Basic Research: The Political Tides Are Shifting

One of the most remarkable developments of the postwar period was the creation and growth of a politically insulated and privileged place in the public process for the practitioners of basic research. It was, of course, never as well insulated or as fully privileged as they wanted it to be. But the scientists who built the bomb and radar emerged as folk heroes from World War II and had little difficulty persuading the country, first, that the prewar neglect of fundamental research must not be repeated and, second, that basic science, to be productive, must be self-governing.

Truman vetoed their quest for a politically disengaged National Science Foundation, but the Office of Naval Research was, in effect, a shadow NSF until a compromise was worked out. Eisenhower came to office as a budget cutter, but the budget of the National Institutes of Health ran away from his control. Kennedy was a romantic when it came to science, and the basic researchers had little difficulty in having their designs embodied in his policies and budgets.

From 1945 on it was a relatively small group of scientists that occupied the high councils of science and government. Academic basic researchers, mainly physicists and physical chemists, drawn predominantly from major East and West Coast institutions, were the people who represented science in the political councils. Six of the seven people who have served as presidential science adviser, or served in the equivalent role prior to Sputnik, were alumni of the World War II Los Alamos Scientific Laboratory or the M.I.T. Radiation Laboratory, and five of them came from northeastern universities.* Not unexpectedly, the membership of the President's Science Advisory Committee reflected the professional acquaintance of the science advisers who served as chairmen. In general, the scientific advisers were summoned to Washington because of their experience in military technology, which for a long time was the most pressing item on the agenda of the scientific advisory bodies. But eventually they turned their attention to the problems of the health of the scientific community, and, being situated as they were, their counsel prevailed. In general, this followed a twofold ideology: society can expect but must not insist upon a utilitarian payoff from basic research and must therefore support the rapid expansion of the nation's basic research capabilities; but if priorities must be drawn, existing quality should be given preference over the development of new research institutions.

Now, as the Johnson administration —an administration dedicated to rapid social engineering—is completing its third year, it is obvious that the enclave of basic research is being battered, new values are in the ascendancy, and the cast of dominant characters on the science side of science and government is undergoing a significant change. At this stage it is perhaps impossible to make any comprehensive assessment of what is happening, but a pattern is developing and it indicates (i) that the dominance of the major East and West Coast institutions is ending, and (ii) that there are pressures all along the line to influence the nation's technical enterprise increasingly toward solutions for the here and now, rather than toward expanding the sum of fundamental knowledge that may—or may not —ultimately have social value. Money is only partially a measure of these changes. Basic science, as a matter of fact, has never received more than approximately 10 percent of total federal expenditures for research and development. But what is significant is that the balance of influence is swinging—away from those institutions that long dominated the system and, at the same time, toward greater interest in directing science and technology toward utilitarian goals. The two developments have separate origins, but they have a common effect: new competition for funds that previously were flowing in ever-increasing volume to the established centers of academic basic research. The direct impact is difficult to trace, but when Congress cut back on NSF's budget request while decreeing that the foundation's Science Development Program was not to suffer any decrease, it was, in effect, taking from M.I.T.-Harvard-Berkeley-Caltech *et al.* and giving to the long-suffering outsiders.

Federal administrators publicly insist that basic research will not, and must not, suffer as more effort is directed toward applications. But with the existing basic research establishment beginning to outrun its financial support, and with new and expensive applied-research goals being politically certified, they are generally silent or fuzzy on the question of the distribution of the available money. For example, last April, in an address to the American Federation for Clinical Research, Surgeon General William H. Stewart said:

> . . . I believe there is a strong current toward pinpointing of the research effort, giving proportionately stronger encouragement to investigations among the most promising avenues. Bear in mind that I am speaking in terms of tendencies and proportions. There must still be abundant support for individual initiative, along whatever line the qualified investigators may choose. Indeed this support is part of the research base . . . which we intend to protect above all else. But I believe that the trends upon which public support of research depend are indicating an increasing investment in mission-oriented, targeted research.

Similarly, Representative Emilio Q. Daddario's proposal for changing the legislative charter of NSF seeks to preserve the basic science orientation of the Foundation but at the same time nudges NSF into applied work. "This change," Daddario states in his report, "would not alter the Foundation's charter to support basic research. It would simply make support of some applied research permissive if such research were directed toward a major national

* The first chairman of the Science Advisory Committee, established in 1951, was Oliver Buckley, of Bell Labs. His successors were Lee DuBridge, of Caltech, and I. I. Rabi, of Columbia, director and associate director, respectively, of the Radiation Laboratory. When the advisory post became a full-time position, in 1957, it was first filled by James R. Killian, Jr., of M.I.T., who was on the Rad Lab steering committee. Killian was followed by George Kistiakowsky, out of Harvard and Los Alamos; Jerome B. Wiesner, M.I.T. and the Rad Lab, and Donald F. Hornig, Princeton and Los Alamos.

problem such as pollution or transportation." Daddario has said that NSF will require additional funds if it takes on new responsibilities. But, in the layout of congressional jurisdictions, he and his parent committee can assign jobs to NSF but it is another committee, Appropriations, that provides the money. And Appropriations is not as generous with the money as Daddario is with new objectives. Daddario himself is almost embarrassingly friendly toward NSF and can be expected to look after the Foundation with care and discretion. But on previous occasions—not involving Daddario or his committee—congressional directives for new NSF programs have not been accompanied by proportionate budget increases, and much of the cost has come out of the most malleable part of NSF's budget, so-called "little science."

