tee is a sizable damping of the national space effort and the assignment of some of its resources to other purposes. Politically, that objective is still out of reach. The space budget of slightly over $5 billion went through Congress again this year without any real difficulty, but in Lyndon Johnson's harem of federal programs, space—once among the most favored—now has to contend with new conditions and new competitors. No one is talking about turning off the space program; obviously it is here to stay, and to stay at a fairly costly level, but many of the arguments that helped nurture it through infancy have not weathered too well. Coming into existence at a time when an East-West detente seemed to be in the works, it was ballyhooed as a benign substitute for war, a surefire way of stimulating technological innovations for the civilian economy, and a WPA for the aerospace industry. But now no substitute for war is needed; we have a real war. The "spinoff" or "fallout" argument long ago passed beyond the bounds of both economics and common sense. [Senator William Proxmire (D–Wis.), long a sniper at the space budget, recently remarked, "one would think that the purpose of the space program is primarily to provide fallout. . . . We could spend $5 billion on a cure for baldness—and sometimes I wish we would—I am sure there would be a great deal of fallout from that; but it seems to me that the program should stand on its own feet."] Finally, social planners in Washington are suddenly intrigued by the expertise of science-based, systems-oriented industry and wonder how it might be turned loose on the economic and social conditions that are producing virtual insurrections in cities across the country. There is no authoritative answer to this question. But suddenly there is less credibility in the arguments that the amounts spent on space are unconnected with the amounts spent on education, rebuilding of cities, health care, or other efforts directly related to human welfare. In the early days of the space program it was argued, and correctly so, that Congress simply refused to enact or put substantial sums into these programs, and that the good fortune of space was not at the expense of welfare. But now, since Johnson's remarkable success in winning legislative approval of his domestic program, welfare has been admitted to the public trough. The issue is no longer political certification of welfare programs; rather, it is what slice of the public pie are they going to get. And this brings them into competition with everything else, but most of all with the Vietnam war and space.

When the space budget came up in the Senate last month, Proxmire made his annual effort to trim it down. First he offered an amendment for a 10-percent cut. There followed a familiar debate, in which Proxmire and Senator Paul Douglas (D–Ill.) trotted out the standard antispace arguments, replete with quotes from generals who see no military value in the moon program and scientists who think the money should be spent otherwise. They were met by Senator Clinton Anderson (D–N.Mex.), who chairs the Senate Aeronautical and Space Sciences Committee, and Senator James Symington (D–Mo.). They argued spinoff, fallout, military value, national goals, technological supremacy. When it came to a vote, the Proxmire amendment was defeated, 65 to 18. Proxmire came back with a proposal for a cut of 3 percent rather than the rejected 10 percent. This, too, was defeated, but by a lesser margin, 52 to 31. (Since Bobby-Kennedy-watching is getting to be a popular pastime, it might be noted that the Senator from New York voted for Proxmire's space-cutting amendments in 1965 and 1966.

Whatever trend may be suggested by the two Senate votes this year, the fact is that the space budget sailed through by a very comfortable margin and was never in difficulty. The President obviously can count on Congress to go along with whatever he prescribes for space. The question is, What will he prescribe? With war in Vietnam and war in the streets undermining his designs for the Great Society, it is not improbable that Lyndon Johnson occasionally wonders about the wisdom of shooting $5 billion a year into space.

—D. S. GREENBERG

Systems Approach: Political Interest Rises

The idea of applying the "systems approach" to the solution of domestic problems such as environmental pollution, traffic congestion, and crime control is, of course, familiar to the technically literate and to a growing number of public officials. Now some Republican congressmen and senators are giving notice that they will try to drum the systems concept into the heads of ordinary citizens and voters.

On 25 August, 44 Republican congressmen and ten Republican senators introduced legislation to establish a National Commission on Public Management as the first step toward implementing what the congressmen called a "revolutionary new concept." The congressmen said that their proposal envisaged having problems such as water pollution and urban blight farmed out by government to private industry, which would use the "modern 'systems management' approach and technology to develop and administer a comprehensive solution."

Senator Gaylord Nelson of Wisconsin, a Democrat, immediately derided the Republicans, indicating that they weren't the avant-garde politicians they pretended to be. "The support of these Republicans should be extremely helpful in enacting the legislation which I introduced last October," Nelson said. The Nelson bill—dubbed the "Scientific Manpower Utilization Act"—would authorize the Secretary of Labor to spend $125 million in helping states and universities (or other public or private institutions) to apply systems analysis and systems engineering to urgent problems.

Nelson noted that in 1964 Governor Edmund G. Brown of California —a fellow Democrat—had aerospace firms submit bid proposals for conducting studies in the fields of waste dis-

posal, transportation, crime control, and information services. The California studies, he said, had "demonstrated compellingly that the concept of systems analysis could in fact be applied creatively to social problems."

