



George T. Javor

## Teaching Biology in the

# LIGHT OF CREATION

**B**iology, the study of life and of living organisms, is one of the most exciting subjects in the sciences. Here, among other things, the student learns how cells and organisms function on the molecular, cellular, and ecological levels of organization. This knowledge is foundational for all health sciences and for nutrition.

However, biology taught in secular settings has become “evolution in action,” the epicenter of materialism, which posits that “physical matter is the only reality and all beings, processes and phenomena can be explained as manifestations of matter.”<sup>1</sup> It is now the orthodox tenet of biology that evolution is the engine that propels the emergence of new species. The title of the famous article by Theodosius Dobzhansky, “Nothing in Biology Makes Sense Except in the Light of Evolution,”<sup>2</sup> has been repeated so many times that it has

become dogma for biology teachers. Standard biology textbooks use such logic to explain the existence and functioning of organisms. Predictably, biology teachers in Adventist schools are challenged to present their subject from the creationist perspective.

Fortunately, creationist biology teachers deal with the vast ocean of biological phenomena, which handily support the biblical account of origins. This article first points out nine such facts in an attempt to stimulate each teacher to develop his or her store of creation-friendly lessons. Ideally, the student will learn that “Nothing in Biology Makes Sense Except in the Light of Creation.”<sup>3</sup>

The second part of this article describes the writer’s journey toward a reformulation of creationism in response to the thought-provoking comments on the topic by the Spirit of Prophecy. An invitation is extended to colleagues to consider a new term, “Superintended Creationism,” which confesses an absolute requirement for the created world of God’s sustaining power.

### Topics Supported by Creationist Interpretations

From the vast array of subject matter in biology or biochemistry, nine topics are selected that easily lend themselves to creationist interpretation:

**1. No living thing can survive by itself.** Organisms in the ecosystem depend on other living entities for survival. Figure 1 highlights some of the interdependence of all organisms. Humans and animals breathe oxygen produced by plants through photosynthesis. Plants, on the other hand, require nitrogen for their growth, which they receive with the help of special nitrogen-fixing microorganisms. Plants and microorganisms also require carbon dioxide, the product of aerobic respiration of a variety of organisms, including plants at night. Even the most self-reliant photosynthetic, nitrogen-fixing, and autolithotrophic microorganisms depend on a source for atmospheric

carbon dioxide.<sup>4</sup> While photosynthesis is not the only source of oxygen, as photolysis of nitrous oxide and water in the upper atmosphere by ultraviolet light also yields oxygen, and some atmospheric carbon dioxide also comes from volcanic outgassing, respiration and photosynthesis are by orders of magnitude, the most important atmospheric sources of oxygen and carbon dioxide.<sup>5</sup> Figure 1 also points to (intestinal) microorganisms in producing vitamins for our use.<sup>6</sup>

**2. The biodegradability of all naturally made organic substances.** Biologists are not aware of any naturally occurring organic substance that is not metabolizable. If naturally made organic substances were not biodegrad-

able, there would be large deposits of unusable organic matter everywhere, cluttering up nature and eventually causing severe shortages of the all-important carbon. One of the largest oil spills in history, occurring in April of 2010 in the Gulf of Mexico,<sup>7</sup> leaked an estimated 210 million gallons of crude oil and resulted in a catastrophic environmental disaster. Its negative impact is still felt in the region. One consequence of this event, however, was a dramatic increase of the levels of aquatic microorganisms that metabolize oil and gas.<sup>8</sup> The Creator made provisions even for this manmade catastrophe. He does not tolerate waste. However, when humans pollute the environment with manmade, non-

biodegradable objects, we undermine and counteract His design.

