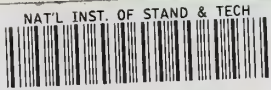


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$$\Phi(\lambda) = \frac{1}{2\pi i} \int_{\sigma-i\infty}^{\sigma+i\infty} e^{u \ln u + \lambda u} du \text{ for real}$$

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CIRCULARS

- C
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 488, Section 5, An ultraviolet multiplet table, C. E. Moore.
- 510, Suppl. 2. Alphabetical index to tables of chemical kinetics. Homogeneous reactions. August 5, 1960.
 539, Vol. 10. Standard X-ray diffraction powder patterns, Vol. 10. Data for 40 substances, H. E. Swanson, M. I. Cook, E. H. Evans, and J. H. deGroot. September 23, 1960.

MONOGRAPHS

MONO

18. Heat treatment and properties of iron and steel, T. G. Digges and S. J. Rosenberg. October 3, 1960. Supersedes C495.
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 32. Tables of spectral-line intensities, Pt. I, Arranged by elements, and Pt. II, Arranged by wavelengths, W. F. Meggers, C. H. Corliss and B. F. Scribner. Pt. I, December 29, 1961; Pt. II, October 2, 1961.
 33. An experimental study of phase variations in line-of-sight microwave transmissions, K. A. Norton, J. W. Herbstreit, H. B. Janes, K. O. Hornberg, C. F. Peterson, A. F. Barghausen, W. E. Johnson, P. I. Wells, M. C. Thompson, Jr., M. J. Vetter, and A. W. Kirkpatrick. November 1, 1961.
 34. Tables of chemical kinetics. Homogeneous reactions. (Supplementary Tables). September 15, 1961.
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 48. Determination of total X-ray beam energy with a calibrated ionization chamber, J. S. Pruitt and S. R. Domen. June 5, 1962.

H

28. (1957)--Part III. Screw-thread standards for Federal Services, 1957. October 7, 1960.
44. 2d Ed., 1955 (corrected through 1961). Specifications, tolerances, and regulations for commercial weighing and measuring devices. June 1962. (Supersedes H44, 2d Ed., 1955 through the updating of technical requirements to include those adopted by the National Conference on Weights and Measures 1961.)
70. Tabulation of data on microwave tubes, C. P. Marsden, W. J. Keery, and J. K. Moffitt. November 1, 1961.
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73. Protection against radiations from sealed gamma sources. July 27, 1960. Supersedes H54.
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75. Measurement of absorbed dose of neutrons, and of mixtures of neutrons and gamma rays. February 3, 1961.
76. Medical X-ray protection up to three million volts. February 9, 1961. Supersedes H60.
77. Precision measurement and calibration. Vol. I. Electricity and electronics; Vol. II. Heat and mechanics; and Vol. III. Optics, metrology, and radiation. February 1, 1961.
78. Report of the international commission on radiological units and measurements (ICRU) 1959. January 16, 1961. Supersedes H62.
79. Stopping powers for use with cavity chambers. September 1, 1961.
80. A manual of radioactivity procedures. November 20, 1961.
81. Safety rules for the installation and maintenance of electric supply and communication lines. Comprising Part 2, the definitions, and the grounding rules of the sixth edition of the National Electrical Safety Code. November 1, 1961 (Supersedes H32 and amends in part, Pt. 2, Definitions and the Grounding Rules of H30 and H43.)
82. Weights and measures administration. June 22, 1962. (Supersedes H26).

MISCELLANEOUS PUBLICATIONS

M

230. Standardization activities in the United States. A descriptive directory, S. F. Booth. August 1, 1960. Supersedes M169.
231. Hydraulic research in the United States, 1960, H. K. Middleton. August 5, 1960.
232. The metric system of measurement (1 chart). Rev. April 1, 1961. Supersedes M3.
233. Units of weight and measure (United States customary and metric). Definitions and tables of equivalents, L. V. Judson. December 20, 1960. Supersedes M214.
234. Household weights and measures (card). October 1960. Supersedes M39.
235. Report of the 45th National Conference on Weights and Measures, 1960. December 16, 1960.
236. Standard frequencies and time signals from NBS stations WWV and WWVH. December 1, 1960.
237. Research highlights of the National Bureau of Standards, Annual Report 1960. December 1960.
238. Hydraulic research in the United States 1961, H. K. Middleton. August 15, 1961.
239. Report of the 46th National Conference on Weights and Measures, 1961. January 18, 1962.
240. Publications of the National Bureau of Standards, July 1, 1957, to June 30, 1960. (Includes titles of papers published in outside journals 1950 to 1959), B. L. Arnold. April 3, 1961. Accompanies C460 and Supplement.
241. Standard materials issued by the National Bureau of Standards. A descriptive list with prices. March 12, 1962.
242. Research highlights of the National Bureau of Standards, Annual Report 1961. December 1961.
243. Index to the reports of the National Conference on Weights and Measures. From the first to the forty-fifth, 1905 to 1960. June 28, 1962. Supersedes M203.

