Congress: Lag in Science Advice Gives Executive an Advantage

One of the most bizarre features of any advanced industrial society in our time is that the cardinal choices have to be made by a handful of men: in secret: and, at least in legal form, by men who cannot have a first-hand knowledge of what those choices depend upon or what their results may be.—C. P. SNOW, in *Science and Government*

. . . most scientists are working with tools and methods that give only a partial glimpse of the real nature of any complex human and social problem.—DON K. PRICE, in *Government and Science*

Federal agencies expect to obligate $14.7 billion for research and development during the coming fiscal year, and Congress, to judge from past performance, can be expected to approve most of these funds for science more or less on faith.

It is not unusual to hear legislators state their predicament in voting on the science budget in just these terms. Last May, for example, Representative Clarence Brown, the ranking minority member of the House Rules Committee, opened debate on the bill authorizing a $3.7 billion budget for the National Aeronautics and Space Administration with the rueful comment that "there seemingly are few Members of the House—and I suspect very few citizens of this country—who know for a certainty whether the amount contained in this bill is the proper one."

Brown went on to express the hope that the Appropriations Committee would subject the bill to searching scrutiny, and he concluded his remarks by saying, "So I feel, very frankly, with a situation here in the House of Representatives where we must accept this legislation on faith, because programs of this type—some of them at least, if not all—must go forward. We must accept them on faith and hope that the expenditure of these huge funds authorized in this bill will be in the best interests of the American people and the world peace we all seek."

Brown is a resolute defender of congressional power and prerogatives and a stern auditor of most kinds of federal spending, and his statement is a measure of congressional acquiescence on science appropriations.

Fears within Congress that the Executive is usurping congressional powers are probably as old as the Republic, but in regard to federal operations affecting science, there is little question that the legislative branch's traditional fiscal control and influence on policy have been eroded. As rising federal expenditures on science have obliged Congress to consider new and highly complex questions, it has in many cases had to default to the Executive, with its decisive advantage in information and expertise. Senators and congressmen as individuals simply do not have the background, and Congress as an institution has so far not developed the apparatus of advice, to put itself on an equal footing with the Executive in making most major decisions on science policy and programs.

The nonscientific bent of Congress at large is indicated by studies of the professional and occupational backgrounds of its membership. These studies show, for example, that in the last Congress, whereas well over half of the members of the Senate and House were lawyers, scientists were a conspicuously under-represented group.

By the least rigorous criteria of education and experience, there was not a single scientist in Congress, and the total number of engineers, physicians, and dentists barely exceeded a dozen. Some members, such as Senator Humphrey, who worked as a registered pharmacist, and Representative Hosmer, who was an attorney for the Atomic Energy Commission, have had experience which may add to their understanding of issues involving science. But on the record, federal politicians are not scientists.

The same statistics suggest, to put it another way, that scientists are not interested in electoral politics, or at least that they do not get elected. There are doubtless adequate economic and career reasons why scientists of ability and reputation avoid federal politics, but anyone who has seen scientists and legislators confronting each other in the committee room or at the Washington party takes away the impression that scientists and politicians are unaccustomed to each other's company and belong to different tribes with distinctly different laws and customs.

It is fair to say that the legislator's attitude toward scientists is tinctured with awe. He feels that scientists are privy to the secrets of nature and also, since they built the bomb, that they are trustees of national security. This awe is not endangered by familiarity, since senators and congressmen, in the line of duty, actually see very little of scientists. They deal mainly with science administrators, who must develop the special knack of interpreting the needs of their agencies in terms that a legislator and his constituents can understand.

If a legislator wants to find out for himself what is going on in a science program in Washington or beyond, he will probably deal with agency liaison and information officers rather than with scientists, unless he is unusually inquisitive.

Government scientists, for the most part, work in laboratory enclaves and see legislators only when the latter are on inspection tours. Another, larger group of scientists do the government's work in industry, universities, and research institutes linked to the government by the attenuated bonds of federal contracts.

Appeal to Authority

Not only do legislators see little of scientists; they may also get the feeling that important decisions on federal science policy are made outside government by the advisory panels and committees of distinguished scientists which the federal science administrators like to have to back them up. Whether the decision is on a fellowship grant or a major piece of science policy, there is almost certain to be a committee of experts from the scientific community in the background to answer an appeal to authority.

The organization of federal science cuts off the scientists from the legislator in a way that the specialist in, for example, the departments of Agriculture, Labor, or Commerce, is not cut off, and thus congressmen and

senators are deprived of a helpful source of information and advice.

Scientists and legislators have not developed closer working relationships for other, more elusive but nonetheless significant reasons. Scientists and politicians, in an important sense, don't speak the same language. Not only is the scientist's idiom becoming increasingly private, but scientists and politicians use language for different purposes. Scientists strive for precision and admire the brevity and exactitude of the formula. The politician very often exploits the vagueness and allusiveness of language to achieve a protective imprecision. Communication between the two groups is often uncomfortable.

