

state & society

Prospects for physics support continue to deteriorate

US government funds for physics may continue to be cut, in terms of buying power, if a proposed 6% annual increase in money for academic science becomes government policy. At an American Physical Society meeting, Carl M. York, technical assistant for basic research at the Office of Science and Technology, explained how the desire for a balanced budget, particularly important in economically depressed times, combined with "the fact that the nation's goals have shifted from a dependence upon the physical sciences to the social sciences," leads to deteriorating prospects for federal support of physics. At the same meeting, American Institute of Physics director H. William Koch brought out the need for a unified national science policy. He protested that "physics and astronomy in the United States may well be in serious trouble because of continued, uncoordinated cuts in the rate of federal funding for research. Given the particular structure of physics research funding, these cuts are generating the prospect of a major physics manpower depression . . . In the contracting economy in science today, hard choices have to be made and coordinated . . ."

The panel session at which Koch and York spoke took place on 23 Nov. in New Orleans and was devoted to physics manpower, government support, and the relation between the two; Arnold Strassenburg, director of the AIP Education and Manpower Division, was chairman of the three-member panel. Wallace R. Brode, past president of both the Optical Society of America and the American Chemical Society, was the third speaker and discussed the factors affecting production of scientists. He noted, as did York, that the current excess of scientists is likely to disappear by the 1980's and warned that we must take steps now to retain people who are already trained.

Pessimism. York explained why physics has been affected more severely than other disciplines by budget cuts. Four agencies, the Department of Defense, the Atomic Energy Commission, the National Science Foundation and the National Aeronautics and Space Administration, have contributed 99% of the federal funds for work in university

and college physics departments. The recent increases in the NSF budget (up \$16.2 million from 1969 to 1970) have been quite insufficient to offset the decreases in the other three agencies (down \$51.3 million from 1969 to 1970). York commented that "in the late 1960's as the rising tide of concern about quality of life became the dominant concern of the people of the country, a marked decrease in funds from these agencies is to be noticed."

Given the goal of a balanced budget, Lee DuBridge, director of OST until last September, proposed a 6% yearly growth (5% to compensate for inflation and "as a minimum rate of growth an additional 1% per year") in total federal funds for academic science. York noted that "the problem here for the physical scientist is perfectly clear. His demands on the federal dollar must be so much more compelling than those of his colleagues that he can beat the social scientist out of the money."

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York (left) and Koch. In rear are Robert Barlow (OST) and Eugene Kone (AIP).

DOD to decide questions of relevancy

The "Mansfield amendment" has turned up again, but this time in a substantially diluted form. This was the controversial amendment to the 1970 Defense Appropriations Act, which required direct military relevance for DOD-funded research. The 1971 Military Procurement Authorization Act recently signed by President Nixon asks for "potential" relevance only, but leaves it to the Secretary of Defense to decide what research is "potentially" relevant to defense needs. Another feature of the new Act is that it prohibits research and development grants to colleges where military recruiting is barred by the policy of the institution.

The 1970 Mansfield amendment said that no funds could be used for any research project or study "unless such project or study has a direct and apparent relationship to a specific military function or operation." The Senate version of the 1971 bill contained the same proviso, but the House version had no such feature.

In the Senate-House conference, House spokesmen wanted to drop the section "because of the adverse impact of narrow interpretations of relevancy in the conduct of basic research." The conference did agree that "applied research should have demonstrable relevance to a military requirement."

The compromise amendment finally adopted reads: "None of the funds authorized to be appropriated to the Department of Defense by this or any other Act may be used to finance any research project or study unless such project or study has, in the opinion of the Secretary of Defense a potential relationship to a military function or operation."

Commenting on the conference version, Senator Mike Mansfield said that in his opinion "the modified language is worse than would be the elimination of the amendment totally" because it says that the "Department of Defense will solely determine what research is beneficial to it. This language, in my opin-

ion, is a legislative act of abdication to the Secretary of Defense by Congress of the Congress's constitutional obligation to establish basic policy." He went on to say "The fight is far from ended. As a matter of fact, it has begun again."

