have arisen spontaneously from a higher entropy state in accord with the second law, if the universe is indeed a closed system, because there could be no corresponding decrease in enthalpy. Furthermore, he apparently fails to recognize the necessity of a preexisting highly ordered energy conversion mechanism in order for the "supply of sunlight" to produce chemical organization on the earth.

In the discussion of the evolution of biological macromolecules (p. 149) the author seems to recognize the problems for the theory of chemical evolution which have been raised by mathematicians, and concedes that "no satisfying, detailed answer to the question of how biologically important molecules were initially selectively synthesized exists at present," but then appeals to hypercycles to somehow overcome these problems. As far as I know, creationists have not yet commented on the use of hypercycles to solve statistical problems associated with chemical evolution.

The limitations of experiments dealing with nonrepeatable historical events such as the origin of life is recognized (p. 149). Yet the final statement:

> However, it is clear that not only do no apparent physical laws forbid the spontaneous generation of chemical organizion, but there are conditions under which currently known theory seems to guarantee it (p. 149)

while being technically accurate as far as "chemical organization" is concerned, is misleading in this context concerning the origin of life. It seems to say that "not only do no apparent physical laws forbid the spontaneous generation of 'life,' but there are conditions under which currently known theory seems to guarantee it." Obviously, this is not actually the case. No exceptions to the law of biogenesis have ever been documented, and the more we learn about the complexity of living cells, the more obvious it becomes that spontaneous generation is, indeed, impossible.

In conclusion, my biggest concern relates to the somewhat misleading implications of the article which arise from its purpose to "shed some light on how life might have evolved," rather than the accuracy of the factual material itself.

Contributed by Larry Helmick

Kinetic Manipulations

The article is full of interesting kinetic manipulations; however the author admits that the universe as a whole is an isolated system. Therefore the argument based on the possibility of life originating in an open system is not valid.

His statement that an isolated system may at some point be far enough from equilibrium to become organized could allow for the kinetic behavior exhibited, but eventually disorganization *will* develop.

The author states that he has no idea of how the biologically-important molecules were initially synthesized and then proceeds to develop his theoretical work by disregarding this problem.

An interesting question for a creationist to ask is: how did the physical laws originate in order for the evolutionary process to follow them?

Contributed by Marsha Damon

SANDSTONE AND THE FLOOD ENVIRONMENT

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Abstract

Terrigenous rocks, those that appear to have been formed on the land, seem incompatible with sediment deposition in the Flood environment. These include sandstones, gravels, and conglomerates. Concepts for reinterpreting these rocks are developed, based upon the evidence of diagenesis, the processes which cause alteration of sediments after deposition.

Interpretation of Sands and Gravels

James Hutton claimed that gravels were formed by the erosional action of rivers over long ages. He interpreted the abundance of rounded pebbles on the land and buried in rock strata as evidence for repeated uplifts and subsidences of the earth's crust and erosion of igneous and sedimentary rocks. The products of erosion eventually became the materials from which new sediments were formed, which were in turn uplifted and eroded, in an endless cycle. To many people, the presence of gravels and sands in the rock record is a compelling reason for assigning a great age to the earth. Hutton wrote:[1]

> Gravel forms a part of those materials which compose our solid land; but gravel is none other than a collection of the fragments of solid stones worn round, or having their angular form destroyed by agitation in water, and the attrition upon each other, or upon similar bodies. Consequently, in finding masses of gravel in the composition of our land, we must conclude, that there had existed a former land, on which there had been transacted certain operations of wind and water, similar to those which are natural to the globe at present, and by which new gravel is continually prepared, as well as old gravel consumed or diminished by attrition upon our shores.
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> Sand is the material which enters, perhaps in greatest quantity, the composition of our land.

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