

# state & society

## Steuer: Basic research is strongest mission of NSF

H. Guyford Steuer had been director of the National Science Foundation for all of six weeks when we recently chatted in his downtown Washington office. He had testified before a Congressional committee on the ninth day of his tenure, and by then he had to know a lot, he said. "But I keep telling my friends it's a good thing I was president of a university (Carnegie-Mellon in Pittsburgh) where the drama department is one of the leading departments, because I've read lots of scripts lately that I didn't write."

Despite his newness to the role, Steuer was obviously well prepared, and in his easy, smiling manner he covered a lot of ground. The conversation ranged over the role of the Foundation in applied research, new relationships for universities and industry, new directions for education, the past, present and future support of physics, the role of advisory committees, and the means of supporting graduate students.

**Applied research.** Some members of the National Science Board and other members of the scientific community have expressed concern that NSF may be tending to become too applied (PHYSICS TODAY, April, page 69). Steuer does not believe so. "The Foundation's strongest mission is in basic research, and that's recognized by all the constituencies and segments of society that deal with it." The three major constituencies are the scientific and educational community, Congress, and the Administration. "In none of those is there a strong push to make NSF give up its basic scientific research, nor is there any concerted strong feeling against basic research. There is a strong push in our government—and all the governments of the developed countries of the world—to use more of the research that we have. Not to cut down on basic research, nor convert basic research to applied, but to do more applied."

It is clear that the large continuing expansion in numbers in the science community will slow in its rate of increase, he said. Many of the scientists being produced by the universities will not be able to find jobs at the universi-

ties themselves.

"I actually think that an increased emphasis on applied science is a good thing for us," he went on, "because although many students study basic science and continue to feel that they are scientists, their life's work is in the application of it. If the scientific community doesn't make that part healthy, where will our students go?"

"If we were rebuffed on the side of applied science at the present time, we really would be in a much worse position on jobs right now. You see the effect of this very strongly on the job market today. Those areas of applied science where society has cut back for some reason or other, such as the aerospace industry, are where we have a job shortage. So I think it's fortunate for science at this time that there is a rebirth of interest in application. If it came at the expense of basic science, I think it would be terrible. But as an added thrust of society, I think it's fine."

"What is an appropriate percentage for applied science?" we asked. "I don't honestly know," Steuer said.

*continued on page 70*



STEUER

## Presidential message stresses R&D

What is billed as being the first Presidential message on science and technology in US history was presented to Congress on 16 March. It is primarily a policy statement, whereas President Nixon's State of the Union message and his budget message outlined specific proposals.

Nixon announced several programs to stimulate support for R&D and innovation in the private sector. One program would allow the National Science Foundation to support applied research in industry "when the use of industrial capabilities would be advantageous in accomplishing the Foundation's objectives." NSF previously has been permitted to support only basic research in industry. Nixon designated the Department of Commerce as the Executive Branch focal point for development of industrial R&D policy. A pro-

gram of research and development prizes to be awarded by the President was announced but no details were available. Other actions would provide for a more active patent filing and licensing program for government-owned inventions, NSF studies on Federal policy on technological innovation, submission of legislation to increase the ratio of government support to Small Business Investment Companies, and the R&D Incentives effort (jointly operated by NSF and the National Bureau of Standards).

Other actions discussed by the President were aimed at strengthening collaboration between the Federal agencies and State and local governments, and at strengthening cooperation between the US and other countries in both science and technology.

## Senate to vote on Office of Technology Assessment

This month the Senate will probably be considering a bill to establish a Congressional Office of Technology Assessment. It is expected to pass. In the form approved by the House in February, the Office would be run by a director and a Technology Assessment Board containing five members from the Senate and five from the House of Representatives. The purpose of the Office, according to the bill, is "to provide an early warning of the probable impacts, positive and negative, of the applications of technology and to develop other coordinate information which may assist the Congress in determining the relative priorities of the programs before it."

As envisioned by Representative John W. Davis (D-Ga.), who introduced the bill in his role as chairman of the House subcommittee on science, research and development of the Committee on Science and Astronautics, the OTA would not carry out the technological assessments itself, but would arrange for contract studies to be done by outside groups—industrial, nonprofit, academic or ad hoc. The assessments would be initiated either by a Congressional committee or by the Board. He anticipates that the office staff would have between 50 and 100 persons.

The Office would be authorized to spend \$5 million over the next two fiscal years.

