technical evaluation in cooperation with the Department of Health, Education and Welfare," says a defense official. American laboratories were first asked by CDC in 1976 to transfer or destroy their stocks of smallpox virus. WHO sent a follow-up letter on 6 July 1978 to the Walter Reed Army Institute of Research (a polite alias for USAMRIID) and is awaiting a reply.

Porton Down, the British biological warfare establishment, gave up its stocks of smallpox virus in April this year. Military medical sources argue that there are good reasons why USAMRIID should wish to retain the virus. Smallpox is not on the usual list of biological warfare agents because vaccination is a sure defense against it. But when the WHO eradication program is successful, and smallpox vaccinations cease, populations will be increasingly vulnerable. Smallpox is the ideal biological warfare agent since it is stable, easily aerosolized, simple to grow, and is a terrifying disease with high lethality. Should such an agent be deployed, whether by foreign powers or terrorists, the army would require immediate access to the virus for diagnostic purposes. The Center for Disease Control has been designated by WHO as one of the four labs that should retain stocks, but Army scientists fear that the virus might in time be lost through accident or error. "USAMRIID maintains stocks in the event that at some future time they can no longer rely on CDC," says one expert.

The WHO smallpox eradication program began in 1967, largely at the initiative of the Soviet Union. The disease has now been eradicated from all continents except Africa, where the last known case occurred in October 1977. If no further cases occur for 2 years from that date, a group of experts will meet to declare smallpox eliminated from the world. Foreseeing this possibility, WHO took steps to bring all laboratory stocks of smallpox virus under closer control. All nations except Kampuchea responded to a WHO survey in 1975. As a result of this and of a literature survey going back to 1950, some 75 laboratories were identified as possessors of smallpox virus.

The WHO goal is to have only four laboratories holding smallpox virus by the end of 1980. These are the Center for Disease Control, the Laboratory for Smallpox Prophylaxis in Moscow, St. Mary's Hospital Medical College in London, and the National Institute of Health in Tokyo. All other holders of smallpox virus have been urged either to destroy their stocks or to transfer them to one of the four centers. The wisdom of this policy was foreshadowed by a fatal laboratory-caused outbreak in London in 1973.

WHO has no powers of enforcement. "We are just using our persuasive skills," says Joel Breman, a CDC smallpox expert detailed to WHO in Geneva. "We have had no outright refusals and a very positive attitude from the labs which still retain viruses."

WHO's persuasive skills have reduced the number of holding laboratories from 75 to 14. Three of these are in the United States: they are the Center for Disease Control, "Walter Reed"—in other words USAMRIID—and the American Type Culture Collection in Rockville, Maryland.

The board of the American Type Culture Collection has discussed the smallpox virus issue several times, and on each occasion has decided to maintain its stocks. The collection does not dispense smallpox virus, as it does the other viruses, bacteria, and cell lines it stores, but wishes to retain smallpox for archival purposes. ATCC officials would like to keep their collection complete, consider that their possession of the virus is a hedge against CDC's being somehow destroyed, and note that they have a perfect safety record. "I am in complete agreement with the position ATCC has taken," says Adrian Chapell, chief of the viral and rickettsial products branch of CDC. Speaking as a former board member of ATCC, and not for CDC, Chapell says that ATCC's right to store the virus would certainly be above the military's reasons for keeping it, and that "I personally feel that ATCC is probably the best place in the world for preserving things of this sort."

But John Richardson, Chapell's colleague at CDC, says that, if ATCC does not turn over its stock voluntarily, it will be categorically asked to do so by the Public Health Service at some time in the future, probably when smallpox is officially declared to be eliminated. "For damned sure, the ATCC storage area does not meet the recommended WHO standards for containment of smallpox," says Richardson. WHO says this has not been confirmed.

