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■ SCIENCE is published weekly on Friday, except the last week in December, and with a supplement in March by the American Association for the Advancement of Science, 1333 H Street, NW, Washington, DC 20005. Second-class Non-profit postage (publication No. 484460) paid at Washington, DC, and at an additional entry. Copyright © 1990 by the American Association for the Advancement of Science. The title SCIENCE is a registered trademark of the AAAS. Domestic individual membership and subscription (51 issues): \$75. Domestic institutional subscription (51 issues): \$120. Foreign postage extra: Canada \$46, other (surface mail) \$46, air mail via Amsterdam \$85. First class, airmail, school-year, and student rates on request. Single copy sales: Current issue, \$3.50; back issues, \$5.00; Biotechnology issue, \$6.00 (for postage and handling, add per copy \$0.50 U.S., \$1.00 all foreign); Guide to Biotechnology Products and Instruments, \$18 (for postage and handling add per copy \$1.00 U.S., \$1.50 Canada, \$2.00 other foreign). Bulk rates on request. Authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$1 per copy plus \$0.10 per page is paid directly to CCC, 27 Congress Street, Salem, Massachusetts 01970. The identification code for *Science* is 0036-8075/83 \$1 + .10. Change of address: allow 6 weeks, giving old and new addresses and 11-digit account number. Postmaster: Send Form 3579 to *Science*, P.O. Box 1723, Riverton, NJ 08077. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

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COVER Dark-field photomicrograph of the anterior hypothalamus of a hamster immunostained with antibodies to vasopressin, showing the paired suprachiasmatic nuclei (SCN) between the third ventricle and optic chiasm (top) and the magnocellular vasopressin cells (yellow fireworks) of the paraventricular nucleus, above which is the SCN. The SCN, the locus of the mammalian biological clock, can be identified as two oval structures at the base of the brain (toward title). See page 975. [Photographic image by Russell Foster]

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Information for contributors appears on page XI of the 22 December 1989 issue. Editorial correspondence, including requests for permission to reprint and reprint orders, should be sent to 1333 H Street, NW, Washington, DC 20005. Telephone: 202-326-6500. **Advertising correspondence** should be sent to Tenth Floor, 1515 Broadway, New York, NY 10036. Telephone 212-730-1050 or WU Telex 968082 SCHERAGO, or FAX 212-382-3725.

A National Engineering and Technology Agency

Perhaps it is time that the U.S. science and engineering community pressed for establishment of a National Engineering and Technology Agency. Such an agency could address several serious concerns that the community faces. The first is the absence of an agency with direct responsibility for funding R&D that is important to the economic well-being of our economy's vital commercial sector. Second, such an agency would clearly distinguish the difference between science and engineering and could promote all aspects of engineering, not just scientifically oriented engineering research. Finally, the creation of such an agency could relieve some of the stress on the National Science Foundation which finds itself trying to meet both the demands of the scientific community and to respond to the national priority of increasing economic competitiveness.

In recent years, the high-technology industrial sector and Congress have generally looked to the Defense Advanced Research Projects Agency (DARPA) to support the applied research that they consider essential to sustaining our national competitiveness. Such support has been justified in the Department of Defense by the argument that a loss of certain commercial industries, the semiconductor industry being the most obvious, would have a serious negative impact on the defense capabilities of our country. Although not incorrect, this argument ignores the primary issue that is the need for a competitive, economically viable industry in terms of the overall national economic health. Defense needs often differ substantially from those of the commercial marketplace, and DARPA programs are often driven in directions inappropriate for commercial exploitation. With the changing situation in Eastern Europe and the Soviet Union, funding for defense is likely to decrease. Under these circumstances, secondary issues such as support of R&D in industries in the United States may become an even lower priority in the Department of Defense. Indeed, the recent suggestions to cut such programs are probably a first indication of this effect, even though they were quickly retracted.

A National Engineering and Technology Agency could serve to place a stronger culture emphasis on engineering as contrasted to science. Funding engineering research through the NSF tends to have the effect of equating engineering research with traditional research in the sciences. Consequently, engineering departments have tended to emulate science departments with the result that such issues as manufacturing processes, quality control, and productivity are virtually ignored or left to the business schools. Excellence in engineering issues such as these need to be reinstated as important achievements for our society.

The early 1980s witnessed a sizable recovery of the NSF budget from the nadir of the 1970s. Nevertheless, in recent years increases have barely kept pace with inflation despite repeated proposals by the Administration for a doubling in constant dollars by 1992. In the face of its relatively constant budget, the NSF has tried to be responsive to the national priorities and has placed an increasing emphasis on relevance to our high-technology industries. The tight budgets, in fact, have not greatly increased the support of engineering as was hoped. The NSF commitment to engineering research was initiated in the late 1970s when there was much discussion of a National Engineering Foundation. As relevance has become a more important element in determining directions at NSF, those types of science viewed as less relevant, such as astronomy and physics, have suffered. This is particularly unfortunate because at NSF, intellectual content has properly been the dominant criterion for funding. Although not always the case, relevance and competitiveness often dominate in the competition for support.

All of these trends and forces influencing DARPA and NSF decisions argue for the formation of a new National Engineering and Technology Agency. Such an agency would fund projects in both universities and industry and would place strong emphasis on the engineering needs of the country. These could include activities related to manufacturing processes, quality, product realization, and productivity as well as applied research, and could help emphasize the importance of engineering in our culture. The NSF could then concentrate more fully on science and science education with a long-term view and with emphasis on intellectual impact. The new agency would be charged with improving the technological health of the country from a broad perspective. Federal spending alone cannot solve our economic problems; however, it can help set the agenda.—W. F. BRINKMAN, *Executive Director, Research, Physics Division, AT&T Bell Laboratory, Murray Hill, NJ 07974*