Sources of Influence

The arrival of the Daddario subcommittee in the affairs of NSF also is related to the new currents of influence. Except for atomic energy matters, in which the Joint Congressional Committee on Atomic Energy has played a traditionally powerful role, government science policy has generally been initiated within the executive branch—which early accorded a place of influence to academic science. But the proposals to amend the NSF charter originated in Congress—not in the executive—though the revisions were made in close consultation with scientists long associated with the executive branch. And just last week Congress's long-standing desire to get a closer hold on the far-flung oceanographic program was accepted by the President when he signed into law a bill establishing a cabinet-level oceanography council (*Science*, 10 June 1966). The effect of Congress's growing presence in science policy is difficult to assess, but one factor is certain: the executive generally was guided by what its science advisers said was good for science; congressmen are not averse to good science, but they don't see any reason why good federally supported science can't be conducted in their own districts or states.

The beginning of the geographic and institutional shift in the personnel of science and government slightly preceded the Johnson succession, but the trend has been greatly accelerated over the past 2 years. First of all, scientists in government, industry, and universities outside the mainstream of federal grants have long chafed over what they consider to be inequities in the distribution of money and position. And they have been particularly grated by the dominance of basic researchers in the councils that advise the politicians on science as well as engineering. The existence of the National Academy of Sciences as a bastion of basic science, with just a handful of engineers, led the engineers to seek their own academy. As things now stand, it will exist in administrative tandem with the NAS, but the engineers are rising and restless and bear many old grudges because of the often supercilious attitudes of their colleagues in basic research. As for the mission-oriented National Laboratories, those federally funded administrative hybrids whose quality is often disparaged by academic scientists, they, too, have resentments toward the dominance of academic basic science. As Alvin Weinberg, director of the Oak Ridge National Laboratory, wrote in *Science* (6 August 1965):

> . . . most of the prestige and emphasis in the university goes to basic science. The best scientific minds go into basic, not applied, science; and the social hierarchy of science, reflecting the discipline-orientation of the university as much as it does the intrinsic logic of the situation, places pure science above the interdisciplinary applied science. . . . To me urgent support of a field is justified only if that field is likely in some way to solve a pressing human need. . . . For the university to persuade society that at this stage in history the university's own intellectual goals and aspirations—remote, pure, and fragmented—deserve the highest place among the goals of the society is hardly tenable.

The relationship between the Johnsonian atmosphere and the age-old tensions of basic and applied research is difficult to establish with any precision. But it has to be noted that changes now under way suggest an identity between Johnson's social vision and the plaints of (i) those who have long felt that the basic research community, and a relatively small segment of it at that, has been exercising a disproportionate influence in the affairs of science and government and (ii) those who feel that emphasis on acquisition of fundamental knowledge is detracting from efforts to put the knowledge to work for the good of people. The Weinberg thesis sends the traditionalists of basic research into paroxysms of dissent, but it appears to have an influential constituency that is beginning to get its message across to the political decision-makers. For example, last year, in *Basic Research and National Goals* (the collection of essays prepared under Academy auspices for the House Committee on Science and Astronautics), Arthur Kantrowitz, of the AVCO-Everett Research Laboratory, wrote:

> While there can be little doubt that our universities maintain world leadership in basic science, there is similarly little doubt that leadership in applied sciences is primarily to be found in nonacademic institutions. In such an environment one cannot expect anything other than the prevalent attitude that applied science may be all right for those who cannot meet the standards set for pure science. This attitude presents an intolerable obstacle to the achievement of excellent university education in applied science.

Similarly, Edward Teller, a basic researcher who has become an apostle of the need to improve the status and quality of applied research, has spoken out against the elite role that basic research has come to occupy in academic settings. "Throughout our universities," he told Daddario's subcommittee in 1963, "the best people are brought up with the idea in mind that pure research is the most wonderful thing, the one thing worthy of attention of the best people."

Last September, in what has come to be referred to as the "share-the-wealth" directive (*Science*, 24 September), Johnson decreed broader geographic distribution of research funds. Since research money moves slowly, the effects of this decree are not yet visible in any significant way, but federal research administrators insist that the have-nots are now en route to getting a bigger share. As one agency official put it, "If I were a young scientist out to make my mark, I think I'd set up shop at a good second-rate university." He added, "Kennedy was a northeast, Ivy president. Johnson is a land-grant president."