A reliable source believes that the Office would not be likely to start up before the next Congress. —GBL

### Stever

*continued from page 69*

"It's difficult to predict how long this increased interest in applications will continue. The budget the Administration is asking for this year clearly reflects a desire to do more in research, both basic and applied, and I would guess that this will prove to be a long-term trend."

Many university people who have been doing basic research have been asking to get into applied research. This pressure within the science community to become more involved in society's problems resembles the feeling that was present during World War II, when Stever was getting out of graduate school.

"The thing that worried me when I first came to NSF was that we would be talking about an either/or situation. That isn't true. There is a complete spectrum of opinions. There are some people who do feel and probably always have felt, that basic research is

worthless—literally. But fortunately they're in a minority, and when they raise their voices they don't have great power. And I'm quite sure there are some people who feel that basic research should never be tainted at all with applications. But they don't carry the day, either."

"There are a certain fraction of people in science who get their motivation out of the pursuit of knowledge. They work best when left on their own, allowed to come up with their own ideas. Many of those ideas will push their science ahead. By pushing science ahead, we will get a practical payoff eventually. Lots of very practical people in government believe in that process of science."

"There are other scientists who get their motivation when they have a specific goal. I think our job is to tap both kinds."

"Some people are worried that the RANN (Research Applied to National Needs) program will cause some of the mission-oriented agencies to feel that it's not necessary for them to do basic research any more," we remarked. "I honestly believe they will increase their basic research rather than decrease it," Stever said. "All of the dynamics of human institutions force them to carry on." Stever pointed to the Department of Transportation, which for the first time has money to work with the universities.

"Our problem in NSF is to make sure that we don't stay in problem-oriented fields too long. If a mission agency is ready to take over, we must make sure they do and help them in the process. I don't think we should cover the entire spectrum of mission-oriented research."

Stever feels that you have to watch the situation all the time to see if you're doing too much in one area or too little. "We cannot become too enamored of applications, or even one field of science versus another. I think the problems of balance within basic science itself are just as delicate as those of balance between basic and applied science."

**The new Experimental R&D Incentives Program**, for which the Administration has requested \$22 million for NSF (as part of \$37.5 million to be shared with the National Bureau of Standards), is intended to explore ways to increase industrial and other non-federal investment in R&D. We told Stever that the program appears to be pushing industry towards doing basic research instead of universities. "On the contrary," he replied. "Our motivation is not to have a dropoff in universities, but to encourage industry to do more. We want better connections between universities and industry."

Half of the President's R&D budget increase, \$700 million, is for the civil-

ian sector—non-space, nondefense. Stever pointed out the growth in the sciences during and right after World War II with a very heavy component oriented toward defense. He said that many scientists didn't think they should be in defense at all, and those who did thought the association should not be exclusively with defense.

"To me this new thrust on civilian needs is a good thing for science. Some people question whether we have the institutional arrangements to do this with ease. It took us a long time to build such relationships in atomic energy and defense—we had to work on it. We would like to get the same thing going in the civilian sector."

The relationship of universities with industry declined as university researchers received more and more support from the federal government, Stever remarked. "I observed this at MIT. When I first went there after World War II, the biggest supporters of research in the universities were industrialists. By and by, the attitude of industry changed. They said the universities were selling out to defense and space, and were not helping industry in all of its needs. You can document the case that the developmental momentum of the power industry in this country suffered relatively as the physics departments and the electrical engineering departments turned away from it. So we ought to be working on institutional relationships to get us back in balance. The whole thrust of our new Experimental R&D Incentives Program is to facilitate these new relationships."

**Education.** Another new direction for NSF is in its education programs. Last year Congress reduced funds requested for RANN and put more money into institutional support and education support. The Administration then refused to allocate about \$30 million of this money, but over the course of the year gave some of it back. The remaining funds are being allocated in fiscal year 1973. The overall education budget for FY 1973 is about the same amount as requested for FY 1972.

Stever says there is a clearcut move within the NSF and Administration to shift the direction of the education programs. Many years ago, at the outset of these programs, a tremendous spurt of activity in upgrading science curricula occurred, starting with such pioneering efforts as that in physics led by Jerrold Zacharias. This was followed by improvements in chemistry, mathematics and biology curricula. "Then NSF set up mechanisms of getting these new curricula spread out into the educational system—into the undergraduate curricula and into the high schools."

"Many people think today that NSF should return to its earlier role, which is that of innovation, developing the new curricula and techniques. You know this is a lot easier said than done. One must search carefully to see what can be done that is really something substantive."

