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The National Bureau of Standards

The recently issued *1965 Technical Highlights of the National Bureau of Standards** is an excellent report. The document, which contains 113 pages of text and 90 pages of appendixes, provides convincing evidence that NBS is serving essential functions and that it is responding to new needs. Appropriations for NBS of $33 million and total expenditures of $69 million are more than amply justified.

For 65 years the National Bureau of Standards has been the nation's central measurement laboratory. It has had responsibility for developing and maintaining the National Standards of Measurement. This is no small task. In addition to the six basic international qualities of length, mass, time, temperature, electrical current, and luminous intensity, there are some 36 derived quantities for which standards are needed. With developments such as the maser and laser, new methods of obtaining better accuracies become available. This requires continual updating of standards. Scientific developments such as ability to obtain higher pressures, a better vacuum, and new and purer materials have correspondingly increased the need for additional standards.

In response to the challenges of the times, NBS has become the focus of scientific and technical competence, covering the entire spectrum of the physical sciences. The accuracy with which measurement standards can be reproduced and disseminated limits the reliability and accuracy of all exchanges derived from standards. NBS must provide leadership in the science of measurement. This requires a staff of high-caliber scientists. The Bureau's scientific activity has been particularly distinguished in atomic and molecular physics, chemical physics, thermodynamics, theoretical physics, crystallography, analytical chemistry, polymers, metallurgy, and cryogenics.

During 1965, NBS research leading to publication of about 1000 scientific papers was conducted. Among the accomplishments was development of a thallium-beam clock, which may be more accurate by an order of magnitude than the cesium-beam clock. A second achievement was the use of a laser to make automatic length measurements. The accuracy obtained was 1.8 parts in 10^9. A third accomplishment was the discovery of superconductivity in the semiconductor strontium titanate. A new purification technique affords, for the first time, the possibility of obtaining absolutely pure and perfect crystals.

In addition to its responsibilities with respect to standards, NBS has long had other functions, such as conducting tests for other government agencies and advising them on scientific and technical problems. NBS is now to establish a central and major government resource in the automatic-data-processing field. It is also to serve as the focal point within the federal government for stimulating the application of science and technology to the economy.

A recently added responsibility of very great importance is the operation of a National Standard Reference Data System. What is involved is the massive effort required to produce the modern equivalent of the old International Critical Tables. The past achievements of NBS augur well for the able performance of the new tasks. Establishment of an effective National Standard Reference Data System would provide major benefits to science, technology, and industry throughout the world.

It is to be hoped that Congress will provide sufficient funds for effective implementation of this much-needed data system, and that the evident quality of the overall NBS effort will be as highly regarded in Congress as it is among knowledgeable scientists and engineers.

—PHILIP H. ABELSON

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