

APPENDIX A

TABLES

Table 1 GNP and R & D EXPENDITURES Billions of Dollars						
Year	GNP	Total National R & D	Total Federal R & D	Federal In House R & D	Federal to Industry R & D	Industry In House R & D
1953	364.6	5.124	2.753	1.010	1.430	2.245
1960	503.7	13.523	8.738	1.726	6.081	4.516
% average annual growth	5.45	23.42	31.06	10.13	46.46	14.45
GNP figures from <i>Historical Statistics of the United States: Colonial Times to 1970. Part 1</i> (Washington, D.C.: Bureau of the Census, 1975): 224 R & D expenditures from <i>National Pattern of Science and Technology Resources: 1987</i> (Washington, D.C.: National Science Foundation, 1988) Table B-1, p. 38; Table B-5, p. 46.						

Table 2 GNP and R & D EXPENDITURES Billions of Dollars							
Year	GNP	Total National R & D	Total Federal R & D	Federal In House R & D	Federal National Basic Research	Total Federal Basic Research	Federal In House Basic Research
1957	441.1	9.912	6.119	1.220	0.857	0.408	0.122
1964	632.4	19.412	12.553	2.838	2.559	1.595	0.364
% average annual growth	6.20	13.41	15.02	18.95	28.37	41.56	28.34
<i>Historical Statistics of the United States: Colonial Times to 1970. Part 1 and 2</i> (Washington, D.C.: Bureau of the Census, 1975): 224, 965.							

Table 3
SELECTED FINANCIAL DATA ON THE NBS PROGRAM, 1963-1970
Obligations in Millions of Dollars

Year	NBS Appropriations			Non-Appropriated Funds ³	Total Funds ⁴	
	RTS Funds ¹		Other Funds ²		Current	Constant
	Current	Constant				
1961	19.58	27.80	0.0	19.26	38.84	55.14
1962	23.36	32.75	0.40	21.40	45.16	63.31
1963	27.78	38.49	0.71	20.90	49.39	68.44
1964	28.12	38.39	1.89	26.03	56.04	76.51
1965	31.76	42.54	1.03	32.88	65.67	87.96
1966	28.66	37.33	0.94	23.80	53.40	69.55
1967	30.77	38.84	0.36	27.13	58.26	73.53
1968	32.28	39.03	0.58	28.43	61.49	74.11
1969	36.10	41.69	0.94	29.03	66.07	76.30
1970	39.80	43.64	1.02	33.44	74.26	81.43

¹ Research and Technical Services (RTS) funds.

² Includes Office of Technical Services, Civilian Industrial Technology, and Special Foreign Currency funds.

³ Reimbursable funds from consultative, advisory, administrative and technical services; research and development programs supported by other Federal agencies or nongovernmental sources; the performance of various tests and calibrations, and the manufacture and sale of standard reference materials for other Government agencies and the public; and the sale of technical documents to the public.

⁴ Does not include the construction and facilities program.

From the NBS Annual Reports for the respective years. Constant amounts are based on 1972 dollars using the GDP deflator.

Table 4
NBS PERSONNEL, 1961-1970

Year	Full-Time Permanent Staff	Other Staff ¹	Total Paid Staff	Research Associates and Guest Workers	Total NBS Staff
1961	3273	646	3919	305	4224
1962	3477	539	4016	169	4185
1963	3518	642	4160	197	4357
1964	3905	475	4380	177	4557
1965	4002	592	4594	199	4793
1966	3569	441	4010	116	4126
1967	3612 ⁽²⁾	386	3998	199	4197
1968	3519 ⁽²⁾	353	3872	147	4019
1969	3433 ⁽²⁾	570	4003	150	4153
1970	3366	687	4053	131	4184

¹ Summer, Post Doctoral Research Fellows, Part-Time, Intermittent, and Temporary.

² Post Doctoral Research Fellows included as FTPS.

From the NBS Annual Reports for the respective years.

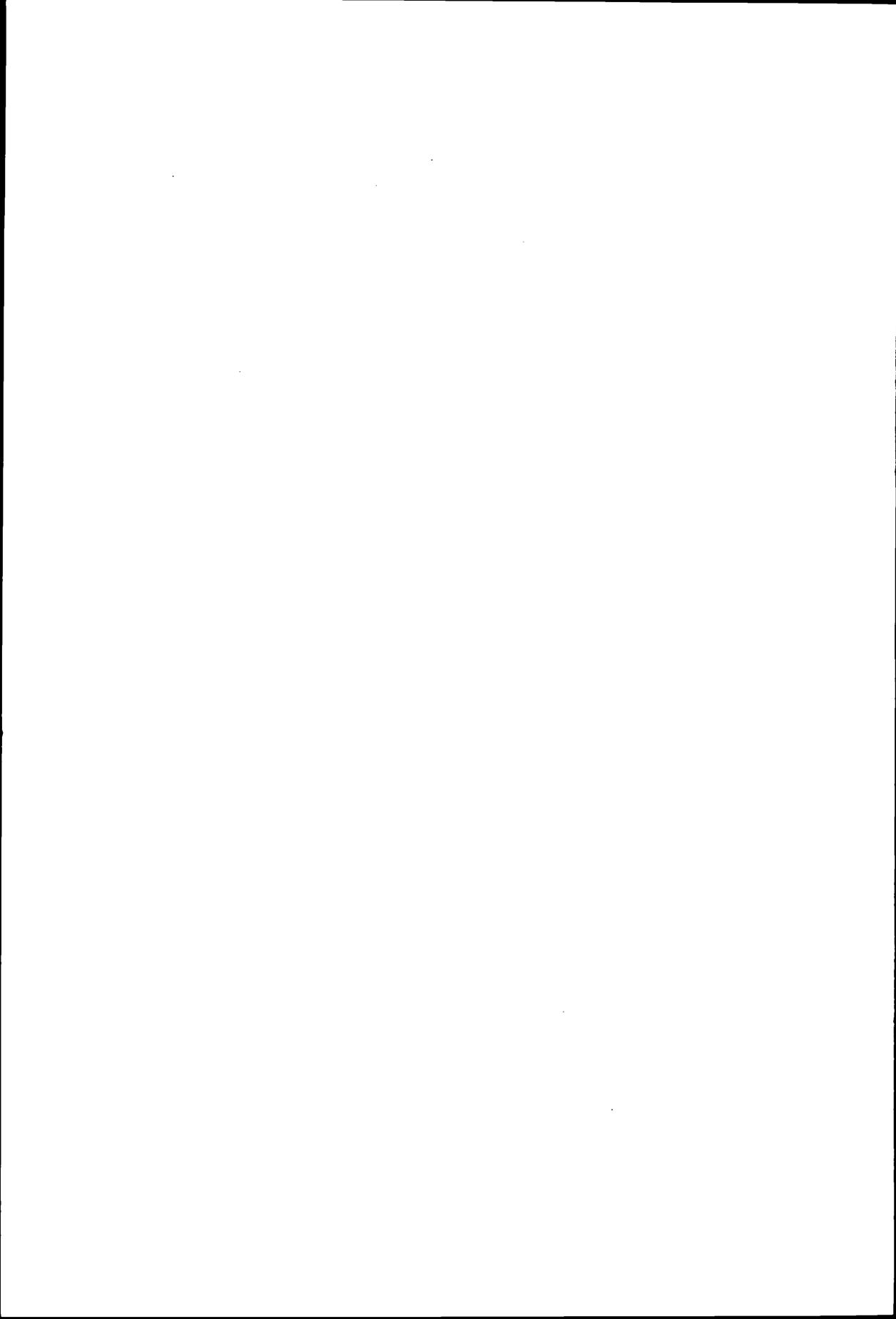
APPENDIX B

ACRONYMS DICTIONARY

AACC	American Association of Clinical Chemistry
ACS	American Chemical Society
ADP	Automatic Data Processing
AEC	Atomic Energy Commission
AID	Agency for International Development
AIME	American Institute of Mining, Metallurgical, and Petroleum Engineers
AIP	American Institute of Physics
ANSI	American National Standards Institute
ARIB	Asphalt Roofing Industry Bureau
ARPA	Advanced Research Projects Agency
ASA	American Standards Association
ASCI	American Standard Code for Information Interchange
ASSS	American-Soviet Science Society
ASTM	American Society for Testing and Materials
BBB	Better Business Bureau
BIPM	International Bureau of Weights and Measures (Bureau International des Poids et Mesures)
BOB	Bureau of the Budget
BSA	Board of Standards and Appeals, New York City
BuAer	Bureau of Aeronautics, U.S. Navy
CAP	College of American Pathologists
CCC	Commodity Credit Corporation
CCIR	International Radio Consultative Committee (Comité Consultatif International des Radiocommunications)
CCIT	International Telegraph and Telephone Consultative Committee (Comité Consultatif International Telegraphique et Telephonique)
CCST	Center for Computer Sciences and Technology
CCT	Consultative Committee on Thermometry
CGPM	General Conference for Weights and Measures (Conférence Générale des Poids et Mesures)
CIPM	International Committee for Weights and Measures (Comité International des Poids et Mesures)
CIT	Civilian Industrial Technology
CRM	Certified Reference Material
CRPL	Central Radio Propagation Laboratory
CSC	Civil Service Commission
DOC	Department of Commerce
DOD	Department of Defense
DOT	Department of Transportation
EEO	Equal Employment Opportunity
ESSA	Environmental Science Services Administration
FAA	Federal Aviation Agency
FBI	Federal Bureau of Investigation
FCC	Face Centered Cubic
FCST	Federal Council for Science and Technology
FHWA	Federal Highway Administration
FIPS	Federal Information Processing Standards
FIPS PUBS	Federal Information Processing Standards Publications

FOSDIC	Film Optical Scanning Device for Input to Computers
FTC	Federal Trade Commission
GR-S	Government Rubber-Styrene
GSA	General Services Administration
HHFA	Housing and Home Finance Agency
HUAC	House Committee on Un-American Activities
HUD	Department of Housing and Urban Development
IAT	Institute for Applied Technology
IAU	International Astronomical Union
IBS	Institute for Basic Standards
ICBM	Intercontinental Ballistic Missile
ICC	Interstate Commerce Commission
ICSU	International Conference of Scientific Unions
IDA	Institute for Defense Analysis
IDMS	Isotope Dilution Mass Spectrometry
IGY	International Geophysical Year
IMR	Institute for Materials Research
INA	Institute for Numerical Analysis
IPTS	International Practical Temperature Scale
IQSY	International Year of the Quiet Sun
IRPL	Interservice Radio Propagation Laboratory
ISO	International Standards Organization
JILA	Joint Institute for Laboratory Astrophysics
JPCRD	<i>Journal of Physical and Chemical Reference Data</i>
LORAN	Long Range Navigation
MAP	Measurement Assurance Program
MDE	Modular Design of Electronics
MIT	Massachusetts Institute of Technology
MPE	Mechanized Production of Electronics
NACA	National Advisory Committee for Aeronautics
NAE	National Academy of Engineering
NAML	National Applied Mathematics Laboratories
NAS	National Academy of Sciences
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NBBB	National Better Business Bureau
NBS	National Bureau of Standards
NBSR	National Bureau of Standards Reactor
NCASF	National Council of American-Soviet Friendship
NCSL	National Conference of Standards Laboratories
NDRC	National Defense Research Committee
NHSB	National Highway Safety Bureau
NIC	National Inventors Council
NIH	National Institutes of Health
NIPS	National Institutes for Physical Sciences
NIST	National Institute of Standards and Technology
NOL	Naval Ordnance Laboratory

NRC	National Research Council
NRL	Naval Research Laboratory
NSF	National Science Foundation
NSRDS	National Standard Reference Data System
NTIS	National Technical Information System
NTSB	National Transportation Safety Bureau
OBBB	Oakland Better Business Bureau
ODM	Office of Defense Mobilization
OII	Office of Invention and Innovation
OMB	Office of Management and Budget
ONR	Office of Naval Research
OSRD	Office of Scientific Research and Development
OSRD	Office of Standard Reference Data
OSRM	Office of Standard Reference Materials
OST	Office of Science and Technology
OSWM	Office of Standard Weights and Measures
OTS	Office of Technical Services
OVSR	Office of Vehicle Systems Research
OWM	Office of Weights and Measures
PBS	Public Buildings Service
POD	Post Office Department
PPB	Planning-Programming-Budgeting
PSAC	President's Science Advisory Committee
PTB	Physikalisch-Technische Bundesanstalt
PTR	Physikalisch-Technische Reichsanstalt
RM	Research Material
RTS	Research and Technical Services
SAE	Society of Automotive Engineers
SCLC	Southern Christian Leadership Conference
SCOOP	Scientific Computation of Optimum Programs
SEAC	Standards Eastern Automatic Computer
SI	International System of Units (<i>Système International d'Unités</i>)
SLAC	Stanford Linear Accelerator Center
SRM	Standard Reference Material
SSCSB	Senate Select Committee on Small Business
SSS	Selective Service System (SSS)
SURF	Synchrotron Ultra-Violet Radiation Facility
SWAC	Standards Western Automatic Computer
TAD	Technical Analysis Division
UN	United Nations
USASCII	USA Standard Code for Information Interchange
UT	Universal Time



APPENDIX C

LEGISLATION RELATING TO THE ORGANIZATION, FUNCTIONS, AND ACTIVITIES OF THE NATIONAL BUREAU OF STANDARDS

July 12, 1894, 28 Stat. 101 (Public Law 105—53d Congress, 2d session)

CHAP. 131.—An Act To define and establish the units of electrical measure.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That from and after the passage of this Act the legal units of electrical measure in the united States shall be as follows:

First. The unit of resistance shall be what is known as the international ohm, which is substantially equal to one thousand million units of resistance of the centimeter-gram-second system of electro-magnetic units, and is represented by the resistance offered to an unvarying electric current by a column of mercury at the temperature of melting ice fourteen and four thousand five hundred and twenty-one ten-thousandths grams in mass, of a constant cross-sectional area, and of the length of one hundred and six and three-tenths centimeters.

Second. The unit of current shall be what is known as the international ampere, which is one-tenth of the unit of current of the centimeter-gram-second system of electro-magnetic units, and is the practical equivalent of the unvarying current, which, when passed through a solution of nitrate of silver in water in accordance with standard specifications, deposits silver at the rate of one thousand one hundred and eighteen millionths of a gram per second.

Third. The unit of electro-motive force shall be what is known as the international volt, which is the electro-motive force that, steadily applied to a conductor whose resistance is one international ohm, will produce a current of an international ampere, and is practically equivalent to one thousand fourteen hundred and thirty-fourths of the electro-motive force between the poles or electrodes of the voltaic cell known as Clark's cell, at a temperature of fifteen degrees centigrade, and prepared in the manner described in the standard specification.

Fourth. The unit of quantity shall be what is known as the international coulomb, which is the quantity of electricity transferred by a current of one international ampere in one second.

Fifth. The unit of capacity shall be what is known as the international farad, which is the capacity of a condenser charged to a potential of one international volt by one international coulomb of electricity.

Sixth. The unit of work shall be the Joule, which is equal to ten million units of work in the centimeter-gram-second system, and which is practically equivalent to the energy expended in one second by an international ampere in an international ohm.

Seventh. The unit of power shall be the Watt, which is equal to ten million units of power in the centimeter-gram-second system, and which is practically equivalent to the work done at the rate of one Joule per second.

Eighth. The unit of induction shall be the Henry, which is the induction in a circuit when the electro-motive force induced in this circuit is one international volt while the inducing current varies at the rate of one Ampere per second.

SEC. 2. That it shall be the duty of the National Academy of Sciences to prescribe and publish, as soon as possible after the passage of this Act, such specifications of details as shall be necessary for the practical application of the definitions of the ampere and volt hereinbefore given, and such specifications shall be the standard specifications herein mentioned.

Approved, July 12, 1894.

* * * * *

March 3, 1901, 31 Stat. 1449 (Public Law 177—56th Congress, 2d session)

The first organic act for the National Bureau of Standards.

CHAP. 872.—An Act To establish the National Bureau of Standards.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Office of Standard Weights and Measures shall hereafter be known as the National Bureau of Standards.

SEC. 2. That the functions of the bureau shall consist in the custody of the standards; the comparison of the standards used in scientific investigations, engineering, manufacturing, commerce, and educational institutions with the standards adopted or recognized by the Government; the construction, when necessary, of standards, their multiples and subdivisions; the testing and calibration of standard measuring apparatus; the solution of problems which arise in connection with standards; the determination of physical constants and the properties of materials, when such data are of great importance to scientific or manufacturing interests and are not to be obtained of sufficient accuracy elsewhere.

SEC. 3. That the bureau shall exercise its functions for the Government of the United States; for any State or municipal government within the United States; or for any scientific society, educational institution, firm, corporation, or individual within the United States engaged in manufacturing or other pursuits requiring the use of standards or standard measuring instruments. All requests for the services of the bureau shall be made in accordance with the rules and regulations herein established.

SEC. 4. That the officers and employees of the bureau shall consist of a director, at an annual salary of five thousand dollars; one physicist, at an annual salary of three thousand five hundred dollars; one chemist, at an annual salary of three thousand five hundred dollars; two assistant physicists or chemists, each at an annual salary of two thousand two hundred dollars; one laboratory assistant, at an annual salary of one thousand four hundred dollars; one laboratory assistant, at an annual salary of one thousand two hundred dollars; one secretary, at an annual salary of two thousand dollars; one clerk, at an annual salary of one thousand two hundred dollars; one messenger, at an annual salary of seven hundred and twenty dollars; one engineer, at an annual salary of one thousand five hundred dollars; one mechanician, at an annual salary of one thousand four hundred dollars; one watchman, at an annual salary of seven hundred and twenty dollars, and one laborer, at an annual salary of six hundred dollars.

SEC. 5. That the director shall be appointed by the President, by and with the advice and consent of the Senate. He shall have the general supervision of the bureau, its equipment, and the exercise of its functions. He shall make an annual report to the Secretary of the Treasury, including an abstract of the work done during the year and a financial statement. He may issue, when necessary, bulletins for public distribution, containing such information as may be of value to the public or facilitate the bureau in the exercise of its functions.

SEC. 6. That the officers and employees provided for by this Act, except the director, shall be appointed by the Secretary of the Treasury, at such time as their respective services may become necessary.

SEC. 7. That the following sums of money are hereby appropriated: For the payment of salaries provided for by the Act, the sum of twenty-seven thousand one hundred and forty dollars, or so much thereof as may be necessary; toward the erection of a suitable laboratory, of fireproof construction, for the use and occupation of said bureau, including all permanent fixtures, such as plumbing, piping, wiring, heating, lighting, and ventilation, the entire cost of which shall not exceed the sum of two hundred and fifty thousand dollars, one hundred thousand dollars; for equipment of said laboratory, the sum of ten thousand dollars; for a site for said laboratory, to be approved by the visiting committee hereinafter provided for and purchased by the Secretary of the Treasury, the sum of twenty-five thousand dollars, or so much thereof as may be necessary; for the payment of the general expenses of said bureau, including books and periodicals, furniture, office expenses, stationery and printing, heating and lighting, expenses of the visiting committee, and contingencies of all kinds, the sum of five thousand dollars, or so much thereof as may be necessary, to be expended under the supervision of the Secretary of the Treasury.

SEC. 8. That for all comparisons, calibrations, tests, or investigations, except those performed for the Government of the United States or State governments within the United States, a reasonable fee shall be charged, according to a schedule submitted by the director and approved by the Secretary of the Treasury.

SEC. 9. That the Secretary of the Treasury shall, from time to time, make regulations regarding the payment of fees, the limits of tolerance to be attained in standards submitted for verification, the sealing of standards, the disbursement and receipt of moneys, and such other matters as he may deem necessary for carrying this Act into effect.

SEC. 10. That there shall be a visiting committee of five members, to be appointed by the Secretary of the Treasury, to consist of men prominent in the various interests involved, and not in the employ of the Government. This committee shall visit the bureau at least once a year, and report to the Secretary of the Treasury upon the efficiency of its scientific work and the condition of its equipment. The members of this committee shall serve without compensation, but shall be paid the actual expenses incurred in attending its meetings. The period of service of the members of the original committee shall be so arranged that one member shall retire each year, and the appointments thereafter to be for a period of five years. Appointments made to fill vacancies occurring other than in the regular manner are to be made for the remainder of the period in which the vacancy exists.

Approved, March 3, 1901.

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May 20, 1918, 40 Stat 556 (Public Law 152—65th Congress, 2d session) "Overman Act."

First official interagency transfer of funds to the Bureau of Standards. The work was done in support of military agencies during World War I.

CHAP. 78.—An Act Authorizing the President to coordinate or consolidate executive bureaus, agencies, and offices, and for other purposes, in the interest of economy and the more efficient concentration of the Government.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the national security and defense, for the successful prosecution of the war, for the support and maintenance of the Army and Navy, for the better utilization of resources and industries, and for the more effective exercise and more efficient administration by the President of his powers as Commander in Chief of the land and naval forces the President is hereby authorized to make such redistribution of functions among executive agencies as he may deem necessary, including any functions, duties, and powers hitherto by law conferred upon any executive department, commission, bureau, agency, office, or officer, in such manner as in his judgment shall seem best fitted to carry out the purposes of this Act, and to this end is authorized to make such regulations and to issue such orders as he may deem necessary, which regulations and orders shall be in writing and shall be filed with the head of the department affected and constitute a public record: *Provided*, That the Act shall remain in force during the continuance of the present war and for six months after the termination of the war by the proclamation of the treaty of peace, or at such earlier time as the President may designate: *Provided further*, That the termination of this Act shall not affect any act done or any right or obligation accruing or accrued pursuant to the Act and during the time that this Act is in force: *Provided further*, That the authority by this Act granted shall be exercised only in matters relating to the conduct of the present war.

SEC. 2. That in carrying out the purposes of this Act the President is authorized to utilize, coordinate, or consolidate any executive or administrative commissions, bureaus, agencies, offices, or officers now existing by law, to transfer any duties or powers from one existing department, commission, bureau, agency, office, or officer to another, to transfer the personnel thereof or any part of it either by detail or assignment, together with the whole or any part of the records and public property belonging thereto.

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May 29, 1920, 41 Stat 681 (Public Law 231—66th Congress, 2d session)

Beginning of transferred funds to the Bureau of Standards as authorized in appropriations legislation.

CHAP. 214.—An Act Making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year ending June 30, 1921, and for other purposes.

During the fiscal year 1921, the head of any department or independent establishment of the Government having funds available for scientific investigations and requiring cooperative work by the Bureau of Standards on scientific investigations within the scope of the functions of that Bureau, and which it is unable to perform within the limits of its appropriations, may, with the approval of the Secretary of Commerce, transfer to the Bureau of Standards such sums as may be necessary to carry on such investigations. The Secretary of the Treasury shall transfer on the books of the Treasury Department any sums which may be authorized hereunder and such amounts shall be placed to the credit of the Bureau of Standards for the performance of work for the department or establishment from which the transfer is made. (41 Stat. 683)

* * * * *

May 14, 1930, 46 Stat. 327 (Public Law 219—71st Congress, 2d session)

CHAP. 275.—An Act Authorizing the establishment of a national hydraulic laboratory in the Bureau of Standards of the Department of Commerce and the construction of a building therefor.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby authorized to be established in the Bureau of Standards of the Department of Commerce a national hydraulic laboratory for the determination of fundamental data useful in hydraulic research and engineering, including laboratory research relating to the behavior and control of river and harbor waters, the study of hydraulic structures and water flow, and the development and testing of hydraulic instruments and accessories: *Provided,* That no test, study, or other work on a problem or problems connected with a project the prosecution of which is under the jurisdiction of any department or independent agency of the government shall be undertaken in the laboratory herein authorized until a written request to do such work is submitted to the Director of the Bureau of Standards by the head of the department or independent agency charged with the execution of such project: *And provided further,* That any State or political subdivision thereof may obtain a test, study, or other work on a problem connected with a project the prosecution of which is under the jurisdiction of such State or political subdivision thereof.

SEC. 2. There is hereby authorized to be appropriated, out of any money in the Treasury not otherwise appropriated, not to exceed \$350,000, to be expended by the Secretary of Commerce for the construction and installation upon the present site of the Bureau of Standards in the District of Columbia of a suitable hydraulic laboratory building and such equipment, utilities, and appurtenances thereto as may be necessary.

Approved, May 14, 1930.

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June 30, 1932, 47 Stat. 382 (Public Law 212—72d Congress, 1st session) "Economy Act of 1932."

SEC. 312.—An amendment to section 8 of the Act establishing the National Bureau of Standards authorized payment of fees, except for other Federal agencies, for Bureau of Standards tests and calibrations.

SEC. 601.—The policy of transferred funds was restated and made general throughout the Federal Government.

[CHAPTER 314]

AN ACT

Making appropriations for the Legislative Branch of the Government for the fiscal year ending June 30, 1933, and for other purposes.

SEC. 312. Section 8 of the Act entitled "An Act to establish the National Bureau of Standards", approved March 3, 1901, as amended and supplemented [U.S.C., title 15, sec. 276], is amended to read as follows:

"SEC. 8. For all comparisons, calibrations, tests, or investigations, performed by the National Bureau of Standards under the provisions of this Act, as amended and supplemented, except those performed for the Government of the United States or State governments within the United States, a fee sufficient in each case to compensate the National Bureau of Standards for the entire cost of the services rendered shall be charged, according to a schedule prepared by the Director of the National Bureau of Standards and approved by the Secretary of Commerce. All moneys received from such sources shall be paid into the Treasury to the credit of miscellaneous receipts." (47 Stat. 410)

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SEC. 601. Section 7 of the Act entitled "An Act making appropriations for fortifications and other works of defense, for the armament thereof, and for the procurement of heavy ordnance for trial and service, for the fiscal year ending June 30, 1921, and for other purposes", approved May 21, 1920 [U.S.C., title 31, sec. 686], is amended to read as follows:

"SEC. 7. (a) Any executive department or independent establishment of the Government, or any bureau or office thereof, if funds are available therefor and if it is determined by the head of such executive department, establishment, bureau, or office to be in the interest of the Government so to do, may place orders with any other such department, establishment, bureau, or office for materials, supplies, equipment, work, or services of any kind that such requisitioned Federal agency may be in a position to supply or equipped to render, and shall pay promptly by check to such Federal agency as may be requisitioned, upon its written request, either in advance or upon the furnishing or performance thereof, all or part of the estimated or actual cost thereof, as determined by such department, establishment, bureau, or office as may be requisitioned; but proper adjustments on the basis of the actual cost of the materials, supplies, or equipment furnished, or work or services performed, paid for in advance, shall be made as may be agreed upon by the departments, establishments, bureaus, or offices concerned: *Provided, however,* That if such work or services can be as conveniently or more cheaply performed by private agencies such work shall be let by competitive bids to such private agencies. Bills rendered, or requests for advance payments made, pursuant to any such order, shall not be subject to audit or certification in advance of payment. (47 Stat. 417)

* * * * *

August 1, 1947, 61 Stat. 715 (Public Law 313—80th Congress, 1st session)

From time to time amendments to this act extended the authority to other agencies, revised the number of positions allotted, and the salary range. In 1965, NBS had twelve appointees under this law.

[CHAPTER 433]

AN ACT

To authorize the creation of additional positions in the professional and scientific service in the War and Navy Departments.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War is authorized to establish and fix the compensation for, within the War Department, not more than thirty positions, and the Secretary of the Navy is authorized to establish and fix the compensation for, within the Naval establishment, not more than fifteen positions in the professional and scientific service, each such position being established to effectuate those research and development functions, relating to the national defense, military and naval medicine, and any and all other activities of the War Department or Naval Establishment which require the services of specially qualified scientific or professional personnel: *Provided,* That the rates of compensation for positions established pursuant to the provisions of this Act shall not be less than \$10,000 per annum nor more than \$15,000 per annum, and shall be subject to the approval of the Civil Service Commission.

SEC. 2. Positions created pursuant to this Act shall be included in the classified civil service of the United States, but appointments to such positions shall be made without competitive examination upon approval of the proposed appointee's qualifications by the Civil Service Commission or such officers or agents as it may designate for this purpose.

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October 15, 1949, 63 Stat. 886 (Public Law 366—81st Congress, 1st session)
Authorization for the Boulder Laboratories.

[CHAPTER 703]

AN ACT

To authorize the construction and equipment of a radio laboratory building for the National Bureau of Standards, Department of Commerce.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby authorized to be constructed and equipped for the National Bureau of Standards a suitable radio laboratory building, together with necessary utilities and appurtenances thereto, under a limit of cost of \$4,475,000: *Provided,* That such limit of cost may be exceeded or shall be reduced by an amount equal to the percentage increase or decrease, if any, in construction costs generally dating from March 1, 1948, as determined by the Federal works Administrator.

SEC. 2. The Secretary of Commerce is authorized to acquire, by purchase, condemnation, or otherwise (including transfer with or without compensation from Federal agencies), such lands, estates in lands, and appurtenances thereto as may in his opinion be necessary or desirable for the construction of buildings to house activities of the National Bureau of Standards: *Provided,* That the site therefor shall be selected after consultation with the Director of the National Bureau of Standards.

SEC. 3. There are hereby authorized to be appropriated to the Secretary of Commerce, out of any moneys in the Treasury not otherwise appropriated, such sums as may be necessary to carry out the provisions of this Act: *Provided,* That such sums so appropriated, except such part thereof as may be necessary for the incidental expenses of the Department of Commerce, shall be transferred to the Public Buildings Administration in the Federal works Agency.

Approved October 25, 1949.

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October 25, 1949, 63 Stat. 905 (Public Law 386—81st Congress, 1st session)

Authorization for a guided-missile research laboratory ultimately located on the site of a former United States Naval Hospital at Corona, California.

[CHAPTER 728]

AN ACT

To authorize the construction and equipment of a guided-missile research laboratory building for the National Bureau of Standards, Department of Commerce.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby authorized to be constructed and equipped for the National Bureau of Standards a research laboratory building, suitable for use as a guided-missile laboratory, together with necessary utilities and appurtenances thereto, under a limit of cost of \$1,900,000: *Provided,* That such limit of cost may be exceeded or shall be reduced by an amount equal to the percentage increase or decrease, if any, in construction cost generally dating from June 1, 1948, as determined by the Federal Works Administrator: *Provided further,* That such limit of cost shall not be exceeded by more than 10 per centum.

SEC. 2. The Secretary of Commerce is authorized to acquire, by purchase, condemnation, or otherwise (including transfer with or without compensation from Federal agencies), such lands, estates in lands, and appurtenances thereto as may in his opinion be necessary or desirable for the construction of a building to house activities of such laboratory for the National Bureau of Standards: *Provided,* That the site therefor shall be selected after consultation with the Director of the National Bureau of Standards.

SEC. 3. There are hereby authorized to be appropriated to the Secretary of Commerce, out of any moneys in the Treasury not otherwise appropriated, such sums as may be necessary to carry out the provisions of this Act: *Provided,* That such sums so appropriated, except such part thereof as may be necessary for the incidental expenses of the Department of Commerce, shall be transferred to the Public Buildings Administration in the Federal Works Agency.

Approved October 25, 1949.

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October 28, 1949, 63 Stat. 954 (Public Law 429—81st Congress, 1st session) *Classification Act of 1949*.

The number of positions for the whole Civil Service in grades GS-16, GS-17, and GS-18 were specified. Periodic revisions in number and salary were made. In 1965, the National Bureau of Standards had 39 appointees in GS-16 and 29 in GS-17.

[CHAPTER 782]

AN ACT

To establish a standard schedule of rates of basic compensation for certain employees of the Federal Government; to provide an equitable system for fixing and adjusting the rates of basic compensation of individual employees; to repeal the Classification Act of 1923, as amended; and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Classification Act of 1949".

TITLE I—DECLARATION OF POLICY

SEC. 101. It is the purpose of this Act to provide a plan for classification of positions and for rates of basic compensation whereby—

- (1) in determining the rate of basic compensation which an officer or employee shall receive, (A) the principle of equal pay for substantially equal work shall be followed, and (B) variations in rates of basic compensation paid to different officers and employees shall be in proportion to substantial differences in the difficulty, responsibility, and qualification requirements of the work performed and to the contributions of officers and employees to efficiency and economy in the service; and
- (2) individual positions shall, in accordance with their duties, responsibilities, and qualification requirements, be so grouped and identified by classes and grades, as defined in section 301, and the various classes shall be so described in published standards, as provided for in title IV, that the resulting position-classification system can be used in all phases of personnel administration.

* * * * *

January 23, 1950, 3 C.F.R. 76 (1950).

EXECUTIVE ORDER 10096

PROVIDING FOR A UNIFORM PATENT POLICY FOR THE GOVERNMENT WITH RESPECT TO INVENTIONS MADE BY GOVERNMENT EMPLOYEES AND FOR THE ADMINISTRATION OF SUCH POLICY.

WHEREAS inventive advances in scientific and technological fields frequently result from governmental activities carried on by Government employees; and

WHEREAS the Government of the United States is expending large sums of money annually for the conduct of these activities; and

WHEREAS these advances constitute a vast national resource; and

WHEREAS it is fitting and proper that the inventive product of functions of the Government, carried out by Government employees, should be available to the Government in appropriate instances; and

WHEREAS the rights of Government employees in their inventions should be recognized in appropriate instances; and

WHEREAS the carrying out of the policy of this order requires appropriate administrative arrangements:

NOW, THEREFORE, by virtue of the authority vested in me by the Constitution and statutes, and as President of the United States and Commander in Chief of the Armed Forces of the United States, in the interest of the establishment and operation of a uniform patent policy for the Government with respect to inventions made by Government employees, it is hereby ordered as follows:

1. The following basic policy is established for all Government agencies with respect to inventions hereafter made by any Government employee:

- (a) The Government shall obtain the entire right, title and interest in and to all inventions made by any Government employee (1) during working hours, or (2) with a contribution by the Government of facilities, equipment, materials, funds, or information, or of time or services of other Government

employees on official duty, or (3) which bears a direct relation to or are made in consequence of the official duties of the inventor.

(b) In any case where the contribution of the Government, as measured by any one or more of the criteria set forth in paragraph (a) last above, to the invention is insufficient equitably to justify a requirement of assignment to the Government of the entire right, title and interest to such invention, or in any case where the Government has insufficient interest in an invention to obtain entire right, title and interest therein (although the Government could obtain same under paragraph (a) above), the Government agency concerned, subject to the approval of the Chairman of the Government Patents Board . . . shall leave title to such invention in the employee, subject, however, to the reservation to the Government of a non-exclusive, irrevocable, royalty-free license in the invention with power to grant licenses for all governmental purposes, such reservation, in the terms thereof, to appear, where practicable, in any patent, domestic or foreign, which may issue on such invention. . . .

* * * * *

March 13, 1950, effective May 24, 1950, 64 Stat. 1263 (Reorganization Plan No. 5 of 1950)

The functions of all the officers of the National Bureau of Standards were transferred to the Secretary of Commerce, with power vested in him to authorize their performance or the performance of any of his functions by any of the officers or employees of the National Bureau of Standards.

REORGANIZATION PLAN NO. 5 OF 1950

Prepared by the President and transmitted to the Senate and the House of Representatives in Congress assembled, March 13, 1950, pursuant to the provisions of the Reorganization Act of 1949, approved June 20, 1949.

DEPARTMENT OF COMMERCE

SECTION 1. *Transfer of functions to the Secretary.*—(a) Except as otherwise provided in subsection (b) of this section, there are hereby transferred to the Secretary of Commerce all functions of all other officers of the Department of Commerce and all functions of all agencies and employees of such Department. . . .

SEC. 2. *Performance of functions of Secretary.*—The Secretary of Commerce may from time to time make such provisions as he shall deem appropriate authorizing the performance by any other officer, or by any agency or employee, of the Department of Commerce of any function of the Secretary, including any function transferred to the Secretary, including any function transferred to the Secretary by the provisions of this reorganization plan. . . .

SEC. 4. *Incidental transfers.*—The Secretary of Commerce may from time to time effect such transfers with the Department of Commerce of any of the records, property, personnel, and unexpended balances (available or to be made available) of appropriations, allocations, and other funds of such Department as he may deem necessary in order to carry out the provisions of this reorganization plan.

* * * * *

June 29, 1950, 64 Stat. 275 (Public Law 583, 81st Congress, 2d session) *Deficiency Appropriation Act, 1950.*
Beginning of the Working Capital Fund for the National Bureau of Standards.

[CHAPTER 405]

AN ACT

Making appropriations to supply deficiencies in certain appropriations for the fiscal year ending June 30, 1950, and for other purposes.

NATIONAL BUREAU OF STANDARDS WORKING CAPITAL FUND

For the establishment of a working capital fund, to be available without fiscal year limitation, for expenses necessary for the maintenance and operation of the National Bureau of Standards, including the furnishing of facilities and services to other Government agencies, not to exceed \$3,000,000. Said fund shall be established as a special deposit account and shall be reimbursed from applicable appropriations of said Bureau for

the work of said Bureau, and from funds of other Government agencies for facilities and services furnished to such agencies pursuant to law. Reimbursements so made shall include handling and related charges; reserves for depreciation of equipment and accrued leave; and building construction and alterations directly related to the work for which reimbursement is made. (64 Stat. 279)

* * * * *

July 21, 1950, 64 Stat. 369 (Public Law 617, 81st Congress, 2d session)

The basic definitions of the act of 1894 were kept but eliminated the alternative definitions specifying devices which were not correct, gave clear legal effect in the United States to a world-wide agreement on electrical units and standards which had been obtained by the National Bureau of Standards, and established in scientific terms definitions of the units of light which had never been specifically established by Federal statutes.

[CHAPTER 484]

AN ACT

To redefine the units and establish the standards of electrical and photometric measurements.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That from and after the date this Act is approved, the legal units of electrical and photometric measurement in the United States of America shall be those defined and established as provided in the following sections.

SEC. 2. The unit of electrical resistance shall be the ohm, which is equal to one thousand million units of resistance of the centimeter-gram-second system of electromagnetic units.

SEC. 3. The unit of electric current shall be the ampere, which is one-tenth of the unit of current of the centimeter-gram-second system of electromagnetic units.

SEC. 4. The unit of electromotive force and of electric potential shall be the volt, which is the electromotive force that, steadily applied to a conductor whose resistance is one ohm, will produce a current of one ampere.

SEC. 5. The unit of electric quantity shall be the coulomb, which is the quantity of electricity transferred by a current of one ampere in one second.

SEC. 6. The unit of electrical capacitance shall be the farad, which is the capacitance of a capacitor that is charged to a potential of one volt by one coulomb of electricity.

SEC. 7. The unit of electrical inductance shall be the henry, which is the inductance in a circuit such that an electromotive force of one volt is induced in the circuit by variation of an inducing current at the rate of one ampere per second.

SEC. 8. The unit of power shall be the watt, which is equal to ten million units of power in the centimeter-gram-second system, and which is the power required to cause an unvarying current of one ampere to flow between points differing in potential by one volt.

SEC. 9. The units of energy shall be (a) the joule, which is equivalent to the energy supplied by a power of one watt operating for one second, and (b) the kilowatt-hour, which is equivalent to the energy supplied by a power of one thousand watts operating for one hour.

SEC. 10. The unit of intensity of light shall be the candle, which is one-sixtieth of the intensity of one square centimeter of a perfect radiator, known as a "black body", when operated at the temperature of freezing platinum.

SEC. 11. The unit of flux of light shall be the lumen, which is the flux in a unit of solid angle from a source of which the intensity is one candle.

SEC. 12. It shall be the duty of the Secretary of Commerce to establish the values of the primary electric and photometric units in absolute measure, and the legal values for these units shall be those represented by, or derived from, national reference standards maintained by the Department of Commerce.

SEC. 13. The Act of July 12, 1894 (Public Law Numbered 105, Fifty-third Congress), entitled "An Act to define and establish the units of electrical measure", is hereby repealed.

Approved July 21, 1950.

* * * * *

July 22, 1950, 64 Stat. 371 (Public Law 619, 81 Congress, 2d session)

First major restatement of Bureau functions since 1901. The Act rewrote section 2 in its entirety and expanded its provisions to cover the standards and measurements functions and activities of the Department of Commerce.