The writings of scientists, especially those directed in letter form to senators and congressmen, suggest that scientists harbor a distaste for politics and a cynicism about politicians. They seem to feel that science is pure and politics is dirty and that the method of the first is obviously preferable to that of the second. Scientists often favor the solution of political problems by strict application of logic or by tests of efficiency or economy—methods which in many cases would guarantee disaster.

Objectivity is a cardinal virtue of science, and many scientists seem to see a fundamental conflict between this objectivity and the compromise which is a necessary element of democratic politics. The lack of affinity between the scientist and the politician makes it difficult for them to work together, but its significance is speculative. Of much more definite influence on congressional competence in science is the quality of advice on science that Congress now gets.

There is a general feeling in Congress that on most scientific issues the internal machinery for providing advice at present is inadequate. Members of the personal staffs of congressmen and senators tend to be generalists like their employers, and, with virtually no exceptions, their training and instincts are nonscientific. The professionalization of congressional committee staffs has only begun, and the committees, with a few notable exceptions, are still patronage fiefs of the chairmen. The science and technology section of the Library of Congress is undermanned and underfinanced, and the Library's Legislative Reference Service, which was established to provide specialized help to Congress in the evaluation of legislative proposals, has a single senior specialist in science.

If Congress as a rule has been a poor match for the Executive in dealing with science, one committee has proved an exception—the Joint Committee on Atomic Energy. Over a period of years and particularly on some issues, the Joint Committee has been an unusually active and influential shaper of policy on the uses of atomic energy. Observers of Congress say that the Joint Committee not only has been given momentum by some vigorous and aggressive members, but also has two special advantages not enjoyed by other committees.

First, the committee by law must be kept "currently and fully informed" by the Atomic Energy Commission. Second, the committee has had the services of staff members with scientific and technical competence borrowed from the federal agencies and military services.

By insisting on its right to information and relying on its own experts, the Joint Committee has achieved a position of authority which other committees envy.

Prestige and Power

The eruption of science into government, however, has been an overwhelming experience for most committees. Even the Armed Services Committees of the House and Senate, which are remarkably well informed on their subject and formidable in the realm of policy, cannot ride close herd on the Defense Department's budget for research and development, which next year will hit $7.3 billion if requests are approved.

The House and Senate committees which handle the authorizations for the nation's fastest growing enterprise—the space program—are still in the relatively early stages of building expertise and prestige. The Senate Aeronautical and Space Sciences Committee and the House Science and Astronautics Committee both were created in 1958 in the wake of Sputnik I, but both are fledgling committees by congressional standards. Under the leadership of its new chairman, Representative George Miller, the House science committee last year showed a new vigor (*Science*, 25 May 1962) which earned it new prestige in the House and may presage a growth to greater influence.

While authority for the research budget remains decentralized in nearly a score of House and Senate committees, congressional performance is likely to remain uneven. And congressional committees being as they are, authority is likely to stay where it is.

Outside Congress, there have been some attempts to do something about the recognized limitations of legislators in science. Three years ago the AAAS joined with the Brookings Institution to sponsor a series of "roundtables" to expose members of Congress to scientists in different disciplines. The National Academy of Sciences is contemplating proposals for similar efforts, and the Academy for some time has been offering to furnish House and Senate committees with names of scientists and engineers competent to give advice in specific fields.

Inside Congress, there have been signs that the legislators are bestirring themselves. The days when hearings on the space budget were essentially briefings seem to be passing. Watchdog committees have been growling over waste and duplication in the growth programs administered by the science agencies. The House Appropriations Committee even cut a rather sizable slice out of the space budget last year, and although the cut was restored, such discussions may be more frequent in the future. These straws in the wind do not mean that Congress is about to turn parsimonious on science, but they do suggest that Congress feels it is not doing its job as well as it should.

Research and Development

Within the last year Congress was given some home truths about research and development which may foster a closer interest in these government activities. A Defense Department report published in June gave information on the geographic distribution of defense contracts and showed that the location of awards for research and development and testing was related to the placement of production orders.

In the words of the report, "Revolutionary changes in weaponry have been reflected, naturally enough, in manufacturing processes. Production line items were a large part of the FY 1953 hard goods buy; but by 1961 these had dwindled comparatively. Instead, the more recent emphasis has been upon research and development, and upon fewer, far more costly, weapon units. Traditional metal fabri-

cating processes are giving way to more intricate and sophisticated techniques. In consequence, blue collar workers are fewer, while scientists, engineers and technicians multiply in establishments serving defense procurement needs."

