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Congress and the Science Budget

Herbert Roback

Congress makes the laws of the land and in this sense gives final form to national policies and their organizational underpinnings. Whether the Legislative or Executive branch takes the initiative in developing any given policy or organization is less important than the adequacy of its response to national need. If the need is sufficiently compelling, the two branches of government will be in accord that action must be taken. They may differ in important details—there is give and take—but between them national policy finally is hammered out or delicately wrought. A law is written, an organization created, and the course of governmental action set for years to come.

Legislative milestones in science and technology stand out more clearly after World War II. Two immediate postwar problems were: how to conserve the resources and sustain the momentum of war-induced scientific research; and, more pointedly, how to organize and control the future development of atomic energy. The problem of atomic

energy was more urgent, because it carried not only the sinister potential of mass destruction but the bright promise of mass benefit through power development and other peaceful applications. The Atomic Energy Commission was established in the year after the war ended, but the debates which eventually established the National Science Foundation as the key support agency for basic research dragged on for 5 years.

In the 1950's there were other milestone enactments. These were, in a sense, the panic years, with missile and space technologies in the forefront. The National Aeronautics and Space Administration, created in 1958, was an immediate answer to Sputnik. The same year the Advanced Research Projects Agency and the Directorate of Research and Engineering were established in the Department of Defense. Spurring these new organizations was a quest for national security interwoven with national prestige and welfare. Although NASA's mission, for example, was stated in terms of peaceful space exploration, in the public mind Sputnik posed a military menace, because it denoted Soviet mastery of large

booster technology and complex space systems which had military import.

Our crash programs for ICBM's achieved a formidable defense posture, and the ambitious Apollo program demonstrated dramatically our entry into the space race. Thereafter, in the 1960's, the government became increasingly involved in the welfare field. The technologies, techniques, and resources applied to missile and space development were examined for their application to social problems. Aerospace contractors began to work on such prosaic problems as garbage disposal and traffic congestion or on such esoteric ones as an artificial heart or a teaching machine.

New government departments were established to deal with housing and transportation. Within existing departments new agencies and organizations sprang up to put science and technology to work for the Great Society. More and more research emphasis was given to traffic safety, urban transportation, air and water purification, public health, crime prevention, and scores of other problem areas which received legislative and executive attention. The larger action agencies, created in response to acute national needs, develop vast technical infrastructures to support their missions. They build laboratories, let contracts, and acquire constituencies in business, professional, and academic circles. They attract community and regional support for the jobs and payrolls they provide and they gain advocates in Congress.

As technical empires expand, programs proliferate and agencies compete for technical talents and contractor re-

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sources, coordinating and control mechanisms are created to smooth working relationships, minimize overlap and duplication, concert policies and programs, develop joint projects, and identify gaps and omissions. The coordinating and control agencies, relatively small in size and consultative in nature, lack the money leverage and the operational impact of the action agencies. These coordinating devices vary in effectiveness, of course, depending on their locus and authority in governmental structure. The Office of Science and Technology, a coordinating agency at the apex of government, enjoys the prestige and authority of the President's Executive Office but undoubtedly suffers in its remoteness from the centers of technical power, where important decisions are made daily and agency heads report directly to the President.

Technical agencies of government, whether directly supporting or conducting research and development or more broadly concerned with coordination and review, participate in the allocation of technical resources. Congress does too, to the extent that it brings these agencies into being, defines their missions and authorities, provides money for their performance, and supervises administration. The definitive action in the first instance is the enabling legislation, which records congressional intent and carves out a technical area for performance. The legislative charter constitutes a mandate to do things, a commitment to create and use national resources for years, decades, even centuries.

Funding Process

Once an agency is created by the Congress, its career is shaped largely by the funding process. By law, the President is called upon to submit, during the first 15 days of each session of Congress, his budget plan for the government (1). From the executive side, budget making is practically continuous. The budget is the most worked over and worried over document in the government. By processes too intricate and probably too mysterious to detail here, the yearly budget estimates are developed, starting at lower levels in the agencies, working their way up through the administrative hierarchies to the agency heads and finally to the President. The higher the level of review, the more intense the competing policy and

political considerations which require budgetary adjustment and constraint. The Budget Director said that the President approved for 1968 \$27 billion less than the agencies wanted (2).

There is blood and sweat in this budget-making process, internal politics, bureaucratic in-fighting, arbitrariness, hunch, whim, and prayer, all of which finally comes out as informed judgment and rational decision. Whatever its faults as a means of allocating resources, the budget plan on the executive side does have a single source for final review and approval—the President, assisted by the Bureau of the Budget and, in technical fields, by the Office of Science and Technology.

