Biomedical Policy: LBJ's Query Leads to an Illuminating Conference

Oklahoma City. Last June, Lyndon Johnson wondered aloud about the payoff the public is getting from the government investment in basic biomedical research (*Science*, 8 July), and, since scientists are among the more insecurity-ridden wards of the federal treasury, a shrewd salesman might have prospered by offering mourning bands for lab coats. By late August, the biomedical gloom was such that NIH called in some 300 of its advisors from throughout the country to take home the message that the Administration is not disenchanted with basic research.* But panic in the scientific enterprise, especially in time of tight budgets, is easier to inspire than to quell, and apparently the NIH meeting was not altogether soothing. Sensing this, Senator Fred R. Harris (D–Okla.), chairman of the Senate Government Operations Subcommittee on Government Research, decided to call a sort of summit conference on biomedical research policies. Titled "Research in the Service of Man," this was held over a 4-day period here in Oklahoma City last week. And though the conference's place and timing—2 weeks before Harris comes up for reelection—stirred some skepticism about his motivation, the effect, whatever the motivation, was to throw an unprecedented amount of illumination on influential political and scientific thinking about the policies that government should follow in supporting biomedical research. (In fairness to Harris it might be pointed out that the polls show him ahead by margins of at least 2 to 1, and that he had originally intended to hold the conference in Washington, until, because of the possibility of an end-of-the-session filibuster, committee chairmen were warned that hearings would not be permitted while the Senate was in session. As for holding the conference post-election, Harris says he had a long-standing commitment to go abroad immediately after election day.)

If any themes emerged from among the 29 papers that were presented during the conference, they were these:

1) Federal policymakers recognize the value as well as the peculiar vulnerabilities of basic research, and they want to protect it from severe budgetary fluctuations and demands for rapid payoff.

2) However, the rationale for federal support of biomedical research is the prevention and alleviation of suffering, and, therefore, greater attention and resources must be devoted to efforts that directly help the sick.

3) Since resources cannot be obtained for investigating or exploiting every reasonable possibility in research and treatment, choices will have to be made, and these choices may involve decisions to support applied research efforts at the expense, in terms of manpower, facilities, and money, of basic research.

This line of thought, which was in one way or another reflected in the papers of many government as well as nongovernment participants, was perhaps best expressed by William D. Carey, assistant director of the Bureau of the Budget, who stated:

> Today we have a strong base of medical research, supported conspicuously by Government. . . . I know of nobody who wants to start taking this enterprise apart, and I believe it will continue to prosper. At the same time, there is no certainty that it will be the exuberant growth industry that it has been. Public policy is starting to look at the field of health as a universe, with medical research sharing the health dollars along with the development of new training institutions, innovations in health services, improved information systems, and effective applied research.
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> These are the dynamics that are now emerging so clearly. It is unrealistic to suppose that Government's attitude toward health in its modern dimension can be essentially neutral and limited to grinding out appropriations for research, training, and facilities. It must concern itself with goals and objectives. . . . It must make choices as to balance in its health investment. . . . I would be surprised if Government does not choose to allot an increasing share of its growing health investment toward more deliberate exploitation of medical knowledge, assigning it a higher priority than heretofore. . . . As I look ahead, the scene will be one of transition. In the main, Government will continue to support undirected research strongly, but it will also be looking for opportunities to invest more substantially in what may be called "directed" research, which means the deliberate, systematic, and programmed effort to seek a well-defined research or development objective—possibly through contract rather than grant mechanisms. If you ask me whether this will take some dollars that might otherwise be budgeted for expanded academic science, I can come no nearer to a clear answer than to grant the possibility of this kind of trade-off. . . .

Carey, who is well acquainted with the panic-prone nature of the scientific community, softened this a bit, however, by adding that the funds for new applied-research programs might possibly be diverted from other fields, such as conservation or transportation, and he went on to state that "Government is not very likely to lose sight of the hard reality that in one way or another it will have to provide for the growth and stability of the academic institutions."

Surgeon General William H. Stewart presented views that were quite similar to Carey's. But NIH Director James A. Shannon, who is said to be not altogether happy with the trends that are now appearing, devoted most of his talk to a brief history lesson on the development of polio vaccines—with particular emphasis on the difficulties encountered along the way "because of an inadequate amount of fundamental information upon which to base the targeted programs." In conclusion, Shannon stated that the existing "mix" of applied and basic biomedical research "has a strong internal logic, which, if interfered with, must be with a full appreciation that (a) the goal is important; (b) the science base is adequate or can be made adequate as part of the organized effort; (c) the losses which may accrue from mounting the programmed effort are counterbalanced by the prospective gains, and (d) developmental work is in itself a hazardous process at times costly of dollars and manpower and without assurance of success."

