tary of Commerce and with the Office of Management and Budget.

Specifically, Representative Brown favors transferring fire services research to an outside organization, such as a university, that would take over the function on a permanent basis. But transitional funding, possibly through the National Science Foundation, should be provided for 5 years to allow for the establishment of a revenue base, Brown suggests. The program funding fix that Brown is floating, however, would be just a short-run solution for NBS. Brown contends the agency needs a 25 percent increase in its budget. "Without it they are going to have more and more serious problems," he notes.

In particular, William P. Slichter, chairman of the National Research Council's review board on NBS programs, cites government salary restrictions as a grave problem. Industry already pays more than the government for scientific talent, he notes. The Administration's freeze on salaries and restrictions on key grades 11 to 15, Slichter adds, will further damage the agency's ability to retain talent as well as attract it.—**MARK CRAWFORD**

Soviets Propose New Arms Agreement

Despite some defects, including tough constraints on lab research, a new Soviet arms control proposal might provide the basis for serious negotiations

The announcement of a sweeping new arms control proposal by the Soviet Union has generated both excitement and disappointment among U.S. officials and independent experts. At a press conference in Geneva on 1 October, shortly after the proposal was first described in detail, Max Kampelman, the chief U.S. negotiator, declared that it was a significant development and added that "I feel hopeful that maybe we can start to seriously negotiate." But he and others have also made clear that the offer is highly one-sided at present and that the path to an agreement will not be smooth.

The most favorable provision is thought to be the call for a 50 percent reduction in the nuclear arsenals of each side, a percentage even greater than that proposed by President Reagan in 1982. But the Soviets' price for this cut is U.S. acceptance of a host of ideas shunned by the Reagan Administration in previous negotiations, including a freeze on deployments of new strategic weapons, a ban on the deployment of all long-range cruise missiles, a moratorium on nuclear testing, and a ban on the development of space weapons.

No one disputes that obstruction of U.S. work on a comprehensive missile defense, officially known as the Strategic Defense Initiative (SDI), remains the principal Soviet objective. Their new proposal calls for a ban on all "purposeful" SDI research, development, and testing, which could block even laboratory work performed by the Department of Defense or its contractors. [When asked what they meant by the phrase "purposeful" at the Geneva talks, the Soviets cited the Mansfield amendment, approved by Congress in 1971, which requires that all Pentagon R&D be related to a specific military "function"—thereby suggesting that all Pentagon missile defense research would be encompassed by such a ban.] Most U.S. experts believe that compliance with this constraint would be unverifiable, and President Reagan has specifically ruled out any SDI research and testing limits beyond those already imposed by the SALT I treaty, which bans only field testing on breadboard models or prototypes of ballistic missile defense components.

The proposal on space weapons is officially a hardening of the Soviets' position. Earlier, U.S. officials were encouraged by public statements in which senior Soviet officials, including leader Mikhail Gorbachev and chief negotiator Viktor Karpov, had indicated that a ban need only encompass SDI testing outside a lab that can be readily observed by the other side. But several U.S. officials discount the significance of the latest shift, arguing that the Soviets are merely trying to gain bargaining leverage and that their flexibility on the topic persists. The difficulty is that "the Soviets have generally been unwilling to discuss the issue in any detail," according to a senior arms control adviser. Ultimately, the adviser added, the debate will probably focus on the admittedly ambiguous definition of the "missile defense component" in SALT I, with the Reagan Administration seeking the narrowest possible interpretation, and the Soviets seeking the broadest. "But this could be some way off," he said.

Other aspects of the Soviet proposal are also disliked by Administration officials. Specifically, the proposal characterizes all U.S. intermediate-range nuclear forces deployed in Western Europe, such as the ground-launched cruise missile and the Pershing II, as strategic weapons, while claiming that similar Soviet weapons, such as the SS20, are not. The effect is to expand the total U.S. arsenal subject to a 50 percent cut, while simultaneously excluding an important part of the Soviet arsenal. At a meeting of the Philadelphia World Affairs Council on 3–4 October, the executive director of the U.S. arms control delegation, Warren Zimmerman, called this "totally unacceptable."

In addition, the proposal has been interpreted by some officials as prohibiting the deployment of new U.S. strategic weapons, such as the MX, Midgetman, and Trident II missiles and the B-1 bomber, while allowing the Soviets to continue deployment of several similar new weapons, such as the SS24 and the SS25. But others privy to the discussions in Geneva thus far caution that several elements of the proposal remain ambiguous, and that the prevailing U.S. interpretation is merely an inference.

Despite the "usual hooks," as some officials put it, the proposal is regarded by many as a highly positive development in the strategic arms talks, which have essentially been stalled since 1979. Speaking at the same Philadelphia forum, for example, former Secretary of Defense James Schlesinger said that "the new proposal is something that can be worked on," and indicates a major shift in negotiating strategy by the Soviet Union. Similarly, Theodore Warner, a strategic systems analyst at the RAND Corporation in Washington, said that "it may provide the basis for a serious negotiation, and it indicates a [Soviet] willingness to cut that is truly surprising in the area of central strategic forces."