[CHAPTER 486]

AN ACT

To amend section 2 of the Act of March 3, 1901 (31 Stat. 1449), to provide basic authority for the performance of certain functions and activities of the Department of Commerce, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section 2 of the Act of March 3, 1901 (31 Stat. 1449), as amended, be, and the same hereby is, further amended so as to read in full as follows:

"SEC. 2. The Secretary of Commerce (hereinafter referred to as the 'Secretary') is authorized to undertake the following functions:

"(a) The custody, maintenance, and development of the national standards of measurement, and the provision of means and methods for making measurements consistent with those standards, including the comparison of standards used in scientific investigations, engineering, manufacturing, commerce, and educational institutions with the standards adopted or recognized by the Government.

"(b) The determination of physical constants and properties of materials when such data are of great importance to scientific or manufacturing interests and are not to be obtained of sufficient accuracy elsewhere.

"(c) 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.

"(d) Cooperation with other governmental agencies on scientific and technical problems.

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

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

"In carrying out the functions enumerated in the section, the Secretary is authorized to undertake the following activities and similar ones for which need may arise in the operations of Government agencies, scientific institutions, and industrial enterprises:

"(1) the construction of physical standards;

"(2) the testing, calibration, and certification of standards and standard measuring apparatus;

"(3) the study and improvement of instruments and methods of measurements;

"(4) the investigation and testing of railroad track scales, elevator scales, and other scales used in weighing commodities for interstate shipment;

"(5) cooperation with the States in securing uniformity in weights and measures laws and methods of inspection;

"(6) the preparation and distribution of standard samples such as those used in checking chemical analyses, temperature, color, viscosity, heat of combustion, and other basic properties of materials; also the preparation and sale or other distribution of standard instruments, apparatus and materials for calibration of measuring equipment;

"(7) the development of methods of chemical analysis and synthesis of materials, and the investigation of the properties of rare substances;

"(8) the study of methods of producing and of measuring high and low temperatures; and the behavior of materials at high and at low temperatures;

"(9) the investigation of radiation, radioactive substances, and X-rays, their uses, and means of protection of persons from their harmful effects;

"(10) the study of the atomic and molecular structure of the chemical elements, with particular reference to the characteristics of the spectra emitted, the use of spectral observations in determining chemical composition of materials, and the relation of molecular structure to the practical usefulness of materials;

"(11) the broadcasting of radio signals for standard frequency;

"(12) the investigation of the conditions which affect the transmission of radio waves from their source to a receiver;

"(13) the compilation and distribution of information on such transmission of radio waves as a basis for choice of frequencies to be used in radio operation;

"(14) the study of new technical processes and methods of fabrication of materials in which the Government has a special interest; also the study of methods of measurement and technical processes used in the manufacture of optical glass and pottery, brick, tile, terra cotta, and other clay products;

"(15) the determination of properties of building materials and structural element, and encouragement of their standardization and most effective use, including investigation of fire-resisting properties of building materials and conditions under which they may be most efficiently used, and the standardization of types of appliances for fire prevention;

"(16) metallurgical research, including study of alloy steels and light metal alloys; investigation of foundry practice, casting, rolling, and forging; prevention of corrosion of metals and alloys; behavior of bearing metals; and development of standards for metals and sands;

"(17) the operation of a laboratory of applied mathematics;

"(18) the prosecution of such research in engineering, mathematics, and the physical sciences as may be necessary to obtain basic data pertinent to the functions specified herein; and

"(19) the compilation and publication of general scientific and technical data resulting from the performance of the functions specified herein or from other sources when such data are of importance to scientific or manufacturing interests or to the general public, and are not available elsewhere, including demonstrations of the results of the Bureau's work by exhibits or otherwise as may be deemed most effective."

SEC. 2. The Act of March 3, 1901 (31 Stat. 1449), as amended, be, and the same hereby is, further amended by inserting at the end thereof the following sections:

"SEC. 11. For all services rendered for other Government agencies by the Secretary in the performance of functions specified herein, the Department of Commerce may be reimbursed in accordance with section 601 of the Economy Act of June 30, 1932.

"SEC. 12. In the absence of specific agreement to the contrary, equipment purchased by the Department of Commerce from transferred or advanced funds in order to carry out an investigation authorized herein for another Government agency shall become the property of the Department of Commerce for use in subsequent investigations.

"SEC. 13. (a) The Secretary of Commerce is authorized to accept and utilize gifts or bequests of real or personal property for the purpose of aiding and facilitating the work authorized herein.

"(b) For the purpose of Federal income, estate, and gift taxes, gifts and bequests accepted by the Secretary of Commerce under the authority of the Act shall be deemed to be gifts and bequests to or for the use of the United States."

Approved July 22, 1950

* * * * *

September 9, 1950, 64 Stat. 823 (Public Law 776—81st Congress, 2d session)

The Technical Documentation Center in the Department of Commerce was transferred to the National Bureau of Standards in 1964. Reorganized and renamed the Clearinghouse for Federal Scientific and Technical Information, it provided inexpensive unclassified information about government-sponsored research and development in national programs.

[CHAPTER 936]

AN ACT

To provide for the dissemination of technological, scientific, and engineering information to American business and industry, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the purpose of this Act is to make the results of technological research and development more readily available to industry and business, and to the general public, by clarifying and defining the functions and responsibilities of the Department of Commerce as a central clearinghouse for technical information which is useful to American industry and business.

CLEARINGHOUSE FOR TECHNICAL INFORMATION

SEC. 2. The Secretary of Commerce (hereinafter referred to as the "Secretary") is hereby directed to establish and maintain within the Department of Commerce a clearinghouse for the collection and dissemination of scientific, technical, and engineering information, and to this end to take such steps as he may deem necessary and desirable—

(a) To search for, collect, classify, coordinate, integrate, record, and catalog such information from whatever sources, foreign and domestic, that may be available;

(b) To make such information available to industry and business, to State and local governments, to other agencies of the Federal Government, and to the general public, through the preparation of abstracts, digests, translations, bibliographies, indexes, and microfilm and other reproductions, for distribution either directly or by utilization of business, trade, technical, and scientific publications and services;

(c) To effect, within the limits of his authority as now or hereafter defined by law, and with the consent of competent authority, the removal of restrictions on the dissemination of scientific and technical data in cases where consideration of national security permit the release of such data for the benefit of industry and business.

* * * * *

June 30, 1953, 67 Stat. 111 (Public Law 88—83d Congress, 1st session) *Flammable Fabrics Act*.

Mandatory flammability standards were set for wearing apparel and fabrics in interstate commerce. The standards relied on the voluntary commercial standards adopted by industry working with the National Bureau of Standards over several years to produce these standards for the industry.

Public Law 88

CHAPTER 164

AN ACT

To prohibit the introduction or movement in interstate commerce of articles of wearing apparel and fabrics which are so highly flammable as to be dangerous when worn by individuals, and for other purposes.

STANDARD OF FLAMMABILITY

SEC. 4. (a) Any fabric or article of wearing apparel shall be deemed so highly flammable within the meaning of section 3 of this Act as to be dangerous when worn by individuals if such fabric or any uncovered or exposed part of such article of wearing apparel exhibits rapid and intense burning when tested under the conditions and in the manner prescribed in the Commercial Standard promulgated by the Secretary of Commerce effective January 30, 1953, and identified as "Flammability of Clothing Textiles, Commercial Standard 191-53", or exhibits a rate of burning in excess of that specified in paragraph 3.11 of the Commercial Standard promulgated by the Secretary of Commerce effective May 22, 1953, and identified as "General Purpose Vinyl Plastic Film, Commercial Standard 192-53". For the purposes of this Act, such Commercial Standard 191-53 shall apply with respect to the hats, gloves, and footwear.

(b) If at any time the Secretary of Commerce finds that the Commercial Standards referred to in subsection (a) of this section are inadequate for the protection of the public interest, he shall submit to the Congress a report setting forth his findings together with such proposals for legislation as he deems appropriate. (67 Stat. 112)

* * * * *

June 20, 1956, 70 Stat. 314 (Public Law 604—84th Congress, 2d session)

Formal approval for the construction of new Bureau laboratories at Gaithersburg.

Public Law 604

CHAPTER 415

AN ACT

Making appropriations for the Department of Commerce and related agencies for the fiscal year ending June 30, 1957, and for other purposes.

NATIONAL BUREAU OF STANDARDS

Construction of facilities: For acquisition of necessary land and to initiate the design of the facilities to be constructed thereon for the National Bureau of Standards outside of the District of Columbia to remain available until expended, \$930,000, to be transferred to the General Services Administration. (70 Stat. 321)

* * * * *

August 2, 1956, 70 Stat. 953 (Public Law 930—84th Congress, 2d session)

The Secretary of Commerce was directed to prescribe commercial standards for a safety device which would enable the refrigerator door to be opened from the inside. The National Bureau of Standards, with the cooperation of the refrigerator manufacturing industry, engaged in experiments to determine the basic criteria of reasonable safety which manufacturers could incorporate in the design of their refrigerators for preventing the suffocation of children entrapped in refrigerators.

Public Law 930

CHAPTER 890

AN ACT

To require certain safety devices on household refrigerators shipped in interstate commerce.

SEC. 3. The Secretary of Commerce shall prescribe and publish in the Federal Register commercial standards for devices which, when used in or on household refrigerators, will enable the doors thereof to be opened easily from the inside; and the standards first established under this section shall be so prescribed and published not later than one year after the date of the enactment of this Act.

* * * * *

August 3, 1956, 70 Stat. 959 (Public Law 940, 84th Congress, 2d session)

The Organic Act of the National Bureau of Standards was amended by Section 7 of this law which authorized the Bureau to retain fees received from the public for services performed, and allowed the Bureau to charge fixed prices for services performed for other agencies. Section 12 (a) incorporated authority for use of the Working Capital Fund in the Organic Act, and permitted changes in the accounting treatment under the fund.

Public Law 940

AN ACT

To amend the Act of March 3, 1901 (31 Stat. 1449) as amended, to incorporate in the Organic Act of the National Bureau of Standards the authority to use the Working Capital Fund, and to permit certain improvements in fiscal practices.

“SEC. 7. The Secretary shall charge for services performed under the authority of section 3 of this Act, except in cases where he determines that the interest of the Government would be best served by waiving the charge. Such charges may be based upon fixed prices or cost. The appropriation or fund bearing the cost of the services may be reimbursed, or the Secretary may require advance payment subject to such adjustment on completion of the work as may be agreed upon.

“SEC. 12. (a) The National Bureau of Standards is authorized to utilize in the performance of its functions the Working Capital Fund established by the Act of June 29, 1950 (64 Stat. 275), and additional amounts as from time to time may be required for the purposes of said fund are hereby authorized to be appropriated.

* * * * *

November 4, 1963, 77 Stat. 299 (Public Law 88-165, 88th Congress, 1st session)

Public Law 88-165

AN ACT

To amend the Act redefining the units and establishing the standards of electrical and photometric measurements to provide that the candela shall be the unit of luminous intensity.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act entitled "An Act to redefine the units and establish the standards of electrical and photometric measurement" (Act of July 21, 1950; (64 Stat. 370) is amended by deleting the word "candle" wherever it appears and inserting in lieu thereof the word "candela".

Approved November 4, 1963.

* * * * *

October 30, 1965, 79 Stat. 1127 (Public Law 89-306—89th Congress, 1st session) "Brooks Act"

As the technical representative of the Department of Commerce, the National Bureau of Standards established the Center for Computer Sciences and Technology to improve the effectiveness and efficiency of the government's use of computers.

Public Law 89-306

AN ACT

To provide for the economic and efficient purchase, lease, maintenance, operation, and utilization of automatic data processing equipment by Federal departments and agencies.

"AUTOMATIC DATA PROCESSING EQUIPMENT

"(f) The Secretary of Commerce is authorized (1) to provide agencies, and the Administrator of General Services in the exercise of the authority delegated in this section, with scientific and technological advisory services relating to automatic data processing and related systems, and (2) to make appropriate recommendations to the President relating to the establishment of uniform Federal automatic data processing standards. The Secretary of Commerce is authorized to undertake the necessary research in the sciences and technologies of automatic data processing computer and related systems, as may be required under provisions of this subsection. (70 Stat. 1128)

* * * * *

September 9, 1966, 80 Stat. 718 (Public Law 89-563—89th Congress, 2d session) *National Traffic and Motor Vehicle Safety Act of 1966.*

The Secretary of Commerce was to use the facilities of the National Bureau of Standards to initiate and conduct research, testing, development, and evaluation in cooperation with other Federal departments and agencies. The brake fluid and seat belt legislation passed in 1962 and 1963 was repealed by this broader law.

Public Law 89-563

AN ACT

To provide for a coordinated national safety program and establishment of safety standards for motor vehicles in interstate commerce to reduce accidents involving motor vehicles and to reduce the death and injuries occurring in such accidents.

SEC. 103. (f) In prescribing standards under this section, the Secretary shall—

(1) consider relevant available motor vehicle safety data, including the results of research, development, testing and evaluation activities conducted pursuant to the Act; . . . (80 Stat. 719)

* * * * *

October 15, 1966, 80 Stat. 931 (Public Law 89-670—89th Congress, 2d session) *Department of Transportation Act*.

The functions, powers, and duties given to the Secretary of Commerce under the *National Traffic and Motor Vehicle Safety Act of 1966* were transferred to the Secretary of Transportation. The Office of Vehicle Systems Research was formed at the National Bureau of Standards in March 1967.

Public Law 89-670

AN ACT

To establish a Department of Transportation and for other purposes.

TRANSFERS TO DEPARTMENT

SEC. 6. (a) There are hereby transferred to and vested in the Secretary all functions, powers, and duties of the Secretary of Commerce and other offices and officers of the Department of Commerce under—

(6) the following laws relating generally to traffic and highway safety:

(A) The National Traffic and Motor Vehicle Safety Act of 1966 (80 Stat. 718).

(B) The Highway Safety Act of 1966 (80 Stat. 731).

* * * * *

November 3, 1966, 80 Stat. 1296 (Public Law 89-755—89th Congress, 2d session) *Fair Packaging and Labeling Act*.

The National Bureau of Standards was given the responsibility to work with industry to reduce the number of package sizes, and to make labels more informative.

Public Law 89-755

AN ACT

To regulate interstate and foreign commerce by preventing the use of unfair or deceptive methods of packaging or labeling of certain consumer commodities distributed in such commerce, and for other purposes.

SEC. 5. (d) Whenever the Secretary of Commerce determines that there is undue proliferation of the weights, measures, or quantities in which any consumer commodity or reasonably comparable consumer commodities are being distributed in packages for sale at retail and such undue proliferation impairs the reasonable ability of consumers to make value comparisons with respect to such consumer commodity or commodities, he shall request manufacturers, packers, and distributors of the commodity or commodities to participate in the development of a voluntary product standard for such commodity or commodities under the procedures for the development of voluntary products standards established by the Secretary pursuant to section 2 of the Act of March 3, 1901 (31 Stat. 1449, as amended; 15 U.S.C. 272). Such procedures shall provide adequate manufacturer, packer, distributor, and consumer representation.

(e) If (1) after one year after the date on which the Secretary of Commerce first makes the request of manufacturers, packers, and distributors to participate in the development of a voluntary product standard as provided in subsection (d) of this section, he determines that such a standard will not be published pursuant to the provisions of such subsection (d), or (2) if such a standard is published and the Secretary of Commerce determines that it has not been observed, he shall promptly report such determination to the Congress with a statement of the efforts that have been made under the voluntary standards program and his recommendation as to whether Congress should enact legislation providing regulatory authority to deal with the situation in question. (80 Stat. 1299)

REPORTS TO THE CONGRESS

SEC. 8. Each officer or agency required or authorized by the Act to promulgate regulations for the packaging or labeling of any consumer commodity, or to participate in the development of voluntary product standards with respect to any consumer commodity under procedures referred to in section 5 (d) of this Act, shall transmit to the Congress in January of each year a report containing a full and complete description of the activities of that officer or agency for the administration and enforcement of this Act during the preceding fiscal year.

COOPERATION WITH STATE AUTHORITIES

SEC. 9. (a) A copy of each regulation promulgated under this Act shall be transmitted promptly to the Secretary of Commerce, who shall (1) transmit copies thereof to all appropriate State officers and agencies, and (2) furnish to such State officers and agencies information and assistance to promote to the greatest practicable extent uniformity in State and Federal regulation of the labeling of consumer commodities.

(b) Nothing contained in this section shall be construed to impair or otherwise interfere with any program carried into effect by the Secretary of Health, Education, and Welfare under other provisions of law in cooperation with State government or agencies, instrumentalities, or political subdivisions thereof. (80 Stat. 1300)

* * * * *

December 14, 1967, 81 Stat. 568 (Public Law 90-189—90th Congress, 1st session)

The Flammable Fabrics Act amendments provided a mechanism for continued evaluation and revision to keep the requirements up-to-date and extended coverage to flammable interior furnishings. The Secretary of Commerce was given the responsibility of developing mandatory flammability standards when necessary. NBS had the responsibility of providing the necessary technical information.

Public Law 90-189

AN ACT

To amend the Flammable Fabrics Act to increase the protection afforded consumers against injurious flammable fabrics.

SEC. 3. Section 4 of the Flammable Fabrics Act is amended to read as follows:

"REGULATION OF FLAMMABLE FABRICS

"SEC. 4. (a) Whenever the Secretary of Commerce finds on the basis of the investigations or research conducted pursuant to section 14 of this Act that a new or amended flammability standard or other regulation, including labeling, for a fabric, related material, or product may be needed to protect the public against unreasonable risk of the occurrence of fire leading to death or personal injury, or significant property damage, he shall institute proceedings for the determination of an appropriate flammability standard (including conditions and manner of testing) or other regulation or amendment thereto for such fabric, related material, or product.

"(b) Each standard, regulation, or amendment thereto promulgated pursuant to this section shall be based on findings that such standard, regulation, or amendment thereto is needed to adequately protect the public against unreasonable risk of the occurrence of fire leading to death, injury, or significant property damage, is reasonable, technologically practicable, and appropriate, is limited to such fabrics, related materials, or products which have been determined to present such unreasonable risks, and shall be stated in objective terms. Each such standard, regulation, or amendment thereto, shall become effective twelve months from the date on which such standard, regulation, or amendment is promulgated, unless the Secretary of Commerce finds for good cause shown that an earlier or later effective date is in the public interest and publishes the reason for such finding. Each such standard or regulation or amendment thereto shall exempt fabrics, related materials, or products in inventory or with the trade as of the date on which the standard, regulation, or amendment thereto, becomes effective except that, if the Secretary finds that any such fabric, related material, or product is so highly flammable as to be dangerous when used by consumers for the purpose for which it is intended, he may under such conditions as the Secretary may prescribe, withdraw, or limit the exemption for such fabric, related material, or product. (81 Stat. 569)

* * * * *

March 1, 1968, 82 Stat. 34 (Public Law 90-259—90th Congress, 2d session) *Fire Research and Safety Act of 1968*.

The Fire Research and Safety Office was created to carry out the activities of the program.

Public Law 90-259

AN ACT

To amend the Organic Act of the National Bureau of Standards to authorize a fire research and safety program, and for other purposes.

Title I—FIRE RESEARCH AND SAFETY PROGRAM

DECLARATION OF POLICY

SEC. 101. The Congress finds that a comprehensive fire research and safety program is needed in this country to provide more effective measures of protection against the hazards of death, injury, and damage to property. The Congress finds that it is desirable and necessary for the Federal Government, in carrying out the provisions of this title, to cooperate with and assist public and private agencies. The Congress declares that the purpose of this title is to amend the Act of March 3, 1901, as amended, to provide a national fire research and safety program including the gathering of comprehensive fire data; a comprehensive fire research program; fire safety education and training programs; and demonstrations of new approaches and improvements in fire prevention and control, and reduction of death, personal injury, and property damage. Additionally, it is the sense of Congress that the Secretary should establish a fire research and safety center for administering this title and carrying out its purposes, including appropriate fire safety liaison and coordination.

AUTHORIZATION OF PROGRAM

SEC. 102. The Act entitled "An Act to establish the National Bureau of Standards", approved March 3, 1901, as amended (15 U.S.C. 271-278e, is further amended by adding the following sections:

"SEC. 16. The Secretary of Commerce (hereinafter referred to as the 'Secretary') is authorized to—

"(a) Conduct directly or through contracts or grants—

"(1) investigations of fires to determine their causes, frequency of occurrence, severity, and other pertinent factors;

"(2) research into the causes and nature of fires, and the development of improved methods and techniques for fire prevention, fire control, and reduction of death, personal injury, and property damage;

"(3) educational programs to—

"(A) inform the public of fire hazards and fire safety techniques, and

"(B) encourage avoidance of such hazards and use of such techniques;

"(4) fire information reference services, including the collection, analysis, and dissemination of data, research results, and other information, derived from this program or from other sources and related to fire protection, fire control, and reduction of death, personal injury, and property damage;

"(5) educational and training programs to improve, among other things—

"(A) the efficiency, operation, and organization of fire services, and

"(B) the capability of controlling unusual fire-related hazards and fire disasters; and

"(6) projects demonstrating—

"(A) improved or experimental programs of fire prevention, fire control, and reduction of death, personal injury, and property damage,

"(B) application of fire safety principles in construction, or

"(C) improvement of the efficiency, operation, or organization of the fire services.

"(b) Support by contracts or grants the development, for use by educational and other nonprofit institutions, of—

"(1) fire safety and fire protection engineering or science curriculums; and

"(2) fire safety courses, seminars, or other instructional materials and aids for the above curriculums or other appropriate curriculums or courses of instruction.

"SEC. 17. With respect to the functions authorized by section 16 of this Act—

"(a) Grants may be made only to States and local governments, other non-Federal public agencies, and nonprofit institutions. Such a grant may be up to 100 per centum of the total cost of the project for which such grant is made. The Secretary shall require, whenever feasible, as a condition of approval of a grant, that the recipient contribute money, facilities, or services to carry out the purpose for which the grant is sought. For the purposes of this section, 'State' means any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, the Canal Zone, American Samoa, and the Trust Territory of the Pacific Islands; and 'public agencies' includes combinations or groups of States or local governments.

"(b) The Secretary may arrange with and reimburse the heads of other Federal departments and agencies for the performance of any such functions, and, as necessary or appropriate, delegate any of his powers under this section or section 16 of this Act with respect to any part thereof, and authorize the redelegation of such powers.

"(c) The Secretary may perform such functions without regard to section 3648 of the Revised Statutes (31 U.S.C. 529).

"(d) The Secretary is authorized to request any Federal department or agency to supply such statistics, data, program reports, and other materials as he deems necessary to carry out such functions. Each such department or agency is authorized to cooperate with the Secretary and, to the extent permitted by law, to furnish such materials to the Secretary. The Secretary and the heads of other departments and agencies engaged in administering programs related to fire safety shall, to the maximum extent practicable, cooperate and consult in order to insure fully coordinated efforts.

"(e) The Secretary is authorized to establish such policies, standards, criteria, and procedures and to prescribe such rules and regulations as he may deem necessary or appropriate to the administration of such functions or this section, including rules and regulations which—

"(1) provide that a grantee will from time to time, but not less often than annually, submit a report evaluating accomplishments of activities funded under section 16, and

"(2) provide for fiscal control, sound accounting procedures, and periodic reports to the Secretary regarding the application of funds paid under section 16."

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July 11, 1968, 82 Stat. 339 (Public Law 90-396—90th Congress, 2d session) *Standard Reference Data Act*.

This Act authorized the National Bureau of Standards to coordinate a National system for providing scientific data to science and industry, thereby strengthening and increasing the effectiveness of the Bureau's standard reference data operation.

Public Law 90-396

AN ACT

To provide for the collection, compilation, critical evaluation, publication, and sale of standard reference data.

DECLARATION OF POLICY

SECTION 1. The Congress hereby finds and declares that reliable standardized scientific and technical reference data are of vital importance to the progress of the Nation's science and technology. It is therefore the policy of the congress to make critically evaluated reference data readily available to scientists, engineers, and the general public. It is the purpose of this Act to strengthen and enhance this policy.

SEC. 2. For the purposes of this Act—

(a) The term "standard reference data" means quantitative information, related to a measurable physical or chemical property of a substance or system of substances of known composition and structure, which is critically evaluated as to its reliability under section 3 of this Act.

(b) The term "Secretary" means the Secretary of Commerce.

SEC. 3. The Secretary is authorized and directed to provide or arrange for the collection, compilation, critical evaluation, publication, and dissemination of standard reference data. In carrying out this program, the Secretary shall, to the maximum extent practicable, utilize the reference data services and facilities of other agencies and instrumentalities of the Federal Government and of State and local governments, persons, firms, institutions, and associations, with their consent and in such a manner as to avoid duplication of those services and facilities. All agencies and instrumentalities of the Federal Government are encouraged to exercise their duties and functions in such manner as will assist in carrying out the purpose of this Act. This section shall be deemed complementary to existing authority, and nothing herein is intended to repeal, supersede, or diminish existing authority or responsibility of any agency or instrumentality of the Federal Government.

SEC. 4. To provide for more effective integration and coordination of standard reference data activities, the Secretary, in consultation with other interested Federal agencies, shall prescribe and publish in the Federal Register such standards, criteria, and procedures for the preparation and publication of standard reference data as may be necessary to carry out the provisions of this Act.

SEC. 5. Standard reference data conforming to standards established by the Secretary may be made available and sold by the Secretary or by a person or agency designated by him. To the extent practicable and appropriate, the prices established for such data may reflect the cost of collection, compilation, evaluation, publication, and dissemination of the data, including administrative expenses; and the amounts received shall be subject to the Act of March 3, 1901, as amended (15 U.S.C. 271-278e).

SEC. 6. (a) Notwithstanding the limitations contained in section 9 of title 17 of the United States Code, the Secretary may secure copyright and renewal thereof on behalf of the United States as author or proprietor in all or any part of any standard reference data which he prepares or makes available under this Act, and may authorize the reproduction and publication thereof by others.

(b) The publication or republication by the Government under this Act, either separately or in a public document, of any material in which copyright is subsisting shall not be taken to cause any abridgment or annulment of the copyright or to authorize any use or appropriation of such material without the consent of the copyright proprietor.

SEC. 7. There are authorized to be appropriated to carry out this Act, \$1.86 million for the fiscal year ending June 30, 1969. Notwithstanding the provisions of any other law, no appropriations for any fiscal year may be made for the purpose of this Act after fiscal year 1969 unless previously authorized by the Congress.

SEC. 8. This Act may be cited as the "Standard Reference Data Act."

Approved July 11, 1968.

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August 9, 1968, 82 Stat. 693 (Public Law 90-472—90th Congress, 2d session) "Metric System Study".

The Act authorized a study of the effect upon the United States of increased use of the Metric System throughout the world and development of recommendations for an action program to deal with the problem.

Public Law 90-472

AN ACT

To authorize the Secretary of Commerce to make a study to determine the advantages and disadvantages of increased use of the metric system in the United States.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of Commerce is hereby authorized to conduct a program of investigation, research, and survey to determine the impact of increasing worldwide use of the metric system on the United States; to appraise the desirability and practicability of increasing the use of metric weights and measures in the United States; to study the feasibility of retaining and promoting by international use of dimensional and other engineering standards based on the customary measurement units of the United States; and to evaluate the costs and benefits of alternative courses of action which may be feasible for the United States.

SEC. 2. In carrying out the program described in the first section of this Act, the Secretary, among other things, shall—

(1) investigate and appraise the advantages and disadvantages to the United States in international trade and commerce, and in military and other areas of international relations, of the increased use of an international standardized system of weights and measures;

(2) appraise economic and military advantages and disadvantages of the increased use of the metric system in the United States or of the increased use of such system in specific fields and the impact of such increased use upon those affected;

(3) conduct extensive comparative studies of the systems of weights and measures used in educational, engineering, manufacturing, commercial, public, and scientific areas, and the relative advantages and disadvantages, and degree of standardization of each in its respective field;

(4) investigate and appraise the possible practical difficulties which might be encountered in accomplishing the increased use of the metric system of weights and measures generally or in specific fields or areas in the United States;

(5) permit appropriate participation by representatives of United States industry, science, engineering, and labor, and their associations, in the planning and conduct of the program authorized by the first section of this Act, and in the evaluation of the information secured under such program; and

(6) consult and cooperate with other government agencies, Federal, State, and local, and, to the extent practicable, with foreign governments and international organizations.

SEC. 3. In conducting the studies and developing the recommendations required in this Act, the Secretary shall give full consideration to the advantages, disadvantages, and problems associated with possible changes in either the system of measurement units or the related dimensional and engineering standards currently used in the United States, and specifically shall—

(1) investigate the extent to which substantial changes in the size, shape, and design of important industrial products would be necessary to realize the benefits which might result from general use of metric units of measurement in the United States;

(2) investigate the extent to which uniform and accepted engineering standards based on the metric system of measurement units are in use in each of the fields under study and compare the extent to such use and the utility and degree of sophistication of such metric standards with those in use in the United States; and

(3) recommend specific means of meeting the practical difficulties and costs in those areas of the economy where any recommended change in the system of measurement units and related dimensional and engineering standards would raise significant practical difficulties or entail significant costs of conversion.

SEC. 4. The Secretary shall submit to the Congress such interim reports as he deems desirable, and within three years after the date of the enactment of this Act, a full and complete report of the findings made under the program authorized by this Act, together with such recommendations as he considers to be appropriate and in the best interests of the United States.

SEC. 5. From funds previously appropriated to the Department of Commerce, the Secretary is authorized to utilize such appropriated sums as are necessary, but not to exceed \$500,000, to carry out the purposes of this Act for the first year of the program.

SEC. 6. This Act shall expire thirty days after the submission of the final report pursuant to section 3. Approved August 9, 1968.

* * * * *

October 27, 1972, 86 Stat. 1207 (Public Law 92-573—92d Congress, 2d session) *Consumer Product Safety Act*.

This Act established the Consumer Product Safety Commission and transferred the regulatory functions of the Secretary of Commerce under the Flammable Fabrics Act and the "Refrigerator Safety Devices Act" to the Commission. The National Bureau of Standards provided technical support to the CPSC.

AN ACT

To protect consumers against unreasonable risk of injury from hazardous products, and for other purposes.

COOPERATION WITH STATES AND WITH OTHER FEDERAL AGENCIES

SEC. 29. (d) The Commission shall, to the maximum extent practicable, utilize the resources and facilities of the National Bureau of Standards, on a reimbursable basis, to perform research and analyses related to risks of injury associated with consumer products (including fire and flammability risks), to develop test methods, to conduct studies and investigations, and to provide technical advice and assistance in connection with the functions of the Commission.

TRANSFERS OF FUNCTIONS

SEC. 30. (a) The functions of the Secretary of Health, Education, and Welfare under the Federal Hazardous Substances Act (15 U.S.C. 1261 et seq.) and the Poison Prevention Packaging Act of 1970 are transferred to the Commission. The functions of the Administrator of the Environmental Protection Agency and of the Secretary of Health, Education, and Welfare under the Acts amended by subsections (b) through (f) of section 7 of the Poison Prevention Packaging Act of 1970, to the extent such functions relate to the administration and enforcement of the Poison Prevention Packaging Act of 1970, are transferred to the Commission.

(b) The functions of the Secretary of Health, Education, and Welfare, the Secretary of Commerce, and the Federal Trade Commission under the Flammable Fabrics Act (15 U.S.C. 1191 et seq.) are transferred to the Commission. The functions of the Federal Trade Commission under the Federal Trade Commission Act, to the extent such functions relate to the administration and enforcement of the Flammable Fabrics Act, are transferred to the Commission.

(c) The functions of the Secretary of Commerce and the Federal Trade Commission under the Act of August 2, 1956 (15 U.S.C. 1211) are transferred to the Commission.

(d) A risk of injury which is associated with consumer products and which could be eliminated or reduced to a sufficient extent by action taken under the Federal Hazardous Substances Act, the Poison Prevention Packaging Act of 1970, or the Flammable Fabrics Act may be regulated by the commission only in accordance with the provisions of those Acts.

(e) (1) (A) All personnel, property, records, obligations, and commitments, which are used primarily with respect to any function transferred under the provisions of subsections (a), (b) and (c) of this section shall be transferred to the Commission, except those associated with fire and flammability research in the National Bureau of Standards. The transfer of personnel pursuant to this paragraph shall be without reduction in classification or compensation for one year after such transfer, except that the Chairman of the Commission shall have full authority to assign personnel during such one-year period in order to efficiently carry out functions transferred to the Commission under this section. (86 Stat. 1231)

October 27, 1972, 86 Stat. 1234 (Public Law 92-574—92d Congress, 2d session) *Noise Control Act of 1972*.

The Administrator of the Environmental Protection Agency was authorized to conduct research on the effects, measurement, and control of noise.

Public Law 92-574

AN ACT

To control the emission of noise detrimental to the human environment, and for other purposes.

SEC. 14 (1) (B) development of improved methods and standards for measurement and monitoring of noise, in cooperation with the National Bureau of Standards, Department of Commerce; (86 Stat. 1245)

September 3, 1974, 88 Stat. 1069 (Public Law 93-409—93d Congress, 2d session) *Solar Heating and Cooling Demonstration Act of 1974*.

The National Bureau of Standards was directed to determine what constituted an effective solar heating and cooling system.

Public Law 93-409

AN ACT

To provide for the early development and commercial demonstration of the technology of solar heating and combined solar heating and cooling systems.

SEC. 2. (b) It is therefore declared to be the policy of the United States and the purpose of this Act to provide for the demonstration within a three-year period of the practical use of solar heating technology, and to provide for the development and demonstration within a five-year period of the practical use of combined heating and cooling technology. (88 stat. 1069)

DEFINITIONS

SEC. 3. For purposes of this Act—

(1) the term "solar heating", with respect to any building, means the use of solar energy to meet such portion of the total heating needs of such building (including hot water), or such portion of the needs of such building for hot water (where its remaining heating needs are met by other methods), as may be required under performance criteria prescribed by the Secretary of Housing and Urban Development utilizing the services of the Director of the National Bureau of Standards, and in consultation with the Director of the National Science Foundation, and the Administrator of the National Aeronautics and Space Administration;

(2) the terms "solar heating and cooling" and "combined solar heating and cooling", with respect to any building, mean the use of solar energy to provide both such portion of the total heating needs of such building (including hot water) and such portion of the total cooling needs of such building, or such portion of the needs of such building for hot water (where its remaining heating needs are met by other methods) and such portion of the total cooling needs of a building, as may be required under performance criteria prescribed by the Secretary of Housing and Urban Development utilizing the services of the Director of the National Bureau of Standards, and in consultation with the Director of the National Science Foundation, and the Administrator of the National Aeronautics and Space Administration, and such term includes cooling by means of nocturnal heat radiation, by evaporation, or by other methods of meeting peakload energy requirements at nonpeakload times; (88 Stat. 1070)

DEVELOPMENT AND DEMONSTRATION OF SOLAR HEATING SYSTEMS TO BE USED IN RESIDENTIAL DWELLINGS

SEC. 5. (a) The Administrator and the Secretary shall promptly initiate and carry out a program, as provided in this section, for the development and demonstration of solar heating systems (including collectors, controls, and thermal storage) for use in residential dwellings.

(b) (1) Within 120 days after the date of the enactment of this Act, the Secretary, utilizing the services of the Director of the National Bureau of Standards and in consultation with the Administrator and the Director, shall determine, prescribe, and publish—

(A) interim performance criteria for solar heating components and systems to be used in residential dwellings, and

(B) interim performance criteria (relating to suitability for solar heating) for such dwellings themselves, taking into account in each instance climatic variations existing between different geographic areas.

(2) As soon as possible after the publication of the performance criteria prescribed under paragraph (1), the Secretary, in consultation with the Director of the National Bureau of Standards and the Administrator, will select on the basis of open competition a number of designs for various types of residential dwellings suitable for and adapted to the installation of solar heating systems meeting the performance criteria prescribed under paragraph (1) (A). (88 Stat. 1070)

DEVELOPMENT AND DEMONSTRATION OF COMBINED SOLAR HEATING AND COOLING SYSTEMS
TO BE USED IN RESIDENTIAL DWELLINGS

SEC. 6. (a) The Administrator and the Secretary shall promptly initiate and carry out a program, as provided in this section, for the development and demonstration of combined solar heating and cooling systems (including collectors, controls, and thermal storage) for use in residential dwellings.

(b) (1) As soon as possible after the date of the enactment of this Act, the Secretary, utilizing the services of the Director of the National Bureau of Standards and in consultation with the Administrator and the Director, shall determine, prescribe, and publish—

(A) interim performance criteria for combined solar heating and cooling components and systems to be used in residential dwellings, and

(B) interim performance criteria (relating to suitability for solar heating and cooling) for such dwellings themselves, taking into account in each instance climatic variations existing between different geographic areas.

(2) As soon as possible after the publication of the performance criteria prescribed under paragraph (1) (and if possible before the completion of the research and development provided for in subsection (c)), the Secretary, in consultation with the Director of the National Bureau of Standards and the Administrator, will select on the basis of open competition a number of designs for various types of residential dwellings suitable for and adapted to the installation of combined solar heating and cooling systems meeting the performance criteria prescribed under paragraph (1) (A). (88 Stat. 1072)

DEVELOPMENT AND DEMONSTRATION OF SOLAR HEATING AND COMBINED SOLAR HEATING
AND COOLING SYSTEMS FOR COMMERCIAL BUILDINGS

SEC. 9. The Administrator, in consultation with the Secretary, the Director, the Administrator of General Services, and the Director of the National Bureau of Standards and concurrently with the conduct of the programs under sections 5 and 6, shall enter into arrangements with appropriate Federal agencies to carry out such projects and activities (including demonstration projects) with respect to apartment buildings, office buildings, factories, crop-drying facilities and other agricultural structures, public buildings (including schools and colleges), and other non-residential, commercial, or industrial buildings, taking into account the special needs of and individual differences in such buildings based upon size, function, and other relevant factors, as may be appropriate for the early development and demonstration of solar heating and combined solar heating and cooling systems suitable and effective for use in such buildings. (88 Stat. 1074)

COORDINATION, MONITORING, AND LIAISON

SEC. 11. (a) The Secretary, utilizing the services of the Director of the National Bureau of Standards and in coordination with such other Government agencies as may be appropriate, shall—

(1) monitor the performance and operation of solar heating and combined solar heating and cooling systems installed in residential dwellings under this Act;

(2) collect and evaluate data and information on the performance and operation of solar heating and combined solar heating and cooling systems installed in residential dwellings under this Act; and

(3) from time to time, carrying out such studies and investigations and take such other actions, including the submission of special reports to the Congress when appropriate, as may be necessary to assure that the programs for which the Secretary is responsible under this Act effectively carry out the policy of this Act. (88 Stat. 1074)

DISSEMINATION OF INFORMATION AND OTHER ACTIONS TO PROMOTE PRACTICAL USE OF
SOLAR HEATING AND COOLING TECHNOLOGIES

SEC. 12. (a) The Secretary shall take all possible steps to assure that full and complete information with respect to the demonstrations and other activities conducted under this Act is made available to Federal, State, and local authorities, the building industry and related segments of the economy, the scientific and technical community, and the public at large, both during and after the close of the programs under this Act,

with the objective of promoting and facilitating to the maximum extent feasible the early and widespread practical use of solar energy for the heating and cooling of buildings throughout the United States. In accordance with regulations prescribed under section 16 such information shall be disseminated on a coordinated basis by the Secretary, the Administrator, the Director of the National Bureau of Standards, the Director, the Commissioner of the Patent Office, and other appropriate Federal offices and agencies. (88 Stat. 1075)

REGULATIONS

SEC. 16. The Administrator and the Secretary in consultation with the Director of the National Bureau of Standards, the Director, the Administrator of the General Services Administration, the Secretary of Defense, and other appropriate officers and agencies, shall prescribe such regulations as may be necessary or appropriate to carry out this Act promptly and efficiently. Each such officer or agency, in consultation with the Administrator and the Secretary, may prescribe such regulations as may be necessary or appropriate to carry out his or its particular functions under this Act promptly and efficiently. (88 Stat. 1078).

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October 29, 1974, 88 Stat. 1535 (Public Law 93-498—93d Congress, 2d session) *Federal Fire Prevention and Control Act of 1974*.

