SCIENCE

Published by the **American Association for the Advancement of Science (AAAS)**, *Science* serves its readers as a forum for the presentation and discussion of important issues related to the advancement of science, including the presentation of minority or conflicting points of view, rather than by publishing only material on which a consensus has been reached. Accordingly, all articles published in *Science*—including editorials, news and comment, and book reviews—are signed and reflect the individual views of the authors and not official points of view adopted by the AAAS or the institutions with which the authors are affiliated.

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objectives are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of human welfare, to advance education in science, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

Membership/Circulation
Director: Michael Spinella
Fulfillment: Marlene Zendell, *Manager*; Mary Curry, *Member Service Supervisor*; Pat Butler, Helen Williams, Laurie Baker, *Member Service Representatives*
Promotions: Dee Valencia, *Manager*; Hilary Baar, Angela Mumeka, *Coordinators*
Research: Kathleen Markey, *Manager*; Robert Smariga, *Assistant*
Financial Analyst: Jacquelyn Roberts
Administrative Assistant: Nina Araujo de Kobes
***Science* Member Services**
Marion, Ohio: 800-347-6969;
Washington, DC: 202-326-6417
Other AAAS Programs: 202-326-6400

Advertising and Finance
Associate Publisher: Beth Rosner
Advertising Sales Manager: Susan A. Meredith
Recruitment Advertising Manager: Janis Crowley
Advertising Business Manager: Deborah Rivera-Wienhold
Finance: Leslie Gelder, *Manager*
Marketing Manager: Laurie Hallowell
Traffic Manager: Tina Turano
Recruitment: Michele Pearl, *Operations Manager*; Dan Moran, *Traffic Manager*; Debbie Cummings, Celeste Wakefield, Angela Wheeler, *Sales*
Marketing Associate: Allison Pritchard
Reprints Manager: Corrine Harris
Permissions Manager: Arlene Ennis
Sales Associate: Carol Maddox

ADVERTISING SALES: East Coast/E. Canada: Richard Teeling, 201-904-9774, FAX 201-904-9701 • **Southeast:** Mark Anderson, 305-856-8567, FAX 305-856-1056 • **Midwest:** Donald Holbrook, 708-516-8882, FAX 708-516-8883 • **West Coast/W. Canada:** Neil Boylan, 415-673-9265, FAX 415-673-9267 • **UK, Scandinavia, France, Italy, Belgium, the Netherlands:** Andrew Davies, (44) 457-838-519, FAX (44) 457-838-898 • **Germany/Switzerland/Austria:** Tracey Peers, (44) 270-760-108, FAX (44) 270-759-597 • **Japan:** Mashy Yoshikawa, (3) 3235-5961, FAX (3) 3235-5852
Recruitment: 202-326-6555, FAX 202-682-0816
European Recruitment: AnneMarie Vis, (44) 0223-302067, FAX (44) 0223-302068
Send materials to *Science* Advertising, 1333 H Street, NW, Washington, DC 20005.

■

Information for Contributors appears on pages 40–42 of the 1 January 1993 issue. Editorial correspondence, including requests for permission to reprint and reprint orders, should be sent to 1333 H Street, NW, Washington, DC 20005.

LETTERS

Journal Policies on Conflict of Interest

Daniel E. Koshland Jr.'s editorial (2 July, p. 11) in response to my commentary on conflict of interest policies in science, which appeared in the *Journal of the American Medical Association* (*1*), criticizes my arguments without addressing them or even mentioning what they are. Koshland quotes my article twice, both times incorrectly.

Current policies on conflict of interest that are in place for *Science* and other journals imply that authors' affiliations, funding sources, financial interests, intellectual passions, and perhaps even sexual orientation or religion (*1*, *2*) should be somehow taken into account when one reads a paper. I have argued that these policies are counterproductive; by shifting the attention of readers away from content, journals are encouraging ad hominem evaluations and thereby reducing the overall objectivity of scientific discourse. These policies are also ethically questionable, because they impugn authors with the implied accusation of wrongdoing without evidence and without recourse. Ad hominem evaluation of work is unfair to those authors who have not compromised their professionalism despite the fact that they may work for industry, government, Greenpeace, the AIDS Action Committee, or any other organization. In his editorial, Koshland does not begin to address the specific issues that I raised.

