News and Comment

Manpower: Academy Study Presents Proposals for Better Utilization of Scientists and Engineers

Early in 1962, following the publication of a study* which showed that the Soviet Union was training more scientists and engineers than this country, President Kennedy ordered two studies aimed at improving the position of the United States.

The first, conducted by the President's Science Advisory Committee, was directed toward finding the means to turn out more scientists and engineers, and it resulted, in December 1962, in a report titled "Meeting Manpower Needs in Science and Technology." The gist of the report was the reasonable and not at all surprising conclusion that the federal government should make a great deal more money available for graduate fellowships. The second study, which was assigned to the National Academy of Sciences, was directed toward a far more difficult matter—namely, how to improve utilization of those who have already completed their scientific and engineering training.

In many respects this was a prickly assignment, for any proposal for improved utilization carries with it an implication of less than perfect utilization, which is not likely to be well received by the organizations in question, especially those that are constantly jockeying for a larger share of federal research and development expenditures. The academy's task was further complicated for a time by the illness of James R. Killian, Jr., of M.I.T., chairman of the 17-member committee that was organized to make the study. But this week, 2½ years after Kennedy's request, the study, "Toward Better Utilization of Scientific and Engineering Talent—A Program for Action," was made public. Stated simply, it was worth the wait, for, while the committee appears to have smoothed a few edges to assuage tender feelings, it has nevertheless come forward with a frank and provocative assessment which adds up to the conclusion that government, industry, and the universities have all been prodigal and far from rational in their utilization of the nation's scientists and engineers.

In addressing itself, for example, to the government's role in major research and development projects, the report refers to the politically sensitive lunar landing program, and goes on to note:

"In view of the way in which certain government decisions have radically altered the pattern of deployment of scientists and engineers in recent years, it might be supposed that major decisions had been preceded by careful studies of their probable impact on the market for scientific and engineering manpower, and, more broadly, of their effect on the general direction of scientific and technological effort in the United States. Yet, so far as we can learn, no adequate studies of the impact of these decisions were in fact made before the decisions were taken. Indeed, meaningful studies probably could not have been made, partly because the information on which to base them was not available."

Industrial Role

In addressing itself to the industrial utilization of scientists and engineers, a matter on which industry is increasingly coming under attack for allegedly overcautious and backward practices, the committee chose a more diplomatic approach, but the implication of disapproval was nevertheless there:

"Corporate managers should strive to provide a climate for creativity and productivity of highly qualified scientists and engineers in keeping with their great potential to their firms. . . . Companies that use scientific and engineering manpower should actively seek ways to help their high-talent manpower augment and replenish their professional capabilities. . . . Steps that may be taken to that end include provision of free time for basic research, leaves of absence for the purposes of broadening and updating knowledge, and subsidization of retraining in universities. . . . Certainly employing institutions that use up high-talent manpower on narrowly focused tasks, without providing for the replenishment and expansion of skill and knowledge, are shirking a vital responsibility."

The committee also took a very easily avoided plunge into the politically controversial issue of the federal government's responsibilities for stimulating research directly aimed at development of civilian products. Industries that were fearful that efforts along these lines would adversely affect their competitive position successfully lobbied down efforts last year to promote such research through a Civilian Industrial Technology program in the Commerce Department (*Science*, 2 Feb. 1964). In addressing itself to "stimulating innovation," the committee flatly called for "coordinated action by industry and government . . . to stimulate more research and development in areas of the economy where the rate of innovation has been relatively slow." Many industries, it noted, have been backward in developing new products and processes, a fact, it said, which cannot be blamed upon government requirements for the services of scientists and engineers. "[The] lag," it noted with apparent deference to the sensitivity of this issue, "stems largely from the difficulty of making the necessary arrangements"—a polite way of saying that a lot of businessmen are being selfish or not very bright about the economic potential of product research. "To facilitate research and innovation . . . the federal government should stimulate and support initiative shown by industrial and labor groups and communities in developing new arrangements that will open the way to more intensive application of research and technical knowledge. In addition . . . more research should be undertaken under the joint auspices of government and industry. Proposals that have been made for the sponsorship of such research should be reexamined with a view to making them more acceptable to Congress and to the business community."

*"Education and Professional Employment in the U.S.S.R.," by Nicholas De Witt, 856 pp., $5.50, U.S. Government Printing Office, Washington, D.C.

In addressing itself to the manner in which the nation's universities utilize scientific and engineering manpower, the committee associated itself with a series of criticisms that probably now amount to a consensus on what is ailing higher education in the sciences.

It noted that there is a need to recognize that while research and teaching are closely associated, a poor researcher can often be a first-class teacher; it also noted the existence of "migratory research workers following available funds" and expressed concern that institutional loyalties are being eroded by loyalties to federal granting agencies. And it called for the creation of new research centers but cautioned that this should be accomplished with special development funds and not by using research funds to build up the have-nots.