The establishment of the Center for Fire Research reorganized and strengthened the fire research programs at the National Bureau of Standards.

Public Law 93-498

AN ACT

To reduce losses of life and property, through better fire prevention and control, and for other purposes.

PURPOSES

SEC. 3. It is declared to be the purpose of Congress in this Act to—

- (1) reduce the Nation's losses caused by fire through better fire prevention and control;
- (2) supplement existing programs of research, training, and activities by State and local governments;
- (3) establish the National Fire Prevention and Control Administration and the Fire Research Center within the Department of Commerce; and
- (4) establish an intensified program of research into the treatment of burn and smoke injuries and the rehabilitation of victims of fires within the National Institutes of Health. (88 Stat. 1536)

FIRE RESEARCH CENTER

SEC. 18. The Act of March 3, 1901 (15 U.S.C. 278), is amended by striking out sections 16 and 17 (as added by title I of the Fire Prevention and Control Act of 1968) and by inserting in lieu thereof the following new section:

"SEC. 16. (a) There is hereby established within the Department of Commerce a Fire Research Center which shall have the mission of performing and supporting research on all aspects of fire with the aim of providing scientific and technical knowledge applicable to the prevention and control of fires. The content and priorities of the research program shall be determined in consultation with the Administrator of the National Fire Prevention and Control Administration. In implementing this section, the Secretary is authorized to conduct, directly or through contracts or grants, a fire research program, including—

"(1) basic and applied fire research for the purpose of arriving at an understanding of the fundamental processes underlying all aspects of fire. Such research shall include scientific investigations of—

"(A) the physics and chemistry of combustion processes;

"(B) the dynamics of flame ignition, flame spread, and flame extinguishment;

"(C) the composition of combustion products developed by various sources and under various environmental conditions;

“(D) the early stages of fires in buildings and other structures, structural subsystems and structural components in all other types of fires, including, but not limited to, forest fires, brush fires, fires underground, oil blowout fires, and water-borne fires, with the aim of improving early detection capability;

“(E) the behavior of fires involving all types of buildings and other structures and their contents (including mobile homes and highrise buildings, construction materials, floor and wall coverings, coatings, furnishings, and other combustible materials), and all other types of fires, including forest fires, brush fires, fires underground, oil blowout fires, and waterborne fires;

“(F) the unique fire hazards arising from the transportation and use, in industrial and professional practices, of combustible gases, fluids, and materials;

“(G) design concepts for providing increased fire safety consistent with habitability, comfort, and human impact in buildings and other structures; and

“(H) such other aspects of the fire process as may be deemed useful in pursuing the objectives of the fire research program;

“(2) research into the biological, physiological, and psychological factors affecting human victims of fire, and the performance of individual members of fire services, including—

“(A) the biological and physiological effects of toxic substances encountered in fires;

“(B) the trauma, cardiac conditions, and other hazards resulting from exposure to fire;

“(C) the development of simple and reliable tests for determining the cause of death from fires;

“(D) improved methods of providing first aid to victims of fires;

“(E) psychological and motivational characteristics of persons who engage in arson, and the prediction and cure of such behavior;

“(F) the conditions of stress encountered by firefighters, the effects of such stress, and the alleviation and reduction of such conditions; and

“(G) such other biological, psychological, and physiological effects of fire as have significance for purposes of control or prevention of fires; and

“(3) operation tests, demonstration projects, and fire investigations in support of the activities set forth in this section.

“The Secretary shall insure that the results and advances arising from the work of the research program are disseminated broadly. He shall encourage the incorporation, to the extent applicable and practicable, of such results and advances in building codes, fire codes, and other relevant codes, test methods, fire service operations and training, and standards. The Secretary is authorized to encourage and assist in the development and adoption of uniform codes, test methods, and standards aimed at reducing fire losses and costs of fire protection.

“(b) For the purposes of this section there is authorized to be appropriated not to exceed \$3,500,000 for the fiscal year ending June 30, 1975 and not to exceed \$4,000,000 for the fiscal year ending June 30, 1976.” (88 Stat. 1545).

* * * * *

December 31, 1974, 88 Stat. 1878 (Public Law 93-577—93d Congress, 2d session) *Federal Nonnuclear Energy Research and Development Act of 1974*.

The Office of Energy Related Inventions was established to help the Energy Research and Development Administration evaluate non-nuclear energy ideas.

Public Law 93-577

AN ACT

To establish a national program for research and development in nonnuclear energy sources.

ENERGY-RELATED INVENTIONS

SEC. 14. The National Bureau of Standards shall give particular attention to the evaluation of all promising energy-related inventions, particularly those submitted by individual inventors and small companies for the purpose of obtaining direct grants from the Administrator. The National Bureau of Standards is authorized to promulgate regulations in the furtherance of this section. (88 Stat. 1894)

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From the *United States Code, 1946 edition, Containing the General and Permanent Laws of the United States, in Force on January 2, 1947, pp. 1446-1447.*

Chapter 7.—THE BUREAU OF STANDARDS

Sec.

- 271. Bureau established.
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- 280. Apprentices; promotion.
- 281. Testing materials for District of Columbia.
- 282. National hydraulic laboratory; establishment; purpose; study of Federal and State projects.

§ 271. Bureau established.

The Office of Standard Weights and Measures shall be known as the National Bureau of Standards. (Mar. 3, 1901, ch. 872, § 1, 31 Stat. 1449.)

§ 272. Functions of Bureau.

The functions of the bureau shall consist in the custody of the standards; the comparison of the standards used in scientific investigations, engineering, manufacturing, commerce, and educational institutions with the standards adopted or recognized by the Government; the construction, when necessary, of standards, their multiples and subdivisions; the testing and calibration of standard measuring apparatus; the solution of problems which arise in connection with standards; the determination of physical constants and the properties of materials, when such data are of great importance to scientific or manufacturing interests and are not to be obtained of sufficient accuracy elsewhere. (Mar. 3, 1901, ch. 872, § 2, 31 Stat. 1449.)

§ 273. Functions; for whom exercised.

The bureau shall exercise its functions for the Government of the United States; for any State or municipal government within the United States; or for any scientific society, educational institution, firm, corporation, or individual within the United States engaged in manufacturing or other pursuits requiring the use of standards or standard measuring instruments. All requests for the services of the bureau shall be made in accordance with the rules and regulations herein established in sections 276 and 277 of this title. (Mar. 3, 1901, ch. 872, § 3, 31 Stat. 1449.)

§ 274. Director; powers and duties; report.

The director shall be appointed by the President, by and with the advice and consent of the Senate. He shall have the general supervision of the bureau, its equipment, and the exercise of its functions. He shall make an annual report to the Secretary of Commerce, including an abstract of the work done during the year and a financial statement. He may issue, when necessary, bulletins for public distribution, containing such information as may be of value to the public or facilitate the bureau in the exercise of its functions. (Mar. 3, 1901, ch. 872, § 5, 31 Stat. 1449; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 275. Appointment of officers and employees.

The officers and employees of the bureau, except the director, shall be appointed by the Secretary of Commerce at such time as their respective services may become necessary. (Mar. 3, 1901, ch. 872, § 6, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 276. Fees.

For all comparisons, calibrations, tests, or investigations, performed by the National Bureau of Standards under sections 271—278 of this title, as amended and supplemented, except those performed for the Government of the United States or State governments within the United States, a fee sufficient in each case to compensate the National Bureau of Standards for the entire cost of the services rendered shall be charged, according to a schedule prepared by the Director of the National Bureau of Standards and approved by the Secretary of Commerce. All moneys received from such sources shall be paid into the Treasury to the credit of miscellaneous receipts. (Mar. 3, 1901, ch. 872, § 8, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736; June 30, 1932, ch. 314, § 312, 47 Stat. 410.)

§ 277. Regulations.

The Secretary of Commerce shall, from time to time, make regulations regarding the payment of fees, the limits of tolerance to be attained in standards submitted for verification, the sealing of standards, the disbursement and receipt of moneys, and such other matters as he may deem necessary for carrying this Act into effect sections 271—278 of this title. (Mar. 3, 1901, ch. 872, § 9, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 278. Visiting committee.

There shall be a visiting committee of five members, to be appointed by the Secretary of Commerce, to consist of men prominent in the various interests involved, and not in the employ of the Government. This committee shall visit the bureau at least once a year, and report to the Secretary of Commerce upon the efficiency of its scientific work and the condition of its equipment. The members of this committee shall serve without compensation, but shall be paid the actual expenses incurred in attending its meetings. The period of service of the members of the committee shall be so arranged that one member shall retire each year, and the appointments to be for a period of five years. Appointments made to fill vacancies occurring other than in the regular manner are to be made for the remainder of the period in which the vacancy exists. (Mar. 3, 1901, ch. 872, § 10, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 279. Absence of Director.

In the case of the absence of the Director of the Bureau of Standards the Secretary of Commerce may designate some officer of said bureau to perform the duties of the director during his absence. (Mar. 4, 1911, ch. 237, § 1, 36 Stat. 1231; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 280. Apprentices; promotion.

Apprentices in the Bureau of Standards may be promoted after satisfactory apprenticeship, with the approval of the Civil Service Commission, to positions corresponding to the journeyman grades for which their duties logically prepare them, without regard to apportionment: *Provided*, That they thus acquire no rights to transfer to other lines of work. (July 16, 1914, ch. 141, § 1, 38 Stat. 502.)

§ 281. Testing materials for District of Columbia.

Materials for fireproof buildings, other structural materials, and all materials, other than materials for paving and for fuel, purchased for and to be used by the government of the District of Columbia, when necessary in the judgment of the commissioners to be tested, shall be tested by the Bureau of Standards under the same conditions as similar testing is required to be done for the United States Government. (Mar. 4, 1913, ch. 150, 37 Stat. 945.)

§ 282. National hydraulic laboratory; establishment; purpose; study of Federal and State projects.

There is authorized to be established in the Bureau of Standards of the Department of Commerce a national hydraulic laboratory for the determination of fundamental data useful in hydraulic research and engineering, including laboratory research relating to the behavior and control of river and harbor waters, the study of hydraulic structures and water flow, and the development and testing of hydraulic instruments and

accessories; *Provided*, That no test, study, or other work on a problem or problems connected with a project the prosecution of which is under the jurisdiction of any department or independent agency of the Government shall be undertaken in the laboratory herein authorized until a written request to do such work is submitted to the Director of the Bureau of Standards by the head of the department or independent agency charged with the execution of such project: *And provided further*, That any State or political subdivision thereof may obtain a test, study, or other work on a problem connected with a project the prosecution of which is under the jurisdiction of such State or political subdivision thereof. (May 14, 1930, ch. 275, § 1, 46 Stat. 327.)

* * * * *

From the *United States Code, 1952 edition, Containing the General and Permanent Laws of the United States, in Force on January 2, 1953*, pp. 1825-1830.

Chapter 7.—THE BUREAU OF STANDARDS

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§ 271. Bureau established.

The Office of Standard Weights and Measures shall be known as the National Bureau of Standards. (Mar. 3, 1901, ch. 872, § 1, 31 Stat. 1449.)

§ 272. Functions of Secretary.

The Secretary of Commerce (hereinafter referred to as the "Secretary") is authorized to undertake the following functions:

(a) The custody, maintenance, and development of the national standards of measurement, and the provision of means and methods for making measurements consistent with those standards, including the comparison of standards used in scientific investigations, engineering, manufacturing, commerce, and educational institutions with the standards adopted or recognized by the Government.

(b) The determination of physical constants and properties of materials when such data are of great importance to scientific or manufacturing interests and are not to be obtained of sufficient accuracy elsewhere.

(c) 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.

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

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

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

In carrying out the functions enumerated in this section, the Secretary is authorized to undertake the following activities and similar ones for which need may arise in the operations of Government agencies, scientific institutions, and industrial enterprises:

(1) the construction of physical standards;

(2) the testing, calibration, and certification of standards and standard measuring apparatus;

(3) the study and improvement of instruments and methods of measurements;

(4) the investigation and testing of railroad track scales, elevator scales, and other scales used in weighing commodities for interstate shipment;

(5) cooperation with the States in securing uniformity in weights and measures laws and methods of inspection;

(6) the preparation and distribution of standard samples such as those used in checking chemical analyses, temperature, color, viscosity, heat of combustion, and other basic properties of materials; also the preparation and sale or other distribution of standard instruments, apparatus and materials for calibration of measuring equipment;

(7) the development of methods of chemical analysis and synthesis of materials, and the investigation of the properties of rare substances;

(8) the study of methods of producing and of measuring high and low temperatures; and the behavior of materials at high and at low temperatures;

(9) the investigation of radiation, radioactive substances, and X-rays, their uses, and means of protection of persons from their harmful effects;

(10) the study of the atomic and molecular structure of the chemical elements, with particular reference to the characteristics of the spectra emitted, the use of spectral observations in determining chemical composition of materials, and the relation of molecular structure to the practical usefulness of materials;

(11) the broadcasting of radio signals of standard frequency;

(12) the investigation of the conditions which affect the transmission of radio waves from their source to a receiver;

(13) the compilation and distribution of information on such transmission of radio waves as a basis for choice of frequencies to be used in radio operations;

(14) the study of new technical processes and methods of fabrication of materials in which the Government has a special interest; also the study of methods of measurement and technical processes used in the manufacture of optical glass and pottery, brick, tile, terra cotta, and other clay products;

(15) the determination of properties of building materials and structural elements, and encouragement of their standardization and most effective use, including investigation of fire-resisting properties of building materials and conditions under which they may be most efficiently used, and the standardization of types of appliances for fire prevention;

(16) metallurgical research, including study of alloy steels and light metal alloys; investigation of foundry practice, casting, rolling, and forging; prevention of corrosion of metals and alloys; behavior of bearing metals; and development of standards for metals and sands;

(17) the operation of a laboratory of applied mathematics;

(18) the prosecution of such research in engineering, mathematics, and the physical sciences as may be necessary to obtain basic data pertinent to the functions specified herein; and

(19) the compilation and publication of general scientific and technical data resulting from the performance of the functions specified herein or from other sources when such data are of importance to scientific or manufacturing interests or to the general public, and are not available elsewhere, including demonstration of the results of the Bureau's work by exhibits or otherwise as may be deemed most effective. (Mar. 3, 1901, ch. 872, § 2, 31 Stat. 1449; July 22, 1950, ch. 486, § 1, 64 Stat. 371.)

§ 273. Functions; for whom exercised.

That the bureau shall exercise its functions for the Government of the United States; for any State or municipal government within the United States; or for any scientific society, educational institution, firm, corporation, or individual within the United States engaged in manufacturing or other pursuits requiring the use of standards or standard measuring instruments. All requests for the services of the bureau shall be made in accordance with the rules and regulations herein established in sections 276 and 277 of this title. (Mar. 3, 1901, ch. 872, § 3, 31 Stat. 1449.)

§ 274. Director; powers and duties; report.

The director shall be appointed by the President, by and with the advice and consent of the Senate. He shall have the general supervision of the bureau, its equipment, and the exercise of its functions. He shall make an annual report to the Secretary of Commerce, including an abstract of the work done during the year and a financial statement. He may issue, when necessary, bulletins for public distribution, containing such information as may be of value to the public or facilitate the bureau in the exercise of its functions. (Mar. 3, 1901, ch. 872, § 5, 31 Stat. 1449; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 275. Appointment of officers and employees.

The officers and employees of the bureau, except the director, shall be appointed by the Secretary of Commerce at such time as their respective services may become necessary. (Mar. 3, 1901, ch. 872, § 6, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 276. Fees.

For all comparisons, calibrations, tests, or investigations, performed by the National Bureau of Standards under sections 271—278c of this title, as amended and supplemented, except those performed for the Government of the United States or State governments within the United States, a fee sufficient in each case to compensate the National Bureau of Standards for the entire cost of the services rendered shall be charged, according to a schedule prepared by the Director of the National Bureau of Standards and approved by the Secretary of Commerce. All moneys received from such sources shall be paid into the Treasury to the credit of miscellaneous receipts. (Mar. 3, 1901, ch. 872, § 8, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736; June 30, 1932, ch. 314, § 312, 47 Stat. 410.)

§ 277. Regulations.

The Secretary of Commerce shall, from time to time, make regulations regarding the payment of fees, the limits of tolerance to be attained in standards submitted for verification, the sealing of standards, the disbursement and receipt of moneys, and such other matters as he may deem necessary for carrying this Act into effect sections 271—278c of this title. (Mar. 3, 1901, ch. 872, § 9, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 278. Visiting committee.

There shall be a visiting committee of five members, to be appointed by the Secretary of Commerce, to consist of men prominent in the various interests involved, and not in the employ of the Government. This committee shall visit the bureau at least once a year, and report to the Secretary of Commerce upon the efficiency of its scientific work and the condition of its equipment. The members of this committee shall serve without compensation, but shall be paid the actual expenses incurred in attending its meetings. The period of service of the members of the committee shall be so arranged that one member shall retire each year, and the appointments to be for a period of five years. Appointments made to fill vacancies occurring other than in the regular manner are to be made for the remainder of the period in which the vacancy exists. (Mar. 3, 1901, ch. 872, § 10, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 278a. Reimbursement from other Government agencies for services rendered.

For all services rendered for other Government agencies by the Secretary in the performance of functions specified in sections 271—278c of this title, the Department of Commerce may be reimbursed in accordance with section 606 of Title 31. (Mar. 3, 1901, ch. 872, § 11, as added July 22, 1950, ch. 486, § 2, 64 Stat. 371.)

§ 278b. Ownership of equipment transferred to carry out investigations.

In the absence of specific agreement to the contrary, equipment purchased by the Department of Commerce from transferred or advanced funds in order to carry out an investigation authorized in sections 271—278c of this title for another Government agency shall become the property of the Department of Commerce for use in subsequent investigations. (Mar. 3, 1901, ch. 872, § 12, as added July 22, 1950, ch. 486, § 2, 64 Stat. 371.)

§ 278c. Acceptance of gifts and bequests.

(a) The Secretary of Commerce is authorized to accept and utilize gifts or bequests of real or personal property for the purpose of aiding and facilitating the work authorized in sections 271—278c of this title.

(b) For the purpose of Federal income, estate, and gift taxes, gifts and bequests accepted by the Secretary of Commerce under the authority of sections 271—278c of this title shall be deemed to be gifts and bequests to or for the use of the United States. (Mar. 3, 1901, ch. 872, § 13, as added July 22, 1950, ch. 486, § 2, 64 Stat. 371.)

§ 279. Absence of Director.

In the case of the absence of the Director of the Bureau of Standards the Secretary of Commerce may designate some officer of said bureau to perform the duties of the director during his absence. (Mar. 4, 1911, ch. 237, § 1, 36 Stat. 1231; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 280. Apprentices; promotion.

Apprentices in the Bureau of Standards may be promoted after satisfactory apprenticeship, with the approval of the Civil Service Commission, to positions corresponding to the journeyman grades for which their duties logically prepare them, without regard to apportionment: *Provided*, That they thus acquire no rights to transfer to other lines of work. (July 16, 1914, ch. 141, § 1, 38 Stat. 502.)

§ 281. Testing materials for District of Columbia.

Materials for fireproof buildings, other structural materials, and all materials, other than materials for paving and for fuel, purchased for and to be used by the government of the District of Columbia, when necessary in the judgment of the commissioners to be tested, shall be tested by the Bureau of Standards under the same conditions as similar testing is required to be done for the United States Government. (Mar. 4, 1913, ch. 150, 37 Stat. 945.)

§ 282. National hydraulic laboratory; establishment; purpose; study of Federal and State projects.

There is authorized to be established in the Bureau of Standards of the Department of Commerce a national hydraulic laboratory for the determination of fundamental data useful in hydraulic research and engineering, including laboratory research relating to the behavior and control of river and harbor waters, the study of hydraulic structures and water flow, and the development and testing of hydraulic instruments and accessories; *Provided*, That no test, study, or other work on a problem or problems connected with a project the prosecution of which is under the jurisdiction of any department or independent agency of the Government shall be undertaken in the laboratory herein authorized until a written request to do such work is submitted to the Director of the Bureau of Standards by the head of the department or independent agency charged with the execution of such project: *And provided further*, That any State or political subdivision thereof may obtain a test, study, or other work on a problem connected with a project the prosecution of which is under the jurisdiction of such State or political subdivision thereof. (May 14, 1930, ch. 275, § 1, 46 Stat. 327.)

§§ 283, 284. Omitted.

§ 285. Availability of funds; functions and activities.

Funds now or hereafter appropriated to the National Bureau of Standards shall be available for the following activities: (a) The purchase, repair, and cleaning of uniforms for guards; (b) the repair and alteration of buildings, and other plant facilities; (c) the rental of laboratory and office space in the District of Columbia and in the field; (d) the purchase of reprints from trade journals or other periodicals of articles prepared officially by Government employees; (e) the furnishing of food and shelter without repayment therefor to employees of the Government at Arctic stations; and (f) in the conduct of observations on radio propagation phenomena in the Arctic region, the appointment of employees at base rates established by the Secretary of Commerce which shall not exceed such maximum rates as may be specified from time to time in the appropriation concerned, and without regard to the civil service and classification laws and sections 911—913, 921, and 922 of Title 5. (July 21, 1950, ch 485, § 1, 64 Stat. 370.)

§ 286. Same; construction and improvement of buildings and facilities.

Within the limits of funds which may be appropriated therefor, the Secretary of Commerce is authorized to make improvements to existing buildings, grounds, and other plant facilities, including construction of minor buildings and other facilities of the National Bureau of Standards in the District of Columbia and in the field to house special apparatus or material which must be isolated from other activities: *Provided*, That no improvement shall be made nor shall any building be constructed under this authority at a cost in excess of \$25,000, unless specific provision is made therefor in the appropriation concerned. (July 21, 1950, ch. 485, § 2, 64 Stat. 371.)

* * * * *

From the *United States Code, 1958 edition, Containing the General and Permanent Laws of the United States, in Force on January 6, 1959*, pp. 2569-2574.

Chapter 7.—THE BUREAU OF STANDARDS

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- 278c. Acquisition of land for field sites.
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- 278e. Functions and activities.
- 279. † Absence of Director.
- 280. Apprentices; promotion.
- 281. Testing materials for District of Columbia.
- 282. National hydraulic laboratory; establishment; purpose; study of Federal and State projects.
- 283, 284. Omitted.
- 285, 286. Repealed.

§ 271. Bureau established.

The Office of Standard Weights and Measures shall be known as the National Bureau of Standards. (Mar. 3, 1901, ch. 872, § 1, 31 Stat. 1449.)

§ 272. Functions of Secretary.

The Secretary of Commerce (hereinafter referred to as the "Secretary") is authorized to undertake the following functions:

- (a) The custody, maintenance, and development of the national standards of measurement, and the provision of means and methods for making measurements consistent with those standards, including the comparison of standards used in scientific investigations, engineering, manufacturing, commerce, and educational institutions with the standards adopted or recognized by the Government.
- (b) The determination of physical constants and properties of materials when such data are of great importance to scientific or manufacturing interests and are not to be obtained of sufficient accuracy elsewhere.
- (c) 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.
- (d) Cooperation with other governmental agencies and with private organizations in the establishment of standard practices, incorporated in codes and specifications.
- (e) Advisory service to Government agencies on scientific and technical problems.
- (f) Invention and development of devices to serve special needs of the Government.

In carrying out the functions enumerated in this section, the Secretary is authorized to undertake the following activities and similar ones for which need may arise in the operations of Government agencies, scientific institutions, and industrial enterprises:

- (1) the construction of physical standards;
- (2) the testing, calibration, and certification of standards and standard measuring apparatus;
- (3) the study and improvement of instruments and methods of measurements;
- (4) the investigation and testing of railroad track scales, elevator scales, and other scales used in weighing commodities for interstate shipment;
- (5) cooperation with the States in securing uniformity in weights and measures laws and methods of inspection;
- (6) the preparation and distribution of standard samples such as those used in checking chemical analyses, temperature, color, viscosity, heat of combustion, and other basic properties of materials; also the preparation and sale or other distribution of standard instruments, apparatus and materials for calibration of measuring equipment;
- (7) the development of methods of chemical analysis and synthesis of materials, and the investigation of the properties of rare substances;
- (8) the study of methods of producing and of measuring high and low temperatures; and the behavior of materials at high and at low temperatures;
- (9) the investigation of radiation, radioactive substances, and X-rays, their uses, and means of protection of persons from their harmful effects;
- (10) the study of the atomic and molecular structure of the chemical elements, with particular reference to the characteristics of the spectra emitted, the use of spectral observations in determining chemical composition of materials, and the relation of molecular structure to the practical usefulness of materials;
- (11) the broadcasting of radio signals of standard frequency;
- (12) the investigation of the conditions which affect the transmission of radio waves from their source to a receiver;
- (13) the compilation and distribution of information on such transmission of radio waves as a basis for choice of frequencies to be used in radio operations;
- (14) the study of new technical processes and methods of fabrication of materials in which the Government has a special interest; also the study of methods of measurement and technical processes used in the manufacture of optical glass and pottery, brick, tile, terra cotta, and other clay products;
- (15) the determination of properties of building materials and structural elements, and encouragement of their standardization and most effective use, including investigation of fire-resisting properties of building materials and conditions under which they may be most efficiently used, and the standardization of types of appliances for fire prevention;
- (16) metallurgical research, including study of alloy steels and light metal alloys; investigation of foundry practice, casting, rolling, and forging; prevention of corrosion of metals and alloys; behavior of bearing metals; and development of standards for metals and sands;
- (17) the operation of a laboratory of applied mathematics;
- (18) the prosecution of such research in engineering, mathematics, and the physical sciences as may be necessary to obtain basic data pertinent to the functions specified herein; and
- (19) the compilation and publication of general scientific and technical data resulting from the performance of the functions specified herein or from other sources when such data are of importance to scientific or manufacturing interests or to the general public, and are not available elsewhere, including demonstration of the results of the Bureau's work by exhibits or otherwise as may be deemed most effective. (Mar. 3, 1901, ch. 872, § 2, 31 Stat. 1449; July 22, 1950, ch. 486, § 1, 64 Stat. 371.)

§ 273. Functions; for whom exercised.

That the bureau shall exercise its functions for the Government of the United States; for any State or municipal government within the United States; or for any scientific society, educational institution, firm, corporation, or individual within the United States engaged in manufacturing or other pursuits requiring the use of standards or standard measuring instruments. All requests for the services of the bureau shall be made in accordance with the rules and regulations herein established in sections 276 and 277 of this title. (Mar. 3, 1901, ch. 872, § 3, 31 Stat. 1449.)

§ 274. Director; powers and duties; report.

The director shall be appointed by the President, by and with the advice and consent of the Senate. He shall have the general supervision of the bureau, its equipment, and the exercise of its functions. He shall make an annual report to the Secretary of Commerce, including an abstract of the work done during the year and a financial statement. He may issue, when necessary, bulletins for public distribution, containing such information as may be of value to the public or facilitate the bureau in the exercise of its functions. (Mar. 3, 1901, ch. 872, § 5, 31 Stat. 1449; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 275. Appointment of officers and employees.

The officers and employees of the bureau, except the director, shall be appointed by the Secretary of Commerce at such time as their respective services may become necessary. (Mar. 3, 1901, ch. 872, § 6, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 275a. Service charges.

The Secretary shall charge for services performed under the authority of section 273 of this title, except in cases where he determines that the interest of the Government would be best served by waiving the charge. Such charges may be based upon fixed prices or costs. The appropriation or fund bearing the cost of the services may be reimbursed, or the Secretary may require advance payment subject to such adjustment on completion of the work as may be agreed upon. (Mar. 3, 1901, ch. 872, § 7, as added Aug. 3, 1956, ch. 906, § 1, 70 Stat. 959.)

§ 276. Ownership of facilities.

In the absence of specific agreement to the contrary, additional facilities, including equipment, purchased pursuant to the performance of services authorized by section 273 of this title shall become the property of the Department of Commerce. (Mar. 3, 1901, ch. 872, § 8, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736; June 30, 1932, ch. 314, § 312, 47 Stat. 410; Aug. 3, 1956, ch. 906, § 1, 70 Stat. 959.)

§ 277. Regulations.

The Secretary of Commerce shall, from time to time, make regulations regarding the payment of fees, the limits of tolerance to be attained in standards submitted for verification, the sealing of standards, the disbursement and receipt of moneys, and such other matters as he may deem necessary for carrying this Act into effect sections 271—278b of this title. (Mar. 3, 1901, ch. 872, § 9, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 278. Visiting committee.

There shall be a visiting committee of five members, to be appointed by the Secretary of Commerce, to consist of men prominent in the various interests involved, and not in the employ of the Government. This committee shall visit the bureau at least once a year, and report to the Secretary of Commerce upon the efficiency of its scientific work and the condition of its equipment. The members of this committee shall serve without compensation, but shall be paid the actual expenses incurred in attending its meetings. The period of service of the members of the committee shall be so arranged that one member shall retire each year, and the appointments to be for a period of five years. Appointments made to fill vacancies occurring other than in the regular manner are to be made for the remainder of the period in which the vacancy exists. (Mar. 3, 1901, ch. 872, § 10, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 278a. Acceptance of gifts and bequests.

(a) The Secretary of Commerce is authorized to accept and utilize gifts or bequests of real or personal property for the purpose of aiding and facilitating the work authorized herein.

(b) For the purpose of Federal income, estate, and gift taxes, gifts and bequests accepted by the Secretary of Commerce under the authority of sections 271-278b of this title shall be deemed to be gifts and bequests to or for the use of the United States. (Mar. 3, 1901, ch. 872, § 11, as added July 22, 1950, ch. 486, § 2, 64 Stat. 371, and amended Aug. 3, 1956, ch. 906, § 2, 70 Stat. 959; Sept. 2, 1958, Pub. L. 85-890, § 2, 72 Stat. 1712.)

§ 278b. Working Capital Fund.

(a) Utilization; appropriations.

The National Bureau of Standards is authorized to utilize in the performance of its functions the Working Capital Fund established by the Act of June 29, 1950 (64 Stat. 275), and additional amounts as from time to time may be required for the purposes of said fund are authorized to be appropriated.

(b) Availability of Fund.

The working capital of the fund shall be available for obligation and payment for any activities authorized by sections 271-278b of this title, and for any activities for which provision is made in the appropriations which reimburse the fund.

(c) Reimbursements.

In the performance of authorized activities, the Working Capital Fund shall be available and may be reimbursed for expenses of hire of automobile, hire of consultants, and travel to meetings, to the extent that such expenses are authorized for the appropriations of the Department of Commerce.

(d) Credits.

The fund may be credited with advances and reimbursement, including receipts from non-Federal sources, for services performed under the authority of section 273 of this title.

(e) Cost defined.

As used in sections 271-278b of this title, the term "cost" shall be construed to include directly related expenses and appropriate charges for indirect and administrative expenses.

(f) Distribution of earnings; restoration of prior impairment.

The amount of any earned net income resulting from the operation of the fund at the close of each fiscal year shall be paid into the general fund of the Treasury: *Provided*, That such earned net income may be applied first to restore any prior impairment of the fund. (Mar. 3, 1901, ch. 872, § 12, as added July 22, 1950, ch. 486, § 2, 64 Stat. 371, and amended Aug. 3, 1956, ch. 906, § 2, 70 Stat. 959.)

§ 278c. Acquisition of land for field sites.

To the extent that funds are specifically appropriated therefor, the Secretary of Commerce is authorized to acquire land for such field sites as are necessary for the proper and efficient conduct of the activities authorized herein. (Mar. 3, 1901, ch. 872, § 13, as added Sept. 2, 1958, Pub. L. 85-890, § 1, 72 Stat. 1711.)

§ 278d. Construction and improvement of buildings and facilities.

Within the limits of funds which are appropriated for the National Bureau of Standards, the Secretary of Commerce is authorized to undertake such construction of buildings and other facilities and to make such improvements to existing buildings, grounds, and other facilities occupied or used by the National Bureau of Standards as are necessary for the proper and efficient conduct of the activities authorized herein: *Provided*, That no improvement shall be made nor shall any building be constructed under this authority at a cost in excess of \$40,000 unless specific provision is made therefor in the appropriation concerned. (Mar. 3, 1901, ch. 872, § 14, as added Sept. 2, 1958, Pub. L. 85-890, § 1, 72 Stat. 1711.)

§ 278e. Functions and activities.

In the performance of the functions of the National Bureau of Standards and the Secretary of Commerce is authorized to undertake the following activities: (a) The purchase, repair, and cleaning of uniforms for guards; (b) the repair and alteration of buildings and other plant facilities; (c) the rental of field sites and laboratory, office, and warehouse space; (d) the purchase of reprints from technical journals or other periodicals and the payment of page charges for the publication of research papers and reports in such journals; (e) the furnishing of food and shelter without repayment therefor to employees of the Government at Arctic and Antarctic stations; (f) for the conduct of observations on radio propagation phenomena in the Arctic or Antarctic regions, the appointment of employees at base rates established by the Secretary of Commerce which shall not exceed such maximum rates as may be specified from time to time in the appropriation concerned, and without regard to the civil service and classification laws and sections 911-913, 921, and 922 of Title 5; and (g) the erection on leased property of specialized facilities and working and living quarters when the Secretary of Commerce determines that this will best serve the interests of the Government. (Mar. 3, 1901, ch. 872, § 15, as added Sept. 2, 1958, Pub. L. 85-890, § 1, 72 Stat. 1711.)

§ 279. Absence of Director.

In the case of the absence of the Director of the Bureau of Standards the Secretary of Commerce may designate some officer of said bureau to perform the duties of the director during his absence. (Mar. 4, 1911, ch. 237, § 1, 36 Stat. 1231; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 280. Apprentices; promotion.

Apprentices in the Bureau of Standards may be promoted after satisfactory apprenticeship, with the approval of the Civil Service Commission, to positions corresponding to the journeyman grades for which their duties logically prepare them, without regard to apportionment: *Provided*, That they thus acquire no rights to transfer to other lines of work. (July 16, 1914, ch. 141, § 1, 38 Stat. 502.)

§ 281. Testing materials for District of Columbia.

Materials for fireproof buildings, other structural materials, and all materials, other than materials for paving and for fuel, purchased for and to be used by the government of the District of Columbia, when necessary in the judgment of the commissioners to be tested, shall be tested by the Bureau of Standards under the same conditions as similar testing is required to be done for the United States Government. (Mar. 4, 1913, ch. 150, 37 Stat. 945.)

§ 282. National hydraulic laboratory; establishment; purpose; study of Federal and State projects.

There is authorized to be established in the Bureau of Standards of the Department of Commerce a national hydraulic laboratory for the determination of fundamental data useful in hydraulic research and engineering, including laboratory research relating to the behavior and control of river and harbor waters, the study of hydraulic structures and water flow, and the development and testing of hydraulic instruments and accessories; *Provided*, That no test, study, or other work on a problem or problems connected with a project the prosecution of which is under the jurisdiction of any department or independent agency of the Government shall be undertaken in the laboratory herein authorized until a written request to do such work is submitted to the Director of the Bureau of Standards by the head of the department or independent agency charged with the execution of such project: *And provided further*, That any State or political subdivision thereof may obtain a test, study, or other work on a problem connected with a project the prosecution of which is under the jurisdiction of such State or political subdivision thereof. (May 14, 1930, ch. 275, § 1, 46 Stat. 327.)

§ 283, 284. Omitted.

§ 285, 286. Repealed. Pub. L. 85-890, 3, Sept. 2, 1958, 72 Stat. 1712.

From the *United States Code, 1964 edition, Containing the General and Permanent Laws of the United States, in Force on January 3, 1965*, pp. 2824-2829.

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§ 271. Bureau established.

The Office of Standard Weights and Measures shall be known as the National Bureau of Standards. (Mar. 3, 1901, ch. 872, § 1, 31 Stat. 1449.)

§ 272. Functions of Secretary.

The Secretary of Commerce (hereinafter referred to as the "Secretary") is authorized to undertake the following functions:

(a) The custody, maintenance, and development of the national standards of measurement, and the provision of means and methods for making measurements consistent with those standards, including the comparison of standards used in scientific investigations, engineering, manufacturing, commerce, and educational institutions with the standards adopted or recognized by the Government.

(b) The determination of physical constants and properties of materials when such data are of great importance to scientific or manufacturing interests and are not to be obtained of sufficient accuracy elsewhere.

(c) 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.

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

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

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

In carrying out the functions enumerated in this section, the Secretary is authorized to undertake the following activities and similar ones for which need may arise in the operations of Government agencies, scientific institutions, and industrial enterprises:

- (1) the construction of physical standards;
- (2) the testing, calibration, and certification of standards and standard measuring apparatus;
- (3) the study and improvement of instruments and methods of measurements;
- (4) the investigation and testing of railroad track scales, elevator scales, and other scales used in weighing commodities for interstate shipment;
- (5) cooperation with the States in securing uniformity in weights and measures laws and methods of inspection;
- (6) the preparation and distribution of standard samples such as those used in checking chemical analyses, temperature, color, viscosity, heat of combustion, and other basic properties of materials; also the preparation and sale or other distribution of standard instruments, apparatus and materials for calibration of measuring equipment;
- (7) the development of methods of chemical analysis and synthesis of materials, and the investigation of the properties of rare substances;
- (8) the study of methods of producing and of measuring high and low temperatures; and the behavior of materials at high and at low temperatures;
- (9) the investigation of radiation, radioactive substances, and X-rays, their uses, and means of protection of persons from their harmful effects;
- (10) the study of the atomic and molecular structure of the chemical elements, with particular reference to the characteristics of the spectra emitted, the use of spectral observations in determining chemical composition of materials, and the relation of molecular structure to the practical usefulness of materials;
- (11) the broadcasting of radio signals of standard frequency;
- (12) the investigation of the conditions which affect the transmission of radio waves from their source to a receiver;
- (13) the compilation and distribution of information on such transmission of radio waves as a basis for choice of frequencies to be used in radio operations;
- (14) the study of new technical processes and methods of fabrication of materials in which the Government has a special interest; also the study of methods of measurement and technical processes used in the manufacture of optical glass and pottery, brick, tile, terra cotta, and other clay products;
- (15) the determination of properties of building materials and structural elements, and encouragement of their standardization and most effective use, including investigation of fire-resisting properties of building materials and conditions under which they may be most efficiently used, and the standardization of types of appliances for fire prevention;
- (16) metallurgical research, including study of alloy steels and light metal alloys; investigation of foundry practice, casting, rolling, and forging; prevention of corrosion of metals and alloys; behavior of bearing metals; and development of standards for metals and sands;
- (17) the operation of a laboratory of applied mathematics;
- (18) the prosecution of such research in engineering, mathematics, and the physical sciences as may be necessary to obtain basic data pertinent to the functions specified herein; and
- (19) the compilation and publication of general scientific and technical data resulting from the performance of the functions specified herein or from other sources when such data are of importance to scientific or manufacturing interests or to the general public, and are not available elsewhere, including demonstration of the results of the Bureau's work by exhibits or otherwise as may be deemed most effective. (Mar. 3, 1901, ch. 872, § 2, 31 Stat. 1449; July 22, 1950, ch. 486, § 1, 64 Stat. 371.)

§ 273. Functions; for whom exercised.

That the bureau shall exercise its functions for the Government of the United States; for any State or municipal government within the United States; or for any scientific society, educational institution, firm, corporation, or individual within the United States engaged in manufacturing or other pursuits requiring the use of standards or standard measuring instruments. All requests for the services of the bureau shall be made in accordance with the rules and regulations herein established in sections 276 and 277 of this title. (Mar. 3, 1901, ch. 872, § 3, 31 Stat. 1449.)

§ 274. Director; powers and duties; report.

The director shall be appointed by the President, by and with the advice and consent of the Senate. He shall have the general supervision of the bureau, its equipment, and the exercise of its functions. He shall make an annual report to the Secretary of Commerce, including an abstract of the work done during the year and a financial statement. He may issue, when necessary, bulletins for public distribution, containing such information as may be of value to the public or facilitate the bureau in the exercise of its functions. (Mar. 3, 1901, ch. 872, § 5, 31 Stat. 1449; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 275. Appointment of officers and employees.