APPLIED MATHEMATICS SERIES

AMS

58. Fractional factorial designs for experiments with factors at two and three levels, W. S. Connor and S. Young. September 1, 1961.

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TN

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- 18-4 (PB151377-4). Quarterly radio noise data - September, October, November 1959, W. Q. Crichlow, R. T. Disney, and M. A. Jenkins. September 28, 1960.
- 18-5 (PB151377-5). Quarterly radio noise data - December, January, February 1959-60, W. Q. Crichlow, R. T. Disney, and M. A. Jenkins. October 10, 1960.
- 18-6 (PB151377-6). Quarterly radio noise data - March, April, May 1960, W. Q. Crichlow, R. T. Disney, and M. A. Jenkins. October 19, 1960.
- 18-7 (PB151377-7). Quarterly radio noise data - June, July, August 1960, W. Q. Crichlow, R. T. Disney, and M. A. Jenkins. November 4, 1960.
- 18-8 (PB151377-8). Quarterly radio noise data - September, October, November 1960, W. Q. Crichlow, R. T. Disney, and M. A. Jenkins. January 31, 1961.
- 18-9 (PB151377-9). Quarterly radio noise data - December, January, February 1960-61, W. Q. Crichlow, R. T. Disney, and M. A. Jenkins. April 18, 1961.
- 18-10 (PB151377-10). Quarterly radio noise data - March, April, May 1961, W. Q. Crichlow, R. T. Disney, and M. A. Jenkins. August 14, 1961.
- 18-11 (PB151377-11). Quarterly radio noise data - June, July, August 1961, W. Q. Crichlow, R. T. Disney, and M. A. Jenkins. November 16, 1961.
- 18-12 (PB151377-12). Quarterly radio noise data - September, October, November 1961, W. Q. Crichlow, R. T. Disney, and M. A. Jenkins. February 23, 1962.
- 18-13 (PB151377-13). Quarterly radio noise data - December, January, February 1961-62, W. Q. Crichlow, R. T. Disney, and M. A. Jenkins. May 22, 1962.
- 40-3 (PB151399-3). Mean electron density variations of the quiet ionosphere, J. W. Wright, L. R. Wescott and D. J. Brown. March 1960.
- 40-4 (PB151399-4). Mean electron density variations of the quiet ionosphere, No. 4 - May 1959, J. W. Wright, L. R. Wescott, and D. J. Brown. May 1961.
- 40-5 (PB151399-5). Mean electron density variations of the quiet ionosphere, No. 5 - July 1959, J. W. Wright, L. R. Wescott, and D. J. Brown. August 1961.
- 40-6 (PB151399-6). Mean electron density variations of the quiet ionosphere, No. 6 - August 1959, J. W. Wright, L. R. Wescott, and D. J. Brown. September 1961.
- 40-7 (PB151399-7). Mean electron density variations of the quiet ionosphere, No. 7 - September 1959, J. W. Wright, L. R. Wescott, and D. J. Brown. April 1962.
- 40-13 (PB151399-13). Mean electron density variations of the quiet ionosphere, No. 13 - summary of one year of data May 1959-April 1960, J. W. Wright. April 15, 1962.
- 58 (PB161559). A survey and bibliography of recent research in the propagation of VLF radio waves, J. R. Wait. May 1960.
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- 137 (PB161638). A bibliography of the thermophysical properties of oxygen at low temperatures, J. C. Hust, L. D. Wallace, J. A. Crim, L. A. Hall, and R. B. Stewart. February 1962.
- 138 (PB161639). Vertical cross sections of the ionosphere across the geomagnetic equator, J. W. Wright. April 6, 1962.
- 139 (PB161640). Siting criteria for HF communication centers, W. F. Utlaut. April 1962.
- 140 (PB161641). Detailed techniques for preparing and using hard gallium alloys, G. G. Harman. April 1962.
- 142 (PB161643). Atlas of Fourier coefficients of diurnal variation of foF2, W. B. Jones. April 1962.
- 143 (PB161644). Numerical results for the surface impedance of a stratified conductor, C. M. Jackson, J. R. Wait and L. C. Walters. March 19, 1962.
- 144 (PB161645). Dielectric constant of liquid parahydrogen, R. J. Corruccini. April 1962.
- 146 (PB161647). Analysis of ionospheric vertical soundings for electron density profile data. III. Procedures for obtaining monthly summary virtual height curves for N(h) analysis (composite virtual height curves), J. W. Wright. May 1, 1962.
- 147 (PB161648). Cryogenic temperature measurement with platinum resistance thermometers - is fixed-point calibration adequate? R. J. Corruccini. April 30, 1962.
- 148 (PB161649). A wire exploder for generating cylindrical shock waves in a controlled atmosphere, D. L. Jones and K. B. Earnshaw. May 1962.

