2) These committees should make intelligent use of *ad hoc* groups to give counsel on technical problems.

3) There should be an easier flow of information among the congressional committees themselves so that Congress avoids needless duplication in repetitious hearings and over-burdening of witnesses.

4) Representatives of the executive agencies should improve their method of presentation to congressional committees. In discussing purely scientific problems, there is no coloration of "executive" or "legislative" science. It is science for the nation as a whole. There are a limited number of people available with the broad knowledge necessary to give Congress advice on purely scientific questions. Although the Office of Science and Technology is an arm of the President, it would be most helpful if its staff could testify fully and adequately before congressional committees. The separation of legislative and executive powers in this regard can be carried to an extent that does damage to programs in which both branches have a mutual interest.

5) The channels for gathering information through the Legislative Reference Service of the Library of Congress should be expanded, and greater use should be made of such existing organizations as the National Academy of Sciences–National Research Council and the National Science Foundation.

6) Congress should receive an annual report on the state of science and technology. Each year we receive from the President a message on the State of the Union, a Budget Message, and various other reports. The President transmits to us through the National Aeronautics and Space Council a report on the year-long activities in space and aeronautics. Perhaps the National Academy of Sciences, through its various committees, could prepare a report by itself or in association with others such as the Office of Science and Technology. The report would briefly discuss the major programs in science and technology and would set forth what problems might be on the horizon which would require congressional attention. Separately, but more effectively, in conjunction with the National Academy, the National Society of Professional Engineers might report on the state of engineering since engineering is such a large part of government R&D programs.

There are no magic ways or easy devices to solve the problem of providing Congress with adequate advice on science and technology. Any approach that some would view as ideal would still be a long way from perfection and could also produce undesirable effects upon both science and government. As H. L. Mencken said: "An idealist is one who, on noticing that a rose smells better than a cabbage, concludes that it will also make better soup."

But those who are the doers of science, and we, in political life, have a mutual responsibility to improve the relationship of Congress and the "endless frontier." As concerned individuals and collectively as members of society, we have a stake in this task.

News and Comment

Scientific Gloom: Congressional Actions Have Stirred Pessimism but Little of It Is Justified

During the past year or so, as Congress has come to regard research more like a skeptical banker than an indulgent patron, a fair amount of gloom has spread throughout the scientific community.

The gloom is nourished by the widespread, though erroneous, impression that Congress has "cut back" on federal support of research. And it is further nourished by the very existence of a number of congressional inquiries into government-supported research programs. Both in and out of Congress, it is said that "the honeymoon is over," which is no doubt the case. But, at times, the thickness of the pessimism suggests belief in H. L. Mencken's assertion that "whenever a husband and wife begin to discuss their marriage, they are giving evidence at a coroner's inquest."

Furthermore, for those seeking facts to suit their anxieties, there can easily be found congressional utterances reflecting something less than sympathy for certain scientific pursuits. Last summer, for example, Representative Howard Smith (D–Va.), chairman of the Rules Committee, cited a research grant of $64,000 "to study resistance to persuasion." Said Smith: "Some of us thought Adam and Eve had settled that question with the apple, but it seems like we have to go over the same ground again at a cost of $64,000."

Thus, it is not at all difficult to piece together evidence to support the expectation that the axe is about to whistle through the air. However, without being pollyannaish or blind to the fact that serious problems have recently developed, it is perhaps worth noting a number of things that help put the congressional-scientific relationship into a realistic perspective.

First of all, Congress did *not* reduce federal support for research. It did reduce the rate of growth that had prevailed in recent years, but when the final accounting was in, *every* major federal agency that supports research received more money in fiscal 1964 than it had received in the previous year. And everything indicates that when Congress completes action on the budget for the fiscal year starting next July, the process will have been repeated.

The grand heading "research and development" is not too meaningful, since it can include anything from laboratory motor pools to electron microscopes, but for what it was worth, the total R&D budget rose from $12 billion in fiscal 1963 to $14.9 billion in the current

year. More meaningful, but still subject to the difficulties of bookkeeping and definition, are agency-by-agency comparisons for basic research expenditures for 1963 and 1964, and these, too reflect growth. For example, the National Science Foundation's basic research expenditures rose from $219 million to $238 million; the space agency says its basic research budget rose from $525 million to $727 million. Skeptics might scoff, but there is still a lot of basic research in that space money. Overall, the total for basic research spending by all federal agencies increased from $1.3 billion to $1.6 billion.

