LETTERS

Science and Engineering: The Future

R. Jeffrey Smith (News and Comment, 19 Dec. 1980, p. 1331) quotes accurately from my book, *America's Technology Slip* (Wiley, New York, 1980). However, without the rest of the text to put isolated paragraphs into context, some quotes could leave a wrong impression. The book puts very strongly and in detail, I believe, a concern about the growing disparity between the nation's future requirements for science and engineering strength and the capacity of the universities to help provide it. The text decries the failure of both government and industry to support universities properly. As for engineering schools, the recommendation is made that government and industry should cooperate to sponsor educational and research programs in manufacturing and design technology, improve facilities, and encourage innovation. Consistent with this, the presently funded Cooperative Automotive Research Program (CARP) appears exemplary. It is not to be confused with some proposals to give the government the job of designing the "right" car for Americans.

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High-Energy Physics: Magnet Technology

I read with interest the article "Magnet failures imperil new accelerator" by William J. Broad (News and Comment, 21 Nov. 1980, p. 875) and am writing to correct some misimpressions it may have conveyed.

It is indeed true, as stated by Broad, that the Isabelle accelerator at the Brookhaven National Laboratory is behind schedule and has serious technical problems with superconducting magnets. It is wrong, however, to generalize from this, as Broad does, asserting that the superconducting programs here and elsewhere were also plagued by incorrect management decisions and further that tighter management controls would have solved Isabelle's technical problems and are indicated as needed for future projects.

The Fermi National Accelerator Laboratory in Batavia, Illinois, has now designed superconducting magnets meeting the requirements of the "Energy Saver" accelerator. In addition, the decision to abandon ESCAR at Lawrence Berkeley Laboratory is not viewed as a mistake, even with hindsight, as Broad also asserts. ESCAR was dedicated to superconducting and cryogenic systems development and would not have contributed to the solution of the magnet component problems at Isabelle. Furthermore, it is recognized that knowledge gained at ESCAR about superconducting magnets has contributed to the national program.

The fundamental problem is that large-scale, advanced, superconducting magnet technology is proving to be more unforgiving than had been realized on the basis of the underlying R & D effort. The U.S. national program has made a major and important commitment to advances in this field of new technology. Superconducting technology is expected to make essential contributions not only for high-energy physics but also for the U.S. national energy programs, including fusion, electrical generators, and energy transmission.

What is needed now is more R & D on the hard technical problems, not more imposed outside management. Isabelle is the most highly reviewed project I can recall in this field. The report to our most recent meeting of the High Energy Physics Advisory Panel (HEPAP) on 9 to 11 November 1980, encourages me to believe that the necessary R & D is proceeding. Isabelle at Brookhaven and the Energy Saver at Fermilab represent very major technological advances paralleled nowhere else in the world. Their difficulties and achievements have highlighted the need for a greater emphasis on advanced accelerator R & D, as recommended in June 1980 by a HEPAP subpanel created more than 2 years ago.

Broad is also incorrect in stating that a recent report by the General Accounting Office (GAO) called for "outside supervision of the whole planning and funding process" under the aegis of the President's Office of Science and Technology Policy (OSTP). What the GAO suggested is a study of the high-energy program, including its priority relative to other fields of science, to be conducted by OSTP, in addition to those already carried out by HEPAP and by the National Academy of Sciences. That is a far cry from an alleged call for outside supervision.

Although the Isabelle problems are of a technical nature, and are therefore not amenable to solution by management or funding changes alone, the primary concern about the U.S. national high-energy program as a whole at present is a funding one. The major difficulty in the national program is that the major program decisions were made on the basis of funding guidance given to us by the Office of Management and Budget and the Department of Energy, but the actual funding has fallen short of these program assumptions.

It is current U.S. policy to maintain a preeminent national program in this very fundamental field of basic research. Great advances in the high-energy frontier have resulted from the development of accelerators which began 50 years ago in the United States. This field has also spawned many new technological advances, including, most recently, superconducting magnet technology itself. Yet we are now forced to compete on the international scene with one hand tied behind our backs: in the past decade, U.S. support of high-energy physics has fallen from being on a par with Western Europe to a current level that is no more than one-half their support. How long will the United States be able to excel under such a handicap? This challenge has to be addressed with urgency!

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Toward Equality

The membership of the AAAS has, it would appear, moved boldly toward rectifying the inequity in the treatment of the sexes that we noted last year (Letters, 15 Feb. 1980, p. 712). In the 1979 annual elections, in contests involving members of both sexes, only 39 percent of the men running won, while 70 percent of the women candidates won. In contrast, in the recently completed 1980 elections (22 Aug., p. 895; 5 Dec., p. 1114) the gap between the sexes was narrowed by half: 45 percent of the men won and 59 percent of the women won. Here are the data (for contests with both sexes represented).

Sex	Elected	Not elected	Total
Male	25	31	56
Female	20	14	34
Total	45	45	90

The available data do not tell us whether this change is due to affirmative action by the electorate, or to the nominating committees' applying higher standards to male candidates this year.

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