REASON & REVELATION

A MONTHLY JOURNAL OF CHRISTIAN EVIDENCES DECEMBER 2001

LIFE ON MARS?—"THE REST OF THE STORY"

Joe Deweese and Bert Thompson, Ph.D.

[EDITOR'S NOTE: In previous issues of *Reason & Revelation* (e.g., December 2000 and July 2001), we published articles by two extremely talented young men—Joe Deweese and Alden Bass—who served as interns during the past two summers at Apologetics Press. As each of them has had time and opportunity, they have continued to work with us to produce additional research material. In last month's issue, we ran another article by Alden. This month, we are running one by Joe. We will be publishing additional articles by them in the future. I might also add that we have accepted and approved applications from two new interns for the summer of 2002—both of whom possess the same self-discipline, scholastic ability, and talent as Alden and Joe. Look for their articles to appear in future editions of *R & R* as well.]

Q. What is the current status regarding the 1996 claim by the National Aeronautics and Space Administration (NASA) that life existed on Mars in the distant past?

A. In 1815, near Chassigny, France, a chunk of rock fell from the sky; in 1865, at Shergotty, India, another came crashing down; and in 1911 at Nakhla, Egypt (near Alexandria) a third plummeted to Earth (allegedly killing a dog in the process—the only known instance of a canine having been killed by material from outer space!). Known collectively as SNCs (pronounced "snicks"—an acronym derived from the first letter of the names of the three cities in which they were found), each of these three "space rocks" was a tiny chunk of the planet Mars. Scientists were able to determine their place of origin because, in 1977, two U.S. spacecraft—*Viking 1* and *Viking 2*—successfully traveled to Mars and were able to collect and analyze samples of the planet's atmosphere. When the mixture of gases in the SNCs was examined, it matched precisely the mixture of gases discovered by the *Viking* missions. [To date, about fifteen Martian meteorites have been identified worldwide.]

Fast-forward to 1984. That year, explorers from the National Science Foundation formed an expedition (known as the United States Antarctic Search for Meteorites) to the Allan Hills region in South Victoria Land of Antarctica. During that trip, a geologist by the name of Roberta ("Robby") Score found a 4½-pound rock (roughly the size of a large potato) that was lying amidst the jagged ice of the South Pole. Designated as ALH84001 (because it was the first sample from the 1984 batch to be curated; sometimes referred to in the scientific literature simply as ALH), the rock was alleged to be 4.5 billion years old and to have originated from the planet Mars. [For a complete account of the discovery and subsequent investigation of ALH84001, see: McKay, et. al., 1996; Davies, 1999, pp. 208-210.]

According to the story released by NASA (whose evolution-based dating schemes we do not accept, of course), 16 million years ago a large asteroid hit Mars and sent ALH84001 into space; from there, it somehow made its way to Earth—where it had laid undisturbed for (supposedly) 13,000 years. At a press conference on August 7, 1996, NASA created instantaneous worldwide headlines when the president of the United States announced in dramatic terms that U.S. scientists believed ALH84001 contained evidence of previous biological activity on Mars. [Approximately one week later, David S. McKay and his colleagues published a report in the August 16, 1996 issue of *Science* supporting that view (see McKay, et al., 1996). Although Dr. McKay was careful to note that "we're not claiming that we have found the smoking gun, the absolute proof, of life on Mars," he nevertheless commented that the study of the meteorite "found a lot of pointers in that direction" (as quoted in Kerr, 1996, 273:864).]

Although we have dealt with this subject in the pages of *Reason and Revelation* on two previous occasions (see: Major, 1996, 16:78-79; Major, 1997, 17:85-86), five years now have passed since NASA's original announcement. And in that intervening time period, two additional claims have been made which have a direct bearing on the suggestion that life once existed on the famed "Red Planet." First, approximately a year ago (see Savage and Hardin, 2000) it was alleged that water once existed in abundance on Mars. Second, earlier this year (see Gibson, et al., 2001) it was suggested that, upon reinvestigation, the 1911 Nakhla meteorite has been found to contain "even more conclusive evidence" of life on Mars than the controversial 1984 specimen (ALH84001). We therefore felt that our readers might benefit from an update regarding this matter. First, we intend to discuss ALH 84001. Second, we will address the possibility that water existed on Mars at some point in the past. Third, we will examine the suggestion that the Nakhla meteorite provides corroboration of NASA's original claim.

The evidence for or against past life on Mars revolves around four main discoveries related to ALH84001: (1) carbonate globules coated in an iron-rich material that included iron sulfide and a form of iron oxide known as magnetite; (2) polycyclic aromatic hydro-

CONTENTS

ARTICLES

DEPARTMENTS

Reason & Revelation is published monthly by Apologetics Press, Inc., a non-profit, tax-exempt work dedicated to the defense of New Testament Christianity.

Editor:
Bert Thompson, Ph.D.*
(*Microbiology, Texas A&M University)

Associate Editor
Brad Harrub, Ph.D.*
(*Neurobiology, University of Tennessee)

Annual Subscription Rates:
$ 8.00 Domestic
$13.00 Canada & Overseas Airmail

Mailing Address:
Apologetics Press, Inc.
230 Landmark Drive
Montgomery, AL 36117-2752

General inquiries, changes of address, or international callers:
Phone: (334) 272-8558
Fax: (334) 270-2002

Orders:
Phone: (800) 234-8558
Fax: (800) 234-2882

On-line Web store/catalog, subscription order/renewal form, current issues, archives, and other information (all orders processed on a secure server):
URL: www.ApologeticsPress.org
E-mail: mail@ApologeticsPress.org

Discovery—Scripture & Science for Kids is a sister publication for children. For more information, please contact our offices or visit the *Discovery* Web site at:
URL: www.DiscoveryMagazine.com

carbons [PAHs]; (3) tube shapes; and (4) crystal chains. However, as Major correctly remarked, "[e]ach of these clues, taken individually, is not unique to life" (1996, 16:78). Consider the following, for example.