In the Congress there is no comparable organization and single source of authority. All budgetary matters are handled by the appropriations committee in each house but these committees alone do not control the funding process; and even if they did, they cannot work on the budgets for all agencies at one time nor report out multiple budget requests in a single piece of legislation. The omnibus appropriation bill, not unknown, is impracticable. In any case, it would not yield a coherent statement or systematic analysis of scientific and technical activities any more than the huge budget document submitted by the President. For the government as a whole, R & D is not a budget category but a jigsaw puzzle of activities in many agencies. Each year some 13 or 14 appropriations subcommittees in each House work on the agency budgets assigned to them. Each subcommittee reports out its own bill; these, together with supplementals, add up to 15 or 16 appropriation statutes each year.

Appropriation bills are considered first in the House of Representatives. Agency heads, reinforced by their budget experts and other officials, make their way to the Hill with detailed "justification" documents, and are there challenged, questioned, criticized, and sometimes given short shrift by House subcommittee members sitting in closed session. The subcommittee, after the hearings are done, "marks up" the bill, assisted by its own staff, cutting here or there, writing statutory language to limit freedom of administrative action in certain expenditures. Less formal but no less constraining are the instructions, admonitions, cautions, and requests written into the subcommittee reports. Agency heads who ignore them will not be treated gently in future appropri-

tions. The appropriation bills have privileged access to the floor and occasionally amendments on the floor will add to, or subtract from, the committee's recommendations.

The appropriations committee members tend to suspect that agency heads pad budgets in anticipation of cuts, and thus cuts are usually made. Budget-cutting signifies the committee is exercising judgment and control rather than rubber-stamping the Executive, and has the added value of demonstrating congressional interest in economy. If the cut is of the "meat-ax" variety, across-the-board, of course the aspect of economy becomes more important than judgments about the merit of specific programs. The House also knows by experience that the Senate usually will be more generous in appropriation matters, and so cuts may be made in the House for bargaining purposes or as an economy gesture.

The Senate in fact serves as a kind of appeals body in hearing reclaims (3) from agency heads. Even in the case of the National Institutes of Health, which rarely suffer a cut and usually get more than they request, the generosity of the House consistently is outmatched by that of the Senate. In the past 18 years, for which I reviewed the figures, the Senate unfailingly has increased the amount of NIH appropriations approved by the House. The final result, as worked out in committees of conference, is a split somewhere along the middle.

A similar pattern shows up in the appropriations for the National Science Foundation. The Senate generally does better by that agency than the House, and the differences are compromised. Occasionally the Senate is content to take the House figure without change. Only once in the Foundation's 18 years did the Senate go below the House recommendation, and the issue was minor—a proposed \$1000 contribution by NSF to the President's Committee on Equal Employment Opportunity. The Senate objected, and that is how the NSF came to receive, instead of the House-approved \$480 million, an appropriation of exactly \$479,999,000 in 1966, repeated to the dollar in 1967.

Yearly Authorizations

The Constitution enjoins the spending of public funds without a legislative enactment. Legislative rules and

procedures enjoin an appropriation without a prior authorization. Historically the rationale for the distinction between authorization and appropriation was to separate substantive policy and money matters and to expedite appropriation measures by freeing them of the inevitable clutter of legislative "riders" for pet projects. In practice, this dual legislative process of authorization and appropriation has introduced new complications and delays. The complicating feature is the statutory requirement for *annual* authorizations. Appropriations for NASA, the AEC, and the "research, development, test and evaluation" of the DOD, which together account for the bulk of the government's R & D outlays, are among those which must wait upon antecedent authorizing statutes. If the separate legislative processes for authorization and funding are not in proper sequence, the fiscal year may run out, and special resolutions are needed to permit agency spending at the previous year's rate until the new appropriation becomes law. The appropriations delays in the first session of the 90th Congress, which caused disruptions in agency planning and even held up paychecks of employees in some agencies, were attributed in large part to the lag between authorizing and funding measures (4).

This dual legislative process—authorization and appropriations—with the process being repeated in each house of Congress, makes for a great many hearings and heavy demands upon the time of busy executives and administrators. It may be inconvenient and even exasperating to high-level government witnesses to spend hours, days, or even weeks before congressional committees, substantially repeating their testimony from one to the other, sometimes suffering delays when other witnesses take up too much time, or merely sitting by when senators and representatives must interrupt the hearing sessions to answer roll calls on the floor. Typically the Executive Branch does not look with favor upon yearly authorization requirements, which now cover approximately one-third of the total federal budget.

Still, this is the way of the Congress, and not much can be done about it. Neither the Congress as a whole nor its legislative committees are content to let the appropriations committees monopolize funding—the most important part of the legislative process so far as the executive departments and agencies are

concerned. There are, moreover, compensating advantages to these departments and agencies in the requirement for yearly authorizations. The legislative committees often serve as protectors or advocates of agency programs in opposition to seemingly unwise budget cuts by the appropriations committees. By their hearings and reports on yearly authorization bills, the legislative committees keep abreast of new programs, broaden congressional participation in policy formation, provide platforms for new ideas, and raise the statutory ceilings for future funding. They are more innovative, marking out new areas of technological and social advance. The appropriating committees tend to be more tightfisted, since they have to add up the total bill and pay the check.

