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LETTERS

Misrepresentation and Fantasy

The mix of misrepresentation and fantasy in David F. Voss and Daniel E. Koshland Jr.'s response (Letters, 18 Feb., p. 903) to our letter (p. 902) clinches our case. The editors of *Science* are consistently unreliable in the matter of the Superconducting Super Collider (SSC).

Voss and Koshland misquote a *Physics Today* account (*1*) that reports "The cost is estimated at $2.70 to $3.05 billion in 1984 dollars (*not including the cost of research equipment, preconstruction R&D, and possible site acquisition*) [emphasis added]." This confirms [as do other contemporaneous accounts (*2, 3*)] our statement that "the cost of the SSC, including detectors, was never $3 billion."

Voss and Koshland's preposterous claim that Fermilab's experience is irrelevant to SSC operating costs is made up out of whole cloth. We challenge them to produce any shred of documentation for their $1 billion per year figure.

What is at issue here is not the fate of the SSC, but the very integrity of scientific discourse. False claims have no place in science, or in *Science*.

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1. B. Schechter, *Phys. Today* **39**, 29 (April 1986).
2. M. Tigner, in *U.S. House Committee on Science and Technology, Fiscal Year 1986 Department of Energy Authorization [No. 28]* (Government Printing Office, Washington, DC, 1985), vol. II-A, pp. 373–400.
3. L. M. Lederman and S. L. Glashow, *Phys. Today* **38**, 36 (March 1985).

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A National Institute for the Environment

Daniel E. Koshland Jr.'s 25 February editorial, "Strategic goals on an NIH model" (p. 1071) makes an excellent point about the creative benefits of investigator-initiated research. The United States has reaped great, although often serendipitous, rewards from a long-term public investment in curiosity-driven research. However, the nation now needs a much greater integration of science into its decision-making processes, in environmental areas in particular.

Koshland refers to the proposed National Institute for the Environment (NIE) as "an expansion of an existing National Institute of Environmental Health Sciences," within the National Institutes of Health (NIH). However, the NIE is not proposed as an extension of any part of NIH, but as an independent, nonregulatory federal institute with a mission to "improve the scientific basis for decision-making on environmental issues."

The NIE would fund credible, problem-focused, peer-reviewed, multidisciplinary and interdisciplinary, extramural research; provide comprehensive assessments of the state of current environmental knowledge and identify information gaps and research needs; facilitate and expand access to environmental information; and sponsor higher education, training, and public education.

Like NIH, the proposed NIE would benefit from peer-reviewed, investigator-initiated research. However, it would not operate intramural laboratories. It would award research grants to existing federal labs, academic institutions, nonprofit organizations and private companies. It would sponsor public education through nonprofit entities, as NIH does through, for example, the American Lung Association. Similar to NIH's National Library of Medicine, the NIE would make environmental information widely available by establishing electronic access through a National Library of the Environment. Legislation to establish the NIE currently has 68 bipartisan cosponsors. Congressional hearings are expected in 1994.

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Adaptive Optics in Astronomy

Eliot Marshall (Special News Report, 4 Feb., p. 621) states that the Phillips Laboratory in Albuquerque, New Mexico, is the only site thus far to do astronomy with

adaptive optics in the visible. However, the Mount Wilson Institute has been conducting an astronomical observing program in the visible with an adaptive optics system for nearly 2 years.

The system was built by the Massachusetts Institute of Technology's Lincoln Laboratory for military applications. It was installed at the 60-inch telescope on Mount Wilson in 1992 in a program aimed at assessing the usefulness of the technology in astronomy. The 60-inch telescope with adaptive optics has achieved images with a full width at half maximum of 0.115 "at a wavelength of 600 nanometers—only 21% larger than the diffraction limit of 0.095" for this telescope. To my knowledge, the Mount Wilson images are the closest to the diffraction limit ever achieved at visible wavelengths for a large telescope on the Earth's surface.

While the principles of adaptive optics were proposed by Horace Babcock in 1953, as Marshall notes, the astronomical community would never have been able to obtain the half-billion dollars in research and development funds which the Air Force and the Strategic Defense Initiative spent in the 1970s and 1980s to translate the proposal into reality. The fact that this revolutionary development has been available to astronomers in this century is entirely the result of the huge Defense Department investment in the development of the essential technologies.

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Space Science Crunch

As an astrophysicist, I know well "The coming crunch for space science" (News & Comment, 18 Feb., p. 908). It is already here. Instead of complaining, we should ask how we can do the best science with the funds available. Experience shows that a scientific field dies when the intervals between experiments exceed a decade because the cycle of data, interpretation, new ideas, new experiments, data is broken. A field will also die if the support for data analysis, theory, and new experimental methods is sacrificed to pay for the construction of large missions. The planned budget cannot support two large missions and the rest of the space science program. The best solution for space science would be to replace the Cassini mission and the Advanced X-ray Astrophysics Facility with "smaller, faster, cheaper" missions. No single experiment or facility is worth a billion dollars.

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Anderson's news article provides a factual statement of the current situation, yet its overall tone does not convey (in my opinion) the National Aeronautics and Space Administration's (NASA's) strong commitment to space science. This commitment is demonstrated by the numbers in the fiscal year 1995 budget request: a modest increase for the Office of Space Science (including a new start for Mars Surveyor), along with a larger increase for Mission to Planet Earth, notwithstanding an overall decrease in the NASA budget. Space science might have fared much worse. Many of us in the scientific community are appreciative of NASA's efforts to maintain a viable scientific program given the budget pressures. As Anderson points out, NASA also responded to the scientific community and obtained funding for the ongoing operation of the International Ultraviolet Explorer and the U.S. involvement in the ROSAT satellite.