

at the University of Kansas, was the first Director. The Mellon Institute contains fifty-seven laboratories, a large library, machine-shop, &c., accommodation being thus provided for seventy research workers, and for a number of graduated students studying specific industries. Equipment is provided for large scale operations, special plants being built when the work cannot be carried out with greater efficiency in the factory. Under the scheme a contract is entered into between the manufacturer and the university in which the object of the research is precisely defined. The research is carried out by a qualified investigator selected as Fellow on the recommendation of the Director. The manufacturer pays the funds for the fellowship and for special equipment or apparatus required for the research. The Fellow receives, besides his emoluments, 10 per cent. or more of the net profits arising from the invention, or a capital sum in lieu thereof. In some cases several Fellows are selected to carry out a research; the emoluments vary according to circumstances. Up to the 1st February, 1914, forty-four* researches had been undertaken by seventy-seven Fellows, dealing with a wide range of important matters chiefly connected with chemical manufactures, engineering, and mining. There are fourteen Fellows on the permanent staff. At the University of Kansas during five years eighteen investigations, mostly chemical, were carried out in a similar manner by twenty-two Fellows. It is interesting to note that about 70 per cent. of the problems assigned to the Mellon Institute for study during the five years 1911-16 were solved to the satisfaction of the donors.

NATIONAL RESEARCH COUNCIL.

In April, 1916, the National Academy of Sciences offered its services to the President of the United States in the interest of national preparedness. President Wilson accepted the offer, and, after preliminary work by an organizing committee and the appointment of representatives of the Army, Navy, Smithsonian Institute, and various scientific bureaux of the Government and of universities, scientific associations, and of engineering institutes and societies, the National Research Council was formed, and held its first meeting in September, 1916. The Council consisted of thirty-seven members, Dr. George E. Hale, Director of the Mount Wilson Solar Observatory, being Chairman. The main work, however, is done by the EXECUTIVE COMMITTEE, consisting of ten members (now more), of which J. J. Carty, Chief Engineer of the American Telephone and Telegraph Company, is Chairman. This committee meets fortnightly. Committees were also set up to prepare a national census of research and of the equipment and personnel available, and for other purposes of organization.

The research committees are of two kinds: (a) Central committees, dealing with various departments of science, composed of leading authorities in each field; (b) local committees in universities, colleges, and other co-operating institutions engaged in scientific research; and other special committees.

It is not intended to supersede or to interfere with existing institutions carrying on research, but where necessary to increase their usefulness by placing additional funds at their disposal and in other ways. For instance, each State is to have an additional grant of £3,000 a year for research conducted by institutions situated in it. The Throop College of Technology, a research institute in California, received a grant of £20,000, and the Massachusetts Institute of Technology a gift of £100,000, to be used for the most part for research.

The relation between the central committees and the local and other special committees may be illustrated by reference to chemical research. There is a central committee of chemistry, which deals in the first instance with all industrial problems connected wholly or mainly with chemistry. This committee defines the specific problems to be investigated, and assigns them to the local committees at certain institutions, or to other special committees consisting of experts in the branch in question.

It must be remembered that in all cases a close connection is maintained between the scientists and the manufacturers and business administrators.

The method of the management of the finance in the United States is not clear. It is evident that the Federal Government provides a considerable sum, by grants and through the several Departments; some of the money is provided by the National Academy of Sciences, and by the institutions that carry out the researches. There appears to have been no difficulty up to the present caused by lack of funds.

V. SOUTH AFRICA.

I. As a consequence of the memorandum from the Committee of the Privy Council the South African Government towards the end of the year 1915 appointed a committee under the title of the GOVERNMENT MUNITIONS AND INDUSTRIES COMMITTEE, the members being representative of the Chambers of Commerce and Manufacturers' Associations. The work of this committee was in the main confined to practical engineering matters, and by no means covered the whole field of industrial research.

II. In October, 1916, the Government appointed an INDUSTRIES ADVISORY BOARD, which was intended to have a wider scope; its members, who were to hold office for three years, were almost exclusively business men representative of commerce, manufactures, and labour.

III. In February, 1917, the Advisory Board recommended "the appointment of a SCIENTIFIC AND TECHNICAL ADVISORY COMMITTEE to deal with all scientific and technical questions, and questions of research which may be referred to them by the Industrial Advisory Board." The Government accordingly constituted a committee of ten members—scientists and engineers—whose functions were

* This number has been more than doubled in the last two years.