"The educational system is changing. There is more individual freedom and a greater variety of educational routes in the university for all kinds of students. There seems to be a changing pattern in the years in which certain kinds of things are taught." There is more use of the laboratory, or cooperative work (in which students mix their study with practical work), and now, going still further, the open university concept is developing. "There is a feeling that NSF should look pretty hard today and tomorrow to see if another new thrust isn't needed. I think it's going to be very difficult, but that is the kind of pressure that is on our education program."

Another new thrust is in institutional support. "There's a question as to what NSF's role in supporting institutions should be. I think it's terribly important to examine this. Just to show you the differing thoughts, look at the recommendation by Alan Pifer, President of the Carnegie Corporation, that universities shouldn't emphasize research the way they have—they should stick only to research directly related to education and let other research be done in research institutions. If that trend should start to develop over the next 10 or 20 years, it would result in quite a different way of doing NSF business."

"Although I certainly don't have any intention of changing the important role of the university in basic research, there are pressures in society which are pointing the universities away from research."

Our conversation then turned to NSF's past, present and future support of physics, the role of advisory committees, and the means of supporting graduate students. We will tell you about those aspects in next month's issue.

—GBL

## Two Bartol students left out in the cold

A novel approach to life as a physics graduate student is being pursued by Michael A. Mongillo and Russell C. Mumm, who are first-year candidates for PhD degrees from the Bartol Research Foundation. Each man is combining course work with research at a cosmic-ray station in the Antarctic. At their posts since October, they will remain one year—Mongillo at McMurdo Station and Mumm, 700 miles away, at the South Pole (Amundsen-Scott) station.

The two men are doing their course work with self-study programs augmented by radio contact with Bartol professors and with each other. In addition, they spend about three hours a day operating and maintaining Bartol's high counting rate nucleonic-intensity detectors and meson scintillators, which are used to study phenomena including longitudinal and axial anisotropies and the propagation of solar cosmic rays.

## in brief

*Adventures in Experimental Physics* is being published semiannually by World Science Communications, P. O. Box 683, Princeton, N.J. 08540. Personal subscriptions are \$10.00 per year; students pay \$9.00 per year and institutions \$20.00. Bogdan Maglic is the editor.

Applications for senior Fulbright-Hays awards for lecturing and research during 1973-74 can be obtained from the Senior Fulbright-Hays Program, 2101 Constitution Ave, Washington, D. C. 20418. 1 July 1972 is the deadline for applying for research awards and is the suggested date for filing for lectureships.

The National Bureau of Standards has presented its 1971 Precision Measurement grants to Norval Fortson (University of Washington), William Parker (University of California at Irvine) and Arthur Rich (University of Michigan). The grants, consisting of \$15 000 each, were awarded for research in developing improved precision measurement techniques. The first three grants were presented in 1970 to James E. Faller (Wesleyan University), Daniel A. Kleppner (MIT) and Hugh G. Robinson (Duke University).

Recorded educational material may be borrowed, free of charge, from Recording for the Blind, 215 East 58th Street, New York, N. Y. 10022. The organization also seeks volunteers to make recordings.

## the physics community

### Panofsky is new APS vice-president elect

The American Physical Society elected a vice-president elect and two new council members and authorized three new committees during the joint APS-American Association of Physics Teachers annual meeting in San Francisco.

The new vice-president elect is Wolfgang K. H. Panofsky, director of the Stanford Linear Accelerator Center. Panofsky, who defeated Morton Hamermesh of the University of Minnesota, will automatically assume the APS presidency in 1974. Director of SLAC since 1961, Panofsky has worked on x rays and natural constants, accelerator design and the properties of elementary particles. Presently, he is also a consultant to the Arms Control and Disarmament Agency. The new council members are Betsy Ancker-Johnson,

of Boeing Scientific Research Laboratory, as councillor-at-large and Eugen Merzbacher, of the University of North Carolina, Chapel Hill.

Installed as 1972 president of APS was Philip M. Morse, professor emeritus at the Massachusetts Institute of Technology. Morse will be succeeded by Joseph E. Mayer, of the University of California, San Diego, who took office as the 1972 vice-president.

The newly authorized APS committees include a committee on the status of women in physics, which is headed by Elizabeth Baranger of MIT. As a successor to last year's *ad hoc* committee, this new continuing committee is intended to carry out the recommendations of its predecessor. Another new committee will be concerned with



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