

## Letters to the Editor

Letters (~300 words) discuss material published in *Science* in the previous 6 months or issues of general interest. They can be submitted by e-mail (science\_letters@aaas.org), the Web (www.letter2science.org), or regular mail (1200 New York Ave., NW, Washington, DC 20005, USA). Letters are not acknowledged upon receipt, nor are authors generally consulted before publication. Whether published in full or in part, letters are subject to editing for clarity and space.

## The Uncertain Future of Gross Anatomy

I WAS INTERESTED TO SEE THE RANDOM Samples item "Anatomy classes face gross shortage," which describes widespread concern about the dearth of faculty capable of effectively teaching gross anatomy to medical students (28 Feb., p. 1309). The time commitment is indeed great, not only for the actual number of teaching contact hours, but in the many years required to develop expertise in the knowledge of the human body.

There is a critical partner in the effective teaching of gross anatomy: those who donate their bodies to the education and training of future physicians. A

Image not available for online use.

number of medical schools around the nation (including my institution) have a body donation program made up of generous individuals who rightly believe that their body, in death, can be an enduring gift. However, the image that you presented with the item (which appears to be an autopsy scene featuring the use of unusual equipment, rather than a scene in a dissection lab) could very likely be highly disturbing to potential donors. We do not permit photography of this nature in our dissection laboratory, and *Science* should be alerted to the potential negative consequences of images such as this, lest you inadvertently worsen an already critical situation by dissuading potential donors.

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*Editor's Note:* The image accompanying the Random Samples was indeed a photo of an autopsy, not a gross anatomy class.

THE RANDOM SAMPLES ITEM "ANATOMY classes face gross shortage" (28 Feb., p.

1309) indicates that medical schools are anticipating a dearth of gross anatomy instructors in coming years. Since modern anatomical research has become increasingly molecular, few young faculty have the training or desire to teach a demanding and time-consuming course like gross anatomy. The article indicates that departments are attempting to give on-the-job training to molecular biology junior faculty or pulling senior professors out of retirement as stop-gap measures. However, there is an alternative. A few anatomy departments with a focus on an organismal level of biology as well as programs in physical anthropology train graduate students in human anatomy who are capable and willing to teach human gross anatomy to health care professional students. What is more, graduates from these programs pursue research in areas related to gross anatomy (typically some aspect of evolutionary morphology, including primate and/or human evolution) and therefore actually have an interest and enthusiasm for the topic. Most importantly, they are productive scientists who enjoy their work and who view health care education as an important component of that work.

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## Revisiting the Cloning Debate

LEROY WALTERS ADVANCES THREE ARGUMENTS against a temporary or permanent ban on research cloning ("Research cloning, ethics, and public policy," Letters, 14 March, p. 1661). A federal ban would, he claims, be premature, preemptive, and unprecedented. However, none of these three claims can withstand scrutiny.

Walters writes that a ban would be premature because debate about research cloning continues and should not be closed off. Instead, he suggests, research cloning should go forward but should be regulated by ethical guidelines. What a strange notion of keeping debate open this is: Some folks think research cloning should not be done, others think it should. In order not to end this debate prematurely, we should do it (with regulation)! This is disingenuous on its face.

Walters writes that a ban would be preemptive because it would impose federal control on the states. But this too is disingenuous, for, as Walters' letter makes clear, he wants federal regulation and oversight of research cloning. He does not want decisions made in the "laboratory of the states"; he wants regulatory control at the federal level, no doubt by bioethicists. As John Evans has demonstrated in his recent book, *Playing God? (1)*, this strategic ploy has been used before and is aimed at keeping important moral decisions out of the hands of elected officials and in the hands of professional bioethicists.

Walters claims that a ban would be an unprecedented intrusion of government into the freedom of scientific inquiry. Yet he himself surely knows better. Many kinds of human experimentation, which are forms of scientific inquiry, are forbidden and, indeed, would be subject to civil and criminal penalty if any researcher attempted them. Moreover, a panel of the National Academy of Sciences, in a February 2002 report (2), called for a ban on what it termed "reproductive cloning"—which, if enacted, would surely constitute government intrusion into freedom of scientific inquiry. So this claim also turns out to be disingenuous.

There is no way forward for us in these debates unless and until our public discussion becomes more straightforward.

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### References

1. J. H. Evans, *Playing God?* (Univ. of Chicago Press, Chicago, IL, 2002).
2. National Academy of Sciences, *Scientific and Medical Aspects of Human Reproductive Cloning* (National Academy Press, Washington, DC, 2002).

