Finally, we must recognize that great discoveries in physics can still be made with small means. In times of generous support, there is always the danger that our thinking will be mastered by our equipment, rather than vice versa. But this danger becomes even greater in times of shrinking budgets, when we are tempted to squeeze one more achievement or elaboration out of the equipment or the computer program we have already developed at great expense. The very time when it may be most important to scrap some of our accumulated research technology in favor of thought may be the time when the shortage of funds makes the prospect of getting new equipment dimmest. Yet physics is probably less likely to die of starvation than of slow strangulation.

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NEWS AND COMMENT

Defense Research: Senate Critics Urge Redeployment to Urban Needs

The assignment of a high priority to military-related research has been a standard fixture of American political life since the end of World War II. In recent years, however, as Soviet-American tensions have somewhat eased and domestic problems have become increasingly painful, more and more questions have been raised about the purposes to which the nation is putting its scientific and technological resources, and about the desirability of a large military role in the support of academic research. Last week, in the U.S. Senate and in the presidential campaign, these questions were raised with new vigor. The effect in the Senate was a slight cutback in funds for military research, with a good deal of the debate focused on Defense support of academic science. In the presidential campaign the effect was a strong, though imprecisely defined, indication that, if Robert F. Kennedy makes it to the White House, there is likely to be a significant redeployment of technological resources away from military and space activities and toward the problems of the cities.

In the Senate, the issue was embodied in a military procurement bill that the Armed Services Committee brought to the floor after snipping out 3 percent from the category of research, development, test, and evaluation (RDT & E). This left the total bill at $22 billion, and reduced the RDT & E component from the $8.015 billion requested by the administration to the $7.875 billion approved by the committee. Clearly, even this reduced sum would leave military research comfortably above the poverty line. But when the bill came to the floor, it was assailed from various directions, with, curiously enough, several of the opponents expressing particular distaste for military support of basic research. The rationale for singling out this relatively small proportion of the total—some $450 million in all—was never presented in any systematic fashion. But it may be inferred that, since a lot of people are disturbed by the military's relatively large presence in American life and since basic research is the least comprehensible and, in the short run, least utilitarian of military-supported activities, it stands out as a target for budget chopping. Thus, Senator Philip Hart (D-Mich.), who, on the floor, offered an amendment to reduce the research budget still another 3 percent below the committee's figure, stated that he was reluctant to cut back on Defense spending while Americans were fighting in Vietnam, "but it seemed to me that research was the area least likely to affect a man under fire." He was joined by Senator George McGovern (D-S.D.), who assailed the Defense Department's argument that it is essential to avoid fluctuations in military support of academic science. "Presumably," McGovern said, "the alternative is for these institutions to lose some of their military research orientation. In the light of the premium we are placing on research today, I see little reason to fear that our scientific capabilities will decline if these defense projects are reduced or channeled through other sources. I have yet to be persuaded that the Nation's research manpower and facilities could not be quickly mobilized in case of an emergency requiring them for military purposes." Quoting a remark that Defense Secretary McNamara made in the course of the Armed Services Committee hearings, to the effect that he had doubts about the return on the $1 billion a year that Defense spends in exploratory research, McGovern stated: "Excessive military expenditures that strain our economy and bleed off resources needed for other purposes actually weaken rather than strengthen our Nation's power and influence in the world."

Senator Margaret Chase Smith (R-Me.) defended the budget request, but not too vigorously. In fact, she observed, "I must say that the results of the research and development efforts funded by the Defense Department over the last few years have seemed disproportionately small in relation to the cost. Yet, I continue to believe that our military preparedness depends so heavily on the investment in research and development that I am reluctant to risk the consequences of inadequate funding."

Senator J. William Fulbright (D-Ark.) joined the debate and took up the subject of the Defense Department's increasing interest in social and behavioral science research. Citing such Defense Department support projects as "Politics and Economic Growth in India," Fulbright demanded to know why the military is involved in such subjects, and answered his own question by declaring, "The Defense Department has blanketed the field in any kind of research, primarily because they have the money." Citing DOD's refusal to release a study to him that the Institute for Defense Analyses made of the Gulf of Tonkin incident,

Fulbright stated, "This is not research at all. This is spending enormous amounts of money to gather information to support administration theory, and if the study does not support their preconceived notions of what our foreign policy should be, the study is buried and hidden from the relevant committee." Fulbright went on to charge that the Bureau of the Budget frequently examines domestic research "with a fine-tooth comb and assigns two or three persons to look at it and, so often, they turn it down." However, when it comes to Defense research, he contended, "They do not have the time to look at it. And, as far as I know, no one looks at it, with the exception of Dr. [John S.] Foster [Defense Director of Research and Engineering], who is in charge of distributing the money. I hope that a way can be found by which to bring this matter under control, not only for the sake of the economy, but also for the sake of our foreign relations."

