It's Time to Realize There Is Life on Mars

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Public fascination with finding life on Mars began with the 1908 book, "Mars as the Abode of Life," by Percival Lowell. The possibility of life on our neighboring planet continues to pique our interest today.

Thus, it was no surprise that our first interplanetary target to look for life was Mars. Since 1960, 40 spacecraft have been launched to Mars. Only 19 of these craft succeeded in orbiting or landing on the planet. Early images from Mars were foreboding. Desolate, apparently barren plains, mountains and valleys showed no visible trace of life or of life-sustaining liquid water. Hope diminished. Later images were more encouraging, revealing more Earth-like geographic features and environmental parameters, but still no evidence of life, either past or present. Still refusing to give up, NASA refocused its effort on microorganisms, based on the idea that if a planet had any life, it must include microorganisms to do the needed job of recycling dead life forms.

Although many claim these efforts have so far come up empty-handed, I would argue that we have strong evidence that Mars harbors microbial life today.

First, we know of at least one mechanism for that life to get there: Comets and asteroids that have hit Earth have sprayed up debris of rocks and soil containing microorganisms. After each strike, a small fraction of the ejecta from Earth eventually entered the gravity field of Mars and crashed onto that planet. This probably happened thousands of times throughout the planets' histories (Earth has also been the recipient of Mars debris). And recent painstaking experiments have shown that these microorganisms could survive indefinitely in the cold vacuum of space.

Once resuscitated, microbes would find a suitable habitat on Mars. We have direct and indirect evidence that there is liquid water there: We have found minerals and landforms that form because of water, and in the last year, liquid water drops were photographed on the Mars Phoenix lander. Plus, everything else needed for life seems to fall within life-tolerable limits: temperature, pressure, atmospheric composition, elements, minerals, soil composition, seasons, length of day, etc. Even the oxidant, perchlorate, which Phoenix also found, is now interpreted by some NASA scientists as beneficial to life because it is a microbial metabolite for species on Earth.

Finally, we have evidence of actual life on Mars. Most recently, methane was found in the atmosphere under conditions that, as on Earth, make microorganisms the gas's most plausible source. The same biological explanation applies to the gas formaldehyde that was recently found. And for more than a decade, NASA scientists have claimed to have found organic matter and fossil remains of long-dead microorganisms in a Martian meteorite.

But the first evidence of life on Mars was found three decades ago. I fear it will surprise many of you that in 1976, the Viking Mission obtained strong evidence for life on Mars. That evidence has been so unreasonably tinged that many people have never heard of it. The Labeled Release (LR) life-detection experiment, performed by me and my co-experimenter Patricia Ann Straat, released radioactive food into a sample of Martian soil to see if there were any microbes present that would ingest the food and then exhale radioactive gas. The LR data detected such an exhalation — and the response was exactly what researchers would have found in soils on Earth.

Yet, because this was Mars, there was a lot of skepticism about the findings. The skepticism was reinforced by another Viking experiment that found no organic compounds in other soil samples. Researchers have since impugned the instrument that conducted the organic search, but the positive LR results have not been vindicated and are still attributed to some unknown, highly oxidative chemical in the soil. But even that has been shown to be wrong. After more than 30 years of avid testing by many skeptics, no one has found a nonbiological way to replicate the results of our experiment.

Why, then, is our experiment still written off in NASA's history books? Why has no life detection experiment been aboard any Mars spacecraft launched since Viking? Why has the astonishing reactivity of the Martian soil, be it biological or chemical, not been investigated?

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I don't know. All of the new findings about Mars' environment are consistent with or actually support the presence of life. Furthermore, the findings of thriving ecosystems in extreme habitats on Earth that rival Mars greatly enhance the prospects for life on our neighbor. Together with the newly realized fact that Mars has sustained infection from Earth, the prospects for a sterile Mars have become vanishingly small even without the Viking data.

The bottom line is: The time has come to accept the presence of microorganisms on the surface of Mars. The implications of that acceptance — perhaps what delayed it all this time — are that life exists beyond Mars and Earth, and likely in forms more complex than microorganisms.

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