It is true, of course, that the National Science Foundation found an icy reception in the House last year when it sought a budget increase from $322 million to $589 million. It came out with a lecture on the perils of rapid growth, and not a nickel above the previous budget. But after the Senate had considered the budget request, the final verdict of a House-Senate conference was $353 million. This amount was far short of the hoped-for sum, and it therefore can truly be said that Congress "cut" the NSF budget. But the fact is that NSF ended up with a good bit more than it had received the previous year.

As for the NIH, it went through an experience for which most federal agencies would happily settle. Having received $930 million in fiscal 1963, it sought $968 million for the current fiscal year. In the past, Congress traditionally granted NIH more than the administration's request, but last year it broke with this pattern and matched the appropriation to the request. Again, it might be said that NIH suffered a "cut," but it would be more accurate to say that it received an increase somewhat smaller than usual.

Source of "Cuts"

The fact that the increases, in general, have been smaller than usual is the source of much of the concern that currently exists within the scientific community, and it is, therefore, worth examining the motives for this deceleration of growth. Those who feel ill-treated tend to attribute the "cuts" to anti-intellectualism or hostility to the learned way of life. Such sentiments unquestionably exist on Capitol Hill, just as they certainly exist outside of Washington, but caveman instincts have had extremely little to do with the fate of spending proposals for research.

The dominating factor is that the R&D budget has climbed rapidly in recent years—from $3.1 billion in fiscal 1954 to a projected $15.2 billion for the coming year—and the growth has now become entangled in efforts to keep the overall federal budget below the politically dangerous $100-billion mark.

The lion's share of the R&D increase has, of course, been in the politically favored fields of military and space research. But the significant thing is that, while other segments of national activity have been retarded by budgetary considerations, research of a nonmilitary nature has nevertheless managed to remain among the favored few.

The fear has been widely expressed that this is because nonmilitary research is linked in the congressional mind with military requirements, and that if military necessity were removed, nonmilitary research would feel the backlash. Unquestionably, leaders of the scientific community have milked the national-security argument to justify support, and a number of them are now showing signs of regret, but the fact is that the NIH budget has managed to stand on its own feet, without aid of the cold war. Though many scientists may not believe it, Congress has supported high-energy physics simply because of its fundamental importance, not because of any delusions about military significance.

Military Stimulus

Nonmilitary research does, in fact, benefit from an atmosphere that ties science to national security, but it is clear that it can thrive outside of this atmosphere. Oceanography, one of the fastest-growing fields for federal support, has close links to the needs of antisubmarine warfare, but a great deal of it has nothing whatever to do with military requirements. Congress is undoubtedly swayed by the problems of locating hostile submarines, but it is also easily moved by straightforward arguments about the economic potential of the oceans. And, while it is inclined to be receptive to research visibly related to commercial applications, it is at the same time willing to provide support for research that promises nothing but fundamental knowledge. If not, how can we account for its willingness to provide $67 million for as curious a scheme as Project Mohole?

Thus, if the financial situation of the scientific community is viewed in a national setting, a reasonable conclusion is that, while it could be better, it is actually relatively good. And this is especially the case in view of the fact that Congress last year passed a college-aid bill which, in effect, acknowledges the necessary intimacy of scientific research and education.

More pressing grounds for concern, it seems, are provided by a number of issues that grow out of the heavy federal involvement in research and development. And, in connection with these, it is a blessing, rather than a bane, that Congress is now conducting a series of careful inquiries, such as the investigation by the House Selected Committee on Government Research and the studies by the House Space Committee's subcommittte on science, research, and development.

Fund Accountability

The problem of researchers' accountability for federal funds can only benefit from open and rational discussion, and, similarly, the problem of spreading the nation's scientific resources without impairing quality could benefit from a good dose of wide-open, informed discussion. If any gloom is to be felt on these matters, some of it should be directed toward the fact that for years the leadership of the scientific community let these problems fester. It was only when Congress began to deal with these problems—as when Representative L. H. Fountain's committee put the clamps on NIH's policies—that the scientific community was willing to acknowledge openly that some revisions might be in order. Congressional handling of these problems has, in fact, suffered from lack of familiarity with many of the issues, but, here again, the scientific community has contributed to its own nightmare. For years it has operated on the assumption that Congress's relationship with science should end with the appropriation of funds, and, accordingly, it did virtually nothing to acquaint its valuable patron with the complexities and importance of the work of the nation's scientists. Congressmen have now initiated their own educational program, by summoning scientists and university administrators in large numbers to explain what it's all about. The very existence of this congressional interest is a source of concern to many persons, but it would be difficult to demonstrate that legislating in the dark is preferable to legislating in the light.—D. S. GREENBERG