Need for Data

Finally, the committee frankly acknowledged that while a great deal is being said about scientific and engineering manpower requirements, large gaps exist in our information about the actual deployment, productivity, and requirements for scientists and engineers. Statistics often run 2 or 3 years behind, projections of need frequently turn out to be far off the mark, and very little study has been done on the role of technicians and machines in assisting scientists and engineers in their work.

"The United States," the report concludes, "is fast becoming a research-oriented society. Rational problem-solving is replacing decision by random trial and error. Growing pains unavoidably accompany such changes, but we can reduce them by strengthening our understanding of this key group, the scientists and engineers, and of the environment in which they work."

Perhaps the most significant thing about the report is the extent to which it carries forward the concept that scientists and engineers are a national resource whose well-being is a proper concern of the organizations—governmental and nongovernmental—that employ them. From the early days of the Republic it was recognized that scientific strength was a component of national strength, and the federal government, accordingly, has ever since been intimately involved in the promotion of research and scientific education.

However, the report carries this involvement still further by stating, in effect, that scientific and engineering manpower is so critically important to national well-being that, to a large extent, it should be insulated against technological and economic ups and downs. This may make a great deal of sense, but since no one is saying the same thing about truck drivers, violinists, or architects, the proposal raises some interesting issues of public policy. The committee, for example, notes that "scientists and engineers can play a key role in creating new opportunities for the nation," and it goes on to observe that "if the burden of defense lightens, they should be involved in the conversion of defense industry to other national objectives or to civilian purposes. If their potential is to be utilized productively, cooperative action will be needed to facilitate the transition. Provisions are required to enable existing defense industrial contractors more readily to utilize their scientists and engineers in transforming the enterprise. Incentives to facilitate the formation of new enterprises, based on the capabilities of creative groups wishing to apply technology with which they are familiar to the civilian economy, will also be of value.

"It would be in the national interest if, during periods of transition, attractive opportunities could be provided for individual scientists and engineers to replenish and augment their professional value through education and training, possibly at university centers, as well as within the organizations in which they work."

Having said this, the committee duly noted that "these objectives are difficult to achieve," and it added that they should not involve "coercive methods" or "encroach upon the proper prerogatives of responsible free enterprise."

Serving with Killian on the committee were Richard H. Bolt, Bernard R. Berelson, Paul W. Cherington, Karl A. Folkers, Walter H. Gale, Louis C. Goad, Crawford H. Greenewalt, Frederick H. Harbison, Clark Kerr, Augustus B. Kinzel, Douglas M. Knight, Herbert E. Longenecker, John W. Macy, Haakon I. Romnes, Merriam H. Trytten, Dean E. Wooldridge, and Marvin Adelson, executive director.

Copies of the report, *Publication 1191*, are available for $3 from the Printing and Publishing Office, National Academy of Sciences, 2101 Constitution Avenue, NW, Washington, D.C. 20418.—D. S. GREENBERG

Ohio: With New Board of Regents, Master Plan in Works, State Takes Plunge into State-Wide Planning

The state of Ohio is passing through a period of adjustment with its public higher education system, a painful experience now being shared in neighboring Big Ten states and, in fact, throughout the country. But the symptoms seem particularly acute in Ohio, perhaps because the matter has attracted wide public attention and prompted fairly drastic action.

Institutions of higher education in Ohio and elsewhere now face the college harvest of the post-World War II baby crop. This year's high school graduating class forms the biggest wave of would-be college students since the veterans of World War II, financed by the GI Bill, swept down on the colleges and universities.

Ohio's problems with higher education take the form of a true dilemma. It appears doubtful to many informed observers that enough new money will be made available to provide faculty and facilities for the proliferating undergraduates and at the same time finance fully the expansion and improvement of graduate and professional education deemed necessary by many to keep Ohio competitive in the arena of economic growth.

To meet its double crisis in higher education, Ohio has embarked on a course of centralizing planning and control for higher education. This represents a marked departure from previous practice in Ohio, a state where planning and centralization of authority in public bodies has been automatically suspect. By legislation, a board of regents has been formed to produce a master plan, now in the process of formulation, and to coordinate and oversee the operations of all state-supported institutions of higher education.

One difficulty facing Ohio is that of adapting a pattern of state institutions of higher education, established in the 19th and early 20th century, to new conditions. There are six state-supported institutions now and these are fairly well distributed geographically (see map). But only one, Ohio State University in Columbus, is located in a major population center.

The four other universities—Ohio University, Miami, Kent State, and Bowling Green State—and Central State College are situated in what can