(1) Carbonate Globules. McKay and his colleagues contended that ALH84001 contained carbonate globules, which are similar to carbonates associated with bacteria on Earth. Physicist Paul Davies, in his 1999 volume on the origin of life, *The Fifth Miracle*, remarked: "Close inspection revealed layered blobs ranging from twenty-five nanometers (one-millionth of a millimeter) up to about a tenth of a millimeter across" (pp. 211-212). However, as Davies went on to admit, "All these minerals can be produced separately by different sorts of chemical processes" (p. 212). Indeed, the carbonate globules and the minerals found within them could have formed through well-documented **in**organic (nonliving) processes. Furthermore, such globules could not have been formed by bacteria unless the temperatures were low enough. As Christopher Chyba wrote in *Nature:* "If the carbonates in ALH84001 were formed at high temperatures in an impact event [e.g., the asteroid impact on Mars that sent meteorites flying toward Earth—JD/BT], a biological interpretation would fail" (1996, 382:576). The probability of what Dr. Chyba called a "biological interpretation" was diminished severely by the work of Harry ("Hap") McSween Jr., Ralph Harvey, and John Bradley (who is one of the premier analysts of geological microscopic material). In an article appearing in the *New York Times*, John Wilford summarized their findings on the temperatures at which the globules formed:

> In their examination of the supposed fossils, the scientists said they found that surrounding minerals probably formed from vapors that crystallized at temperatures as high as 1,400 degrees Fahrenheit, **conditions much too hot to have included biological processes** (1996, pp. 1,6; see also Bradley, et al. 1996, 60:5149-5155, emp. added).

Two years later, McSween and his colleagues concluded that temperatures of less than half the original 1,400 degrees they originally calculated might have been plausible, but still would be extremely high to support life (see Taylor, 1999b, p. 260). Davies alluded to their most recent work when he wrote:

> These distinguished geologists examined the meteorite and concluded that the carbonate material was deposited at a temperature of at least 650 degrees Celsius. This would instantly destroy even the hardiest hyperthermophile. ...[S]everal other chemical and physical analyses have tipped the balance of evidence against the claim that ALH84001 contains traces of life (1999, pp. 215, 216).

Yes, they have. McKay and his colleagues suggested that the iron sulfides were remnants of sulfur-eating bacteria. But there are different varieties of sulfur, each of which has a slightly different atomic weight. As it turns out, bacteria utilize more of the "lighter" varieties, which means those are the ones that should have been concentrated within the iron sulfide minerals. Yet this was not the case (see Shearer, et al., 1996, 60:2921-2926). Jim Papike and Charles Shearer of the University of New Mexico examined the iron disulfide in ALH84001, and were unable to detect any ratio of sulfur isotopes that would be consistent with known biological activity (as referenced in Kerr, 1996, 273:865). Furthermore, in a paper in the March 2, 2000 issue of *Nature*, James Farquhar et al. published the results of their studies on the sulfur content of ALH84001. They wrote: "We conclude that the sulphur data from the SNC meteorites reflects deposition of oxidized sulphur species **produced by atmospheric chemical reactions**...," rather than any type of bacterial life form (404:50, emp. added).

In his book, *A Case Against Accident and Self-Organization*, Dean Overman remarked: "Although pyrite's presence in ALH can be explained by the hypothesis of Martian bacteria, that hypothesis is extremely improbable. ...[The] ratio **is inconsistent with biological activity**" (1997, pp. 95,96, emp. added). Thus, Kenneth Nealson of the University of Wisconsin at Milwaukee stated: "The little blobs in ALH84001 did not convince me.... [Y]ou can form little blobs on rocks with all kinds of chemical precipitates" (as quoted in Kerr, 1996, 273:865-866).

(2) Polycyclic aromatic hydrocarbons [PAHs]. Living organisms can produce these oily, organic compounds as they decompose. However, PAHs could have come just as readily from inorganic sources or, as some critics believe, from contamination with terrestrial sources. Luann Becker and her colleagues have suggested that the PAHs may have come from melted Antarctic ice (1997, 61:475-481). A.J.T. Jull of the University of Arizona examined ALH84001 and concluded: "Our analyses indicate that at least 80% of the organic material in ALH84001 is from Earth, not Mars, casting doubt on the hypothesis the meteorite contains a record of fossil life on Mars" (1998). Nevertheless, even the presence of PAHs is not terribly helpful to the scientist bent on discovering evidence of biological activity. As Overman noted:

> These PAHs are not good biomarkers or signs of life in ALH because they are not directly synthesized in biological systems but produced by a process of metamorphism. ALH is not metamorphosed. PAHs can be formed when organic matter decomposes. Coal, for example, is made of the fossils of plant life. But PAHs are commonplace in interplanetary and interstellar dust particles and in meteorites from the asteroid belt. These PAHs are the residue of non-biological reactions among carbon compounds. Even on earth, PAHs are ubiquitous in their presence and are formed not only by the decomposition of living matter, but also by power plants and automobile engines. PAHs are present in practically every gas cloud in the Milky Way galaxy (1997, p. 96).

Davies concurred, and added:

> The problem is that, although PAHs are made by living organisms, they are also made by inorganic processes. Indeed, they have been found in normal meteorites, and even in interstellar space. So their presence in ALH84001 is suggestive but inconclusive. Even if it can be proved that the PAHs come from Mars, they could have been produced by nonbiological processes or delivered there from space (1999, p. 212).

