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References

1. J. Lederberg, K. Uncapher, "Towards a national laboratory: Report of an invitational workshop at the Rockefeller University" (Directorate for Computer and

Informational Science, National Science Foundation, Washington, DC, 1989).

2. S. Teasley, S. Wolinsky, *Science* **292**, 2254 (2001).
3. B. Autran, P. Debre, B. Walker, C. Katlama, *Nat. Rev. Immunol.* **3**, 503 (2003).
4. B. Autran et al., *AIDS* **22**, 1313 (2008).

Keeping Mars Clean

C. P. MCKAY ("BIOLOGICALLY REVERSIBLE EXPLORATION," Policy Forum, 6 February, p. 718) recommends that "COSPAR [the international Committee on Space Research] ... set a policy that all Mars exploration be biologically reversible." I agree; it allows rigorous scientific study of past and current life there without presupposing that it will be easily recognizable or accessible. However, several assertions may not go far enough to enable remediation, which could make cleanup politically or fiscally

impossible. Key are clear statements as to the purpose and urgency of exploration that may contaminate; biological discovery and mining may not be compatible.

McKay asserts that "hitchhiking organisms" exposed to the martian environment are killed quickly by ultraviolet (UV) solar radiation but that bacteria inside spacecraft may survive and remain dormant because of the dry conditions. This theory does not account for the environments beneath the surface. Biological contamination from a crashed vehicle could be buried by the impact or deposited by Mars' winds in UV-shielded crevasses far from the crash site. A nighttime introduction would not expose bacteria to UV, allowing them time to work into cracks or other protected niches. Second, the surface may be dry, but the Phoenix Mars Lander found water ice at 5 cm below the surface. Should bacteria reach subsurface liquid water, they could propagate rapidly. Third, the Policy Forum states that contaminants "will remain local and static and can be removed without requiring an effort vastly larger than the missions that carried the contamination." Such conclusions don't account for wind dispersal of contaminants not exposed to UV or possible burial by meteor strikes or landslides.

LIFE IN SCIENCE

It Takes a Village

A couple of years ago, we set out along with a team of ecologists to sample 100 lakes along the east coast of South America. We discovered that the task was easier said than done. Our four-wheel-drive pickup was stolen in Brazil and had to be restored by airplane. In the far south of Argentina, our boat sank with all of our equipment—and us—on it. But perhaps the most memorable adventure was the quest for our missing samples and the villagers in a small town in Argentina who came to our aid.

We had been in the field, traveling from lake to lake, for almost 2 months straight. Our precious samples were stored in coolers in the back of our pickup truck. At night, we would park the pickup in guarded car-parks. One early morning, we took the truck to lake El Paraiso. After a long day of fieldwork, we went to

store the "catch of the day" in the cooler, only to discover that the cooler was no longer there.

We drove back the 30 km to the previous day's worksite in the hope that we had left the cooler there. Upon realizing that we did not have the key to the gate of the lake, we decided to climb



the fence and walk the last 2 km through a mosquito-infested swamp. But it was for naught; the cooler was not there.

Back in the village, at the suggestion of a local, we sent a plea for help through the local radio station. Even before we arrived back at our hotel, three people had called with information. Apparently, someone had stolen the cooler during the night. Disappointed with its contents, the thief had thrown the cooler with samples in a garden adjacent to the hotel. The owner of the garden found them and, thinking they were veterinary samples, informed the police. The police, in turn, contacted all vets in the area. The neighbor, the police, and a veterinarian all contacted the radio show as soon as they heard our story. What a relief: We recovered almost all of our samples and became local celebrities in the process!

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Note

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EDITOR'S NOTE

This is an occasional feature highlighting some of the day-to-day humorous realities that face our readers. Can you top this? Submit your best stories at www.submit2science.org.

"Biologically reversible exploration" (putting off cleaning up) may be impossible given experiences on Earth. Remediation is often extremely expensive, requiring political resolve. In Hawaii, for example, there is no effective control that is affordable and politically feasible for scores of alien species. If an invasive weed cannot be controlled in Hawaii [as in the case of *Miconia calvenscens*, an invasive tree (1)], what are the probabilities that a microbe on Mars can be contained and eradicated? How would costs be apportioned among space-faring nations?

Lastly, McKay posits that discovering martian life "may open discussions of warming Mars to help that alien life to flourish." Although it is true that warming generally speeds metabolism, it may be prudent to complete noninvasive studies of martian life processes and its evolutionary path and critique our motives for intervention first. While human-initiated warming of the planet may help humans, it would not necessarily "help" endemic life that has adapted to the present martian environment. If a goal of exploration is mineral extraction, early contamination, and plenty of it, would best justify a later con-

clusion that Mars is too contaminated to clean; exploitation with decreased regard for contamination would be facilitated. As industries gain a foothold on Mars, their influence on governance there will strengthen. If COSPAR requires clean Mars vehicles, the astrobiological value of a more pristine Mars would be enhanced. Now is the time for caution, while it is still an option.

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Reference

1. L. L. Loope, "Harmful non-indigenous species report: Report for *Miconia calvenscens*" (Haleakala National Park Field Station, USGS/BRD, 1997).

CORRECTIONS AND CLARIFICATIONS

Reports: "Regulators of PP2C phosphatase activity function as abscisic acid sensors" by Y. Ma *et al.* (22 May, p. 1064; published online 30 April). The date of receipt was 27 October 2008, not the later date in the original *Science* Express publication. The date has been corrected both online and in print.

Reports: "Human induced pluripotent stem cells free of vector and transgene sequences" by J. Yu *et al.* (8 May, p. 797). Karyotypes were performed on each of the vector-free iPSC clones analyzed and were reported to be normal. Through

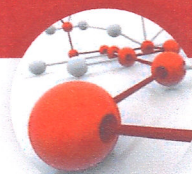
subsequent high-resolution chromosomal analysis by comparative genomic hybridization, a small interstitial deletion of chromosome 15 was identified in one of the clones (iPS-DF6-9-12T). Re-review of the original karyotypes revealed that this small deletion was present and missed, and that the initial karyotype depicted in Fig. 3B was not normal, but should have been reported as: 46,XY,del(15)(q14q15). The karyotypes for the other vector-free iPSC cell clones analyzed were also re-reviewed, and all are apparently normal. The revised karyotype for clone iPS-DF6-9-12T does not change the substance of the paper given that the karyotypes of the remaining vector-free clones appear normal.

Books *et al.*: "Many worlds in tiny grains" by R. Holman (6 March, p. 1291). The photographs of sand samples were not printed as intended. From top to bottom, the sands are actually from Rodeo Beach, Marin County, California; Agate Beach, Oregon; Daytona Beach, Florida; Santorini, Greece; Ayers Rock, Australia; Sahara Desert, Mauritania; Santorini, Greece (again); and Old Course Golf Course, Scotland. The photograph of shell-rich sand from Bermuda (shown here) mentioned in the original caption was inadvertently replaced.



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