(Shannon's historical review of the polio vaccines, it might be added, held the audience fascinated as nothing else did during the conference, which raises a point that has often been made about science policy planners: in many cases they appear to have little systematic

* See "The Government, the Universities, and Biomedical Research," a talk delivered by HEW Secretary John W. Gardner on this occasion (*Science*, 30 September).

knowledge of the history of science; nevertheless, while ignorant of the way science has worked in the past, many of them vigorously grapple with the problem of how it should be made to work in the future.)

In recent years, many persons have come to regard Alvin M. Weinberg, director of the Oak Ridge National Laboratory, as perhaps the most innovative thinker in science policy planning. His papers, "Criteria for scientific choice" (*Minerva*, Winter 1963) and "But is the teacher also a citizen?" (*Science*, 6 August 1965) represent an order of originality and insight that put to shame a good deal of the stuff that now clogs public discussion in this area. At the Oklahoma meeting Weinberg was up to form and elevated the already high level of discussion by examining some of the scientific and technical realities that govern our ability to attain applied-research objectives:

> . . . there is a difference between the physical and biological sciences with respect to the degree to which their underlying scientific structure can be efficiently mobilized for achieving practical goals. The physical sciences and engineering, though they may have started independently . . . have now been so intertwined and integrated, and the physical sciences themselves are so advanced, that given an applied goal in engineering, there is often nothing but money that stands in the way of achieving the goal, provided basic science has shown this goal to be achievable. I can't stress too strongly the importance of this latter proviso. Thus, applications in the physical sciences fall into two great categories: those projects whose basic feasibility has been demonstrated; and those equally desirable projects whose basic feasibility is yet to be demonstrated. . . . The bulk of biomedical research is in the pre-feasibility stage, and therefore, the underlying basic research must be done broadly. Since most of our knowledge is in the pre-feasibility stage, the vital link between basic and applied biomedical research is much more haphazard and unpredictable than I suspect our President would like it to be. . . . I think it is fair to say that most basic molecular biologists would work directly on a cure for cancer rather than on what they are now doing, if only they knew how to make real progress. We don't cure cancer because we don't want to, but rather because we don't know how to cure it.

Weinberg, however, went on to argue that "there are some rather substantial areas in biomedical science where we probably have reached the feasibility stage or at least closely approached it and where the President's 'vital link between pure research and practical achievement' is rather clear and definite."

In this group, he said, he would place the application of engineering

From Remarks Delivered at Biomedical Policy Conference

I would like to draw an analogy between science and basketball. Our high school basketball coach used to say, "In setting up a good shot at the basket, by all means keep the ball moving. It doesn't matter so much where the ball moves as long as it does not remain in one place; only in this way are openings created." This approach to basketball is certainly inefficient; the amount of wasted motion is much greater than the amount of motion specifically directed at the goal. And yet by following this prescription our team won most of its games. In the same sense, science is inefficient; by maintaining scientific activity in areas that are broadly of interest, one creates opportunities that can be exploited practically.—ALVIN M. WEINBERG, *Oak Ridge National Laboratory*

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When W. B. Cannon borrowed the word serendipity from Horace Walpole, he used it merely to symbolize the fact that scientific investigators are likely to discover many interesting facts other than the ones they are looking for. Oddly enough, this simple concept has been given so much importance and dignity during the past few decades that it has become a dominant scientific philosophy. If one were to judge from much recent writing, even by some scientists, the justification for doing research on almost any subject is the statistical chance of achieving by accident useful and practical results. . . . I cannot refrain however from stating my view that the cult of serendipity is based on an erroneous interpretation of the history of science, and furthermore amounts to an abdication of intellectual and ethical responsibility. Serendipity is the equivalent of Stephen Vincent Benet's line, "We don't know where we're going, but we're on our way."

Finding and recognizing the value of things unsought is of course part and parcel of the investigator's life. But granted this truism, it is nevertheless a fact that certain classes of phenomena are not likely to be discovered or understood, and some very important problems cannot be solved, unless attention is consciously directed to them. Hence the danger of letting whole areas of knowledge be as completely neglected as they are today. The mechanisms of body-mind relationships, the effects of crowding on physiological processes, the interplay between social conditions and medical care, and other areas of biomedical knowledge involving complex systems at a high level of integration, will remain undeveloped until as much scientific attention is devoted to them as to scientifically better defined systems that are more fashionable.—RENÉ J. DUBOS, *The Rockefeller University*

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The academic biomedical community must face the hard, unyielding reality that we live in what [HEW Secretary] John Gardner has called a "practical-minded" society. Science, including biomedical science, can no longer hope to exist, among all human enterprises, through some mystique, without constraints or scrutiny in terms of national goals, and isolated from the competition for allocation of resources which are finite. . . . Unless we biomedical scientists are prepared to examine our endeavors, our objectives, and our priorities, and to state our case openly and clearly, the future will be difficult indeed. . . . We must cease to give the impression that we don't have time to talk to the public—and even worse that if we did talk to them, they couldn't grasp our meaning anyway. We must abandon the idea that some sort of taint attaches to the scientist who explains his endeavors to outsiders.—IVAN L. BENNETT, *Office of Science and Technology*

science to the development of the artificial kidney. "To be sure, the artificial kidney is a cumbersome and awkward thing; yet artificial kidneys do work. We have passed the feasibility stage, and what seems to be indicated is massive development . . . to reduce the technique to widespread practice." Other examples, Weinberg continued, would be further development of medical scintillometry, automation of clinical chemistry, and development of the zonal centrifuge and the 1-angstrom electron microscope.