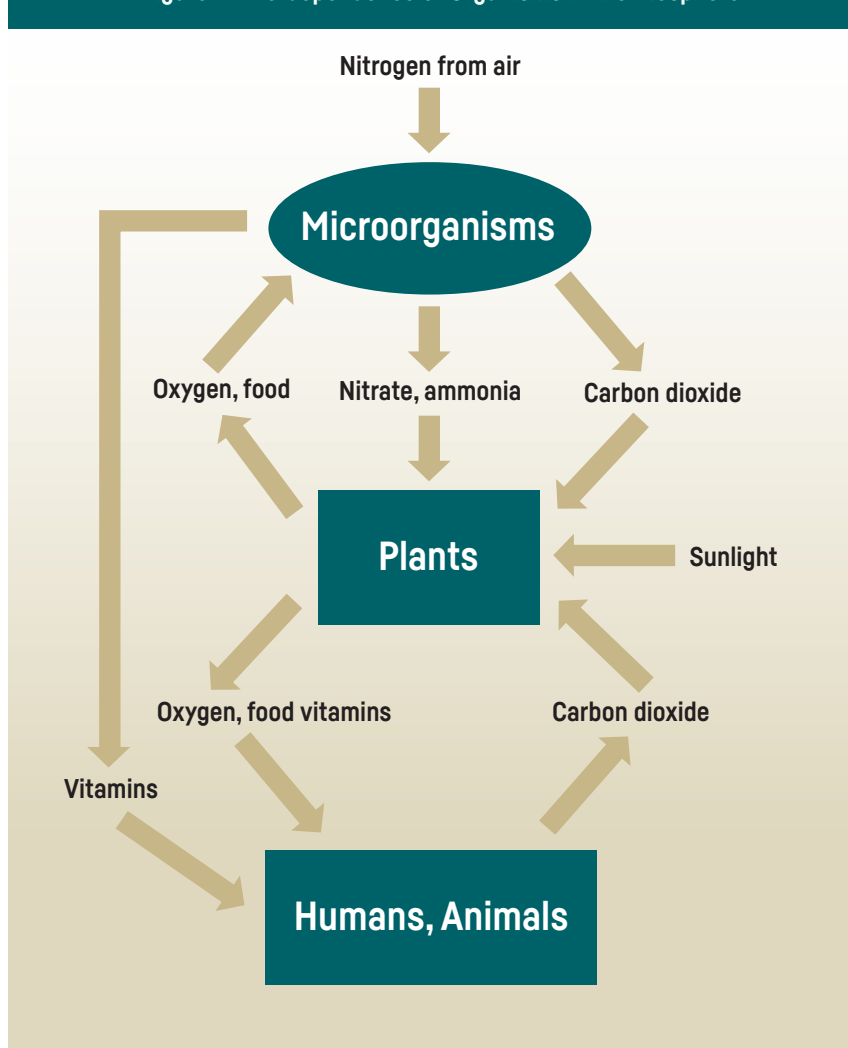
**3. Enzymes catalyze essentially every chemical reaction in living matter.** Many substances in living matter have the potential of chemically interacting with one another, yielding compounds that would be useless or even toxic. Such interactions could undermine live processes. Enzymes speed up biologically useful chemical reactions by orders of magnitude over spontaneous, random chemical events in cells ensuring orderly metabolism. Thus, substances in living matter are ushered along predetermined metabolic pathways as they accomplish growth, movement, metabolism, and replication. In the study of metabolism we see how the Creator optimizes the workings of living matter.

**4. The universal existence of turnover of matter in organisms.**

Biodegradative pathways are in complete synchrony with biosynthetic pathways. If either system is out of balance, the organism perishes. Even though cells expend considerable energy to build protein molecules, we now know that proteins are periodically degraded. For example, hemoglobin, the oxygen-carrying protein of blood cells, is degraded in about 120 days. Scientists eventually came to understand the important reason for the turnover of proteins. During normal metabolism, protein molecules become damaged by their interaction with free radicals of oxygen, rendering them ineffective and even toxic. Turnover ensures that there are no worn-out, oxidatively damaged components in living matter. Everything is “factory fresh.”<sup>9</sup>

**5. The existence of apoptosis,** the programmed self-destruction of entire cells, in order to promote the orderly development of tissues in plants and animals, as well as to preserve the health of the tissues. Just as worn-out molecules are degraded, old cells from the tissue are also degraded. In the course of seven to 10 years, every cell in our bodies, except for the brain cells, is replaced. Imagine the dire consequences of a failure of control-

Figure 1. Interdependence of Organisms in the Biosphere



ling apoptosis or trying to establish it by trial and error.