PERIODICALS OF THE NATIONAL BUREAU OF STANDARDS

The following two monthly periodicals are issued by the Bureau, and may be obtained on a 1-, 2-, or 3-year subscription basis (although no reduction in rates can be made) from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., as follows:

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1960, Numbers 185 to 187, 189 to 196.
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Information concerning the subscriptions on the following sections of the Journal of Research are given on page V:

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The following is a list of National Bureau of Standards publications issued from 1901 to date that may be purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at the prices given. See "HOW TO PURCHASE NBS PUBLICATIONS," Page IV.

The tabulation brings up-to-date the information given in the basic Circular 460, its Supplement, and Miscellaneous Publication 240, and should be referred to instead of these publications to determine if a given publication is still available.

Individual papers from the Journal of Research are not available by purchase. However, reprints may often be obtained directly from the author. The bimonthly (Sections A and D) and quarterly (Sections B and C) issues of the four section Journal of Research are usually obtainable by purchase from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at the prices indicated on page

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²H81 amends in part: Pt. 2, Definitions and the Grounding Rules of these Handbooks.

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¹Supplement No. 1, Dec. 20, 1940.
²Supplement No. 2, Sept. 15, 1947.

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San Diego: San Diego Public Library.
San Francisco: Mechanics Mercantile Library.
San Francisco Public Library.
San Francisco State College,
Social Science and Business
Library.
Santa Barbara: Santa Barbara Public Library.
Stanford Univ.: Stanford University Library.
Stockton: Stockton Free Public Library.

COLORADO

Boulder: University of Colorado Library.
Colorado Springs: Colorado College, Coburn
Library.
Denver: Colorado State Library.
Public Library.
Regis College Library.
U.S. Air Force Academy.
University of Denver, Mary Reed
Library.
Fort Collins: Colorado State College of Agri-
culture and Mechanic Arts
Library.
Golden: Colorado School of Mines Library.
Gunnison: Western State College Library.
Pueblo: McClelland Public Library.

CONNECTICUT

Bridgeport: Bridgeport Public Library.
Hartford: Connecticut State Library.
Hartford Public Library.
Trinity College Library.
Middletown: Wesleyan University, Olin Library.
New Haven: Yale University Library.
New London: Connecticut College, Palmer
Library.
U.S. Coast Guard Academy
Library.
Storrs: University of Connecticut Library.
Waterbury: Silas Bronson Library.

DELAWARE

Dover: Delaware State Library.
Newark: University of Delaware Library.
Wilmington: Wilmington Institute Free Library.

DISTRICT OF COLUMBIA

Washington: Department of Agriculture Library.
Department of Commerce Library.
Department of Health, Education,
and Welfare Library.
Department of Interior Central
Library.
Department of Justice Main
Library.

Washington: Department of State Library.
National War College Library.
Naval Records and Library, Navy
Department.
Post Office Department
Library.
Public Library.
Treasury Department Library.

FLORIDA

Coral Gables: University of Miami Library.
De Land: Sampson Library of John B. Stetson
University.
Gainesville: University of Florida Library.
Jacksonville: Jacksonville Public Library.
Lakeland: Lakeland Public Library.
Miami: Miami Public Library.
Tallahassee: Florida Agricultural and Mechan-
ical College Library.
Florida State Library.
Florida State University Library.
Tampa: University of Tampa Library.
Winter Park: Rollins College, Mills Memorial
Library.

GEORGIA

Athens: University of Georgia General Library.
Atlanta: Atlanta Public Library.
Georgia State Library.
Collegeboro: Georgia Teachers College Library.
Dahlonega: North Georgia College Library.
Emory University: Asa Griggs Candler Library.
Milledgeville: Georgia State College for Women
Library.
Savannah: Savannah Public Library.
Valdosta: Valdosta State College Library.

HAWAII

Honolulu: Library of Hawaii.
University of Hawaii Library.

IDAHO

Boise: Boise Public Library.
Idaho State Law Library.
Caldwell: Strahorn Memorial Library.
Moscow: University of Idaho Library.
Pocatello: Idaho State College Library.
Rexberg: Ricks College Library.

ILLINOIS

Carbondale: Southern Illinois University Library.
Carlinville: Blackburn College Library.
Chicago: Amundsen Junior College Library.
Chicago Public Library.
Chicago Teachers College Library.
John Crerar Library.
Museum of Science and Industry
Library.
Newberry Library.
University of Chicago Libraries.
University of Illinois Library.
Decatur: Decatur Public Library.