Prospects for federal support

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Leverage. Koch pointed out the high degree of leverage exerted on physicists by changes in federal funds. In his analysis of manpower dynamics, he noted that physicists are more involved in research and development than are any other group of scientists, and money for that research and development comes largely from the US government. Why is this so? Physics is generally expensive and has a longer-term "pay off" than other sciences, so that most private companies do not care to invest heavily in its support.

At one time, he continued, a teacher shortage in the US gave physicists some alternatives in their choice of jobs. This shortage no longer exists, so that research and development provide essentially the only opportunity for physicists. We see then, continued Koch, that physicists are very dependent on government support. And the physicist population has been growing by about 8-9% each year; in 1970, 1300 new PhD's were added to a total of 14 300. Just to provide salaries for all these new physicists, funds must be increased by

8-9% a year (after correction for inflation). If funds increase by only 4%, then about half of these new physicists will not find jobs. This leverage explains why physics-department chairmen report abrupt 15-40% decreases in manpower, at all levels from the admission of graduate students to the hiring of faculty, at the same time that government reports show, for example, an effective decrease of 5% in support of academic science (see story on page 93).

What is AIP doing? Raymond W. Sears, formerly Director of University Relations at Bell Telephone Laboratories, has been hired as a special placement consultant; financial assistance from APS makes this appointment possible. Sears, a physicist whose research career extends from early development of electron tubes to work on lasers, had been at Bell Labs since 1929. He is scheduled to begin his new job on 1 Jan. Koch also announced a new AIP advisory committee on placement.

Right now, the education and manpower division is conducting two more surveys in an attempt to form a more complete picture of what is happening to physics. The aim of one survey is to get details on the fall 1970 enrollments in physics departments (both graduate and undergraduate), to analyze the degrees awarded in 1970 and to estimate the number of degrees likely to be awarded this year. The aim of the other study is to determine the extent of unemployment; recent graduates (BS, MS and PhD), postdoctoral fellows and those physicists who listed themselves with AIP as job seekers during the past year are included in this second survey. Once all these statistics are collected, says Koch, the effect of funding cuts on the production of physicists and on the job market will be documented, and the need for long-term planning of manpower needs will be clear.

Holding pattern needed. Brode showed how US production of scientists has varied over recent decades and concluded that we have reached a saturation level: A fairly constant proportion of the college-age population, he explained, has been receiving degrees in science and engineering, and this proportion is limited by both motivation and ability. But in the past 15 years or so, the college-age group has grown almost exponentially; the number of age-22 persons was 2.2 million in 1955 and is likely to be 4.4 million in 1985. This great expansion, which is much larger than the growth of the general population and has led to the present excess of scientists, will probably level off with the present leveling of the birth rate, so that the excess of scientists will disappear during the 1980's.

We need a "holding pattern" to retain people already trained; unless such

a program is begun, warned Brode, the number of scientists being produced will drop quickly, and we will again have a severe shortage. Efforts might include additional training as well as special public works or research programs that would both advance science and help scientists maintain their proficiency.

—MSR

NSF supports retraining project for jobless scientists

Fifteen unemployed scientists and engineers, each with at least five years of professional work experience, have recently begun a three-quarter academic program at Stanford University leading to the degree of MS in computer science. Their expenses are being paid out of a National Science Foundation grant totalling \$155 000.

This is the start of an experimental project funded by NSF and organized by a group of engineers and scientists who are interested in using technical skills to solve contemporary social problems. Called the "TASC [Technology and Society Committee] Force for Constructive Alternatives," the Palo Alto, Calif., group is assisting unemployed mid-career technical people to retrain for the jobs that do exist. NSF is taking a continuing interest in the program, and hopes to extend it if it proves successful.

Daddario committee calls for a national science policy

In one of his last major actions as chairman of the House Subcommittee on Science, Research and Development, Emilio Daddario recommended a revamped Federal organization for the planning and management of research and development and the formation of a task force to draft a master plan for a national science policy. A subcommittee report called "Toward a Science Policy for the United States" is a result of three months of science-policy hearings last summer and years of inquiry into the government-science relationship.

Daddario, commenting on the report, particularly urged establishment of a special task force to submit a draft national science policy by the end of 1971 for consideration by Congress.

A key set of recommendations concern the Office of Science and Technology. It should be strengthened through additional staffing and legislative backing, and it should be separated from direct administrative connections with the President's science adviser and the President's Science Advisory Com-



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