urban region" by a uniform logic where the objective was to identify units (cities and surrounding suburbs) by the way they function as daily labor markets. We combined neighboring cities where the distance between cities is less than 45 minutes by ground transport. We then determined how many papers were published by authors from each research center.

The 1999–2001 top 40 list includes 22 European and 14 North American centers, along with three Asian centers and one Australian center. Africa and South America are not represented. Japanese centers have prominent positions on the list. Tokyo-Yokohama is the research center with the world's highest number of papers published in the period studied, and Osaka-Kobe is third. London is in second place, and the top two are far ahead of the other centers on the list. The highest-scoring North American centers are the San Francisco Bay Area (4), Boston (6), New York (7), and Los Angeles (9). From Europe, Paris (5), Moscow (8)—the only representative from the former Soviet Union—and Amsterdam (10) are among the top 10 research centers. There is a considerable gap in publications between the centers in the top 10 and those in the lower ranks. It is notable that Beijing is ranked 12th; that U.S. centers show a very compact pattern, with most of the represented centers having high ranks; that Northern European centers hold higher ranks than Southern European ones; and that the United Kingdom is represented by no less than six centers in the top 40.

We compared data from 1996 to 1998 with data from 1999 to 2001 to identify "winners" and "losers." The weighted arithmetic mean change is +8.5%. Half of the cities are within a range from +6.3 to +11.1%, which is an average change. We classify nine centers as winners—an increase of 11.6% or more—and 10 cities as losers—an increase of 4.8% or less.

Large research nations with multiple centers in the top 40 are the United States with 12 centers, the United Kingdom with six, and Germany with five. Of these nations, only the United States has one winner. The traditional top research nations include seven of the 10 losing regions. To find the successes, one must look outside those nations traditionally seen as research heavyweights.

The big winner is Beijing, with a more than 60% increase in research output from 1996–98 to 1999–2001. All four Southern European research centers (Milan, Barcelona, Madrid, and Rome) on the top 40 list are winners, which shows a pattern of advancement for a large part of Southern Europe. Only one U.S. center, Baltimore, and one Canadian center, Toronto, are members of the high-growth category, which also includes Sydney.

The big losers are Moscow and St. Petersburg. Other members of this category include some larger European and North American cities with long histories as research centers, e.g., Paris, London, Washington, DC, and the capital-like city Frankfurt near the former German capital Bonn.

If the growth pattern from 1996–98 to 1999–2001 continues, a shift in the rank of major research centers can be envisaged, although the overall pattern is rather stable. Centers located in the Pacific Rim will increase in importance together with Southern European centers. The traditional heavyweight centers of Northern Europe and the United States will decrease in importance, as will Russia.

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Human Reproductive Cloning

BROCK'S THOUGHTFUL VIEWPOINT "HUMAN cloning and our sense of self" (Reflections on Self: Immunity and Beyond, 12 April, p. 314) prompts us to raise another issue that has been lost in the cacophony surrounding this controversial topic. Some claim that no legitimate scientific purpose can be served by perfecting technology to permit human reproductive cloning. Others include the preservation of endangered species among the legitimate and beneficial goals of mammalian cloning (*1*). Although it may seem difficult to imagine plausible circumstances under which our own species might become endangered, one possibility is the spontaneous origin or malicious development of a virus that is as lethal as AIDS and as contagious as chicken pox. However, with AIDS, individuals exist who are genetically resistant to the virus, no matter how many times they are exposed (*2*). In the event of a worldwide pandemic, the identification and cloning of rare genetically resistant individuals might therefore provide an effective last-ditch strategy for preventing our extinction. If safe, effective procedures for human reproductive cloning were developed, society could, if it chose, permit their use only for such emergencies, but not for other purposes (*3*). For those who consider human cloning to be intrinsically immoral (*4*), its use to prevent our extinction raises the existential question of whether the preservation of any particular moral system or code of ethics should take precedence over the preservation of the human species. One might well ask what moral system will prevail after *Homo sapiens* has become extinct? If any life-forms still exist, it is likely to be a Darwinian system. These are questions truly worthy of consideration by the Presidential Council on Bioethics or the ethical, legal, and social implications program of the Human Genome Project.

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References and Notes
1. Y. Tsanoda, Y. Kato, *Differentiation* **69**, 158 (2002).
2. R. Liu *et al.*, *Cell* **86**, 367 (2002).
3. The atomic bomb and manned exploration of the moon are examples of technology we have not continued to employ after their initial use.
4. L. R. Kass, J. Q. Wilson, *The Ethics of Human Cloning* (AEI Press, Washington, DC, 1998).

CORRECTIONS AND CLARIFICATIONS

ASSOCIATION AFFAIRS: PRESIDENTIAL ADDRESS: "Science, sustainability, and the human prospect" by P. H. Raven (9 August, p. 954). Some text is missing at the end of page 956. The text should read, "John Browne, chief executive officer of BP-Amoco, for example, set his company on a course that will embrace alternative energy sources and energy conservation, reasoning that in the face of global warming, they must do this if they are to continue to be a profitable energy company in the future. The kinds of grassroots activities that are promoting sustainability on a local scale have become a powerful force throughout the world." The correct version is available at www.sciencemag.org/cgi/content/full/297/5583/954.

NEWS OF THE WEEK: "Senate puts the heat on science nominees" by Jeffrey Mervis (26 July, p. 493). A response by Kathie Olsen to a question from Senator John McCain (R-AZ) was misquoted. After McCain quoted from a recent administration report on climate change put out by the Environmental Protection Agency, Olsen said, "I don't have the exact numbers and everything in my head to be able to respond..." Olsen did not say she did not understand the text, as *Science* reported; it was McCain who interpreted her answer that way. The article also misrepresented President Bush's response to the EPA report. Bush had told reporters that it was "a product of the bureaucracy," a position that McCain described as Bush "basically dismissed it."