## Response

MEILAENDER RAISES THREE QUESTIONS about my letter. I will respond to his objections in reverse order.

Meilaender construes proposals for a legal ban on reproductive cloning as intrusions into the freedom of scientific inquiry. However, bans on cloning people are not intrusions on research. They are limits on a possible method of reproduction. Most commentators on the ethics of human cloning—including the President's Council on Bioethics (PCBE)—draw a sharp distinction between cloning for reproduction and cloning for biomedical research. Cloning for reproduction would attempt to provide a novel (and very risky) clinical service. In contrast, somatic cell nuclear

transfer (SCNT) for research is an attempt to develop generalizable knowledge. Research cloning would not, under any circumstances, be followed by embryo transfer and thus would have no connection with reproduction.

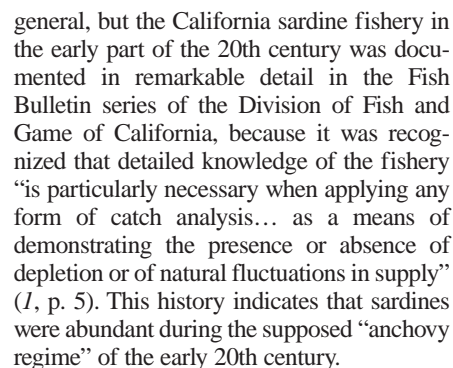
Meilaender contends that I favor federal preemption of state policies on SCNT research. The laboratory of the states has been actively engaged with the topic of cloning. During their 2003 sessions, legislators in 25 states have introduced bills that explicitly discuss cloning; in one of these states and in three additional states, nuclear transfer for embryonic stem cell research (without mention of the word “cloning”) has also been the focus of proposed legislation (*1*). In my Letter, I advocated only that SCNT research should be subject to transparent public oversight, not that this oversight should be provided by the federal government. If states—for example, California—develop their own approaches to regulating this area of biomedical research, their policy innovations should be welcomed. However, even if uniform national standards were adopted or a federal regulatory system were enacted for SCNT research—for example, through the Food and Drug Administration or a newly created advisory committee—such national guidance or oversight would be qualitatively different from a preemptive federal ban on performing the research.

Finally, Meilaender and I disagree on what public policy should be chosen when ethical opinion on research cloning is sharply divided and while national and international ethical discussion and debate continue. Here I must acknowledge advocating a conservative, incremental political philosophy. In my view, any legal ban on research should be enacted only as a last resort and in the face of serious harms to individual persons or a clear and present danger to society. The burden of demonstrating that SCNT research presents

Ethical standards for research cloning should be developed and adopted. One hopes that critics of the research will assist in creating those standards. In the interim, however, this promising line of biomedical research should be permitted to continue, not banned by an act of Congress.

1. J. Brainard, *Chronicle of Higher Education*, 28 March 2003, p. A22.

**IN THEIR REVIEW "FROM ANCHOVIES TO** sardines and back: multidecadal change in the Pacific Ocean" (10 Jan., p. 217), F. P. Chavez *et al.* describe regime shifts in the Pacific that are supposed to correspond with cycles in the populations of anchovies and sardines that are "difficult to explain on the basis of fishing pressure." For example, they describe a cool "anchovy regime" from about 1900 to 1925, followed by a warm "sardine regime" from about 1925 to 1950, which they link with the boom in the California sardine fishery. Perhaps Chavez *et al.* are correct in



The developing understanding of oceanic regime shifts should be a great help to fisheries management, but fisheries still need to be managed. I am perhaps unusually sensitive on this point, having participated briefly in the Monterey sardine fishery near the time of its final collapse in the late 1950s, when spotters in small planes helped us find the few remaining small schools along the Central California coast.

1. W. L. Scofield, *Sardine fishing methods at Monterey, California*, Fish Bulletin No. 19 (Division of Fish and Game of California, Sacramento, CA, 1929).

27 JUNE 2003 VOL 300 SCIENCE www.sciencemag.org

## Response

**OUR REVIEW DESCRIBES BASIN-SCALE** synchrony in the catches of several commercially important stocks of small pelagic fish. It is this synchrony that we suggest is "difficult to explain on the basis of fishing pres-

sent that for the entire California domain (including Baja). Monterey Bay may be a refuge during environmentally adverse periods. We must also make clear that the period for the multidecadal changes fluctuates between 40 and 60 years. A close look at Fig. 1 in our Review shows that in panels A, B, and C, the change of sign occurs closer to 1920. Finally, there is no mention in our Review of not managing fisheries, only that knowing about this natural variability, as Williams himself notes, should be a great help to fisheries management.

