A reader questions the state of the life sciences in Scandinavia. Fire is said to have been used by humans 1.6 million years ago. It is suggested that the United States ask countries that are successful at math and science education what their methods are, and adopt them. Hungarian scientific citation rates are said to be good, but not as high as *Science* stated. The proposal is made that "*Science* lead the way and make it a regular feature to prominently document 'best practices' when it comes to public outreach [by scientists]." The value of thermography in breast cancer screening is questioned. And the study of multimodal signals is explored.

How Fares Scandinavian Biology?

In the issue of 2 April, a news article and an advertising supplement present apparently contradictory information. The article, "University cash crisis blocks career paths" by Lone Frank (News Focus, p. 25), describes the plight of young scientists hit by the decision of the University of Copenhagen "not [to] fill any junior tenured positions that became vacant [and] to cut 15% of the tenured science positions...." Frank writes, "a whole generation of young researchers will either have to leave academic science or pursue a career abroad."

In contrast, the advertising supplement by Peter Gwynne on page 178, "Scandinavia stimulates a biology boom," says that "inventive government, industry, and academic programs have sparked a surge in life science in Scandinavia. That success has put well-qualified life scientists at a premium." The advertisement goes on to state that "[u]nfortunately, local universities aren't producing qualified life science graduates fast enough. Governments are trying to overcome that, through such initiatives as Denmark's 'centers without walls' [and] favorable tax breaks for foreign scientists."

When read in the context of Frank's article, this information is confusing. Are Scandinavian universities not producing well-qualified graduates? Are young researchers cognizant of their government's policy of importing brains to fill an apparent shortage?

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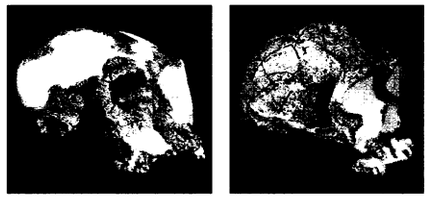
Fire Use

With regard to the discussion by Elizabeth Pennisi (News Focus, 26 Mar., p. 2004) about the debate among anthropologists regarding the cooking of tubers by *Homo erectus*, whether or not they cooked tubers and/or meat, they certainly had the capacity for using fire, and thus, in principle, to cook. Not only is there considerable evidence for human association with fires before 240,000 years ago at Zhoukoudian in China, and in Africa at Chesnowanja and Swartkrans (*1, 2*), but a number of well-documented fireplaces have been recovered in the Okote tuff at Koobi Fora in Kenya, found by the late Glynn Isaac and Jack Harris; others were found later by Harry Merrick (*3*). These



Did the use of fire for cooking lead to a diet change that resulted in the expansion of brain size in *Homo erectus* (right) from that of *Australopithecus africanus* (left)?

fireplaces have been dated by the potassium-argon method to approximately 1.6 million years ago and were undoubtedly made by humans, as they contain a mixture of woods, including easily ignited palm wood, used to make the fires. Charles Peters of the University of Georgia and I have a chapter on these fireplaces in a forthcoming volume in the *Koobi Fora* publications series (*4*). The most accessible report on these fireplaces (*3*) demonstrates differences between burned trees and the circular fireplaces not only among the *H. erectus*–associated remains—which included one irregular burned spot containing largely phytoliths of the same wood, thus apparently a burned tree—but also in present-day replications. Additional fireplaces excavated from the Okote tuff by Merrick at Koobi Fora have not yet been described in the literature. The relative thinness of the bone in the sides of the skull of *H. erectus* compared with that of earlier hominids, along with the smaller teeth, make it clear that *H. erectus* was doing something to make chewing easier. They clearly had the pyrotechnical ability to cook tubers at least as far back as 1.6 million years ago, even if further research must determine exactly what was cooking.

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Over the Fence

In an effort to improve early math, science, and reading instruction, the U.S. government proposes to spend up to $75 million annually on education research, according to Jeffrey Mervis's article "Agencies launch effort to improve U.S. schools" (News of the Week, 26 Mar., p. 1995). A simple analogy shows the folly of this approach. Suppose that your flower garden is doing poorly, while your next-door neighbor is growing prize-winning blooms. One approach might be to fund a multiyear research program, involving soil chemists, agronomists, and phytopathologists, hoping that their research findings may be useful in 10 years. A simpler and less expensive approach might be to lean over the fence and ask your neighbor how he does it.

If other nations are outstripping the United States in math and science education, it would cost far less than $75 million per year to find out what they are doing right. Even if our research program made some astounding breakthroughs, it would take 10 years for the findings to make it into teacher training programs and 12 additional years for our first-graders to reach college age. If the Europeans, Japanese, and Chinese are ahead of us now, how much further ahead will they be in 22 years?

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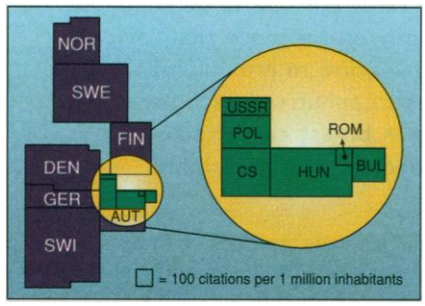
Hungarian Virtues

Like many of our compatriots, we read with pride and satisfaction the praising words about the science and technology (S&T) potential of our little country ("Hungary for high-tech," Random Samples, 26 Mar., p. 2007). It was an embarrassment, however, to see a diagram intending to illustrate Hungary's "disproportionately high per capita scientific citation rates in the '80s." Apart from the boldness of attempting to draw any

direct relation between citation rates (a debated, but nevertheless useful, proxy for the impact of basic research) and actual or potential technological developments, the diagram suggests that Hungary clearly surpasses Denmark, Switzerland, and Austria, but falls short of the USSR, Czechoslovakia,



Per capita citation rates in Hungary, 1985.

and Poland. This strange figure not only questions the claimed vanguard role of Hungary among the former Soviet-bloc countries, but is inconsistent with any so-far published similar statistics. A figure (above) based on a recent European Community compilation (*1*) shows a radically different picture. The per capita citation rate of Hungary stands out in the Central–East European region, but is dwarfed by the values in the more developed parts of Europe, particularly by those of the Scandinavian countries. A similar picture can be obtained if, instead of the total population, the total research and development personnel or the number of scientists and engineers is used as a reference base. We sincerely hope that we do not irreparably damage the reputation of Hungary by placing it behind Switzerland or Denmark, but rather give evidence of another Hungarian virtue: modesty.

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Our Public Image

The issues of 5, 12, and 19 March make interesting back-to-back reading regarding public outreach by scientists. Michael Crichton's essay "Ritual abuse, hot air, and missed opportunities" (Essays on Science and Society, *Science*'s Compass, 5 Mar., p. 1461) exhorts scientists to start working effectively with the media, to "assume your power, and shoulder your responsibility to get your message to the waiting world." Crichton notes that there are many scientists who would do so if it were not for the fear of "professional scorn." A week later, in their editorial "Congress and U.S. research" (12 Mar, *Science*'s Compass, p. 1639), Erich Bloch and Charles M. Vest make the same exhortation, urging scientists to take "every opportunity…to explain the benefits" of science. In an editor's note in the 19 March issue (Letters, *Science*'s Compass, p. 1850), mention is made of a letter supporting stem cell research signed by 33 Nobel laureates that was sent to President Clinton and Congress on 8 March. Since the editors of *Science* agree with Crichton (Editorial, *Science*'s Compass, 5 Mar., p. 1453) that the community "should identify and reward members who…can act as effective spokespersons," I suggest that *Science* lead the way and make it a regular feature to prominently document "best practices" when it comes to public outreach. I think that this would stimulate more scientists—not just Nobel laureates, university presidents, former chief executive officers, and agency directors—to feel empowered to participate.

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