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Information for Contributors appears on pages 93–94 of the 5 January 1996 issue. Editorial correspondence, including requests for permission to reprint and reprint orders, should be sent to 1333 H Street, NW, Washington, DC 20005.

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LETTERS

Right pathways

Preservation and responsibility are recurring themes in this week's letters. One correspondent asks, "Do we [scientists and modern society] operate in a sustainable manner?" Other writers describe the care with which a unique set of hominid fossil footprints have been reburied to prevent possible damage from the weather, invasive plants, or intrusive humans. (At right, excavation of the footprints in 1995 before removal of the acacia roots and the fill in the prints.) A third letter points out that collectors, in taking specimens of a rare tree, probably hurried that organism's extinction in the wild. Even "knowledge of research done and under way" is itself a "unique resource" that, it is argued, could be better managed.

NEVILLE AGNEW/J. GETTY TRUST

Gibbons on NIH Budget

In the ScienceScope item "NSF's up and down budget" (16 Feb., p. 897), I am described as "angry about one number from this year's budget—the 5.7% increase that Congress bestowed on the National Institutes of Health [NIH]." It is implied that my admonitions about "cutthroat squabbling" and "sweetheart deals" were aimed at NIH. Let me clarify: I am not angry with NIH, nor were my remarks about "squabbling" and "deals" a commentary on NIH. To the contrary, I commend NIH for its success in maintaining strong public support.

As I read from my prepared text for the AAAS Annual Meeting, "This [good budget for NIH] reflects the broad perception that research is clearly and directly relevant to the needs and aspirations of the American people." I concluded these remarks by noting that "the rest of the scientific community needs to understand the need to be engaged in developing a similar public perception of its relevance to societal goals."

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The Laetoli Footprints

The 3.6-million-year-old hominid footprints from the Laetolil beds in Tanzania have been extensively reported since their discovery in 1978–1979 (*1*) (Random Samples, 13 Jan. 1995, p. 171). After excavation and study, the 23-meter-long trackway was reburied and the mound covered with lava boulders to prevent erosion. By the late 1980s, concerns were being expressed by the scientific community that revegetation by acacia trees on the reburial mound might be damaging the footprints. The probability of intrusion of roots into the Footprint Tuff surface and between the laminae that comprise the individual ash falls was considered to be high after 15 years of unchecked growth.

At the invitation of the Tanzanian government, the Getty Conservation Institute in 1993 entered into a collaborative agreement to undertake the conservation of the trackway site. A strategy was agreed in discussion with the Laetoli Consultative Committee, made up of professional and political representatives from Tanzania, the Unesco regional representative, and specialists in the field of palaeoanthropology. The strategy encompasses in situ preservation through conservation and reburial of the trackway. Alternative proposals to remove the tracks to a museum or to shelter the trackway were deemed inappropriate, because removal would destroy the integrity and context of the site, and impractical given the site's remoteness and the lack of resources.

Preparatory work included a full condition assessment, site stabilization work, the making of new casts from the 1979 cast and, most important, destruction of the 150 trees growing on and adjacent to the trackway. These were killed by application of the biodegradable herbicide Roundup. Contrary to concerns raised about the use of the herbicide (*2*), we believe it posed no environmental threat. Applied directly to tree stumps, the herbicide was absorbed into the root system and did not affect adjacent vegetation or insect life, which continued to flourish.

During 1995, 29 hominid prints were uncovered in the southern 10 meters of the trackway, where the most dense revegetation had occurred and where coincidentally the best preserved footprints occurred. Only near the northern end of the excavation trench, under a naturally weathered area of tuff, had root penetration occurred. Elsewhere, the unweathered tuff encouraged development of adventitious roots above the footprint horizon, and damage was limited. Stumps and roots were removed, and voids were filled with synthetic material (acrylic dispersion and fumed silica) to prevent slumping. Where it was not possible to extract root stock, preservative was applied to inhibit termites and fungal deterioration. The condition of each print was documented, and the surface was photogrammetrically recorded.

Working as a team over 10 days before reburial of the trackway, chosen by the consultative committee on the basis of their areas of expertise and their ability to provide a fresh perspective, and invited by the Tanzanian Antiquities Unit, Craig Feibel (Rutgers University), Bruce Latimer (Cleveland Natural History Museum), and Peter Schmid (Zurich University) undertook a study aimed at answering outstanding questions related to the microstratigraphy and taphonomy of the tracks, features of anatomical significance observable in the prints, and aspects of gait.

The site was reburied under different types of geotextile to serve as a marker layer 5 centimeters above the footprint surface and to prevent root penetration and erosion. The reburial mound was capped with lava boulders, as originally, and will be allowed to revegetate with grasses. A monitoring trench (6.5 square meters in area) close to the site will allow periodic inspection of subsurface conditions without the need to disturb the trackway. In 1996 and 1997, other field seasons are planned for the northern section of the trackway to complete the project.

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References and Notes

1. See references in M. D. Leakey and J. M. Harris, *Laetoli: A Pliocene Site in Northern Tanzania* (Clarendon Press, Oxford, UK, 1987); T. D. White and G. Suwa, *Am. J. Phys. Anthropol.* **72**, 485 (1987).
2. *Resolution Regarding Immediate Plans for the Conservation of the Laetoli Footprints* (Conference on the Preservation and Use of Olduvai Gorge, Laetoli, Rock Art, and Other Paleoanthropological Resources in Tanzania, Bellagio Center, Italy, 5 to 9 June 1995).

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A Scientific "American Dream"

Neal F. Lane opens the door to a critical question for U.S. scientists today: What is our role in the path to the "American dream?" (Editorial, 23 Feb., p. 1037). Lane exhorts us to give our qualified perspective to the lay public in order to maintain our funding levels.

As scientists, we can say that we have contributed to the development of increased agricultural output, more efficient processing of raw materials into goods and energy, and a greater capacity to heal and kill on a large scale. This is a severely truncated list of things that science has given to society, but delivers the gist. Most scientific and technologic developments, material and theoretical, have been answers to immediate needs, without being consciously required to fit a long-term strategy. Certain assumptions prevail in guiding the larger-scale process of the evolution of science and technology; these include (i) that growth is "good," or at least to be strived