Characterizing these problems as Prospects for Big Biology, Weinberg argued that the national laboratories, such as those operated by the AEC, were ideal institutions for undertaking huge, costly programs that require multidisciplinary coordination, a view that was in many respects seconded by Harvey Brooks, dean of the school of engineering and applied physics at Harvard. "The range of technological capabilities represented by these laboratories," Brooks said, "is extraordinary, but after a few years, the magnificent machinery tends to get devoted to less and less significant problems and it is extremely difficult to redefine their missions in response to the changing goals of federal science. . . . We do not treat our federal laboratories as a common national resource to be used flexibly for many of the purposes of government. Rather we tend to regard each laboratory as the inviolate preserve of the agency to which it belongs. . . . I feel it is time we learned how to use these institutions more flexibly for national purposes with less worry about roles and missions."

I would like to stress that, in the limited space and time available for describing and quoting from the papers at the conference, it is not possible to do justice to their quality and scope. Fortunately, the proceedings are to be published by McGraw-Hill early next year. They are highly recommended reading for anyone interested in the problems of science and public policy.

—D. S. GREENBERG

LBJ's "Great Congress": Rubber Stamp or Creativity?

The second session of the productive 89th Congress could be called "the Vietnam Congress," even though the legislators did not often deal directly with Vietnam. Congressmen were puzzled about how the war would influence their chances for reelection. Not only did they worry about the conflict's effect on their constituents but they also reflected the worry of their home districts about the rising inflation created by American expenditures on the war. In their legislative battles, many congressmen, especially liberals, resented the priority which the President had given Vietnam in his budget. For them, domestic programs had equal or higher priority. They indicated their own priorities by appropriating more than the President had requested in several areas, including education.

Some view the 89th Congress as a rubber stamp for President Johnson. This image is encouraged by the Republican minority and was even fostered by the White House when it recently announced that the Congress had batted ".905" in passing the President's program. Actually, the Congress demonstrated a good deal of independence, even as it enacted many of the President's requests.

Although Congress would certainly not have passed as much liberal legislation as it did if the President had not provided the necessary backing and initiative, the voting record of the Democratic majority showed a genuine concurrence with the Great Society's programs, rather than an acquiescent response to White House arm-twisting.

In terms of obtaining passage of his program, the President could be faulted for not twisting enough arms rather than for twisting too many. During the past year the President has used his considerable powers of persuasion much less than he did in his early months in office. He has seemed to have a single-minded preoccupation with waging the Vietnam war, and he often appears to be only going through the motions of supporting his domestic legislation. For instance, when Senator Robert F. Kennedy fought to protect funds for the President's foreign aid program and for the war on poverty, it was obvious that Kennedy and other liberals were more interested in the President's program than he was himself.

Had the President been willing to give more of his White House massage treatments to recalcitrant congressmen, he might have avoided some of the defeats which marred his record in the second session. He suffered a major loss when Republican Senate leader Everett Dirksen (Ill.) was able to kill the President's 1966 civil rights bill. This session, Johnson again failed in his commitment to labor leaders to repeal section 14 (b) of the Taft-Hartley law, which permits state laws prohibiting the union shop. He also was unsuccessful in his efforts to persuade Congress to give "home rule" to the still unrepresented citizens of the District of Columbia. Other major Presidential programs were weakened by Congress or suffered a reduction in appropriations.

But while Congress did not pass all the President's proposals intact, it enacted enough liberal legislation to qualify it as one of the most notable congresses of American history. A few leading Washington political analysts, such as the *New York Times's* James Reston and the *Christian Science Monitor*'s Richard L. Strout, suggested Barry Goldwater as the second member of the dynamic duo responsible for the great liberal victories of the last 2 years. Reston called the 89th "the Goldwater Congress" and said that Johnson and Goldwater are "insupportable, even insufferable," when apart but that, together, they are "invincible." Reston justified this whimsy by arguing that the Democrats would never have picked up the 38 new House seats in the 1964 election which insured these liberal legislative triumphs if the Goldwater candidacy had not dragged so many Republican congressional candidates to defeat. Outnumbering the Republicans 2 to 1 in both the House and the Senate in the 89th Congress, the Democratic liberals were finally numerous enough to throw off the incubus of the Southern Democrats who had