(3) Tube Shapes. ALH84001 showed extremely tiny, tubular-shaped objects that Dr. McKay and his coworkers suggested were the fossilized remains of bacteria (see picture on p. 94). They speculated that the bacteria grew in calcium-rich waters, which penetrated the cracks of the rock and were preserved as the fluid hardened into carbonate. In speaking about these structures, Davies observed:

> There was, however, a third reason for the NASA team to suspect that organisms once inhabited the Martian rock, and it was the most dramatic of all. Revealed under a powerful electron microscope were thousands of tiny sausage-shaped blobs clinging to the carbonate grains. These blobs look, for all the world, like terrestrial bacteria. McKay and his colleagues tentatively concluded that the blobs were nothing less than fossilized Martians—the petrified husks of microbes that lived on the red planet over three and a half billion years ago. If they were right, they would be the first people in history to see the imprint of an alien life form (1999, pp. 212-213).

The key phrase here, of course, is "if they were right." These objects—at a mere fifty nanometers—are a hundred times smaller than most terrestrial bacteria (one one-hundredth the thickness of a human hair; one thousand of them lying end to end would equal the diameter of the period at the end of this sentence!). It is true that since the discovery of ALH84001, scientists have found microorganisms living on Earth roughly the size of the alleged Martian microbes (see: Folk and Lynch, 1997, 67:583; Overman, 1997, p. 99; Taylor, 1999b, p. 244). But as Jack Farmer, a NASA biologist, commented: "The problem is that at that scale of just tens of nanometers, minerals can grow into shapes that are virtually impossible to distinguish from nanofossils" (as quoted in Gibbs and Powell, 1996, 275[4]:20). Regardless of the size, as Overman noted, "skeptical scientists will want to see some evidence of a cell wall" (1997, p. 100). Why is evidence of a cell wall so important? The reason, according to origin-of-life scientist Harold Morowitz, is that "the only life we know for certain is cellular" (1992, p. 12). And, we might add, those same scientists will want evidence of DNA. As Imre Friedman, the world-renowned microbiologist of Florida State University (and NASA's Ames Research Center) put it: "What someone needs to do is to extract DNA from nanobacteria" (as quoted in Taylor, 1999b, p. 192). Why is it important to locate DNA? Davies addressed this question when he wrote regarding the extremely minute size of the supposed Martian life forms:

> If they were DNA-based organisms, they could accommodate only a thousand base pairs in their genomes. Even this ignores the existence of any other structures, such as a cell wall, which in terrestrial bacteria is at least twenty-five nanometers thick. Could a Martian microbe perform the alleged mineral-processing feats and other metabolic functions with less than 1 percent of the molecular inventory of a common Earth bacterium? (1999, p. 215).

In a curiously titled article, "Bugs in the Data?" on the *Scientific American* Web site, W.W. Gibbs and C.S. Powell quoted Kenneth Nealson, a University of Wisconsin microbiologist, who complained: "I'd get drummed out of the microbiological society if I showed pictures like that and claimed I had bacteria" (1996). Further complicating the matter is the not-so-remote possibility of terrestrial contamination of the meteorites. In an article, "Fossils Blowing in the Wind: More Contamination of Antarctic Meteorites," G.J. Taylor discussed the work of Lloyd Burckle (of the Lamont-Doherty Earth Observatory) and Jeremy Delaney (of Rutgers University) who have found dramatic new evidence of contamination in Antarctic meteorites. As Taylor noted, Burckle and Delaney "conclude that contamination with micrometer-sized organisms might be a ubiquitous process in Antarctica. This presents a big problem for scientists searching for fossil extraterrestrial life in an Antarctic meteorite" (1999a).

In an article in *Time* magazine, staff writer Frederic Golden observed:

> For years Congress funded various SETI [search for extraterrestrial intelligence —JD/BT] efforts, until the political stigma of paying for the quest for "little green men," as cynics like to call them, scuttled federal funding in 1993. Nonetheless, NASA continues the search for unearthly life, even if it's only for little green bugs, under the more politically palatable label of astrobiology. Right now, NASA is eyeing the dusty surface of Mars (where water once flowed) and the likely oceans under the ice of Jupiter's moon Europa as sites for primitive life-forms. **One recent false alarm: the much trumpeted Martian meteorite found in Antarctica apparently does not contain convincing evidence of the existence of microorganisms on the Red Planet, as originally claimed** (2000, 155[14]:75, emp. added, parenthetical item in orig.).

Truth be told, ALH84001 does not contain "convincing evidence" of life on Mars. It may show evidence of certain compounds that on occasion are known to be associated with fossils of living matter, but at present there is no credible evidence that it contains legitimate fossils of once-living organisms.

(4) Crystal Chains. The newest evidence which supposedly documents the fact that the tubular-shaped objects discovered in ALH 84001 actually were living microorganisms comes from an article ("Chains of Magnetite Crystals in the Meteorite ALH84001: Evidence of Biological Origin") by Imre Friedmann et al. published in the February 2001 issue of *Proceedings of the National Academy of Sciences* (98:2176-2181). The argument centers on tiny crystals detected within the meteorite, which, according to the scientists who did the research, are the same as those deposited by terrestrial microorganisms known as magnetotactic bacteria. In an interview on this topic reproduced on the BBC Web site, Dr. Friedmann stated:

> The crystals match all the criteria for biologically formed chains, and as far as I'm concerned it's conclusive evidence that Martian bacteria were in this meteorite. I cannot guess how my colleagues will react, but in my opinion no reasonable person can doubt it any more. The evidence is so strong (see Noble, 2001).

