carried out. However, Rasmussen is the first among those who worked on it to argue that despite the prejudicial circumstances everyone involved did his best to be objective.

Ultimately, of course, the study will be judged on its substantive merits, which have already been debated considerably, but which will be reviewed further, both in a subsequent report by the UCS, and by a new, "independent" study group appointed by the NRC, headed by Harold A. Lewis, of the University of California at Santa Barbara.

—DEBORAH SHAPLEY

Videoconferences via Satellite: Opening Congress to the People?

The 3½-hour legislative hearing conducted 8 June by the Senate Subcommittee on Science, Technology, and Space was like no other ever held by this or any other congressional committee. Senator Adlai E. Stevenson (D–Ill.) and the other three senators participating were seated in their usual places in the Commerce Committee hearing room in the Dirksen Senate Office Building in Washington. But the several panels of scientists and other witnesses taking part were 800 miles away, in the federal courtroom in Springfield, Illinois. The hearing was a videoconference, with the senators and the witnesses engaged in a two-way visual and audio exchange via the new U.S.–Canadian Communications Technology Satellite (CTS), which the National Aeronautics and Space Administration placed in synchronous orbit 22,300 miles above the earth in January of 1976.

This was, as one senator put it, a "historic first" in the use of television in the legislative process. The hearing happened to be about a bill to improve U.S. capabilities in forecasting the weather and climate trends, but, the important thing on this occasion was the communications technology which was being employed and what it presaged.

"By this device," said Senator Stevenson, referring to the CTS, "Congress may be able to conduct hearings in all parts of the world without leaving the Capitol or requiring witnesses to travel to the Capitol." He suggested that the videoconference via satellite would ultimately lead to significant savings in both time and money for members of Congress and witnesses—and to a much fuller public involvement in legislative deliberations.

The videoconference on the climate bill, which came off smoothly except for some distracting scratchiness in the audio system at the Washington end, required use of NASA's Portable Earth Terminal (PET), a television van which the agency has been moving about the country to accommodate a variety of CTS experiments in educational TV, refresher medical courses for rural doctors, and the like. The PET was parked outside the Federal Building in Springfield to exchange signals with the CTS, which was similarly linked with the Goddard Space Flight Center at Greenbelt, Maryland. Goddard and the hearing room in the Dirksen Building on Capitol Hill were connected by telephone lines and microwave.

This videoconference was the second of three demonstrations of congressional applications of the videoconference-CTS technology which have been planned by Fred B. Wood of George Washington University. The first demonstration arranged by Wood, who is director of the university's program of policy studies in science and technology, took place 15 April. Representative Charles Rose (D–N.C.), holding forth at a small studio at NASA headquarters in Washington, engaged in a lengthy closed-circuit videoconference discussion with some high school students and local officials assembled in the library of a high school in Raeford, North Carolina, a small town in his congressional district.

The students, about 150 of them, had chosen a panel of five to put most of the questions to Rose, and observers say that this interview was anything but stage-managed. The panel's questions ranged from pot and abortion to energy and the social security system. More than once, Rose, who is said to be an adept user of the tube, had to confess he was at a loss for an answer. "From a political point of view, I think Rose came out ahead because he was open and forthright and did not pretend to know things which he didn't know," observes Wood, who believes that this videoconference met its aim of achieving an open dialog between congressman and constituents.

An extremely ambitious demonstration of applying the videoconference-CTS technology to the problem of making a busy member of Congress more accessible to the press in his home district or state is planned for 21 July. At 11 a.m. on that day, Senator Howard Metzenbaum (D–Ohio) will conduct, from the NASA studio in Washington, an hour-long press conference with what evidently will be a good cross-section of virtually the entire press corps of Ohio. The reporters will gather at the studios of eight different television stations which, located in various cities across the state, constitute a microwave-linked educational TV network. This network will be linked to the CTS via the NASA ground terminal at the agency's Lewis Research Center in Cleveland. Although the press videoconference will be by closed circuit, it will be taped for showing statewide the next night (Friday, 22 July) at 10 o'clock over the Public Broadcasting Service.