Reviews and Investigations

The Congress not only enacts laws to establish agencies, authorize programs, and provide funds; it seeks to determine how well the laws are administered and how wisely the monies are spent. This is termed the congressional "oversight" or review function, and it ranges from full-dress investigations or hearings in public or private to informal and intermittent inquiries by congressional staffs.

All committees of Congress are enjoined by law and rule to exercise "continuous watchfulness" over the agencies within their jurisdictional orbits. Several committees have established special subcommittees for oversight or investigation, such as the House committees dealing with defense, space, and commerce activities. The Committees on Appropriations have the right to investigate any agency or matter involving public expenditures, and the House committee employs a special survey and investigations staff, with rotating personnel, for this purpose. The reports of the investigative unit are used by the chairman and members in questioning agency witnesses at closed hearings. Occasionally these reports are made public, after the various House subcommittees on appropriations have completed their examining work.

The Committees on Government Operations also have jurisdictional reach over all government agencies and activities from the standpoint of assessing economy and efficiency. The Committees on Government Operations historically have close affinity with the General Accounting Office, which

serves as an investigative arm of the Congress and is on call to any committee for personnel detail or special investigations. The GAO also inquires on its own initiative into matters where the Congress shows, or is likely to show, particular interest.

It can be expected that auditors and investigators will be around from time to time to inspect books and ask questions in government laboratories and even in academic halls where federal monies are spent. Scientists and science administrators are not notably more efficient, and sometimes much less so, than workers or managers in other sectors. GAO investigations usually are not concerned with broad policy and program choice, but with more mundane housekeeping matters—effectiveness of procurement, utilization of equipment, inventory control and accounting, and the like.

Both the House and Senate Committees on Government Operations established special subcommittees in the research and development area. The House Committee on Science and Astronautics also has a standing subcommittee on research. During the 88th Congress, a House Select Committee on Government Research of limited tenure also was established. These several groups, organized around research and development policies and problems, have been active in gathering information, stimulating new studies and more systematic data collection, promoting improved management practices, and generating or sustaining a dialogue in science policy issues of government and academic concern.

The hearings and studies of these subcommittees, valuable and informative as they are, do not bear directly on the allocation of resources in the manner of a legislative committee which authorizes a specific program or the appropriations committee which provides the requisite funds. The authorization and funding processes provide the greatest leverage of congressional control. On the other hand, the several subcommittees on research and development, relieved of the yearly grind of legislation, are better suited to examining policies and programs which cut across agencies and disciplines. They bring broader perspective and greater depth of analysis.

The Committees on Government Operations have jurisdictional reach over all government agencies by their concern not only with economy and efficiency but with government reorganiza-

tion. Sooner or later every agency of government is involved in reorganization of one kind or another. If these are to be accomplished by presidential reorganization plans, the plans are referred to the Committees on Government Operations for review. The Office of Science and Technology, for example, was created by a reorganization plan in 1962. The House committee held hearings on the plan and submitted a favorable report to the Congress. This is a kind of reverse legislative process in which the President drafts a law, so to speak, and the Congress has the veto power. The plan has the force and effect of law after a 60-day waiting period if the Congress does not pass a disapproving resolution.

The rationale for creating the OST was partly to moderate congressional concern about overlap and duplication of scientific agencies and activities and to counter proposals for a department of science as a possible solution; and partly to make the OST director more accessible to the Congress. By defining his powers and duties in statutory form, the director would be made something more than a presidential adviser and thus would be partly relieved of the obligation of confidence attaching to that role. In recent years the OST director has made frequent appearances before committees of the Congress and has provided helpful information and advice. It cannot be said, however, that OST is rid of the problem of executive privilege or that the Congress is making the most effective use of its services (5).

When to consult with the Congress is always a problem on the executive side. Apart from the narrow issue of executive privilege which the President asserts now and then, on a matter of great sensitivity, administrators are reluctant to publicize their mistakes or to seek prior congressional approval for every decision they make. It would be obviously impractical to run to the Hill every time a problem comes up, and premature publicity can be harmful to policies still in the making or issues still unresolved. Generally committee chairmen and agency heads consult frequently and cooperate well. Occasionally the communication breaks down, bad feelings are engendered, and caustic comments are traded.

