



SCIENCE AND TECHNOLOGY

Finding Life On Mars Would Not Surprise One Scientist

By Margie Wylie

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If NASA's rovers find signs of life on Mars, Gilbert V. Levin will have three words for the space agency: Told you so.

Levin designed one of three life detection experiments carried out on the red planet's surface by the Mars Viking probes in 1976. For years, he has been trying to convince NASA that his tests found microbial life.

When Levin's experiment exposed martian soil samples to moist, radioactively tagged nutrients, a Geiger counter recorded a release of radioactive gases. That's what microscopic organisms would exhale after eating such a spiked dinner.

"All our results were consistent with a biological answer," Levin said in an interview. But, he acknowledged, "no one else was convinced."

No organic materials -- which are based on carbon, the stuff of life -- were detected by a second Viking soil experiment. The third experiment uncovered a puzzling release of oxygen when water was added to the soil.

NASA's team concluded that Levin's results were part of a lifeless chemical reaction, said James B. Garvin, Washington-based lead scientist for the agency's Mars exploration program.

"We now have a strong belief that the upper centimeters of Mars' surface probably contain some kind of interesting superoxide chemistry. It reacts quickly to produce a peroxide-like chemistry that fizzes and decays," releasing gases, Garvin said.

Levin, 79, doesn't buy it. "Some 40 (chemical) theories have been proposed to explain away our data, but none have been able to reproduce the test and control data that we got from Mars," he said.

Levin is chairman and chief science officer of Spherix, a Beltsville, Md., company he founded as Biospherics in the 1960s shortly before winning the NASA contract to develop his Viking experiment. He called the experiment Gulliver after the Jonathan Swift character who discovers the tiny people called Lilliputians. NASA renamed it the more sober "Labeled Release" experiment.

While scientists agree they haven't yet found the key to unlock Levin's findings, they say that doesn't mean he is right.

In November, an international team reported in the journal *Science* that they were able to reproduce a reaction similar to what Levin achieved in 1976, but using nearly sterile soils from the Atacama Desert in Chile.

"We don't understand what is going on in the soil of Mars," said Chris McKay of the NASA Ames Research Center in Mountain View, Calif., a planetary scientist who led the team. "My guess is that it's not microbiology."

At the University of Southern California, biologist Joseph Miller backs Levin.

Miller re-examined Levin's data in 2001 and uncovered what he concluded were circadian rhythms, or patterns of biological processes usually tuned to day and night cycles, such as sleeping. "These are clearly circadian rhythms set to a martian day, and here on Earth, things that have these rhythms are alive," Miller said.

He also pointed out that Levin's experiment sustained reactions over weeks, while unstable superoxides degrade in seconds.

But Miller is a minority in the scientific community, most of which still thinks Levin's results could not be life.

To Levin, "the real incredible thing ... is imagining that Mars could be sterile." In the last decade or so, he noted, Earthbound scientists have found life in the most extreme of circumstances.

"We now know that microbes live up to three miles deep in the Earth; life exists in ice in glaciers, at above boiling temperatures in the hearts of atomic reactors, deep in ocean trenches, in thermal vents and in the acid storage cores of car batteries," he said. "It's hard to wipe out all life. Even radiation doesn't do that. I think you have to make a strong case to prove a place like Mars is sterile."

But the debate that has simmered for 28 years is likely to continue.

NASA's Spirit rover, now on the planet's surface, and Opportunity, due to land Jan. 24, are looking for rocks, rather than direct evidence of life. The Beagle 2 Mars lander, lost by the European Space Agency when it attempted to land in December, was carrying experiments that would have specifically addressed the issues raised by Viking's results, Garvin said.

Levin believes one modification to his experiment would solve the matter -- if he could just get it on Mars.

All molecules come in two mirror-image constructions, right-handed and left-handed. On Earth, life prefers right-handed molecules. Levin's Viking experiment mixed the two together. Applying them separately should get equal responses if the reaction is not biological. But "if one responds and not the other, that's absolute proof of life," Levin argued.

Levin and McKay collaborated on just such an experiment in 1996, for a Russian Mars probe, but the rocket carrying it crashed into the ocean after takeoff. Levin will propose another for the NASA Mars mission planned for 2009. That year, he will be a sprightly 84 years of age.

"Never a day goes by since Viking that I don't think about it," Levin said. "Every day I think about it. Every day I'm wondering, how can I convince these guys?"

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(Margie Wylie can be contacted at margie.wylie@newhouse.com)