Alas, Friedmann will not have to venture a "guess" as to how his colleagues are going to react, because some "reasonable" people have stepped forward to state that they **do** doubt his claims. In an article titled "Mars Attracts!" in the May 19, 2001 issue of *New Scientist*, astronomer Ralph Lorenz (of the Lunar and Planetary Laboratory at the University of Arizona) wrote:

> The debate now hangs on the presence of tiny magnetic crystals in the meteorite. Why should magnets be a sign of life? Because there is a class of bacteria on Earth that manufacture their own magnetic crystals to orient themselves in dark, muddy pools. Could Mars have been home to similar bacterial 4 billions years ago?
>
> **Magnetite crystals can also be created by "abiogenic" geological processes**, and many researchers believe the Martian crystals are made in this way. Hap McSween of the University of Tennessee in Knoxville maintains that the crystals from ALH84001 were made at very high temperatures, ruling out a biological origin....
>
> At the conference [the 2001 Lunar and Planetary Science Conference–JD/BT] in March, D.C. Golden of the Johnson Spaceflight Center put forward a powerful counter-argument. He created very similar magnetite crystals in the lab, simply by heating up a carbonate mineral called siderite. Golden's discovery means the ALH84001 magnetites could have been made abiogenically, says Allan Trieman of the Lunar and Planetary Institute....
>
> Some opponents of the Martian-life theory think that these chains might have been left behind by bacteria colonising the meteorite after it landed on Earth.... **Most still think that the evidence in the meteorite is not conclusive**.... In the astrobiology session at the LPSC, chaired by Trieman, Friedmann's talk met with harsh criticism (2001, 170:38,40, emp. added).

And so, as it turns outs, the evidence that was supposed to be "so strong" that "no reasonable person" could doubt it, is, after all, "not conclusive." Enough said.

But what about the current claim (as alluded to by Golden in his *Time* quote) that scientists have found water on Mars? What is that evidence? And what does it have to do with life on the Red Planet? The concept of life on Mars has a long and storied history. In 1877, Italian astronomer Giovanni Schiaperelli (1835-1910) reported that he had seen what he called "*canali*" (channels) on the surface of the planet. Not long thereafter, Percival Lowell (1855-1916) from the United States seized upon that idea and claimed that the *canali* actually were **artificial canals** that Martians had constructed to irrigate their parched landscape by using melted ice from the polar caps. Lowell, being independently wealthy, even constructed an observatory in 1894 in Flagstaff, Arizona (eponymously labeled the Lowell Observatory), dedicated to charting the Martian canals. He took thousands of photographs of Mars, and drew detailed pictures of over 500 structures he genuinely believed to be the planet's canals. Edward C. Pickering (1846-1919), as professor of astronomy at Harvard and director of the university's observatory, took issue with Lowell regarding the presence of the canals. So did British astronomer Sir Harold Jones (1890-1960), who had been knighted in 1943 for measuring more accurately than anyone before him the distance from the Earth to the Sun (93,005,000 miles, he suggested—a figure that would not be updated until the late 1950s). Both scientists pointed out (correctly) that blotches at the limit of visibility may appear to the eyes as interconnecting straight lines. Or, as the late Isaac Asimov succinctly stated the matter, the artificial nature of the canals was "probably an optical illusion, in other words" (1972, p. 488).

NASA's current search for life—any life—on Mars is not its first attempt. As far back as the 1970s, NASA's contention was that water existed on Mars, and thus life might have existed there as well at some point in the past. In 1977, when *Viking 1* and *Viking 2* landed on Mars, they discovered potential evidence of water in the soil, as well as iron oxides, sulfur, carbon, and iron oxide (i.e., rust, which is responsible for Mars' red color). Alas, those missions found not a trace of life (see *Understanding Science: Space and Planets*, n.d., pp. 12,125; Davies, 1999, pp. 191-192). Still, the dry Martian surface does have what appears to be an intricate system of ridges and valleys. And it is in these so-called "landforms" where NASA scientists believe water once existed in abundant quantities when, according to standard theories of cosmic evolution, "Mars was warmer" (see *Understanding Science*, n.d., p. 13). The unmanned *Mariner 9* spacecraft (launched in 1971) took striking photographs of Mars upon its arrival approximately a year later, as well as samples of the planet's atmosphere for laboratory analysis. Evolutionist Ken Edgett, a staff scientist at Malin Space Science Systems, observed: "Twenty-eight years ago the Mariner 9 spacecraft found evidence —in the form of channels and valleys—that billions of years ago the planet had water flowing across its surface" (as quoted in Savage and Hardin, 2000). Paul Davies wrote:

> You can easily tell that Mars was once more favorable for life by glancing at the pictures taken by the *Mariner* and *Viking* space probes. One distinctive feature leaps out of the survey photographs: river valleys. There, among the tangled mountain uplands, cutting swathes across sandy plains, carving deep into hillsides, spilling from the rims of craters, are easily recognizable channels sculpted by running water. They come complete with tributaries and deltas and flood plains. These watercourses, I might add, bear no resemblance to Lowell's famous straight-line canals; instead, they are dendritic and sinuous, like rivers on Earth, and undeniably natural rather than artificial. Unfortunately, no trace of water remains in Mars' ancient riverbeds; they have long since dried up. But...there can be no doubt: water once flowed freely on Mars (1999, pp. 192-193).

But what does all of this have to do with **life** on Mars? Water (in some form) is critically important to living organisms. Thus, the view persists that if water once existed on Mars, then life very likely evolved there as well. As two evolutionary scientists put it: "Wherever liquid water and chemical energy are found, there is life. There is no exception" (Levin and Levin, 2001). The following assessment appeared on NASA's Web site in an article titled, "New Images Suggest Present-day Sources of Liquid Water on Mars":

> "For two decades scientists have debated whether liquid water might have existed on the surface of Mars just a few billion years ago," said Dr. Ed Weiler, Associate Administrator for Space Science, NASA Headquarters. "With today's discovery, we're no longer talking about a distant time. The debate has moved to present-day Mars. The presence of liquid water on Mars has **profound implications** for the question of life not only in the past, but perhaps even today. If life ever did develop there, and if it survives to the present time, then these landforms would be great places to look" (Savage and Hardin, 2000, emp. added).

Davies summarized the matter in this fashion.

> Mars could still be of major interest to biologists, for a simple reason. Today the red planet may present a bleak picture, but it was not always a frozen wasteland. There is abundant evidence that in the remote past Mars was warm and wet and Earth-like, and much more

hospitable for life. Whether or not Mars is today a totally dead planet, there is still a good chance that life may once have flourished there....

