NSF Boosts Engineering, Applied Research

Reorganization plan calling for new engineering directorate, integration of applied research raises qualms about basic science

The National Science Foundation has embarked on a reorganization that is designed to put greater emphasis on applied research and engineering. The changes in form and function will be the biggest for NSF since the period in the 1970's when the agency sought to solve national problems through projects stressing interdisciplinary research.

The decision is likely to put the foundation uncomfortably in the middle between two major constituencies. The NSF's clients in the basic research community see a threat in the changes to the foundation's traditional commitment to support of fundamental science. On the other side, critics in Congress, industry, and engineering fields have put pressure on the agency to broaden its program; they are skeptical about whether the agency will follow through adequately on the new initiatives (*Science*, 26 September).

The NSF has announced that it will spread responsibility for support of applied research throughout the foundation and will create a separate engineering directorate. NSF officials have backed away from a proposal to create a separate directorate for the social sciences.

Reorganization has been seriously discussed at NSF since early this year. Concern in Congress about a decline in innovation and productivity in U.S. industry and complaints from engineering societies that NSF has neglected engineering education and research acted as catalysts.

> "We're not just going to change the boxes in the organization chart. . ."

Plans for the changes were announced at a National Science Board meeting on 21 November by NSF's Director-designate John B. Slaughter. Slaughter, who is provost of Washington State University, has been confirmed by the Senate for the NSF post but has not yet been sworn in. His confirmation was delayed until after the beginning of the fall term, and he felt obliged to stay at Washington State to wind up his responsibilities there. Slaughter, who says he expects to make the transition to Washington, D.C., by early January, has been involved in reorganization discussions, but staff work in developing the proposals for reorganization has been headed by NSF Deputy Director Donald N. Langenberg.

Slaughter and other NSF officials have expressed concern about the prospect of implementing a major reorganization in the face of prevailing budget limitations and restrictions on agency manpower. At the October NSB meeting, Slaughter referred to the constraints and said that in developing plans for reorganization he wanted to be sure he was "not managing a train wreck."

At the latest NSB meeting, Slaughter said that forming the new engineering directorate meant that NSF is committing itself to "move toward increased resources for engineering." He said that this could be done either by redistributing present funds or by "obtaining new dollars." He said, "We hope that we can make a strong case for new resources." The Reagan Administration is expected to be sympathetic to the new emphasis on applied science and engineering, but there is no solid indication about attitudes on funding and manpower questions.

In discussing the decision to distribute responsibility for support of applied research throughout the foundation, Slaughter emphasized the need to establish arrangements for the support of "quality science," whether it be applied or basic research. Leaders at NSF have taken pains to reassure basic researchers, who fear that the reorganization signals a tilt away from support of fundamental research. A quote from Slaughter in a brief NSF announcement of the changes began, "The support of basic research remains the central mission of the Foundation."

At the NSB meeting, Slaughter gave no details of how applied research support would be integrated with existing programs. He did acknowledge that to solve "management problems in applied research" it would be necessary to "give the AD's [assistant directors] the mechanisms they need." He said that Langenberg would have the responsibility for "establishing these processes."

Certainly, there will be difficulties up and down the line in implementing the changes. Program officers are accustomed to dealing with basic research and will have to expand their horizons. The same is true of the advisory groups and reviewers who assist the agency in its grant-awarding labors. Of the need for broadened perspectives, Langenberg said, "We realize we have to pay very serious attention to that. We're not just going to change the boxes on the organization chart and walk away."

Donald Langenberg

One NSF official who thinks the agency can make the transition successfully is Kent Wilson, director of the office of planning and resource management. He sees an encouraging precedent in the foundation's experience with a university-industry cooperative research program for which, he says, people knowledgeable in applied research were found fairly readily.

Also to be dealt with are the inevitable institutional frictions caused by any extensive shuffle of people. For example, consultations are going on with the employees' union, the American Federation of Government Employees, which represents nonsupervisory workers.

In a general sense, the reorganization represents the latest effort by NSF to deal with the question of how applied research fits into the foundation, an issue debated since NSF was established in 1951. It was not until the late 1960's that

0036-8075/80/1205-1105$00.50/0 Copyright © 1980 AAAS

Brailovsky Arrested

In the latest of Soviet actions against civil rights activists, police in Moscow have arrested Victor Brailovsky on charges of "defaming the Soviet state and public order." Brailovsky, 45, formerly a cyberneticist at a Moscow research institute, was the organizer of a weekly seminar for scientists displaced from their jobs after they had applied for emigration.