The officers and employees of the bureau, except the director, shall be appointed by the Secretary of Commerce at such time as their respective services may become necessary. (Mar. 3, 1901, ch. 872, § 6, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 275a. Service charges.

The Secretary shall charge for services performed under the authority of section 273 of this title, except in cases where he determines that the interest of the Government would be best served by waiving the charge. Such charges may be based upon fixed prices or costs. The appropriation or fund bearing the cost of the services may be reimbursed, or the Secretary may require advance payment subject to such adjustment on completion of the work as may be agreed upon. (Mar. 3, 1901, ch. 872, § 7, as added Aug. 3, 1956, ch. 906, § 1, 70 Stat. 959.)

§ 276. Ownership of facilities.

In the absence of specific agreement to the contrary, additional facilities, including equipment, purchased pursuant to the performance of services authorized by section 273 of this title shall become the property of the Department of Commerce. (Mar. 3, 1901, ch. 872, § 8, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736; June 30, 1932, ch. 314, § 312, 47 Stat. 410; Aug. 3, 1956, ch. 906, § 1, 70 Stat. 959.)

§ 277. Regulations.

The Secretary of Commerce shall, from time to time, make regulations regarding the payment of fees, the limits of tolerance to be attained in standards submitted for verification, the sealing of standards, the disbursement and receipt of moneys, and such other matters as he may deem necessary for carrying this Act into effect sections 271—278e of this title. (Mar. 3, 1901, ch. 872, § 9, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 278. Visiting committee.

There shall be a visiting committee of five members, to be appointed by the Secretary of Commerce, to consist of men prominent in the various interests involved, and not in the employ of the Government. This committee shall visit the bureau at least once a year, and report to the Secretary of Commerce upon the efficiency of its scientific work and the condition of its equipment. The members of this committee shall serve without compensation, but shall be paid the actual expenses incurred in attending its meetings. The period of service of the members of the committee shall be so arranged that one member shall retire each year, and the appointments to be for a period of five years. Appointments made to fill vacancies occurring other than in the regular manner are to be made for the remainder of the period in which the vacancy exists. (Mar. 3, 1901, ch. 872, § 10, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 278a. Repealed. Pub. L. 88-611, § 4(a)(1), Oct. 2, 1964, 78 Stat. 991.

§ 278b. Working Capital Fund.

(a) Utilization; appropriations.

The National Bureau of Standards is authorized to utilize in the performance of its functions the Working Capital Fund established by the Act of June 29, 1950 (64 Stat. 275), and additional amounts as from time to time may be required for the purposes of said fund are authorized to be appropriated.

(b) Availability of Fund.

The working capital of the fund shall be available for obligation and payment for any activities authorized by sections 271-278e of this title, and for any activities for which provision is made in the appropriations which reimburse the fund.

(c) Reimbursements.

In the performance of authorized activities, the Working Capital Fund shall be available and may be reimbursed for expenses of hire of automobile, hire of consultants, and travel to meetings, to the extent that such expenses are authorized for the appropriations of the Department of Commerce.

(d) Credits.

The fund may be credited with advances and reimbursement, including receipts from non-Federal sources, for services performed under the authority of section 273 of this title.

(e) Cost defined.

As used in sections 271-278e of this title, the term "cost" shall be construed to include directly related expenses and appropriate charges for indirect and administrative expenses.

(f) Distribution of earnings; restoration of prior impairment.

The amount of any earned net income resulting from the operation of the fund at the close of each fiscal year shall be paid into the general fund of the Treasury: *Provided*, That such earned net income may be applied first to restore any prior impairment of the fund. (Mar. 3, 1901, ch. 872, § 12, as added July 22, 1950, ch. 486, § 2, 64 Stat. 371, and amended Aug. 3, 1956, ch. 906, § 2, 70 Stat. 959.)

§ 278c. Acquisition of land for field sites.

To the extent that funds are specifically appropriated therefor, the Secretary of Commerce is authorized to acquire land for such field sites as are necessary for the proper and efficient conduct of the activities authorized herein. (Mar. 3, 1901, ch. 872, § 13, as added Sept. 2, 1958, Pub. L. 85-890, § 1, 72 Stat. 1711.)

§ 278d. Construction and improvement of buildings and facilities.

Within the limits of funds which are appropriated for the National Bureau of Standards, the Secretary of Commerce is authorized to undertake such construction of buildings and other facilities and to make such improvements to existing buildings, grounds, and other facilities occupied or used by the National Bureau of Standards as are necessary for the proper and efficient conduct of the activities authorized herein: *Provided*, That no improvement shall be made nor shall any building be constructed under this authority at a cost in excess of \$40,000 unless specific provision is made therefor in the appropriation concerned. (Mar. 3, 1901, ch. 872, § 14, as added Sept. 2, 1958, Pub. L. 85-890, § 1, 72 Stat. 1711.)

§ 278e. Functions and activities.

In the performance of the functions of the National Bureau of Standards and the Secretary of Commerce is authorized to undertake the following activities: (a) The purchase, repair, and cleaning of uniforms for guards; (b) the repair and alteration of buildings and other plant facilities; (c) the rental of field sites and laboratory, office, and warehouse space; (d) the purchase of reprints from technical journals or other periodicals and the payment of page charges for the publication of research papers and reports in such journals; (e) the furnishing of food and shelter without repayment therefor to employees of the Government at Arctic and Antarctic stations; (f) for the conduct of observations on radio propagation phenomena in the Arctic or Antarctic regions, the appointment of employees at base rates established by the Secretary of Commerce which shall not exceed such maximum rates as may be specified from time to time in the appropriation concerned, and without regard to the civil service and classification laws and sections 911-913, 921, and 922 of Title 5; and (g) the erection on leased property of specialized facilities and working and living quarters when the Secretary of Commerce determines that this will best serve the interests of the Government. (Mar. 3, 1901, ch. 872, § 15, as added Sept. 2, 1958, Pub. L. 85-890, § 1, 72 Stat. 1711.)

§ 279. Absence of Director.

In the case of the absence of the Director of the Bureau of Standards the Secretary of Commerce may designate some officer of said bureau to perform the duties of the director during his absence. (Mar. 4, 1911, ch. 237, § 1, 36 Stat. 1231; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 280. Apprentices; promotion.

Apprentices in the Bureau of Standards may be promoted after satisfactory apprenticeship, with the approval of the Civil Service Commission, to positions corresponding to the journeyman grades for which their duties logically prepare them, without regard to apportionment: *Provided*, That they thus acquire no rights to transfer to other lines of work. (July 16, 1914, ch. 141, § 1, 38 Stat. 502.)

§ 281. Testing materials for District of Columbia.

Materials for fireproof buildings, other structural materials, and all materials, other than materials for paving and for fuel, purchased for and to be used by the government of the District of Columbia, when necessary in the judgment of the commissioners to be tested, shall be tested by the Bureau of Standards under the same conditions as similar testing is required to be done for the United States Government. (Mar. 4, 1913, ch. 150, 37 Stat. 945.)

§ 282. National hydraulic laboratory; establishment; purpose; study of Federal and State projects.

There is authorized to be established in the Bureau of Standards of the Department of Commerce a national hydraulic laboratory for the determination of fundamental data useful in hydraulic research and engineering, including laboratory research relating to the behavior and control of river and harbor waters, the study of hydraulic structures and water flow, and the development and testing of hydraulic instruments and accessories; *Provided*, That no test, study, or other work on a problem or problems connected with a project the prosecution of which is under the jurisdiction of any department or independent agency of the Government shall be undertaken in the laboratory herein authorized until a written request to do such work is submitted to the Director of the Bureau of Standards by the head of the department or independent agency charged with the execution of such project: *And provided further*, That any State or political subdivision thereof may obtain a test, study, or other work on a problem connected with a project the prosecution of which is under the jurisdiction of such State or political subdivision thereof. (May 14, 1930, ch. 275, § 1, 46 Stat. 327.)

§ 283, 284. Omitted.

§ 285, 286. Repealed. Pub. L. 85-890, 3, Sept. 2, 1958, 72 Stat. 1712.

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From the *United States Code, 1970 edition, Containing the General and Permanent Laws of the United States, in Force on January 20, 1971*, pp. 3231-3240.

Chapter 7.—THE BUREAU OF STANDARDS

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- 279. Absence of Director.
- 280. Apprentices; promotion.
- 281. Testing materials for District of Columbia.
- 282. National hydraulic laboratory; establishment; purpose; study of Federal and State projects.
- 283. Repealed
- 284. Transfer of materials, supplies, and equipment to Bureau for Arctic ionosphere observation by Departments of Army, Navy, and Air Force.
- 285, 286. Repealed.

§ 271. Bureau established.

The Office of Standard Weights and Measures shall be known as the National Bureau of Standards. (Mar. 3, 1901, ch. 872, § 1, 31 Stat. 1449.)

§ 272. Functions of Secretary.

The Secretary of Commerce (hereinafter referred to as the "Secretary") is authorized to undertake the following functions:

(a) The custody, maintenance, and development of the national standards of measurement, and the provision of means and methods for making measurements consistent with those standards, including the comparison of standards used in scientific investigations, engineering, manufacturing, commerce, and educational institutions with the standards adopted or recognized by the Government.

(b) The determination of physical constants and properties of materials when such data are of great importance to scientific or manufacturing interests and are not to be obtained of sufficient accuracy elsewhere.

(c) 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.

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

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

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

In carrying out the functions enumerated in this section, the Secretary is authorized to undertake the following activities and similar ones for which need may arise in the operations of Government agencies, scientific institutions, and industrial enterprises:

(1) the construction of physical standards;

(2) the testing, calibration, and certification of standards and standard measuring apparatus;

(3) the study and improvement of instruments and methods of measurements;

(4) the investigation and testing of railroad track scales, elevator scales, and other scales used in weighing commodities for interstate shipment;

(5) cooperation with the States in securing uniformity in weights and measures laws and methods of inspection;

(6) the preparation and distribution of standard samples such as those used in checking chemical analyses, temperature, color, viscosity, heat of combustion, and other basic properties of materials; also the preparation and sale or other distribution of standard instruments, apparatus and materials for calibration of measuring equipment;

(7) the development of methods of chemical analysis and synthesis of materials, and the investigation of the properties of rare substances;

(8) the study of methods of producing and of measuring high and low temperatures; and the behavior of materials at high and at low temperatures;

(9) the investigation of radiation, radioactive substances, and X-rays, their uses, and means of protection of persons from their harmful effects;

(10) the study of the atomic and molecular structure of the chemical elements, with particular reference to the characteristics of the spectra emitted, the use of spectral observations in determining chemical composition of materials, and the relation of molecular structure to the practical usefulness of materials;

(11) the broadcasting of radio signals of standard frequency;

(12) the investigation of the conditions which affect the transmission of radio waves from their source to a receiver;

(13) the compilation and distribution of information on such transmission of radio waves as a basis for choice of frequencies to be used in radio operations;

(14) the study of new technical processes and methods of fabrication of materials in which the Government has a special interest; also the study of methods of measurement and technical processes used in the manufacture of optical glass and pottery, brick, tile, terra cotta, and other clay products;

(15) the determination of properties of building materials and structural elements, and encouragement of their standardization and most effective use, including investigation of fire-resisting properties of building materials and conditions under which they may be most efficiently used, and the standardization of types of appliances for fire prevention;

(16) metallurgical research, including study of alloy steels and light metal alloys; investigation of foundry practice, casting, rolling, and forging; prevention of corrosion of metals and alloys; behavior of bearing metals; and development of standards for metals and sands;

(17) the operation of a laboratory of applied mathematics;

(18) the prosecution of such research in engineering, mathematics, and the physical sciences as may be necessary to obtain basic data pertinent to the functions specified herein; and

(19) the compilation and publication of general scientific and technical data resulting from the performance of the functions specified herein or from other sources when such data are of importance to scientific or manufacturing interests or to the general public, and are not available elsewhere, including demonstration of the results of the Bureau's work by exhibits or otherwise as may be deemed most effective. (Mar. 3, 1901, ch. 872, § 2, 31 Stat. 1449; July 22, 1950, ch. 486, § 1, 64 Stat. 371.)

§ 273. Functions; for whom exercised.

That the bureau shall exercise its functions for the Government of the United States; for any State or municipal government within the United States; or for any scientific society, educational institution, firm, corporation, or individual within the United States engaged in manufacturing or other pursuits requiring the use of standards or standard measuring instruments. All requests for the services of the bureau shall be made in accordance with the rules and regulations herein established in sections 276 and 277 of this title. (Mar. 3, 1901, ch. 872, § 3, 31 Stat. 1449.)

§ 274. Director; powers and duties; report.

The director shall be appointed by the President, by and with the advice and consent of the Senate. He shall have the general supervision of the bureau, its equipment, and the exercise of its functions. He shall make an annual report to the Secretary of Commerce, including an abstract of the work done during the year and a financial statement. He may issue, when necessary, bulletins for public distribution, containing such information as may be of value to the public or facilitate the bureau in the exercise of its functions. (Mar. 3, 1901, ch. 872, § 5, 31 Stat. 1449; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 275. Appointment of officers and employees.

The officers and employees of the bureau, except the director, shall be appointed by the Secretary of Commerce at such time as their respective services may become necessary. (Mar. 3, 1901, ch. 872, § 6, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 275a. Service charges.

The Secretary shall charge for services performed under the authority of section 273 of this title, except in cases where he determines that the interest of the Government would be best served by waiving the charge. Such charges may be based upon fixed prices or costs. The appropriation or fund bearing the cost of the services may be reimbursed, or the Secretary may require advance payment subject to such adjustment on completion of the work as may be agreed upon. (Mar. 3, 1901, ch. 872, § 7, as added Aug. 3, 1956, ch. 906, § 1, 70 Stat. 959.)

§ 276. Ownership of facilities.

In the absence of specific agreement to the contrary, additional facilities, including equipment, purchased pursuant to the performance of services authorized by section 273 of this title shall become the property of the Department of Commerce. (Mar. 3, 1901, ch. 872, § 8, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736; June 30, 1932, ch. 314, § 312, 47 Stat. 410; Aug. 3, 1956, ch. 906, § 1, 70 Stat. 959.)

§ 277. Regulations.

The Secretary of Commerce shall, from time to time, make regulations regarding the payment of fees, the limits of tolerance to be attained in standards submitted for verification, the sealing of standards, the disbursement and receipt of moneys, and such other matters as he may deem necessary for carrying this Act into effect sections 271—278e of this title. (Mar. 3, 1901, ch. 872, § 9, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 278. Visiting committee.

There shall be a visiting committee of five members, to be appointed by the Secretary of Commerce, to consist of men prominent in the various interests involved, and not in the employ of the Government. This committee shall visit the bureau at least once a year, and report to the Secretary of Commerce upon the efficiency of its scientific work and the condition of its equipment. The members of this committee shall serve without compensation, but shall be paid the actual expenses incurred in attending its meetings. The period of service of the members of the committee shall be so arranged that one member shall retire each year, and the appointments to be for a period of five years. Appointments made to fill vacancies occurring other than in the regular manner are to be made for the remainder of the period in which the vacancy exists. (Mar. 3, 1901, ch. 872, § 10, 31 Stat. 1450; Feb. 14, 1903, ch. 552, § 10, 32 Stat. 829; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 278a. Repealed. Pub. L. 88-611, § 4 (a)(1), Oct. 2, 1964, 78 Stat. 991.

§ 278b. Working Capital Fund.

(a) Utilization; appropriations.

The National Bureau of Standards is authorized to utilize in the performance of its functions the Working Capital Fund established by the Act of June 29, 1950 (64 Stat. 275), and additional amounts as from time to time may be required for the purposes of said fund are authorized to be appropriated.

(b) Availability of Fund.

The working capital of the fund shall be available for obligation and payment for any activities authorized by sections 271-278e of this title, and for any activities for which provision is made in the appropriations which reimburse the fund.

(c) Reimbursements.

In the performance of authorized activities, the Working Capital Fund shall be available and may be reimbursed for expenses of hire of automobile, hire of consultants, and travel to meetings, to the extent that such expenses are authorized for the appropriations of the Department of Commerce.

(d) Credits.

The fund may be credited with advances and reimbursement, including receipts from non-Federal sources, for services performed under the authority of section 273 of this title.

(e) Cost defined.

As used in sections 271-278e of this title, the term "cost" shall be construed to include directly related expenses and appropriate charges for indirect and administrative expenses.

(f) Distribution of earnings; restoration of prior impairment.

The amount of any earned net income resulting from the operation of the fund at the close of each fiscal year shall be paid into the general fund of the Treasury: *Provided*, That such earned net income may be applied first to restore any prior impairment of the fund. (Mar. 3, 1901, ch. 872, § 12, as added July 22, 1950, ch. 486, § 2, 64 Stat. 371, and amended Aug. 3, 1956, ch. 906, § 2, 70 Stat. 959.)

§ 278c. Acquisition of land for field sites.

To the extent that funds are specifically appropriated therefor, the Secretary of Commerce is authorized to acquire land for such field sites as are necessary for the proper and efficient conduct of the activities authorized herein. (Mar. 3, 1901, ch. 872, § 13, as added Sept. 2, 1958, Pub. L. 85-890, § 1, 72 Stat. 1711.)

§ 278d. Construction and improvement of buildings and facilities.

Within the limits of funds which are appropriated for the National Bureau of Standards, the Secretary of Commerce is authorized to undertake such construction of buildings and other facilities and to make such improvements to existing buildings, grounds, and other facilities occupied or used by the National Bureau of Standards as are necessary for the proper and efficient conduct of the activities authorized herein: *Provided*, That no improvement shall be made nor shall any building be constructed under this authority at a cost in excess of \$40,000 unless specific provision is made therefor in the appropriation concerned. (Mar. 3, 1901, ch. 872, § 14, as added Sept. 2, 1958, Pub. L. 85-890, § 1, 72 Stat. 1711.)

§ 278e. Functions and activities.

In the performance of the functions of the National Bureau of Standards and the Secretary of Commerce is authorized to undertake the following activities: (a) The purchase, repair, and cleaning of uniforms for guards; (b) the repair and alteration of buildings and other plant facilities; (c) the rental of field sites and laboratory, office, and warehouse space; (d) the purchase of reprints from technical journals or other periodicals and the payment of page charges for the publication of research papers and reports in such journals; (e) the furnishing of food and shelter without repayment therefor to employees of the Government at Arctic and Antarctic stations; (f) for the conduct of observations on radio propagation phenomena in the Arctic or Antarctic regions, the appointment of employees at base rates established by the Secretary of Commerce which shall not exceed such maximum rates as may be specified from time to time in the appropriation concerned, and without regard to the civil service and classification laws and sections 911-913, 921, and 922 of Title 5; and (g) the erection on leased property of specialized facilities and working and living quarters when the Secretary of Commerce determines that this will best serve the interests of the Government. (Mar. 3, 1901, ch. 872, § 15, as added Sept. 2, 1958, Pub. L. 85-890, § 1, 72 Stat. 1711.)

§ 278f. Fire research and safety program; functions of Secretary of Commerce.

The Secretary of Commerce (hereinafter referred to as the "Secretary") is authorized to—

- (a) Investigations for determination of pertinent factors; prevention, control, and reduction of effects, methods and techniques; educational programs; fire information reference services; demonstration projects.

Conduct directly or through contracts or grants—

(1) investigations of fires to determine their causes, frequency of occurrence, severity, and other pertinent factors;

(2) research into the causes and nature of fires, and the development of improved methods and techniques for fire prevention, fire control, and reduction of death, personal injury, and property damage;

(3) educational programs to—

(A) inform the public of fire hazards and fire safety techniques, and

(B) encourage avoidance of such hazards and use of such techniques;

(4) fire information reference services, including the collection, analysis, and dissemination of data, research results, and other information, derived from this program or from other sources and related to fire protection, fire control, and reduction of death, personal injury, and property damage;

(5) educational and training programs to improve, among other things—

(A) The efficiency, operation, and organization of fire services, and

(B) The capability of controlling unusual fire-related hazards and fire disasters; and

(6) projects demonstrating—

(A) improved or experimental programs of fire prevention, fire control, and reduction of death, personal injury, and property damage,

(B) application of fire safety principles in construction, or

(C) improvement of the efficiency, operation, or organization of the fire services.

- (b) Engineering or science curriculums; instructional materials and aids.

Support by contracts or grants the development, for use by educational and other nonprofit institutions, of—

(1) fire safety and fire protection engineering or science curriculums; and

(2) fire safety courses, seminars, or other instructional materials and aids for the above curriculums or other appropriate curriculums or courses of instruction.

(Mar. 3, 1901, ch. 872, § 16, as added Mar. 1, 1968, Pub. L. 90-259, title I, § 102, 83 Stat. 35.)

§ 278g. Same; general provisions.

With respect to the functions authorized by section 278 of this title—

(a) Eligibility for grants; amount; conditions; definitions.

Grants may be made only to States and local governments, other non-Federal public agencies, and nonprofit institutions. Such a grant may be up to 100 per centum of the total cost of the project for which such grant is made. The Secretary shall require, whenever feasible, as a condition of approval of a grant, that the recipient contribute money, facilities, or services to carry out the purpose for which the grant is sought. For the purposes of this section, "State" means any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, the Canal Zone, American Samoa, and the Trust Territory of the Pacific Islands; and "public agencies" includes combinations or groups of States or local governments.

(b) Reimbursement of Federal agencies; delegation of powers.

The Secretary may arrange with and reimburse the heads of other Federal departments and agencies for the performance of any such functions, and, as necessary or appropriate, delegate any of his powers under this section or section 278f of this title with respect to any part thereof, and authorize the redelegation of such powers.

(c) Advances of public moneys.

The Secretary may perform such functions without regard to section 529 of Title 31.

(d) Cooperation of Federal agencies.

The Secretary is authorized to request any Federal department or agency to supply such statistics, data, program reports, and other materials as he deems necessary to carry out such functions. Each such department or agency is authorized to cooperate with the Secretary and, to the extent permitted by law, to furnish such materials to the Secretary. The Secretary and the heads of other departments and agencies engaged in administering programs related to fire safety shall, to the maximum extent practicable, cooperate and consult in order to insure fully coordinated efforts.

(e) Administration of functions; rules and regulations.

The Secretary is authorized to establish such policies, standards, criteria, and procedures and to prescribe such rules and regulations as he may deem necessary or appropriate to the administration of such functions or this section, including rules and regulations which—

(1) provide that a grantee will from time to time, but not less often than annually, submit a report evaluating accomplishments of activities funded under section 278f of this title, and

(2) provide for fiscal control, sound accounting procedures, and periodic reports to the Secretary regarding the application of funds paid under section 278f of this title.

(Mar. 3, 1901, ch. 872, § 17, as added Mar. 1, 1968, Pub. L. 90-259, title I, § 102, 82 Stat. 35.)

§ 279. Absence of Director.

In the case of the absence of the Director of the Bureau of Standards the Secretary of Commerce may designate some officer of said bureau to perform the duties of the director during his absence. (Mar. 4, 1911, ch. 237, § 1, 36 Stat. 1231; Mar. 4, 1913, ch. 141, § 1, 37 Stat. 736.)

§ 280. Apprentices; promotion.

Apprentices in the Bureau of Standards may be promoted after satisfactory apprenticeship, with the approval of the Civil Service Commission, to positions corresponding to the journeyman grades for which their duties logically prepare them, without regard to apportionment: *Provided*, That they thus acquire no rights to transfer to other lines of work. (July 16, 1914, ch. 141, § 1, 38 Stat. 502.)

§ 281. Testing materials for District of Columbia.

Materials for fireproof buildings, other structural materials, and all materials, other than materials for paving and for fuel, purchased for and to be used by the government of the District of Columbia, when necessary in the judgment of the commissioners to be tested, shall be tested by the Bureau of Standards under the same conditions as similar testing is required to be done for the United States Government. (Mar. 4, 1913, ch. 150, 37 Stat. 945.) ?

§ 282. National hydraulic laboratory; establishment; purpose; study of Federal and State projects.

There is authorized to be established in the Bureau of Standards of the Department of Commerce a national hydraulic laboratory for the determination of fundamental data useful in hydraulic research and engineering, including laboratory research relating to the behavior and control of river and harbor waters, the study of hydraulic structures and water flow, and the development and testing of hydraulic instruments and accessories; *Provided*, That no test, study, or other work on a problem or problems connected with a project the prosecution of which is under the jurisdiction of any department or independent agency of the Government shall be undertaken in the laboratory herein authorized until a written request to do such work is submitted to the Director of the Bureau of Standards by the head of the department or independent agency charged with the execution of such project: *And provided further*, That any State or political subdivision thereof may obtain a test, study, or other work on a problem connected with a project the prosecution of which is under the jurisdiction of such State or political subdivision thereof. (May 14, 1930, ch. 275, § 1, 46 Stat. 327.)

§ 283. Repealed. Pub. L. 89-554, § 8(a), Sept. 6, 1966, 80 Stat. 655, 656.

§ 284. Transfer of materials, supplies, and equipment to Bureau for Arctic ionosphere observation by Departments of Army, Navy, and Air Force.

§ 285, 286. Repealed. Pub. L. 85-890, § 3, Sept. 2, 1958, 72 Stat. 1712.

Chapter 7A.—STANDARD REFERENCE DATA PROGRAM

Sec.

290. Congressional declaration of policy.

290a. Definitions.

290b. Collection, compilation, critical evaluation, publication and dissemination of standard reference data.

290c. Standards, criteria, and procedures for preparation and publication of standard reference data; publication in Federal Register.

290d. Sale of standard reference data; cost recovery; proceeds subject to Bureau of Standards.

290e. United States copyright and renewal rights.

290f. Authorization of appropriations.

§ 290. Congressional declaration of policy.

The Congress hereby finds and declares that reliable standardized scientific and technical reference data are of vital importance to the progress of the Nation's science and technology. It is therefore the policy of the Congress to make critically evaluated reference data readily available to scientists, engineers, and the general public. It is the purpose of this chapter to strengthen and enhance this policy. (Pub. L. 90-396, § 1, July 11, 1968, 82 Stat. 339.)

§ 290a. Definitions.

For the purposes of this chapter—

(a) The term "standard reference data" means quantitative information, related to a measurable physical or chemical property of a substance or system of substances of known composition and structure, which is critically evaluated as to its reliability under section 290b of this title.

(b) The term "Secretary" means the Secretary of Commerce. (Pub. L. 90-396, § 2, July 11, 1968, 82 Stat. 340.)

§ 290b. Collection, compilation, critical evaluation, publication and dissemination of standard reference data.

The Secretary is authorized and directed to provide or arrange for the collection, compilation, critical evaluation, publication, and dissemination of standard reference data. In carrying out this program, the Secretary shall, to the maximum extent practicable, utilize the reference data services and facilities of other agencies and instrumentalities of the Federal Government and of State and local governments, persons, firms, institutions, and associations, with their consent and in such a manner as to avoid duplication of those services and facilities. All agencies and instrumentalities of the Federal Government are encouraged to exercise their duties and functions in such manner as will assist in carrying out the purpose of this chapter. This section shall be deemed complementary to existing authority, and nothing herein is intended to repeal, supersede, or diminish existing authority or responsibility of an agency or instrumentality of the Federal government. (Pub. L. 90-396, § 3, July 11, 1968, 82 Stat. 340.)

§ 290c. Standards, criteria, and procedures for preparation and publication of standard reference data; publication in Federal Register.

To provide for more effective integration and coordination of standard reference data activities, the Secretary, in consultation with other interested Federal agencies, shall prescribe and publish in the Federal Register such standards, criteria, and procedures for the preparation and publication of standard reference data as may be necessary to carry out the provisions of this chapter. (Pub. L. 90-396, § 4, July 11, 1968, 82 Stat. 340.)

§ 290d. Sale of standard reference data; cost recovery; proceeds subject to Bureau of Standards.

Standard reference data conforming to standards established by the Secretary may be made available and sold by the Secretary or by a person or agency designated by him. To the extent practicable and appropriate, the prices established for such data may reflect the cost of collection, compilation, evaluation, publication, and dissemination of the data, including administrative expenses; and the amounts received shall be subject to the Act of March 3, 1901, as amended. (Pub. L. 90-396, § 5, July 11, 1968, 82 Stat. 340.)

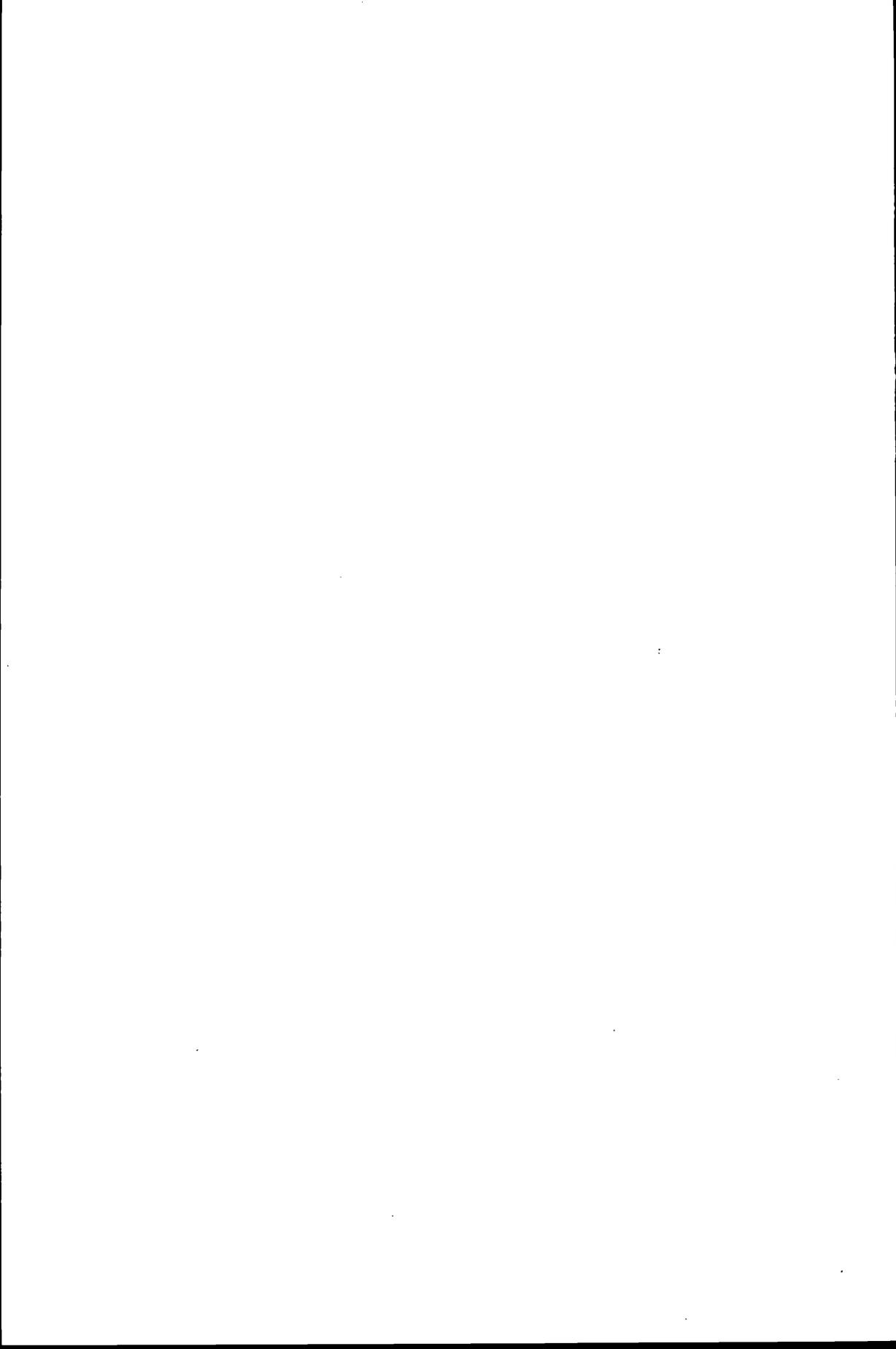
§ 290e. United States copyright and renewal rights.

(a) Notwithstanding the limitations contained in section 8 of Title 17, the Secretary may secure copyright and renewal thereof on behalf of the United States as author or proprietor in all or any part of any standard reference data which he prepares or makes available under this chapter, and may authorize the reproduction and publication thereof by others.

(b) The publication or republication by the Government under this chapter, either separately or in a public document, or any material in which copyright is subsisting shall not be taken to cause any abridgment or annulment of the copyright or to authorize any use or appropriation of such material without the consent of the copyright proprietor. (Pub. L. 90-396, § 6, July 11, 1968, 82 Stat. 340.)

§ 290f. Authorization of appropriations.

There are authorized to be appropriated to carry out this chapter, \$1.86 million for the fiscal year ending June 30, 1969. Notwithstanding the provisions of any other law, no appropriations for any fiscal year may be made for the purpose of this chapter after fiscal year 1969 unless previously authorized by legislation hereafter enacted by the Congress. (Pub. L. 90-396, 7, July 11, 1968, 82 Stat. 340.)