Concerning the possibility of life, the fact that Mars was warm and wet between 3.8 and 3.5 billion years ago is highly significant, for it means that Mars resembled Earth at a time when life existed here. This has led some scientists to conclude that Mars would have been a suitable abode for life at that time too (1999, pp. 192,199).

Thus, the entire thrust of searching for water on Mars is tied to the evolutionary presuppositions that: (1) life evolved; and (2) water is crucial if we are to be convinced that such an event did, in fact, occur. Scientists admit, of course, that liquid water cannot exist naturally under climatic and atmospheric conditions on the Red Planet today. Currently, the cold temperatures and low air pressure make that impossible. [NASA, however—grasping at any possibility—has suggested that "trace quantities of water **vapor**" may exist in the Martian atmosphere (see Phillips, 2000, emp. in orig.).] Edgett said:

...Mars science has focused on the question, "Where did the water go?" The new pictures from Global Surveyor tell us part of the answer—some of that water went under ground, and quite possibly it's still there (as quoted in Savage and Hardin, 2000).

Davies agrees:

Where did all the water go?... The simple answer is: into the ground.... [E]ven though the surface is now extremely dry, Mars may still have extensive reserves of water concealed beneath the ground, in the form of permafrost or, many kilometers down, as trapped liquid (1999, p. 195).

NASA scientists admit that if water does exist on Mars, it must be somewhere beneath the permafrost on the surface of the planet. From an evolutionary perspective, then, the presence of water on Mars does indeed have "profound implications" for the existence of life.

What, then, shall we say to all this? Our response is as follows. First, we need to point out that it is a long way from a primitive puddle of putative Martian water to a living organism. The late evolutionist Loren Eiseley addressed that point years ago when he wrote:

One does occasionally observe, however, a tendency for the beginning zoological textbook to take the unwary reader by a hop, skip, and jump from the little steaming pond or the beneficent chemical crucible of the sea, into the lower world of life with such sureness and rapidity that it is easy to assume that there is no mystery about this matter at all, or, if there is, that it is a very little one. This attitude has indeed been criticized by the distinguished British biologist Woodger, who some years ago remarked: "Unstable organic compounds and chlorophyll corpuscles do not persist or come into existence in nature on their own account at the present day, and consequently it is necessary to postulate that conditions were once such that this did happen **although (and in spite of the fact that) our knowledge of nature does not give us any warrant for making such a supposition**.... It is simply dogmatism—asserting that what you want to believe did in fact happen" (1957, pp. 199,200, emp. added, parenthetical item in orig.).

Second, the chemical compound, dihydrogen monoxide (i.e., water), is extremely common. What if it **could** be proved that it has existed (or exists presently) on Mars? Our response would be—"so what?" The mere existence of water does not somehow prove necessarily that life "evolved." While it may be true that water is **necessary** for life as we know it, it is **not sufficient to create life**. That is to say, the existence of water is a **necessary** condition, but it is not a **sufficient** condition. To suggest that because water existed (or exists) on Mars, then the spontaneous generation of life must be possible, is to make the same mistake Charles Darwin made when he suggested that one organism could give rise to another merely because he observed minuscule changes in the beaks of Galapagos finches—thereby extrapolating far beyond the available facts in order to draw a conclusion that is totally unwarranted by the available evidence. Matter, in and of itself, does not possess the capability to mold itself into something that is living, as evolutionists Robert Augros and George Stanciu forcefully admitted in their college-level textbook, *The New Biology*.

There must be a cause apart from matter that is able to shape and direct matter. Is there anything in our experience like this? Yes, there is: our own minds. The statue's form originates in the mind of the artist, who then subsequently shapes matter, in the appropriate way.... **For the same reasons there must be a mind that directs and shapes matter in organic forms** (1987, p. 191, emp. added).

"Water" hardly qualifies as a "cause apart from matter." Nor is it a "mind that directs and shapes matter." It is merely—water! Dean Overman addressed this point when he said:

Life appears to be formed only by a guided process with intelligence somehow inserting information or instructions into inert matter.... In examining biogenesis theories we must look at the mathematical probabilities, not at metaphysical perspectives, regardless of the way in which they may point. The calculations in this book rule out chance alone for 130 million years or for the entire age of the universe. **Something besides chance caused and is causing life** (1997, p. 101, emp. added).

Dr. Bert Thompson

January 11-13	Andalusia, AL	(334) 222-3651
January 14	Fort Worth, TX	(817) 282-6526
January 18-20	Jacksonville, AL	(256) 435-9356
January 25-27	Venice, FL	(941) 493-2403

Dr. Brad Harrub

January 3	Prattville, AL	(334) 285-0077

Kyle Butt

December 27, 2001	Huntsville, AL	(256) 290-1349
January 21	Hamilton, AL	(205) 921-3232

Eric Lyons

January 20	Leeds, AL	(205) 699-2447

Third, the problem with all of these scenarios is that there **never** has been a single case of spontaneous generation documented—yet evolution, in its entirety, is based on the **assumption** that spontaneous generation **must have occurred** at some point in the distant past. In his classic text, *The Implications of Evolution*, world-famous British evolutionist and physiologist G.A. Kerkut, discussed the seven **non-provable assumptions** upon which the edifice of organic evolution has been constructed. The first assumption is: "Non-living things gave rise to living material, i.e., spontaneous generation occurred" (1960, p. 6). Over forty years ago at the 1959 Darwin Centennial Convocation held at the University of Chicago, one of the participants, Hans Gaffron, admitted, in addressing the subject of "scientific progress" after Darwin: "It is the general climate of thought—which has created an **unshakable belief** among biochemists—that **evolution of life from inanimate matter is a matter of course**" (1960, 1:46, emp. added). Harlow Shapley (the famous Harvard astronomer) commented at that same conference: "The **assumption** that life originated from nonliving matter must be made by the modern scientist if he believes that the question 'What is life?' belongs in the natural sciences at all" (1960, 3:75, emp. added). Forty years later, in 1999, Paul Davies wrote:

> Although biogenesis [the beginning of life—JD/BT] strikes many as virtually miraculous, the starting point of any scientific investigation must be the assumption that life emerged naturally, via a sequence of normal physical processes.... [I]n the absence of a miracle, life could have originated **only** by some sort of spontaneous generation. **Darwin's theory of evolution and Pasteur's theory that only life begets life cannot both have been completely right** (pp. 81-82,83, first emp. in orig., last emp. added).