Should that reduction survive intact, according to several sources, the Soviet Union would have to dismantle roughly

1250 "strategic nuclear delivery vehicles," while the United States would have to dismantle 1680. A corresponding reduction of 50 percent or so might be made in the number of nuclear warheads on each side, which presently total about 12,000. (The willingness of the Soviets to discuss specific warhead limits, which the Administration considers extremely important, is considered a breakthrough.) In addition, because of another provision, much of the reduction on the Soviet side would have to occur in land-based missiles, presently considered highly threatening to the United States. On the American side much of the reduction would have to occur in submarines, which the Soviets greatly fear.

In the view of Schlesinger and many others, including even some officials within the Administration, the best features of the Soviet proposal will surely be withdrawn if President Reagan proves unwilling to bargain on SDI. Indeed, both the Arms Control and Disarmament Agency and the State Department have produced "white papers" that discuss a negotiating trade-off between deep reductions in offensive nuclear weapons and SDI constraints. According to one suggestion, the deployment of certain missile defense components, such as those based in space, would be delayed for a set time period—say, 10 years. Another idea under discussion is to allow the deployment of space sensors, but to prohibit the deployment of space weapons, again for a set time period.

For the time being, however, even internal talk of such trade-offs remains muted, and no formal recommendations have been forwarded to the U.S. negotiating team or recommended by its members to the rest of the arms control bureaucracy. Assistant Secretary of Defense Richard Perle, for one, is said to be opposed to any trade-offs involving SDI. Besides this division of opinion, there is also the matter of negotiating tactics. As Zimmerman says, "we certainly would like to find a compromise solution. Any arms control negotiator knows that agreement can only result from compromise. . . . [But] it is very wrong to refer to any elements of one's arsenal as a bargaining chip, becauses [such talk] reduces their value and inhibits the other side's willingness to pay anything for them."

Most experts predict that a deal will be cut only when the Soviet offer becomes much sweeter or the pressures for a treaty from the allies or domestic public opinion become so great that Reagan will decide to give in. They also agree that this point remains fairly distant.

—R. JEFFREY SMITH

Citizenship Stressed in New Education Report

A new report on higher education, produced by the Carnegie Foundation for the Advancement of Teaching, calls on higher education to pave the way for an "American resurgence." It was written by former University of Rhode Island president Frank Newman, who 15 years ago produced two reports calling attention to the growing homogeneity and bureaucratization of the nation's colleges and universities. Now, writes Newman, who is president of the Education Commission of the States, "the most critical demand is to restore to higher education its original purpose of preparing graduates for a life of involved and committed citizenship."

The report differs mainly from its predecessors of recent years in its emphasis on the need for schools to encourage more creativity, risk-taking, civic consciousness, and international awareness in students. "There is today a dangerous, growing mismatch between the country's urgent need for civic mindedness and the parochial attitudes of its citizens." Students are characterized as excessively preoccupied with jobs, status, and themselves; well-groomed but apathetic, afflicted with "an easy-going American kind of nihilism." They "too frequently sit passively in class, take safe courses, are discouraged from risky or interdisciplinary research projects, and are discouraged from challenging the ideas presented to them."

The report says that much of the concern about future technical manpower for the country is "misdirected," and that the over- or undersupply of graduates is not as much an issue as is whether education "makes a difference to the quality of their lives." The capacity to innovate and keep up with the times is more critical than the nature of technical training: "Can the leaders of the automobile industry accept women in management with as much enthusiasm as they have the front-wheel drive?"

The report contains recommendations on several other fronts:

- Student aid: The report claims that the "go now, pay later" philosophy "undercuts traditional values" and steers debt-burdened students into safe jobs. Measures are proposed to link student aid with service work, such as a program for students to pay off loans through teaching.
- Minorities: "The subject of minority education must return to the head of higher education's agenda." Progress has not been as great as some people think—from 1975 to 1982, for example, black enrollment fell from 8.5 percent to 8 percent. A National Opportunity Fund is proposed, modeled on the Fund for Improvement in Post-Secondary Education, which would offer competitive grants to programs for the disadvantaged.
- University research: There needs to be more on economic development and less on defense, with more money to university laboratories and less to government ones. Information flow should be facilitated by the establishment of four "regional periodical centers," and the National Science Foundation and the National Institutes of Health should set up new grant programs for research instrumentation.

—CONSTANCE HOLDEN

Gene Therapy Guidelines Approved

Guidelines on human gene therapy research were approved unanimously on 23 September by the Recombinant DNA Advisory Committee of the National Institutes of Health. The guidelines apply to the treatment of somatic cells, not germline cells, and govern only NIH-funded research.

The guidelines will be used by the committee to evaluate researchers' applications to perform gene therapy experiments, which may be filed in the near future (*Science,* 23 August, p. 736). The document approved is virtually the same as the version circulated in the *Federal Register* on 19 August. Researchers will be asked, for example, to explain why the disease to be studied is a good candidate for gene therapy, to provide a full description of methods to be used, and to describe the selection of patients and how the experiment will be explained to patients. The formal title of the document is "Points to Consider in the Design and Submission of Human Somatic-Cell Gene Therapy Protocols."

—MARJORIE SUN