Elsah: The Marshall Brooks Library.
Evanston: Northwestern University Library.
Freeport: Freeport Public Library.
Galesburg: Galesburg Public Library.
Jacksonville: MacMurray College Library.
Joliet: Public Library.
Kankakee: Olivet Nazarene College Library.
Lisle: St. Procopius College Library.
Lockport: Lewis College of Science and Tech-
nology Library.
Monmouth: Monmouth College Library.
Normal: Illinois State Normal University
Library.
Peoria: Peoria Public Library.
Rock Island: Rock Island Public Library.
Rockford: Public Library.
Springfield: Illinois State Library.
Urbana: University of Illinois Library.

INDIANA

Bloomington: Indiana University Library.
Crawfordsville: Wabash College Library.
Evansville: Evansville Public Library.
Fort Wayne: Public Library.
Gary: Gary Public Library.
Greencastle: De Pauw University Library.
Hanover: Hanover College Library.
Indianapolis: Indiana State Library.
Indianapolis Public Library.
Lafayette: Purdue University Library.
Muncie: Public Library.
Notre Dame: University of Notre Dame Library.
Richmond: Morrison-Reeves Library.
Terre Haute: Indiana State Teachers College
Library.
Valparaiso: Valparaiso University Library.

IOWA

Ames: Iowa State College Library.
Cedar Falls: Iowa State Teachers College
Library.
Council Bluffs: Free Public Library.
Des Moines: Iowa State Traveling Library.
Public Library.
Dubuque: Carnegie Stout Free Public Library.
Fairfield: Fairfield Free Public Library.
Grinnell: Grinnell College Library.
Iowa City: State University of Iowa Library.
Lamoni: Graceland College Library.
Mount Pleasant: Iowa Wesleyan College Library.
Mount Vernon: Cornell College Library.
Sioux City: Public Library.

KANSAS

Baldwin City: Baker University Library.
Emporia: William Allen White Library, Kansas
State Teachers College.
Hays: Forsyth Library of Fort Hays Kansas
State College.
Lawrence: University of Kansas Library.
Manhattan: Kansas State College Library.
Pittsburg: Porter Library, Kansas State Teach-
ers College.
Salina: Kansas Wesleyan University Library.

KANSAS (continued)

Topeka: Kansas State Historical Society Library.
 Kansas State Library.
 Wichita: University of Wichita Library.

KENTUCKY

Ashland: Ashland Public Library.
 Barbourville: Abigail E. Weeks Memorial
 Library, Union College.
 Bowling Green: Western Kentucky State Teachers
 College Library.
 Danville: Centre College Library.
 Frankfort: State Law Library.
 Kentucky State College Library.
 Lexington: University of Kentucky Library.
 Louisville: Louisville Free Public Library.
 University of Louisville Library.
 Murray: Murray State Teachers College Library.
 Pikeville: Pikeville College Library.

LOUISIANA

Baton Rouge: Louisiana State University Law
 Library.
 Louisiana State University Library.
 Southern University Library.
 Lafayette: Southwestern Louisiana Institute
 Library.
 Lake Charles: McNeese State College Library.
 Natchitoches: Northwestern State College of
 Louisiana.
 New Orleans: Law Library of Louisiana.
 Loyola University Library.
 New Orleans Public Library.
 Tulane University, Howard-Tilton
 Memorial Library.
 Ruston: Louisiana Polytechnic Institute Library.
 Shreveport: Shreve Memorial Library.

MAINE

Augusta: Maine State Library.
 Bangor: Bangor Public Library.
 Brunswick: Bowdoin College Library.
 Lewiston: Bates College Library.
 Orono: University of Maine Library.
 Portland: Portland Public Library.
 Waterville: Colby College Library.

MARYLAND

Annapolis: Maryland State Library.
 U. S. Naval Academy Library.
 Baltimore: Enoch Pratt Free Library.
 Johns Hopkins University Library.
 Morgan State College Library.
 Peabody Institute Library.
 Chestertown: Washington College, George Avery
 Bunting Library.
 College Park: University of Maryland Library.
 Gaithersburg: Montgomery County Department
 of Public Libraries.
 Westminster: Western Maryland College Library.

MASSACHUSETTS

Amherst: Amherst College Library.
 University of Massachusetts,
 Goodell Library.
 Boston: Boston Athenaeum Library.
 Boston Public Library.
 State Library of Massachusetts.
 Brookline: Public Library.
 Cambridge: Harvard College Library, Serials
 Division.
 Massachusetts Institute of Tech-
 nology Library.
 Lowell: Lowell Textile Institute Library.
 Lynn: Lynn Public Library.
 New Bedford: Public Library.
 Tufts College: Tufts College Library.
 Wellesley: Wellesley College Library.
 Williamstown: Williams College Library.
 Worcester: American Antiquarian Society
 Library.
 Free Public Library.

