Bloch Prepares NSF for Lean Years

He is conducting a major planning effort to set priorities and free funds for fresh initiatives—whatever the Gramm-Rudman era holds

WHILE the National Science Foundation is learning to live with the budget uncertainties generated by the Gramm-Rudman-Hollings deficit reduction measure, foundation director Erich Bloch has been putting the agency through a major planning effort aimed at changing the way NSF as an institution thinks and acts. Bloch insists that his intention is not only to prepare the foundation to make sensible choices if cuts in programs are required, but also to enable NSF to come to terms with changes in the way research in science and engineering is done.

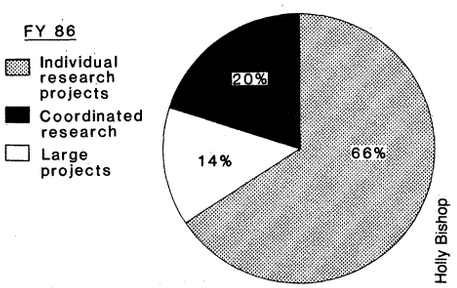
In a recent memo on the strategic planning environment for the coming budget cycle Bloch put it in a nutshell when he noted that, "Compelling arguments will be required even to maintain existing programs; marginal activities and less productive programs must be terminated to make resources available for other initiative."

Bloch assumed the directorship in late 1984 after a career of more than three decades at IBM. Ever since he arrived at NSF he has made the setting of priorities for the agency a major theme. In an interview with *Science*, Bloch discussed the implications of restricted funding. "It's important at a time like this to have your priorities straight, not say 'the sky is falling, where do we hide?' So I've been focusing on planning. I'm not talking about the budget, but planning. People in Washington like to talk about the budget going 2% up or down. I'm interested in understanding what NSF is all about, how its mission is changing."

He sees the current strategic planning effort as an opportunity to look at the base plan—that is the total NSF budget. "In the past," says Bloch, the agency "only looked at the margins." Now, he says, "the aim is to shake out of the base 10% or 15% that we can use for new initiatives."

Old hands at NSF say that it is in this insistence on examining the whole budget that Bloch's approach differs most from his predecessor's. An NSF senior official says that "Others in Washington, including OMB [Office of Management and Budget], don't look at the base. When Bloch came in he was astonished that people looked at the millions on the margin, not the billion in the base."

What is Bloch's strategy for dealing with possible budget reductions? "If it were only for 1 year we'd do it the easy way with small cuts all around. I hope I'm wrong in this case, but I'm working from the viewpoint that it will not be only one year. The worst thing you can do is to take an optimistic position. The realistic assessment is that it will be worse. We don't want to be caught if we have to cut."



NSF research funds

Coordinated research grew to 14% this year from less than 10% in 1982.

Asked if there were specific examples of programs that were candidates for cuts if contingency plans have to be applied, Bloch insisted "There is no hit list." In the planning exercises of the past year, NSF managers have been asked to stress what they regard as most productive and promising programs, not the least.

Bloch emphasizes, however, that he is not simply waiting for the budget ax to fall. "Independent of the budget," he says, "I think science and engineering are in for change. There is ferment in many new areas springing up at the intersections of disciplines. Bioengineering, for example. Is it biology? Is it chemistry? Chemical engineering? None of those. It's something new."

He cites computational science and engineering as a new approach to research that affects many key disciplines. And he notes the growing trends toward multidisciplinary research and use of sophisticated instrumentation. "The single investigator can't do it with a Bunsen burner," says Bloch.

Patterns of research support are changing in NSF. In discussing the need for strategic planning during the March meeting of the National Science Board, Bloch noted that the foundation increasingly puts substantial sums into initiatives such as its scientific computing program and engineering research centers. He acknowledged concern that the foundation "is more and more frozen into these structures" and there are questions about flexibility and about "how much will be left to support good [investigator initiated] research."

Any development in NSF that appears to squeeze funding of traditional one-man, one-grant research has always alarmed the foundation's academic constituency. Controller Sandra D. Toye says that an analysis done for her office showed that the fraction of the budget going into large programs and centers has not risen significantly. What has been increasing is funding of multidisciplinary group research. NSF officials note that pressure to do this comes from advisory groups and researchers themselves.

NSF budget breakdowns comparing major categories of research spending show that individual research projects accounted for about 72% of total research in 1982 compared with 66% requested for the current year. Coordinated research, which includes multidisciplinary group grants, accounted for about 10% of total research in 1982 compared with 14% this year and 16% requested for next year. And large projects, like the Antarctica program and the astronomical observatories that NSF supports, received 18% in 1982 against 20% for this year. The portion of the budget devoted to engineering research rose from 9.6% in 1982 to 12.5% in the Administration's 1987 budget request.

Bloch says, "What's happening in the universities all points to the fact that, while research by the single investigator is very important, it has to be supplemented by group and center activities. There is no doubt in my mind that the distribution of funds will shift."

Trends in total funding are less certain. NSF has enjoyed five relatively fat years since the Reagan Administration took office. The NSF budget was about $1 billion in Reagan's first year; the request for NSF in the President's budget for next year is $1.7 billion. However, prospects for continued increases are clouded. And the foundation

got a taste of retrenchment this year when it had to apply a 4.3% reduction in spending mandated by Gramm-Rudman.

