had contact with mainland Chinese.

Largely through the impetus given by Brown, the academy in 1963 embarked on a new program of aid to developing countries. The main thrust of this program is in helping these nations create the kind of scientific institutions that will enable them to adapt modern technology to their needs. NAS insistence on reciprocal benefits for the visiting American scientists is also pursued. "Our scientists go there and learn about their institutions, their customs, their ways of getting things done," says Todd. "In this way we also learn to help them in a more effective manner."

NAS programs now encompass an extensive area in Asia. Through its Pacific Science Board, the academy is expanding programs with the Philippines as well as with the Academia Sinica on Taiwan. At the same time, a committee on science relations with Indonesia is being considered. In 1964 Indonesian scientists visited the US for talks about science coöperation.

Congress studies national science policy

What is the appropriate relation between science and government? Several groups in Washington are now exploring this question. For example, the House Subcommittee on Science, Research and Development, headed by Rep. Emilio Q. Daddario (D. Conn.) believes the National Science Foundation should take a major role in developing our nation's science resources and policies. His report urges NSF to put aside its passive role and put added emphasis in the areas of engineering and the social sciences. NSF director Haworth and others in government generally agree with the thrust of the report while having reservations in some particulars. Meanwhile, groups in Congress, headed by Senators Harris (D. Okla.) and Nelson (D. Wis.) and Rep. Reuss (D. Wis.) are actively discussing the entire government-science interface.

What is Congress really seeking? It does have Constitutional responsibility to allocate and appropriate the resources of the country. But as William Carey of the Bureau of the Budget has pointed out, "Congress is not anxious to take over policy initiative for scientific research. It merely takes the quaint view that somebody should seize the initiative. It cannot make sense out of the decision-making procedure of the agencies in deciding how—if at all—research priorities are defined and resources matched up with them. What Congress wants more than anything else is evidence that the Executive is running a tight ship and knows what it is doing."

Daddario wants bigger NSF role

The Daddario subcommittee has asked that the National Science Foundation "should take the initiative and be held broadly responsible for the nation's science resources, disengaging the Office of Science and Technology and the President's science advisory committee from their detailed oversight in this area." To further this goal, the subcommittee proposes, among other things, that NSF evaluate the state of the various scientific disciplines and their resources, direct research "to help bring the scientific base for new and emerging technologies required in the national interest," and channel more effort into the social sciences.

To equip the foundation for its new role, the subcommittee is going to ask Congress to amend the NSF Act of 1950. Legislation will be introduced to:

- release the National Science Board (which shares NSF authority with the director) from routine duties and give it a strictly policy-making function
- require the board to make an annual report on the status of science, "the report to be made to the Congress via the President"
- require NSF to evaluate the needs of the individual disciplines (in order for the foundation to operate as a "balance-wheel")
- encourage NSF to support research in the applied and social sciences
- strengthen the director's office by giving him complete management authority plus authority to approve all grants, subject only to the board's veto. The report also recommends placing the director's salary on a par with those of the heads of AEC and NASA and providing NSF with a deputy director and four assistant directors appointed by the President and confirmed by the Senate
- remove the present authority by which NSF is organized largely by disciplines, and require its organization along functional lines; for example basic research and support of institutional development.

DADDARIO

Other nonlegislative recommendations of the subcommittee include:

- stronger representation on NSB of nonprofit organizations, industry, small colleges and social scientists
- improved liaison with the State Department
- additional emphasis on institutional and developmental support
- more top administrative and management personnel. "NSF has had its troubles in dealing effectively with the big operational programs [for example Project Mohole, Antarctic program, educational curriculum studies]. The subcommittee believes that this is due in part to the lack of trained and experienced professional management."

Reactions of government scientists

Will the above proposals achieve their purpose of providing NSF with a "positive, dynamic stance" and putting it in the forefront of science policymaking? PHYSICS TODAY asked NSF director Leland Haworth for his views. "I think that the objectives they have of trying to be helpful both to the Congress and the Executive branch in their recommendations and conclusions are all to the good," Haworth says. "The study and report are very worthwhile and have caused a lot of soul-searching on the part of both the subcommittee and the foundation, and forced us to think

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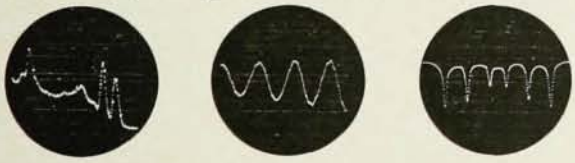

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about our operations in a way we have never done before. To be sure, I don't agree with every detailed recommendation of the report as to whether each and every one will help toward their objectives although some obviously will. My analysis of the report is that the subcommittee has decided that the foundation is a successful and worthwhile endeavor and that its usefulness can be enhanced both in the sense of engaging in new operations and in that of making existing programs more effective."