While we **dis**agree with Dr. Davies on his comment that a scientist must assume that life originated naturally, we **agree** with him on his two other points. (1) It is absolutely true that spontaneous generation **does** "strike many as virtually miraculous." Nobel laureate Sir Francis Crick admitted:

> An honest man, armed with all the knowledge available to us now, could only state that in some sense, **the origin of life appears at the moment to be almost a miracle**, so many are the conditions which would have had to have been satisfied to get it going (1981, p. 88, emp. added).

(2) It also is true that the theory of evolution and the concept of life begetting life (known in science as the law of biogenesis) cannot **both** be correct. But which of these concepts do the actual laws of science support? In his book, *The Creation-Evolution Controversy*, R.L. Wysong answered that question quite clearly when he wrote:

> The creationist is quick to remind evolutionists that biopoiesis [spontaneous generation—JD/BT] and evolution describe events that stand in stark, naked contradiction to an established law. The law of biogenesis says life arises only from pre-existing life, biopoiesis says life sprang from dead chemicals; evolution states that life forms give rise to new, improved and different life forms; the law of biogenesis says that kinds reproduce their own kinds (1976, p 182).

Top—Martian rock ALH84001; Bottom—scanning electron micrograph of alleged tube-shaped fossilized bacteria

In nature, we have not documented a single case of spontaneous generation. If something is "dead" (i.e., nonliving), it stays dead. And if something is living, when it procreates it produces another organism basically like itself. Cows give rise to cows, birds to birds, tulips to tulips, corn to corn, and so on. Over half a century ago, the brilliant scientist J.W.N. Sullivan wrote a book on *The Limitations of Science* in which he included the following assessment:

> The beginning of the evolutionary process raises a question which is yet unanswerable. What was the origin of life on this planet? Until fairly recent times there was a pretty general belief in the occurrence of "spontaneous generation...." But careful experiments, notably those of Pasteur, showed that this conclusion was due to imperfect observation, and **it became an accepted doctrine that life never arises except from life. So far as the actual evidence goes, this is still the only possible conclusion.** But since it is a conclusion that seems to lead back to some supernatural creative act, it is a conclusion that scientific men find very difficult of acceptance (1933, p. 94, emp. added).

Difficult indeed! Not much has changed since 1933, has it? Little wonder Paul Davies concluded: "Darwin's theory of evolution and Pasteur's theory that only life begets life cannot **both** have been completely right." Fortunately, true science tells us which one is "right"—Pasteur's view that only life begets other life "after its kind."

Last, what shall we say about the suggestion that, upon reinvestigation, the 1911 Nakhla meteorite has been found to contain even more "conclusive evidence" of life on Mars than the controversial 1984 specimen, ALH 84001? The *New York Times* originally broke this story in an article ("Another Meteorite May Show Life on Mars, Scientists Report") in its March 19, 1999 issue. The author of the article, John N. Wilford, wrote concerning the work of a NASA team of scientists:

> In their new research, the geochemists analyzed chips from an orange-size meteorite that landed in Egypt in 1911 and was almost immediately collected by scientists. The particular fragment of this meteorite came from the British Museum in London and had presumably been protected from most terrestrial contamination by a glassy crust that formed during the meteorite's fiery plunge through the atmosphere (Wilford, 1999).

Then, earlier this year, NASA scientists published an article in *Precambrian Research* which suggested in its abstract that "[n]ew observations in two additional meteorites, Nakhla and Shergotty, indicate possible biogenic features" (see Gibson, et al., 2001, 106: 15). The authors of the study then went on to note that the Nakhla meteorite contained clay (which they referred to as "iddingsite")-filled cracks "of Martian origin" and that "light microscopy revealed rounded micrometer-sized structures embedded within the iddingsite-filled cracks." They also remarked that the structures were found "in distinct cluster-like distributions within the clay. The spheres are sometimes joined together in pairs or triplets" (106:24).

About the same time, various Web sites began to tout a new book due to be published early in 2002, *Mars: Inside the Red Planet*, by two British scientists, Heather Couper and Nigel Henbest, which alleges (based in part on the paper by Gibson et al. in *Precambrian Research*) that the Nakhla meteoritic spheres are microfossils similar to those found within ALH84001, but much more easily identifiable as genuine microorganisms. According to Everett Gibson of NASA's Johnson Space Center: "Within these carbonates and clays are structures and features that are even larger and better preserved than those we saw in 84001" (as quoted in "New Life on Mars...," 2001). Toward the end of the article by Gibson et al., however, the scientific team behind the investigation calmly stated:

> The spheres in Nakhla and Shergotty are similar to the fossils of terrestrial coccoid bacteria. However, as previously noted, spherical morphologies alone are not indicative of biogenic activity. Therefore, the spherical structures in Nakhla and Shergotty are compelling, **but not conclusive, evidence for biogenic activity** (p. 26, emp. added).

In the article's abstract, the authors admitted:

> The morophological similarities between terrestrial microfossils, biofilms, and the features found in the three Martian meteorites are intriguing but have not been conclusively proven. Every investigation must recognize the possibility of terrestrial contamination of the meteorites, whether or not the meteorites are Martian (p. 1).

