

Brown, Columbia, Massachusetts Institute of Technology, Stanford, California Institute of Technology, University of Illinois, New York University, and Princeton, for illustration, is supported by Federal funds.

New institutional arrangements have been established in many cases, related to but organized separately from the universities, in order to respond to the needs of the Federal Government. Thus, the Lincoln Laboratory of the Massachusetts Institute of Technology was established by contract with the Air Force to supply research and development services and to establish systems concepts for the continental air defense, and similarly the Jet Propulsion Laboratory was established at the California Institute of Technology to conduct research on rocket propulsion for the Department of the Army and later to supply space craft design and systems engineering services to the National Aeronautics and Space Administration. In addition, other research institutions—such as the Stanford Research Institute—which were established to conduct research on contract for private or public customers, now do a major share of their business with the Federal Government.

In addition to altering the traditional patterns of organization of private industry and the universities, the rise in Federal research and development expenditures has resulted in the creation of entirely new kinds of organizations.

One kind of organization is typified by the RAND Corporation, established immediately after World War II, to provide operations research and other analytical services by contract to the Air Force. A number of similar organizations have been established since, more or less modeled on RAND, to provide similar services to other governmental agencies.

A second new kind of organization is the private corporation, generally not-for-profit but sometimes profit, created to furnish the Government with "systems engineering and technical direction" and other professional services. The Aerospace Corporation, the MITRE Corporation, the Systems Development Corporation, and the Planning Research Corporation are illustrations.

A third new organizational arrangement was pioneered by the Office of Scientific Research and Development during World War II and used by the Atomic Energy Commission, which took over the wartime atomic energy laboratories and added others—all consisting of facilities and equipment owned by the Government but operated under contract by private organizations, either industrial companies or universities.

Apart from their impact on the institutions of our society, Federal needs in research and development are placing critical demands on the national pool of scientific and engineering talent. The National Science Foundation points out that the country's supply of scientists and engineers is increasing at the fairly stable rate of 6 per cent annually, while the number engaged in research and development activities is growing at about 10 per cent each year. Accordingly, the task of developing our manpower resources in sufficient quality and quantity to keep pace with the expanding research and development effort is a matter of great urgency. The competition for scientists and engineers is becoming keener all the time and requires urgent attention to the