in 1810, "The progress of knowledge is faster and more lively at a University, where it is constantly being mulled over and examined by numbers of vigorous and youthful heads" (*2*). This is probably still the vital factor in the university's continuing dominance in our study of nature, despite increased competition by institutions where the researcher is not bothered by students. It is frequently and truly said that the best instructor for the elementary student is the active scientist and scholar who brings with him the enthusiasm and insight that comes from working at the frontier. We should admit that this relationship is symbiotic. Perhaps the lively and intelligent student even plays the more important part in helping to provide perspective and direction in our study of nature.

References and Notes

1. Such cultism can be even stronger in the humanities than in the sciences. One frequently witnesses the spectacle of whole schools of scholars swooping down to exhaustively examine every scrap ever written by some minor poet whose innate intelligence was probably far below that of his modern critics. Such slavery to fashion is perhaps more pronounced in the humanities, because there absolute standards which set a direction for scholarship are much harder still to define than in pure science. Correspondingly, nuances of taste become more important.
2. W. von Humboldt, "Uber die innere und ausser Organisation der hohere wissenschaftlichen Anstalten in Berlin," in *Gesammelte Werke* (Preussische Akademie der Wissenschaften, Berlin, 1903–1918), vol. 10, p. 250. Although the present article deals with pure science in the modern context, the most general concept which underlies it was already clearly recognized by Humboldt: "It is not possible to lecture on science [*Wissenschaft*] as science without at the same time comprehending it anew, and it would be incredible if sometimes, perhaps often, one did not come across new discoveries." Again: "The professor does not exist solely for the student, both exist for the sake of knowledge. The professor depends on the presence of students and without them he could not proceed. He would have to find them, thereby to attain his goals through the connection between his practiced but therefore more one-sided and already less lively mind, and the weaker but less partisan and wider-ranging powers of the student."
3. This article grew largely out of extended discussions with Miss Nancy Doe and Prof. William von E. Doering, and Dr. Helmut Krauch. It was written while the author was a guest of the Institut für Systemforschung, Heidelberg.

NEWS AND COMMENT

Reuss Committee: New Probe Planned into Priorities for R&D

When Congress reconvenes next month, the subcommittee headed by Representative Henry S. Reuss will embark on its second study of matters related to federal support of research and development. In the Capital's science establishment, the announcement of this forthcoming event has stirred a good deal of interest and perplexity over what the congressman is up to and how his subcommittee fits into the patchwork of research jurisdictions on Capitol Hill.

Reuss, a Milwaukee-area Democrat, chairs the Research and Technical Programs Subcommittee, which was established last year by the Government Operations Committee. In October, upon completion of its first study (*Science*, 22 October), the subcommittee concluded that the federal government's $16-billion outlay for research and development "has actually harmed higher education in this country." The judgment generally pleased persons outside the mainstream of the $16 billion, and infuriated or at least displeased many of those who dispense and receive the money. (See letters scheduled for publication in 31 December issue of *Science*.)

Government administrators and staff people appeared to have been particularly aggrieved by Reuss's findings and use of statistics, but they showed no desire to get into a public row with the congresman. As one administration aide put it, Reuss has a solidly liberal, pro-education, pro-science voting record, and furthermore, whatever his findings, his recommendations jibed with the administration's own goals in this area: greater geographical distribution of research funds, more institutional grants, and increased support for the humanities and social sciences.

A few weeks ago Reuss announced that his subcommittee will next look into the question, "Do we now possess efficient machinery for determining that our scientific resources are economically employed to achieve our vital national goals?"

The question, in one form or another, has for some time been bothering a lot of people, but on the basis of the subcommittee's first performance, and the text accompanying the announcement of the new hearings, there is abundant curiosity not so much about the question as about the subcommittee.

In the announcement, for example, Reuss notes that almost 90 percent of the $16 billion in federal R & D expenditures is for military, space, and atomic energy programs, and he questions whether civilian needs are being shortchanged in this order of priorities. "If anyone in the Administration or Congress is now asking these hard questions, it has escaped notice," he states—a view that no doubt was greeted with words of one syllable at the Bureau of the Budget, the Office of Science and Technology, and the Federal Council on Science and Technology, and in the various congressional committees that have worked on the subject in recent years.

Reuss, in his statement, goes on to recommend the following: "Army Field Manual 101-5, which outlines for the field officer an approach for determining the most suitable course of action to accomplish his mission, provides an example in decision making which should be useful to those responsible for allocating federal research and development funds: he is told to consider alternative courses of action before coming to a decision." (Those inclined to accept this recommendation might also look at paragraph 6.19, of the manual, dealing with "The Tactical Cover and Deception Estimate," which "is used to determine the deceptive measures which will contribute most effectively to the successful accomplishment of the mission.")

In view of all this, a reasonable question is, What's going on here? To get the answer, it is necessary to go back to the demise last year of Representative Carl Elliott's Select Committee on Government Research (*Science*, 8 January). Upon expiring, it left behind a series of recommendations for improving congressional handling of scientific and technical matters, all of

which were ignored except for one: that the Government Operations Committee establish a subcommittee to maintain surveillance over federal support of research and development.

