

SCIENCE NEWS OF THE WEEK

Reagan Budget: The Slicing of Science

On an appropriately gloomy and rainy day last week, almost 100 leaders of science in the U. S. met in Washington, D. C., to discuss with administration officials the impact of proposed budget reductions. The scientists agreed, in a statement released at the conclusion of the discussions, that the proposed 12 percent, across-the-board budget cuts "will do irreversible damage unless longer-term research, in contrast to development and demonstration, is protected."

The participants, who attended at the invitation of National Academy of Sciences President Frank Press, included university presidents, national laboratory directors, industrial research executives and other prominent scientists and engineers. The purpose of the gathering was to provide information to the science and technology community, now in a state of considerable uncertainty, about the budgetary process, Press said, and to inform government people about the scientists' concerns. It was not to be a confrontation or a lobbying effort, he said.

In their recommendations, the scientists urged:

- That the administration and Congress maintain the strength of current science budget allocations in each agency.
- A reallocation of research and development funds to ensure adequate support for the basic sciences.
- That a large part of the increase in the national security budget be focused on basic research that is essential to the maintenance of security.

Numerous scientists expressed alarm at the budget proposals. The theme of current and future manpower shortages recurred throughout the discussions, reflecting the close relationship between the performance of basic research and the training of scientists and engineers. "In the physical sciences, the manpower numbers will decline to those of the pre-Sputnik era," said Herman Feshbach of the Massachusetts Institute of Technology. "This is a new window of vulnerability on the national scene. If we go back to that kind of manpower situation, the shortage of scientific personnel will make us vulnerable."

Hans Mark, deputy administrator at the National Aeronautics and Space Administration, said NASA was already in trouble even before the budget cuts because of the escalating costs of materials and parts. He blamed much of this increase on the shortage of adequately trained technicians, scientists and craftsmen and the decline of U.S. industrial productivity.

"If the final outcome of the budget process is one that will tend to destroy our future sources of scientific and engineering manpower, then I think we are in big

trouble," said Keith McHenry of the Amoco Oil Co.

George A. Keyworth II, science adviser to the President, and Fred Khedouri, associate director for natural resources, energy and science in the Office of Management and Budget, tried to reassure the scientists earlier in the meeting that science was still a top priority with the administration, and it was in good health. But several later speakers commented on the apparent lack of understanding of their problems among administration officials. Paul Gray, president of MIT, commented that the discussions between scientists and the officials weren't "coupled," but

These are part of a series of stories SCIENCE NEWS will run periodically on the impact of actual or proposed budget cuts on various areas of science.

appeared to be on "nonintersecting planes." He added that some of the government assumptions were not valid.

Most of the speakers appeared to accept the necessity for restraint, but disagreed strongly with the manner in which it was being imposed. "There are ways of allocating the cuts to minimize the harm, but if they're applied across the board, that's the worst way to do it," said Press.

"Somewhere in the government, the budget should be examined not agency by agency but across the whole government,"

Press said. "The appropriate place to do that would be in the White House, within the OMB and in the Office of Science and Technology Policy, and that would also be an appropriate place to examine the overall structure to see whether or not institutional changes might be necessary to make more effective and productive use of the research dollar."

The closing statement also noted the need for a much strengthened mechanism through which the scientific and engineering communities could advise on resource allocations and analyze the impacts and benefits of various budget strategies.

In the short term, however, several government officials indicated that there was little room for flexibility in the current proposals. "The only realistic prospect, not a cheerful one, is to assume the worst-case scenario," said Alvin Trivelpiece, energy research office director at the Department of Energy. "At the same time, you should also have a plan in mind if things should improve so you're in a position to go ahead rapidly and effectively." They were also pessimistic about future budgets because of projected severe problems in budget deficits.

"We view the budgetary process as a dynamic process," said Press. "There is now a dialogue between the White House and Congress on the budgetary situation, and we hope that a meeting such as ours, where we communicated to both the executive and Congress the results of our meeting, is the kind of input that will somehow affect the outcome of the political process." □

Slashes in high-energy physics

The people at the Fermi National Accelerator Laboratory have not yet used up all the stationery that identifies the laboratory as related to the Energy Research and Development Agency. They have been scratching out ERDA and typing in "Department of Energy." Now they will have a new agency to type in, and they may well wonder — in fact they are wondering — what will happen to the major physics programs funded by DOE.

According to a spokesperson, Fermilab did not fare badly in the first round of Reagan budget cuts, getting most of what it asked for. That prompted some nervous talk (was it whistling in the cemetery?) to the effect that "these people understand the high-energy physics, not like that Georgia crowd." But the second round of Reagan cuts has bit — by 12 percent.

All this has to be taken in the context of a science that was underfunded to start with. All of the nation's high-energy

physics laboratories have had recurrent stretches of idleness in recent years for lack of funds. Even before the Reaganists took power the situation brought about the protest resignation of Fermilab's first director, Robert R. Wilson.

In a speech delivered at the celebration of the 50th anniversary of the Lawrence Berkeley Laboratory, George A. Keyworth II, the President's science adviser, spoke assuring "American preeminence in this promising and creative area of science while operating in concert with a strong European effort at CERN." In the past, American physicists have generally wished to equal and even surpass CERN (while cooperating with CERN, of course).