The investigation of the disastrous Apollo fire by the House and Senate space committees was a case in point. When a House committee member obtained in some undisclosed way a copy

of the so-called Phillips report criticizing the major Apollo contractor and released it to the press, there was great consternation. This was the first time the committees had heard of the Phillips report. The House Committee on Science and Astronautics recommended, and the House approved, a provision in the NASA authorization bill for FY 1968 requiring that agency to keep the space committees of each house "fully and currently informed" (6). This language was borrowed from the Atomic Energy Act, which places a similar obligation on the AEC relative to the Joint Committee on Atomic Energy. However, the Senate objected to the House language, and it was deleted from the authorization bill on the ground that NASA's obligation to keep the committees posted is implicit in its organic act (7). Later, the NASA administrator and the committee chairmen came to some less formal understandings that the flow of information in the future would be improved.

Politics and Personalities

Each year thousands of bills are introduced in the Congress, hundreds of them perhaps dealing with one aspect or another of science and technology. These bills are referred to committees having jurisdiction in the subject matter, and most of them are pigeonholed. Some may get a hearing in committee and a favorable report leading to action in one or both houses. If a measure is part of the President's legislative program for the year, it stands high on the priority list, particularly if the President and the majority in Congress are of the same party. If the Chief Executive is forceful in conveying his views, if the party majority in Congress is substantial enough to prevail against temporary coalitions, legislative proposals of the Administration will fare better. Bills concerned with yearly authorizations and appropriations demand timely attention lest the wheels of government grind to a halt. War and taxes and spending and approaching elections enhance the acerbity if not the profundity of the political debate.

Within a broad and sometimes vague context of party differences, each member of Congress records his personal and political preferences, his rough scale of priorities for legislative action. He may try, by action in committee or on the floor, by amendments and par-

liamentary maneuvers, to give some effect to his own readings of priorities. For the most part individual legislative forays, though they may gain publicity and please a given constituency, do not substantially change the outcome. In the Congress the legislative distribution of work is rather highly specialized and the members rely heavily upon the committees involved. They look to the chairmen of the committees and subcommittees for guidance in the more complex technical areas requiring legislative action.

Whether a committee or subcommittee chairman is strong or weak, liberal or conservative, interested or inactive, makes a big difference to the legislative result. The watchfulness and influence of a member of Congress strategically placed as chairman of a committee or subcommittee, or high in seniority, may well account for the sustained support in a given research and development sector. Certainly the National Institutes of Health owe much of their generous funding to the unflagging zeal and attention of the late John E. Fogarty in the House and Lister Hill in the Senate. Fogarty, a former bricklayer, became a member of the House Committee on Appropriations in 1947. By 1949 he became chairman of the subcommittee handling appropriations for the Department of Health, Education and Welfare, which includes the Public Health Service and NIH. Senator Hill, who recently announced his intention to retire, heads the counterpart appropriations subcommittee in the Senate and also is chairman of the Senate Committee on Labor and Public Welfare, which handles substantive legislation in the health field.

The influence of key chairmen, important as it is, should not be exaggerated. The prudent chairman does not step too far away from the dominant sentiment and prevailing mood in the Congress. He tempers his opinions and tailors his recommendations to gain support and acceptance for his legislative and appropriation bills. It follows that some programs fare better than others not only because the sponsoring committee or subcommittee chairman is respected or persuasive, but because the program itself has wide political appeal. For example, diseases that disable and kill are the concern of all; they are close-to-home problems, and so the Congress is unusually generous in support of health and medical research. During an 18-year span, yearly funding for NIH rose from \$60 million

to almost \$1.2 billion, and in only 4 of those years did appropriations fall below the amounts requested. Even in the 1968 fiscal year, when the economy drive was strong, NIH received \$1,178,924,000 or 99 percent of the budget request.

Cumulative appropriations to NIH, compared with budget requests, show an average excess of about 15 percent. The NSF ratio, by contrast, shows an average deficiency of about 15 percent. It is apparent that basic research specifically associated with health and medicine is more appealing than basic research in general. In no year since it was created in 1950 has NSF received from the Congress quite as much money as the Budget Bureau has requested.

Appropriations for NSF and NIH are handled by different subcommittees and chairmen, NIH being a component of a cabinet department, NSF an independent agency. In each case the House subcommittee chairmen virtually "grew up" with the agency. Fogarty, as we noted, was on the job for NIH since at least 1949. The late Albert Thomas of Texas, chairman of the Independent Offices Subcommittee, supervised the NSF appropriation for the first 15 years of that agency's existence (excepting 2 years when Congress had a Republican majority). These men developed an intimate knowledge of the agencies' operations and were instrumental in providing for stable and continuous growth. If, as usually happened, the NIH yearly budget request was added to, and the NSF's subtracted from, under their respective leadership, at least these responses were predictable, and adjustments could be made without too serious consequences. Both of these venerable chairmen now have passed from the scene, and undoubtedly there will be changes in approach and treatment of NIH and NSF from the congressional side.