Government Operations cannot write legislation or pass on appropriations, but it does have authority to investigate the conduct of any federal activity and to make recommendations. Reuss, a member of Congress since 1955, had generally been associated with economic and fiscal questions, through diligent and admired service on the Banking and Currency Committee and the Joint Economic Committee. There wasn't any visible indication that he was straining to undertake surveillance over research and development, but, when the subcommittee was established, seniority contributed to his receiving the chairmanship. Initially, his committee staff consisted of Harry Selden, a writer and editorial specialist who had served under Elliott, and Edna Gass, a longtime Reuss associate with a background in economics. Selden recently left the committee, and now Mrs. Gass holds the chief position, assisted by a former journalist and an attorney.

Theoretically, the subcommittee could look into anything related to federal support of research, but congressional committee preserves are balkanized and jealously guarded. Medical research was out of bounds because it had long ago been preempted by Representative L. H. Fountain (D–N.C.), head of the Government Operations Subcommittee on Intergovernmental Operations. Atomic Energy was similarly beyond reach: the Joint Committee on Atomic Energy does not stand for intrusions, and, besides, Representative Chet Holifield, chairman of the JCAE, is ranking Democrat on Government Operations; he also is chairman of its subcommittee on Military Operations, which covers the Defense research programs. Similar sovereignties reduced the choices in other fields, and, as a consequence, the Reuss subcommittee had to choose its subjects with a view to avoiding trespass.

Since research versus teaching didn't fall into anyone's preserve, it qualified for the first investigative venture. The ordering of research priorities gets a little closer to some sensitivities, and may arouse other chairmen, but, if handled in terms of the adequacy of the executive decision-making system rather than the value of specific programs, it might pass without friction, at least on Capitol Hill.

Significantly, the leadoff witnesses in the forthcoming investigation will be Charles L. Schultze, director of the Bureau of the Budget, and Donald F. Hornig, director of the Office of Science and Technology. The witness list is not yet completed, but so far its emphasis is on persons from private research organizations that have been examining the economic implications of research and development expenditures. The hearings will probably take place in mid-January.

As might be expected from his previous interests, and unlike his congressional predecessors in this area, Reuss tends toward an interest in the economic significance of research and development. "When you examine the federal budget," he said in an interview last week, "you see at once that research and development represents a huge chunk of discretionary expenditures. There is no readily accessible control over much of the budget, but the 15 or so percent that we spend on R & D is manageable. Therefore, it's worth looking at for that reason, but also because research and development, perhaps more than any other federal spending, molds the future." Does this mean, Reuss was asked, that he suspects some deficiency in the White House science office?

"I want to explore if it has been adequate," he replied. "The results so far have not satisfied my own preconception of what it should be." And he added, "I have a hunch that the hearings will develop a discernible failure to apply a Benthamite pleasure-pain analysis to various programs."

Reuss stressed that "we want to make it clear to other committees that we won't impinge on their jurisdictions. We will not attack research problems that fall under a given committee, but we will work on problems common to all."

In the announcement of the hearings, and in the interview, Reuss made frequent reference to the space program, raising, for example, the question of whether the 1970 moon landing goal is having the effect of deferring attention to other goals. He explained, however, that "we don't have any designs on the space program. We simply want to make sure that the decisions are being properly made."

It will take some skillful footwork to tread that line and it will also take a great deal of diligence on the part of the congressman himself to produce findings that will be taken seriously by the research agencies and his own colleagues on Capitol Hill.

—D. S. GREENBERG

The 200-Bev Machine: University Compact Offers Its Services

Universities Research Association, Inc. (URAI), a 34-institution compact designed to keep the peace in high-energy physics, has offered itself to the U.S. government as "contracting agency for the construction and operation" of the proposed 200-Bev accelerator.

URAI's creation was initiated last December by Frederick Seitz, president of the National Academy of Sciences, who, according to an Academy announcement, was "concerned lest the competition among scientific institutions for massive one-of-a-kind research facilities destroy the unity of purpose that once characterized the national scientific community." Though closely tied to the Academy by genesis and personal relationships, URAI is an independent entity, incorporated in the District of Columbia and operating under its own bylaws. But, at least on the science side of the science-and-govern-

*URAI members are California Institute of Technology, University of California (Berkeley), University of California (Los Angeles), University of Chicago, Carnegie Institute of Technology, University of Colorado, Columbia, Cornell, Duke, Harvard, University of Illinois, Indiana University, University of Iowa, Johns Hopkins, University of Maryland, Massachusetts Institute of Technology, University of Michigan, University of Minnesota, University of North Carolina (Chapel Hill), Northwestern, Notre Dame, University of Pennsylvania, Princeton, Purdue, Rice, University of Rochester, Rockefeller, Stanford, University of Texas, Tulane, Washington University, University of Washington, University of Wisconsin, and Yale.