APPENDIX D

THE NATIONAL BUREAU OF STANDARDS IN THE FEDERAL ADMINISTRATION

UNITED STATES PRESIDENTS

William McKinley
1897-1901

Theodore Roosevelt
1901-9

William Howard Taft
1909-13

Woodrow Wilson
1913-21

Warren G. Harding
1921-23

Calvin Coolidge
1923-29

Herbert C. Hoover
1929-33

Franklin D. Roosevelt
1933-45

Harry S. Truman
1945-53

Dwight D. Eisenhower
1953-61

John F. Kennedy
1961-63

Lyndon B. Johnson
1963-69

Richard M. Nixon
1969-74

DEPARTMENT SECRETARIES

Lyman J. Gage
Secretary of Treasury
1897-1901

Leslie M. Shaw
1901

George B. Cortelyou
Secretary of Commerce
and Labor, 1903-4

Victor H. Metcalf
1904-6

Oscar S. Straus
1906-9

Charles Nagel
1909-13

William C. Redfield
Secretary of Commerce
1913-19

Joshua W. Alexander
1919-21

Herbert C. Hoover
1921-28

William F. Whiting
1928-29

Robert P. Lamont
1929-32

Roy D. Chapin
1932-33

Daniel C. Roper
1933-39

Harry L. Hopkins
1939-40

Jesse Jones
1940-45

Henry A. Wallace
1945-46

W. Averell Harriman
1947-48

Charles W. Sawyer
1948-52

Sinclair Weeks
1952-58

Lewis L. Strauss
1958-59

Frederick H. Mueller
1959-61

Luther H. Hodges
1961-65

John T. Conner
1965-67

Alex B. Trowbridge
1967-68

Cyrus R. Smith
1968-69

Maurice H. Stans
1969-1972

NBS DIRECTORS

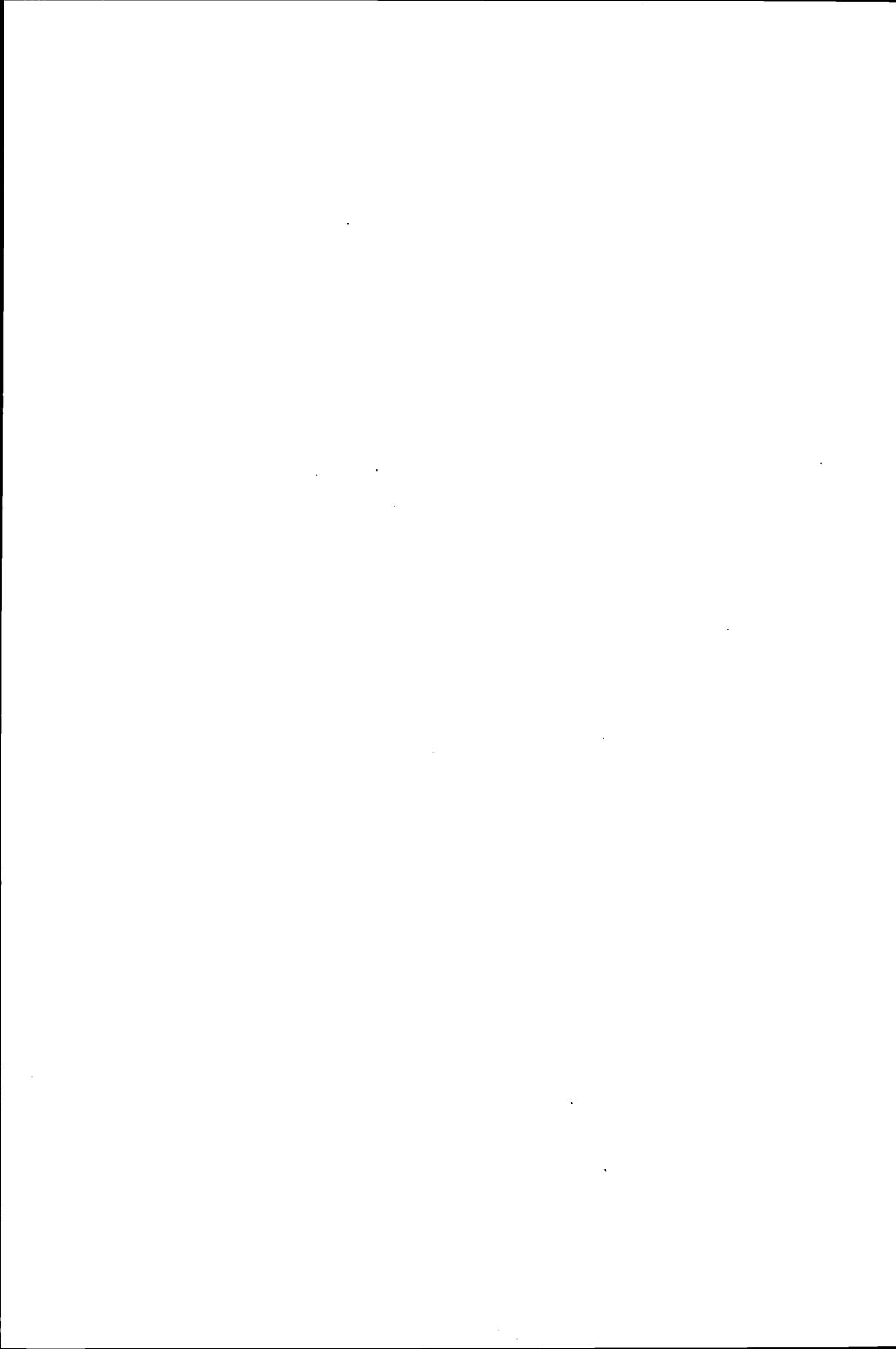
Samuel W. Stratton
1901-22

George K. Burgess
1922-32

Lyman J. Briggs
1932-46
Edward U. Condon
1946-51

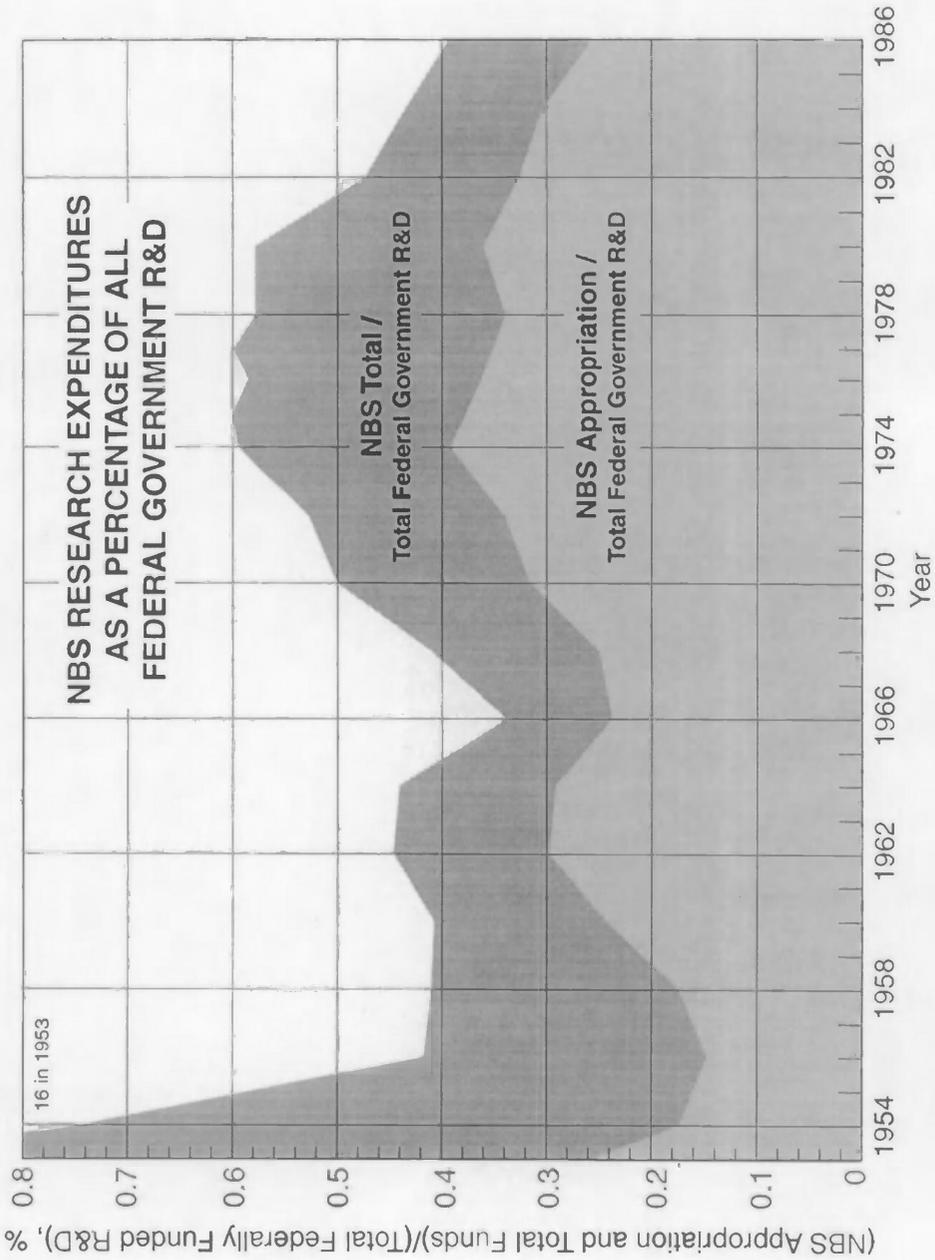
Allen V. Astin
1951-68

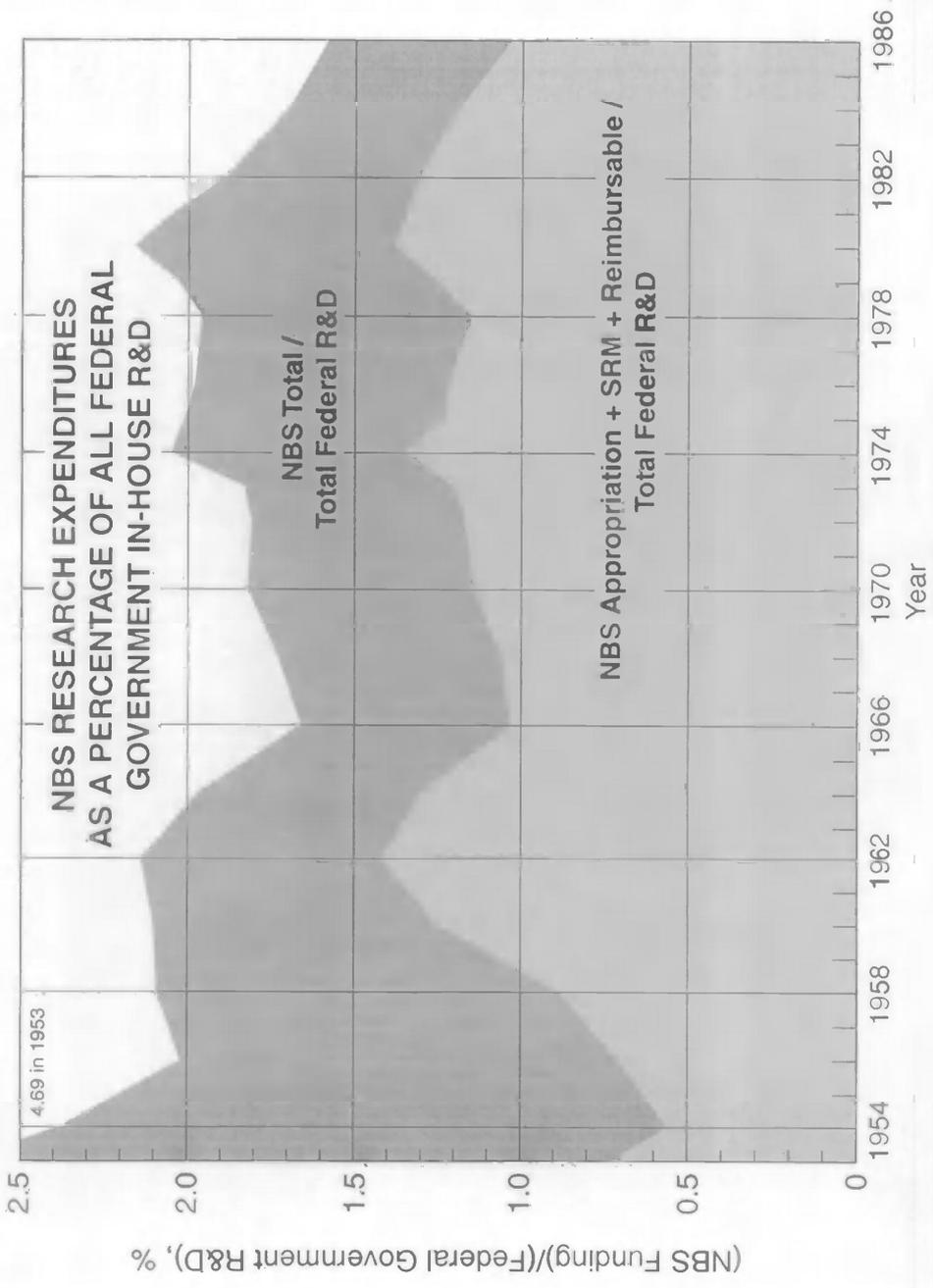
Lewis M. Branscomb
1969-71

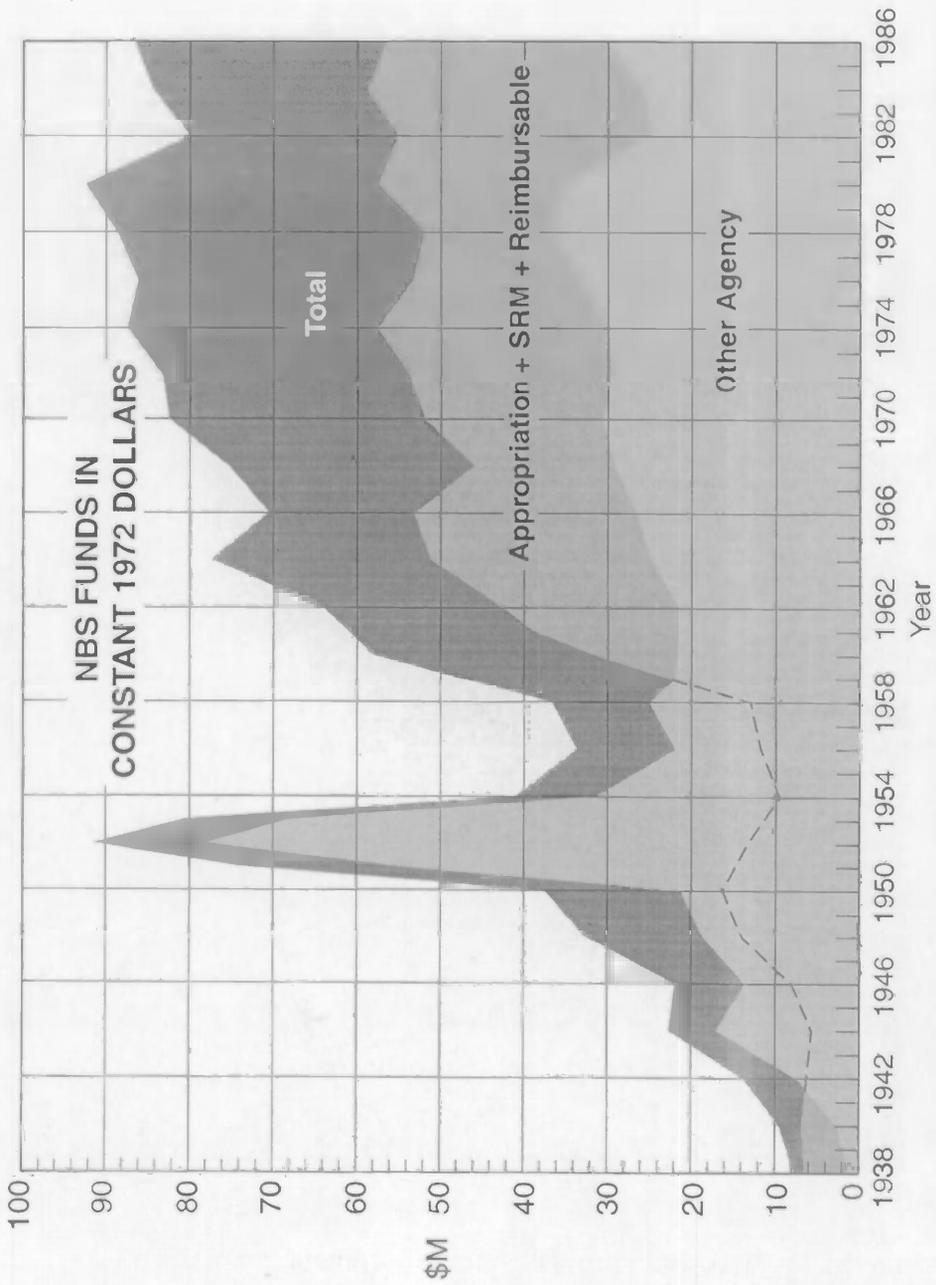


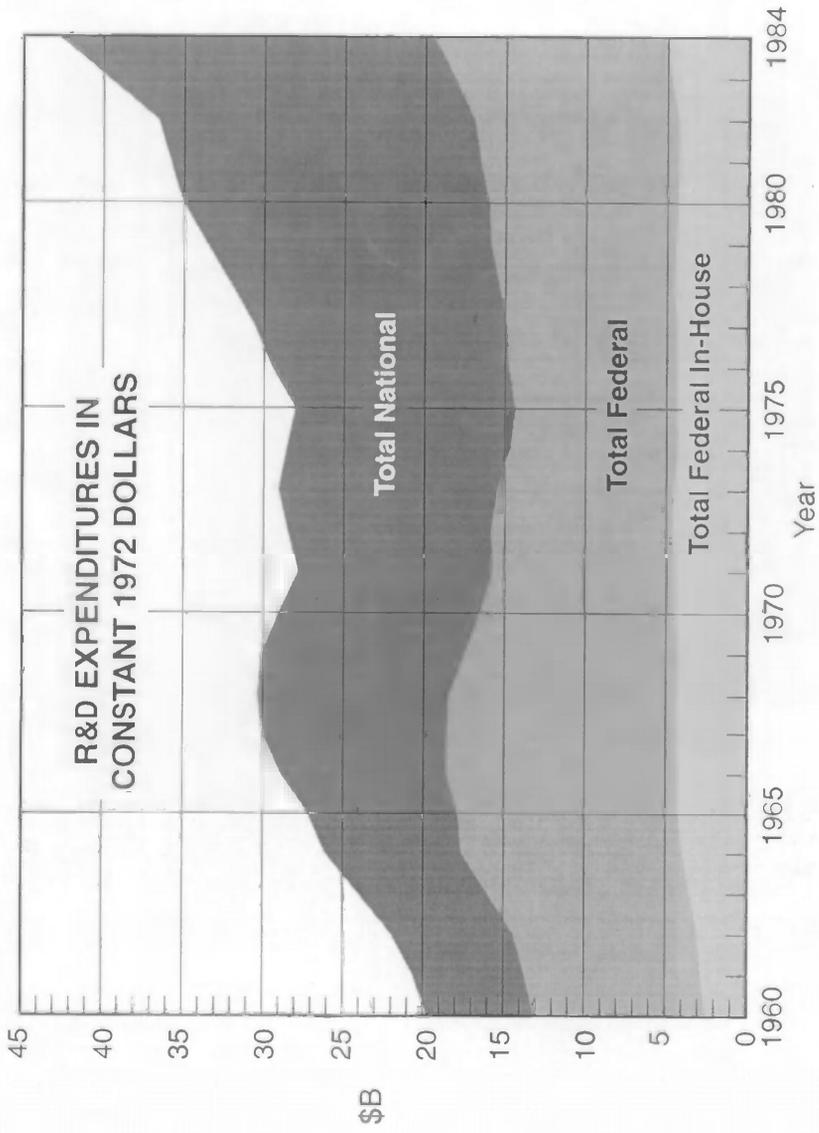
APPENDIX E

APPROPRIATIONS AND EXPENDITURES CHARTS









APPENDIX F

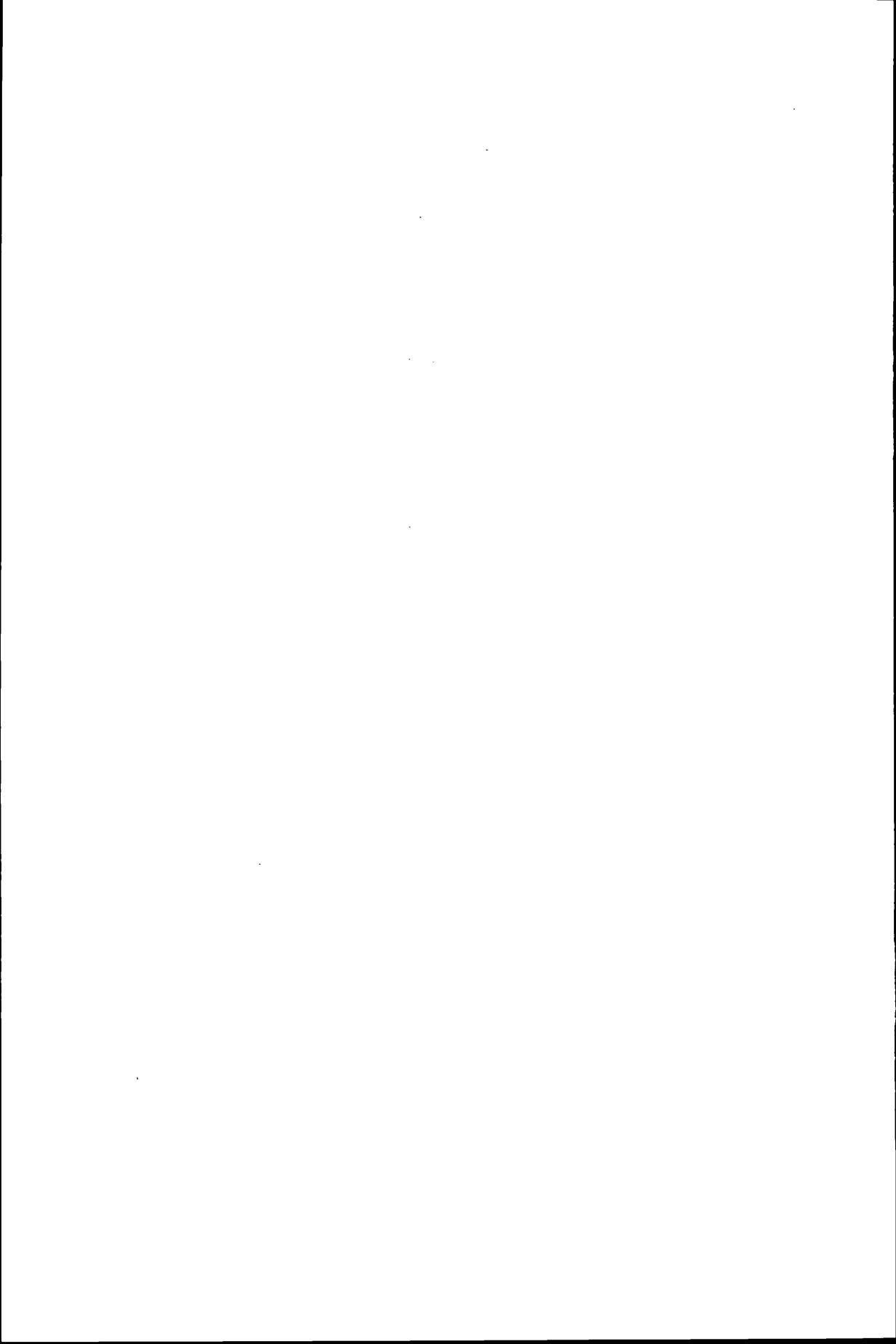
MEMBERS OF THE VISITING COMMITTEE OF THE SECRETARY OF COMMERCE TO NBS AND NIST¹

	<i>Term</i>
ALBERT LADD COLBY	1901-07
Consulting engineer in metallurgy, South Bethlehem, Pa., and secretary, Association of American Steel Manufacturers.	
DR. ELIHU THOMSON	1901-18
Electrical engineer, General Electric Co., Lynn, Mass.	
DR. IRA REMSEN	1901-09
Director of Chemical Laboratory and president, Johns Hopkins University.	
DR. HENRY S. PRITCHETT	1901-10
President, Massachusetts Institute of Technology; later president, Carnegie Foundation for the Advancement of Teaching.	
PROF. EDWARD L. NICHOLS	1901-11
Professor of physics, Cornell University.	
DR. ROBERT S. WOODWARD	1908-12
President, Carnegie Institution of Washington.	
PROF. HENRY M. HOWE	1909-14
Professor of metallurgy, Columbia University.	
PROF. ARTHUR G. WEBSTER	1910-15
Director, Physics Laboratory, Clark University.	
PROF. JOHN F. HAYFORD	1912-21
Director, College of Engineering, Northwestern University.	
PROF. ARTHUR E. KENNELLY	1912-17
Professor of electrical engineering, Harvard University.	
JOHN R. FREEMAN	1915-24, 1926-31
Consulting engineer, Providence, R.I.	
PROF. WILLIAM A. NOYES	1915-20
Director, Chemical Laboratory, University of Illinois.	
PROF. JOSEPH S. AMES	1917-22
Director, Physical Laboratory, Johns Hopkins University.	
PROF. FRED W. McNAIR	1921-23
President, Michigan College of Mines, Houghton, Mich.	
PROF. WILDER D. BANCROFT	1920-25
Professor of physical chemistry, Cornell University.	
DR. AMBROSE SWASEY	1921-26
Chairman of the Board, Warner & Swasey Co., Cleveland, Ohio.	
DR. SAMUEL W. STRATTON	1923-31
President, Massachusetts Institute of Technology.	

¹ Sources: NARG 167, NBS Box 296; NARG 40, files of Secretary of Commerce, 67009/5; current files, Office of the Director, NBS.

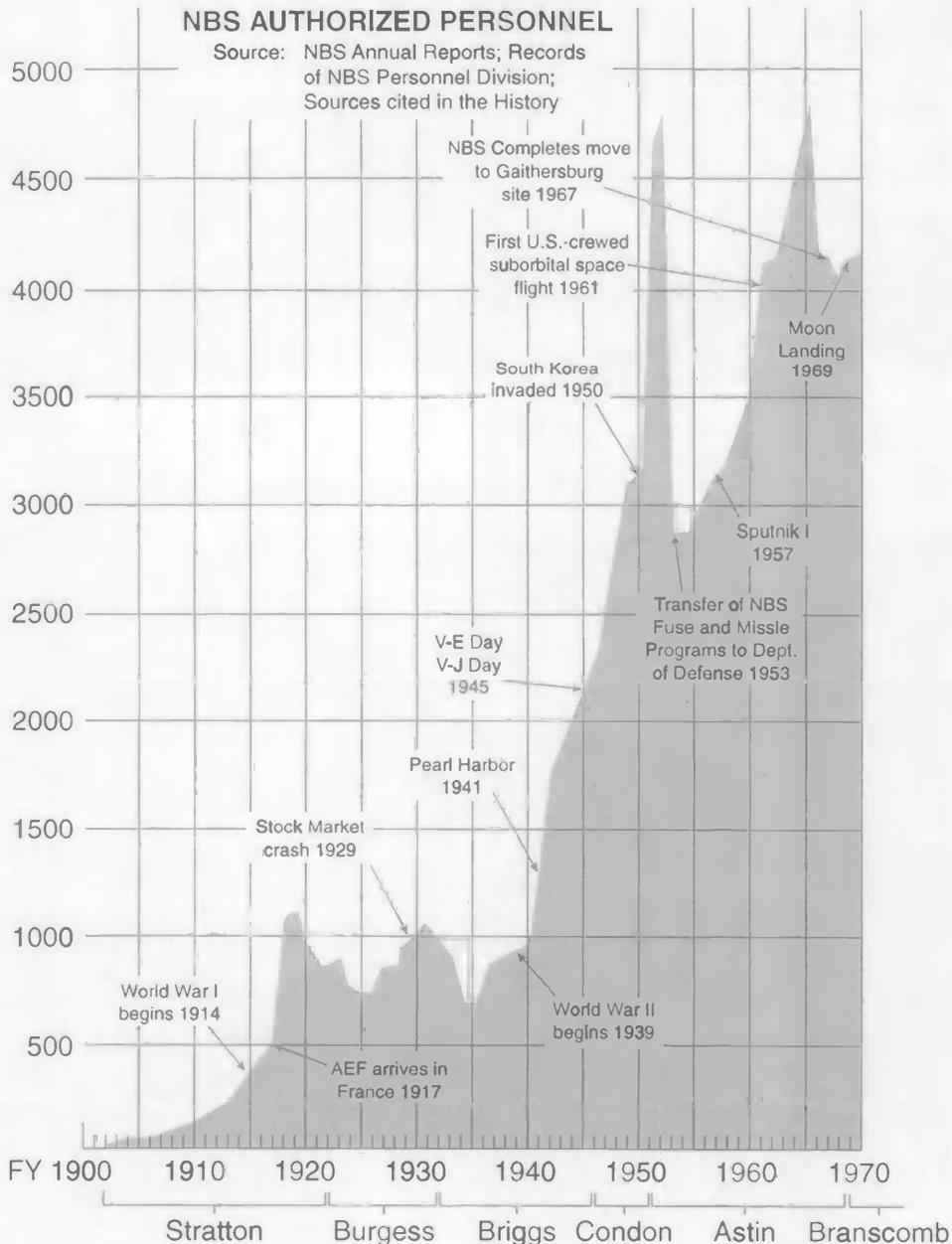
	<i>Term</i>
GANO DUNN	1923-48
President, J. G. White Engineering Corp., New York.	
PROF. WILLIAM F. DURAND	1924-29
Professor of mechanical engineering, Leland Stanford University.	
DR. WILLIS R. WHITNEY	1925-30
Director, General Electric Research Laboratory, Schenectady, N.Y.	
DR. CHARLES F. KETTERING	1929-34, 1947-52
Director of research and vice president, General Motors Corp.	
DR. CHARLES L. REESE	1930-35
Consulting chemist to E. I. du Pont de Nemours & Co.	
MORRIS E. LEEDS	1931-41
President, Leeds & Northrup Co., Philadelphia, Pa.	
DR. KARL T. COMPTON	1931-47
President, Massachusetts Institute of Technology.	
DR. WILLIAM D. COOLIDGE	1935-49
Vice president and director of research, General Electric Co.	
DR. FRANK B. JEWETT	1935-45
Vice president in charge of research and development, American Telephone & Telegraph Co.; president, National Academy of Sciences.	
DR. VANNEVAR BUSH	1942-46
President, Carnegie Institution of Washington; director, Office of Scientific Research and Development.	
DR. HAROLD C. UREY	1945-50
Research professor of chemistry, University of Chicago.	
DR. EUGENE P. WIGNER	1946-51
Metallurgical Laboratory, University of Chicago; director of research, Clinton Laboratories, Oak Ridge, Tenn.	
DR. ROBERT F. MEHL	1948-53
Director, Metals Research Laboratory, Carnegie Institute of Technology.	
DR. DONALD H. MENZEL	1949-54
Chairman, Department of Astronomy, Harvard University; associate director, Harvard Observatory.	
DR. DETLEV W. BRONK	1950-60
President, Johns Hopkins University.	
PROF. JOHN H. VAN VLECK	1951-56
Dean, Division of Applied Science, Harvard University.	
DR. MERVIN J. KELLY	1952-62
President, Bell Telephone Laboratories.	
DR. CLYDE E. WILLIAMS	1953-58
Director, Battelle Memorial Institute, Columbus, Ohio.	
DR. CRAWFORD H. GREENEWALT	1954-64
President, E. I. du Pont de Nemours & Co.	
PROF. FREDERICK SEITZ	1956-61
Chairman, Department of Physics, University of Illinois.	
DR. LLOYD V. BERKNER	1957-62
Scientific research administrator; chairman, Space Science Board, National Academy of Sciences.	

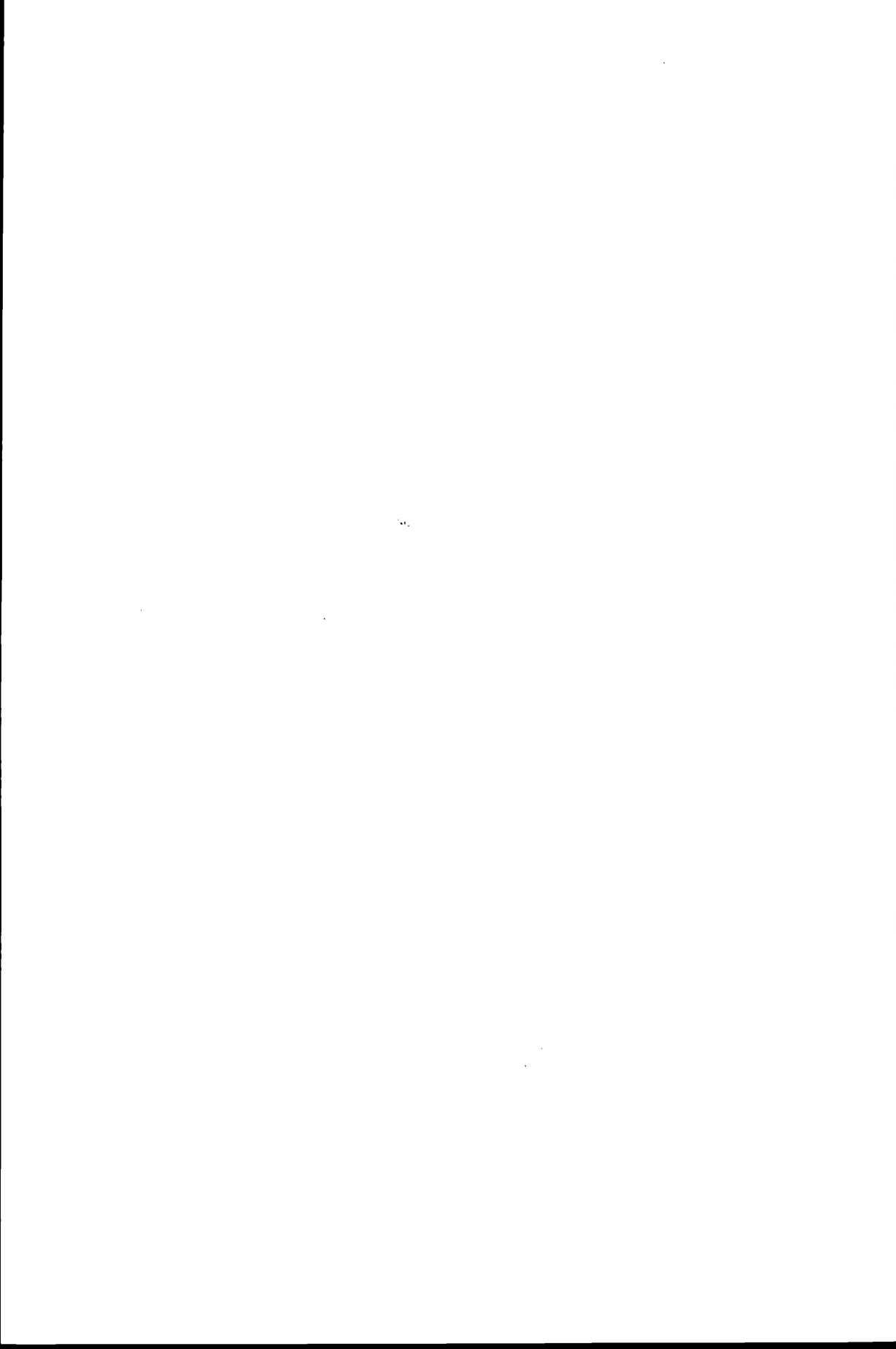
	<i>Term</i>
PROF. CHARLES H. TOWNES..... Department of Physics, Columbia University, consultant, Brookhaven National Laboratories.	1960-65
EMANUEL R. PRYORE..... Vice president and chief scientist, International Business Machines, Incorporated.	1962-72
ELMER W. ENGSTROM..... President, Radio Corporation of America.	1963-71
PAUL C. CROSS..... President, Mellon Institute.	1964-69
NORMAN F. RAMSEY..... Department of Physics, Harvard University.	1965-70, 1982-87
ROBERT L. SPROULL..... Vice president, University of Rochester.	1966-71
JACK E. GOLDMAN..... Senior vice president, Research and Development, Xerox Corp.	1969-74
JAMES C. FLETCHER..... President, University of Utah.	1970-71



APPENDIX G

NBS AUTHORIZED PERSONNEL CHART





APPENDIX H

NBS/NIST PUBLICATIONS

Aeronautic Instruments Circulars

TL589.U47

No. 1-51 (1918-1921)

These technical circulars discussed the principles involved in the various aeronautic instruments and the methods of testing employed by the Aeronautic Instruments Section. The confidential reports were duplicated for temporary use and served to make the results immediately available for the instruction of the experts engaged in aviation work in the technical divisions of the Army and Navy. They were not for publication.

Aeronautic Power Plants Reports

TL521.A33

No. 3-53 (1918-1919)

These technical reports were results of investigations by the NBS Airplane Power Plant Section for the National Advisory Committee for Aeronautics. The reports were confidential for use by the Army, Navy, and authorized civilians.

Annual Reports

QC100.U55

Fiscal Year 1902–Fiscal Year 1985

The title varies and includes:

Annual Report of the Director of the National Bureau of Standards for the Fiscal Year Ended . . .
(June 30, 1902–June 30, 1903)

Annual Report of the Director of the Bureau of Standards to the Secretary of Commerce and Labor for the Fiscal Year Ended . . . (June 30, 1904–June 30, 1912)

Annual Report of the Director, Bureau of Standards to the Secretary of Commerce for the Fiscal Year Ended . . . (June 30, 1913–June 30, 1921)

Annual Report of the Director of the Bureau of Standards to the Secretary of Commerce for the Fiscal Year Ended . . . (June 30, 1922–June 30, 1932)

Reprinted from the Annual Report of the Secretary of Commerce. Bureau of Standards. (1933)

Reprinted from the Annual Report of the Secretary of Commerce. National Bureau of Standards.
(1934-1942)

The *Annual Reports of the National Bureau of Standards* for the fiscal years 1943, 1944, and 1945 were not published because of economy measures taken during World War II. The manuscripts for these annual reports were submitted to the secretary of commerce in typewritten form.

Annual Report of the National Bureau of Standards. Reprinted from the Annual Report of the Secretary of Commerce. (1946-1948)

Annual Report . . . National Bureau of Standards. (1949-1952)

Biennial Report 1953 and 1954, National Bureau of Standards. From the Preface: At the scheduled time for the preparation and release of the 1953 report the Bureau was undergoing comprehensive survey by an Ad Hoc Committee [Kelly Committee] appointed by the secretary of commerce to "evaluate the present functions and operation of the NBS in relation to present national needs." A number of important changes affecting the over-all Bureau program were made as a result of this survey. It was considered more appropriate to delay the report for a year in order to include the complete recommendations of the Ad Hoc Committee rather than to report on them partially.

Annual Report . . . National Bureau of Standards. (1955-1957)
Research Highlights of the National Bureau of Standards. Annual Report, Fiscal Year . . . (1958-1963)
Technical Highlights of the National Bureau of Standards. Annual Report, Fiscal Year . . . (1964-1970)
NBS 1971 Annual Report. SP-397 June 1972
National Bureau of Standards, NBS. (1972) SP-367 Oct 1972
National Bureau of Standards, NBS. [1973] SP-397 June 1974
NBS Annual Report Fiscal Year 1974. SP-418 March 1975
National Bureau of Standards Annual Report FY 1975. SP-437 Dec 1975
National Bureau of Standards, Perspectives on Standards. (1976) SP-467 March 1977
Science on it's Way to Work, Activities of the National Bureau of Standards.
[1977] SP-498 April 1978
National Bureau of Standards, A National Resource for Science and Technology, Fiscal Year 1978.
SP-538 July 1979
1979 was not published.
National Bureau of Standards 1980. SP-600 Jan 1981
National Bureau of Standards 1982. [covered fiscal years 1981 and 1982] SP-643 Feb 1983
National Bureau of Standards. [1983] SP-679 July 1984
National Bureau of Standards. [1985] SP-679 July 1984, revised April 1986.
The last annual report in this series was published in 1986 as a revision of the previous report. The two publications differ in all but a few minor areas.

Applied Mathematics Series

QA3.U5
No. 1-63 (1948-1973)

This series contains mathematical tables, manuals and studies of special interest to physicists, engineers, chemists, biologists, mathematicians and others engaged in scientific and technical work. Some of the publications are reissues of the Mathematical Tables prepared by members of the Project for the Computation of Mathematical Tables. This series is inactive as none have been published since 1973.

BASIC RADIO PROPAGATION PREDICTIONS SERIES

This monthly series was prepared by the Interservice Radio Propagation Laboratory (IRPL) which was set up during WWII by the United States Joint Communications Board at NBS. The series succeeded "Radio Propagation Conditions," also prepared by the IRPL. The predictions series was initially restricted and available only to the military as a basic supplement to the IRPL's "Radio Propagation Handbook" issued by the military. Predictions were made three months in advance. May 1, 1946, the wartime IRPL ceased to exist and its duties and functions were assumed by the Central Radio Propagation Laboratory (CRPL) of the National Bureau of Standards. In July 1946 the series was made available by annual subscription to those concerned with radio communication in determining the best sky-wave frequencies over any path at any time of day for average conditions. In September 1947, various maps, charts, diagrams, and nomograms needed to make practical application of the world-contour charts were added with examples of their use.

Basic Radio Propagation Predictions, IRPL Series D

TK6570.B7U47
No. 1-22 (1944-June 1946)
Continued by: Basic Radio Propagation Predictions, CRPL Series D

Basic Radio Propagation Predictions, CRPL Series D

TK6570.B7U47
No. 23-220 (July 1946-1962)
Continues: Basic Radio Propagation Predictions, IRPL Series D
Superseded by: Ionospheric Predictions

Building and Housing

TH1.U4

No. 1-18 (1923-1932)

This series contained reports of the work of the Building and Housing Division that included gathering and distributing scientific, practical, statistical, and other information tending to reduce costs, and encourage and improve construction and housing. It covered investigations for use in framing local building and plumbing codes, and a study of problems connected with city zoning. Information on the prices, production, consumption, and stocks of building materials, and on building activity was collected, analyzed, and distributed. Special attention was paid to factors bearing on the housing problem. The work included studies of building practices, and cooperative efforts to reduce seasonal operations and otherwise eliminate waste in the construction industries.

Building Materials and Structures Reports

TA410.U48

No. 1-152 (1938-1959)

This series reported the results of Bureau investigations on the properties and suitability of new materials and new methods of construction. The program was carried out with the cooperation and advice of the housing agencies of the Government. The objective was to furnish the Government, the building industry, and the public with technical information that would be useful with particular reference to low-cost housing. This series was discontinued in July 1959 and papers on building technology were then published in the *Journal of Research*—usually *Section C. Engineering and Instrumentation*—or the Monograph series.

Building Science Series *see* NIST Building Science Series

Bulletin of the Bureau of Standards *see* Journal of Research

Circulars *see* National Bureau of Standards Circular

Commercial Standards

QC100.U5553

Nos. 0-274 (1928-1966)

Commercial standards were voluntary, recorded standards agreed upon by producers, distributors, and consumers, covering terminology, types, classifications, grades, sizes, and use characteristics of manufactured products as a basis for better understanding between buyers and sellers. They generally included standard methods of test, rating, certification, and labeling, and provided a uniform basis for fair competition. Each standard included a list of members of the standing committee, a history of the project, and list of acceptors. After 1966 as *Commercial Standards* were revised, they became *Product Standards* and in 1969, *Voluntary Product Standards*.

Commercial Standards Monthly

HD62.U3

Vol. [1]-9 (1925-1933)

This periodical was a review of progress in commercial simplification and standardization. It covered the national movement initiated by President Hoover for the reduction of needless sizes and varieties of products and the promotion of voluntary commercial standardization by industry.

Consumer Information Series

TX335.A1U6

No. 1-10 (1970-1978)

This series contained practical information, based on NBS research and experience, covering areas of interest to the consumer. Easily understandable language and illustrations provide useful background knowledge for shopping in today's technological marketplace. This series is inactive as none have been published since 1978.

CRPL Report

QC503.U5

No. 1-1 - 9-10 (July 1946-1950)

Supersedes: IRPL Report

Reports prepared by the Central Radio Propagation Laboratory at NBS.

CRPL-F, PART A: IONOSPHERIC DATA

These bulletins represent a variety of data collected by IRPL, later CRPL, in the course of its research and service activities. The data were made available for use in research on radio propagation and the ionosphere, and in other geophysical applications.

Ionospheric Data, IRPL-F

QC503.U5

No. 1-22 (1944 - June 1946)

Continued by: Ionospheric Data, CRPL-F

Ionospheric Data, CRPL-F

QC503.U5

No. 23-134 (July 1946-1955)

Continues: Ionospheric Data, IRPL-F

Split into two parts: CRPL-F, Part A and CRPL-F, Part B

CRPL-F, Part A: Ionospheric Data

QC503.U5

No. 135-256 (1955-1965)

Continues in part: Ionospheric Data, CRPL-F

Continued as U.S. Environmental Science Services Administration. Institute for Telecommunication Sciences. CRPL-FA: Ionospheric Data

CRPL-F, Part B: Solar-Geophysical Data

QC503.U51

No. 135-256 (1955-1965)

Continues in part: Ionospheric Data, CRPL-F

Continued as U.S. Environmental Science Services Administration. Institute for Telecommunication Sciences. CRPL-FB: Solar-Geophysical Data

DIMENSIONS

During World War I the Bureau originally issued the *Confidential Bulletin* as an information bulletin for the military of ordnance work done by the Bureau. The name was changed to *Technical News Bulletin* (TNB) and the first issue, no. 26, June 20, 1919, was also issued as *Confidential Bulletin* no. 26, June 20, 1919. These two publications were the same except for information items concerning ordnance that were blanked out of the TNB.

The *Technical News Bulletin*, available by annual subscription, summarized the current research, development, and test activities of the Bureau. The articles were brief, with emphasis on the results of research and their significance, chosen for their importance to other scientists, engineers, and to industry. Resumes of longer research reports, important national and international conferences on fundamental science in which the Bureau represented the Nation, and a bibliography of all publications by members of the staff as published were included. The Bulletin was designed to give a succinct account of the current work of the Bureau.

Dimensions continued the TNB in a popular magazine format to inform scientists, engineers, businessmen, industry, teachers, students, and consumers of the latest advances in science and technology, with primary emphasis on the work at NBS. It highlighted and reviewed such issues as energy research, fire protection, building technology, metric conversion, pollution abatement, health and safety, and consumer product performance in addition to Bureau programs in measurement standards and techniques, properties of matter and materials, engineering standards and services, instrumentation, and automatic data processing.

Confidential Bulletin

T1.U45

No. 1-26 (Dec. 15, 1917-June 20, 1919)

Continued by: Technical News Bulletin of the Bureau of Standards

Technical News Bulletin of the Bureau of Standards

T1.U45

No. 26-204 (1919-1934)

Continued by: Technical News Bulletin of the National Bureau of Standards

Technical News Bulletin of the National Bureau of Standards

T1.U45

No. 205- Vol. 57 no. 7 (May 1934-July 1973)

(after no. 356, Dec. 1946, changed to volume numbering with Vol. 31 no. 1, Jan. 1947)

Continues: Technical News Bulletin of the Bureau of Standards

Continued by: *Dimensions: the Magazine of the National Bureau of Standards*

Dimensions: the Magazine of the National Bureau of Standards

T1.U45

Vol. 57 no. 8-Vol. 65 no. 8 (Aug. 1973-Oct. 1981)

Continues: Technical News Bulletin of the National Bureau of Standards

Additional title: *Dimensions/NBS*

Federal Information Processing Standards Publications

JK468.A8A3

No. 0 (1968)-present

This series is the official publication relating to standards and guidelines developed for Federal computer systems by the National Institute of Standards and Technology and promulgated under the Federal Property and Administrative Services Act of 1949, Section 111(d), as amended by the Computer Security Act of 1987, Public Law 100-235 (101 Stat. 1724) January 8, 1988.

Federal Specifications

The Bureau developed specifications for the purchase of supplies (other than foods and drugs) for the Federal Government. These specifications were generally recognized as dependable guides by many large organizations and purchasing agencies in achieving purchasing economy. The Bureau endorsed these specifications and published them for distribution. The first one published by the Bureau was Circular 13, *Standard Specifications for the Purchase of Carbon-Filament Incandescent Lamps*, in 1907. The first official U.S. Government specification, authorized by Presidential order, was published as Bureau Circular C33, *United States Government Specification for Portland Cement*, in 1912. Specifications were published in the Circular and Miscellaneous Publications series.

In 1921 The Federal Specifications Board was created by the Bureau of the Budget to unify specifications already available to government agencies. Bureau specifications accepted by the Board became official standards and were binding on all departments of the Federal Government.

Gage Section Communications

TJ1166.U5
1919-1920

The various communications of the Gage Section of the Weights and Measures Division contained information about the practical problems of gauges and gauging methods including work carried out with the National Screw Thread Commission.

Handbooks *see* NIST Handbooks

Hydraulic Laboratory. Bulletin. Series B: Hydraulic Laboratories in the United States

TC1.U5
(1933 and 1935, 1st rev.)

This series updated *Hydraulic Laboratories in the United States of America*, giving descriptions of 47 hydraulic laboratories in the United States.

HYDRAULIC RESEARCH IN THE UNITED STATES

These reports represented a cooperative attempt on the part of the hydraulic laboratories in the United States to bring about the effective interchange of information relating to research projects being carried out in these laboratories. NBS served as a central agency to compile, publish and distribute information related to current hydraulic laboratory research.

Hydraulic Laboratory. Bulletin. Series A: Current Hydraulic Laboratory Research in the United States

TC1.U51
No. 1-10 (1933-1942)
Continued by: *Hydraulic Research in the United States*

Hydraulic Research in the United States

TC1.U51
Vol. 11-14 (1947-1950)
Continues: Hydraulic Laboratory. Bulletin. Series A: Current Hydraulic Laboratory Research in the United States

In 1951 *Hydraulic Research in the United States* became part of the Miscellaneous Publications series, and an annual issue was published, keeping the title *Hydraulic Research in the United States*. In 1969 the series name changed to Special Publications and the frequency of publication of *Hydraulic Research* became biennial. In 1972 the title changed to *Hydraulic Research in the United States and Canada*. Publication of this title ended in 1978.

Miscellaneous Publications 201, 205, 208, 210, 215, 218, 221, 224, 227, 231, 238, 245, 249, 261, 270, 280
Special Publications 316, 346, 382, 443, 497, 583

International Aircraft Standards

TL671.1.U5
(1917-1918)

International Aircraft Standards, adopted by the International Aircraft Standards Board, were specifications that resulted from testing done at NBS. The classification of specifications covered general inspection and testing instructions, raw materials, fabricated material, and fabricated parts.

Ionospheric Predictions

TK6570.B7U47

No. 1-36 (1963-1965)

Supersedes: Basic Radio Propagation Predictions, CRPL Series D

The CRPL *Ionospheric Predictions* were issued monthly as an aid in determining the best sky-wave frequencies over any transmission path, at any time of day, for average conditions for the month. Issued three months in advance, each issue provided tables of numerical coefficients that defined the functions describing the predicted worldwide distribution of foF2 and M(3000)F2 and maps for each even hour of Universal Time of MUF(Aero)F2 and MUF(4000)F2.

IRPL Report

TK6540.U5

No. 1-35 (1943-June 1946)

Superseded by: CRPL Report

Reports prepared by the Interservice Radio Propagation Laboratory at NBS.

Journal of Physical and Chemical Reference Data

Q199.J65

Vol. 1 (1972)– present

This journal provides critically evaluated physical and chemical property data and critical reviews of measurement techniques. It is not an outlet for original experimental measurements or for review articles of a descriptive or primarily theoretical nature. The National Standard Reference Data System is one source of contributions to the Journal. JPCRD is published by the American Chemical Society and the American Institute of Physics for NIST.

JOURNAL OF RESEARCH

Results of research in science and technology were reported in the *Scientific Papers*. The first 14 volumes of the *Scientific Papers* were issued as the *Bulletin of the Bureau of Standards* and the separate papers were called "Reprints." Results of investigations of materials and methods of testing were reported in the *Technologic Papers*. In July 1928 the *Scientific Papers* and *Technologic Papers* were combined and issued under the title *Bureau of Standards Journal of Research*.

Complete scientific reports of the Bureau's research and development, both experimental and theoretical, in physics, chemistry, and engineering and the results of test and instrumentation activities in these fields were printed in the *Journal of Research*. The subject matter of the reports embraced all fields of work conducted at the Bureau. *Research Papers* were reprints of individual articles appearing in the monthly issues of the *Journal of Research*. They were made available in this form to serve the need of research workers, technical groups, and others for the separate papers relating to the particular subjects in which they cooperated or were interested. In July 1959 the Bureau began publishing the Journal in four separate sections, A, B, C, and D, and the *Research Papers* were discontinued. Issued six times a year.

Journal of Research of the National Bureau of Standards, Section A. Physics and Chemistry was of interest primarily to scientists working in these fields. It covered a broad range of physical and chemical research, with major emphasis on standards of physical measurement, fundamental constants, and properties of matter. Issued six times a year.

Journal of Research of the National Bureau of Standards, Section B. Mathematics and Mathematical Physics presented studies and compilations designed mainly for the mathematician and the theoretical physicist. Topics in mathematical statistics, theory of experiment design, numerical analysis, theoretical physics and chemistry, logical design and programming of computers and computer systems were covered, together with short numerical tables. In 1967 *Mathematics and Mathematical Physics* changed to *Mathematical Sciences*. Issued quarterly.

Journal of Research of the National Bureau of Standards, Section C. Engineering and Instrumentation reported research and development results of interest chiefly to the engineer and the applied scientist. It included many of the new developments in instrumentation resulting from the Bureau's work in physical measurement, data processing, and development of test methods. It also covered some of the work in acoustics, applied mechanics, building research, and cryogenic engineering. Issued quarterly. Ceased publication at end of 1972.

Journal of Research of the National Bureau of Standards, Section D. Radio Propagation reported research in radio propagation, communications, and upper atmospheric physics. Topics covered included propagation in ionized media, scattering by turbulence, effect of irregular terrain on propagation, diffraction and scattering by solid obstacles, propagation through time-varying media, surface waves, and antennas. In January 1964, *Radio Propagation* changed to *Radio Science*. Issued six times a year.

Journal of Research of the National Bureau of Standards, Section D. Radio Science was published monthly by the National Bureau of Standards in cooperation with the U.S. National Committee of the International Scientific Radio Union (URSI). It served as the principal publication outlet for the research of the NBS Central Radio Propagation Laboratory and the scientific activities of the USNC of URSI; it also carried selected papers from the NBS Radio Standards Laboratory. *Radio Science* presented research papers, as well as occasional survey articles, in radio propagation, communications, and radio science generally. Beginning with the January 1966 issue, *Radio Science* was published by the Environmental Science Services Administration (ESSA) after the transfer of the Central Radio Propagation Laboratory from NBS to ESSA. The scope and coverage remained the same. It continued to be cosponsored by the U.S. National Committee of the International Scientific Radio Union. The title of the journal was changed to simply *Radio Science* with new volume numbering.

In July 1977 Sections A and B were combined under its former title *Journal of Research of the National Bureau of Standards* and issued six times a year.

As of August 23, 1988, the National Bureau of Standards (NBS) became the National Institute of Standards and Technology (NIST) when the Omnibus Trade and Competitiveness Act was signed into law. The title was changed to *Journal of Research of the National Institute of Standards and Technology* with the Volume 93, no. 6 (November-December 1988) issue to reflect the organizational name change.

Bulletin of the Bureau of Standards

QC1.U5

Vol. 1-14 (1904-1919)

Scientific Papers of the Bureau of Standards

QC1.U572

Vol. 15-22 (1919-1928)

Merged with: Technologic Papers of the Bureau of Standards, to form: Bureau of Standards Journal of Research

Technologic Papers of the Bureau of Standards

T1.U4

Vol. 1-22 (1910-1928)

Merged with: Scientific Papers of the Bureau of Standards, to form: Bureau of Standards Journal of Research

Bureau of Standards Journal of Research

QC1.U52

Vol. 1-12 (1928-1934)

Formed by the union of: Scientific Papers of the Bureau of Standards, and Technologic Papers of the Bureau of Standards

Continued by: Journal of Research of the National Bureau of Standards

Journal of Research of the National Bureau of Standards

QC1.U52

Vol. 13-62 (1934-1959)

Continues: Bureau of Standards Journal of Research

Split into four parts and continued by Sections A, B, C, and D

Journal of Research of the National Bureau of Standards. Section A: Physics and Chemistry

QC1.U522

Vol. 63A-81A (1959-1977)

Continues in part: Journal of Research of the National Bureau of Standards

Merged with: Journal of Research of the National Bureau of Standards. Section B, to form: Journal of Research of the National Bureau of Standards

Journal of Research of the National Bureau of Standards. Section B: Mathematical Physics

QA1.U57

Vol. 63B-71B (1959-1967)

Continues in part: Journal of Research of the National Bureau of Standards

Continued by: Journal of Research of the National Bureau of Standards. Section B: Mathematical Sciences

Journal of Research of the National Bureau of Standards. Section B: Mathematical Sciences

QA1.U57

Vol. 72B-81B (1968-1977)

Continues: Journal of Research of the National Bureau of Standards. Section B: Mathematics and Mathematical Physics

Merged with: Journal of Research of the National Bureau of Standards. Section A, to form: Journal of Research of the National Bureau of Standards

Journal of Research of the National Bureau of Standards. Section C: Engineering and Instrumentation

QC100.U5554

Vol. 63C-76C (1959-1972)

Continues in part: Journal of Research of the National Bureau of Standards

Ceased publication in 1972.

Journal of Research of the National Bureau of Standards. Section D: Radio Propagation

QC973.U46

Vol. 63D-67D (1959-1963)

Continues in part: Journal of Research of the National Bureau of Standards

Continued by: Journal of Research of the National Bureau of Standards. Section D: Radio Science

Journal of Research of the National Bureau of Standards. Section D: Radio Science

QC973.U46

Vol. 68D-69D (1964-1965)

Continues: Journal of Research of the National Bureau of Standards. Section D: Radio Propagation

Ceased publication by NBS in 1965.

Journal of Research of the National Bureau of Standards

QC1.U524

Vol. 82-93 no. 5 (1977-1988)

Formed by the union of its Sections A and B

Continued by: Journal of Research at the National Institute of Standards and Technology

Journal of Research of the National Institute of Standards and Technology

QC1.U524

Vol. 93 no. 6 (1988)-present

Continues: Journal of Research of the National Bureau of Standards

LETTER CIRCULARS

Letter Circulars 1-1040 are mimeographed, irregularly published lists of Bureau publications and references, and general information concerning specific subjects on which popular interest had been demonstrated by inquiries addressed to the Bureau. With no. 1041 (1966) the Letter Circulars changed from a report format to that of brochures, booklets, and charts. They are still an informal series and not subject to a review process.

Letter Circular of the Bureau of Standards

QC100.U5775

No. 1-411 (1921-1934)

Letter Circular of the National Bureau of Standards

QC100.U5775

No. 412-1040 (1934-1962)

No. 1041 (1966)-present

Limitation of Variety Recommendations

No. 1 (September 1, 1924)

Apparently only one "Elimination of Waste-Limitation of Variety Recommendation" was published (listed in "Publications of the Bureau of Standards, 1901-June 30, 1925," 7th ed. final, pg. 215. Circular no. 24) No mention of this series is made in the "Supplementary List of Publications of the Bureau of Standards, (July 1, 1925, to December 31, 1931)" or any thereafter.

Mathematical Tables Series

QA47.U51

No. 1-37 (1939-1946)

The tables (with the exception of MT15) were prepared by the Mathematical Tables Project for the computation of mathematical tables. The project, conducted by the Federal Works Agency, Work Projects Administration (WPA) for the city of New York, was under the sponsorship of, and tables made available through, the National Bureau of Standards. Selected for tabulation were functions of fundamental importance in pure and applied mathematics in the most useful range and interval of the argument. They are of special interest to physicists, engineers, chemists, biologists, mathematicians and others engaged in scientific and technical work.

In 1943 the project was administratively transferred from the WPA to the Bureau, but it remained in New York. When the National Applied Mathematics Laboratories was established at NBS in July 1947, the Mathematical Tables Project moved from New York to Washington, DC and became a part of the NBS's Computation Laboratory.

MT-18, MT-30, and MT-37 were originally printed as part of the series in the "Bulletin of the American Mathematical Society".

MT-19—MT-29, and MT-31—MT-36 were originally printed as part of the series in the "Journal of Mathematics and Physics".

Miscellaneous Publications *see* NIST Special Publications

Monographs *see* Monographs

NATIONAL BUREAU OF STANDARDS CIRCULARS

Circulars were compilations of information on various subjects related to the Bureau's scientific, technical, and engineering activities. They included not only the results of Bureau studies, but give data of general interest from other sources.

This series also contained *Recommended Specifications*, *United States Government Specifications*, and *United States Government Master Specifications* formerly issued by the Bureau. These bore a specification number in addition to the Bureau Circular number, but all of these specifications were canceled or superseded by *Federal Specifications*, now formulated by the Federal Specifications Board. The series was discontinued in June 1959 and "circular" material was directed to the *Journal of Research* and the Monograph series.

Circular of Information of the National Bureau of Standards

QC100.U554

No. 1-4 (1902-1903)

Continued by: Bureau Circular—Department of Commerce and Labor, Bureau of Standards

Bureau Circular—Department of Commerce and Labor, Bureau of Standards

QC100.U555

No. 1-20 (1903-1909)

Continues: Circular of Information of the National Bureau of Standards

Continued by: Circular of the Bureau of Standards

Circular of the Bureau of Standards

QC100.U555

No. 21-404 (1910-1934)

Continues: Bureau Circular—Department of Commerce and Labor, Bureau of Standards

Continued by: Circular of the National Bureau of Standards

Circular of the National Bureau of Standards

QC100.U555

No. 405-459 (1934-1948)

Continues: Circular of the Bureau of Standards

Continued by: National Bureau of Standards Circular

National Bureau of Standards Circular

QC100.U555

No. 460-603 (1947-1959)

Continues: Circular of the National Bureau of Standards

Superseded by: NBS Monograph

National Bureau of Standards Reports

Nos. 1000-10,987 (1951-1975)

These were usually preliminary or progress accounting documents intended for use within the government. Before material in the reports was formally published, it was subjected to additional evaluation and review. The reports were often called "graybacks" because of their gray covers.

NBS-GCR Reports

QC100.U6N25

70-1 (1970)—present

Grantee/Contractor reports are prepared by non-NIST persons or organizations working under grant or contract from NIST.

NBS-GCR-ETIP Reports

73-01—82-101 (1973-1982)

Grantee/Contractor reports prepared by non-NBS persons or organizations working under grant or contract from NBS on subjects specifically for the Experimental Technology Incentives Program.

NBS Standard

T1.U44 Vol. 1—vol. 26, no. 15 (October 1955-July 22, 1981)

This publication was the official NBS employee newsletter. All department of commerce individual agency newsletters were discontinued in 1981 as part of the secretary of commerce's goal to develop a more unified and cohesive department. The assistant secretary for administration established an employee newsletter to cover the entire Department of Commerce.

NIST BUILDING SCIENCE SERIES

This series disseminates technical information developed at NIST on building materials, components, systems, and whole structures. The series contains research results, test methods, and performance criteria related to the structural and environmental functions and the durability and safety characteristics of building elements and systems.

Building Science Series

TA435.U58

No. 0-49 (1965-1974)

Continued by: NBS Building Science Series

NBS Building Science Series

TA435.U58

No. 50-165 (1974-1987)

Continues: Building Science Series

Continued by: NIST Building Science Series

NIST Building Science Series

TA435.U58

No. 166 (1989)—present

Continues: NBS Building Science Series

NIST HANDBOOKS

These are recommended codes of engineering and industrial practice, including safety codes, developed in cooperation with the national organizations and others concerned. In many cases the recommended requirements are given official status through their incorporation in local ordinances by State and municipal regulatory bodies.

Handbook of the Bureau of Standards

QC1.U51
No. 1-18 (1918-1934)
Continued by: NBS Handbook

NBS Handbook

QC1.U51
No. 19-145 (1934-1986)
Continues: Handbook of the Bureau of Standards
Continued by: NIST Handbook

NIST Handbook

QC1.U51
No. 146 (1989)–present
Continues: NBS Handbook

NIST MONOGRAPHS

Monographs are usually contributions to the technical literature which are too lengthy for publication in the *Journal of Research*. They often provide extensive compilations of information on subjects related to the Bureau's technical program. Until July 1959 most of this type of material was published in the Circular series.

NBS Monograph

QC100.U556
No. 1-174 (1959-1986)
Supersedes: National Bureau of Standards Circular
Continued by: NIST Monograph

NIST Monograph

QC100.U556
As of 11-20-89, no NIST Monographs have been published.
Continues: NBS Monograph

NIST SPECIAL PUBLICATIONS

The Miscellaneous Publications series included material, which, because of its character or because of its size, did not fit into any of the other regular publication series. Some of these were charts, administrative pamphlets, directories of specifications, annual reports, weights and measures conference reports, and other subjects appropriate to this series. In 1968, the series title changed to Special Publication.

Miscellaneous Publication—Bureau of Standards

QC100.U57
No. 1-132 (1918-1933)
Continued by: Bureau of Standards Miscellaneous Publication

Bureau of Standards Miscellaneous Publication

QC100.U57
No. 133-144 (1932-1934)
Continues: Miscellaneous Publication—Bureau of Standards
Continued by: Miscellaneous Publication—National Bureau of Standards

Miscellaneous Publication—National Bureau of Standards

QC100.U57

No. 145-294 (1934-1967)

Continues: Bureau of Standards Miscellaneous Publication

Continued by: NBS Special Publication

NBS Special Publication

QC100.U57

No. 295-749 (1968-1988)

Continues: Miscellaneous Publication—National Bureau of Standards

Continued by: NIST Special Publication

NIST Special Publication

QC100.U57

No. 750 (1988)—present

Continues: NBS Special Publication

NIST TECHNICAL NOTES

This series was initiated in 1959 to supplement the Bureau's regular publications program. Technical Notes provide a means for making available scientific data that are of transient or limited interest.

NBS Technical Note

QC100.U5753

No. 1-1321 (1959-1988)

Continued by: NIST Technical Note

Nos. 1250-1299, 1310, 1318 published as NIST Technical Notes.

NIST Technical Note

QC100.U5753

No. 1250 (1988)—present

Continues: NBS Technical Note

Nos. 1300-1309, 1311-1317, 1319-1321 published as NBS Technical Notes.

NISTIR

This is a special series of interim or final reports on work performed by NIST for outside sponsors (both government and nongovernment).

NBSIR

QC100.U56

No. 73-101—88-3836 (1973-1988)

NISTIR

QC100.U56

NO. 88-3837 (1988)—present

NSRDS-NIST

The National Standard Reference Data Series provides quantitative data on the physical and chemical properties of materials, compiled from the world's literature and critically evaluated. It was developed under a worldwide program coordinated by NBS, under authority of the National Standard Data Act (Public Law 90-396). This series supplements the *Journal of Physical and Chemical Reference Data*.

NSRDS-NBS

QC100.U573

No. 1-73 (1964-1987)

Continued by: NSRDS-NIST

NSRDS-NIST

QC100.U573

As of 7/7/99, nothing has been published in the NSRDS-NIST series.

Continues: NSRDS-NBS

Photographic Laboratory Circulars

TR395.U5

No. 1-2 (????-1920)

These were confidential reports of NBS tests for government agencies that were done in the Photographic Laboratory.

Planning Report

QC100.U5P5

No. 1 (1980)– present

These are internal reports but shared with government or private agencies. The reports are prepared by the NBS/NIST Program Office or by private contractors.

Product Standards *see* Voluntary Product Standards

PROJECTS AND PUBLICATIONS OF THE APPLIED MATHEMATICS DIVISION: A QUARTERLY REPORT

These were reports on the research and services of Division 11, the National Applied Mathematics Division.

Activities in Applied Mathematics

QA27.U5A31

(1946-1947)

Continued by: Projects and Publications of the National Applied Mathematics Laboratories: a Quarterly Report

Projects and Publications of the National Applied Mathematics Laboratories: a Quarterly Report

QA27.U5A32

(1947-1954)

Continues: Activities in Applied Mathematics

Continued by: Projects and Publications of the Applied Mathematics Division: a Quarterly Report

Projects and Publications of the Applied Mathematics Division: a Quarterly Report

QA27.U5A32

(1954-1964)

Continues: Projects and Publications of the National Applied Mathematics Laboratories: a Quarterly Report

REFERENCE DATA REPORTS

This was an informal communication of the National Standard Reference Data System (NSRDS) for the exchange of news and ideas about data centers, publications, meetings, and other activities related to data evaluation and dissemination. It ceased publication in April 1983.

NSRDS News

QC100.U57315

Issues for June 1966-May 1973 were originally published in the *Technical News Bulletin*; not published Nov. 1974-Apr. 1975, Mar., June-Aug. 1976

June 1973—Nov./Dec. 1976

Superseded by: Reference Data Report

Reference Data Report

QC100.U57315

Vol. 1-7 (1977-April 1983)

Other title: NSRDS Reference Data Report

Supersedes: NSRDS News

Reports *see* National Bureau of Standards Reports

Scientific Papers of the Bureau of Standards *see* Journal of Research

Simplified Practice Recommendations

QC100.U564

No. 1-80 (1922-1927)

(1928-1966)

"Simplified Practice," in this series, meant reduction of excessive variety of manufactured products, or of methods. Simplified Practice Recommendations were records of stock items retained after superfluous variety had been eliminated. These recommendations were developed by voluntary cooperation among manufacturers, distributors, consumers, and others interested, through a regular procedure of the National Bureau of Standards established for that purpose—a procedure designed to insure not only the initial success of a program, but also its continued adjustment to meet changing industrial conditions.

Each printed booklet contained not only the specific recommendation itself, but also its history and development, the names of trade associations, firms, individuals, and others that approved the recommendation, and the personnel of the standing committee in charge of its maintenance and revisions as needed to keep them current with developments. The date from which each recommendation was effective was given. Beginning in 1966 as they were revised, Simplified Practice Recommendations changed to Product Standards and later to Voluntary Product Standards.

Standards Yearbook

QC100.U576
(1927-1933)

This publication gave a summary of progress in the field of standardization in agencies, both governmental and private, throughout the world. The yearbook was originally designed as a companion volume to "Commerce Yearbook." The seven volumes were published as Miscellaneous Publications 77, 83, 91, 106, 119, 133, 139 but titled Standards Yearbook.

Technical Information on Building Materials for Use in the Design of Low Cost Housing

TH1.U5
No. 1-61 (1936-1938)

These releases presented, very briefly, essential facts developed through research work at NBS and refer to longer publications where methods of investigation and results obtained were given in greater detail. They were prepared principally for the guidance of architectural and engineering staffs of federal agencies in the selection of materials for use in low-cost housing.

Technical Notes *see* NIST Technical Notes

Technologic Papers of the Bureau of Standards *see* Journal of Research

VOLUNTARY PRODUCT STANDARDS

This series provides requirements for sizes, types, quality and methods for testing various industrial products. These standards are developed cooperatively with interested government and industry groups, provide the basis for common understanding of product characteristics for both buyers and sellers, and are used voluntarily. Voluntary Product Standards include Commercial Standards (material requirements and quality criteria) and Simplified Practice Recommendations (sizes, models, and dimensions of commonly stocked items) revised since 1966. They are developed under procedures published by the Department of Commerce in Part 10, Title 15, of the "Code of Federal Regulations." The purpose of these standards is to establish nationally recognized requirements for products, and to provide all concerned interests with a basis for common understanding of the characteristics of the products. The National Institute of Standards and Technology administers the Voluntary Product Standards program as a supplement to the activities of the private sector standardizing organizations.

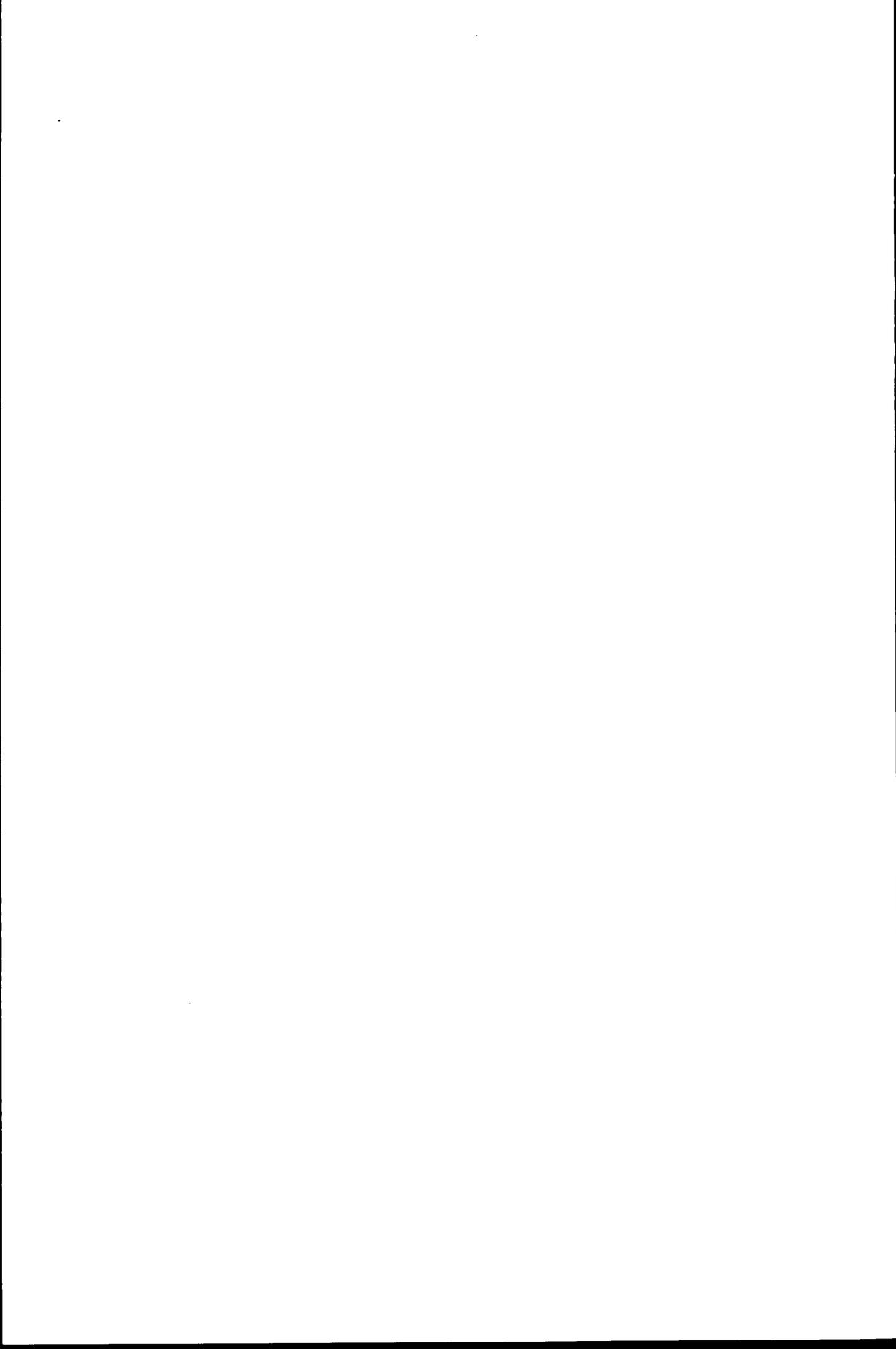
In 1979, private standards-writing organizations were encouraged by the Department of Commerce to develop voluntary product standards and it announced the withdrawal of all Voluntary Product Standards sponsored by NBS. Sponsorship of the standards was transferred to other institutions or private standards-writing organizations, or the standards were withdrawn. As of September 1997, three Voluntary Product Standards are still sponsored by NIST, but on a cost-reimbursable basis by private organizations.

Product Standards

QC100.U563
No. 0-13 (1966-1969)
Continued by: Voluntary Product Standards

Voluntary Product Standards

QC100.U563
No. 14 (1969)—present
Continues: Product Standards



APPENDIX I

ORGANIZATIONAL LEVELS OF THE NATIONAL BUREAU OF STANDARDS

MARCH 1950

30	DIRECTOR'S OFFICE	
	Director	Dr. Edward U. Condon
	Assistant to the Director	Hugh Odishaw
	Assistant to the Director	Nicholas E. Golovin
	Associate Director	Dr. Eugene C. Crittenden
	Associate Director	Dr. Wallace R. Brode
31	OFFICE OF SCIENTIFIC PUBLICATIONS	Hugh Odishaw
.1	Library	Sarah Ann Jones
.2	Technical Reports	W. Reeves Tilley
.3	Publications	Jesse L. Mathusa
32	OFFICE OF WEIGHTS AND MEASURES	Ralph W. Smith
	Assistant Chief	William S. Bussey
1	ELECTRICITY AND OPTICS	Dr. Francis B. Silsbee
	Assistant Chief	Dr. Kasson S. Gibson
.1	Resistance Measurements	Dr. James L. Thomas
.2	Inductance and Capacitance	Dr. Charles Moon
.3	Electrical Instruments	Dr. Francis M. Defandorf
.4	Magnetic Measurements	Raymond L. Sanford
.5	Photometry and Colorimetry	Dr. Kasson S. Gibson
.6	Optical Instruments	Dr. Irvine C. Gardner
.7	Photographic Technology	Raymond Davis
.8	Electrochemistry	Dr. George W. Vinal
2	METROLOGY	Dr. Wilmer Souder
	Assistant Chief	David R. Miller
.1	Length	Dr. Lewis V. Judson
.2	Mass	Lloyd B. Macurdy
.3	Time	Horace A. Bowman (Acting)
.4	Capacity, Density and Fluid Meters	Howard S. Bean
.6	Thermal Expansion	Dr. Peter Hidnert
.7	Dental Materials	Dr. Irl C. Schoonover
.8	Scales	H. Haig Russell
.9	Gage	David R. Miller
3	HEAT AND POWER	Dr. Ferdinand G. Brickwedde
.1	Temperature Measurements	Dr. Raymond E. Wilson
.2	Thermodynamics	Dr. Ferdinand G. Brickwedde
.3	Cryogenics	Russell B. Scott
.4	Engines and Lubrication	Samuel A. McKee
.5	Engine Fuels	Dr. Frank L. Howard (Acting)
.6	Combustion	Dr. Ernest F. Fiock

- 4 ATOMIC AND RADIATION PHYSICS**
 Assistant Chief
 Radioactivity Consultant
 Stable Tracers Consultant
- 4A Atomic Physics Laboratory**
 .1 Spectroscopy
 .2 Radiometry
 .3 Mass Spectrometry
 .4 Physical Electronics
 .5 Electron Physics
 .6 Atomic Physics
 .7 Neutron Measurements
- 4R Radiation Physics Laboratory**
 .8 Nuclear Physics
 .9 Radioactivity
 .10 X-Rays
 .11 Betatron
 .12 Nucleonic Instrumentation
 .13 Radiological Equipment
- 5 CHEMISTRY**
 Assistant Chief
 .1 Paint, Varnish and Lacquer
 .2 Surface Chemistry
 .3 Organic Chemistry
 .4 Analytical Chemistry
 .5 Platinum Metals and Pure Substances
 .6 Electrodeposition
 .7 Gas Chemistry
 .8 Physical Chemistry
 .9 Thermochemistry and Hydrocarbons
 .10 Spectrochemistry
- 6 MECHANICS**
 .1 Sound
 .2 Mechanical Instruments
 .3 Aerodynamics
 .4 Engineering Mechanics
 .5 Hydraulics
- 7 ORGANIC AND FIBROUS MATERIALS**
 Assistant Chief
 Consultant
 .1 Rubber
 .2 Textiles
 .3 Paper
 .4 Leather
 .5 Testing and Specifications
 .7 Organic Plastics
- 8 METALLURGY**
 Assistant Chief
 .1 Optical Metallurgy
 .2 Thermal Metallurgy
- Dr. Robert D. Huntoon
 Lauriston S. Taylor
 Dr. Leon F. Curtiss
 Dr. Fred L. Mohler
 Dr. Robert D. Huntoon
 Dr. William F. Meggers
 Dr. Curtis J. Humphreys
 Dr. Fred L. Mohler
 Dr. Willard H. Bennet
 Dr. Ladislaus L. Marton
 Dr. John A. Hipple
 Dr. Leon F. Curtiss
 Lauriston S. Taylor
 Dr. Ugo Fano
 Lauriston S. Taylor (Acting)
 Harold O. Wyckoff
 Herman W. Koch
 Harold O. Wyckoff (Acting)
 Dr. Scott W. Smith
- Dr. Edward W. Wichers
 Dr. William Blum
 Eugene F. Hickson
 Dr. James I. Hoffman
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 Dr. Raleigh Gilchrist
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 Dr. Frederick D. Rossini
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 Dr. Gordon M. Kline
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 William F. Roeser
 George A. Ellinger
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| .3 | Mechanical Metallurgy | William F. Roeser |
| .4 | Chemical Metallurgy | Harold E. Cleaves |
| .5 | Experimental Foundry | Alexander I. Krynskiy |
| .6 | Underground Corrosion | Dr. Irving A. Denison |
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| .2 | Glass | Clarence H. Hahner |
| .3 | Refractories | Raymond A. Heindl |
| .4 | Enameled Metals | William N. Harrison |
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| .6 | Concreting Materials | Raymond L. Blaine |
| .7 | Constitution and Microstructure | Howard F. McMurdie |
| .8 | Chemistry of Mineral Products | Dr. Lansing S. Wells |
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| | Assistant Chief | Floyd W. Reynolds |
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| .2 | Electron Tubes | Dr. John E. White |
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| .6 | Ordnance Electronics | P. Anthony Guarino |
| .7 | Ordnance Engineering | Myron G. Domsitz |
| .8 | Ordnance Tests | Theodore B. Godfrey |

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	.10 Missile Intelligence	Dr. Harold K. Skramstad
	.11 Missile Engineering	Dr. Fred S. Atchison
	.12 Missile Instrumentation	Ralph A. Lamm
	.13 Technical Services	William A. Wildhack
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	.5 Ionospheric Research	Alvin G. McNish
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		Joseph Hilsenrath
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	.9 Grounds	Herman B. Burke
	.10 Janitorial	William R. David
	.11 Refrigeration and Air Conditioning	Adeeb J. Neam
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		Vacant

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.6	Instrument Shop No. 5	Andrew J. Altman
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- 13 ELECTRONICS**
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Adrian P. Suttan, Chief
- Warren Grove Test Field, Warren Grove, Tuckerton, NJ
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14 CENTRAL RADIO PROPAGATION LABORATORY

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Radio Propagation Field Station, Island of Guam
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		Dr. Leon F. Curtiss
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	.6 Atomic Physics	Vacant
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	.14 Radiation Instruments Branch, Atomic Energy Commission	
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	.10 Spectrochemistry	Bourdon F. Scribner
	.11 Pure Substances	Dr. Charles P. Saylor
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	Assistant Chief	Dr. William G. Brombacher
	Consultant	Dr. Wilmer Souder
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	.2 Mechanical Instruments	Dr. William G. Brombacher
	.3 Aerodynamics	Dr. Galen B. Schubauer
	.4 Engineering Mechanics	Bruce L. Wilson
	.5 Hydraulics	Vacant
	.6 Mass	Lloyd B. Macurdy
	.7 Capacity, Density and Fluid Meters	Howard S. Bean
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	Assistant Chief	Dr. Irl C. Schoonover
	Consultant	Dr. Wilmer Souder
	.1 Rubber	Dr. Lawrence A. Wood
	.2 Textiles	William D. Appel
	.3 Paper	Dr. Robert B. Hobbs

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| .4 | Leather | Everett L. Wallace |
| .5 | Testing and Specifications | Dr. Robert D. Stiehler |
| .6 | Polymer Structure | Dr. Irl C. Schoonover |
| .7 | Organic Plastics | Frank W. Reinhart |
| .8 | Dental Research | William T. Sweeney |
| 8 | METALLURGY | Dr. John G. Thompson |
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| .2 | Chemical Metallurgy | LeRoy L. Wyman |
| .3 | Mechanical Metallurgy | John A. Bennett |
| .4 | Corrosion | George A. Ellinger |
| 9 | MINERAL PRODUCTS | Dr. Herbert Insley |
| | Assistant Chief | Clarence H. Hahner |
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| .2 | Glass | Clarence H. Hahner |
| .3 | Refractories | Raymond A. Heindl |
| .4 | Enameled Metals | William N. Harrison |
| .6 | Concreting Materials | Raymond L. Blaine |
| .7 | Constitution and Microstructure | Howard F. McMurdie |
| .8 | Chemistry of Mineral Products | Dr. Lansing S. Wells |
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| | Consultant | William F. Roeser |
| | Consultant | Nolan D. Mitchell |
| | Consultant | John W. McBurney |
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| | Assistant Chief | Dr. Edward W. Cannon |
| * | .1 Numerical Analysis | Dr. Derrick H. Lehmer (UCLA) |
| | .2 Computation | John Todd |
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| | .4 Machine Development | Dr. Edward W. Cannon |
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| .2 | Electron Tubes | Dr. Robert T. Young |
| .3 | Electronic Computers | Dr. Samuel N. Alexander |
| .4 | Electronic Instrumentation | Carroll Stansbury |
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| .2 | | Leo Rubinowitz |
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.4		Dr. Roger W. Curtis
.5		Philip J. Franklin
.6		P. Anthony Guarino
.8		Theodore B. Godfrey
14	CENTRAL RADIO PROPAGATION LABORATORY	
	Assistant Chief	Dr. Newbern Smith
*	Assistant Chief	Alvin G. McNish
.3	Regular Propagation Services	Kenneth A. Norton (Boulder)
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.1	Upper Atmosphere Research	
.5	Ionospheric Research	Alvin G. McNish
	Systems Research Laboratory	Ross Bateman
*	.4 Frequency Utilization Research	Kenneth A. Norton (Boulder)
*	.6 Tropospheric Propagation	Jack W. Herbstreit (Boulder)
	Measurement Standards Laboratory	
.8	High Frequency Standards	William D. George
.9	Microwave Standards	Dr. Harold Lyons
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.6	Combustion	Dr. Ernest F. Fiock
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.2		Laurence M. Andrews
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.6		William M. Piper (Acting)
.7		Walter A. Hereth (Acting)
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.3		Dr. Hans W. Kohler
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		Joseph P. Spalding (Acting)

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46	BUDGET STAFF	Wilbur W. Bolton, Jr.
50	PLANT Assistant Chief .1 Power Plant .2 Electric Shop .3 Piping Shop	Charles A. Dieman Clarence B. Crane Arthur C. Ramm George V. Hall Raymond A. Watson