MICHIGAN

Ann Arbor: General Library of University of
 Michigan.
 Battle Creek: Willard Library.
 Benton Harbor: Benton Harbor Public Library.
 Bloomfield Hills: Cranbrook Institute of Science
 Library.
 Dearborn: Henry Ford Community College
 Library.
 Detroit: Detroit Public Library.
 University of Detroit Library.
 Wayne University, General Library.
 East Lansing: Michigan State College of Agri-
 culture and Applied Science
 Library.
 Flint: Robert N. Mandeville High School Library.
 Grand Rapids: Grand Rapids Public Library.
 Houghton: Michigan College of Mining and
 Technology Library.
 Kalamazoo: Public Library.
 Lansing: Michigan State Library.
 Mt. Pleasant: Central Michigan College Library.
 Muskegon: Hackley Public Library.
 Port Huron: Port Huron Public Library.
 Saginaw: Hoyt Public Library.

MINNESOTA

Collegeville: St. Johns University Library.
 Duluth: Duluth Public Library.
 Minneapolis: Public Library.
 University of Minnesota Library.
 Moorhead: State Teachers College Library.
 Northfield: Carleton College Library.
 St. Olaf College Library.
 St. Paul: Minnesota Historical Society Library.
 Minnesota State Law Library
 St. Paul Public Library
 Stillwater: Stillwater Public Library.

MISSISSIPPI

Columbus: J. C. Fant Memorial Library of
Mississippi State College for
Women.
Hattiesburg: Mississippi Southern College
Library.
Jackson: Mississippi Library Commission.
Mississippi State Library.
State College: Mississippi State College,
Mitchell Memorial Library.
University: University of Mississippi Library.

MISSOURI

Cape Girardeau: Kent Library Southeast
Missouri State College.
Columbia: University of Missouri Library.
Fulton: Westminster College Library.
Jefferson City: Lincoln University Library.
Missouri Supreme Court Library.
Kansas City: Kansas City Public Library.
Rockhurst College Library.
University of Kansas City Library
Liberty: William Jewell College Library.
Rolla: School of Mines & Metallurgy Library.
St. Joseph: St. Joseph Public Library.
St. Louis: St. Louis Public Library.
St. Louis University Library.
Washington University Library.
Springfield: Drury College Library.
Warrensburg: Central Missouri State College
Library.

MONTANA

Billings: Eastern Montana College Library.
Bozeman: Montana State College Library.
Butte: Montana School of Mines Library.
Helena: Helena Public Library.
Historical Society of Montana Library.
Missoula: State University of Montana Library.

NEBRASKA

Blair: Dana College Library.
Crete: Whitin Library of Doane College.
Fremont: Midland College Library.
Lincoln: Nebraska State Library.
University of Nebraska Library.
Omaha: Municipal University of Omaha Library.
Omaha Public Library

NEVADA

Carson City: Nevada State Library.
Hawthorne: Mineral County Public Library.
Reno: University of Nevada Library.
Washoe County Library.

NEW HAMPSHIRE

Concord: New Hampshire State Library.
Dover: Dover Public Library.
Durham: University of New Hampshire Library.
Hanover, Dartmouth College Library.
Laconia: Laconia Public Library.
Manchester: City Library.

NEW JERSEY

Atlantic City: Free Public Library.
Bayonne: Free Public Library.
Camden: Camden Free Public Library.
Convent Station: Santa Maria Library of College
of St. Elizabeth.
Elizabeth: Public Library.
Jersey City: Free Public Library.
Madison: Rose Memorial Library.
New Brunswick: Free Public Library.
Rutgers University Library.
Newark: Public Library.
Princeton: Princeton University Library.
Rutherford: Fairleigh Dickinson College Library.
South Orange: Seton Hall University Library.
Trenton: Division of State Library, Archives and
History--Department of Education.
Free Public Library.

NEW MEXICO

Albuquerque: University of New Mexico.
Las Vegas: New Mexico Highlands University,
Rogers Library.
Santa Fe: New Mexico State Law Library.
Silver City: New Mexico State Teachers College
Library.
State College: New Mexico College of Agricul-
ture and Mechanic Arts Library.

NEW YORK

Albany: New York State Library.
Brooklyn: Brooklyn College Library.
Brooklyn Public Library.
Pratt Institute Library.
Buffalo: Buffalo and Erie County Public Library.
Grosvenor Library.
Canton: St. Lawrence University Library.
Elmira: Elmira College Library.
Farmingdale: Long Island Agricultural and
Technical Institute Library.
Flushing: Queens College Library.
Glens Falls: Crandall Library.
Hamilton: Colgate University Library.
Ithaca: Albert R. Mann Library, New York
State Colleges of Agriculture and Home
Economics.
Cornell University Library.
Jamaica: Queens Borough Public Library.
St. Johns University Library.
New York City: College of the City of New York
Library.
Columbia University Library.
Cooper Union Library.
Fordham University Library.
New York Law Institute Library.
New York Public Library
(Astor Branch).
New York Public Library
(Lenox Branch).
New York State Maritime College
Library.
New York University General
Library.
Newburgh: Newburgh Free Library.
Potsdam: Clarkson College of Technology Library.