HAWORTH

Others at the foundation also believe that Daddario has performed a valuable service in his analysis of NSF operations and that his subcommittee is an enlightened group of legislators. Various sources, however, have expressed reservations to the report both inside NSF and beyond.

The principal charge is that the Daddario subcommittee is trying to turn the clock back. Originally the foundation was assigned by law the responsibility to coördinate the basic research programs of the entire government. It did not, however, fully discharge its responsibility in this respect. "I think the Science Foundation was initially given responsibilities to do things which we later concluded it should not have been asked to do," says former presidential science advisor Jerome Wiesner, in the Daddario hearings. "This is the role which, as an operating agency, as a funding agency, we concluded it could not really play. It can play an advisory role, a statistics-gathering role, a leadership role, but it cannot play the kind of government-wide decision-making and coördinating role that was originally visualized for it."

More immediate reasons for NSF's failure, as Don K. Price in *The Scientific Estate* indicated, concerned the compromised authority of the NSF director in his relation to the National Science Board and the organization of NSF on the basis of scientific disciplines rather than purpose. The Daddario subcommittee, however, in its legislative recommendations, would attempt to correct both these shortcomings.

Diffusion balances centralization

There is perhaps a deeper reason behind the inability of the foundation to take a more prominent role in US science policymaking decisions. Operation of science policy, says the Federal Council for Science and Technology, 'reflects the pluralistic character of most political processes in the United States. This character militates against a neat division of functions, and it results in a sharing of functions. This pluralism has the effect of diffusing power. In science policy, the continuing task is to sustain the most effective balance between diffusion and centralization of power."

An additional criticism of the Daddario report concerns its recommendation for an annual report on the status and health of science. As the Federal Council points out, "there can be no such thing as 'the plan', just as there is no simple, single, national science policy. There are many plans, each representing a valid way of looking at science and technology. . . . This sort of process is a familiar one in political affairs. . . . But the entire process of planning is so intricate that it is not possible or desirable to undertake to integrate all of the different kinds of planning. The interaction of different kinds of planning are not fully predictable. For this reason, the system must be flexible and open. . . . The feedback process, resulting in the correction of errors, is the substitute for omniscience."

Answering the charge of turning the clock back, Daddario says "there is nothing in the report or in the proposed legislation that can be construed as rescinding the 1962 NSF reorganization plan number 2 (which gave major assignments to the foundation)." As to the subcommittee recommendation for an annual report on science, he says, "Certainly no master plan was ever contemplated. But when you consider the feedback process reflected in the Congress through its own attention to the issues . . . you see the way we must insure that information, logically organized and usefully presented, begins to flow. In that way the feedback will adjust the thinking of the Congress. . . ."

How then can the legitimate desires of Congress for a clear view of the overall research and development picture and for stronger science policy leadership be satisfied? Or will Congress adjust to a more subtle appreciation of the workings of government science policy? It is reported that many of the recommendations of the Daddario subcommittee have a good chance of passage in this, an election year session. As a minimum, many of the foundation's operations which NSF director Haworth has encouraged in the engineering and social sciences will be given greater impetus and direction. It also appears possible that Congress, through the Committee on Science and Astronautics, will obtain the right to authorize all NSF funds before appropriation, in the same way the Joint Committee on Atomic Energy reviews Atomic Energy Commission budgets.

Other committees study problem

At the same time, other groups in Congress will be studying the government-science relation. Rep. Reuss's subcommittee on research and technical programs is holding hearings on redeploying federal research facilities for new tasks once their missions have been completed; Sen. Nelson will conduct hearings on the use of systems analysis techniques in manpower conversion; Sen. Harris's group will seek a total overview of the government's involvement in research.

What this will all add up to in the larger issues of government science policy, no one can possibly foresee. Daddario has said, "We believe science can play in the political leagues without being corrupted or unduly influenced by the character of the other players." Certainly for both Congress and the oligarchy that formulates science policy and determines budgets, days of intense debate, compromise and accommodation inevitably lie ahead.