

been the continuing policy of the Bureau to do those things in the physical sciences which are related to our basic missions when a national need exists and the work is not being done adequately by anyone else. When another agency or industry develops the capability to carry on and become self-reliant in the field, we step aside and turn our attention to the unending appearance of new areas that require our attention.

For example, the Naval Research Laboratory, established in 1923, absorbed research on radio communications with submarines that was initiated in laboratories at the Bureau during World War I. Similarly, the Naval Ordnance Laboratory absorbed work NBS had done on range finding and the stabilization of naval guns.

For a time after the establishment of the National Advisory Committee for Aeronautics in 1915, the Bureau served as its main research facility. The early aerodynamic research performed at NBS was ultimately greatly expanded in the NACA's own laboratories, which in turn became a part of the National Aeronautics and Space Administration.

In 1953, in response to the recommendations of the National Academy of Sciences Committee I mentioned earlier, ordnance work generated at the Bureau during World War II and the Korean conflict was transferred from NBS. Three NBS divisions became the Harry Diamond Laboratories under Army Ordnance. Naval Ordnance took over NBS work on missile development that had been conducted at Corona, California.

Other examples could be cited concerning research initiated at NBS that has provided a basis for activities now conducted by the Federal Aviation Administration, the Federal Communications Commission, and others. Most recently, our Central Radio Propagation Laboratory became a key research component of the newly formed Environmental Science Services Administration.

NBS also has provided a breeding ground for private endeavors. Many of our staff members get ideas that need industrial, exploitation and leave the Bureau for this reason. Two of our neighbors in Maryland, Rabinow Electronics, and Weinschel Engineering, were formed by former NBS employees. The American Instrument Company was also founded by a former employee, and techniques for geophysical prospecting became the basis for private enterprises headed by former NBS employees working in that field.

Certain of the technical activities in which the Bureau pioneered provided the basis for extensive industries. For example, there was no optical glass made in the United States prior to World War I. When the war cut off supplies from Europe, NBS established a research program in the making of optical glass. The technology developed in that research program, especially the development of new types of pots for melting the glass, was the foundation of our domestic optical glass industry.

In 1921, NBS scientists tested their first crude radio guidance system for aircraft. By 1929 they had refined it to the point where the pilot could keep on course and know his approximate position at all times without being able to see outside his plane. By 1930 they had accomplished the first blind landing of an airplane entirely by radio guidance. The continuation of this technology under private development has helped to shape large segments of the transportation and instrument industries.

There are other examples. The printed electronic circuit which is used so widely today was developed under NBS sponsorship during the wartime ordnance development. NBS built the first internally programmed electronic computer in this country. The technology from that project was absorbed immediately into what has become a multimillion dollar private industry. Numerous other cases could be cited.

SHARING RESOURCES

As you can see, the Bureau has a long tradition of sharing its laboratories—both staff and equipment—with others. This is provided for in our Organic Act as amended.

NBS is really a complex of many laboratories. The range of research in them and the sophistication of the labs themselves have grown greatly over the years. So much so that our former quarters in the District of Columbia became hopelessly cramped and outmoded. Provision was made for moving the Bureau to its present quarters at Gaithersburg, Maryland. The present facilities are as modern as today's state of the art permits. These facilities, and the professionals who staff them, are available, to varying degrees and in diverse ways, to the Federal