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## Reference

1. T. Kawasaki, *FAO Fish. Rep.* **291**, 1065 (1983).

## African Food Security and Population Growth

**IN THEIR POLICY FORUM "SCIENCE FOR** African food security" (21 Feb., p. 1187), G. Conway and G. Toenniessen fail to prescribe for a key factor in the equation for food security: rapid population growth. They say it now averages about 3% annually across Africa.

Their prototypical "Mrs. Namurunda" is presented as a single mother with four children. At that rate, the population will double in every generation. If a generation is measured by the age of the mother at first birth, which I would guess is about 16, the popula-

tion and food demand will double in about that time. Actually, I am surprised they did not depict Mrs. Namurunda as having another child or two as a result of increased fertility, thanks to better nutrition.

So the story should include an acronymic organization working to bring fertility down to replacement levels, at the same time as the Rockefeller Foundation is working to increase food production to stabilize current demand levels.

JOHN H. TANTON

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## Response

**TANTON SEEMS TO HAVE MISSED ONE OF THE** key points in our story of Mrs. Namurunda. Increased crop productivity on her farm not only improves the family's nutrition, it also generates income to pay for the children's health care, to send her daughters to school, and to raise the family's overall economic well-being.

In numerous developing countries, such farm-based economic growth has been shown to lower desired family size and reduce fertility (1). Kenya began such a demographic transition in the early 1970s, with its total fertility rate dropping from over 8 births per woman to 4.15 currently (2). At this rate, the population is still rising rapidly and may double within a generation, but Mrs. Namurunda's daughters and their classmates are likely to choose to have still fewer children, leading to a replacement-level fertility rate in one or two generations. Fortunately, as Tanton suggests, there are a variety of local, national, and international organizations—yes, all with acronyms—helping to provide the agricultural technologies, health care, education, and family planning needed to make this a reality.

GORDON CONWAY AND GARY TOENNIESSEN

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## References

1. J. Bongaarts, *Science* **263**, 771 (1994).
2. *World Population Prospects: The 2000 Revision* (United Nations Population Division, New York, 2000).

## CORRECTIONS AND CLARIFICATIONS

**News of the Week:** "Congress fiddles with law while scientists burn" by N. Lubick (6 June, p. 1486). The article misrepresented researcher Peter Tyack's views on the effects of sound on marine mammals. Tyack believes that ship noise and other sounds that impact broad geographic areas have the potential to affect large numbers of marine mammals. Also, the court decision last January that halted Tyack's research on sonar and marine mammals in the Pacific found that the National Marine Fisheries Service, not Tyack, had violated the National Environmental Policy Act when it amended Tyack's research permit without conducting an environmental assessment.

**Reports:** "Regulation of aging and age-related disease by DAF-16 and heat-shock factor" by A.-L. Hsu *et al.* (16 May, p. 1142). The authors stated incorrectly that Lithgow's lab had previously used an *shsp::gfp* fusion to assay *shsp* gene expression. Instead, this group used an *shsp::lacZ* fusion and anti-SHSP antisera [G. Walker *et al.*, *J. Gerontol.* **56A**, B281 (2001)]. In addition, as the Hsu *et al.* paper was going to press, Walker and Lithgow reported that overexpression of *hsp-16* can extend *C. elegans* life-span [G. A. Walker, G. Lithgow, *Aging Cell* **2**, 131 (2003)], and, using microarrays, McElwee *et al.* observed an increase in *shsp* expression in insulin/IGF-1 pathway mutants [J. McElwee *et al.*, *Aging Cell* **2**, 111 (2003)], as did Hsu *et al.*

**Reports:** "Genetic evidence for local retention of pelagic larvae in a Caribbean reef fish" by M. S. Taylor and M. E. Hellberg (3 Jan., p. 107). Much of the locality information used in Fig. 1 was based on work performed by Patrick L. Colin [P. L. Colin, *Neon Gobies* (T.F.H. Publications, Neptune, NJ, 1975); P. L. Colin, unpublished data], which was not acknowledged. The authors regret this oversight.

**Research Articles:** "The genome sequence of the malaria mosquito *Anopheles gambiae*" by R. A. Holt *et al.* (4 Oct., p. 129). The name of the 33rd author was spelled incorrectly. It is Kabir Chaturvedi, not Kabir Chatuverdi.