The ill-fated Mohole project was an immediate casualty. Though NSF reported that some \$57 million of work already had been done, and only another \$21.5 million was needed to finish the drilling platform, the Mohole contract was terminated after Albert Thomas' death in 1966. It happened that the contractor originally chosen for the project was headquartered in Houston, the subcommittee chairman's home city. The choice of contractor by NSF never sat well with members from states with other prominent contenders for the drilling job who represented the

oil, metal, and aerospace industries. Project costs also seemed to have a discouraging elasticity, so that what started as a \$20- or \$40-million job kept stretching with each new estimate. When the legislators were told that the total project costs for 3 years, including platform construction, drilling operations, and yearly maintenance, had risen from \$70 million estimated in 1963 to \$127 million estimated in 1966, they decided to call the whole thing off. Recorded in the subcommittee hearings was the concern of members about the substantial cost overruns, the uncertain scientific results, the seeming lack of practical benefits, and the need to put the money elsewhere. Unrecoverable costs of Project Mohole will approach \$40 million (8).

The demise of Project Mohole points up an interesting issue of congressional funding procedure already mentioned. The NSF, sponsoring agency for the project, does not go through a yearly authorizing procedure. It looks to the Appropriations Committee alone for a yearly review of program content and project justification. Possibly Mohole would have survived and been completed on schedule if separately authorized by a legislative committee.

There is no guarantee of course that a program authorized will be funded. Occasionally an authorization remains a dead letter or funding activity is deferred for some years. What Project Mohole needed, however, was a broader base of congressional support—involvement by more committees, informed attention by more members. From time to time suggestions have been made for subjecting NSF to the yearly authorization routine. So far the Congress has not responded, possibly because of the differing jurisdictions of the space and science committees in the house and Senate, their preoccupation with NASA and the Apollo program, and recognition of NSF's need to have latitude and discretion in allocating its grant monies and other support to universities without undue congressional interference and control.

Expenditure Control

Holding the key to the national purse, the Congress always is sensitive to economy arguments. Research and development has become, in recent years, a subject of congressional interest and concern because of the increasingly large dollar outlays in this sector.

When economy in general becomes a matter of overriding concern, as was manifest in the first session of the 90th Congress, then R & D programs are bound to suffer with the rest, depending on their relative vulnerabilities.

Congress, awed by a \$135-billion expenditures budget and a looming deficit of \$20 billion or more, was reluctant to raise taxes. It preferred to cut back expenditures. Retrenchment was the order of the day. Reflecting this posture, Chairman Wilbur D. Mills of the House Ways and Means Committee made it known that if a tax bill were to have any chance at all, spending must be curtailed. And not only spending for the current fiscal year, but spending for the future. When asked about unnecessary spending, Chairman Mills was reported as saying: "Any professor who wants a vacation in the woods can get a grant to make a study of the formation of leaves and then he may write a report or he may not" (9).

As the appropriation bill for each agency or combination of agencies made its tortuous way through the first session of the 90th Congress, cuts were made here and there, and research and development came in for their share. NASA, for example, was cut \$500 million, spread over some 17 R & D categories and a number of construction projects. The only R & D category not cut was \$21 million for "human factor systems." The Voyager program, budgeted for \$71.5 million, went to zero. Apollo applications, which seeks to determine what usefully can be done with Apollo hardware beyond the moon landing, went down from \$454.7 million to \$315.5 million, a cut of \$139.2 million.

Vulnerability of the civilian space program had been building up, of course, for some time. The large expenditure demands of the war in Vietnam, and the assorted ills of urban society underscored by the prevalence of rioting and crime, made it difficult for many members of Congress to justify to themselves or to their constituents a \$5 billion yearly outlay for space exploration. Recognition that we were too deeply committed to a lunar landing program to turn back and that there were important values to be subserved by a vigorous program of space exploration only made the dilemma more painful and the rhetoric of criticism more eloquent.

The DOD was cut \$1,647,380,000, about one-tenth of which was in the category of research, development, test,

and evaluation. The 1968 budget estimate for this category was \$7,273,000,000 from which \$133,400,000 (or 1.8 percent) was subtracted by the Congress. Modest cuts showed up in studies and analysis, basic research (but not Project Themis, which is designed to spread funds to smaller universities and help build up more centers of excellence), and nonprofit organizations identified as Federal Contract Research Centers. The Advanced Manned Strategic Aircraft program, still in the study stage, got an increase from \$26 million to \$47 million. The Manned Orbital Laboratory, representing the Air Force's most ambitious space program, got no cut at all in contrast to NASA.

From the President's 1968 budget request for new obligational authority of \$144 billion, the general goal of cuts in appropriation requests was \$5 billion. Chairman George H. Mahon of the House Committee on Appropriations had committed himself to at least this figure, and the appropriation bills in the House easily made the mark. Many of the funds were restored in the Senate, but in conference, the House budget cutters largely prevailed, reflecting the pressure of the economy drive.

