

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.

Sustainable Yield and Conservation Goals

IN HIS PERSPECTIVE "OVERKILL AND SUSTAINABLE USE" (21 March, p. 1851), Martyn Murray suggests that "[c]onsideration of episodes of overkill and sustainable use in human history may inform the prevailing conservation paradigm" and presents traditional anthropological scenarios of overkill and sustainable use as his warrant.

He lists three variables—availability of alternative sources of food, ownership of wildlife resources, and existence of cultural and spiritual beliefs—that can result in sustainable yield, but these are not the only ones. Humans may also conserve prey populations by cultural mechanisms, such as "first fruits" ceremonies, during which harvesting is halted while the first catch is subject to ritualistic treatment. Prey ecology may suggest that past human predation unintentionally resulted in equilibrium (1), or knowledge of prey behaviors may suggest that predation was limited to a portion of the prey population that could be harvested without causing significant depression (2–4).

Murray writes that "[i]t has been suggested that a spiritual relationship with nature may preclude overexploitation." However, as noted by Murray, relying on religion to underpin conservation among indigenous peoples is fraught with difficulties. Development of a spiritually oriented conservation ethic may require resource scarcity under conditions of relatively secure access to resources (5).

But secure resource access is no guarantee that indigenous people will follow the expectations of Western conservationists; indigenes may even make use of environmentalist rhetoric and alliances to secure resources for their own needs and uses (6).

Conservationists must keep in mind that local people are concerned with producing

food and useful materials, not with promoting a potentially alien ideal of biodiversity (7, 8). If those goals are met through practices that include conservation, then local and conservationist interests will converge, at least for a time. But we should not be surprised when divergence of interests occurs at the outset or later on. Anthropologists have widely acknowledged the value to conservation of indigenous ecological knowledge (5, 9), and they agree that only by producing realistic understanding of indigenous peoples' ecological practices, past and present, can we hope to inform Western-oriented conservation.

R. LEE LYMAN AND REED WADLEY

Department of Anthropology, University of Missouri, 107 Swallow Hall, Columbia, MO 65211, USA.

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Response

IN HIGHLIGHTING VARIOUS PROBLEMS THAT are associated with conservation efforts reliant on a spiritually oriented conservation ethic, Lyman and Wadley usefully expand on the concerns expressed in my Perspective about efforts to sustainably manage wildlife populations that are based on single values. Neither a close spiritual relationship with game animals or the granting of exclusive harvesting rights can guarantee prevention of overkill. The achievement of sustainable use may, however,

be more likely where ownership is well established and integrates material, spiritual, and knowledge-based values. The challenge for the international conservation community, which currently

advocates economic means for achieving sustainable living, is to derive a model of development that incorporates multiple values. At present, this task is hampered by conflicts within Western society that have been apparent for over half a century between proponents of different wildlife values (1).



Promoting conservation can be a delicate balance.

For example, those in favor of an economic justification for wildlife are often opposed to those finding ethical or aesthetic reasons for conserving it. In seeking a resolution, conservationists will require an understanding of the human-wildlife relationship that, on the one hand, incorporates Western ecological, economic, and ethical knowledge and, on the other, is informed by the ecological practices of indigenous peoples.

MARTYN MURRAY

Institute of Cell, Animal, and Population Biology, University of Edinburgh, Edinburgh EH9 3JT, UK. E-mail: m.murray@ed.ac.uk

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Hong Kong SARS Sequence

MY TEAM OF EIGHT GRADUATE STUDENTS AND a postdoc produced one of the first sequences of the SARS coronavirus. In this fast-moving project, we found ourselves striking a balance between time and accuracy. We received the starting viral RNA material during the late afternoon of 7 April. We designed a full set of degenerate primers, as well as using the primers from another *Nidovirus* PRRSV, so that we could begin sequencing the genome in multiple places. For the completion of the genome sequencing, we also constructed a cDNA library. To characterize the subgenomic transcripts and the leader sequence, we used two separate RACE assays to characterize their 5' ends.

The Canadian British Columbia Cancer Agency and the U.S. Centers for Disease Control groups posted their SARS coronavirus genome sequences on the Internet on 12 and 14 April, respectively. On 16 April, at 11:40 p.m., we started to upload our complete HKU-39849 viral genome. Examination of the online SARS coronavirus sequences revealed that the Tor2 sequence from the Canadian group lacked the first 15 nucleotides of the 5' leader sequence but contained the 3' poly-A in the 14 April version. The 16 April version of the Urbani sequence posted by the CDC group lacked the 3' poly-A, but contained the 5' leader sequence, with a T as its starting base pair. The first nucleotide of our 5' leader sequence was an A, confirmed by two independent 5' RACE assays on the genome and 6 subgenomic transcripts. We noticed that the first base pairs of the Urbani sequence released on the CDC Web site on 21 April had been revised to an "A," matching our original 16

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April version. On 1 May, the Canadian group added the 5' leader sequence, also reporting an A as the first nucleotide.

