

The Search for Life on Mars

Doug Cook¹

¹Aquila Mission Space

Abstract

This paper will review the ongoing search for life on Mars. The Mariner 9 Mars flyby in 1965 captured images showing what appeared to be a cratered planet as lifeless as the Moon. Nevertheless, there were images of canyons possibly carved by water. Mars' first billion years of geologic history was remarkably like Earth's. Some xenobiologists even speculate that life evolved on Mars before it did on Earth. The Viking 1 and 2 landers successfully landed on Mars in 1976 while their respective orbiters returned images of Mars that showed convincingly that water once flowed on Mars. The landers conducted three independent biological experiments to detect life in the Martian soil. Scientists' consensus is that non-biological chemical reactions likely cause positive metabolism results. While the 2020 Perseverance Rover has state-of-the-art onboard lab instruments, it will cache samples to be returned to Earth on a future robotic mission. Even before we bring that Mars sample bonanza back to Earth, we already have pieces of Mars meteorites to study in Earth labs. One Martian meteorite rocked the world in 1996 when a NASA science team published that they had found possible relic nanobacteria in Martian Meteorite ALH84001. The robotic Curiosity Rover (Mars Science Laboratory) has been studying geology in Gale Crater on Mars since 2012. Curiosity has detected methane and complex organic molecules preserved for 3.5 billion years. Did Mars' early, water-rich geologic history in the Noachian period, from 4.1 to 3.7 billion years ago, lead to the evolution of life? What will the Perseverance Rover find to illuminate unanswered questions about possible extraterrestrial life on Mars? For the search for life on Mars, we should adhere to Carl Sagan's standard, "extraordinary claims require extraordinary evidence."