

Appendix I

HISTORICAL BACKGROUND OF THE NATIONAL SCIENCE FOUNDATION

The establishment of the National Science Foundation on May 10, 1950 represents the culmination of a long series of efforts to provide for an appropriate recognition and support of science by the Federal Government. It may therefore be of interest to note some of the steps in the evolution of the National Science Foundation.

Smithsonian Institution

The Smithsonian was created by act of Congress approved August 10, 1846 under the terms of the will of James Smithson, of London, England, who in 1829 bequeathed his fortune to the United States to found, at Washington, an establishment for the "increase and diffusion of knowledge among men." This was the first significant step taken by the Federal Government to support fundamental research.

National Academy of Science and the National Research Council

On March 3, 1863, President Lincoln approved an act passed by the Congress for the incorporation of the National Academy of Sciences. The Act stipulated that

...the Academy shall, whenever called upon by any department of the Government, investigate, examine, experiment, and report upon any subject of science or art, the actual expense of such investigations, examinations, experiments and reports to be paid from appropriations which may be made for the purpose, but the Academy shall receive no compensation whatever for any services to the Government of the United States.

During World War I, President Wilson requested the Academy to establish the National Research Council as the active agent of the Academy to assist the Government in organizing the scientific resources of the country. The Council so fully demonstrated its value that it seemed desirable that its life be extended after the war. President Wilson accordingly signed, on May 11, 1918, Executive Order No. 2859 requesting the Academy to perpetuate the National Research Council.

The distinguished members of the Academy and of the Council, render their services without compensation on a part time basis. Neither body is directly financed with Federal funds, although the Academy has contracts with the Federal Government.

Science Advisory Board

In order that the various scientific services of the Government might enjoy the cooperation of non-governmental scientists, President Roosevelt named a Science Advisory Board to the National Research Council on July 31, 1933. The Board, which was established on a short-term basis, was authorized to appoint committees to deal with specific problems in various Government departments. Under the operating principles which the Board set for itself, advice was given only when requested, and the functions, standards and programs of the scientific bureaus were its principal concern. In its first report, however, the Board stated: "The attempt has been made to look beyond details of program, procedure and personnel, toward the great social objectives of science, to see which of them are the necessary part of government and how each bureau can contribute toward them."

Dr. Karl T. Compton, then President of the Massachusetts Institute of Technology, was Chairman of the Board, and its membership represented an impressive cross section of the scientists of the country.

In its first report the Board commented as follows:

In the evolution of our national life we have reached a place where science, and the research which has discovered and released its powers, cannot be regarded as matters of accidental growth and application, but must be consciously related to our social life and well-being. What these relations are or may become is now a matter of general or public concern. This leads at once to the question as to how far Government itself should go in conducting or supporting research or guiding the applications of scientific discoveries, and how its responsibilities in these lines can best be handled.

These were the depression years and one recommendation of far-reaching importance was for a recovery program of science progress. In it, the Board had this vigorous comment to make regarding research in the basic sciences:

It should not be forgotten that back of applied science must be continual progress in pure science.. Consequently any well balanced program of research should provide for continued productive activity in the fundamental sciences. It is suggested, therefore, that some portion of the funds here discussed be made available for such research, with particular consideration of important programs already in progress in institutions, which have had to be dropped or curtailed in the present financial emergency.

"Relation of the Federal Government to Research"

Another major inquiry into the relationships of the Federal Government to research and development was instituted in 1937 by the National Resources Committee, with the approval of the President. A Science Committee, under the chairmanship of Ross G. Harrison, issued a series of reports from 1938 to 1941. The first of these "Relation of the Federal Government to Research," the work of Charles H. Judd, William F. Ogburn and E. B. Wilson, is of particular significance.

In submitting and indorsing to the President of the United States the findings of the Science Committee, the National Resources Committee commented:

Research constitutes one of our most important national resources. The Federal Government has always played an important role in relation to scientific research, and in the last decade has expanded its activities, particularly in the social sciences. If we are to make more effective use of all the resources of the Nation for the benefit of all our citizens, our research resources must be conserved and developed.

Office of Scientific Research and Development

The following year war broke out in Europe, and the activities of scientists loomed in new perspective. Rumors of the technological superiority of the Wehrmacht spurred a group of American scientists to action. Spokesman of a group which included Conant of Harvard, Compton of M.I.T., and Jewett of Bell Telephone Laboratories, Dr. Vannevar Bush, President of the Carnegie Institution of Washington, presented a plan for the President's consideration. It envisioned the immediate mobilization of American scientists

and resources for the development of weapons and devices of warfare which would offset anything a potential enemy might bring against this country. The President gave the plan almost immediate approval, and the National Defense Research Committee, headed by Dr. Bush, was created by Order of the Council of Defense on June 27, 1940. A year later, the National Defense Research Committee had so far proved its value to the Military Services that the organization was reconstituted by the President into the Office of Scientific Research and Development by Executive Order of June 28, 1941. Out of its activities grew the United States radar program, the proximity fuse, and the atomic bomb, to name but a few of the weapons for which it was wholly or in part responsible. The OSRD through its Committee on Medical Research also sponsored an effective program of medical research which made significant contributions to the development of penicillin, blood fractionation, anti-malarials, insecticides, and other important contributions to the health of our fighting forces.

The OSRD demonstrated that an independent agency could operate effectively in the area of scientific research and development. It avoided the construction of elaborate new facilities and instead chose to contract with existing academic, industrial and governmental research institutions. This policy enabled the Government to make full use of the best brains and facilities in the country. The OSRD was, however, a purely wartime agency, predestined to go out of existence at the end of the war. Long before the war was over it became apparent to members of Congress, to scientists, and to others, that an important need existed for a permanent agency of the OSRD type to support and foster scientific research for applications over and above military needs.