Science Board Changes

One indicator of the changed atmosphere is to be found in the latest appointments to the National Science Board, the top advisory board of NSF. Last month, terms of eight of the 24 members expired. These were W. O. Baker, Bell Labs; Theodore Hesburgh, Notre Dame; William V. Houston, Rice; Robert S. Morison, Cornell; Joseph C. Morris, Tulane; E. R. Piore, I.B.M.; William W. Rubey, U.C.L.A.; and Eric A. Walker, Penn State. Morison and Piore, who had been appointed

to complete unexpired portions of the normal 6-year term, were reappointed. The newly appointed members are Clifford M. Hardin, University of Nebraska; Charles F. Jones, Humble Oil; Thomas F. Jones, Jr., University of South Carolina; Joseph M. Reynolds, Louisiana State; Athelstan F. Spilhaus, University of Minnesota; and Richard H. Sullivan, Reed College. (The board, which elects its own officers, has chosen Philip Handler of Duke to succeed Walker as chairman, and Ralph W. Tyler of the Center for Advanced Study in the Behavioral Sciences, Stanford, as vice chairman succeeding Handler.)

Another indication of change is Johnson's latest appointment to the five-member Atomic Energy Commission. When Mary Bunting resigned last year to return to the presidency of Radcliffe, it was reported that the White House wanted a woman to replace her, as part of the adminstration's efforts to elevate the professional status of women. The quest went on unsuccessfully for months, and then it was reported that a Negro or a Mexican-American was being sought —which inspired a staff member of the Joint Committee on Atomic Energy to remark, "At least they're not playing the poverty angle." Last week the appointment of the AEC's first Negro commissioner was announced, Samuel M. Nabrit, president of Texas Southern University.

In making the NSF and AEC appointments, the President obviously did not dip into the academic or scientific proletariat. Professionally, the appointees are all distinguished people. But their admission to the high councils demonstrates that new values and new geographic regions are now gaining strength. As noted here earlier, Cambridge representation on the 18-member PSAC has receded from a long-standing one-third down to one member. And the new appointments, as well as the administration's emphasis on using science rather than supporting science, also suggest that we are witnessing the slow but certain demolition of the unique enclave that a segment of the scientific enterprise carved out for itself in the period after World War II.

—D. S. GREENBERG

Congress: A New Option for Addicts; a Look at LSD

The House of Representatives on 1 June passed a Narcotic Addict Rehabilitation Act, thus breaking its own habit of enacting strictly punitive legislation in the narcotics field.

Heart of the bill (H.R. 9176) is a provision which would enable addicts charged with federal crimes to elect, under certain circumstances, civil commitment to institutional treatment followed by a period of supervised aftercare instead of facing trial and possible imprisonment on the criminal charges.

The bill has the most proper sort of legislative pedigree. Such a measure has been urged on Congress in two successive Presidential messages on crime and law enforcement. H.R. 9176 is an administration-blessed bill introduced by the chairman of the House Judiciary Committee, Emmanuel Celler (D–N.Y.). It follows the lines of statutes now in force in California and New York, which are the two most populous states and the states having the highest rates of narcotics addiction. Furthermore, the bill embodies one of the main recommendations of the President's Advisory Committee on Narcotic and Drug Abuse (*Science*, 14 February 1964). The advisory committee's suggestions sounded mildly radical at the time the report was issued, but, more than most blue ribbon panels, the committee is proving to have been influential or at least prophetic.

The vote on final passage for H.R. 9176 in the House was an overwhelming 367 to 1 and indicated acceptance by the House of the reformist view that hope of progress in dealing with narcotic addicts lies in treating the addict as a medical problem rather than a criminal. The grounds of the debate were set when Rules Committee member Rep. J. Madden (D–Ind.) in introducing the debate said, "The problem of drug addiction involves medical, psychological and sociological factors as well as the aspect of criminality."

The debate, however, had a cautious, almost querulous, tone often detectable in Congress when the conventional wisdom is being challenged, especially when the matter lies in the poorly marked border zone between law and morality, where the guides of law and court decisions cannot be relied on. This uneasiness was reflected in the action of the House in first rejecting, individually, two amendments on the first day of debate and then, on the second day, accepting the same amendments, one of which scrapped a main feature of the administration bill.

The doubts of some legislators were probably reflected, in the committee report on the measure, in minority views filed by five Republican members who said that one section of the bill "constitutes a congressional warrant to the judiciary directing an experimental excursion into uncertain sociological theories. The experiment is to be conducted at the expense of indispensable principles that those who shall commit crimes shall be brought to account."

What bothered the dissenters in this case was the section permitting a defendent to elect civil commitment rather than be prosecuted. The principle espoused in this section, the minority went on to say, was "that the individual is not really responsible for his acts—to society much less than himself—as long as he has indulged himself into dependence on narcotic drugs."

The section at issue was the bill's key Title I, which opens the possibility of civil commitment for an addict arrested on another federal charge. Robert T. Ashmore (D–S.C.), chairman of the subcommittee which handled the bill, argued that the bill provides for the "controlled rehabilitation of selected addicts." To be eligible for civil commitment the addict must not be accused of a crime of violence, must never have been convicted of such a crime in the past, and must not have