Cutting the appropriation requests, measure by measure, is of course the traditional way. But economizers in the Congress wanted more drastic action. The Congress was behind in its appropriation chores anyway. Continuing resolutions had to be enacted to permit spending at last year's rate, while the work on new appropriation bills was completed. No less than five such resolutions were enacted and these offered opportunities for amendments proposing across-the-board cuts.

The issue was joined by Representative Frank Bow, ranking Republican member of the House Appropriations Committee, who proposed a \$5 billion cut in actual expenditures budget for the current fiscal year rather than in new obligational authority. A point made by Bow and his supporters was that since obligational authority is spread over a number of years, a \$5 billion cut in obligational authority would mean only half that amount or less in reduced expenditures for 1968. The proposal for expenditures reduction came in the form of the Bow amendment to a continuing resolution.

Critics of the Bow amendment argued in the floor debates that if the President were compelled by law to cut \$5 billion from the expenditure budget, this would be tantamount to an item veto by the

President and an abdication of congressional control of the purse. The proper and constitutional way—these critics argued—was for the Congress itself to make the cuts.

Charges of political maneuvering were heard. There were those who believed the only reason why a conservative opposition wanted to invest the President with blanket budget-cutting responsibilities was to thrust on him any political liabilities that might ensue. Others were greatly put out when the President, through some of his department heads, began to explore the possibilities of a freeze in contract awards and new projects.

The Bow amendment in the first try fell on a point of order, but prevailed in the House when another resolution was passed after a complicated sequence of parliamentary maneuvering. The House also adopted the Whitten amendment, which would limit 1968 expenditures to 95 percent of the preceding fiscal year—with certain exceptions. The Senate Appropriations Committee tossed out the Bow and Whitten amendments, and the Senate sustained its committee. Efforts on the floor to reinstate these and other across-the-board budget-cutting proposals were defeated by close margins. The majority of the senators was persuaded by testimony of the Budget Director that a \$5 billion cut in current expenditures would mean a \$10 billion cut in programs, and the "controllable" programs represented about one-third of the budget. The Budget Director could identify only \$38 billion of the budget which was not already "locked in" by military necessity, fixed obligations such as interest on the debt, payment of salaries, and the like.

After repeated conferences, the House and Senate came to a compromise on a \$9 billion reduction in obligational authority and a \$4 billion reduction in actual expenditures for fiscal year 1968. Cuts were to be spread uniformly throughout the Executive Branch on a percentage basis. Each department and agency was required to reduce 1968 obligations incurred by 2 percent for personnel and 10 percent in other respects. These cuts would apply to the "controllable" portion of each agency's budget, taking account of reductions already made in appropriation acts. Obligations for defense spending were to be reduced by 10 percent except for special Vietnam costs. The Congress also recorded its preference that personnel reductions

be accomplished as much as possible by not filling vacancies and that new construction projects be stretched out rather than eliminated.

How and where to cut agency budgets was left to agency heads except for decisions already recorded in specific appropriation acts. Thus the readjustment of priorities and the budget cutting resulting from the economy drive are jointly done by the legislative and the executive branches.

Outlook for Change

Congressional procedure is hallowed by tradition, and practices have evolved through the years to regulate and control the legislative process. The extent to which reforms are needed to oil the wheels of Congress and improve the legislative process is a subject of recurring debate. Certain it is that the Congress is slow to change its ways, and most proposals for reform fall by the wayside.

Perhaps the reformers want to make of the Congress an institution and assign it a role which it cannot and probably should not perform. The Congress participates in policy formation; it is a policy-making body in the broadest sense. But the Congress is not, in the nature of the case, an independent planning agency. It can challenge, question, criticize, modify or reject what the Executive proposes, but practically it cannot develop an alternative budget or plan all operations for the government as a whole. Some of the proposals for improving the capacity of Congress to be informed, to assess and choose, including the widespread use of computers and system analysis techniques, seem to assume that the Congress should duplicate the executive branch in planning and programming.

What the Congress needs to do, above all, is to preserve its pragmatic, common-sense approach to public affairs. The answer is not to develop a corps of technical experts on the Hill. Committees of Congress—and individual members for that matter—can be as well informed about any subject as time and willingness permit. All the experts in government, in universities and elsewhere, even in the far corners of the earth, are available to them. For most matters demanding legislative attention, there is no dearth of information. In fact, there is usually too much information for the busy congressmen to assimilate and use.

It has been proposed that scientific advisers be attached to the Congress either in a special office for one or both Houses or as adjuncts to committee staffs. A realistic appraisal of the committee structure of the Congress discloses the difficulties which would confront any such proposal. There are a score of committees and 100 or more subcommittees in each House. While defense, atomic energy, space, and commerce committees (in addition to the appropriations committees) predominate in science legislation, many other committees have jurisdiction and interest in one phase or another of scientific affairs.