On Hart's amendment to cut the RDT & E budget by 3 percent, the outcome was 28 for and 30 against. But on the following day the Senate approved, 45 to 13, an amendment by Senator John J. Williams (R-Del.) for an across-the-board 3-percent cut in the $22-billion bill.

It seems likely that anti-spending sentiment, rather than hostility to the military, accounted for the major proportion of support for the cutback—which, after all, was of token rather than meaningful size. But anti-military sentiment was also present in significant volume, and against this background it is interesting to observe a position that is beginning to emerge in the presidential campaign addresses of Senator Robert F. Kennedy. Speaking on 11 April in Lansing, Michigan, on the need for dealing with domestic problems, Kennedy stated, "And let us not be discouraged by the legitimate question of resources, by those who ask where, in the face of a $30-billion war and fiscal crisis, we shall find the money. . . . First, the most important need is for a national impact project: to put men to work, to restore possibility to the young and to give the resident of the ghetto some sense that the nation is committed to the fulfillment of his hopes. For such a program, over the months ahead, we can find the money in programs already authorized. We can slow down the race to the moon, if it means salvation of our nation here on earth.

NEWS IN BRIEF

● **TRANSPLANTS ETHICS**: The American Heart Association has established a 15-member Committee on Ethics to study the ethical, moral, and legal questions of heart transplants and other forms of surgical and medical techniques. The committee will be comprised of persons from the fields of medicine, law, religion, education, and communications. Eugene A. Stead, Florence McAlister Professor of Medicine, Duke University, will head the committee.

● **NEW PUBLICATIONS**: The Organisation for Economic Co-operation and Development (OECD) has issued two new publications on science policy. *Review of National Science Policy—United States* ($11.50 a copy) is the seventh OECD publication in a series on national science policies. *Problems of Science Policy* ($3.50 a copy) is the proceedings of an experimental seminar that was held at Jouy-en-Josas, France, in February 1967. Both may be obtained from the OECD Publications Center, Suite 1305, 1750 Pennsylvania Ave., NW, Washington, D.C. 20006.

Radiation Exposure of Uranium Miners is the summary analysis of hearings May–August 1967 before a subcommittee of the Joint Committee on Atomic Energy. Copies are available, at 20 cents each, from the U.S. Government Printing Office, Washington, D.C. 20402.

Copies of *Marine Science Affairs—A Year of Plans and Progress*, the second annual report by the National Council on Marine Resources and Engineering Development, are available, at $1 each, from the U.S. Government Printing Office, Washington, D.C. 20402.

● **TEACHER TRAINING**: The U.S. Office of Education has awarded $1 million in grants to eight universities and a regional educational laboratory for the first phase of a 6-year program to upgrade teacher training. The institutions will design model programs for training preschool and elementary school teachers. Institutions receiving grants are: Florida State University, Michigan State University, Syracuse University, Columbia University, University of Georgia, University of Massachusetts, University of Pittsburgh, University of Toledo, and the Northwest Regional Laboratory, Portland, Ore.

● **TECHNOLOGY AND BIOMEDICAL RESEARCH**: A committee of the National Academy of Engineering has awarded subcontracts totaling $140,000 to six universities to find new means of using technology to improve biomedical research and health care. The subcontracts were awarded by the Committee on the Interplay of Engineering with Biology and Medicine, which is working under a contract to the National Institutes of Health. Universities receiving the subcontracts are: Carnegie-Mellon, Johns Hopkins, M.I.T., Ohio State University Research Foundation, University of Virginia, and University of Washington.

● **NEW CHICAGO PROGRAM**: The Field Museum of Natural History, Chicago, has established a Center for Graduate Studies in cooperation with Northwestern University and the University of Chicago. The center will offer graduate work leading to the Ph.D. in zoology and paleontology. The program is being supported by a 2-year, $111,000 National Science Foundation grant. Robert F. Inger, curator of the museum for reptiles and amphibians, is chairman of the advisory committee which directs the program.

● **CHILDREN'S TV EXPERIMENT**: A television experiment in the teaching of preschool children is scheduled to begin broadcasts in the fall of 1969. The experiment, known as the Children's Television Workshop, will aim at stimulating the intellectual and cultural growth of children—"particularly those from disadvantaged backgrounds." Hour-long color programs will be broadcast 5 days a week by National Educational Television, which will produce the programs. The workshop, including advance preparation and 26 weeks of broadcasts, is expected to cost between $6 and $8 million. Fifty percent of the cost will be provided by the Carnegie Corporation and the Ford Foundation. The other half will be borne by federal agencies, with the Office of Education providing about 75 percent of the federal share. Other federal agencies that are expected to help finance the project include the Office of Economic Opportunity, the National Institute of Child Health and Human Development, and the National Endowment for the Humanities.

