
The Military Threat to R&D

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One needn't be opposed to defense spending to decry the disproportionate allocation of federal R&D funds that has gone to the military sector during the Reagan administration.

The administration's budget request for fiscal year 1988 would bring to 72 percent the share of federal research dollars earmarked for defense-related programs. But a roughly three-fourths portion for military R&D is historically anomalous: from 1965 to 1980, the federal pie for R&D was divided about equally between defense and civilian programs.

In 1981 federal spending for civilian R&D amounted to \$15.3 billion while military R&D received \$17 billion. In the administration's 1988 request, however, civilian R&D would receive \$18 billion and military R&D would total \$46 billion—a nearly three-fold increase from the 1981 level. With respect to last year's budget, the 1988 request represents a 16.8 percent increase for military R&D but only a 2.8 percent increase for civilian R&D.

During the current appropriations process, the Congress will rechannel some funds from the defense to the civilian sector, as it has in the past. In particular, the administration's

\$5.7 billion request for SDI research—about \$2 billion more than last year's amount—will be denied in the budget compromise of the House and Senate. The figure for SDI research will likely be \$3.7 billion, or about the same amount allocated last year.

Following its pattern of past years, the Congress will increase support for the biomedical research community, specifically for the National Institutes of Health, whose budget the administration seeks to cut by 9 percent. Yet even after adjustments by the Congress, the federal R&D budget will remain heavily weighted toward military programs.

Why has the scientific community not been more outspoken in criticizing this trend? Perhaps it is because overall federal R&D spending has risen. The 1988 request represents a 12 percent increase over the 1987 figures. For civilian basic research alone, the federal government increased funds 26 percent in real terms during the period 1980 to 1985. Quite naturally, most scientists are concerned chiefly about the level of support for their own research areas. Few monitor other realms or wade through federal budget tables. The long-term im-

plications of inordinate support for military research ought to concern all scientists, however.

Consider the following comparative data:

As a percentage of its gross national product (GNP), the United States spends more on military R&D than any other Western industrialized nation—0.81 percent.

The United Kingdom ranks second, spending 0.68 percent of its GNP on defense-related R&D. However, as reported in the last issue of *The Scientist* (June 1, 1987, pp. 1, 5), the Thatcher government has recently announced plans to reduce the 55 percent portion of R&D funds going to its Ministry of Defense. That portion—substantially less than the Reagan administration's proposed 72 percent for military R&D—has elicited widespread criticism in Britain for some time.

Next come France and West Germany, which spend 0.49 and 0.11 percent of GNP, respectively, on research related to national defense.

Japan, constrained by its post-World War II tradition and admittedly a special case, spends only 0.01 percent of its GNP. And, as economist Nathan Rosenberg of Stanford University notes, "if one compares civilian R&D expenditures [in Japan and the United States], it appears that the Japanese share [of its GNP] has exceeded that of the United States for a least a quarter of a century." Thus, the increases given by the Reagan administration to military rather than to civilian R&D have only added to

Japan's proportional advantage in civilian research.

In defense of its defense spending, the administration has at times promised civilian spin-offs; however, as a way to improve the technological capacity of the private sector, this strategy is highly inefficient if not wholly invalid. The rational and rewarding course is to spend directly on creating new and marketable technologies in the way that the West Germans and Japanese do. Disproportionate spending for military hardware distorts capital investment and undermines future industrial potential. The economic argument of the administration is either mistaken or disingenuous.

Therefore the Congress, which is in a strong position this year to arrange the budget according to its own priorities, should move to reverse the trend to militarize federal R&D. Aside from the needs of the biomedical community, I wish to call attention to three areas that have been too long neglected by both the President and the Congress: education, instrumentation and facilities at the nation's universities.

The educational infrastructure of the country urgently requires both strong leadership and many more federal dollars to stem its decline. During the present administration, science and technology education has been a hot potato tossed back and forth by the National Science Foundation and the Department of Education. Programs to improve science teaching, as well as others in support of undergraduate research and graduate fellowships, are still

underfunded, despite the recent increases for educational programs at the NSF.

The lack of federal support for instrumentation and facilities, which can be traced as far back as the late 1960s, has been left unaddressed and has prompted many universities to pursue the pork-barrel route to federal funds. University laboratory buildings in this country are deteriorating. The 1986 Packard Committee on the Health of U.S. Colleges and Universities estimated that over \$10 billion is needed during the next decade to update university science and technology facilities. Moreover, a 1985 NSF study revealed that less than one-fifth of the scientific instruments at the nation's universities can be described as state-of-the-art and as many as one-half are probably inadequate for research. Underfunding of education and substandard facilities and instruments will very quickly dull the nation's scientific edge.

Lest anyone think that the argument to reduce R&D funds for the military and increase support for civilian projects arises from the self-interest of the scientific community alone, answer this question: how will we as a nation find solutions to such problems as AIDS and hazard-

ous waste disposal if military projects and problems drain away our best scientific talent? The professional skills of an entire generation of scientists and engineers are being shaped by present federal spending on military R&D.

I have heard it said that the Reagan administration has no coherent science policy. But the foregoing indicates to me that its implicit policy has been to increase massively research for defense-related applied technology, while in relative terms neglecting basic science. That basic science has in many instances received more federal funds has only diverted attention from the administration's real mission. But in undercutting the future contributions of basic science, the administration fails to perceive that, in the words of Walter C. Mendenhall, past director of the U.S. Geological Survey, "there can be no applied science if there is no science to apply."

Ironically, even to achieve its own goals, the actions of this administration will, in the long-term, prove self-defeating. The Japanese challenge, the AIDS crisis and other present imperatives demand that the Congress act forcefully to support basic research. ■