The Republican congressmen and senators sponsoring the systems management bill are, ideologically speaking, a heterogenous lot. Representative F. Bradford Morse of Massachusetts, a prime mover behind the legislation, belongs among the moderate-to-liberal Republicans. But the sponsors include a number who are distinctly conservative, among them Senator John G. Tower of Texas. According to Morse, advocacy of an industry-managed systems approach to solving social problems is likely to become a major Republican theme. Morse says that, while the Republican minority leader, Representative Gerald R. Ford of Michigan, is not among the 44 sponsors of the legislation, he is interested in it.

With Democrats in control of Congress and the Administration, Republican legislative proposals seldom follow a charmed course, however. The principal effect of the Republicans' systems management proposal may be to encourage the administration to come forward next year with a proposal of its own, perhaps by adopting the Nelson bill or some variation of it. In fact, even prior to the Republican initiative, some administration planners were considering the possibility of such a step. "This has not been high on our agenda, but it's an idea which has been percolating," one official said.

The administration is still in the painful process of having all government departments and agencies adopt the integrated system of analysis, program planning, and budgeting which Secretary of Defense Robert S. McNamara and his former comptroller, Charles J. Hitch, instituted at the Pentagon in 1961. One qualified observer within the administration reports that adoption of the new methods is well under way but that several years must pass before they become part of the bureaucratic way of life.

This view is supported by a high official who says that the secretary of his department has been chary about accepting systems analysis and mathematical model studies as basic tools in making assessments and decisions in some vital areas of national policy. Moreover, the official says it has taken him 18 months just to persuade one of

NEWS IN BRIEF

● **SPACE COOPERATION:** The meteorological "hot line" between Washington and Moscow began functioning, the way it was planned, for the first time last month, when the Russians—unannounced—began transmitting weather data from their satellite Cosmos 122, launched 25 June. The Russian step represents a first move toward implementing standing bilateral agreements for cooperation in weather prediction. The agreements, signed in 1963 and expanded in 1964, were designed to bring about extensive cooperation, including joint planning and coordinated launching of weather satellites, but have thus far remained largely inactive. (*Science*, 12 April 1963; 8 July 1966). The weather line, established in 1964, has so far been used by both sides only for transmission of data acquired by conventional means, although U.S. satellite data have been available to the Russians through a daily worldwide weather report broadcast from Washington. U.S. officials, tied to a rigidly tit-for-tat policy in exchanges with the Russians, hope the new move will be the occasion for arranging the regular exchange of satellite data on a basis of equality.

● **MEDICAL COSTS:** President Johnson has directed HEW Secretary John Gardner to begin a major study of rising medical costs, following newspaper reports that some doctors have raised their fees for patients over 65 as much as 300 percent since Medicare went into effect 1 July. The purpose of the study, which will be run by HEW in cooperation with the Labor Department, the President's Council of Economic Advisers, and other federal agencies, is chiefly to investigate the facts; remedies will be considered later. The investigation will cover not only doctors' fees but also hospital charges, the cost of medicines, and other related medical expenses. The cost of these services, Gardner reported last week, has risen by 3.4 percent during the last 6 months.

● **FINALE OF MOHOLE:** NSF is bringing work on Project Mohole to a halt, following a Senate decision to go along with the House on cutting off funds for the deep-drilling program (*Science*, 26 August). Some dozen subcontracts that are nearly completed, including several on positioning systems, will be allowed to run their course. All other work, including construction of the drilling platform at the National Steel and Shipbuilding Co., San Diego, has been ordered to stop. Before the cutoff date, NSF had contracted to spend about $55 million and had actually laid out about $38 million. Cancellation clauses in the contracts will enable it to recover some of the difference, but just how much is not certain.

● **JET AIRCRAFT NOISE:** New York congressmen, who obviously had been hearing plenty from constituents about jet noise, sought unsuccessfully last week to have an Office of Aircraft Noise Control and Abatement created within the proposed Department of Transportation. The office would have supervised research and development work and established abatement and control regulations. The New Yorkers would have provided for the office by amending the Department of Transportation bill, before its passage by the House. The amendment was rejected, however, partly because of objections that a reorganization bill should not create new government functions.

● **OCEANOGRAPHY:** The new Cabinet-level National Council on Marine Resources and Engineering Development, which held its first meeting on 17 August, will not displace the existing Interagency Committee on Oceanography. ICO ordinarily will report to the new council, not to the Federal Council on Science and Technology, as in the past. The council has been instructed by President Johnson to have its initial legislative recommendations ready by next January. Vice President Humphrey, chairman of the council, has observed that the new organization's role will differ from that of the National Aeronautics and Space Council, which he also heads, because there is no NASA in the marine resources field. Edward Wenk Jr., the council's executive secretary, is taking an 18-month leave from the Library of Congress's Legislative Reference Service, where he is chief of the Science Policy Research Division.

his own principal subordinates to undertake a systems study of his agency's procedures. The Northeast Corridor transport studies (*Science*, 4 March 1966) illustrate strikingly how the government can use systems analysis as an integral part of its process of program development, however.