**6. The existence of topoisomerase II enzymes**, which, during replication, cut both strands of DNA while holding onto the strands. During replication, it is necessary to separate the two strands of the genetic material. But at the replicating fork, the point of strand separation, there is a tightening of the yet unseparated strands of DNA. Without the cutting of DNA strands to relieve the tension, DNA replication would come to a halt. When the topoisomerase II enzyme cuts both strands of the DNA temporarily, all that stands between life and death of the cell is the tight grip of the enzyme on each DNA strand. Thus, at every replication cycle, the cell is pushed to the edge of death. Imagine the difficulty of such an enzyme coming into existence by trial and error.

**7. The mechanism of the peptidyl transferase reaction on ribosomes**, which creates the peptide bonds of proteins, is identical (in the reverse direction) to that of the protein-degrading enzyme chymotrypsin. Ribosomes are the sites of protein synthesis in cells. They are large sub-cellular complexes, composed of several molecules of ribonucleic acid and more than 50 proteins. For many years, scientists did not know which of the more than 50 proteins of the bacterial ribosome catalyzed the formation of peptide bonds.<sup>10</sup> Then, after the three-dimensional structures of ribosomes were determined, it was discovered that the ribosome's catalytic center is not on any of its proteins but at a special location on one or more of its ribonucleic acid segments.<sup>11</sup> The process of peptide bond formation turned out to be identical to the exact reverse of the way peptide bonds are broken up.<sup>12</sup> The surprising thing is that in ribosomes, nucleotide bases are doing the same work as amino acid residues of the protein chymotrypsin.

This illustrates the elegance of the

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Creator's genius of solving biochemical problems. In this instance, the formation (and degradation) of peptide links are catalyzed by selected amino acid residues in the enzyme chymotrypsin and by purine and pyrimidine residues in ribosomes.

**8. The absolute avoidance of equilibrium** in the hundreds to thousands of chemical reactions in living matter, in spite of the fact that every reaction is pushed vigorously toward equilibrium by an enzyme. Every chemical reaction has a beginning, a middle, and an end. All isolated (or closed) chemical reactions reach a state of equilibrium, where no further net chemical change happens. Life, on the other hand, depends on continuous

chemical changes in cells. In living matter, most chemical reactions participate in metabolic pathways where reactions are in open systems, where there is a steady supply of reactants and removal of products. If, for whatever reason, this stops, and chemical reactions reach their equilibria, the cell dies.

The Le Chatelier's Principle in chemistry states that once a chemical reaction reaches its equilibrium, it will not revert to a non-equilibrium state spontaneously. Chemical evolutionary scenarios all postulate that life happened spontaneously by the step-wise development of enzymes (protein or

RNA molecules), which promote single chemical steps. Therefore, even if all of these postulates were true, they would only result in a collection of isolated chemical reactions, all in states of equilibria.

In order to form living cells, all of the chemical reactions in cells would have to be present simultaneously, linked in states of non-equilibria; however, the Le Chatelier's principle forbids the spontaneous conversion of chemical reactions from states of equilibria to states on non-equilibria. Therefore, all claims that suggest a spontaneous emergence of a living cell under any conditions are an impossibility!

**9. We cannot reverse death or create life in the laboratory.** Because of the great abundance of living forms, the reality of existence in a biosphere among millions of different organisms is frequently taken for granted. The level of sophistication in the design and functioning required even for the simplest of organisms, bacteria, is seldom appreciated. Our considerable knowledge of biology and technical capacities are inadequate to manufacture a live bacterium. Nor can we restore to life a dead cell. The great advances in life sciences are all about discovering how everything works. Students deserve to be taught that the very existence of life is incontrovertible evidence of the Creator's existence.

### A Personal Journey

In my 37 years of teaching chemistry, biochemistry, and microbiology in the Adventist school system, I emphasized God's creatorship, giving the Lord full credit for designing and implementing all of biology. I thought that this was the needed counterweight to the prevailing evolutionary concepts that were in vogue at that time. I did not realize the unstated implication of my logic, namely: God created this world and the biosphere as an extremely complicated and efficient machine, which once started, operates on its own. Aside from origins, I was

teaching a **materialistic version of creationism**. With regard to how things worked in biology, there was little difference between a materialist and me. I was aware of statements by Ellen G. White, such as this:

"It is supposed that matter is placed in certain relations and left to act from fixed laws with which God himself cannot interfere; that nature is endowed with certain properties and placed subject to laws, and is then left to itself to obey these laws and perform the work originally commanded. This is false science; there is nothing in the word of God to sustain it. God does not annul His laws but He is continually working through them, using them as His instruments. They are not self-working. God is perpetually at work in nature. . . . It is not by an original power inherent in nature that year by year the earth yields its bounties and continues its march around the sun. . . . It is by His power that vegetation is caused to flourish, that every leaf appears and every flower blooms. . . . In God we live and move and have our being."<sup>13</sup>

Yet, I did not know what to do with the notion of the Lord being continually involved with the routine operation of nature. In an essay published in 2000, I wrote:

"These and other similar passages in the writings of Ellen White suggest the Lord's intimate engagement in the operation of our world. But science and scientists, including this writer, are clueless to deal with such a concept. To us matter behaves in a perfectly predictable manner, obeying the fundamental laws of gravity, attractions between positive and negative charges, etc. Chemical properties of each element depend on the configuration of its valence electrons. Biochemical properties of living matter are understood, based on the characteristics of proteins, nucleic acids, carbohydrates and lipids.

"While it may be suggested that the Lord works precisely through these and other laws of nature, it is an unsatisfactory solution, because it is not testable.

"Moreover, it renders the Lord directly responsible for every undesirable physical event in the world. If the Lord directly pushes atoms and molecules around, then He would surely stop doing it when it comes to an explosion by a suicide bomber!

"Accepting the Creatorship of the Lord does imply that all matter proceeded from Him, and that the Lord is aware of every atom in the Universe. But it does not necessarily follow that the Lord micro manages the Universe through actively superintending every chemical change. I am more comfortable letting the mystery of the nature of the Lord's involvement with our world linger until we enroll in a university on the earth made new."<sup>14</sup>

As creation scientists, we should be less smug about our understanding of the relationship between the Creator and His creation. In the past several years, little has been done to advance this topic; yet, it continues to be one for which many science teachers (and presumably students and even their parents) struggle to find answers. What if the Lord's involvement in nature is much more robust than previously imagined? What if all the laws of physics, chemistry, and biochemistry, which govern the behavior of matter, were dependent on the continual expression of the Creator's power? In this paradigm, the Creator would not be micromanaging every chemical transformation in nature; rather, His power would be required for the continual existence of subatomic particles, for the phenomenon of gravity, magnetic forces, positive and negative charges, etc.

This view of reality affirms that nothing in the created universe is truly independent of the Creator. All created entities, animate and inanimate, owe their origins and continued existence, nanosecond by nanosecond, to maintenance by the Creator. His power un-



derwrites all of the known laws that science has identified. In my opinion, the Lord does not micromanage all chemical reactions in nature. Rather, His power expressed continuously is an absolute requirement for the machinery of life to function. The Creator and His creation are separate entities, but nothing exists without being sustained by the Creator, as described in Hebrews 1:1-3. The most graphic biblical text in support of the Creator's intimate sustaining power comes from an unlikely source, one of Job's "friends": "If it were his intention and he withdrew his spirit and breath, all humanity would perish together and mankind would return to dust" (NIV).<sup>15</sup>

### Superintended Creationism

I am suggesting that we call this concept **superintended creationism** to emphasize the Creator's continued sustenance of creation. It removes the possibility that matter on its own would organize itself into planets, stars, and galaxies in space. It negates the chemical evolutionary doctrine that life arose spontaneously on a hypothetical primordial Earth and eliminates any notion of the evolutionary "tree of life," which purports to show the evolutionary linkages of all organisms.

Superintended creationism moves the doctrine of creation from the past to the present, in that we continually are mindful of the Creator's sustaining power in our lives. Sabbath keeping is not just about the past, but also about the present and the future. We are safe from destruction in the hands of our caring Creator!

To be sure, the Lord "causes his sun to rise on the evil and the good, and sends rain on the righteous and the unrighteous" (NIV).<sup>16</sup> God underwrites the existence of evil with the hope that some will turn from their

destructive ways. This fact alone ensures that current conditions will not last indefinitely. The tide of evil washing over the world must pain the Lord greatly.

The many-faceted implications of superintended creationism remain to be identified. The immediate task for Christian teachers of biology is to teach their students not to view ecosystems, organisms, cells, or enzymes ONLY as highly sophisticated machines (which they are), but rather as precious expressions of the Creator's sustaining love. ✍

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