The other large physics area funded by DOE is controlled thermonuclear fusion. This is divided into two areas: magnetic-confinement fusion and inertial-confinement fusion. There have been rumors that the inertial confinement pro-

gram would be shut down, at least as far as civilian funding is concerned. (Some parts of it have military funding because of weapons applications.)

One of the people involved in inertial-confinement fusion from the beginning, John H. Nuckolls of the Lawrence Livermore Laboratory, took the occasion of winning the American Physical Society's James Clerk Maxwell Prize (given for achievement in this field at the recent meeting of the APS Division of Plasma Physics in New York) to pronounce a vigorous defense of inertial-confinement fusion as a prospective energy source. □

... and holes in the drilling budget

Enthusiasm for the new Ocean Margin Drilling Program, a government-industry collaboration intended to produce geophysical information related to the ocean margins, gave way to disappointment last week when the 10 oil companies that had agreed to pay for half of the OMDP pulled out.

"This clearly means the OMDP will have to be delayed more or less indefinitely," said Allen Shinn, director of the National Science Foundation's Office of Scientific Ocean Drilling.

Industry support hinged upon NSF's promise that more oil companies could be persuaded to share the costs of the program. With only 10 participants, annual costs in 1980 dollars were at least \$1 million per company. "Many companies felt it just wasn't cost-effective science," said George Pichel of Union Oil Co. in Los Angeles. Industry's primary interest in the program, he said, was the development of a riser system able to drill to 13,000 feet.

Both Shinn and representatives of the oil companies say that industry withdrawal is only "superficially" related to the recent NSF proposal to combine the Deep Sea Drilling Project and the OMDP. In August, NSF outlined a plan for replacing the *Glomar Challenger*, now used for the Deep Sea Drilling Project, with the *Glomar Explorer*, which would be converted to a drillship capable of riser and nonriser drilling. Under the revised program, development of the riser would be delayed several years and because fewer holes would be drilled on the ocean margins, the cost per hole would rise.

Shinn said that both houses of Congress had appropriated the full request for the government's fiscal year 1982 share of the OMDP costs, covering enough design work on the *Explorer* to learn the costs of conversion. In the next few weeks NSF will consider options for continuing the program. Alternatives include converting the *Explorer* without adding the riser and substituting the ship for the *Challenger* at the end of 1983, or rehabilitating the aging *Challenger*. □

Marijuana-heroin link reappraised



Discarded in the 1970s, the "stepping stone hypothesis" that smoking marijuana leads to abuse of harder drugs was "rejected prematurely and now needs serious reevaluation," says William Pollin, director of the National Institute on Drug Abuse.

The government-funded study that prompted Pollin's October 21 comment in testimony to the Senate Subcommittee on Alcoholism and Drug Abuse calls marijuana use "a cause of heroin use." But Pollin qualified that conclusion in an interview with *SCIENCE NEWS*. "We never said we're convinced that it [the stepping stone hypothesis] is true," Pollin says, "just that it's in need of reevaluation." He cites the survey—performed by University of Kentucky researchers and to be published in the fall issue of *CHEMICAL DEPENDENCIES* (Volume 4)—as useful in documenting the link between marijuana use and the use of heroin and cocaine.

The nationwide survey of 2,510 men 20 to 30 years of age showed that 73 percent of those who said they had used marijuana 1,000 times or more went on to try cocaine, while 33 percent graduated to heroin use. In contrast, less than one percent of the nonsmokers surveyed used the harder drugs, according to the report by sociologists John A. O'Donnell and Richard R. Clayton.

When equated with daily use of marijuana for three years, smoking the substance 1,000 times or more is "not that unusual for heavy users of marijuana," Pollin asserts. Of those who had used marijuana fewer than 100 times, only seven percent later tried cocaine, while four percent went on to take heroin. Although only one in ten of the 1,382 marijuana users in the study also used heroin, a causal relationship was clearly discernible, Clayton asserts.

"I'm not saying that marijuana use invariably leads to heroin use or to cocaine use—that's not what causality means," Clayton told *SCIENCE NEWS*. He draws an analogy between the marijuana-heroin link and tobacco smoke's role in causing lung cancer, though he admits that the marijuana-heroin link is not biological. Only a minority of smokers develop lung cancer, he points out, but few researchers doubt tobacco's role in triggering the disease. □



"I think that there's absolutely clear evidence that marijuana use is a stepping stone to other illicit drug use," Clayton says. "Why is it that we have such a problem saying one thing causes another thing unless the end result is a biopsy report?" By "throwing subjects into a subculture that elicits heroin use," even moderate marijuana use can weld the first link of a causal chain leading to heroin, Clayton asserts.

Other researchers have reported an association between marijuana and heroin use, but stop short of labeling the relationship "causal"—a word pregnant with policy implications. "I think it's really more a semantic quibble about what cause is than it is about the results," says Bruce Johnson of New York State Substance Abuse Services in New York City.

"The fact is, the majority of kids who use marijuana do not go on to other drug use," says Denise Kandal of the Columbia U. School of Public Health and New York State Psychiatric Institute. "All we can say safely at this point is that marijuana is a necessary but not sufficient condition for the progression to the use of other drugs," she says. "There is a subgroup of marijuana smokers who are more at risk for the use of other illicit drugs, and we should identify this group both in terms of personality characteristics, and in terms of social environment," says Kandal, whose research has included the study of marijuana use among young adults. □