

Mr. DADDARIO. Dr. McLean, you have been extremely helpful, and I hope that we might send some further questions to you for the record.

Dr. McLEAN. All right.

Mr. DADDARIO. I appreciate your being here.

QUESTIONS SUBMITTED TO DR. WILLIAM B. McLEAN BY THE SUB-COMMITTEE ON SCIENCE, RESEARCH AND DEVELOPMENT

1. *In your statement you say, "the procedures for disestablishing laboratories should be improved." What specific recommendations would you make in this regard?*

This problem was introduced only in recognition of the need for more consideration and study of alternatives for accomplishing the disestablishment of laboratories. My mention of the need was intended to indicate the lack of ideas as to workable techniques for the closing of laboratories. Some of the factors which make the disestablishment of laboratories difficult, or in some cases prevent it, are the following:

a. The organizational unity and loyalty necessary to the operation of an organization prevents its rapid dissolution. The more effective and productive an organization has been in the past, the more it generates internal resistance to disestablishment.

b. The political environment in which laboratories exist also contributes to the difficulties encountered in the dissolution of laboratory organizations.

2. *In your testimony you speak of competition as a measure of quality, yet the other side of the coin is duplication. How do you draw the dividing line, and what criteria are there to guide you?*

In research we set a general goal of understanding the operation of nature. Such an objective allows freedom for each research man to define his own areas of interest. Competition provides a general management function as long as all the individuals can understand what the others are doing and can judge their own rate of progress relative to that of others. We have a breakdown when the rate of progress exceeds our ability to absorb, and we have duplication through ignorance. This is obviously a waste and the demands for centralized planning come to the front. We have a choice between broadening our ability to consume by discovering better methods for transmitting and absorbing information, or we can choose to limit production by instituting centralized planning as a substitute for individual goals.

I like to think of research as being those operations which occur at the borders of the known area of knowledge and which are concerned with the penetration into the surrounding infinitude of the unknown. As the realm of the known increases, it is obvious that the total number of areas of research which can be undertaken will also increase.

We hear a great deal about planning research in such a way as to avoid gaps in coverage, about trying to make sure that all research will be profitable, and about the necessity to avoid duplication. It is my belief that it will always be impossible to cover all possible areas of research. The best we can do in the management of research is to find people who have a genuine interest in carrying out research activities and try to stimulate discussions across organizational lines in order to promote the generation of new ideas. I hope we can forget about clearly defined missions and the avoidance of duplication. No well-informed and sensible research man is going to deliberately do the same kinds of work which are being carried out in another organization. The more the planning of research can be delegated to the man close to the work, the more likely it is that it will approach the boundaries of the known realm of knowledge.

3. *In your testimony you state that the 5 percent discretionary funds which you have had "keeps the laboratory creative." Would you please provide some examples of how this authority has helped?*

The following items or techniques were fostered or developed by the use of discretionary funds available to me:

(a) The Johnson Shark Screen (a major advancement in the Navy's search for adequate protection of its personnel from sharks).

(b) Syntactic Foam (this buoyant material is now used in most deep submersible vehicles).

(c) The use of ultra sonics for wire and metal forming.

(d) Color sonar (presentation of sonic information in color). This may prove useful in the recognition of specific rock formations below the sea floor.