In view of the very gradual—in some cases grudging—acceptance of systems analysis techniques within the federal government, it is not surprising that the states and localities should need help and encouragement in using these techniques. Inquiries received by the Bureau of the Budget about the new planning, programming, and budgeting (PPB) system indicate that interest in this approach to management and decision-making is becoming widespread.

The PPB methodology involves a comprehensive and precise statement of government objectives, together with cost-benefit studies of various alternatives for attaining those objectives. Mastering this methodology can be a first step toward effective use of systems analysis studies of major social problems.

The Bureau of the Budget is helping to organize a 12-month pilot project for the development of PPB systems by five states, five counties, and five cities in several program areas, such as health and public housing, which receive substantial federal support. The operational phase of the project has not yet begun, and the states and localities which will participate have not yet been identified. New York City has moved on its own initiative to adopt the PPB system, to make greater use of computers (in police work, for example), and to undertake systems studies leading to a reorganization of the city government.

If effective use of the new approach to government decision-making and problem-solving is to be widespread, a much larger federal effort to assist the states and localities in that regard apparently will be necessary. Systems analysis of major problems is not cheap, and, furthermore, it demands special training of those who sponsor the studies as well as of those who conduct them. When California began its four initial systems studies, for which it paid $100,000 apiece, the state found that it lacked the competence to monitor them. It hired System Development Corporation to oversee the methodological aspects of the studies conducted by the four aerospace companies—Aerojet General, Space-General, Lockheed, and North American Aviation.

After several days of hearings on his bill, held in Los Angeles and Washington, Senator Nelson has concluded that the measure should be revised to provide for more than just funds for the financing of systems studies. He would provide also for at least enough training of state and local officials in systems analysis techniques to enable them to monitor studies done on contract. Not only is some technical expertise required of those who monitor studies, but some grasp of systems analysis methods by government policy makers is necessary if the study results are to be used and appreciated.

Brown Enthusiastic

Governor Brown of California has enthusiastically endorsed the Nelson bill. Although some people are disappointed that the first California studies have not yet led to dramatic action programs, the state has shown enough interest in the results to follow them up with further investigations. For example, a $200,000 contract for a study of social welfare problems has been awarded to Space-General Corporation, partly as an outgrowth of the crime control study which Space-General conducted. A $200,000 contract also has been awarded for a study of land-use data, a project closely related to the study of a statewide information system. If some urgency has gone out of the California study program, it is because the aerospace industry has not suffered the heavy loss of defense and space contract work once feared.

Some large questions must be answered before "systems" to combat pollution, crime, urban blight, and other social ills are not only formulated but established and put in operation. Just what such systems would be, and how they would operate, generally remains vague.

Having a private firm establish a waste disposal system for a large metropolitan region is perhaps one way of overcoming the region's political fragmentation. But that fragmentation may prove one of the greatest obstacles in creating the system in the first place. How can the multitude of individual political units within metropolitan regions be brought to collaborate in so novel a venture? And will they simply have a company establish the system, then turn it over to a regional political authority for operation? Or will the operating authority be delegated to the company? And, if the latter, how will the voters react to the fact that a profit-making enterprise has been given authority to run a service affecting their interests?

These and other questions involved in the application of systems analysis to social problems are indeed important and difficult—so much so that the Republican enthusiasts for the "systems approach" believe that establishment of their proposed National Commission on Public Management should precede any other steps. The commission would be asked to identify those social problems to which the systems approach is most applicable and to suggest how that approach can best be applied. The 13-member commission would consist of two senators, two congressmen, and nine members to be appointed by the President from among persons in government, education, business, or research, who have special training or interest in the matter which the commission will consider.

For his part, Senator Nelson calls the Republican bill a "half-hearted step," and says that no national study is needed. However this may be, it now seems evident that political interest in the systems approach to the problems of government and society is fast growing. This may be taken as a hopeful sign by those who believe that this approach offers the only real solution to problems which are among the nation's most important and vexing.

—LUTHER J. CARTER

Announcements

The **National Endowment for the Humanities**, part of the National Foundation on the Arts and the Humanities, recently awarded its first grants. The recipients are:

The Modern Language Association of America: $300,000 for a center to edit and publish accurate editions of the works of several American writers since the mid-19th century.

The American Classical League: $32,500 to study and make plans for improving Latin instruction in secondary schools.

American Council of Learned Societies: $25,000 to help meet the expenses of U.S. scholars participating in international conferences.