Koshland's editorial does have the virtue of illustrating some of the dangers of hurling around labels as a method of "protecting" readers. His anecdote about the captain and first mate illustrates one of my points, as it shows how labels can be simultaneously both truthful and misleading. Koshland states that "the truth taken out of context can be deceptive and pejorative." Indeed, where is the evidence that attaching the label of "conflict of interest" to an author avoids more problems than it inflicts?

The justification offered for editorial policies on conflict of interest is that gullible readers need to be protected by savvy editors from the dangers of reading biased work. Editors should eschew the arrogance that presumes readers need this type of "protection."

Kenneth J. Rothman
Editor, Epidemiology,
One Newton Executive Park,
Newton Lower Falls, MA 02162–1450

References

1. K. J. Rothman, *J. Am. Med. Assoc.* **269**, 2782 (1993).
2. E. Marshall, *Science* **257**, 620 (1992).

Response: Rothman makes many points with which I can agree, but his basic conclusion—that journals should "keep the revelations about potential conflicts [of interest] out of the review process" (*1*, p. 2784)—is impossible, in my opinion. A policy on conflict of interest should be as wise and as fair as possible. If a professor at university X argues that a great new national facility such as a supercollider be located at university X, we might print his article if it is well-reasoned and approved by peer review, but the readers are entitled to know the professor is from university X. If this professor has a consultancy with venture capital company Y, we are not likely to know it from his address or title, but our editors are entitled to know this affiliation in case he should review work related to company Y. Information that is not obvious from the title or address of an individual, such as consultancies, stock options, long-time political advocacy, and so forth, need to be taken into account. We do not reject advice from such individuals; we only wish to be able to take it in context. We require the same information of our staff, our reviewers, and our authors. The editor-in-chief, who has the final authority, must (and does) take responsibility for the danger of ad hominem extrapolations as well as naïve disregard for subliminal influences. A policy that is fair to our readers and authors cannot be eliminated because of the possibility that others could misuse the information it produces. The test of the policy will depend on its wise and fair application.

—Daniel E. Koshland Jr.

References

K. J. Rothman, *J. Am. Med. Assoc.* **269**, 2782 (1993).

■

The End of Public Higher Education?

Public higher education supported by state governments is one of the truly great achievements of the United States. Thomas Jefferson, the several land grant acts, the generosity and foresight of the pioneer builders of the west, and sustained support

by state taxpayers were largely responsible for this distinction. The decision by the federal government to make universities, in Dael Wolfle's apt phrase, "the home of science," strengthened an already strong system of public and private higher education. Moreover, it kept the states focused on higher education as a primary task, much as the federal land and agricultural policies had done in an earlier time.

Until recently, the states have been worthy trustees of this tradition. Public higher education in the United States has meant that more people of modest means have received high-quality higher education than in any other part of the world. Children of farmers and the working class throughout the country have had in our public universities that special opportunity that U.S. public higher education has, uniquely in the world, provided.

Is the end near? It may be. Two indices—tuition and percentage of state spending on higher education—tell the grim tale. Tuitions, once free at some of the best places and almost nominal at most others, have been rising rapidly. State legislative support is in a tailspin. Nationally, higher education's share of the states' budgets has been dropping steadily, now averaging around 10% from more than twice that just a few years ago. The West Coast, where the Proposition 13 syndrome has spread north from California, provides stark examples. At the University of California in the past 2 years, senior faculty ranks have shrunk, with physics and civil engineering at Berkeley, for example, losing 26% of senior faculty. Beginning this year, faculty salaries are to be cut 5% and programs slashed 9%. Oregon, more recently joining the ranks of the ballot-beseiged, is facing reductions and possible closures. The problem continues up the coast. At the University of Washington, the percentage of the budget provided by state appropriation has declined from about 50% in the early 1960s to less than 25%. A 4% cut is effective this fall. Two "tax revolt" measures on the ballot this fall would cut higher education budgets throughout the state sharply. Exactly how these cuts would be taken has not been determined, but substantial cuts in faculty, enrollment, and student aid appear certain, with closure of whole departments, schools, and colleges possible.