Neither ATCC nor USAMRIID has refused outright to comply with the WHO recommendation. Discussions are still continuing. But if they are still continuing by the time the world is declared officially free of smallpox, WHO's recommendations may become more insistent unless the two laboratories and their counterparts in other countries can show exceptional cause for retaining the virus.—NICHOLAS WADE

Budget-Cutting Mood in Congress Begins to Hit Science

The impact of California's tax-cutting Proposition 13 hit the Washington science community several weeks ago, as the U.S. Senate, led by Senator Orrin Hatch (R-Utah), beat back a proposal to permit a $16 million boost in the President's budget request for the National Science Foundation (NSF). The incident marked the first time that the Senate has voted a reduction of the NSF budget ceiling approved by the Subcommittee on Health and Scientific Research, chaired by Senator Edward Kennedy (D-Mass.).

It also came at a time when President Carter is directly urging members of congressional appropriations committees not to reduce his requests for spending on basic research. The impact of the Senate action, however, is to make it likely that some reduction in the President's request for the science agency will be made. "Congress has me worried," the director of NSF, Richard Atkinson, told *Science*. "I don't expect the budget to fare too well."

Although the NSF funding saga is not yet over, the significance of the action thus far lies in the fact that the Kennedy subcommittee and the Senate appropriations committee usually approve an increase in the Administration request, and their counterparts in the House approve a decrease. Ultimately, after the NSF budget bill goes through each House twice—once to set a ceiling and once to fix the exact amount—a compromise is reached at or about the Administration's requested level.

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This year, the House played its usual part, although the size of the reduction in the Administration request was surprising to some: $40 million, mostly in funds for applied research (*Science*, 14 July). This would give the agency an increase from the present fiscal year of only 3.7 percent, well below the rate of inflation. In the Senate, Kennedy's subcommittee had played its role, proposing the $16 million increase, primarily for applied research and science education. On the Senate floor, however, a group of ten Senators—with even Kennedy among them—offered a successful amendment to return the NSF budget ceiling to the amount requested initially by Carter. The effect of this action is to preclude the

Dole Tries to Bar Science Exchanges with Soviets

In what can be termed an overzealous reaction to the growing involvement of scientists in the political issue of human rights in the Soviet Union, Senator Robert Dole (R-Kan.) recently introduced legislation that would have restricted the use of National Science Foundation (NSF) money to support trips to Russia by U.S. scientists. The legislation, which was offered as an amendment to the 1979 budget authorization for NSF, was withdrawn after an aggressive lobbying effort against it by Washington science agencies, orchestrated by the office of Senator Edward Kennedy (D-Mass.), chairman of the Subcommittee on Health and Scientific Research.

In support of his idea, Dole told the 30-odd senators in the chamber when the NSF bill came up that the Soviets would change their behavior as a result because they benefit from scientific exchanges more than we do. The amendment said, in essence, that no NSF money can be used for travel to an international conference if anyone who wants to attend the conference is barred for religious, ethical, cultural, or political views. Just prior to the boarding of planes, the NSF director would determine whether everyone who wanted to attend was actually going. If enacted, it could have ended some NSF support for scientific exchanges with Eastern European nations, which last year involved more than 1000 U.S. scientists and 4 million U.S. dollars.

Apparently convinced that the government should step into the arena in a paternal way, Dole said on the Senate floor that "The scientific community lacks a ready mechanism or spokesperson to present a feeling of outrage over the violation of human rights experienced by their fellow scientists. I suggest it is time to move toward an active collaboration between Government and scientific communities, where the Government and its elected representatives speak and act on behalf of the scientific community."

The amendment was, in part, the handiwork of Barry Leshowitz, a AAAS Congressional Science Fellow in Dole's office who alerted influential science leaders to the amendment's existence when he called around for comment. Thus forewarned, Kennedy, Frank Press, the President's science adviser, and Richard Atkinson, the NSF director, moved aggressively to block it, because, according to a Kennedy staffer, "given the present mood of the Senate," there was no assurance that it would not pass.