Brailovsky's meetings, known as the Moscow Sunday Scientific Seminars, had attracted as speakers some prominent Western scientists, including David Baltimore of MIT, Walter Gilbert of Harvard, and Howard Temin of the University of Wisconsin, all Nobel laureates. Arno Penzias of Bell Labs, the 1978 Nobelist in physics, went directly from his acceptance speech in Stockholm to a gathering of 40 Soviet refusenik scientists in Brailovsky's apartment. "I've never seen a group less threatening to a powerful state," Penzias says. "Brailovsky is a sincere, very friendly man—naturally, he was a little nervous." Discussions at the seminar, frequently on aspects of theoretical physics, were necessarily abstract: As Brailovsky once remarked, "Our maximum facility is the pocket calculator." Since his arrest, Soviet police have prevented the meetings from taking place.

Like some other scientists, Brailovsky was recruited into dissident circles by the Soviets' refusal of his 1972 application for emigration to Israel. He and his wife, Irina, a mathematician at Moscow State University, were both denied on grounds of work relating to state secrets, a claim apparently denied by his supervisor and, in Irina's case, by the university's rector. Both were promptly fired from their jobs. Eventually, in a catch-22 of typical form, Brailovsky's exit visa was approved and his wife's was not; at first he demurred—not wanting to leave her behind; shortly after changing his mind, the visa was revoked on grounds that separation of families violated Soviet rules. Also, Brailovsky was denied permission to tutor, and then warned he could be imprisoned for failing to support himself. His latest arrest, reportedly in connection with his authorship of a journal on Jews in the U.S.S.R., occurred 2 days after the opening of the international conference to review the Helsinki Accords on human rights, held in Madrid. Brailovsky's arrest has been criticized there by the U.S. delegation, and at a recent press conference sponsored by the Greater New York Conference on Soviet Jewry. But the timing of the Soviet's action seems designed to show that such outcries will not be heeded.

Anne Penzias

A Moscow Sunday scientific seminar, with Brailovsky (far left).

Unfortunately, it fits into a pattern of renewed harsh actions against scientists. Tatyana Velikanova, a mathematician and computer scientist who once worked at the Soviet Academy of Science, was recently sentenced to 4 years in a labor camp and 5 years of internal exile for "anti-Soviet agitation and propaganda." Her cause has been taken up by the Association for Women in Mathematics. In addition, the Soviets have recently sentenced Josif Dyadkin, a physicist who worked at the Geophysical Institute in Kalinin, to 3 years in a labor camp. Dyadkin was convicted of slander, apparently after preparing a demographic study of persons who perished under Stalin's rule. His cause and that of a dozen Soviet physicists denied the right to emigrate have been taken up by the American Physical Society.

It seems unlikely that there will be many Soviet concessions during the Madrid conference, which recesses in December and resumes in January.

—R. JEFFREY SMITH

the NSF statute was altered to permit it to support applied research. In the early 1970's the so-called RANN (Research Applied to National Needs) program was created under pressure from Congress, and the executive and a research applications directorate set up. RANN interdisciplinary research acquired a lowered profile in the foundation in the middle 1970's after some $50 million worth of energy research projects were transferred from NSF to the new energy research agency. A directorate for engineering and applied research (ESA) was formed in 1977. Some applied research has been lodged elsewhere in the agency, but responsibility for administering all applied research resided with ESA. Under the new reorganization, the five other directorates, which are organized on discipline or program lines, will also support applied research projects in addition to funding basic research.

Creating an engineering directorate with an undivided role is intended to give engineering greater visibility and leverage within the foundation. Jack Sanderson, NSF assistant director, who heads ESA says the new directorate will be "able to concentrate more effectively" on the problems facing engineering and "be more of a spokesman for engineering."

The decision against a major realignment of social and behavioral sciences came as no surprise. At the October NSB meeting, Langenberg indicated that the planners were moving away from a proposal for a social, behavioral, and neural sciences directorate. Word of a preliminary plan to separate research in neural and behavioral sciences from relevant research in the biological sciences had caused alarm, particularly among psychologists. There were also apprehensions on political grounds that a separate social sciences budget would be an inviting target for critics of federal support of social and behavioral science research. Slaughter says that for the time being, at least, the only change will be the transfer of some scattered social science programs into the existing directorate for biological, behavioral, and social sciences.

Now that the formal decision has been made to implement the proposals on applied research and engineering, NSF officials face the task of making the reorganization work. To keep things moving and monitor progress, a special oversight group will be established in the director's office. Certainly the process will also be under close scrutiny by those who think that too much or too little will be done.

—JOHN WALSH

0036-8075/80/1205-1106$00.50/0 Copyright © 1980 AAAS