LETTERS

From a distance

"If you want to be on television, tell them what you think they want to hear," says a researcher who is skeptical of evidence of past life on Mars (right). Other writers state that "fast transfers (taking less than a year)" of ejecta "from Mars to Earth must have occurred numerous times during Earth's past." On other topics, "sociobiological research programs (by whatever name)" are said to have "prospered." And "restoring and strengthing cellular immunity" is advocated as a strategy for curing AIDS, as opposed to "treating the consequences" of the disease with drugs.

Mars Media Mayhem

As lead author of a recent report (*1*) advising the National Aeronautics and Space Administration (NASA) on a strategy for the search for evidence of life on Mars, I was besieged for most of the first week of August by media representatives needing an instant opinion on the Research Article by D. McKay *et al.* (16 Aug., p. 924).

First, I should note that I am convinced that the search for evidence of ancient life on Mars is a rational exercise with a reasonable probability of success, but that I am equally convinced that the paper by McKay *et al.*, although an excellent study of martian chemistry and mineralogy, fell far short of establishing the case for evidence of biological activity in martian meteorite ALH84001. Thus, my responses to the media reflected a high degree of skepticism concerning the conclusions of McKay *et al.*

The printed media and radio seemed to have no problem with my skepticism, asking generally sensible and pertinent questions and making use of a significant amount of the material I provided. The television networks, on the other hand, were less receptive. Interviews that I taped for NBC News and ABC News were not used. The programs that were aired by NBC and ABC were relentlessly upbeat and contained only token criticism of the "pro-life" interpretation. Planned appearances on CNN and ABC Nightline were abruptly cancelled after my skepticism had been made public.

For scientists facing such a situation in future, the bottom line seems to be, if you want to be on television, tell them what you think they want to hear. If you want the public to know the truth, stick to print and radio.

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1. *An Exobiological Strategy for Mars Exploration* (NASA SP-530, National Aeronautics and Space Administration, Washington, DC, 1995).

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Mars Meteorite Transfer: Simulation

The possible detection of ancient life in martian meteorite ALH84001 (D. McKay *et al.*, Research Article, 16 Aug., p. 924) raises questions about the likelihood that microorganisms might have been transported between Earth and Mars (*1*). A related question is whether martian samples (to be returned by future spacecraft missions) should be sterilized in order to protect Earth from possible contamination. The survivability of such organisms on their journey between planetary habitats would depend on the flight time, which determines the dose of damaging cosmic rays and ultraviolet radiation, and the sample size, which might protect a meteorite's interior from radiation and from the heat of atmospheric entry.

In an attempt to understand the distribution of cosmic-ray exposure ages of the dozen known martian meteorites, we numerically simulated the orbital histories of more than 2000 particles launched from Mars at speeds slightly above escape (B. J. Gladman *et al.*, Research Article, 8 Mar., p. 1387); these particles were followed as their orbits evolved as a result of close planetary encounters and distant perturbations of all

the planets from Venus to Neptune. In our simulation, we found that a few percent of the martian particles struck Earth, having typical transfer times of several million years; ALH84001's measured transfer age of about 15 million years is unusually long.

Although terrestrial bacteria are known to have survived in vacuum for several years (*2*), transit times of millions of years may preclude safe passage. Our simulations show, however, that a small fraction of martian ejecta launched just marginally faster than the martian escape speed could be found immediately on Earth-crossing orbits. Our simulations show that the rate of Earth deliveries was almost constant for the first 10^7 years, which implies that on the order of 1 in 10^7 of the martian meteorites that reached Earth could have spent less than half of an orbital period in space (less than a year). The dozen recovered martian meteorites, the majority of which have been on Earth for much less than 10^5 years, represent only a tiny fraction of all the pieces of Mars currently on our planet and, when one considers the much higher impact rate early in the solar system's history, an even smaller proportion of those that have arrived throughout Earth's history. Therefore, fast transfers (taking less than a year) from Mars to Earth must have occurred numerous times during Earth's past. We leave to others an appraisal of the likelihood of survival of martian organisms in the rigors of space and their fiery entry through Earth's atmosphere. Because such an entry would hardly affect the center of a meteorite, terrestrial weathering would eventually have exposed the pristine interior. If martian microorganisms can survive a year in space, many may have already arrived.

Large impact events could also have liberated some pieces of Earth at high speeds and simultaneously could have cleared an atmospheric channel through which a few particles might have slipped to Mars. Our simulations show that about 0.1% of these rarely liberated terrene meteoroids could have found their way to Mars, but even fewer than 1 in 10^7 of these would have had rapid transfer times.

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References

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2. F. J. Mitchell and W. L. Ellis, in *Analysis of Surveyor 3 Material and Photographs Returned by Apollo 12* (National Aeronautics and Space Administration, Washington, DC, 1972), pp. 239–248; G. Horneck, *Nucl. Tracks Radiat. Meas.* **20**, 185 (1992).

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Sociobiology's Successes

In a highlighted text box (Random Samples, 19 July, p. 315), the headline " 'Sociobiology' to history's dustbin?" is placed over a photograph of E. O. Wilson. The "news" is thin: a specialist journal has changed its name.

Sociobiology was originally envisioned as the comparative, evolutionary study of the biological bases of social behavior, integrating traditional ethological approaches with new advances in population biology, behavioral ecology, demography, and life history theory (*1*). A few politically motivated critics then invented and promoted a caricature of the field, which they criticized as "sexist," "racist," and "determinist." In response, many researchers did indeed shrink from the label "sociobiology," but sociobiological research programs (by whatever name) have prospered.

One easily forgets, after 20 years, how