On the day before it was to be introduced, Press wrote a letter to all 100 senators in which he was forced to step back from the President's view that withdrawing U.S. support from scientific exchange can coerce better Soviet behavior. Press wrote that conferences in the Soviet Union "have been effective—in unpublicized, informal ways—in establishing contact with such [dissident] scientists, providing a window to the outside world, and in securing their attendance at conferences." Kennedy's staffers also called a half-dozen science agencies in town, and assembled a group of agency employees and Administration lobbyists (including a representative of Vice President Mondale) in a room just off the Senate floor. From there, the group contacted senators by phone to lobby against Dole's amendment.

When the amendment finally came up, one of those contacted, Senator Jacob Javits (R-N.Y.), rose to say, "We all know that probably, as the decades go on, the Soviet Union will remain the system it is. What will change is the ability to see what is happening in the system." For that reason, he said, American scientists should continue to be allowed to visit the Soviet Union.

Then Kennedy spoke, and he went almost straight to the senatorial jugular, asking if Dole would be willing to extend his curtailment of trade with the Soviet Union from the intellectual to the material, say for example, to wheat from the state of Kansas? "Did I understand that the Senator was going to offer an amendment like this on Kansas wheat when the agricultural appropriations are up?" Kennedy asked.

Dole, clearly taken aback, managed a reply, "It might be an appropriate place if we find in that bill . . . that our tax dollars are being used to ship wheat or permitting them to buy wheat on preferential credit terms. But I think that begs the question."

Kennedy did not abate, however. "Does the Senator mean there is a difference—if we are making money privately, we say that we cannot sacrifice human rights in those circumstances when private industry is doing it, but that is where the Senator draws his line about how committed we are to human rights?"

Kennedy, of course, supported the idea no more than Dole, but his argument was to the point. Dole, after briefly excusing himself by noting that he had just wanted to raise the issue for discussion anyway, withdrew the amendment. Several weeks later, he said that he "was shocked to learn of the intensive efforts of the Administration to defeat the idea." At the same time, suggesting that to him the issue is not resolved, Dole introduced a resolution asking Carter to suspend all bilateral scientific and cultural exchanges with the Soviets. So far, no action on it has been taken.

—R. JEFFREY SMITH

Senate appropriations committee from voting an increase in the President's budget and then compromising with the House at the level of that request. If any compromise is to take place, it will occur at a level below what Carter requested. Unless Kennedy is successful at holding the line, the NSF budget next year may not even keep pace with the rate of inflation.

The $16 million reduction in the budget ceiling was the result of a compromise between Kennedy and Hatch, one which acceded to Hatch the overall reduction, but preserved the increases made originally by Kennedy. To accomplish this, the alternative amendment shifted $8 million away from basic research within the agency budget, as well as another $8 million from other areas. Ultimately, it was passed, as well as the amended bill, by voice vote.

According to a staff aide for Hatch, "We got support for the reduction because of simple economics: the budget for basic research has increased substantially in recent years, and the mood of the Congress, as well as the nation in general, is one of fiscal conservatism. Even Kennedy realized that you have to start somewhere, and NSF is not the only agency that's going to be cut."

In his remarks on the Senate floor, however, Hatch offered other reasons why the NSF budget ceiling should be cut back, suggesting that he shares with other congressmen a more direct dissatisfaction with the agency's activities. "While I realize there is disagreement regarding the scientific significance of studies such as 'Ecological Interactions Between Flamingos and Lakes in the Andean Altiplano' for $16,500 or the 'Analysis and Hormonal Correlates in Parental Behavior in Marmosets' for $22,300, I think that the beleaguered American taxpayer would prefer another use for these funds," Hatch said.

Similar remarks were made during the NSF budget hearings this year by Representative Eldon Rudd (R-Arizona) and by Senator William Proxmire (D-Wisconsin), who chairs the Senate subcommittee that must approve the final NSF budget. Indeed, Proxmire and Senator Henry Bellmon (R-Okla.) have proposed to keep the NSF funding at the current level, where inflation would force the agency to sharply curtail its present activities.

