may experience a temporary loss in productivity. Both universities and granting agencies need to find ways to offset this.

Another important area that was discussed was that of mentors. All of us independently noted the role our mothers played in supporting us in our career decisions and in setting an example for us to follow early in life. We also talked about the crucial role that past and present mentors, both male and female, have had in teaching us how to be effective scientists, encouraging us to continue on and actively helping us to advance. We cannot emphasize enough the importance of these individuals in shaping our paths and the debt that we owe them.

***Laura I. Davis***
*Howard Hughes Medical Institute,*
*Department of Genetics,*
*Duke University Medical Center,*
*Durham, NC 27710*
***Ann Marie White***
*Whitehead Institute,*
*9 Cambridge Center, Cambridge, MA 02142*

■

## Bottleneck in Human Evolution and the Toba Eruption

Ann Gibbons' Research News article "Pleistocene population explosions" (1 Oct., p. 27) discusses an apparent bottleneck in human evolution in the period before about 50,000 years ago and a possible link to climate cooling related to the massive Toba volcanic eruption in Sumatra 73,500 years ago. In a recent study of the possible effects of the Toba eruption (*1*), we calculated that climate cooling for 1 or 2 years after the eruption could have been quite severe, representing "volcanic winter" conditions similar to those proposed in scenarios of nuclear winter following a major nuclear exchange (*2*). Land temperatures in the latitude zone from 30° to 70°N may have ranged from about 5° to 15°C colder than normal, with widespread hard freezes in mid-latitudes and very low summer temperatures. Hemispheric temperature decreases of 3° to 5°C may have persisted for several years. Increased snow cover and sea ice and perturbed sea-surface temperatures could have led to longer term (decadal) cooling.

The Toba eruption occurred at a prominent transition from warm to cold climates in the last glacial cycle, at a time of abrupt ice-sheet growth and sea-level fall and when Milankovitch insolation parameters were such as to favor the growth of Northern Hemisphere ice sheets. Because climate cooling was already under way when Toba erupted, it may be that sea-level fall related to the cooling had some role in triggering the eruption from an unstable magma chamber (*1*, *3*). Calculations suggest that the brief cooling related to the dust and aerosols from the Toba eruption may have been a contributing factor in the rapid climatic switch.

Toba was apparently the largest explosive eruption of the last few 100,000 years and it may have been connected to a possibly unique Late Pleistocene bottleneck in human evolution. More accurate dating of the eruption, and a record of its short-term effects on climate could come from the detailed archive of the newly drilled GISP2 and GRIP ice cores in Greenland.

***Michael R. Rampino***
*Department of Earth System Science,*
*New York University,*
*New York, NY 10003, and*
*NASA, Goddard Institute for Space Studies,*
*2880 Broadway, New York, NY 10025*
***Stephen Self***
*Department of Geology and Geophysics,*
*School of Ocean and Earth Science*
*and Technology,*
*University of Hawaii at Manoa,*
*Honolulu, HI 96822*

### References

1. M. R. Rampino and S. Self, *Nature* **359**, 50 (1992).
2. R. P. Turco, O. B. Toon, T. P. Ackerman, J. B. Pollack, C. Sagan, *Science* **247**, 166 (1990).
3. M. R. Rampino and S. Self, *Quat. Res.* **40**, 269 (1993).

## The Baucus Bill

The ScienceScope item regarding proposed legislation (the Baucus Bill) to protect fossil vertebrates on federal lands (15 Oct., p. 323) is a somewhat downbeat recitation of the situation. In fact, neither commercial nor amateur collectors can legally collect fossil vertebrates from federal lands at the present time. Thus, commercial collectors who take fossils from federal lands are already (would not be "put") "on the wrong side of the law." The Baucus Bill recognizes the valuable contributions made in the past by amateur collectors and attempts, for the first time, to develop ways in which the amateurs can apply for a permit to collect fossils. As already in effect with permits to scientific or academic institutions, the permits would specify that an arrangement had been made to curate the scientifically significant specimens with a suitable institution where they would be conserved (along with associated contextural data) for the citizens of the United States.

Regardless of what museums or institutions may think is the case, none actually "has title" to the federal fossils under its jurisdiction, and the Baucus Bill emphasizes that any person collecting fossil vertebrates from federal land has responsibility for *stewarding* these fossils on behalf of the

general public. Only by protecting fossil vertebrates from loss to our public domain can we ensure that the vital information locked within them will be investigated by the academicians who are trained to do so.