Senate Committee on Military Affairs, Subcommittee on
Technological Mobilization

An early wartime effort to mobilize as fully as possible technically trained manpower, technical facilities, inventions and knowledge of the country was made by a Senate Committee on Military Affairs Subcommittee on Technological Information under the chairmanship of Senator Harley M. Kilgore. The hearings which extended through 1942, 1943, 1944, and 1945 were antecedent to the National Science Foundation legislation.

"Science--The Endless Frontier"

Further thinking as to the need for continuing Federal financing of scientific activities was stimulated by Presidential inquiry. In a letter of November 17, 1944 the President asked the Director of the Office of Scientific Research and Development four important questions:

(1) What can be done, consistent with military security, and with the prior approval of the military authorities, to make known to the world as soon as possible the contributions which have been made during our war effort to scientific knowledge?

(2) With particular reference to the war of science against disease, what can be done now to organize a program for continuing in the future the work which has been done in medicine and related sciences?

(3) What can the Government do now and in the future to aid research activities by public and private organizations?

(4) Can an effective program be proposed for discovering and developing scientific talent in American youth so that the continuing future of scientific research in this country may be assured on a level comparable to what has been done during the war?

Dr. Bush appointed a series of committees representative of American science to assist him in the preparation of a reply to the President. That reply is the now well-known "Science--the Endless Frontier." A major recommendation of the report was for the establishment of a National Research Foundation, the purposes of which would be to:

...develop and promote a national policy for scientific research and scientific education, ...support basic research in non-profit organizations, ...develop scientific talent in American youth by means of scholarships and fellowships, and ...by contract and otherwise support long range research on military matters.

The Committee on Postwar Research

At about the same time the Secretaries of War and Navy were experiencing some concern regarding the hiatus which would be created in the program of military research and development when the OSD was terminated. Together they named a Committee on Postwar Research which was requested "to study the various aspects of the postwar research and development needs of the War and Navy Departments and to recommend a plan for carrying on such work after the war." The Committee, which was headed by Mr. Charles E. Wilson, Vice President of General Electric Company and now Director of Defense Mobilization, was composed equally of civilian

scientists, and Army and Navy representatives. The Committee's report, submitted September 18, 1944, recommended the establishment of an independent agency which should be charged with the responsibility of a long term program for national security. Recommended legislation to accomplish the purpose accompanied the report. As an interim measure, until such legislation might be enacted, the Committee recommended that a Research Board for National Security should be established within the National Academy of Sciences. In a letter of November 9, 1944, addressed to the president of the National Academy of Sciences, the Secretaries of War and Navy requested that a Research Board for National Security be constituted, and commented in part:

To insure continued preparedness along far sighted technical lines, the research scientists of the country must be called upon to continue in peacetime some substantial portion of those types of contribution to national security which they have made so effectively during the stress of the present war. By such peacetime service, moreover, there will be maintained at all times a substantial body of scientists acquainted with military personnel, establishments, procedures and problems who can be immediately mobilized for effective service in event of another war emergency.

The Research Board for National Security was never activated, but efforts for a permanent Federal agency for the support and encouragement of research and development continued along other lines.

The President's Scientific Research Board

By Executive Order of October 17, 1946, the President's Scientific Research Board was established and directed

to investigate and report upon the entire scientific program of the Federal Government, to make recommendations concerning its content and balance, to report upon its administration and to recommend administrative improvements, to examine the conditions under which scientists are employed by the Government, to analyze the policies of the several agencies in respect to research contracts, to survey our national scientific resources in terms of men, money, and facilities, and to examine into the training of scientific personnel.

A report to the President on Science and Public Policy by the Chairman of the President's Scientific Research Board was issued in five volumes on successive dates following the appearance of the first volume on August 27, 1947.

The report recommended that by 1957 we should be devoting at least one percent of our national income to research and development in the universities, industry and the Government; that heavier emphasis should be placed on basic research and upon medical research in our national research and development budget; that the Federal Government should support basic research in the universities and non-profit research institutions at a progressively increasing rate reaching an annual expenditure of at least \$250,000,000 by 1957; and that a National Science Foundation should be established to make grants in support of basic research. The Board made other recommendations pointing toward the purposes for the accomplishment of which the National Science Foundation has now been established.

The Office of Naval Research

Of particular note is legislation passed in August 1946 creating the Office of Naval Research to coordinate research activities of the Navy and to support basic research of interest to the Navy through contracts with universities and other research institutions. This Office is generally regarded as having sustained basic research through the crucial post-war period in which there was no other Federal median for its support.

Other Military and Atomic Energy Research and Development

This summary does not attempt to take into account the chronological evolution of Military and Atomic Energy research and development.

The Departments of the Army, the Navy, and the Air Force support their own programs of research and development. A separate agency at the Department of Defense level, the Research and Development Board, was created by the National Security Act of 1947 to coordinate the programs of the three military departments and to formulate an over-all program at the national level.

The Atomic Energy Commission, established by the Atomic Energy Act of 1946, administers the Government's research and development program in that field, and funds are appropriated expressly for that purpose.

Conclusion

For over a hundred years the Federal Government has recognized that scientific research is a matter of national concern. It has further recognized the need for governmental support and encouragement of research. This need has now culminated in the establishment of the National Science Foundation, an agency created by Congress in 1950:

To promote the progress of science;
to advance the national health,
prosperity, and welfare; and to
secure the national defense.