The jurisdictional areas cannot be neatly delineated. Assignment of legislative bills by direction of the Speaker of the House and the President of the Senate, or of committee tasks by direction of their respective chairmen, do not always follow the written rules. And even if they did, the rules cannot cover the variety of changing situations reflected in legislative processes.

To cite a few jurisdictional problems: A bill to create a Commission on Science and Technology is referred in the Senate to the Committee on Government Operations which has jurisdiction, among other things, over organizational matters in the government; the same bill in the House is referred to the Committee on Science and Astronautics which has jurisdiction in science matters. The Senate Committee on Aeronautical and Space Sciences does not have the same jurisdictional reach as the House committee. The bill to amend the National Science Foundation Act went to the House Committee on Science and Astronautics and was approved by the House, but in the Senate it went to the Committee on Labor and Public Welfare, where it still remains. So far, proposals to align the House and Senate committee jurisdictions in science matters have not prevailed (10).

With this complex committee structure and distribution of legislative work in the Congress, a small central group of scientific advisers could not hope to respond to the recurring or continuous legislative demands for information and advice on scientific affairs. And, on the other hand, if the scientific experts were attached to separate committees and subcommittees, it would not be practical, except in very limited and informal ways, for the staff expert on one committee to assist another committee.

The consequences would be either that the scientific experts would have to build up a big bureaucracy of their own in the legislative branch, which the Congress would not sanction, or they would be bypassed in the hurry and scuffle of legislative work.

If the scientific advisers were full-time employees, they would be expected to do many chores beyond their special talents. If they were part-time consultants, then they would be too remote from the legislative process to respond to its exigent demands and hence no better placed than witnesses before the committees.

A modest alternative to these proposals was the creation in 1963 of the Science Policy Research Division in the Legislative Reference Service of the Library of Congress. This division, though small in size and subject to a variety of demands, has been very helpful to the Congress. The division serves committees and members by collating information, making special studies and analyses, and developing background material for legislation.

There are, of course, many other kinds of scientific advisory services available to the Congress. Expert witnesses can be called individually or in panels, in public or private session. Occasionally a committee contracts with a university group or nonprofit corporation for technical studies. The House Committee on Science and Astronautics has a standing advisory panel established in 1960 of 16 members drawn from major scientific areas. Reports of the yearly panel proceedings are presented by the committee to the House of Representatives. The National Academy of Sciences and the National Science Foundation have undertaken special studies for the Congress. The Office of Science and Technology, as noted above, also has been represented before many congressional committees. Finally, particular committee staffs will include a few persons with good technical background when the legislative work requires them.

Since the Executive Branch, through the Office of Science and Technology and other instrumentalities, has introduced coordinating mechanisms for research and development, it is common to inquire whether similar steps can be taken in the Congress. Changes in committee structure and organization are extremely difficult to make, and even if they were easy, we still have a government of many agencies and many

functions, for which legislative divisions of labor have to be devised.

Typically and inevitably, the legislative and the appropriations committees are agency- rather than function-oriented. After all, agencies are going institutions of government and must be provided for. Members become familiar with their key personnel and styles of work and their administrative problems. As a function or category of concern, research and development is much discussed but little affected, except as it is involved in the agency's budget.

From time to time, the special committees and subcommittees concerned particularly with research and development will examine such activities as they cut across agencies and as they enter into general policy considerations. However, the committees have their own jurisdictional outlook, work schedules, staffing arrangements, and methods of carrying on the legislative business. For these and other reasons, joint committees or joint hearings of separate committees are not ordinarily a convenient way to do business in a bicameral Congress. Perhaps this is why the idea of a Joint Committee on Research Policy, proposed by the Elliott Committee a few years ago as the legislative counterpart to OST in the Executive Branch, has not taken root.

Department of Science and Technology

A re-sorting of responsibilities and better integration of committee activities on the congressional side possibly could be achieved if a Department of Science and Technology were created. The case for a new department rests not on bringing together a multitude of governmental research and development functions torn from their agency settings, but on the availability of large relatively self-contained technical agencies to serve as basic components of the new organization.

There is good logic in establishing a Department of Science and Technology not only to house older more mature technical agencies but new ones, such as oceanography, which has not yet found a permanent home, as well as other technical agencies and bureaus which may now be in less congenial surroundings. It would not be wise to break out research and development functions from old established departments and agencies except

if attachment to the parent organization is tenuous in terms of mission or readily adaptable to serving multiple agency missions.

In the event such a department came to pass, committee changes likely would be in order.

