

long-standing work in chemistry, radio, electricity and electronics had been needed.

The heavy commitment of NBS resources to the assistance of other Federal agencies during World War II, and the almost explosive development of Government concern with scientific and technological programs in the years immediately following, created severe problems for the Bureau. In its efforts to be responsive to the many demands for technical assistance from the military, the Atomic Energy Commission, and numerous other agencies intent upon exploiting and refining the scientific and technological breakthroughs achieved during the war, the Bureau at times devoted as much as 77% of its manpower to the programs of other agencies, and depended on funds transferred from those agencies for up to 85% of its financial support.

In 1953, following a study of the Bureau's programs and activities by a committee of the National Academy of Sciences, substantial changes were initiated in the content of the Bureau's scientific activities and in the emphasis which would be placed on its varied functions. Military development programs were transferred to agencies of the Department of Defense. Plans were begun to decrease the amount of work done by the Bureau for other Government agencies. These moves would enable the Bureau to concentrate its efforts on the vital measurement and calibration services needed by the Nation, and on the determination of the physical constants and the properties of materials. It would continue its long-standing, close cooperation with industrial and scientific standardizing organizations. This reorientation of the Bureau toward its original, basic functions was given special emphasis and appropriateness by the greatly increased demands made upon the Bureau's measurement services as a result of the advent of the space age in 1957.

The new and exacting requirements of the space age, the widening use of automation, the ever faster application and transfer of technological breakthroughs to the civilian economy—these factors and others all offer evidence that the measurement needs of the Nation will be greater in the years ahead than ever before. It is within this context that the Bureau during the last decade has modernized its facilities, and has continued to strengthen its measurement capabilities and the research which is essential to its measurement competence.

#### CHANGES IN LEGISLATION

The evolutionary changes in NBS activities that I have outlined were not accompanied by significant changes in the Bureau's basic legislation until 1950. This was possible largely as a result of the liberal interpretation of the comparatively general language in the original Organic Act and a substantial amount of authorizing language inserted in appropriation bills over the years. In 1950, the Organic Act of 1901 was amended to include more specifically four additional functions which the Bureau had been performing for many years. These were:

(1) The development of methods for testing materials, mechanisms, and structures, and the testing of materials, supplies, and equipment, including items purchased for use of Government departments and independent establishments.

(2) Cooperation with other Government agencies and with private organizations in the establishment of standard practices, incorporated in codes and specifications.

(3) Advisory service to Government agencies on scientific and technical problems.

(4) Invention and development of devices to serve special needs of the Government.

In 1950, the Bureau also was given authority to establish a working capital fund that has proved to be an excellent mechanism for handling reimbursements for the extensive services we render to other agencies and the public.

#### NEW IDEAS AND ORGANIZATIONS

The National Bureau of Standards has served over the years as a breeding ground for both new ideas and new organizations. This, quite possibly, has been one of the most important contributions of the Bureau to the operations of the Government and of the private sector. It has taken various forms. In some cases actual organizational units were transferred from NBS to another agency. In others, research initiated at NBS was picked up and carried on elsewhere—in another Federal laboratory, in private industry, in standards-making organizations, and in standards laboratories. This has not occurred by accident. It has