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# EDITORIAL

## The Path to Research Prioritization

The question of priorities in research has become a concern for Congress, the White House, and scientists. In general, Congress and the White House are supportive of research, but the federal budget law is forcing choices that make decision-makers receptive to any argument, no matter how superficial, to cut a program. Therefore, adjectives such as "pure," "basic," "targeted," "strategic," and "applied" need to be clarified before they do harm.

The classic example of basic research and its applicability is illustrated by the visit of Prime Minister Gladstone to the laboratory of Michael Faraday. Gladstone asked Faraday whether he thought this esoteric substance called "electricity" would ever have any practical uses. Faraday's reply was, "One day, sir, you will tax it." Nobody believes that electricity is useless or untaxable today, and many similar examples sustain the fundamental belief of scientists that basic research almost invariably becomes of great value to mankind. A failure to understand the Faraday story has led some in Congress to believe that the research process could be improved if the Faradays were forced to think of potential uses before carrying out any experiments and the Gladstones were put in charge of the scientific granting process. To be fair, scientists have their own arena of unreality. Some scientists exhort their professional organizations "to state our own priorities or others (implying Congress and outsiders) will state them for us." The political and practical realities of current science are that neither Congress nor the scientists should be excluded from the priority-setting process. Good priority selection requires input with regard to the needs of the citizens as interpreted by their elected representatives and the feasibility of the science as interpreted by scientists.

A step in the right direction has been made by Senator Barbara Mikulski (D–MD), a major force on the Appropriations Committee who has been a supporter of basic research, but whose comments for "strategic goals" suggested to some scientists a top-down micromanagement of research. Senator Mikulski, in a speech to a conference of scientists and government officials organized by the White House Office of Science and Technology Policy (OSTP) and sponsored by the National Academy of Sciences and the American Association for the Advancement of Science, has taken a good step toward clarifying her views by saying that the National Institutes of Health is an excellent model of a strategic goal, implemented by a fine mix of investigator-initiated research and program-project–type research. That is a definition of "strategic" that scientists can embrace.

The primary responsibility of Congress is to identify the needs of its constituents in broad, strategic goals—such as defense, health, global competitiveness—and to implement programs effectively. It would be foolish of scientists to claim they have exclusive rights to priority-setting and folly of Congress to believe they can decide scientific feasibility without the advice of scientists. Feasibility in this context will require deciding what is ultimately possible scientifically, and also assessing degrees of difficulty in attaining those goals. Scientists will have to be careful to qualify these estimates with degrees of uncertainty. They can also tell Congress that neither an automobile that runs on water nor an airplane that runs on antigravity devices is possible.

Congress, in turn, must be careful to realize that it is in the nation's strategic interest to have some research in which nature is being explored in new ways—a role has traditionally been assigned to the National Science Foundation. Even Faraday could not have predicted the impact and usefulness of electricity. Watson and Crick's seminal advance in genetics eventually led to a giant biotechnology industry, but no one would have predicted that outcome. Industrial leaders have almost uniformly said, "We want government to do basic research—we're willing to do the application." In fact, the line between basic and applied research is disappearing and industry, universities, private institutions, and government are doing both; but the creation of entire new industries and new views of life usually come from the unexpected. The bigger the goal, the less it can be planned in detail.

Communication between Congress and scientists needs to be improved and the OSTP-generated meeting at the National Academy of Sciences performed a signal service in catalyzing first steps toward this communication. In a world in which science will play crucial roles in almost every aspect of life, both the Gladstones and the Faradays will be needed. Creating better avenues of communication should be a first step in optimizing the role of science in producing a better world.

**Daniel E. Koshland Jr.**