References and Notes

1. Title 31, *U.S. Code*, sec. 11.
2. Bureau of the Budget press release, 6 Oct. 1967.

3. "Reclama" is a government term which refers to the budgetary appeal procedure.
4. *Congressional Rec.* (7 Dec. 1967), p. H16458.
5. "The Office of Science and Technology," *Science Policy Research Div., Legislative Ref. Serv., Library of Congress Rep.* (Mar. 1967).
6. House Rep. No. 338, 90th Congress, 1st session, 6 June 1967, p. 148.
7. House Rep. No. 535, 90th Congress, 1st session, 3 Aug. 1967, p. 9. Section 303 of the National Aeronautics and Space Act contains a proviso "that nothing in this Act shall authorize withholding of information by the Administrator from the duly authorized committees of the Congress."
8. Hearings before Independent Offices Subcommittee of the House Committee on Appropriations, 89th Congress, 2nd session, 1 Feb. 1966, pt. 2, p. 115; also hearings before Independent Offices Subcommittee of the Senate Committee on Appropriations, 89th Congress, 2nd session, 13 June 1966, p. 1726.
9. L. J. Carter, *Science* 158, 233 (1967).
10. Jurisdictional changes were recommended by the Joint Committee on the Organization of the Congress, but no legislative action has been taken on these particular recommendations.
11. In this article the author is expressing his personal views and they are not necessarily those of any member of the Congress.

NEWS AND COMMENT

French Student Revolt: An Account of the Origins and Objectives

Paris. The most surprising thing about the massive and violent student demonstrations here is that they surprised everyone, including the students. There had been, indeed, sporadic demonstrations in French universities, but that these protests would explode into a national crisis seemed beyond the realm of possibility.

The UNEF (l'Union Nationale d'Etudiants de France), which has become the chief spokesman for the students, did not organize the early demonstrations. In the first days of street fighting, UNEF did not control the students. Even later, its authority, though strengthened by events, remained far from total.

The party politicians of the French left did not anticipate—and, for the most part, did not encourage—the demonstrations. Most conspicuously out of line were the Communists, who initially condemned everything the students did. This hostility was only natural. The most radical students (labeled *les enragés* by the newspapers) were to the left of the party and openly contemptuous of traditional French Communists. Moreover, the Communist party has formed a formidable electoral alliance with other, more moderate leftist parties and is playing the parliamentary game as seriously as

ever. Is this perhaps because the *enragés* seemed too bold and risked upsetting the slow shift of the nation's voters to the left? Whatever the reasons, the party quickly reversed itself once the size of the demonstrations became apparent.

But the lack of foresight cost the Gaullist government more than it cost anyone else. Throughout the early days of the demonstrations, when a serious problem became a major crisis, the government down-played and apparently misinterpreted everything that was happening. In the evening of the day on which some of the most violent street fighting occurred (more than 800 were injured), the Minister of Education appeared on television and warned viewers not to exaggerate the seriousness of the situation. After all, he observed, the demonstrations in Paris were not nearly so grave as those in Berlin or even as those at Columbia in New York. Georges Pompidou, the prime minister, was away on a trip to Iran and Afghanistan. De Gaulle flew off on a ceremonial trip to Rumania. For whatever reason, the government seemed bewildered and acted on an impetuous day-to-day basis.

The first serious mistakes were made on Friday, 3 May. Though dull in comparison with the ensuing days, that day held the key to much that followed.

The crucial point in the chronology was the decision of the rector of the University of Paris, Jean Roche, to ask

police to remove student demonstrators from the courtyard of the Sorbonne. This pivotal event occurred in circumstances that are still being disputed. The students, representing a small leftist group, were protesting the suspension of classes at the University's Nanterre campus, just beyond the city limits (*Science*, 17 May). Necessary or not, the call for force was clearly a bad move. The appearance of the police and the dispatch of the demonstrators antagonized other students who had gathered in crowds around the Sorbonne to see what was going on. They began to taunt and, later, to pelt the police with stones.

The reaction was spontaneous. What happened Friday and during the following week was, in one sense, very simple: students fought police. Had they not wanted to fight, rather than just resist or stage large protest marches, the level of violence, and of publicity, would surely have been much lower.

The police, for their part, seemed to operate on the theory that every insult and injury should be repaid three or four times over. It was, thus, a gruesome game that was played in the streets of Paris that Friday afternoon. Helmeted and armed with riot shields and night sticks, the police periodically rushed the students.

The cycle of combat recurred endlessly; the police, for all their ferocity, were too few. The students simply refused to go home and regrouped after every charge. While all this was going on, the rector, after consulting with the Minister of Education, made what many consider his second important mistake. He closed the Sorbonne, for the second time in its history. That decision probably exaggerated the importance of the afternoon's fighting and, coupled with the appeal for police assistance, made a real and symbolic break with large numbers of students.

The writer, a contributing correspondent for *Science*, now staying in Paris, was forced by the disruption of French services to travel to Belgium to send this story to the United States.—Ed.