Then, just as supporters of the "life-on-Mars" theory were preparing to celebrate, a devastating article ("Magnetite Morphology and Life on Mars") appeared in the November 20, 2001 issue of the *Proceedings of the National Academy of Sciences* (see Buseck, et al., 2001, 98:13490-13495) in which the authors examined in detail the claims that bacterial life existed in the SNC meteorites, and concluded: "In contrast to previous accounts, we argue that the existing crystallographic and morphological evidence **is inadequate to support the inference of former life on Mars**" (98:13490).

In conclusion, we should note that the hoopla surrounding many of the NASA announcements about some "new find" are completely unwarranted. Unfortunately, the media frequently exaggerate the information, which in turn causes the public at large to fall prey to misinformation, which later turns out to be misleading at best, or, at worst, quite simply—wrong. Admittedly, however, when it comes to belief in organic evolution, as Marshall and Sandra Hall observed: "It is not easy to overthrow a belief, however absurd and harmful it may be, which your civilization has promulgated as the scientific truth for the better part of a century" (1974, p. 74). Oh, how true! How very true.

REFERENCES

Asimov, Isaac (1972), *Isaac Asimov's Biographical Encyclopedia of Science and Technology* (New York: Avon).

Augros, Robert and George Stanciu (1987), *The New Biology* (Boston, MA: New Science Library).

Becker, Luann., D.P. Glavin, and J.L. Bada (1997), "Polycyclic Aromatic Hydrocarbons (PAHs) in Antarctic Martian Meteorites, Carbonaceous Chondrites, and Polar Ice," *Geochimica et Cosmochimica Acta*, 61:475-481.

Bradley, J.P., R.P. Harvey, and H.Y. McSween Jr. (1996), "Magnetite Whiskers and Platelets in ALH84001 Martian Meteorite: Evidence of Vapor Phase Growth," *Geochimica et Cosmochimica Acta*, 60:5149-5155.

Buseck, P.R., R.E. Dunin-Borkowski, et al. (2001), "Magnetite Morphology and Life on Mars," *Proceedings of the National Academy of Sciences,* 98:13490-13495, November 20.

Chyba, Christopher F. (1996), "Life Beyond Mars," *Nature*, 382:576-577, August 15.

Crick, Francis (1981), *Life Itself: Its Origin and Nature* (New York: Simon & Schuster).

Davies, Paul (1999), *The Fifth Miracle: The Search for the Origin and Meaning of Life* (New York: Simon & Schuster).

Eiseley, Loren (1957), *The Immense Journey* (New York: Random House).

Farquhar, James, Joel Savarino, and Terri L. Jackson (2000), "Evidence of Atmospheric Sulphur in the Martian Region from Sulphur Isotopes in Meteorites," *Nature*, 404:50-52, March 2.

Folk, Robert and F. Leo Lynch (1997), "The Possible Role of Nanobacteria (Dwarf Bacteria) in Clay Mineral Diagenesis, and the Importance of Sample Preparation in High Magnification SEM Study," *Journal of Sedimentary Research*, 67:583.

Friedmann, E.I., J. Wierzchos, C. Ascaso, and M. Winklhofer (2001), "Chains of Magnetite Crystals in the Meteorite ALH84001: Evidence of Biological Origin," *Proceedings of the National Academy of Sciences,* 98:2176-2181, February 27.

Gaffron, Hans (1960), "The Origin of Life," *The Evolution of Life* [Volume 1 of *Evolution After Darwin*], ed. Sol Tax (Chicago, IL: University of Chicago Press), pp. 39-84.

Gibbs, W.W. and C.S. Powell (1996), "Bugs in the Data," *Scientific American*, 275[4]:20,22, October.

Gibson, E.K. Jr., D.S. McKay, K.L. Thomas-Keprta, et al. (2001), "Life on Mars: Evaluation of the Evidence Within Martian Meteorites ALH84001, Nakhla, and Shergotty," *Precambrian Research*, 106:15-24.

Golden, Frederic (2000), "Will We Meet E.T.?," *Time*, 155[14]:75, April 10.

Hall, Marshall and Sandra (1974), *The Truth: God or Evolution?* (Grand Rapids, MI: Baker).

Jull, A.J.T. (1998), "Organic Compounds in Martian Meteorites May be Terrestrial Contaminants," [On-line], URL: http://www.psrd.hawaii.edu/Feb98/OrganicsALH84001.html.

Kerkut, G.A. (1960), *The Implications of Evolution* (London: Pergamon).

Kerr, Richard A. (1996), "Ancient Life on Mars?," *Science*, 273:864-866, August 16.

Levin, Gilbert V. and Ron L. Levin (2001), "Liquid Water and Life on Mars," [On-line], URL: http://www.biospherics.com/Mars/spie2/spie98.htm.

Lorenz, Ralph (2001), "Mars Attracts!," *New Scientist*, 170:38-40, May 19.

Major, Trevor (1996), "Life on Mars?," *Reason & Revelation*, 16:78-79, October.

Major, Trevor (1997), "Mars Rock Update," *Reason & Revelation*, 17:85-86, November.

McKay, David S., E.K. Gibson, Jr., K.L. Thomas-Keprta, et al. (1996), "Search for Past Life on Mars: Possible Relic Biogenic Activity in Martian Meteorite ALH84001," *Science*, 273:924-930, August 16.

Morowitz, Harold J. (1992), *Beginnings of Cellular Life* (New Haven, CT: Yale University Press).

"New Life on Mars Evidence 'Conclusive,' " (2001), [On-line], URL: http://www.ananova.com/news/story/sm_419740.html.

Noble, Ivan (2001), "'Conclusive Evidence' for Martian Life," [On-line], URL: http://news.bbc.co.uk/hi/english/sci/tech/newsid_1190000/1190948.stm.

Overman, Dean L. (1997), *A Case Against Accident and Self-Organization* (New York: Rowman and Littlefield).

Phillips, Tony (2000), "Making a Splash on Mars," [On-line], (National Aeronautics and Space Administration—U.S. Government), URL: http://science.nasa.gov/headlines/y2000/ast29jun_1m.htm.

