

Meteors, Mars and Extraterrestrial Life

Robert C. Newman
Biblical Theological Seminary
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How common is life in our universe? No one on earth really knows. Creationists are not agreed among themselves, nor are evolutionists. In both groups, some think life very rare, others think it rather common.

Admittedly, the media tends to see the matter in black and white. Evolutionists claim life is common, and creationists that it is unique to earth. Perhaps this is because most media attention and federal money go to those who think it common. After all, why would a talk show host feature a guest who claims there is life only on earth? How exciting is that? UFO stories also imply that life is common, and they certainly sell. And how are you going to get government funding to look for radio signals from intelligent civilizations if you think there aren't any within radio range?

Yet biologist Ernst Mayr and physicist Enrico Fermi are prominent examples of evolutionists who feel life (at least intelligent life) is very rare or even unique to earth in all our universe.¹ They think so (though they believe in evolution) because they have also paid close attention to the calculations that show the random assembly of life from non-life is enormously unlikely.²

On the creationist side, there is also a range of opinion. In fact, Bible-believers realize that there is at least one intelligent race beside humanity—the angels—though we often seem to forget about them when talking about extraterrestrial life. We might argue whether angels belong to our universe or not, yet Scripture is clear that they can at least enter and move around in it.

In his science fiction trilogy C. S. Lewis pictured intelligent life as quite common (on earth, Mars, Venus, even in space).³ Of course, that was Lewis' fiction; but he also wrote an article exploring the theological implications of life elsewhere in the universe.⁴ On the other hand, the *SCP Journal*, after a survey of the possibilities, thought life unique to earth.⁵

Nowhere in the Bible does it say there is no life but earth-life. Yet the Scripture's very silence on the subject has been taken by many to indicate there isn't. After all, how would the atonement work if there are intelligent races elsewhere in our universe? Yet the Bible's explicit teaching that angels, demons and such do exist already raises the question of how *these* creatures might be affected by Jesus' death. The situation is not going to be drastically different if the universe has other races besides these.

The Mars Rock Discovery

Enter the Mars rock. On August 7, 1996, the U. S. National Aeronautics and Space Administration released the following announcement:⁶

A NASA research team of scientists at the Johnson Space Center (JSC), Houston, TX, and at Stanford University, Palo Alto, CA, has found evidence that strongly suggests primitive life may have existed on Mars more than 3.6 billion years ago.

The NASA-funded team found the first organic molecules thought to be of Martian origin; several mineral features characteristic of biological activity; and possible microscopic fossils of primitive, bacteria-like organisms inside of an ancient Martian rock that fell to Earth as a meteorite. This array of indirect evidence of past life will be reported in the August 16 issue of the journal *Science*, presenting the investigation to the scientific community at large for further study.

The press release goes on for several more pages, but the picture given is basically this: A rock on the surface of Mars during its early history was cracked by some sort of shock, probably from a meteor striking nearby. Later, water seeped into these cracks, depositing carbonate minerals. Some sort of primitive bacteria lived for a while in these carbonates, leaving behind evidence of their presence. All these things took place some 32 to 42 billion years ago, when water was fairly abundant on Mars. Then, just 15 million years ago, the rock was blasted into space by a meteor striking the Martian surface with a glancing blow. The rock went into orbit around the sun, and about 13 thousand years ago, it fell to earth on the Antarctic ice sheet. In the course of time, the rock was brought to the surface by movements within the sheet, and recovered by investigators in 1984. Since then, it was discovered to be Martian and quite old. A subsequent search within it for evidences of life found what has just been reported.⁷

To a layperson, it all sounds like fantasy. A Mars rock? Where did they find it? On earth? The South Pole? Gimme a break! I bet this is just some stunt by NASA to get money to send astronauts to Mars!

Well, no doubt NASA *would* like to send an expedition to Mars, or at least a series of sophisticated robot landers. But the evidence that this rock is a meteorite from Mars is really quite good. Let's see.

Meteorite from Mars?