In view of these demonstrations, Senator Lee Metcalf (D–Mont.), chairman of the Joint House-Senate Committee on Congressional Operations (which 3 years ago held hearings on Congress and its use of existing and emerging communications systems), is highly enthusiastic about the potential the videoconference-CTS technology holds for helping to overcome what he regards as a deep malaise affecting relations between members of Congress and their constituents. Following the videoconference on the national climate program legislation, Metcalf spoke thus:

> For too many years the federal government has been seen to be remote, unresponsive, insulated, and untrustworthy. All of us sense the feeling of distrust whenever we are able to return to our home states, visits which have become more and more infrequent over the years as congressional sessions have steadily lengthened and the workload has continued to expand. In these circumstances, there are compelling reasons for us to be looking for new ways of relating the work of the Senate to the people, for bringing more citizens into our hearings as participants, for listening to voices other than those of the professional witnesses we tend to hear year after year in the development of legislation. Ultimately, if we can realize the use of this [communica-

Carter Aides Lament Research Decline

Key officials of the Carter Administration are concerned about downtrends in the level of support for basic research, but economic constraints may make it difficult to pump more money into the nation's laboratories.

Such was the gist of comments made by a number of Administration officials, congressional staffers, and close observers of the Washington scene at the second annual AAAS-sponsored colloquium on "Research & Development in the Federal Budget." Some 250 participants attended the conference, which was held at the Sheraton National Motor Hotel in Arlington, Va., on 15 and 16 June, with financial assistance from the Sloan Foundation.

Two of the Administration's top money managers—W. Bowman Cutter, executive associate director for budget in the Office of Management and Budget, and William D. Nordhaus, newly appointed member of the Council of Economic Advisers—gave speeches stressing the importance of investing in basic research to sustain economic growth. They lamented that federal expenditures for basic research have declined steadily in real terms (taking account of inflation) for the past decade or so. The drop was almost 22 percent between 1970 and 1976. They also suggested that this downtrend might be related to what Nordhaus called "an alarming rate" of decline in productivity growth—from 3.5 percent in the period 1948–1955 to only 1.9 percent in the period 1965–1976—although both acknowledged that the causal connection could not be proved.

But whether the Administration's concern over funding trends will lead to greater spending on basic research remains uncertain. Various speakers noted that President Carter has pledged to balance the federal budget by the end of his first term, an effort that is virtually certain to restrict spending on "controllable" budget items, of which research and development are prime examples.

Some speakers suggested that the President's determination to use "zero-base budgeting" procedures may prove harmful to research budgets. The gist of the zero-base budgeting approach—which was developed by the TRW company and applied in Georgia while Carter was governor there—is that *all* proposed expenditures for a given budget package are reviewed and challenged, not just the incremental changes that have been proposed as modifications in the previous budget levels. Thus, entire programs may find themselves challenged and perhaps abolished, whereas in previous years haggling focused on how much to increase or decrease those programs.

Budget official Cutter suggested that basic research and R & D are "particularly vulnerable to casualty in this kind of process" because one can "turn them on and switch them off" without noticing much immediate effect; the results become apparent only years later. But President Carter is sensitive to the need to view research in a "broad perspective," he added, and there is no reason to think that budget decisions will be arbitrary. Some participants viewed zero-base budgeting as a threat to research funding; others predicted it would have no particular impact on funding levels; and one suggested it was a threat only to research of low quality.

Participants came away with differing impressions of the prognosis for research funding. Robert Hirsch, a former government energy official who is now with Exxon Corp., found the message "pretty grim" for basic research in the immediate future. But William D. Carey, the AAAS executive officer, saw "a mixture of light and shadow" with encouraging signs that "basic research has won some powerful friends in high places."

The colloquium touched on, but did not discuss in depth, a proposal for new budgetary procedures developed under AAAS auspices by Willis H. Shapley, a former federal budget official and space agency administrator.* Carey said AAAS officials will explore these concepts further with the Carter Administration.—P.M.B.

*The proposal is set forth in *Research & Development in the Federal Budget: FY 1978*, by Willis H. Shapley, Don I. Phillips, and Herbert Roback, available from Department L, AAAS, 1515 Massachusetts Ave. NW, Washington, D.C. 20005, $5.50 (AAAS member price: $4.95). For instructions on ordering the previous year's report, or both reports at a special rate, see *Science*, 17 June, p. 1264.

tions satellite] technology and gain routine access to [it], the Senate and individual senators could schedule "town meetings" with groups of constituents on a reasonably frequent basis.

. . . Yesterday's experiment by the science subcommittee was limited to a closed circuit link between the Senate hearing room and the witnesses in Springfield. But the same technology can be used to direct public service broadcasts to local stations, allowing live or delayed telecasting of hearings or debate in any state or region which may be affected by a particular bill or committee investigation.

I believe this opens the prospect for a new era in representative democracy.

