Book Reviews

High Time for Some Hard Choices

Reflections on Big Science. ALVIN M. WEINBERG. M.I.T. Press, Cambridge, Mass., 1967. 192 pp. $5.95.

"I am simply a citizen who is interested in these matters," Alvin Weinberg testified 20-some years ago before a congressional committee debating creation of an Atomic Energy Commission. Now, after 18 years spent guiding the research course of the Oak Ridge National Laboratory, Weinberg's credentials for speaking out on the issues in which Big Science affects society are impressive. His laboratory spends $100 million of federal funds each year. He has been an active participant in the affairs of the President's Science Advisory Committee and of the National Academy of Sciences. The PSAC study "Science, Government, and Information" is, in fact, known as the Weinberg report, and it now forms the basis for a chapter in a timely book in which Weinberg expresses his interest in many problems.

In *Reflections on Big Science* Weinberg deals with the promise, the problems, the choices, and the institutions of Big Science. Modern science and technology cost our society dearly, he argues, and it has a right to demand its money's worth. Muffled applause resounds in the corridors of the Bureau of the Budget, but most scientists are to be found sitting on their hands. Many scientists get positively huffy about justifying their demands on the U.S. Treasury, and absolutely indignant ("Over my dead body!" exclaims a Big Scientist) about setting priorities in the sciences.

Nonetheless, after two decades of postwar mushrooming, Big Science has run into budgetary barriers. The dollar demand has outrun the federal supply. Hence the necessity for choice—and, in a democracy, the need for justification. The two big "justifiers," PSAC and NAS, pile report on report, but these only add up to greater demands. For example, in February of this year the White House issued a PSAC study, "The Space Program in the Post-Apollo Period," in which as much as $7 billion was stipulated for the civilian space program in fiscal year 1972. (I deduced that such funding would make NASA king of basic research, giving the space agency as much as *all* U.S. agencies now spend on such research.) Then in June PSAC brought forth mighty volumes on "The World Food Problem" stressing the gravity of global hunger but avoiding a specific budgetary request. Space research and world hunger juxtaposed—and no sign of priority!

Weinberg has labored long and hard with NAS studies, and it is through no fault of his that the Academy remains aloof from assessing relative urgencies and instead performs elegant analyses in the various fields of science like an ardent encyclopedist. Who buys the PSAC and NAS reports? A little market analysis would be a good thing. If the purpose of such studies is to bridge the gap between science and society, a traffic evaluation is in order. Weinberg's emphasis on "money's worth" is well advised, especially as science goes into specialties far from the perimeter of public understanding. The 200-Bev Weston accelerator is a case in point. Weinberg has bruised the nerve-endings of some colleagues by daring to question in public the value of this $400-million machine of Big Science. Ours is a world of strange contrasts, but few rival that between the civil rights upheaval in Chicago and the proposed 200-Bev machine 40 miles away. At one site blacks and whites throw rocks; at the other physicists plan a mile-diameter device to hurl protons at each other. The *Wall Street Journal* comments (23 June 1967): "If American society really intends to build these cathedrals to the great god science, it's going to have to learn the medievalists' knack of deciding where to put them."

In a chapter on National Laboratories and Missions Weinberg points out that mission-oriented laboratories like those of the AEC are relatively new inventions, but, it seems, they age rapidly or run out of missions. Weinberg has urged new assignments for AEC laboratories, but the new AEC budget is $2.6 billion and its missions remain unchanged. The new budget earmarks $1.2 billion for weapons. (What comes after overkill—superkill or hyperkill?) AEC laboratories are not yet pure calcium. Far from it—they have excellent facilities and a concentration of talented researchers. But, as Weinberg pleads, they need new missions. Here the AEC will at last know the full measure of its captivity, for it is a prisoner of the Joint Committee on Atomic Energy. Some political invention is needed to remake the AEC. The original scientists' lobby which promoted it has faded away, and it is unlikely that a similar operation is feasible today. What is really needed is a summit conference of leading scientists. But who would lead?

More things need to be set straight than just the AEC. NASA's labs, though of undetermined calcium content, need reassignment. HEW has arrived at the point where applications of its research necessitate profound changes in the Bethesda complex. NSF is a candidate for change unless it likes the idea of becoming a shriveled appendage. All of which underlines the importance of the topics which Weinberg has exposed in his meaty little book.

Weinberg makes it clear that though the past two decades have belonged to the physical scientists, if man—not weapons—is to be the scientific concern of the future, we need Big Biologists to lead the way. In a chapter devoted to The Coming Age of Biomedical Science he urges Big Biology to meet the challenge. Biologists have their DNA, but they lack the A-bomb credentials of the physicists; they are heavily outnumbered by physical scientists on the President's Science Advisory Committee. This deficiency might be righted if President Johnson were to name a biologist as his next science adviser.

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