SUPPLEMENTARY LIST OF PUBLICATIONS
of the
NATIONAL BUREAU OF STANDARDS

July 1, 1960 to June 30, 1961

(To accompany NBS Circular 460, its Printed
Supplement 7-1-47 to 6-30-57, and Miscellaneous
Publication 240, 7-1-57 to 6-30-60)
Functions and Activities

The functions of the National Bureau of Standards are set forth in the Act of Congress, March 3, 1901, as amended by Congress in Public Law 619, 1950. These include the development and maintenance of the national standards of measurement and the provision of means and methods for making measurements consistent with these standards; the determination of physical constants and properties of materials; the development of methods and instruments for testing materials; devices, and structures; advisory services to government agencies on scientific and technical problems; invention and development of devices to serve special needs of the Government; and the development of standard practices, codes, and specifications. The work includes basic and applied research, development, engineering, instrumentation, testing, evaluation, calibration services, and various consultation and information services. Research projects are also performed for other government agencies when the work relates to and supplements the basic program of the Bureau or when the Bureau's unique competence is required. The scope of activities is suggested by the listing of divisions and sections on the inside of the back cover.

Publications

The results of the Bureau's research are published either in the Bureau's own series of publications or in the journals of professional and scientific societies. The Bureau itself publishes three periodicals available from the Government Printing Office: The Journal of Research, published in four separate sections, presents complete scientific and technical papers; the Technical News Bulletin presents summary and preliminary reports on work in progress; and Basic Radio Propagation Predictions provides data for determining the best frequencies to use for radio communications throughout the world. There are also five series of non-periodical publications: Monographs, Applied Mathematics Series, Handbooks, