PHYSICS AND ASTRONOMY COLLOQUIUM

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"Are we all Martians? The Meteoritic Exchange of Life between Planets and Moons"

Abstract

The first hint that our Earth and Mars are not biologically isolated arose in 1980 when research on a class of unusual meteorites suggested that they might have originated on another large planet, perhaps Mars. Since then, the Martian connection has been proven beyond all reasonable doubt. The mechanism by which large impacts on Mars can launch boulder-sized surface rocks into space is now clear. Both theory and direct measurements on some of these rocks tell us that living microbes could have survived both the launch and travel in the vacuum of space for periods long enough for them to have reached the vicinity of Earth, decelerated in our atmosphere and arrived intact on the surface of our planet. Even the reverse journey, Earth to Mars is plausible. Research with biologist Wayne Nicholson has filled in many details of this process and made biological exchange between the planets of our solar system seem not only possible, but inevitable. Extensions to planets within other solar systems suggest that such in-system exchanges are also possible, but the jump between solar systems appears too vast to bridge. It seems possible that Percival Lowell was right, in a way not imagined by him, and that life could have originated on the planet Mars and then traveled to Earth. In that case, we are, in fact, all Martians.

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