I am grateful that *Science* has allowed us to publish this letter so that we can set the record straight.

FREDERICK C. LEUNG

Department of Zoology, The University of Hong Kong, Pokfulam Road, Hong Kong SAR, China.

Should Scientists Remain Objective?

DONALD KENNEDY'S EDITORIAL "RESEARCH fraud and public policy" (18 April, p. 393) yields a questionable conclusion. Kennedy recommends that "[o]nce the experiments are done and the data are out there, scientists may argue forcefully for the appropriateness of their conclusions and for the policies they believe should follow." Recognizing that some might object to this recommendation because it threatens scientific objectivity, Kennedy nevertheless extends his conclusion. He instructs social scientists who have reliable data to advocate "policies based on what they have learned." He gives prominence to this recommendation by stating that it is not only

"good for them to take sides. Indeed, it's their responsibility."

Consider these recommendations in the context of the political wars fought over an abortion policy. During Reagan's presidency, an attempt was made to instill fear in women contemplating abortion. It was suggested that abortion would likely produce depression. This assumption was objectively tested by Major (1). Her findings over a 2-year period revealed that the risk of depression following an abortion is no greater than if an unplanned pregnancy is brought to term. Was it the responsibility of Major to argue that her scientific data supported a pro-choice policy? To her credit, she abided by the implications of the "naturalistic fallacy," more pointedly described as the "fact/value dichotomy." According to this concept, which has its origins in the philosophy of ethics, facts cannot logically generate value judgments. Whatever is known about the

factual consequences of abortion, they are irrelevant to the ethical judgment about abortion, whether it is morally right or wrong. Although scientific information cannot dictate ethical judgments and their public policy implications, it nevertheless can assist a democracy in its policy-making decisions (2). In the words of Philip Handler (3), former President of the National Academy of Sciences, scientists "best serve public policy by living within the ethics of science, not those of politics" (p. 1093).

Another factor should be considered. Coupling social science with political advocacy will lead to public mistrust that will deny a democracy the opportunity to base its public policies on reliable scientific evidence.

HOWARD H. KENDLER

Professor Emeritus, Department of Psychology, University of California, Santa Barbara, Santa Barbara, CA 93106, USA.

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Coupling social science with political advocacy will lead to public mistrust that will deny a democracy the opportunity to base its public policies on reliable scientific evidence."

—KENDLER

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Plagiarism Erodes Scientific Integrity

IN HIS EDITORIAL "RESEARCH FRAUD AND public policy" (18 April, p. 393), Donald Kennedy makes an impassioned plea for reliable scientific data particularly as it relates to public policy. Other recent high-profile falsification cases (1–3) attest to the prevalence of misconduct. Without question, data fabrication is an affront to scientific progress and compromises sound policy decision-making. Yet another more sinister form of scientific misconduct (one that receives comparatively little attention and may be even more pervasive) threatens to undermine the validity of the scientific record: instances of plagiarism perpetrated by senior faculty members against their graduate students.

In an effort to gage misconduct frequencies and stem their occurrences, the Office of Research Integrity (ORI), a division of the Department of Health and Human Services, has recently instituted procedures to

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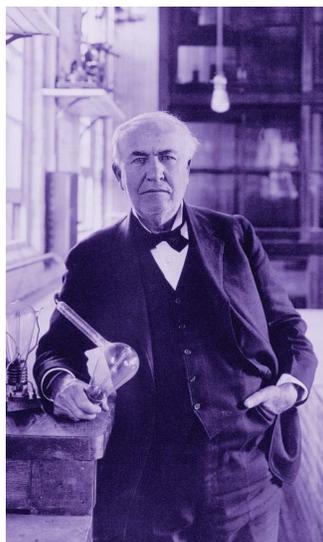
—CLOTHIER

standardize how these allegations are investigated (4–7). Nevertheless, exceptional latitude exists whereby an implicated institution can influence the outcome of its own internal investigation in favor of the

faculty member while seemingly complying with ORI directives. The ORI has compiled data for 218 misconduct cases it completed between 1993 and 1997 (8). A striking finding of this study was the realization that 73% of allegations made against students were supported, whereas a mere 19% of accusations made against full professors were supported. Further, an inescapable conclusion was that complaints brought by junior accusers against senior faculty almost always resulted in dismissal of the misconduct allegation. The solution, therefore, might seem to be to develop more protections for low-ranking whistleblowers. However, at the risk of sounding overly pessimistic, it is unlikely that sufficient protections for junior faculty members, fellows, or students can ever effectively be implemented into an academic system so predicated on the politics of publication (9).

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Thomas Alva Edison with the Edison effect bulb, c.1918

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Corrections and Clarifications

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