Although no radical surgery was required, the imposition of the 4.3% reduction probably offered some clues to Bloch's priorities. Bloch says he did not like the Gramm-Rudman provision for across-the-board reductions and was able to protect several programs. Those sheltered were mathematics and ocean drilling programs; graduate fellowships; special programs for women, minorities, and the handicapped; and a program to bolster the ability of states that have ranked low on winning NSF funding to compete for funds.

Mathematics had been relatively neglected in the past, says Bloch, and the program had been rebuilt at great cost. "To hit it makes no sense." The ocean drilling program represented an important international commitment. If the United States had reduced its share of funding, others would likely have followed suit.

The foundation also decided not to reduce the number of graduate fellowships or cut the fellows' stipends. That portion of the budget had to be reduced to conform to the law, however, and cuts were made in the educational allowance that goes to the fellowship holders' universities and is used for such things as salaries of principal investigators.

Special programs for women, minorities, and the handicapped are relatively low-budget items, but they have been regarded as vulnerable in the past. NSF officials familiar with Gramm-Rudman decisions say Bloch's sense of fairness came into play in protecting these programs as well as a recognition that such underrepresented groups will be an increasingly important source of scientists and engineers in the coming decade when demographic trends may result in shortages of scientific manpower.

On Capitol Hill, Bloch's penchant for planning and priority setting is apparently viewed favorably as a means of preparing NSF to make rational decisions if forced to pare programs. Bloch is regarded as frank in his dealings with legislators and apparently has scored well by taking responsibility when the foundation has been criticized and by providing information promptly when it is sought. As one Capitol Hill staff member put it, "He gets high marks on procedure."

On the other hand, members of the committees that deal with NSF have been getting expressions of concern from both constituents in the scientific community and from rank and file staff inside NSF about what may occur if new priorities are implemented at the expense of the foundation's traditional programs. A Hill staffer said the question being asked is "Would something important be lost in the traditional disciplines."

So far, Bloch's approach has affected the way things are done at NSF more than the results. In the coming months, however, the shape of the agency's budget for the fiscal year that begins in October will be decided. The outcome of budget negotiations between Congress and the Administration is in even greater doubt than usual. But the betting is that some of the hard choices Bloch has been preparing the foundation for will have to be made. ■ JOHN WALSH

Fill the Oil Reserve, Academy Report Says

While it saves money, the Administration's work stoppage at the reserve misses a chance to prepare for the 1990's

On 8 April, a group of oil experts at the National Academy of Sciences played Cassandra at the victory party. While others were celebrating the demise of OPEC, they released a study* warning that there should be no relaxation of the drive to complete the strategic petroleum reserve in the salt caverns of Texas and Louisiana.

This group, under the National Research Council's Energy Engineering Board, was chaired by Norman Hackerman, president of Rice University. It said that the availability of cheap oil from Saudi Arabia makes it more important than ever that the United States protect itself against import dependence in the 1990's. The recent price break, the panel members said, offers a chance to fill the reserve at discount rates.

The advice clashes with federal policy at present. In order to trim the budget this January, the Reagan Administration ordered a "moratorium" on filling the reserve. It also stopped construction at the sixth and final underground reservoir, at a site called Big Hill, near Beaumont, Texas. The decision ended what may have been the government's most effective single investment in dealing with the threat of an oil blockade. The budget cutback, together with technical weaknesses noted by the Academy group, may leave the reserve ill prepared for the next decade.

Meanwhile, members of the Academy panel conceded that dramatic changes in the market during the past few months have rendered parts of their report obsolete. Some of the recommendations now seem irrelevant, while others are understated. One year ago, the panel's main concern was with imported refinery products, and now, it is with cheap crude oil.

The most important change in the picture is the decline of crude prices from $30 per barrel last November to $13 in April, triggered by Saudi Arabia's decision to boost production. The collapse has thrown the foreign oil producers into chaos and disrupted the finances of U.S. oil states such as Texas, Oklahoma, and Louisiana. Most significantly, it has begun to dampen U.S. oil production and reduce commercial reserves. This adds urgency to the report's message that the federal reserve should be filled as originally planned, for U.S. sources of oil may decline more rapidly than expected.

While the market upheaval has hurt oil sellers, it has benefited the refiners. In this area the experts' advice fell farthest from the mark. Because prices at the gas pump will change more slowly than crude prices, refiners may be able to make unusual profits. In time, gasoline prices will come down, but during the period of adjustment, some refiners may reap a windfall. This means that U.S. refiners are far from desperate.

In addition, U.S. refiners have been helped, according to panel members, by Saudi Arabia's decision to abandon plans to compete with them. After investing heavily in new refineries, the Saudis have discovered that it makes no economic sense to ship gasoline and heating oil across the Atlantic

*"The Logistics of the U.S. Strategic Petroleum Reserve in the World Petroleum Market: 1990–2000," published by a National Research Council committee chaired by Norman Hackerman, president of Rice University.