Savage, Donald, and Mary Hardin (2000), "New Images Suggest Present-day Sources of Liquid Water on Mars," [On-line], URL: ftp://ftp.hq.nasa.gov/pub/pao/pressrel/2000/00-099.txt.

Shapley, Harlow (1960), "Panel One: The Origin of Life," *Issues in Evolution* (Volume 3 of *Evolution After Darwin*], ed. Sol Tax (Chicago, IL: University of Chicago Press), pp. 69-105.

Shearer, C.K., G.D. Layne, J.J. Papike, and M.N. Spilde (1996), "Sulfur Isotope Systematics in Alteration Assemblages in Martian Meteorite ALH84001," *Geochimica et Cosmochimica Acta*, 60:2921-2926.

Sullivan, J.W.N. (1933), *The Limitations of Science* (New York: Viking).

Taylor, G. Jeffrey (1999a), "Fossils Blowing in the Wind: More Contamination of Antarctic Meteorites," [On-line], URL: http://www.psrd.hawaii.edu/July99/contamination.html.

Taylor, Michael Ray (1999b), *Dark Life* (New York: Scribner).

Understanding Science and Nature: Space & Planets (no date), (Alexandria, VA: Time-Life).

Wilford, John N. (1996), "On Mars, Life's Getting Tougher (If not Impossible)," *New York Times*, December 22, pp. 1,6.

Wilford, John N. (1999), "Another Meteorite May Show Life on Mars, Scientists Report," *New York Times*, March 19.

Wysong, R.L. (1976), *The Creation/Evolution Controversy* (East Lansing, MI: Inquiry Press).

APOLOGETICS PRESS • 230 LANDMARK DRIVE • MONTGOMERY, AL 36117

ADDRESS SERVICE REQUESTED

Nonprofit Organization
U.S. Postage
PAID
Montgomery, Alabama
Permit No. 513

NOTE FROM THE EDITOR

ANNOUNCING: REASON & REVELATION/DISCOVERY 2001 BOUND VOLUMES

When we began publishing *Reason & Revelation* in 1981, we realized that many of the articles we published in the journal would remain relevant far beyond the time period during which they were authored. We therefore decided to produce a bound volume of all twelve issues at the end of each calendar year. Twenty-one volumes later, we still remain dedicated to that initial commitment.

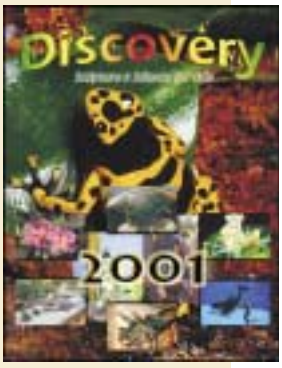
For over two decades, many of our subscribers have made it a habit to purchase their personal copies of each year's bound volume of *Reason & Revelation.* No doubt they have benefited from having the articles available in a permanent format that allows continued study of the themes covered within the various articles. If sales of bound volumes through the years are any indicator, I believe it is safe to say that our readers certainly have appreciated their availability.

Previously, we have carried in stock bound volumes of *Reason & Revelation* for 1994-2000. With the collating and binding of all issues for 2001, we now have available a total of eight years' worth of bound volumes. Each volume contains all twelve issues for the year, as well as an extensive author/subject index and an attractive cover with a comb binding.

The bound volume of *Reason & Revelation* for 2001 now is available from our offices, and contains articles on such important topics as: "Behemoth and Leviathan—Creatures of Controversy"; "Jesus—Unique Savior or Average Fraud?"; "*Archaeopteryx, Archaeoraptor,* and the 'Dinosaurs to Birds' Theory"; "Will Those Who Have Never Heard the Gospel be Lost?"; "How Long Was the Israelites' Sojourn?"; "Human Cloning and Stem-Cell Research—Science's Slippery Slope"; "Does God Hear and Respond to the Prayer of an Alien Sinner?"; "Life on Mars—'The Rest of the Story' "; etc. You may purchase the 2001 bound volume (as well as those from 1994-2000) for only $8 each. Or you may purchase the entire set of eight at the special price of $58. Whenever the bound volumes go out of print, they are gone forever; we do not republish them.

We also would like you to know that the 2001 bound volume of *Discovery,* our monthly magazine on Scripture and science for children, now is available. In addition, we have in stock bound volumes for 1995-2000 (unfortunately, the 1990-1994 volumes are out of print permanently). The individual bound volumes of *Discovery* cost just $12 each. The entire set of seven (1995-2001) costs only $78. Each bound volume of *Discovery* provides a veritable storehouse of knowledge for children on scriptural and scientific matters—much of which is difficult or impossible to find elsewhere. Each issue generally contains articles (written by faithful Christians) on both science and the Bible, and is heavily illustrated with beautiful, professionally produced artwork as well.

During 2001, *Discovery* contained articles on such topics as: glaciers; penguins; whales; woolly mammoths; intriguing insects; idolatry; Egypt; myths versus the Bible; dreaded diseases; God and human suffering; leprosy; Bible mountains; the land of Palestine; the Dead Sea; "cave men"; spelunking; the bombardier beetle; dragons; sea horses; electric eels; dinosaurs; scientific foreknowledge of the Bible; the Genesis Flood; the existence of God; the law of cause and effect; morality; the historicity and deity of Jesus; the resurrection; human evolution; and many others.



You may order any, or all, of these bound volumes via credit card by calling us toll-free at 800/234-8558. Or, you may order them by mail if you so desire. [Calculate shipping/handling at $1.50 for the first volume, and $0.50 for each additional volume.] Bound volumes make extremely useful additions to personal, church, or school libraries. They also make valuable gifts for youngsters, men attending a preacher training school, or students in college (especially those majoring in either Bible- or science-related fields). Why not consider giving one (or, better yet, an entire set) to someone for their future study and edification? If we may assist you in any way, call on us. We are here to serve, and appreciate your use of our products and services.

Bert Thompson