Scientists have recently concentrated on Antarctica in their search for meteorites for several reasons. Meteors are less likely to shatter striking an ice field than they would striking rock. Then again, they are easier to spot on ice than in dirt. And third, they are less likely to be contaminated by earth-life. Our particular rock, labelled ALH 84001 because it was the first meteorite catalogued in the 1984 Allen Hills expedition, has a thin, dark, glassy coating on most of its surface C a distinctive fusion crust which a meteor picks up as its surface melts during its fiery descent through our atmosphere.⁸

OK, so the rock is a meteorite. How do we know it is from Mars? After all, most meteorites are thought to come from the debris floating around loose in the asteroid belt between Mars and Jupiter. This is sometimes knocked out of orbit by a collision that sends pieces into the inner solar system, where some of them will eventually collide with earth. Other such material is diverted inward by gravitational interaction with the planet Jupiter. Why should we think this meteorite is any different?

For one thing, calculations show that a large meteor striking a planet at a grazing angle can throw debris from the planet's surface into space. And in recent years, astronauts have brought back mineral samples from the moon's surface. These samples have a very distinct mineralogy, and it matches that of some meteorites that have been found. These meteorites were apparently blasted off the surface of the moon at one time or another.

We have not yet been able to bring back rock samples from Mars, but we do have a detailed analysis of the Martian atmosphere from the two Viking landers, and it is quite unusual also.⁹ Gas bubbles found trapped in ALH 84001 turn out to have the same composition.¹⁰ In addition to this, the mineralogy of ALH 84001 fits that of the group of so-called SNC meteorites, for which the most likely source is also Mars.¹¹ So the rock was apparently once on Mars. The details (given above) about how the rock got here, and the times involved, are guesses based on various radiometric ages in the rock,¹² but the identification of the rock as Martian does not depend upon them.

So it looks like the rock was once on Mars. The big question is, does it really contain evidence of primitive Martian life? This question has not yet been settled to the general satisfaction of the scientific community. Let's review the situation.

Martian Life Inside?

Investigators agree that the rock has nothing alive in it at present. The question is whether the rock ever had Martian life in it at one time C life which has left behind evidence of its presence C or whether the phenomena observed are the results of

purely inorganic processes.

The rock contains microscopic carbonate globules in cracks in the rock, which the investigators think were formed some billions of years ago by organic processes in the presence of liquid water.

These globules contain several features that suggest very small bacteria once lived in them:

1. Shapes that resemble bacteria have been found in the cracks. These are much smaller than the usual bacteria on earth, but their shapes and sizes resemble so-called nanobacteria, a life form recently discovered on earth living inside rocks hundreds of feet below the earth's surface.¹³

2. Microscopic mineral grains of the sorts produced by bacteria have been found there also. These consist of magnetite (an iron oxide), pyrrhotite and greigite (two sorts of iron sulfide). Though any of these can be formed by inorganic processes, their presence together in carbonate globules is thought to be very unlikely for inorganic formation.

3. Chemicals called polycyclic aromatic hydrocarbons (PAHs) have also been found in the rock. PAHs form from the decay of living things, including bacteria, though they may easily be formed in other ways. The peculiarity here is that they are not the sort of PAHs that would be picked up from earth's industrially polluted atmosphere, but are too abundant to have been absorbed into the rock during the pre-industrial period on earth. They are not the sort of PAHs found in interplanetary dust, interstellar dust grains, or most meteorites. In any case, they don't appear to be a contamination which came into the rock from outside after it reached the earth, as they are found with higher concentrations inside the rock than near its surface, and especially near and in the carbonate globules.

The investigators admit that any of these phenomena taken alone would not necessarily indicate the presence of organic activity, since all can be produced by inorganic processes. It is the combination of these, especially in close proximity in the rock, that they feel strongly points to biological activity in the rock when it was on Mars.

