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EDITORIAL

Concerning the Future of the NSF

During the past decade, the National Science Foundation (NSF) has taken large strides into the areas of applied science and technology and science education. The engineering directorate has enjoyed a constantly increasing budget under the mandate of Congress. The creation of new, multi-investigator centers, with tasks such as cement research and new methods for building construction, testify to the movement of the NSF's center of gravity away from basic research and toward highly applied projects. The question facing the Special Commission on the Future of the NSF can be phrased as follows. Should that center of gravity: (i) move further and faster into the realm of engineering, technology, and applied science; (ii) stay about where it is; or (iii) recover some of the distance by which it has moved away from pure science and basic research? Code phrases and buzz words like "international competitiveness" and "technological infrastructure" should not obscure the real issue. The NSF is the only U.S. governmental agency ever created specifically to maintain the strength of basic research. Should it now accord a higher priority to applied research?

There has been a deeply troubling crescendo in the view that the public should pay only for such applied science and engineering as is clearly aimed at solving recognized economic, environmental, and even social problems. There is the implication that basic research may be a luxury we can no longer afford. Although the United States must convert its scientific leadership more effectively into technological leadership, it must also continue to lead in basic science. Apart from massive programs such as space exploration and the supercollider (about which many have well-founded misgivings), the NSF supports the only well-rounded and consistent basic research program in the country. The idea is that professors and their students, following their own curiosity about how nature works, can produce new knowledge that will support the technology of the future.

In 1945 Dr. Vannevar Bush, the respected maker of science policy, wrote a report to President Truman in which the general purpose, the design, and the philosophical basis of NSF were promulgated. In his foreword to the 1980 reprint of Bush's report, *Science—The Endless Frontier*, Norman Hackerman said, "Dr. Bush's words sound just as topical in 1980 as they did in 1945." I hope that the men and women of the commission will find them "just as topical" in 1992. Seven statements made by Bush deserve special consideration:

"Scientific progress on a broad front results from the free play of free intellects, working on subjects of their own choice, in the manner dictated by their curiosity for exploration of the unknown."

"Basic research...creates the fund from which the practical applications of knowledge must be drawn."

"A nation which depends upon others for its new basic scientific knowledge will be slow in its industrial progress and weak in its competitive position in world trade...."

"The simplest and most effective way in which the government can strengthen industrial research is to support basic research...."

"Basic research is performed without thought of practical ends."

"Basic research is a long-term process—it ceases to be basic if immediate results are expected on short-term support."

"...[T]here is a perverse law governing research: Under the pressure for immediate results, and unless deliberate policies are set up to guard against this, applied research invariably drives out pure....The moral is clear: It is pure research which deserves and requires special protection and specially assured support."

These statements are in no way taken out of context. Bear in mind, also, that Bush himself was an engineer, and thus not at all unfriendly to technology nor unappreciative of the need for society to derive practical benefits from science and technology. The commission would do well to ponder deeply these statements. Let us instead rededicate the NSF to its true purpose, to foster in American universities free, basic, curiosity-driven research.

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