

The Search for Life on Mars

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For centuries, the planet Mars has been regarded as a possible abode for life. Serious searches for the signatures of life began in the 19th century, and continue via telescopic investigations and landed missions. While early work focused on phenomenology and bordered on fantasy, modern scientific inquiry has emphasized the search for chemical signatures of life in the soil and rocks at the planet's surface, and the search for biomarker gases in the atmosphere.

Living systems produce more than 90% of Earth's atmospheric methane; the balance is of geochemical origin. The discovery of methane on Mars will be described, along with the ongoing extended search for clues to its origins. The possible origins of Mars methane will be discussed in the context of terrestrial analogue sites where geologic and biologic methane production now occurs – ranging from sub-permafrost zones in the arctic to hydrothermal vents in the deep ocean. Terrestrial organisms that could prosper on Mars today will be mentioned. I will briefly touch upon experiments conducted by landed spacecraft, ranging from the Viking Life Science Experiments in 1976 to the impending Mars Science laboratory, and the Trace Gas Orbiter and ExoMars missions now being developed for flight in the coming decade.