When do these institutions stop being public higher education institutions? Tuition is a key. One influential legislator told me he hoped to raise tuition to five figures, where it would replace the state's contribution to the university's operating budget. A few years ago, two western states actually took the trust income from the federal land grants away from education and applied it to other purposes. Some states tax endow-

ment income of their public universities. Public higher education in the United States is essential to the functioning of our republic, to our dedication to equality, and to the quality of our work force. The only way the United States can be competitive in a global economy is to retain and enhance its leadership in technology and the brain industries. That leadership has been in significant measure the product of generous support of public higher education.

Readers of *Science* will face a special argument. The uninformed will say, "You guys aren't worried, are you? All those expensive, high-quality research programs are paid for by federal grants and foundation gifts and the top professors are supported by endowment, right?" Wrong! The quality research programs rest on the fundamental institution itself. They depend on the supporting and related disciplines, on the quality of undergraduate teaching, on the access of students to educational opportunity at an affordable cost, and on an expensive educational infrastructure, laboratories, and buildings. For the most part, money in the public research institutions comes from the states. Governments built much of the "home of science." And now governments are dismantling it.

Brewster C. Denny
University of Washington, Seattle, WA 98195

■

How Much Wilderness?

The Wildlands Project's plan to protect biodiversity in the U.S. by resettling the nation, as described by Charles C. Mann and Mark L. Plummer ("The high cost of biodiversity," News & Comment, 25 June, p. 1868), threatens other actions to protect biodiversity. No matter how romantically appealing the idea of converting 50% of the United States into wildlands may be to me or others, proposals like this will not help. How can scientists advocate such a massive program when smaller conservation plans, like that proposed for the spotted owl, create extensive debate, litigation, and social foment? The news article misconstrues the conclusion of my research (*1*), which is that the increasing fragmentation of habitats [which creates small populations and threatens them with extinction (*2*)] requires that we respond with more intensive management to guarantee the persistence of these populations, because protection of larger tracts of land is not likely.

Perhaps the idea of wilderness where there is no management by humans is invalid, given the evidence that many ecological communities in North America, as first seen by European explorers, may have been the product of intensive management by Native Americans (*3*). In a practical vein, the important questions may be, what types of ecological landscapes does society desire (*4*), and what science-based management will be necessary to achieve these? The way to preserve biodiversity is not to move people, but to curtail development, which results from people moving into "wild" areas to escape the consequences of existing development; and to prevent overexploitation of resources that are needed to support a fragile economy. This leads to a question that was glossed over in the article: how can conversion of as much as 50% of the U.S. landscape into wildlands be advocated without also addressing the size of the human population, the ultimate threat to biodiversity (*5*)?

Gary E. Belovsky
Department of Fisheries and Wildlife, and Ecology Center, Utah State University, Logan, UT 84322–5210

References

1. G. E. Belovsky, in *Viable Populations for Conservation*, M. Soule, Ed. (Cambridge Univ. Press, Cambridge, United Kingdom, 1987), pp. 35–57.
2. E. O. Wilson, *Biodiversity of Life* (Harvard Univ. Press, Cambridge, MA, 1992).
3. A. M. Josephy, Jr., Ed., *America in 1492* (Vintage, New York, 1991).
4. R. S. Nicholson, *Science* **261**, 143 (1993).
5. P. R. Ehrlich, in *Perspectives in Ecological Theory*, J. Roughgarden, R. M. May, S. A. Levin, Eds. (Princeton Univ. Press, Princeton, NJ, 1989), pp. 306–318.

I was delighted to read the informative and entertaining article on the Wildlands Project. As Science Director for the project, I offer only a clarification. It is stated parenthetically that "[i]n fact, the Wildlands plan has not yet been peer reviewed" (p. 1869). As a grand strategy made up of many components, the Wildlands Project is not amenable to peer review in the ordinary sense. However, the land conservation component of the project is based on a synthesis (*1*) of scientific work in conservation biology. Most of the papers cited are in peer-reviewed journals. Furthermore, several specific regional projects (including the Florida and Oregon Coast Range plans illustrated in the article by Mann and Plummer) have been published in peer-reviewed journals (*2*) or are in press. Finally, our symposium at the 1993 Society for Conservation Biology meeting was designed to expose the Wildlands Project to scientific scrutiny, a peer review of sorts. Our invited panel of scientists representing several universities, agencies, and organizations was specifically asked to critique the project, which they happily did.

Reed F. Noss
7310 NW Acorn Ridge Drive, Corvallis, OR 97330