

SCIENCE

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EDITORIAL

Basic Research (III): Priorities

In the administration of basic research, the ultimate question is strategic priorities. Society, through its representatives in the executive and legislative branches of the government, has, of course, control over all governmental aspects of research, but the wise governments of the past defined the strategic goals based on societal needs and scientific feasibility and left the tactical day-to-day implementation of those goals to scientists. Recently, with no great leaders of science in Congress such as Representative Fogarty and Senator Hill of the past, Congress has gotten into more micromanagement of details, including supporting or removing support from individual National Science Foundation (NSF) grants and earmarking of funds, and scientists have been less frequently forthcoming on strategic goals. Both relationships should change.

In a new administration seeking to aid the economy, one of the great opportunities is a rapidly growing biotechnology industry. Help for that industry by appropriate (but not micromanaged) basic research seems logical because agricultural products—once a major U.S. balance-of-payments benefit—have declined with the altruistic export of the “green revolution.” The biotechnology industry is a logical successor, and it can be helped by appropriate basic research. Similarly, the need for new cutting-edge industries should favor research in low energy physics and chemistry. The need for infrastructure guidance in transportation, race relations, economics, and demography should call for more basic research in the social sciences. High energy physics still offers much in fundamental science, but the cost has become astronomical and the earlier societal goal—better bombs—has begun to pale with the temporary decrease in power of our major adversary. A space station can be justified on the basis of a “national adventure” or maintaining immediate jobs in Texas and elsewhere, but space research for weather, environmental amelioration, and resource management can be accomplished less expensively in other ways. Megaprojects should not be excluded because they are big, but if the ultimate goals are new benefits and new industries, then one should embark on big projects only if “little science” is fully funded. If the megaprojects are ones whose ultimate nonscience spin-off is dubious (better bombs), or for which there are cheaper ways to get the same science (for example, the space station), then they should defer to more cost-effective science projects. This is particularly true if the project, once it is completed, involves a heavy and extensive commitment to annual operating costs. The time has come to set the proper priorities for science on the basis of good research within a discipline and the probable values to society. No longer should projects that are 90 percent public works, 9 percent public relations, and 1 percent science be labeled “science” projects. They may be worthwhile as public works, but they need to be labeled as such. And scientists, if asked, need to be honest about goals, neither being afraid to criticize overstated goals nor unwilling to give strong support for basic research goals that have the potential for societal benefits.

There is thus a need for better communication between science and government on both goals and implementation. Serendipitous discoveries can occur on any project. Expensive projects can have spin-offs, but the types of spin-offs that are most likely—better health, better food, better communications, and better defense—should be indicated by the scientists to Congress, together with the caveat that unlikely events occur in all basic research. The cost-benefit ratio is better in little science. If Congress is impatient about the rate of progress on a particular project, it should indicate its concern and listen to the explanations of the scientists before taking precipitous action. If legislators discover a need to reward constituents with projects involving jobs, scientists should listen and devise useful projects rather than wasteful ones. The recent pressure on NSF to change its classic role in basic research and the Senate bill changing the Office of AIDS Research without consulting any scientists are examples of how not to help the country or basic research. Scientists who mute their voices to avoid irritating colleagues do not help the overall science program. The past U.S. economic miracle was in major ways a result of the great cooperation between science and government. To maintain and to expand that economic progress and quality of life will require nurturing the constructive cooperation between science and society that has existed for many years and that is endangered when each group believes the other is no longer listening.

Daniel E. Koshland, Jr.