We can postpone work on the supersonic transport, if it means we can safely sit still in our cities. We can adjust our research and development programs, now running into the billions of dollars, if it allows us to search for purpose and human dignity within our own communities."

On 19 April, in a talk to business and financial executives in Los Angeles, Kennedy expanded on these points. Noting that in California "planes are being built to fly men across oceans in two hours," while "neglect of public transit has trapped the young job-seeker of Watts two hours away from a decent job," Kennedy stated: "Now we are coming to understand that there is a national agenda before us, that we must begin to arrange our national priorities, so that each of us in his own way can help fuse private freedom and public purpose in a new American commonwealth."

Kennedy continued: "We know that with enough public concern and resources, we can build radically new kinds of abilities, to solve awesome problems. That is what we did when we constructed an impregnable defense system. That is what we did when we began our space program. That is what we can do now: by directing government's influence toward new and unsolved problems—in the cleansing of our air and water, in the reconstruction of our urban transportation system, in the development of sources of recreation within our urban center.

"We now spend almost $18 billion on research and development in public funds alone. But we have scarcely begun to put this resource to work within our own concerns. Surely this kind of incentive, offered to the men who are building for defense and space, can also encourage them to build what we need so desperately within our own cities and communities, so that men will walk on the moon—and walk with pride and confidence in the streets of American cities. We are training almost 20,000 Ph.D.'s a year. Surely they can be encouraged—through public incentives—to develop for their companies and their country the keys to better lives for our citizens."

That Kennedy's statement is characterized by airy rhetoric and lack of detail should not be surprising at this early stage of the presidential campaign. Nor, considering that the business community has no great affection for him, should it be surprising that he placed considerable emphasis on the private role in developing technology. But the drift of his thoughts is clear, and they harmonize to a large extent with last week's events in the Senate: the specter of external threat is no longer the dominant force that it was once for determining how the United States shall develop and employ its scientific and technological resources. It is yet to be determined whether domestic needs can underwrite American science and technology as effectively as Communism once did, but it is plain that the old motivation is rapidly declining and that politicians are beginning to grope around for new answers.

—D. S. GREENBERG

Social Science: British Council Has Key Role in Research Support

London. The social sciences have had a late flowering in Britain as compared to their history in the United States, but in 1965 the British, by establishing a government-supported Social Science Research Council (SSRC), did what Americans have so far only talked about doing.

The idea of establishing a separate government organization for the support and coordination of research and education in the social sciences has been in the air in Britain since the end of World War II, but official opinion was doubtless moved to create the council by the so-called boom in the social sciences. In its recently published annual report for 1966–67 the SSRC noted that, in the 5-year period between 1962–63 and 1966–67, the number of full-time students admitted to university social science faculties increased by 62 percent. Last year it was possible to admit only 38 percent of the qualified applicants in social sciences, as compared with 56 percent in applied science and 71 percent in pure science.

What accounts for the boom? Asked to speculate, Michael Young, the SSRC's first chairman and probably Britain's best-known practicing sociologist, suggested that behind it all is a growing acceptance, both by government and by society at large, of the view that the social sciences can be usefully applied to their problems.

Economics was the first of the social sciences to win acceptance in Britain as a useful discipline, and the most influential in changing the climate of opinion. Keynes and Beveridge were public figures of considerable magnitude, and economists held prominent posts in Britain during and after World War II. The exploits of the economists seem to have made other kinds of social scientists think more about public life and public problems. Another spur was the growing influence and affluence of the natural sciences.

The example of the United States has been important. Many British social scientists have spent postgraduate or sabbatical time there. In leading centers of social science research in Britain there is usually at least one person who has had crucial exprience in the U.S.

Young dates the beginning of general public awareness of the social sciences at about 1960. The most obvious sign was the increasing number of British secondary school students opting for the social sciences rather than the natural sciences. The explanation given most widely by the students was that they felt emphasis on the natural sciences had become excessive. At the same time, interest in other social sciences, particularly sociology, was catching up with the interest in economics. The boom of the 1960's, says Young, was created by a "student-propelled demand."

It is in the new universities that the social sciences seem to be blooming most brightly. At Oxford and Cambridge and the older civic universities new disciplines often get limited encouragement. Oxford and Cambridge have had distinguished scholars in the newer social sciences, but teaching in these subjects tends to be ad hoc and