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The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

Vannevar Bush Speaks

The spectacular success of applied research during the war led to a fallacy entertained by many. It is that any problem can be solved by gathering enough scientists and giving them enough money. To solve the problem of the common cold assemble a great institution, fill it with scientists and money, and soon we will have no more colds! It is folly to thus proceed. The great scientific steps forward originate in the minds of gifted scientists, not in the minds of promoters. The best way to proceed is to be sure that really inspired scientists have what they need to work with, and leave them alone.

A man sitting at a desk and thinking is not an expensive proposition. A scientist directing a team and operating an expensive array of apparatus is. The costs of research go up very rapidly when one gets into hardware. When money comes easily there is a tendency to rush into use of complex equipment too fast and too far. We may be making this mistake.

If the country pours enough money into research, it will inevitably support the trivial and the mediocre. The supply of scientific manpower is not unlimited.

In any broad program of research the key word in regard to any one aspect of the program is relevance. It is a good word to have in mind in examining any research program. Competent directors of research know what it means. Probably "conducive to progress toward the main object of a program" is as good a definition as any. Just finding out something new is not by itself sufficient justification for research. It needs to mean something when we find it.

It makes sense to ask a young researcher in basic research what he is trying to find out, what sort of knowledge he hopes to have at the end of his program which does not now exist. Surprisingly often the answer will be hard to extract. But it makes no sense to ask him just how he is going to do it, what it will cost, or how long it will take. If he knew the answers it would not be basic research.

When scientific programs are judged by popular acclaim we inevitably have overemphasis on the spectacular. That is just what we have today. The deeply important scientific advances moving today are not easy to understand. If they were they would have been accomplished long ago. Outstanding scientific progress, which will most affect the lives and health of our children, is not grasped by many.

Since the war we have seen a strange, and to my mind dangerous, development. The armed services have called upon universities to manage great programs of research and development, involving secrecy, and often calling for business judgment. Some of this has been avoided by the creation of independent non-profit organizations. We ought to find a better way. The universities will respond, when called upon by government to undertake burdens in the public interest. But management of secret programs is not their proper business, and they should not be thus utilized. We ought to be ingenious enough to avoid loading our universities with tasks which may interfere with their proper function of turning out educated men and women.

It should never be forgotten that the main task of the universities is to educate men. The country will need skilled professional men in the future as much as it will need new knowledge. As we now go we are not meeting this challenge sufficiently. Every research program placed in a university should be so ordered that its product is not only new knowledge but skilled educated men.

(Excerpts from a statement given by Professor Bush before the Select Committee on Government Research of the U.S. House of Representatives, 21 November 1963. A report of the hearings will be published by the Committee after the first of the year.)