Videoconferences are, of course, already familiar to viewers of both commercial network and Public Broadcasting Service (PBS) news programs—for instance, a few months ago PBS reporters arranged a discussion of western drought problems between Secretary of Agriculture Bob Bergland in Washington and Governor Jerry Brown in California, with the reporters also participating. Such videoconferences, generally transmitted by commercial land lines, have entailed up to several thousand dollars an hour in transmission charges. But Wood says that transmission of videoconferences via one or more commercial satellite channels leased by the Congress on a continuing basis could be relatively cheap, perhaps averaging well under $100 for each hour a channel is actually used if a brisk demand for this service develops.

But the videoconference is still so new that development of a substantial congressional demand for this kind of communications service may have to await more pioneering effort and demonstration projects. According to Wood, more than a dozen senators and representatives—out of about 20 who were approached—were interested in participating in his project, but, given limitations of time and money and the complexity of scheduling the videoconferences, it has thus far been possible to arrange only the three already described. Once these have been completed and fully evaluated, it will then apparently be up to interested members of Congress such as Rose and Stevenson to try to bring about further congressional use of videoconferences.

Already Congress has put some of its old-fashioned ways behind it and become more receptive to the idea of applying modern communications technology to its activities. For instance, the House is just now winding up a test of closed-circuit television coverage of its floor proceedings, a test which has allowed members with offices in the new Rayburn House Office Building (which is

completely wired for closed-circuit TV) to follow debates even when not on the floor themselves. Furthermore, an unofficial bipartisan group of about 75 members of the House known as the "Clearinghouse on the Future"—behind which Rose has been a prime mover—has asked Western Union and RCA to submit proposals for selling to Congress, at bargain rates, satellite channel time in nonpeak hours which could be allocated among interested committees and members for videoconferences.

The CTS, which cost $80 million to develop, build, and launch, may reach the end of its useful life within another year. But it was designed strictly as a research and demonstration device and was never intended to become part of an operational system. If NASA and the Congress do as the National Research Council (NRC) has recommended in a recent report, the agency will continue its support of R & D on developing uses of communications satellite technology in the public sector. As Wood points out, the NRC has in particular called for NASA to develop a new generation of public service satellites that would pick up where the CTS and another existing communications satellite, the ATS-6, leave off.

Wood, together with many of the members of Congress who have commented on congressional use of videoconferences, are mindful that such use and the televising of congressional proceedings can be subject to bad abuse. Senators and representatives and committees could very well contrive to conduct videoconferences for wide public viewing which would be masterpieces of stage management and "PR." One safeguard against this would be for the House and Senate to adopt rules denying use of videoconference facilities to any individual member or committee who could not vouch for the legitimacy of the planned event in terms of balance in the points of view to be presented and of equal access—especially in campaign seasons—for political rivals. Another safeguard would be to place the videoconference facilities in the members' home districts and states under the management and control of authorities who can be counted on to demand political fair play and a serious and balanced treatment of public issues.

It is of course true, given even the best of rules for their conduct, that videoconferences could offer a political advantage to the senator or representative who handles himself particularly well on camera. Yet the qualities of intelligence, articulateness, forthrightness, and force of character that make for a convincing performance on television are not all that different from those that most citizens look for anyway in a public man or woman.

In sum, as Senator Metcalf has suggested, the same on-rush of technology that has produced an increasingly complex society and an enormous workload for Congress has led to new possibilities in communications which, if properly used, may put even the busiest senators and representatives back in closer touch with their constituents. To speak of a "new era in representative democracy" may be going pretty far, but the communications satellite and the videoconference technology can plainly make it easier for citizens to have a say on pending issues and to keep better tabs on their members' attitudes and performance.

—LUTHER J. CARTER

The Senate Subcommittee on Science, Technology, and Space conducts videoconference hearings from Capitol Hill while the witnesses testify from the federal building in Springfield, Illinois. The four senators seated at the curved dias are (from left) James B. Pearson (R–Kan.), Barry Goldwater (R–Ariz.), Harrison Schmitt (R–N.M.), and Adlai E. Stevenson (D–Ill.), the subcommittee chairman. The hearing was about a proposed new national weather and climate program, and in this photo, the senators are following the testimony of Linda K. DeGrand of Cargill Investors Services, Inc., a major farm commodities company in Chicago and user of weather information. Among the other witnesses appearing in Springfield was Verner Suomi, a professor of space science and engineering at the University of Wisconsin and a well-known climatologist. Commenting on the videoconference afterward, Suomi said, "The only thing lacking was the opportunity to shake hands with the Senators." [NASA photo]