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| .5 | Paint Shop | Howell C. Walker |
| .6 | Labor Services | Roy B. Powell |
| .7 | Metal Shop | Charles Needham |
| .9 | Grounds | William R. David |
| .11 | Refrigeration and Air Conditioning | James S. Powers (Acting) |

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| .5 | Missile Evaluation | Gerard R. Sams |
| .6 | Combustion Section | Dr. Ernest F. Fiock (Washington) |
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- | | | |
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| 2 | OPTICS AND METROLOGY | |
| | Lamp Inspector, Brookline, MA | |
| 3 | HEAT AND POWER | |
| | 3.6 Cryogenic Engineering, Boulder, CO | Russell B. Scott |

- 9 MINERAL PRODUCTS**
9.06 Concreting Materials
 Allentown, PA
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 Seattle, WA
- 11 APPLIED MATHEMATICS**
11.01 Numerical Analysis, The Institute for Numerical Analysis, University of California at
 Los Angeles
 Director of Research Dr. Derrick H. Lehmer
 Assistant Director Dr. Magnus R. Hestenes
 Assistant to the Director (Admin.) Albert S. Cahn, Jr.
- 13 ORDNANCE DEVELOPMENT**
 Blossom Point Proving Ground, La Plata, MD
- 14 CENTRAL RADIO PROPAGATION LABORATORY**
 Radio Propagation Field Station, Anchorage, AK
 Radio Propagation Field Station, Point Barrow, AK
 Radio Propagation Field Station, Guam Island
 Radio Propagation Field Station, Puunene, Maui, Territory of Hawaii
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- 17 NATIONAL BUREAU OF STANDARDS**
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- 32 OFFICE OF WEIGHTS AND MEASURES**
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| .13 | Radiological Equipment | Dr. Scott W. Smith |
| .14 | Radiation Instruments Branch,
Atomic Energy Commission | Robert L. Butenhoff |
| 5 | CHEMISTRY | Dr. Edward W. Wichers |
| | Assistant Chief | Dr. James I. Hoffman |
| .1 | Organic Coatings | Paul T. Howard |
| .2 | Surface Chemistry | Dr. James I. Hoffman |
| .3 | Organic Chemistry | W. Harold Smith |
| .4 | Analytical Chemistry | Harry A. Bright |
| .5 | Inorganic Chemistry | Dr. Raleigh Gilchrist |
| .6 | Electrodeposition | Dr. Abner Brenner |
| .7 | Gas Chemistry | Elmer R. Weaver |
| .8 | Physical Chemistry | Dr. Edgar R. Smith |
| .9 | Thermochemistry | Edward J. Prosen |
| .10 | Spectrochemistry | Bourdon F. Scribner |
| .11 | Pure Substances | Dr. Charles P. Saylor |
| 6 | MECHANICS | Dr. Walter Ramberg |
| | Consultant | Dr. Wilmer Souder |
| .1 | Sound | Dr. Richard K. Cook |
| .2 | Mechanical Instruments | Edward C. Lloyd |
| .3 | Fluid Mechanics | Dr. Galen B. Schubauer |
| .4 | Engineering Mechanics | Bruce L. Wilson |
| .6 | Mass and Scale | Douglas R. Tate |
| .7 | Capacity, Density and Fluid Meters | Howard S. Bean |
| .8 | Combustion Controls | Dr. Ernest F. Fiock |
| 7 | ORGANIC AND FIBROUS MATERIALS | Dr. Gordon M. Kline |
| | Assistant Chief | Dr. Irl C. Schoonover |
| .1 | Rubber | Dr. Lawrence A. Wood |
| .2 | Textiles | William D. Appel |
| .3 | Paper | Dr. Robert B. Hobbs |
| .4 | Leather | Everett L. Wallace |
| .5 | Testing and Specifications | Dr. Robert D. Stiehler |
| .6 | Polymer Structure | Dr. Irl C. Schoonover |
| .7 | Organic Plastics | Frank W. Reinhart |
| .8 | Dental Research | William T. Sweeney |
| 8 | METALLURGY | Dr. John G. Thompson |
| .1 | Thermal Metallurgy | Thomas G. Digges |
| .2 | Chemical Metallurgy | LeRoy L. Wyman |
| .3 | Mechanical Metallurgy | John A. Bennett |
| .4 | Corrosion | George A. Ellinger |

- 9 MINERAL PRODUCTS**
 Consultant
 .1 Porcelain and Pottery
 .2 Glass
 .3 Refractories
 .4 Enameled Metals
 .6 Concreting Materials
 .7 Constitution and Microstructure
- 10 BUILDING TECHNOLOGY**
 Assistant Chief
 Consultant
 Consultant
 .1 Structural Engineering
 .2 Fire Protection
 .3 Heating and Air Conditioning
 .4 Floor, Roof and Wall Coverings
 .5 Codes and Specifications
- 11 APPLIED MATHEMATICS**
 Assistant Chief
 * .1 Numerical Analysis
 .2 Computation
 .3 Statistical Engineering
 .4 Machine Development
- 12 ELECTRONICS**
 .1 Engineering Electronics
 .2 Electron Tubes
 .3 Electronic Computers
 .4 Electronic Instrumentation
 .5 Process Technology
- 14 CENTRAL RADIO PROPAGATION LABORATORY**
 Assistant Chief
 Consultant
 Consultant
 .3 Regular Propagation Services
Ionospheric Research Laboratory
 .1 Upper Atmosphere Research
 .5 Ionospheric Research
Systems Research Laboratory
 * .4 Frequency Utilization Research
 * .6 Tropospheric Propagation (Res.)
Measurement Standards Laboratory
 .8 High Frequency Standards
 .9 Microwave Standards
- 40 ACCOUNTING**
 Deputy Chief
 .1 Accounting Operations
 .2 Internal Audit
- Clarence H. Hahner (Acting)
 Dr. Lansing S. Wells
 Roman F. Geller
 Clarence H. Hahner
 Raymond A. Heindl
 William N. Harrison
 Raymond L. Blaine
 Howard F. McMurdie
- Douglas E. Parsons
 George N. Thompson
 William F. Roeser
 John W. McBurney
 Douglas E. Parsons
 Dr. Alexander F. Robertson
 Richard S. Dill
 Dr. Hubert R. Snoko
 George N. Thompson
- Dr. Franz L. Alt (Acting)
 Dr. Edward W. Cannon
 Dr. C. B. Tompkins (Acting) UCLA
 John Todd
 Dr. Churchill Eisenhart
 Dr. Edward W. Cannon
- Dr. Robert D. Huntoon (Acting)
 Dr. Paul J. Selgin
 Dr. Charles P. Marsden, Jr. (Acting)
 Dr. Samuel N. Alexander
 Carroll Stansbury
 Lucien P. Tuckerman (Acting)
- Dr. Robert D. Huntoon (Acting)
 Dr. Ralph J. Slutz
 Alvin G. McNish
 Dana K. Bailey
 Walter B. Chadwick
- Thomas N. Gautier (Acting)
 Ross Bateman
- Kenneth A. Norton (Boulder)
 Jack W. Herbstreit (Boulder)
- William D. George
 Dr. Harold Lyons
- Gordon D. Horsburgh
 Willard K. Duckworth
 Willard K. Duckworth
 Robert A. Strizzi

41	PERSONNEL	George R. Porter
	Assistant Chief	Frankie R. Keyser
.1	Board of Civil Service Examiners	Edith N. Fimple
.2	Recruitment and Placement	Frankie R. Keyser
.3	Classification	Charles V. Ramey
.4	Employee Relations	Ruth B. Armsby
.5	Operations and Procedures	Helen V. Courtney
.6	Medical Office	Dr. Charles P. Waite
42	ADMINISTRATIVE SERVICES	Harry P. Dalzell
	Assistant Chief	Karl L. Hafen
.1	Records and Communications	Robert W. Lamberson
.2	Special Services	Gird M. Tolley, Jr. (Acting)
.3	Janitorial Services	Robert C. Howey
.4	Guard Services	Vacant
.5	Transportation Services, Garage	Charles W. Anderson
.6	Deputy Security Officer	Harry P. Dalzell
.7	Test Administration	Randolph K. Artz
43	SHOPS	Frank P. Brown
	Assistant Chief	Winfield L. Drissel
.1	Instrument Shop No. 1	David G. Kennedy
.2	Instrument Shop No. 2	George A. Rheinbold
.3	Instrument Shop No. 3	George A. Rheinbold
.4	Instrument Shop No. 4	Norman C. Pines
.5	Instrument Shop No. 5	Robert E. Ward
.6	Instrument Shop No. 6	Andrew J. Altman
.7	Welding and Sheet Metal Shop	Terrell C. Freemon
.8	Ordnance Development Branch Shop	August C. Kus
.9	Tool Crib	Lewis H. Brigham
.10	Maintenance	Winfield L. Drissel
.11	Glassblowing Shop	Leonardo Testa
44	SUPPLY	Charles B. Kipps (Acting)
.3	Procurement	Charles B. Kipps
.4	Property Management	Harold G. Nicholas (Acting)
45	MANAGEMENT PLANNING STAFF	Ivan Asay
46	BUDGET STAFF	Wilbur W. Bolton, Jr.
50	PLANT	Charles A. Dieman
	Assistant Chief	Clarence B. Crane
.1	Power Plant	Arthur C. Ramm
.2	Electric Shop	George V. Hall
.3	Piping Shop	Raymond A. Watson
.4	Construction Shop	John A. King
.5	Paint Shop	Howell C. Walker
.6	Labor Services	Roy B. Powell
.7	Metal Shop	Charles Needham
.9	Grounds	William R. David
.11	Refrigeration and Air Conditioning	James S. Powers (Acting)

* Laboratories located in Boulder, Colorado, and Los Angeles, California.

FIELD STATIONS

- 2 OPTICS AND METROLOGY**
Lamp Inspector, Brookline, MA
Visual Landing Aids Field Laboratory, Arcata Airport, Arcata, Humboldt County, CA
- 3 HEAT AND POWER**
3.6 Cryogenic Engineering, Boulder, CO
- 6 MECHANICS DIVISION**
NBS Master Railway Track Scale Depot, Clearing, IL
6.4 Engineering Mechanics, Boulder, CO
- 9 MINERAL PRODUCTS**
9.06 Concreting Materials
Allentown, PA
Denver, CO
Kansas City, MO
San Francisco, CA
Seattle, WA
- 11 APPLIED MATHEMATICS**
11.01 Numerical Analysis, The Institute for Numerical Analysis, University of California at Los Angeles
Director of Research C. B. Tompkins (Acting)
Assistant Director Dr. Magnus R. Hestenes
Assistant Director Dr. Harry D. Huskey
- 14 CENTRAL RADIO PROPAGATION LABORATORY**
Radio Propagation Field Station, Anchorage, AK
Radio Propagation Field Station, Point Barrow, AK
Radio Propagation Field Station, Guam Island
Radio Propagation Field Station, Puunene, Maui, Territory of Hawaii
Radio Propagation Field Station, Ramey Air Force Base, Puerto Rico
Radio Propagation Field Station, Blue West-1, Greenland
Radio Propagation Field Station, Fort Gulick, Panama Canal Zone
Cheyenne Mountain Field Station, Colorado Springs, CO
Radio Field Station, Ft. Belvoir, VA
Radio Propagation Laboratory, Sterling, VA
Radio Transmitting Station, Beltsville, MD
National Bureau of Standards, Boulder CO
- 80 FACILITIES**
Boulder, CO

JANUARY 1956

- 30 DIRECTOR'S OFFICE**
Director
Assistant to the Director
Assistant to the Director
Associate Director for Chemistry
Consultant to the Director
Associate Director for Physics
Associate Director for Testing
Associate Director for Planning
* Director, Boulder Laboratories
Assistant Director for Administration
Consultant to the Director
Consultant to the Director
Consultant to the Director
Consultant to the Director
Director Emeritus
- Dr. Allen V. Astin
Dr. Henry Birnbaum
Clarence N. Coates
Dr. Wallace R. Brode
Dr. Wilmer Souder
Dr. Robert D. Huntton
Dr. Archibald T. McPherson
Nicholas E. Golovin
Dr. Frederick W. Brown (Boulder)
Robert S. Walleigh
Dr. Eugene C. Crittenden
Dr. Leon F. Curtiss
Dr. Chester H. Page
Alvin G. McNish
Dr. Lyman J. Briggs
- 31 OFFICE OF PUBLICATIONS**
.1 Library
.2 Editorial and Printing
- Dr. Wallace R. Brode
Sarah Ann Jones
Jesse L. Mathusa
- 32 OFFICE OF WEIGHTS AND MEASURES**
Assistant Chief
Consultant
- William S. Bussey
Malcolm W. Jensen
Ralph W. Smith
- 33 OFFICE OF BASIC INSTRUMENTATION**
Assistant to the Chief
- William A. Wildhack
- 34 OFFICE OF TECHNICAL PUBLICATIONS**
.4 Photographic Services
- W. Reeves Tilley
Warren P. Richardson
- 1 ELECTRICITY AND ELECTRONICS**
Assistant Chief for Electronics
.1 Resistance and Reactance
.2 Electron Tubes
.3 Electrical Instruments
.4 Magnetic Measurements
.5 Process Technology
.6 Engineering Electronics
.7 Electronic Instrumentation
.8 Electrochemistry
- Dr. Francis B. Silsbee
Carroll Stansbury
Dr. James L. Thomas
Charles P. Marsden, Jr.
Dr. Francis M. Defandorf
Irvin L. Cooter (Acting)
Lucien P. Tuckerman
G. Shapiro (Acting)
Carroll Stansbury
Dr. Walter J. Hamer
- 2 OPTICS AND METROLOGY**
Assistant to the Chief
.1 Photometry and Colorimetry
.2 Optical Instruments
.3 Photographic Technology
.4 Length
.5 Engineering Metrology
- Dr. Irvine C. Gardner
Leroy W. Tilton
Louis E. Barbow
Dr. Francis E. Washer
Raymond Davis
Dr. Lewis V. Judson
Irvin H. Fullmer

- 3 HEAT AND POWER**
- .1 Temperature Measurements
 - .2 Thermodynamics
 - .3 Cryogenic Physics
 - .4 Engines and Lubrication
 - .5 Engine Fuels
- Dr. Ferdinand G. Brickwedde
James F. Swindells
Dr. Charles W. Beckett
Dr. Ralph P. Hudson
Pei Moo Ku (Acting)
Dr. Frank L. Howard
- 4 ATOMIC AND RADIATION PHYSICS**
- Atomic Physics Laboratory**
- .1 Spectroscopy
 - .2 Radiometry
 - .3 Mass Spectrometry
 - .4 Solid State Physics
 - .5 Electron Physics
 - .6 Atomic Physics
- Radiation Physics Laboratory**
- .8 Nuclear Physics
 - .9 Radioactivity
 - .10 X-Rays
 - .11 Betatron
 - .12 Nucleonic Instrumentation
 - .13 Radiological Equipment
 - .14 Radiation Instruments Branch,
Atomic Energy Commission
- Dr. Lauriston S. Taylor
- Dr. William F. Meggers
Dr. Earle K. Plyler
Dr. Fred L. Mohler
Dr. Earle K. Plyler (Acting)
Dr. Ladislaus L. Marton
Dr. Lewis M. Branscomb
Dr. Harold O. Wyckoff
Dr. Ugo Fano
Dr. Wilfrid B. Mann
Dr. Harold O. Wyckoff
Dr. Herman W. Koch
Dr. Louis Costrell
Dr. Scott W. Smith
- Robert L. Butenhoff
- 5 CHEMISTRY**
- Assistant Chief
- .1 Organic Coatings
 - .2 Surface Chemistry
 - .3 Organic Chemistry
 - .4 Analytical Chemistry
 - .5 Inorganic Chemistry
 - .6 Electrodeposition
 - .7 Gas Chemistry
 - .8 Physical Chemistry
 - .9 Thermochemistry
 - .10 Spectrochemistry
 - .11 Pure Substances
- Dr. Edward W. Wichers
Dr. James I. Hoffman
Paul T. Howard
Dr. James I. Hoffman
W. Harold Smith
Harry A. Bright
Dr. Raleigh Gilchrist
Dr. Abner Brenner
Elmer R. Weaver
Dr. Edgar R. Smith
Edward J. Prosen
Bourdon F. Scribner
Dr. Charles P. Saylor
- 6 MECHANICS**
- Consultant
- Consultant
- .1 Sound
 - .2 Mechanical Instruments
 - .3 Fluid Mechanics
 - .4 Engineering Mechanics
 - .6 Mass and Scale
 - .7 Capacity, Density and Fluid Meters
 - .8 Combustion Controls
- Dr. Walter Ramberg
Dr. William G. Brombacher
Dr. Louis B. Tuckerman
Dr. Richard K. Cook
Edward C. Lloyd
Dr. Galen B. Schubauer
Bruce L. Wilson
Douglas R. Tate
Howard S. Bean
Dr. Ernest F. Fiock

- | | |
|---|---|
| <p>7 ORGANIC AND FIBROUS MATERIALS
 Assistant Chief</p> <p>.1 Rubber
 .2 Textiles
 .3 Paper
 .4 Leather
 .5 Testing and Specifications
 .6 Polymer Structure
 .7 Plastics
 .8 Dental Research</p> | <p>Dr. Gordon M. Kline
 William D. Appel
 Dr. Lawrence A. Wood
 William D. Appel
 Dr. Robert B. Hobbs
 Dr. Joseph R. Kanagy
 Dr. Robert D. Stiehler
 Dr. Norman P. Bekkedahl
 Frank W. Reinhart
 William T. Sweeney</p> |
| <p>8 METALLURGY</p> <p>.1 Thermal Metallurgy
 .2 Chemical Metallurgy
 .3 Mechanical Metallurgy
 .4 Corrosion</p> | <p>Dr. John G. Thompson
 Thomas G. Digges
 LeRoy L. Wyman
 John A. Bennett
 George A. Ellinger</p> |
| <p>9 MINERAL PRODUCTS
 Assistant Chief</p> <p>.1 Porcelain and Pottery
 .2 Glass
 .3 Refractories
 .4 Enameled Metals
 .6 Concreting Materials
 .7 Constitution and Microstructure</p> | <p>Dr. Irl C. Schoonover
 Clarence H. Hahner
 Milton D. Burdick (Acting)
 Clarence H. Hahner
 Dr. Samuel Zerfoss
 William N. Harrison
 Raymond L. Blaine
 Howard F. McMurdie</p> |
| <p>10 BUILDING TECHNOLOGY
 Assistant Chief
 Consultant
 Consultant</p> <p>.1 Structural Engineering
 .2 Fire Protection
 .3 Heating and Air Conditioning
 .4 Floor, Roof and Wall Coverings
 .5 Codes and Specifications</p> | <p>Douglas E. Parsons
 Dr. Hubert R. Snoke
 William F. Roeser
 Dr. John W. McBurney
 D. Watstein (Acting)
 Dr. Alexander F. Robertson
 Richard S. Dill
 Dr. Hubert R. Snoke
 John A. Dickinson</p> |
| <p>11 APPLIED MATHEMATICS
 Assistant Chief</p> <p>.1 Numerical Analysis
 .2 Computation
 .3 Statistical Engineering
 .4 Mathematical Physics</p> | <p>Dr. Edward W. Cannon
 Dr. Franz L. Alt
 John Todd
 Dr. M. Abramowitz
 Dr. Churchill Eisenhart
 Dr. Robert F. Dressler</p> |
| <p>12 DATA PROCESSING SYSTEMS
 Assistant Chief for Systems</p> <p>.1 Components and Techniques
 .2 Digital Circuitry
 .3 Digital Systems
 .4 Analog Systems
 .5 Application Engineering</p> | <p>Samuel N. Alexander
 Dr. Harold K. Skramstad
 Robert D. Elbourn
 Sidney Greenwald (Acting)
 Alan L. Leiner
 Dr. Harold K. Skramstad
 Samuel N. Alexander (Acting)</p> |

- 40 ACCOUNTING**
Deputy Chief
- .1 Accounts and Reports
 - .2 Classification
 - .3 Tabulation
 - .4 Voucher Examination
 - .5 Billing and Collection
 - .6 Payroll
 - .7 Internal Audit
- 41 PERSONNEL**
- .1 Board of Civil Service Examiners
 - .2 Recruitment and Placement
 - .3 Classification
 - .4 Employee Relations
 - .5 Operations and Procedures
 - .6 Medical Office
- 42 ADMINISTRATIVE SERVICES**
Assistant Chief
- .1 Records and Communications
 - .2 Special Services
 - .3 Janitorial Services
 - .4 Guard Services
 - .5 Transportation Services
 - .6 Security Office
 - .7 Test Administration
- 43 SHOPS**
Assistant Chief
- .1 Instrument Shop No. 1
 - .2 Instrument Shop No. 2
 - .3 Instrument Shop No. 3
 - .4 Instrument Shop No. 4
 - .5 Instrument Shop No. 5
 - .7 Welding and Sheet Metal Shop
 - .9 Tool Crib
 - .11 Glassblowing Shop
- 44 SUPPLY**
Deputy Chief
- .3 Procurement
 - .4 Property Management
- 45 MANAGEMENT PLANNING**
Assistant Chief
- 46 BUDGET STAFF**
Deputy Budget Officer
- Paul R. McClenon
Horace E. Hardaway
Robert A. Strizzi
Pearl E. Miller
John P. Lafon
Matilda Udoff
Doris J. Lothrop
Kathryn L. Rock
James P. Menzer
- George R. Porter
Edith N. Fimple
Frankie R. Keyser
Charles V. Ramey
Ruth B. Armsby
Helen V. Courtney
Dr. Glen Pincock
- Harry P. Dalzell
Karl L. Hafen
Vacant
Gird M. Tolley, Jr.
Robert C. Howey
Capt. William R. Allen
Charles W. Anderson
Harry P. Dalzell
Randolph K. Artz
- Frank P. Brown
Winfield L. Drissel
David G. Kennedy
George A. Rheinbold
George A. Rheinbold
Norman C. Pines
Carl E. Pelander
Terrell C. Freeman
Lewis H. Brigham
Leonardo Testa
- George B. Kefover
Norman L. Christeller
Charles B. Kipps
Fred H. Johncox
- Ivan Asay
George E. Auman
- Wilbur W. Bolton, Jr.
William E. Lilly

50	PLANT	
	Assistant Chief	Charles A. Dieman
.1	Power Plant	Clarence B. Crane
.2	Electric Shop	Arthur C. Ramm
.3	Piping Shop	George V. Hall
.4	Construction Shop	Raymond A. Watson
.5	Paint Shop	John A. King
.6	Labor Services	Howell C. Walker
.7	Metal Shop	Roy B. Powell
.8	Special Laboratory Service	Charles Needham
.9	Grounds	Donald J. Leweck (Acting)
.11	Refrigeration and Air Conditioning	William R. Stevenson
		James S. Powers
*80	BOULDER LABORATORIES	
	DIRECTOR'S OFFICE	
	Director	Dr. Frederick W. Brown
.1	Executive Officer	Samuel W. J. Welch
.3	Statistician	Dr. Edwin L. Crow
.4	Information Officer	Charles L. Bragaw
.5	Library	Victoria S. Barker
	ADMINISTRATIVE DIVISION	Samuel W. J. Welch
.2	Fiscal Office	Herbert D. Stansell
.3	Personnel	Roy W. Stockwell, Jr.
.4	General Services Section	Barton F. Betts
.5	Engineering Services Section	Paul S. Ballif
81	CRYOGENIC ENGINEERING	Russell B. Scott
.1	Cryogenic Equipment	Bascom W. Birmingham
.2	Cryogenic Processes	Peter C. Vander Arend
.3	Properties of Materials	Dr. R. Joseph Corruccini
.4	Gas Liquefaction	Victor J. Johnson
84	RADIO STANDARDS	Dr. Harold A. Thomas
84A	High Frequency Standards Branch	William D. George
.1	High Frequency Electrical Standards	Myron C. Selby
.2	Radio Broadcast Service	Alvin H. Morgan
.3	HF Impedance Standard	William D. George (Acting)
84B	Microwave Standards Branch	Vacant
.6	Extreme High-Frequency and Noise	David M. Kerns
.7	Microwave Frequency and Spectroscopy	George Birnbaum
.8	Microwave Circuit Standards	Robert W. Beatty (Acting)
	CENTRAL RADIO PROPAGATION LABORATORY	
82	RADIO PROPAGATION PHYSICS	Dr. Ralph J. Slutz
	Consultant	Dr. Franklin E. Roach
	Consultant	Dana K. Bailey
.1	Upper Atmosphere Research	Thomas N. Gautier
**	.2 Ionospheric Research	Richard C. Kirby (Acting) (Washington)
	.3 Regular Propagation Services	Walter B. Chadwick
	.5 Ionospheric Research (Boulder)	Richard C. Kirby

- 83 RADIO PROPAGATION ENGINEERING**
Consultant
.4 Frequency Utilization Research
.6 Tropospheric Propagation Research

Kenneth A. Norton
Dr. James R. Wait
William Q. Crichlow
Jack W. Herbstreit

- * Laboratories located in Boulder, Colorado.
** Laboratory located in Washington, D.C.

FIELD STATIONS

- 2 OPTICS AND METROLOGY**
Lamp Inspector, Brookline, MA
Visual Landing Aids Field Laboratory, Arcata Airport, Arcata, CA
- 6 MECHANICS**
NBS Master Railway Track Scale Depot, Clearing, IL
- 9 MINERAL PRODUCTS**
9.6 Concreting Materials
Allentown, PA
Denver, CO
San Francisco, CA
Seattle, WA
- 80 Boulder Laboratories**
Boulder Laboratories, National Bureau of Standards, Boulder, CO
Radio Propagation Field Station, Anchorage, AK
Radio Propagation Field Station, Point Barrow, AK
Radio Propagation Field Station, Guam Island
Radio Propagation Field Station, Puunene, Maui, Territory of Hawaii
Radio Propagation Field Station, Ramey Air Force Base, Puerto Rico
Radio Propagation Field Station, Bluie West-1, Greenland
Radio Propagation Field Station, Fort Gulick, Panama Canal Zone
Radio Propagation Field Station, Carthage, IL
Cheyenne Mountain Field Station, Colorado Springs, CO
Radio Propagation Field Station, Ft. Belvoir, VA
Radio Propagation Laboratory, Sterling, VA
Radio Transmitting Station, Beltsville, MD
Radio Noise Recording Station, Front Royal, VA

FEBRUARY 1959

- 30 DIRECTOR'S OFFICE**
Deputy Director
Library
Associate Director for Physics
Associate Director for Engineering
Associate Director for Chemistry
Associate Director for Planning
Associate Director for Administration
* Associate Director for the Boulder Laboratories
Consultant to the Director
Consultant to the Director
Consultant to the Director
Consultant to the Director
Director Emeritus
- 32 OFFICE OF WEIGHTS AND MEASURES**
- 33 OFFICE OF BASIC INSTRUMENTATION**
- 34 OFFICE OF TECHNICAL INFORMATION**
.1 Information
.2 Editorial
.3 Publications
.4 Photographic Services
- 1 ELECTRICITY AND ELECTRONICS**
.1 Resistance and Reactance
.2 Electron Devices
.3 Electrical Instruments
.4 Magnetic Measurements
.5 Dielectrics
.6 Engineering Electronics
.7 Electronic Instrumentation
.8 Electrochemistry
- 2 OPTICS AND METROLOGY**
.1 Photometry and Colorimetry
.2 Optical Instruments
.3 Photographic Technology
.4 Length
.5 Engineering Metrology
- 3 HEAT**
.1 Temperature Physics
.2 Thermodynamics
.3 Cryogenic Physics
.4 Rheology
.5 Engine Fuels
.6 Free Radicals Research
- Dr. Allen V. Astin
Dr. Robert D. Huntoon
Sarah Ann Jones
Dr. Robert D. Huntoon
Dr. Archibald T. McPherson
Dr. Edward W. Wichers
Dr. Irl C. Schoonover
Robert S. Walleigh
Dr. Frederick W. Brown
Dr. Ferdinand G. Brickwedde
Dr. Leon F. Curtiss
Alvin G. McNish
Dr. Chester H. Page
Dr. Lyman J. Briggs
- William S. Bussey
- William A. Wildhack
- W. Reeves Tilley
Paul E. Walsh (Acting)
William K. Gautier
John E. Carpenter
Warren P. Richardson
- Dr. Francis B. Silsbee
Dr. James L. Thomas
Charles P. Marsden
Dr. Francis M. Defandorf
Irvin L. Cooter
Dr. John D. Hoffman
Gustave Shapiro
G. Franklin Montgomery
Dr. Walter J. Hamer
- Dr. Irvine C. Gardner
Louis E. Barbrow
Dr. Francis E. Washer
Calvin S. McCamy
Dr. Lewis V. Judson
Irvin H. Fullmer
- Dr. Charles M. Herzfeld
James F. Swindells
Dr. Charles W. Beckett
Dr. Ralph P. Hudson
Dr. Robert S. Marvin
Dr. Frank L. Howard
Dr. Herbert P. Broida

- 4 ATOMIC AND RADIATION PHYSICS**
Atomic Physics Laboratory
.1 Spectroscopy
.2 Radiometry
.3 Mass Spectrometry
.4 Solid State Physics
.5 Electron Physics
.6 Atomic Physics
Radiation Physics Laboratory
.7 Neutron Physics
.8 Radiation Theory
.9 Radioactivity
.10 X-Rays
.11 High Energy Radiation
.12 Nucleonic Instrumentation
.13 Radiological Equipment
- 5 CHEMISTRY**
.1 Organic Coatings
.2 Surface Chemistry
.3 Organic Chemistry
.4 Analytical Chemistry
.5 Inorganic Chemistry
.6 Electrodeposition
.7 Molecular Structure and Properties of Gases
.8 Physical Chemistry
.9 Thermochemistry
.10 Spectrochemistry
.11 Pure Substances
- 6 MECHANICS**
.1 Sound
.2 Mechanical Instruments
.3 Fluid Mechanics
.4 Engineering Mechanics
.6 Mass and Scale
.7 Capacity, Density and Fluid Meters
.8 Combustion Controls
- 7 ORGANIC AND FIBROUS MATERIALS**
.1 Rubber
.2 Textiles
.3 Paper
.4 Leather
.5 Testing and Specifications
.6 Polymer Structure
.7 Plastics
.8 Dental Research
- 8 METALLURGY**
.1 Thermal Metallurgy
.2 Chemical Metallurgy
.3 Mechanical Metallurgy
.4 Corrosion
.5 Metal Physics
- Lauriston S. Taylor
Bourdon F. Scribner (Acting)
Dr. Earle K. Plyler
Dr. Fred L. Mohler
Dr. Hans P. R. Frederikse
Dr. Ladislaus L. Marton
Dr. Lewis M. Branscomb
Dr. Harold O. Wyckoff
Dr. Randall S. Caswell
Dr. Ugo Fano
Dr. Wilfrid B. Mann
Dr. Harold O. Wyckoff
Dr. Herman W. Koch
Louis Costrell
Dr. Scott W. Smith
Dr. Edward W. Wichers (Acting)
Paul T. Howard
Dr. William W. Walton
Dr. Horace S. Isbell
Harry A. Bright
Dr. Raleigh Gilchrist
Dr. Abner Brenner
Floyd Buckley
Dr. Roger G. Bates
Edward J. Prosen
Bourdon F. Scribner
Dr. Charles P. Saylor
Dr. Walter Ramberg
Dr. Richard K. Cook
Edward C. Lloyd
Dr. Galen B. Schubauer
Bruce L. Wilson
H. Steffen Peiser
Charles T. Collett (Acting)
Frank R. Caldwell
Dr. Gordon M. Kline
Dr. Lawrence A. Wood
Dr. Herbert F. Schiefer
Dr. Robert B. Hobbs
Dr. Joseph R. Kanagy
Dr. Robert D. Stiehler
Dr. Norman P. Bekkedahl
Dr. Frank W. Reinhart
William T. Sweeney
Dr. James I. Hoffman
Thomas G. Digges
LeRoy L. Wyman
John A. Bennett
George A. Ellinger
Dr. Lawrence M. Kushner

9	MINERAL PRODUCTS	Dr. Irl C. Schoonover (Acting)
	.1 Engineering Ceramics	Milton D. Burdick
	.2 Glass	Clarence H. Hahner
	.3 Refractories	Vacant
	.4 Enameled Metals	William N. Harrison
	.6 Concreting Materials	Raymond L. Blaine
	.7 Constitution and Microstructure	Howard F. McMurdie
10	BUILDING TECHNOLOGY	Douglas E. Parsons
	.1 Structural Engineering	David Watstein
	.2 Fire Protection	Dr. Alexander F. Robertson
	.3 Air Conditioning, Heating, and Refrigeration	Paul R. Achenbach
	.4 Floor, Roof and Wall Coverings	Dr. Hubert R. Snoke
	.5 Codes and Safety Standards	John A. Dickinson
	.6 Heat Transfer	Henry E. Robinson
11	APPLIED MATHEMATICS	Dr. Edward W. Cannon
	.1 Numerical Analysis	Dr. Philip J. Davis
	.2 Computation	Dr. Edward W. Cannon (Acting)
	.3 Statistical Engineering	Dr. Churchill Eisenhart
	.4 Mathematical Physics	Dr. Robert F. Dressler
12	DATA PROCESSING SYSTEMS	Samuel N. Alexander
	.1 Components and Techniques	Robert D. Elbourn
	.2 Digital Circuitry	Sidney Greenwald
	.3 Digital Systems	Alan L. Leiner
	.4 Analog Systems	Dr. Harold K. Skramstad
	.5 Applications Engineering	Samuel N. Alexander (Acting)
40	ACCOUNTING	Horace E. Hardaway
	.1 Reports and Billing	Mrs. Pearl E. Miller
	.2 Classification	Robert J. Goldsmith
	.3 Tabulation	Walter G. Shackelford
	.4 Voucher Examination	Matilda Udoff
	.6 Payroll	Kathryn L. Rock
41	PERSONNEL	George R. Porter
	.2 Recruitment and Placement	Frankie R. Keyser
	.3 Salary and Wage Administration	Charles V. Ramey
	.4 Employee Relations and Training	Ruth B. Armsby
	.5 Operations and Procedures	Helen V. Courtney
	.6 Medical Office	Dr. Glen Pincock
42	ADMINISTRATIVE SERVICES	Harry P. Dalzell
	.1 Records and Communications	Howard L. Sampson
	.2 Special Services	Raymond S. Cudmore (Acting)
	.3 Janitorial Services	Robert C. Howey
	.4 Guard Services	Capt. William R. Allen
	.5 Transportation Services	Charles W. Anderson
	.6 Security Office	Harry P. Dalzell
	.7 Test Administration	Randolph K. Artz

43	SHOPS	
	.1 Instrument Shop #1	Frank P. Brown
	.2 Instrument Shop #2	Carl E. Pelander
	.3 Instrument Shop #3	George A. Rheinbold
	.4 Instrument Shop #4	George A. Rheinbold
	.5 Instrument Shop #5	Norman C. Pines
	.7 Welding and Sheet Metal Shop	John L. Pararas
	.9 Tool Crib	Terrell C. Freemon
	.11 Glassblowing Shop	Lewis H. Brigham
		Leonardo Testa
44	SUPPLY	
	.3 Procurement	George B. Kefover
	.4 Property Management	Charles B. Kipps
		Fred H. Johncox
45	MANAGEMENT PLANNING	Ivan Asay
46	BUDGET	Norman L. Christeller
47	INTERNAL AUDIT	James P. Menzer
50	PLANT	
	.1 Heating and Air Conditioning	Hylton Graham
	.2 Electric Shop	James S. Powers
	.3 Piping	George V. Hall
	.4 Construction Shop	Raymond A. Watson
	.5 Paint Shop	John A. King
	.6 Labor Services	Howell C. Walker
	.7 Metal Shop	Roy B. Powell
	.9 Grounds	Donald I. Thompson
		William R. Stevenson

***BOULDER LABORATORIES**

79	DIRECTOR'S OFFICE	
	Associate Director, NBS	Dr. Frederick W. Brown
	Executive Officer	Samuel W. J. Welch
	Consultant	Dr. Richard N. Thomas
	Consultant	Dr. James R. Wait
80	ADMINISTRATIVE	
	.1 Management Planning	Samuel W. J. Welch
	.2 Fiscal Office	Jessie B. Berkley
	.3 Personnel	Herbert D. Stansell
	.4 General Services (Supply Officer)	Roy W. Stockwell, Jr.
	.5 Engineering Services	Barton F. Betts
		Paul S. Ballif
81	CRYOGENIC ENGINEERING LABORATORY	
	.1 Cryogenic Equipment	Russell B. Scott
	.2 Cryogenic Processes	Dr. Robert B. Jacobs
	.3 Properties of Materials	Bascom W. Birmingham
	.4 Gas Liquefaction	Dr. R. Joseph Corruccini
		Victor J. Johnson

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|-----------|---|-------------------------------------|
| 84 | RADIO STANDARDS LABORATORY | William D. George (Acting) |
| | .1 High Frequency Electrical Standards | Myron C. Selby |
| | .2 Radio Broadcast Service | Alvin H. Morgan |
| | .3 High Frequency Impedance Standards | John L. Dalke |
| | .5 Electronic Calibration Center | Harvey W. Lance |
| | .7 Microwave Physics | Dr. John M. Richardson |
| | .8 Microwave Circuit Standards | Robert W. Beatty |
| |
CENTRAL RADIO PROPAGATION LABORATORY |
Dr. Frederick W. Brown (Acting) |
| 82 | RADIO PROPAGATION PHYSICS | Dr. Ralph J. Slutz |
| | .1 Upper Atmosphere Research | Roger M. Gallet |
| | .2 Ionospheric Research | Dr. Ernest K. Smith, Jr. |
| | .3 Regular Prediction Services | Walter B. Chadwick |
| | .4 Sun Earth Relationships | Robert W. Knecht |
| | .5 VHF Research | Dr. Kenneth L. Bowles (Acting) |
| | .6 Radio Warning Services | J. Virginia Lincoln |
| | .7 Airglow and Aurora | Dr. Franklin E. Roach |
| | .8 Radio Astronomy and Arctic Propagation | Dr. C. Gordon Little |
| 83 | RADIO PROPAGATION ENGINEERING | Kenneth A. Norton |
| | .1 Data Reduction Instrumentation | Walter E. Johnson |
| | .2 Modulation Systems | Arthur D. Watt |
| | .4 Radio Noise | William Q. Crichlow |
| | .5 Tropospheric Measurements | Charles F. Peterson |
| | .6 Tropospheric Analysis | Philip L. Rice |
| | .7 Radio Systems Application Engineering | Robert S. Kirby |
| | .8 Radio Meteorology | Bradford R. Bean |
| | .9 Lower Atmosphere Physics | Dr. Moody C. Thompson, Jr. |
| 85 | RADIO COMMUNICATIONS AND SYSTEMS | Richard C. Kirby |
| | .1 Low Frequency-Very Low Frequency Research | A. Glenn Jean, Jr. |
| | .2 High Frequency-Very High Frequency Research | Richard Silberstein |
| | .3 Ultra High Frequency-Super High Frequency Research | Vacant |
| | .4 Modulation Research | J. Wesley Koch |
| | .5 Antenna Research | Herman V. Cottony |
| | .6 Navigation Systems | Gifford Hefley |
| | .7 Systems Analysis | Donald W. Patterson (Acting) |
| | .8 Field Operations | Harry G. Sellery |

* Laboratories located in Boulder, Colorado.