Poughkeepsie: Vassar College Library.
 Rochester: Rochester Public Library, Edger-
 ton Branch.
 University of Rochester Library.
 St. Bonaventure: St. Bonaventure College
 Library.
 Schenectady: Union College Library.
 Staten Island: Wagner College Library, Grymes
 Hill.
 Syracuse: Syracuse University Library.
 Troy: Troy Public Library.
 Utica: Utica Public Library.
 West Point: U. S. Military Academy.
 Yonkers: Yonkers Public Library.

NORTH CAROLINA

Chapel Hill: University of North Carolina
 Library.
 Charlotte: Queens College Library.
 Cullowhee: Western Carolina College Library.
 Davidson: Library of Davidson College.
 Durham: Duke University Library.
 Greensboro: Agricultural and Technical College
 Library.
 Greenville: East Carolina College Library.
 Raleigh: D. H. Hill Library of North Carolina
 State College.
 North Carolina State Library.
 Salisbury: Catawba College Library.
 Wilson: Atlantic Christian College, Clarence L.
 Hardy Library.
 Winston-Salem: Public Library of Winston-
 Salem and Forsyth County.
 Wake Forest College Library.

NORTH DAKOTA

Bismarck: State Historical Library.
 State Law Library.
 Fargo: North Dakota Agricultural College and
 Experiment Station Library.
 Grand Forks: University of North Dakota
 Library.
 Minot: State Teachers College Library.
 Valley City: State Teachers College Library.

OHIO

Akron: Akron Public Library.
 Alliance: Mt. Union College Library.
 Ashland: Ashland College Library.
 Athens: Ohio University Library.
 Bluffton: Musselman Library of Bluffton
 College.
 Bowling Green: Bowling Green State University
 Library.
 Bucyrus: Bucyrus Public Library.
 Cincinnati: Public Library.
 University of Cincinnati Library.
 Cleveland: Adelbert College Library of
 Western Reserve University.
 Cleveland Public Library.
 Columbus: Columbus Public Library.
 Ohio State Library.
 Ohio State University Library.
 Dayton: Dayton Public Library.

Delaware: Charles Slocum Library of Ohio
 Wesleyan University.
 Gambier: Kenyon College Library.
 Granville: Denison University Library.
 Hiram: Hiram College Library.
 Marietta: Marietta College Library.
 Oberlin: Oberlin College Library.
 Oxford: Miami University Library.
 Portsmouth: Free Public Library.
 Springfield: Warder Public Library.
 Toledo: Toledo Public Library.
 Van Wert: Brumback Library of Van Wert
 County.
 Youngstown: Youngstown Public Library.

OKLAHOMA

Ada: East Central State Teachers College
 Library.
 Alva: Northwestern State Teachers College
 Library.
 Durant: Southeastern Teachers College Library.
 Edmond: Central State College Library.
 Enid: Carnegie Public Library.
 Langston: Langston University Library.
 Norman: University of Oklahoma Library.
 Oklahoma City: Oklahoma State Library.
 Shawnee: Oklahoma Baptist University Library.
 Stillwater: Agricultural and Mechanical College
 Library.
 Tahlequah: Northeastern State Teachers Col-
 lege Library.
 Tulsa: University of Tulsa Library.

OREGON

Ashland: Southern Oregon College of Education
 Library.
 Corvallis: Oregon State College Library.
 Eugene: University of Oregon Library.
 Forest Grove: Pacific University Library.
 La Grande: Eastern Oregon College of Education
 Library.
 Portland: Library Association of Portland.
 Reed College Library.
 Salem: Oregon State Library.

PENNSYLVANIA

Allentown: Muhlenberg College Library.
 Bethlehem: Lehigh University Library.
 Bradford: Carnegie Public Library.
 Carlisle: Dickinson College Library.
 Erie: Erie Public Library.
 Harrisburg: Pennsylvania State Library.
 Haverford: Haverford College Library.
 Huntingdon: Juniata College Library.
 Lancaster: Franklin and Marshall College,
 Fackenthal Library.
 Meadville: Allegheny College Library.
 Philadelphia: Free Library of Philadelphia.
 Philadelphia Commercial Museum
 Library.
 Temple University, Sullivan
 Memorial Library.
 University of Pennsylvania Library.