"It would be an absolute disaster if one of these proposals got through," Atkinson said in a telephone interview. Prior to the recent cancellation of a key appropriations subcommittee meeting, Kennedy's staff said they had lined up enough votes to kill the proposals, but Bellmon's aides insist they have gained substantial support since then. "As the whole thing gets drawn out, the more worried I get," Atkinson said.

President Carter recently wrote to members of the Proxmire subcommittee, stating that "As the Congress considers final funding levels for R & D programs, I want to emphasize that relatively small reductions in key agencies—such as the National Science Foundation . . . would defeat our objective. Modest increments of real growth in these programs are necessary if we are to strengthen the nation's capacity and production in critical areas of research."

How much influence the President's letter will have cannot be predicted, however, largely because Congress is in a mood to cut back, particularly in those areas that have recently had funding boosts. The House Appropriations Committee, in its report on the NSF bill, noted that between 1970 and 1978, the NSF budget grew at an average annual rate of 3 percent above inflation, and NSF funding for research alone grew at an annual rate of almost 7 percent above inflation. "With this growth history in mind, and in accord with the Administration's decision to expand basic research support primarily through the mission agencies, the Committee does not agree that an increase in this account [research and related activities] beyond the cost of living is justified," the report states. In other words, the days of wine and roses are over.

Worth noting is the fact that the cost of living estimate used in the above statement is 3 percent. For the last few years, NSF has been insisting—with general congressional agreement—that inflation hit harder in areas related to basic research than it did in other sectors of the economy. Last year, for example, Congress was told that colleges and universities had experienced a 7 percent rate of inflation—as opposed to 6 percent for the economy in general—largely because of a sharp rise in faculty salaries. Extra funds were needed for basic research, therefore, just to keep pace. Within the last year, however, a study of inflation at colleges and universities by the National Institute of Education has suggested that the average annual rate of inflation for areas related to basic research since 1971 has actually been *below* the general inflation rate, not above it. The cost of salaries for faculty members and graduate students—which comprise 50 percent of NSF grants—has increased each year by only 4.8 percent; the overall cost of basic research has increased only 5.3 percent. According to Representative Rudd, "this error in adjusting NSF's annual basic research budget to compensate for inflation has resulted in the authorization of $12–15 million more each year than was intended. This is an added bonus of $36–45 million just since the fiscal year 1977 authorization."

Bellmon, in particular, is upset at the claim that more funds are needed for faculty salaries. His overall concern for NSF spending got its start when he tried to hire an aide to advise him on science from the university community in Oklahoma. Three times, according to his staff, he was told that the salary he was offering was not high enough, in part because of lucrative NSF contracting.

Similar, though more generalized, complaints about NSF have recently been raised by other members of Congress in connection with the budget. A recurrent one that perhaps is the most aggravating to the agency is that, contrary to its congressional mandate, NSF has failed to distribute its grants and contracts equitably among all of the states. Indeed, the statistics that bear this out leave little room for debate: 42 percent of the agency's research funds in 1977 went to only four states, New York, Colorado, Massachusetts, and California. Nine other states, mostly in the south, received only 6.4 percent of the research funds. Although the NSF insists correctly that its funded proposals are unsolicited, and chosen only by peer review, inequitable distribution of NSF funds is a matter of great concern to congressmen from the less fortunate states. Bellmon and Hatch, for example, both represent states near the bottom of the NSF grants list. Kennedy, of course, represents a state right at the top.

NSF officials have tried to fend the criticism off by offering to set up committees to study the problem along with the states at the bottom of the list (Arkansas, Maine, Montana, North Dakota, South Dakota, South Carolina, and West Virginia are currently being considered as prospects). The National Science Board approved the idea in January, and it is expected to get under way in August.

Whether or not such tactics will preserve the present rate of growth in the NSF budget over the long haul is doubtful. An associate director of the federal Office of Management and Budget, Bowman Cutter, recently told a AAAS symposium on research and development (*Science*, 7 July) that austerity will be the dominant theme of the 1980 budget, and yes, that scientists will have to absorb some of the cutbacks.

—R. JEFFREY SMITH