Since the press release and paper appeared last August (1996), other scientists have been busy trying either to confirm or refute the observations and interpretations made therein. So far as I can tell, there has been little objection to the observations. The rock does appear to be a meteorite, most likely from Mars. It does have the chemicals mentioned, and the strange shapes. The objections, rather, have related to the interpretation of the observations.¹⁴

For one thing, some now claim the PAHs are the result of contamination, perhaps while on earth, perhaps while in space, possibly even while on Mars, by inorganically produced or terrestrial PAHs. Researchers at the Scripps Institution of Oceanography say that some of the same kinds of PAHs have been found in Antarctic ice, and probably penetrated into the meteorite while it was lying in the ice after its fall to earth. They note that carbonates tend to soak up PAHs they come in contact with.¹⁵ The original researchers on the Mars rock (the McKay team) have responded (1) that if it were contamination the concentration of PAHs ought to be larger near the surface of the rock, but in fact it is just the opposite; (2) that such a large amount of water would have had to flow through the cracks in the rock to bring in as many PAHs as are found there that they would have brought in a lot of clay also, but there is very little clay present; and (3) that the relative frequency of oxygen isotopes should be very different if the PAHs were from earth rather than from Mars.¹⁶

Another group of scientists headed by Harry McSween claim that the crystal structure of the carbonates in the rock shows it was formed from vapors at high temperatures (up to 1400° F) rather than from liquid water, too hot for life to exist.¹⁷ Here the original researchers respond that the crystals described by the McSween group are different than those they investigated, and may well have formed at high temperatures some other time in the rock's history. But the carbonate globules the McKay team studied were formed at much lower temperatures, and seem to have been dissolved by biological activity at the same places where the magnetite and iron sulfides were deposited.¹⁸

A third objection also comes from the McSween group, indicating that the apparent fossils are actually crystals of iron oxide rather than nanobacteria.¹⁹ But, of course, fossils are often made out of a different material than the original living organism from which the fossil was formed (e.g., petrified wood, sharks' teeth). The crucial test here will be to get really good pictures of these objects and see whether or not cells walls and such can be detected.

Meanwhile, a team of British scientists have found additional evidence in ALH 84001 that points to the presence of biological activity, plus evidence consistent with biological activity in one of the other eleven meteorites thought to have come from Mars.²⁰ This is meteorite EETA 79001, found in Elephant Moraine, Antarctica in January of 1980, and thought to be much younger than ALH 84001. The team's finding concerning ALH 84001 is that something has been concentrating the isotope carbon-13 relative to its more common partner carbon-14; this is something that bacteria do very easily. In EETA 79001, they detected some carbon in a reduced rather than oxidized state, which may also point to biological activity.

What Do We Make of All This?

Clearly, the debate is sometimes hard to follow. And it involves a lot of technical detail that only specialists in each particular area are able to evaluate. It may be that some item will turn up that will definitely decide the question whether ALH 84001 contains fossils or not. Or the matter may remain unresolved, not to be settled without extensive investigation of the Martian surface. Even now, a major meeting to discuss these matters (the Lunar and Planetary Conference) is winding up in Houston, TX as I speak. I will try to get the latest results via the Internet if possible.

If the materials turn out not to be biological, we need make nothing of it. It fits with the idea that life is rare or even unique to earth, but it certainly doesn't prove it.

If these really are fossils from early in Martian history, then we will learn that life has existed on more than one planet in our universe. Those evolutionists who think life rather common (and have been troubled by theoretical calculations to the contrary) will feel vindicated and will make much of this in the media. Yet the existence of simple life on Mars, the nearest planet down-wind from the earth, may mean nothing more than that (1) such life was transported to Mars by the solar wind, having floated up into the upper reaches of our atmosphere and been carried off. Or (2) that a large meteor struck the earth and blew material into space which later fell on Mars when the planet still had enough surface water to support life. Or (3) that God created life on Mars as well as on earth. The scientific problems of evolution do not go away even if life is discovered on another planet.

Meanwhile, we Christians should be cautious about taking hard positions on questions for which Scripture has not provided answers. We already face strong hostility from many in academia and the media who are not beyond emphasizing off-the-wall statements made by evangelical and fundamental Christians that make the Bible and Christianity look ridiculous. As pastors and teachers, we need to have enough information in our hands to speak responsibly to those we are able to influence. We need to point out where evolutionists are going far beyond the data themselves, and where we as creationists have explicit biblical and scientific support and where we are guessing. The Lord will honor our attempts to be faithful to Him.

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