Pittsburgh: Carnegie Free Library of Allegheny.
Carnegie Library of Pittsburgh.
University of Pittsburgh Library.
Reading: Reading Public Library.
Scranton: Scranton Public Library.
State College: Pennsylvania State University
Library.
Swarthmore: Swarthmore College Library.
Warren: Warren Library Association.
Washington: Memorial Library of Washington
and Jefferson College.
Wilkes-Barre: Kings College Library.
Williamsport: James V. Brown Library.

PUERTO RICO

Mayaguez: University of Puerto Rico, College
of Agriculture and Mechanical
Arts Library.
Rio Piedras: University of Puerto Rico General
Library.

RHODE ISLAND

Kingston: University of Rhode Island Library.
Providence: Brown University Library.
Providence Public Library.
Rhode Island State Library.
Westerly: Westerly Public Library.

SOUTH CAROLINA

Charleston: Charleston College Library.
Clemson: Clemson College Library.
Columbia: South Carolina State Library.
University of South Carolina Library.
Orangeburg: State Agricultural and Mechanical
College.
Rockhill: Carnegie Library of Winthrop College.

SOUTH DAKOTA

Brookings: Lincoln Memorial Library of South
Dakota State College.
Mitchell: Dakota Wesleyan University Library.
Pierre: South Dakota Free Library Commission.
Sioux Falls: Carnegie Free Public Library.
Spearfish: Black Hills Teachers College Library.
Vermillion: University of South Dakota Library.
Yankton: Yankton College Library.

TENNESSEE

Chattanooga: Chattanooga Public Library.
Clarksville: Austin Peay State College Library.
Johnson City: East Tennessee State College
Library.
Knoxville: University of Tennessee Library.
Memphis: Cossitt Library.
Murfreesboro: Middle Tennessee State College
Library.
Nashville: Joint University Libraries.
Nashville Public Library.
State Library Division, Tennessee
State Library and Archives.
Sewanee: University of the South Library.

Abilene: Hardin Simmons University Library.
Austin: Texas State Library.
University of Texas Library.
Beaumont: Lamar State College of Technology
Library.
Canyon: West Texas State Teachers College
Library.
College Station: Agriculture and Mechanical
College of Texas Library.
Commerce: East Texas State Teachers College
Library.
Dallas: Dallas Public Library.
Southern Methodist University Library.
Denton: North Texas State Teachers Library.
El Paso: El Paso Public Library.
Fort Worth: Fort Worth Public Library.
Texas Christian University Library.
Galveston: Rosenberg Library.
Houston: Houston Public Library.
University of Houston.
Huntsville: Sam Houston State Teachers Col-
lege, Estill Library.
Kingsville: Texas College of Arts and Indus-
tries Library.
Lubbock: Texas Technological College Library.
Marshall: Bishop College Library.
San Antonio: Public Library (La Villita Annex).
San Marcos: Southwest Texas State Teachers
College Library.
Waco: Baylor University Library.

UTAH

Ephraim: Snow College Library.
Logan: Utah State Agricultural College Library.
Ogden: Carnegie Free Library.
Provo: Brigham Young University Library.
Salt Lake City: University of Utah Library.
Utah State Library.

VERMONT

Burlington: University of Vermont Library.
Middlebury: Middlebury College, Egbert Starr
Library.
Montpelier: Vermont State Library.
Northfield: Norwich University Library.

VIRGINIA

Blacksburg: Virginia Polytechnic Institute
Library.
Bridgewater: Bridgewater College Library.
Emory: Emory and Henry College Library.
Fredericksburg: Mary Washington College
Library.
Hampden Sydney: Hampden Sydney College
Library.
Lexington: Virginia Military Institute Library.
Washington and Lee University
Library.
Norfolk: Norfolk Public Library.
Petersburg: Virginia State College Library.
Richmond: Virginia State Library.
Salem: Bittle Memorial Library of Roanoke
College.
University: University of Virginia Library.

VIRGINIA (continued)

Univ. of Richmond, P. O.: University of Richmond Library.
Williamsburg: William and Mary College Library.

WASHINGTON

Everett: Everett Public Library.
Olympia: Washington State Library.
Pullman: State College of Washington Library.
Seattle: Seattle Public Library.
University of Washington Library.
Spokane: Spokane Public Library.
Tacoma: College of Puget Sound Library.
Tacoma Public Library.
Walla Walla: Whitman College Library.

WEST VIRGINIA

Athens: Concord College Library.
Charleston: Department of Archives and History, State Library.
Kanawha County Public Library.
Elkins: Davis and Elkins College Library.
Fairmont: Fairmont State College Library.
Huntington: Marshall College Library.
Institute: West Virginia State College Library.
Morgantown: West Virginia University Library.
Salem: Salem College Library.