Translated, this meant that contracts, jobs, and votes were at stake. Some legislators, particularly in areas that had been adversely affected by the gravitation of research to the coasts, reacted to the report by demanding that their fine industries and great universities get a bigger share of the R&D contracts. But others realized that it is time to cultivate the research men in the firms and universities back home as well as those who award the contracts in the agencies.

Congress knows that it has forfeited much power over science to the Executive and it does not like it. If the legislators are to get their own competent science advisers, serious organizational and temperamental difficulties will have to be overcome. It is true that Congress changes its ways slowly and reluctantly, but it is also worth noting that Congress is at its most adaptable when it feels threatened.
—JOHN WALSH

Announcements

The University of Rochester has received the largest single grant ever awarded by the National Science Foundation. The $3,561,000 grant was made for construction of a laboratory to study the **structure of atomic nuclei**. Harry E. Gove, head of the Chalk River, Ontario, atomic energy installation's nuclear structure laboratory, has been named director of the new Rochester laboratory. He plans to join the university as a physics professor in September.

The new facilities will serve the school's department of physics and astronomy and department of chemistry, as well as the atomic energy project at the University Medical Center. A newly developed Van de Graaff accelerator is to be housed in the laboratory; the machine will utilize a two-stage "tandem" device to boost its energy output. It will be able to produce proton beams of energies to 20 Mev (million-electron-volts), the highest ever achieved with a Van de Graaff unit.

Grants, Fellowships, and Awards

Authors of book-length manuscripts on problems of **national security**—including economic, political, ideological, scientific, or diplomatic aspects—are eligible for the $2500 Mershon award sponsored by Ohio State University. The winning paper will be published by the University Press, and royalties will be paid to the author. Deadline for receipt of completed work: *1 April*. (Mershon Committee, Ohio State University Press, 164 W. 19 Ave., Columbus 10)

The National Science Foundation announces the availability of funds to support travel of a limited number of scientists to the Sixth **International Embryological Conference** scheduled for 22–25 July in Helsinki, Finland. Deadline for receipt of applications: *8 February*. (Developmental Biology Program, Division of Biological and Medical Sciences, Washington 25, D.C.)

Meeting Notes

The **Institute of Aerospace Sciences** plans to hold its last annual meeting 21–23 January, in New York. Thirty-one technical sessions will be held, with approximately 150 papers scheduled for delivery. (On 1 February the IAS will merge with the American Rocket Society to form the American Institute of Aeronautics and Astronautics.) Registration is at the Hotel Astor grand ballroom and is free for members of IAS, ARS, and participating societies, as well as for speakers and students. Reservation deadline for banquet and luncheons: *9 January*. (IAS, 2 E. 64th St., New York 21)

An international symposium on **space telecommunications**, sponsored by the Institute of Radio Engineers' professional group on antennas and propagation, will be held from 9 to 11 July 1963 in Boulder, Colo. Unpublished papers are being solicited in the fields of antennas, propagation, radio astronomy, electromagnetic theory, propagation in plasmas, space telecommunications, and related subjects. Deadline for receipt of 100-word abstract and 1000-word summary, in duplicate: *1 March*. (Herman V. Cottony, PGAP International Symposium, Boulder Laboratories, National Bureau of Standards, Boulder, Colo.)

Scientists in the News

Herbert L. Ley Jr., formerly chief of the medical and biological sciences branch, and acting chief of the scientific analysis branch, life sciences division, Army Research Office, has become associate professor of epidemiology and applied microbiology at Harvard University.

M. W. Welch, president of the Welch Scientific Co., Chicago, has been elected president of the International Union for Vacuum Science Technology Applications. The Union was formed by delegates from western European countries, the United Kingdom, Yugoslavia, Japan, and the United States; it replaces the International Organization for Vacuum Science and Technology, of which Mr. Welch had been president elect.

Robert Fleischer, professor of astronomy at Rennselaer Polytechnic Institute, has taken leave of absence from the school to accept the post of National Science Foundation coordinator for the International Year of the Quiet Sun. The IQSY will take place 1 January 1964 through 31 December 1965, when solar activity will be at its minimum cycle.

Bernard J. Brent, research and clinical research director at the S. E. Massengill Co., has been appointed professor of pharmaceutical chemistry at Northeastern University, Boston, Mass., effective 1 February.

Joseph C. Boyce has joined the National Academy of Sciences–National Research Council as assistant director in the office of scientific personnel. He was formerly dean of the graduate school and academic vice president of Illinois Institute of Technology, Chicago.

Mortimer I. Kay, of the National Aeronautics and Space Administration's Lewis Laboratories, Cleveland, has joined the Georgia Institute of Technology's Engineering Experiment Station as a research chemist in the solid state branch.

Thomas C. Evans, recently retired from the U.S. Forest Service, has become professor of forest mensuration at Virginia Polytechnic Institute, Blacksburg.