*Michael O. Woodburne*
*Society of Vertebrate Paleontology*, and
*Department of Earth Sciences,*
*University of California,*
*Riverside, CA 92521–0423*

■

## Ice Man's Fungi: Discussion Rekindled

I write in response to the letters of Horst Seidler (18 Dec. 1992, p. 1868) and Michael Grant and Norris Denman (9 Apr. 1993, pp. 146 and 147) concerning the fungi found with the ice man. Only one of the two pieces of polypore has been identified so far as *Piptoporus betulinus* (*1*). This species contains the antibacterial "polyporenic acid C" (*2*), *not*, as Seidler suggests, agaric acid. The latter is a typical product of *Laricifomes officinalis*, another nonagaric fungus "endowed with the most astonishing medicinal virtues" (*3*) that was used in folk medicine, even by the ancient Greeks and Romans (*4*).

Grant's creative statement that the Tyrolean man was "well equipped for collecting insects or sharpening knives" deserves to be completed. The fruiting bodies of *P. betulinus* were also used for the manufacture of drawing charcoal (*5*), whereas an Australian podiatrician reports having packed it behind ingrowing toenails with "excellent results" (*8*).

As to the question of whether or not the ice man used the birch polypore "as fire-starting tinder," an additional third fungal material reveals more information: among the equipment found in his leather bag (including several flint objects) was a large amount of mysterious black stuff. At first it was thought to be part of a prehistoric repair kit (*8*), but this black stuff has now been clearly identified as "classical tinder." It consists of loosely interwoven context hyphae of the "true tinder bracket" (*Fomes fomentarius*) still containing traces of pyrite (*9*). The tissue does not show the compactness of the native fungal trama. It gives the impression of having been treated mechanically in some way. Consequently, we have to assume that the two other pieces of polypore, each mounted separately on a leather strap, served some purpose other than making fire.

***Reinhold Pöder***
*Institut für Mikrobiologie,*
*Leopold-Franzens-Universität,*
*A-6020 Innsbruck, Austria*

**References**

1. R. Pöder, U. Peintner, T. Pümpel, *Bericht über das Internationale Symposium "Der Mann im Eis—Ein Fund aus der Steinzeit Tirols,"* Innsbruck, Austria, 3 to 5 June 1992, K. Spindler, Ed. (Veröffentlichungen der Universität Innsbruck, 1992), vol. 187, pp. 313–319.
2. J. H. Birkinshaw, E. N. Morgan, P. K. Findlay, *Biochem. J.* **50**, 509 (1952).
3. A. H. R. Buller, *Trans. Brit. Mycol. Soc.* **5**, 21 (1914).
4. R. A. Blanchette, B. D. Compton, N. Y. Turner, R. L. Gilbertson, *Mycologia* **84**, 119 (1992).
5. A. S. Bondartsev, *The Polyporaceae of the European USSR and Caucasia*, E. Rabinovitz, Ed. (Keter, Jerusalem, 1971), p. 266.
6. R. N. Hilton, *Mycologist* **21**, 121 (1987).
7. A. Lippert and K. Spindler, *Archeol. Österr.* **2**, 11 (1991).
8. F. Sauter and H. Stachelberger, *Bericht über das Internationale Symposium "Der Mann im Eis—Ein Fund aus der Steinzeit Tirols,"* Innsbruck, Austria, 3 to 5 June 1992, K. Spindler, Ed. (vol. 187, Veröffentlichungen der Universität Innsbruck, 1992), pp. 442–453; R. Pöder, T. Pümpel, U. Peintner, *Der Mann im Eis*, K. Spindler, Ed., vol. 2, in press.

■

## Manson Crater Extinctions

Richard Kerr (Research News, 29 Oct., p. 659) exonerates the cometary impact that produced the Manson Crater in Iowa (and was formerly suspected of having caused the extinction of the dinosaurs) of "global mayhem." However, it may well have produced mayhem on a subcontinental scale. The Manson impact-generated tsunami deposit [Crow Creek Member, Pierre Shale (*1*)] separates strata containing assemblages characteristic of different North American marine vertebrate "ages" (Niobraran and Navesinkan) with their distinctive mosasaurs (*2*). Vertebrate remains in continental strata, deposited along the western border of the Cretaceous interior seaway shortly before and after the Manson tsunami, also belong to separate North American land mammal "ages" (Aquilan and Judithian) and reflect genus-level changes in crocodiles, dinosaurs, and mammals (*3*). It seems likely that local vertebrate faunas were badly disturbed by the Manson impact and that taxa which were exterminated were replaced by immigrants from beyond North America. More problematic is the finding that post-Manson survivors from the subcontinent bordering the eastern edge of the seaway show abundance patterns differing from those of their western contemporaries (*4*), perhaps because Asian/western immigrants were blocked by the seaway.

A study of the paleontological record associated with the Manson crater will help to reveal the lethal effects of bolide impacts of differing energies.

***Dale A. Russell***
*Canadian Museum of Nature,*
*Post Office Box 3443, Station "D,"*
*Ottawa, Ontario K1P 6P4, Canada*