WISCONSIN

Appleton: Lawrence College Library.
Beloit: Beloit College Library.
Eau Claire: Wisconsin State College Library.
Fond du Lac: Fond du Lac Public Library.
La Crosse: Public Library.
Madison: State Historical Society Library.
University of Wisconsin Library.
Wisconsin State Library.
Milwaukee: Law Library of Milwaukee County.
Milwaukee Public Library.
Oshkosh: Oshkosh State College Library.
Racine: Racine Public Library.
Stevens Point: Wisconsin State College Library.
Superior: Superior Public Library.
Curran Library, Wisconsin State College.

WYOMING

Casper: Natrona County Public Library.
Cheyenne: Wyoming State Library.
Laramie: University of Wyoming Library.

U. S. DEPARTMENT OF COMMERCE
Luther H. Hodges, *Secretary*

NATIONAL BUREAU OF STANDARDS
A. V. Astin, *Director*



THE NATIONAL BUREAU OF STANDARDS

The scope of activities of the National Bureau of Standards at its major laboratories in Washington, D.C., and Boulder, Colorado, is suggested in the following listing of the divisions and sections engaged in technical work. In general, each section carries out specialized research, development, and engineering in the field indicated by its title. A brief description of the activities, and of the resultant publications, appears on the inside of the front cover.

WASHINGTON, D. C.

Electricity. Resistance and Reactance. Electrochemistry. Electrical Instruments. Magnetic Measurements. Dielectrics. High Voltage.

Metrology. Photometry and Colorimetry. Refractometry. Photographic Research. Length. Engineering Metrology. Mass and Scale. Volumetry and Densimetry.

Heat. Temperature Physics. Heat Measurements. Cryogenic Physics. Equation of State. Statistical Physics.

Radiation Physics. X-ray. Radioactivity. Radiation Theory. High Energy Radiation. Radiological Equipment. Nucleonic Instrumentation. Neutron Physics.

Analytical and Inorganic Chemistry. Pure Substances. Spectrochemistry. Solution Chemistry. Standard Reference Materials. Applied Analytical Research. Crystal Chemistry.

Mechanics. Sound. Pressure and Vacuum. Fluid Mechanics. Engineering Mechanics. Rheology. Combustion Controls.

Polymers. Macromolecules: Synthesis and Structure. Polymer Chemistry. Polymer Physics. Polymer Characterization. Polymer Evaluation and Testing. Applied Polymer Standards and Research. Dental Research.

Metallurgy. Engineering Metallurgy. Microscopy and Diffraction. Metal Reactions. Metal Physics. Electrolysis and Metal Deposition.

Inorganic Solids. Engineering Ceramics. Glass. Solid State Chemistry. Crystal Growth. Physical Properties. Crystallography.

Building Research. Structural Engineering. Fire Research. Mechanical Systems. Organic Building Materials. Codes and Safety Standards. Heat Transfer. Inorganic Building Materials. Metallic Building Materials.

Applied Mathematics. Numerical Analysis. Computation. Statistical Engineering. Mathematical Physics. Operations Research.

Data Processing Systems. Components and Techniques. Computer Technology. Measurements Automation. Engineering Applications. Systems Analysis.

Atomic Physics. Spectroscopy. Infrared Spectroscopy. Solid State Physics. Electron Physics. Atomic Physics. **Instrumentation.** Engineering Electronics. Electron Devices. Electronic Instrumentation. Mechanical Instruments. Basic Instrumentation.

Physical Chemistry. Thermochemistry. Surface Chemistry. Organic Chemistry. Molecular Spectroscopy. Molecular Kinetics. Mass Spectrometry.

Office of Weights and Measures.

BOULDER, COLO.

Cryogenic Engineering Laboratory. Cryogenic Equipment. Cryogenic Processes. Properties of Materials. Cryogenic Technical Services.

CENTRAL RADIO PROPAGATION LABORATORY

Ionosphere Research and Propagation. Low Frequency and Very Low Frequency Research. Ionosphere Research. Prediction Services. Sun-Earth Relationships. Field Engineering. Radio Warning Services. Vertical Soundings Research.

Radio Propagation Engineering. Data Reduction Instrumentation. Radio Noise. Tropospheric Measurements. Tropospheric Analysis. Propagation-Terrain Effects. Radio-Meteorology. Lower Atmosphere Physics.

Radio Systems. Applied Electromagnetic Theory. High Frequency and Very High Frequency Research. Modulation Research. Antenna Research. Navigation Systems.

Upper Atmosphere and Space Physics. Upper Atmosphere and Plasma Physics. Ionosphere and Exosphere Scatter. Airglow and Aurora. Ionospheric Radio Astronomy.

RADIO STANDARDS LABORATORY

Radio Physics. Radio Broadcast Service. Radio and Microwave Materials. Atomic Frequency and Time-Interval Standards. Millimeter-Wave Research.

Circuit Standards. High Frequency Electrical Standards. Microwave Circuit Standards. Electronic Calibration Center.

