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## Dictation to Science by Laymen

There is the danger that there will be overemphasis on the applied phase of science, for the public is alert to the tangible benefits to be had from it, but hardly realizes the fact that they are all dependent upon long-term advance in fundamental science. . . . As a people we are strongly philotechnical, we have always excelled in the applied, we have not turned with the same success to more philosophical matters. . . .

There is also a danger that control of funds may occasion injurious dictation to science by laymen. The fact that this is a somewhat subtle matter renders the danger much greater. In applying science it is often correct that a group of laymen should set the general objectives—in industrial research, for example, where men of diverse backgrounds and interest need to meet with the scientists and engineers in order to create a program that is sound from the standpoint of the industry. . . . The danger is that this lay participation will go beyond its appropriate function, enter into the methods themselves, and seek to influence the choice of the particular paths to be followed. If a scientist is really competent in his field, he knows better than anyone else how, in the exceedingly complex situation surrounding the frontier of knowledge, to single out an approach which may lead toward great attainment. Interference with him by any individual, board, or committee as he thus determines his way annoys him greatly, and should. The finding of the path is one of the finer parts of his art; in fact his rise to eminence depends very decidedly upon the wisdom with which he can thus choose.

To illustrate, there is today in this country a great urge to clear up once and for all at least the worst aspects of the great curse of cancer. Moreover, because of recent advances, new approaches of promise exist. Certainly funds poured into this field at the present time are well invested. Yet how does one proceed from here? One method favorably known to Americans because of the great advances which it has produced in applied science is to assemble a group of highly intelligent citizens, to build up great laboratories and install therein competent scientists, and to create patterns of effort paralleling those that have been successful in large industrial laboratories, with the single aim of finding a cure. But there is an alternative method, recommended by its admirable results in fundamental research. This is to select scientific men of great power—men who are thus regarded by their colleagues—and see to it that they get every bit of support which they can utilize effectively, in their own undertakings, and in accordance with their own plans. Such an effort should cover every contributory field, and hence the entire science of man's physical and chemical constitution and growth. It might be that the first method would find a solution—such things do happen. The question is essentially one of timing. If investigation of cancer has come to the stage of applied research, then the organized approach is entirely sound. If that investigation is still in the stage demanding fundamental research—and the evidence emphatically indicates that it is—then the second method is the one to follow. Through it, by and large, have come the great accomplishments in fundamental science, and it is sure to bring results in the long run, in many fields of application at once, and over a broad range. The characteristic and productive urge of Americans to move swiftly into applied research for immediate and practical results could easily lead to the ignoring of this vital fact.

—VANNEVAR BUSH, 304 Marsh Street, Belmont, Massachusetts 02178

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