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## Justifying Academic Research

As a nation we often behave as if we are not sure that we will survive the next 6 months. Urgent short-term or emotion-laden issues commanding the headlines compete successfully for federal funds, while programs essential to the long-term life of the nation are neglected. In such circumstances, academic scientists must not fail to remind the public of the many enduring benefits to be derived from support of research.

The public is aware that practical applications have arisen from past research and are likely to arise from future research, but scientists would do well to continue to furnish examples of the relation of research and beneficial applications. Another need is to help the public explore the cultural aspects of scientific knowledge. Most humans hunger to understand the universe about them, and many are willing to make considerable efforts to satisfy their curiosity. Thus the museums of the Smithsonian Institution in Washington draw large crowds. The observatory at Mount Palomar is besieged with visitors, and the Christmas science lectures sponsored by the American Association for the Advancement of Science are well attended.

Leadership in the creation of knowledge brings great national prestige. When a conspicuous contribution is recognized with a Nobel prize, a nation's stature increases. The United States has been receiving about half of the Nobel prizes, and most of the winners do their research at universities.

A serious failure of academic scientists has been in educating the public with regard to the role of scholarly inquiry in the universities. The necessity to do so became acute a few years ago. At that time a number of articles in major publications asserted that research efforts by professors were destructive to the teaching functions of universities. Critics neglected to mention that often the most incompetent professors in science departments are those who do no research. The administrations of many colleges and universities quietly responded to the criticisms by making clear to their faculties the importance attached to the teaching function. However, the public is largely unaware of these steps, and an impression remains that good teaching and research are incompatible. This is an incorrect view.

With science evolving rapidly, a major task for professors is to keep up with developments in their field. The full-time instructor who presents material that is out of date defrauds his students in at least three ways: He fails to render proper guidance with respect to subject material, he fails to set high standards of scholarship, and he fails to inspire enthusiasm for learning. To be a good teacher of science, a professor must be intellectually virile. He must be part of the creative enterprise. The most practical means of keeping current with new developments is to participate personally in research activity. The sharply disciplining nature of cold-eyed peer evaluation induces research scientists to work hard at creative endeavor. As part of that effort they try to achieve awareness and understanding of new discoveries in their branch of science. Their students are beneficiaries.

A final role of academic research is in the graduate training of scientists for industry, government, and academia. If good basic research is not conducted in the universities, how will the nation obtain the elite scientists so essential to modern civilization?—P. H. ABELSON