FIELD STATIONS

- | | |
|----------|--|
| 2 | OPTICS AND METROLOGY |
| | Lamp Inspector, Brookline, MA |
| | Visual Landing Aids Field Laboratory, Arcata, CA |
| 6 | MECHANICS |
| | Master Railway Track Scale Depot, Clearing, IL |

- 9 MINERAL PRODUCTS**
Concreting Materials Section
Allentown, PA
Denver, CO
San Francisco, CA
Seattle WA
- 82 RADIO PROPAGATION PHYSICS**
Radio Propagation Field Station
Anchorage, AK
Fort Belvoir, VA
Barrow, AK
Ramey AFB, San Juan, Puerto Rico
Sterling, VA
Radio Transmitting Field Station WWVH
Puene, Maui, HA
Long Branch Radio Propagation Field Station
Kilbourne, IL
- 83 RADIO PROPAGATION ENGINEERING**
Cheyenne Mountain Field Station, Colorado Springs, CO
Radio Noise Recording Station
Front Royal, VA
Kauai, Hawaii
Bill, WY
- 84 RADIO STANDARDS LABORATORY**
Radio Transmitting Station WWV, Beltsville, MD

MAY 1961

30	DIRECTOR'S OFFICE	Dr. Allen V. Astin
	Deputy Director	Dr. Robert D. Huntoon
	Associate Director	Dr. Archibald T. McPherson
	Associate Director	Dr. Edward W. Wichers
	Library	Sarah Ann Jones
	Associate Director	Dr. Irl C. Schoonover
	NBS Reactor Program	Dr. Carl O. Muehlhause
	Associate Director	Dr. Charles M. Herzfeld (Acting)
	Associate Director	Robert S. Walleigh
	Special Assistant to the Director	William A. Wildhack
*	Director, Boulder Laboratories	Dr. Frederick W. Brown
	Special Research Assistant and Senior Research Fellow	Dr. Ugo Fano
	Consultant to the Director	Dr. Leon F. Curtiss
	Consultant to the Director	Dr. James I. Hoffman
	Consultant to the Director	Dr. Kurt E. Shuler
	Director Emeritus	Dr. Lyman J. Briggs
1	ELECTRICITY	Dr. Chester H. Page
.1	Resistance and Reactance	Dr. James L. Thomas
.2	Electrochemistry	Dr. Walter J. Hamer
.3	Electrical Instruments	Dr. Francis M. Defandorf
.4	Magnetic Measurements	Irvin L. Cooter
.5	Dielectrics	Dr. John D. Hoffman
2	METROLOGY	Alvin G. McNish
.1	Photometry and Colorimetry	Louis E. Barbrow
.2	Refractometry	Dr. Francis E. Washer
.3	Photographic Research	Calvin S. McCamy
.4	Length	Benjamin L. Page
.5	Engineering Metrology	Irvin H. Fullmer
.6	Mass and Scale	Alvin G. McNish (Acting)
.7	Volumetry and Densimetry	John C. Hughes (Acting)
3	HEAT	Dr. Ralph P. Hudson
.1	Temperature Physics	James F. Swindells
.2	Heat Measurements	Dr. Defoe C. Ginnings
.3	Cryogenic Physics	Dr. Ernest Ambler
.7	Equation of State	Joseph Hilsenrath
.8	Statistical Physics	Dr. Melville S. Green
4	RADIATION PHYSICS	Dr. Lauriston S. Taylor
.1	X-Ray	Dr. Harold O. Wyckoff
.2	Radioactivity	Dr. Wilfrid B. Mann
.3	Radiation Theory	Dr. Lewis V. Spencer (Acting)
.4	High Energy Radiation	Dr. Herman W. Koch
.5	Radiological Equipment	Dr. Scott W. Smith
.6	Nucleonic Instrumentation	Louis Costrell
.7	Neutron Physics	Dr. Randall S. Caswell

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| 5 | ANALYTICAL AND INORGANIC CHEMISTRY | |
| | .1 Pure Substances | Dr. Irl C. Schoonover (Acting) |
| | .2 Spectrochemistry | Dr. Frank L. Howard |
| | .3 Solution Chemistry | Bourdon F. Scribner |
| | .4 Standard Reference Materials | Dr. Roger G. Bates |
| | .5 Applied Analytical Research | John L. Hague |
| | | Dr. John K. Taylor |
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| 6 | MECHANICS | Bruce L. Wilson |
| | .1 Sound | Dr. Richard K. Cook |
| | .2 Pressure and Vacuum | Dr. Daniel P. Johnson |
| | .3 Fluid Mechanics | Dr. Galen B. Schubauer |
| | .4 Engineering Mechanics | Lafayette K. Irwin |
| | .5 Rheology | Dr. Robert S. Marvin |
| | .8 Combustion Controls | Frank R. Caldwell |
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| 7 | ORGANIC AND FIBROUS MATERIALS | Dr. Gordon M. Kline |
| | .1 Rubber | Dr. Lawrence A. Wood |
| | .2 Textiles | Dr. Herbert F. Schiefer |
| | .3 Paper | Dr. Robert B. Hobbs |
| | .4 Leather | Dr. Joseph R. Kanagy |
| | .5 Testing and Specifications | Dr. Robert D. Stiehler |
| | .6 Polymer Structure | Dr. Norman P. Bekkedahl |
| | .7 Plastics | Dr. Frank W. Reinhart |
| | .8 Dental Research | William T. Sweeney |
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| 8 | METALLURGY | Dr. Lawrence M. Kushner (Acting) |
| | .1 Thermal Metallurgy | Thomas G. Digges |
| | .2 Chemical Metallurgy | LeRoy L. Wyman |
| | .3 Mechanical Metallurgy | John A. Bennett |
| | .4 Corrosion | George A. Ellinger |
| | .5 Metal Physics | Dr. Lawrence M. Kushner |
| | .6 Electrodeposition | Dr. Abner Brenner |
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| 9 | MINERAL PRODUCTS | Dr. Alan D. Franklin |
| | .1 Engineering Ceramics | Milton D. Burdick |
| | .2 Glass | Clarence H. Hahner |
| | .3 Refractories | Vacant |
| | .4 Enameled Metals | William N. Harrison |
| | .5 Crystal Growth | Dr. Fred Ordway |
| | .6 Physical Properties | Dr. Alan D. Franklin (Acting) |
| | .7 Constitution and Microstructure | Howard F. McMurdie |
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| 10 | BUILDING RESEARCH | Douglas E. Parsons |
| | .1 Structural Engineering | David Watstein |
| | .2 Fire Research | Dr. Alexander F. Robertson |
| | .3 Mechanical Systems | Paul R. Achenbach |
| | .4 Organic Building Materials | Dr. William W. Walton |
| | .5 Codes and Safety Standards | Richard L. Lloyd (Acting) |
| | .6 Heat Transfer | Henry E. Robinson |
| | .7 Inorganic Building Materials | Raymond L. Blaine |

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| 11 | APPLIED MATHEMATICS | Dr. Edward W. Cannon |
| | .1 Numerical Analysis | Dr. Philip J. Davis |
| | .2 Computation | Dr. Don I. Mittleman |
| | .3 Statistical Engineering | Dr. Churchill Eisenhart |
| | .4 Mathematical Physics | Dr. William H. Pell |
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| 12 | DATA PROCESSING SYSTEMS | Samuel N. Alexander |
| | .1 Components and Techniques | Robert D. Elbourn |
| | .2 Digital Circuitry | Vacant |
| | .3 Digital Systems | Dr. Harold K. Skramstad |
| | .4 Analog Systems | Dr. Harold K. Skramstad |
| | .5 Applications Engineering | Ezra Glaser (Acting) |
|
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| 13 | ATOMIC PHYSICS | Dr. Lewis M. Branscomb |
| | .1 Spectroscopy | Dr. Karl G. Kessler |
| | .2 Infrared Spectroscopy | Dr. Earle K. Plyler |
| | .4 Solid State Physics | Dr. Hans P. R. Frederikse |
| | .5 Electron Physics | Dr. Ladislaus L. Marton |
| | .6 Atomic Physics | Dr. Stephen J. Smith |
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| 14 | INSTRUMENTATION | G. Franklin Montgomery |
| | .1 Engineering Electronics | Gustave Shapiro |
| | .2 Electron Devices | Charles P. Marsden |
| | .3 Electronic Instrumentation | G. Franklin Montgomery (Acting) |
| | .4 Mechanical Instruments | Arnold Wexler |
| | .5 Basic Instrumentation | Joshua Stern |
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| 15 | PHYSICAL CHEMISTRY | Dr. Merrill B. Wallenstein |
| | .1 Thermochemistry | Edward J. Prosen |
| | .2 Surface Chemistry | Dr. Ralph Klein |
| | .3 Organic Chemistry | Dr. Horace S. Isbell |
| | .4 Molecular Spectroscopy | Dr. David E. Mann |
| | .5 Molecular Kinetics | Dr. Robert E. Ferguson |
| | .6 Mass Spectrometry | Dr. Vernon H. Dibeler |
| | .7 Molecular Structure and Radiation Chemistry | Floyd Buckley |
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| 32 | OFFICE OF WEIGHTS AND MEASURES | William S. Bussey |
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| 34 | OFFICE OF TECHNICAL INFORMATION | W. Reeves Tilley |
| | .1 Information | Paul E. Walsh |
| | .2 Editorial | William K. Gautier |
| | .3 Publications | John E. Carpenter |
| | .4 Photographic Services | Warren P. Richardson |
| | .5 Graphic Arts | Conrad F. Peters |
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| 40 | ACCOUNTING | James P. Menzer |
| | .1 Reports and Billing | Pearl E. Miller |
| | .2 Classification | Robert J. Goldsmith |
| | .3 Tabulation | Walter G. Shackelford |
| | .4 Voucher Examination | Matilda Udoff |
| | .6 Payroll | Kathryn L. Rock |

41	PERSONNEL	George R. Porter Frankie R. Keyser Charles V. Ramey Ruth B. Armsby Helen V. Courtney Dr. Glen Pincock
	.2 Recruitment and Placement	
	.3 Salary and Wage Administration	
	.4 Employee Relations and Training	
	.5 Operations and Procedures	
	.6 Medical Office	
42	ADMINISTRATIVE SERVICES	Harry P. Dalzell Howard L. Sampson Karl L. Hafen (Acting) Robert C. Howey Capt. William J. Kane Charles W. Anderson Harry P. Dalzell Randolph K. Artz
	.1 Records and Communications	
	.2 Special Services	
	.3 Janitorial Services	
	.4 Guard Services	
	.5 Transportation Services	
	.6 Security Office	
	.7 Test Administration	
43	SHOPS	Frank P. Brown John R. Hettenhouser George A. Rheinbold George A. Rheinbold Philip Pfaff, Jr. John L. Pararas Harold E. Brown Frank P. Brown (Acting) Lewis H. Brigham Leonardo Testa
	.1 Instrument Shop #1	
	.2 Instrument Shop #2	
	.3 Instrument Shop #3	
	.4 Instrument Shop #4	
	.5 Instrument Shop #5	
	.7 Welding and Sheet Metal Shop	
	.8 Optical Shop	
	.9 Tool Crib	
	.11 Glassblowing Shop	
44	SUPPLY	George B. Kefover Charles B. Kipps Fred H. Johncox
	.3 Procurement	
	.4 Property Management	
45	MANAGEMENT PLANNING	Ivan Asay
46	BUDGET	Dr. James E. Skillington, Jr.
47	INTERNAL AUDIT	Jacob Seidenberg
50	PLANT	Hylton Graham James S. Powers George V. Hall Raymond A. Watson John A. King Howell C. Walker Roy B. Powell Donald I. Thompson William R. Stevenson
	.1 Heating and Air Conditioning	
	.2 Electric Shop	
	.3 Piping	
	.4 Construction Shop	
	.5 Paint Shop	
	.6 Labor Services	
	.7 Metal Shop	
	.9 Grounds	

***BOULDER LABORATORIES**

79 DIRECTOR'S OFFICE

Director for the Boulder Laboratories
Executive Officer
Consultant— Math-Analysis and Computation
Facility Group
Consultant— Mathematical Physics
and Educational Director
Consultant— Statistics
Consultant— Astrophysics
Consultant— Astrophysics
Consultant— Radio Wave Propagation

Dr. Frederick W. Brown
Samuel W. J. Welch

Dr. John J. Sopka

H. E. Brown
Dr. Edwin L. Crow
Dr. Richard N. Thomas
Dr. John T. Jefferies
Dr. James R. Wait

80 ADMINISTRATIVE

- .1 Management Planning
- .2 Fiscal Office
- .3 Personnel
- .4 Supply
- .5 Engineering Services
- .6 Office Services

Samuel W. J. Welch
Jessie B. Berkley
Herbert D. Stansell
Roy W. Stockwell, Jr.
Barton F. Betts
Paul S. Ballif
Richard G. Bulgin

81 CRYOGENIC ENGINEERING LABORATORY

- .1 Cryogenic Equipment
- .2 Cryogenic Processes
- .3 Properties of Materials
- .4 Cryogenic Technical Services

Russell B. Scott
Dr. Robert B. Jacobs
Bascom W. Birmingham
Dr. R. Joseph Corruccini
Victor J. Johnson

84 RADIO STANDARDS LABORATORY

- .1 HF Electrical Standards
- .2 Radio Broadcast Service
- .3 Radio and Microwave Materials
- .4 Atomic Frequency and Time Interval Standards
- .5 Electronic Calibration Center
- .7 Millimeter-Wave Research
- .8 Microwave Circuit Standards

Dr. John M. Richardson
Myron C. Selby
Alvin H. Morgan
John L. Dalke
Dr. Richard C. Mockler
Harvey W. Lance
Dr. William Culshaw
Robert W. Beatty

CENTRAL RADIO PROPAGATION LABORATORY

Dr. Frederick W. Brown (Acting)

82 IONOSPHERE RESEARCH AND PROPAGATION

- .1 LF and VLF Research
- .2 Ionosphere Research
- .3 Prediction Services
- .4 Sun-Earth Relationships
- .5 Field Engineering
- .6 Radio Warning Services

Dr. Ernest K. Smith, Jr.
A. Glenn Jean, Jr.
Dr. Kenneth Davies
Walter B. Chadwick
Robert W. Knecht
Harry G. Sellery
J. Virginia Lincoln

83 RADIO PROPAGATION ENGINEERING

- .1 Data Reduction Instrumentation
- .4 Radio Noise
- .5 Tropospheric Measurements
- .6 Tropospheric Analysis
- .7 Propagation-Terrain Effects
- .8 Radio Meteorology
- .9 Lower Atmosphere Physics

Kenneth A. Norton
Walter E. Johnson
William Q. Crichlow
Martin T. Decker
Philip L. Rice
Robert S. Kirby
Bradford R. Bean
Dr. Moody C. Thompson, Jr.

- | | |
|--|---|
| 85 RADIO SYSTEMS
.2 HF and VHF Research
.4 Modulation Research
.5 Antenna Research
.6 Navigation Systems | Richard C. Kirby
William F. Utlaut
William C. Coombs
Herman V. Cottony
Gifford Hefley |
| 87 UPPER ATMOSPHERE AND SPACE PHYSICS
.1 Upper Atmosphere and Plasma Physics
.5 Ionosphere and Exosphere Scatter
.7 Airglow and Aurora
.8 Ionospheric Radio Astronomy | Dr. C. Gordon Little
Roger M. Gallet
Dr. Kenneth L. Bowles
Dr. Franklin E. Roach
Robert S. Lawrence |

* Laboratories located in Boulder, Colorado.

FIELD STATIONS

- 2 METROLOGY**
 Lamp Inspector, Brookline, MA
 Visual Landing Aids Field Laboratory, Arcata, CA
 Master Railway Track Scale Depot, Clearing, IL
- 10 BUILDING TECHNOLOGY**
 Concreting Materials Section
 Allentown, PA
 Denver, CO
 San Francisco, CA
 Seattle WA

CENTRAL RADIO PROPAGATION LABORATORY

- Anchorage Station, Anchorage, AK
 Antarctica Station, Byrd & South Pole
 Barrow Station, Barrow, AK
 Bill Station, Douglas WY
 Cheyenne Mountain Station, Colorado Springs, CO
 Fort Belvoir Station, Fort Belvoir, VA
 Fritz Peak Station, Rollinsville, CO
 Front Royal Station, Front Royal, VA
 Gun Barrel Hill Station, Boulder, CO
 Hygiene Station, Boulder, CO
 Kekaha Station, Koloa, Kauai, HA
 Kolb Station, Boulder, CO
 Lafayette Site, Lafayette, CO
 Lima Site, Lima, Peru
 Long Branch Station, Havana, IL
 Maui Station WWVH, Puunene, Maui, HA
 Puerto Rico Station, Ramey AFB
 Shickley Site, Shickley, NE
 Table Mesa Station, Boulder, CO

RADIO STANDARDS LABORATORY

- Beltsville Station WWV
 Maui Station WWVH

JANUARY 1963

30 DIRECTOR'S OFFICE

Deputy Director
Associate Directors, Technical

Associate Director, Administrative

- * Director, Boulder Laboratories
- Assistant to the Director
- Assistant to the Director for Weights and Measures Administration
- Special Research Assistant and Senior Research Fellow
- Senior Research Fellow
- Consultant to the Director
- International Relations
- Director Emeritus
- Library
- NBS Reactor Program

Dr. Allen V. Astin
Dr. Robert D. Huntoon
Dr. Lauriston S. Taylor (Acting)
William A. Wildhack
Robert S. Walleigh
Russell B. Scott (Acting)
George E. Auman

William S. Bussey
Dr. Ugo Fano
Dr. Herbert P. Broida
Douglas E. Parsons
Dr. Franz L. Alt
Dr. Lyman J. Briggs
Sarah Ann Jones
Dr. Carl O. Muehlhause

1 ELECTRICITY

- .1 Resistance and Reactance
- .2 Electrochemistry
- .3 Electrical Instruments
- .4 Magnetic Measurements
- .5 Dielectrics
- .6 High Voltage

Dr. Chester H. Page
Vacant
Dr. Walter J. Hamer
Dr. Francis M. Defandorf
Irvin L. Cooter
Dr. John D. Hoffman
Dr. F. Ralph Kotter

2 METROLOGY

- .1 Photometry and Colorimetry
- .2 Refractometry
- .3 Photographic Research
- .4 Length
- .5 Engineering Metrology
- .6 Mass and Scale
- .7 Volumetry and Densimetry

Alvin G. McNish
Louis E. Bar brow
Dr. Francis E. Washer
Calvin S. McCamy
Theodore R. Young
Irvin H. Fullmer
Paul E. Pontius
John C. Hughes (Acting)

3 HEAT

- .1 Temperature Physics
- .2 Heat Measurements
- .3 Cryogenic Physics
- .7 Equation of State
- .8 Statistical Physics

Dr. Ralph P. Hudson
James F. Swindells
Dr. Defoe C. Ginnings
Dr. Ernest Ambler
Joseph Hilsenrath
Dr. Melville S. Green

4 RADIATION PHYSICS

- .1 X-Ray
- .2 Radioactivity
- .3 Radiation Theory
- .4 High Energy Radiation
- .5 Radiological Equipment
- .6 Nucleonic Instrumentation
- .7 Neutron Physics

Dr. Herman W. Koch (Acting)
Dr. Harold O. Wyckoff
Dr. Wilfrid B. Mann
Dr. Martin Berger (Acting)
Dr. Herman W. Koch
Dr. Scott W. Smith
Louis Costrell
Dr. Randall S. Caswell

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|---|--|
| <p>5 ANALYTICAL AND INORGANIC CHEMISTRY</p> <p>.1 Pure Substances</p> <p>.2 Spectrochemistry</p> <p>.3 Solution Chemistry</p> <p>.4 Standard Reference Materials</p> <p>.5 Applied Analytical Research</p> <p>.6 Crystal Chemistry</p> | <p>Dr. Harry C. Allen, Jr.</p> <p>Dr. Frank L. Howard</p> <p>Bourdon F. Scribner</p> <p>Dr. Roger G. Bates</p> <p>John L. Hague</p> <p>Dr. John K. Taylor</p> <p>H. Steffen Peiser</p> |
| <p>6 MECHANICS</p> <p>.1 Sound</p> <p>.2 Pressure and Vacuum</p> <p>.3 Fluid Mechanics</p> <p>.4 Engineering Mechanics</p> <p>.5 Rheology</p> <p>.8 Combustion Controls</p> | <p>Bruce L. Wilson</p> <p>Dr. Richard K. Cook</p> <p>Dr. Daniel P. Johnson</p> <p>Dr. Galen B. Schubauer</p> <p>Lafayette K. Irwin</p> <p>Dr. Robert S. Marvin</p> <p>Frank R. Caldwell</p> |
| <p>7 POLYMERS</p> <p>.1 Macromolecules Synthesis and Structure</p> <p>.2 Polymer Chemistry</p> <p>.3 Polymer Physics</p> <p>.4 Polymer Characterization</p> <p>.5 Polymer Evaluation and Testing</p> <p>.6 Applied Polymers Standards and Research</p> <p>.8 Dental Research</p> | <p>Dr. Gordon M. Kline</p> <p>Dr. Donald McIntyre</p> <p>Dr. Leo A. Wall</p> <p>Dr. Elio Passaglia</p> <p>Dr. Norman P. Bekkedahl</p> <p>Dr. Robert D. Stiehler</p> <p>Dr. Robert B. Hobbs</p> <p>William T. Sweeney</p> |
| <p>8 METALLURGY</p> <p>.1 Engineering Metallurgy</p> <p>.3 Microscopy and Diffraction</p> <p>.4 Metal Reactions</p> <p>.5 Metal Physics</p> <p>.6 Electrolysis and Metal Deposition</p> | <p>Dr. Lawrence M. Kushner</p> <p>Samuel J. Rosenberg</p> <p>Herbert C. Vacher</p> <p>George A. Ellinger</p> <p>Dr. Lawrence M. Kushner</p> <p>Dr. Abner Brenner</p> |
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	.4 Engineering Applications	Raymond T. Moore
	.5 Systems Analysis	Samuel N. Alexander (Acting)
		Samuel N. Alexander (Acting)
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	.2 Infrared Spectroscopy	Dr. William C. Martin, Jr.
	.3 Far Ultraviolet Physics	Dr. Earle K. Plyler
	.4 Solid State Physics	Dr. Robert P. Madden
	.5 Electron Physics	Dr. Hans P. R. Frederikse
	.6 Atomic Physics	Dr. John A. Simpson
	.7 Plasma Spectroscopy	Dr. Harold S. Boyne
		Dr. Wolfgang L. Wiese
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	.3 Electronic Instrumentation	Charles P. Marsden
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	.5 Basic Instrumentation	Arnold Wexler
		Joshua Stern
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	.2 Surface Chemistry	Dr. Merrill B. Wallenstein
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	.4 Molecular Spectroscopy	Dr. Horace S. Isbell
	.5 Elementary Processes	Dr. David E. Mann
	.6 Mass Spectrometry	Dr. Robert E. Ferguson
	.7 Photochemistry	Dr. Henry M. Rosenstock
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.5	Transportation Services	Charles W. Anderson
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.2	Instrument Shop #2	George A. Rheinbold
.3	Instrument Shop #3	George A. Rheinbold
.4	Instrument Shop #4	Philip Pfaff, Jr.
.5	Instrument Shop #5	John L. Pararas
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.11	Glassblowing Shop	Leonardo Testa
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47	INTERNAL AUDIT	Jacob Seidenberg
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.2	Electric Shop	Vacant
.3	Piping	Vacant
.4	Construction Shop	John A. King
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.7	Metal Shop	Donald I. Thompson
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 - .4 Cryogenic Technical Services
- CENTRAL RADIO PROPAGATION LABORATORY**
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 - .1 LF and VLF Research
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 - .3 Prediction Services
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 - .5 Field Engineering
 - .6 Radio Warning Services
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 - .4 Radio Noise
 - .5 Tropospheric Measurements
 - .6 Tropospheric Analysis
 - .7 Propagation-Terrain Effects
 - .8 Radio Meteorology
 - .9 Lower Atmosphere Physics
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 - .2 HF and VHF Research
 - .3 Frequency Utilization
 - .4 Modulation Research
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 - .2 High Latitude Ionospheric Physics
 - .5 Ionosphere and Exosphere Scatter
 - .7 Airglow and Aurora
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- .3 Radio and Microwave Materials
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* Laboratories located in Boulder, Colorado.

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Master Railway Track Scale Depot, Clearing, IL

10 BUILDING RESEARCH

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San Francisco, CA
Seattle WA

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Antarctica Station, Byrd & South Pole
Barrow Station, Barrow, AK
Bill Station, Douglas WY
Broadcast Station WWV, Greenbelt, MD
Broadcast Station WWVH, Puunene, Maui, HA
Cheyenne Mountain Station, Colorado Springs, CO
Eric Station, Eric, CO
Fort Belvoir Station, Fort Belvoir, VA
Fritz Peak Station, Rollinsville, CO
Front Royal Station, Front Royal, VA
Gun Barrel Hill Station, Boulder, CO
Hygiene Station, Boulder, CO
Kekaha Station, Koloa, Kauai, HA
Kolb Station, Boulder, CO
Lafayette Site, Lafayette, CO
Lima Site, Lima, Peru
Long Branch Station, Havana, IL
Puerto Rico Station, Ramey AFB
Shickley Site, Shickley, NE
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July 1, 1964

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103 TECHNICAL ANALYSIS GROUP	
104 OFFICE OF PROGRAM PLANNING AND EVALUATION	
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 Vacant
 Vacant
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 Vacant</p> |
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 Dr. Robert L. Parker</p> |
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 Consultant</p> <p>.01 Inorganic Chemistry</p> <p>.02 Glass</p> <p>.03 High Temperature Chemistry</p> <p>.04 Crystal Chemistry</p> <p>.05 Physical Properties</p> <p>.06 Crystallography</p> | <p>Dr. Harry C. Allen, Jr.
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 Dr. Ellis R. Lippincott
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 Clarence H. Hahner
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 H. Steffen Peiser
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 Assistant to the Director, International Standards</p> <p>.01 Pilot Projects and Programs</p> <p>.02 Invention and Innovation</p> <p>.03 Domestic Technology Information</p> <p>.04 AID Technology Information</p> | <p>Dr. Donald A. Schon
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.20 High Latitude Ionospheric Physics

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Radio Propagation Field Station, Barrow, AK

Ionosonde and Conjugate Points Station, Byrd Station, Antarctica

Radio Noise Station, USNS ElTanin, Antarctica

Conjugate Points Station, Charlevoix, Quebec

Western Test Range, Lompoc (Point Arguello), CA

Radio Propagation Field Station, Akron, CO

Boulder Magnetic Observatory, Boulder, CO

Cheyenne Mountain Radio Propagation Station, Colorado Springs, CO

HF/VHF Research Section Radio Propagation Transmissions Site, Erie, CO

Standard Frequency Stations WWVB/WWVL, Fort Collins, CO

Antenna Research Test Site, Green Mountain Mesa, CO

Radio Meteorological Field Site, Radio Noise Station and Telemetry

Recording Station, Gun Barrel Hill, CO

Radio Propagation Field Station, Haswell, CO

Ionosphere Research Field Station, Kolb, CO

VLF/ELF Propagation Station, Lafayette, CO

Fritz Peak Observatory, Aurora and Airglow Station, Rollinsville, CO

Radio Propagation Research Station, Table Mesa, CO

Radio Noise Recording Station, Koloa, Kauai, HA

Radio Propagation and Standard Frequency Station WWVH, Puunene, Maui, HA

Radio Propagation Transmissions Station, Havana, IL

Standard Frequency Station WWV, Greenbelt, MD

Radio Noise Recording Station, Warrensburg, MO

Radio Propagation Field Station, Mangum, OK

Jicamarca Radar Observatory, Lima, Peru

Radio Propagation Field Station, Ft. Belvoir, VA

Radio Noise Station, Front Royal, VA

Ionosphere Sounding Station, Wallops Island, VA

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Visual Aids Field Laboratory, Arcata, CA

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 Master Railway Track Scale Depot, Clearing, IL
 Radio Station WWV, Greenbelt, MD
 U.S. Joint Publications Research Service, New York, NY
 Ionosphere Research Station, Wallops Island, VA
 Inorganic Building Materials Section Laboratory, Seattle, WA
 Standard Frequency Stations WWVB/WWVL, Fort Collins, CO
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 .07 Cryogenic Fluid Transport Processes
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 .02 Instrument Shop 2
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 .04 Glass Blowing Shop
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 .04 Analytical Coordination Chemistry
 .05 Microchemical Analysis
 .06 Analytical Mass Spectrometry
 .07 Organic Chemistry
 .08 Activation Analysis
 .09 Separation and Purification
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 .02 Polymer Chemistry
 .03 Polymer Crystal Physics
 .04 Molecular Properties
 .05 Dental Research
 .06 Polymer Characterization
 .07 Polymer Interfaces
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- 312 METALLURGY**
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 .03 Lattice Defects and Microstructures
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 .02 Inorganic Glass
 .03 High Temperature Chemistry
 .05 Physical Properties
 .06 Crystallography
 .07 Solid State Physics
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 .03 Humidity Measurements
 .04 Engineering Mechanics
 .05 Rheology
 .06 Fluid Meters
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 .08 Aerodynamics
- 221 HEAT**
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 .04 Equation of State
 .05 Statistical Physics
 .07 Pressure Measurements
 .11 Temperature
 .12 Radiation Thermometry
- 222 ATOMIC AND MOLECULAR PHYSICS**
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 .02 Infrared Spectroscopy
 .03 Far Ultraviolet Physics
 .04 Molecular Spectroscopy
 .05 Electron Physics
 .06 Atomic Physics
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 Senior Research Fellow
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| | | H. L. Hoyt |
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- 501 REACTOR RADIATION**
 .01 Reactor Operations
 .02 Engineering Services
 .03 Neutron Solid-State Physics
 .04 Radiation Effects
- 502 LINAC RADIATION**
 .01 Linac Operations
 .02 Radiation Physics Instrumentation
 .03 Photonuclear Physics
 .04 Electronuclear Physics
- Myron G. Domsitz
 Gustave Shapiro
 Charles P. Marsden
 Dr. W. Murray Bullis
 Judson C. French
 Joshua Stern
 Dr. Joseph A. Coleman
- Dr. W. Edward Cushen
 Abraham E. Karp
 Dr. George Suzuki
 Dr. George Suzuki (Acting)
 Louis C. Santone
 Dr. June R. Cornog
 William F. Druckenbrod
 Ralph E. Schofer
 John W. Locke
- Frank P. Brown
 Winfield L. Drissel
 Earl L. Schwenk
 Walter A. Koepper
 Charles E. Taylor
 Phillip Pfaff, Jr.
 John R. Pidgeon
 Enrico Deleonibus
 Harold E. Brown
 Stanley W. Gerner
 Herbert Robinson (Acting)
 Frank P. Brown (Acting)
- G. Franklin Montgomery
 Robert J. Carpenter
 M. Leighton Greenough
 Robert O. Stone
- Dr. Carl O. Muehlhause
 Dr. Randall S. Caswell
 Dr. Martin J. Berger
 Dr. Abraham Schwebel
- Dr. Robert S. Carter
 Tawfik M. Raby (Acting)
 John H. Nicklas
 Dr. Robert S. Carter
 Vacant
- Dr. James E. Leiss
 Dr. James E. Leiss
 Louis Costrell
 Dr. Everett G. Fuller
 Dr. Samuel Penner

503	NUCLEAR RADIATION	
	.01 Neutron Physics	Dr. Harry H. Landon
	.02 Radioactivity	Dr. Harry H. Landon
	.03 Nuclear Spectroscopy	Dr. Wilfred B. Mann Dr. Raymond W. Hayward
504	APPLIED RADIATION	
	.01 X-ray Physics	Dr. Joseph W. Motz
	.02 Dosimetry	Dr. Joseph W. Motz Dr. Robert Loevinger
600	CENTER FOR COMPUTER SCIENCES AND TECHNOLOGY	
	Director	Dr. Herbert R. J. Grosch
	Consultant	Mary Elizabeth Stevens
	Consultant	Madeline B. Henderson
	.10 Manager-Pattern Recognition and Description Program	Joseph H. Wegstein
610	OFFICE OF INFORMATION PROCESSING STANDARDS	
	.01 Planning and Coordination	Dr. Joseph O. Harrison, Jr. Vacant
	.02 Hardware Standards	Vacant
	.03 Software Standards	Vacant
	.04 Applications and Data Standards	Vacant
	.05 ADP Management Standards	Vacant
620	OFFICE OF COMPUTER INFORMATION	Margaret R. Fox
630	COMPUTER SERVICES	
	Assistant Chief	W. Bruce Ramsay
	.01 Business Applications	Loretta M. Allison
	.02 Scientific Applications	Martin R. Shaver
	.03 Computer Operations	Dr. Robert J. Arms
	.04 Systems Programming and Training	Peter J. O'Hara Dr. Robert J. Arms (Acting)
640	SYSTEMS DEVELOPMENT	
	.01 Programing Research	Charles T. Meadow
	.02 Information Science	Charles T. Meadow (Acting)
	.03 Management Systems	Dr. Stephen J. Tauber
	.04 Instructional Systems	John F. Wood Charles T. Meadow (Acting)
650	INFORMATION PROCESSING TECHNOLOGY	
	.01 Measurements Automation	James P. Nigro
	.02 Computer Systems	Raymond T. Moore
	.03 Performance Measurements	Thomas N. Pyke, Jr. Arthur A. Ernst

* Laboratories located in Boulder, Colorado.

FIELD STATIONS

Visual Landing Aids Laboratory, Arcata, CA
 U.S. Joint Publications Research Service, San Francisco, CA
 Scientific Observations and Measurements Site, Poor Man's Mine, Four Mile Canyon, Boulder, CO
 Standard Frequency Stations WWVB/WWVL, Fort Collins, CO
 Radio Propagation and Standard Frequency Station WWVH, Puunene, Maui, HA
 Master Railway Track Scale Depot, Clearing, IL
 U.S. Joint Publications Research Service, New York, NY

APPENDIX J

**SITE INFORMATION AND MAPS
GAITHERSBURG AND BOULDER**

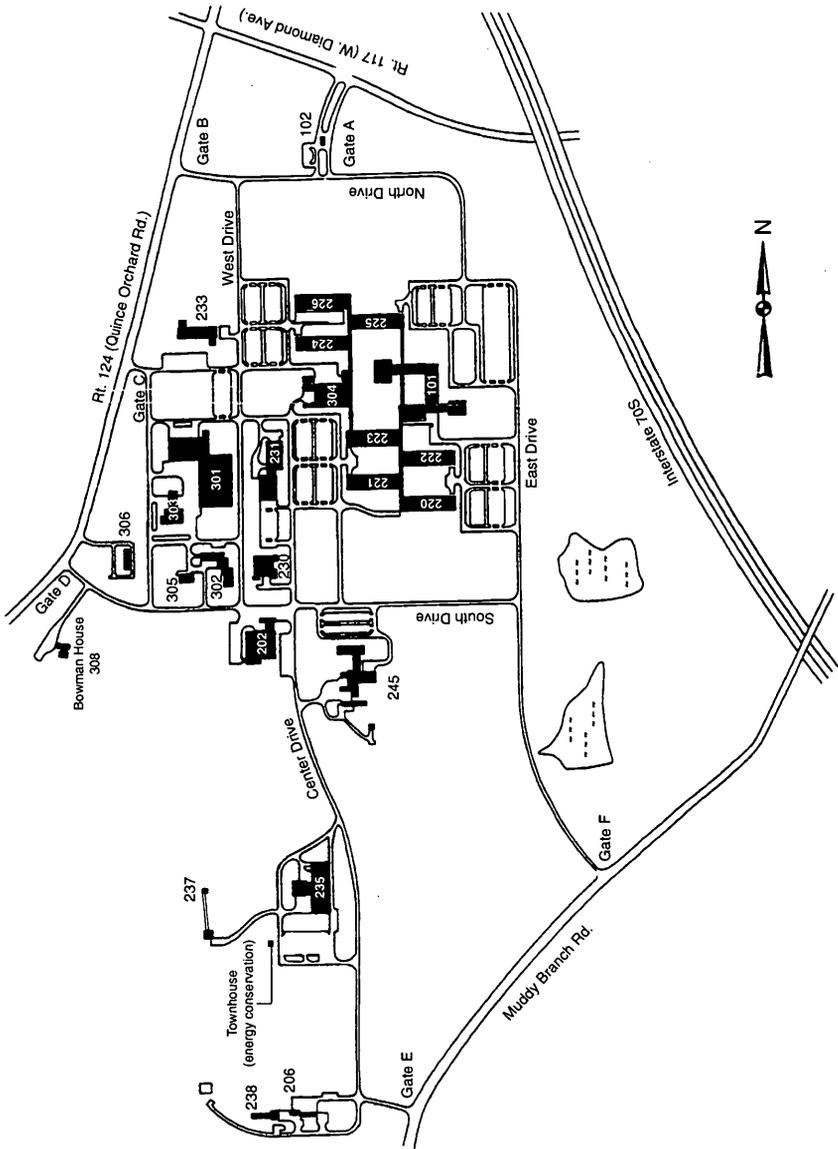
BUILDINGS AND STRUCTURES OF THE NATIONAL BUREAU OF STANDARDS

GAITHERSBURG, MARYLAND

1970

Building	Name	Year Construction		Occupancy Date (in operation)	Assignable Square Feet
		Begun	Completed		
101	Administration	6-18-62	7-12-65	7-12-65	308,493
102	Gate House	5-1-69	3-1-70	2-19-70	170
202	Engineering Mechanics	7-19-61	10-1-63	6-1-63	46,111
206	Concreting Materials	3-1-66	3-1-68	3-1-68	5,418
220	Metrology	8-21-63	2-14-66	2-14-66	109,130
221	Physics	8-21-63	3-28-66	3-28-66	111,505
222	Chemistry	8-21-63	2-28-66	2-28-66	79,496
223	Materials	8-21-63	4-27-66	4-27-66	78,060
224	Polymers	8-21-63	6-6-66	6-6-66	78,597
225	Instrumentation	8-21-63	8-3-66	8-3-66	104,621
226	Building Research	8-21-63	10-3-66	9-8-66	64,388
230	Fluid Mechanics	6-1-67	6-1-69	6-1-69	50,080
231	Industrial	2-8-66	2-8-68	2-8-68	40,615
233	Sound	9-20-65	2-27-68	2-27-68	21,247
235	Reactor	4-25-63	8-23-65	8-23-65	61,086
236	Hazards	4-15-66	4-15-68	5-15-68	6,505
237, 238	Non-Magnetic	6-3-64	2-14-68	2-14-68	4,352
245	Radiation	6-18-62	8-20-65	4-15-64	88,104
301	Supply & Plant	6-18-62	10-15-64	10-15-64	103,807
302	SCWGP	7-19-61	7-21-64	4-1-63	27,551
303	Service	6-18-62	5-4-64	5-4-64	12,262
304	Instrument	6-18-62	12-4-64	12-4-64	53,552
305	Cooling Tower	7-19-61	7-21-64	-----	-----
306	Electrical Substation	7-19-61	1-2-64	4-1-63	-----
308	Bowman House*	1-1-52	1-1-53	5-15-69	3,826
TOTAL 1,352,843					

Main Site Land - 575 acres
 Date Acquired: August 1958 to May 1970
 *Existing Structure
 Dates are approximate



BUILDINGS AND STRUCTURES OF THE NATIONAL BUREAU OF STANDARDS

BOULDER, COLORADO

1970

Building	Name	Date (in operation)	Assignable Square Feet
B1	Radio Building: Library, Auditorium, Center Spine, Wing 1, Wing 2, Wing 3, Wing 4	1954	200,257
B1	Wing 5	1962	77,928
B1	Wing 6	1959	26,000
B2	Cryogenics, South and North Half	1952	45,702
B2	Cryogenics, Wing "B"	1962	9,800
B3	Liquefier	1952	20,024
B4	Camco	1951	15,403
B5	Heavy Equipment	1951	2,850
B8	Cryogenic Mesa Test Site	1953	2,400
B9	Gas Meter	1958	312
B10	Green Mountain Antenna Building	1958-1973	209
B11	Vertical Incidence	1958	408
B14	Field Strength Calibration	1958	278
B17	Hydrogen Storage Tanks		
B18	Tube Tanks (Hydrogen) Storage		
B21	Maintenance Garage	1963	3,968
B22	Warehouse	1964	17,280
B23	Cooling Tower	1957-1989	312
B24	Plasma Physics ¹	1967	27,328
B25	North Shop	1966	3,200
B26	Ground Scanner Site		
B27	High Frequency Field Site		
B28	Microwave Antenna Range		
TOTAL			453,659

Main Site Land: 217 acres
Date Acquired: June 14, 1950

¹ Used by the Environmental Science Services Administration.

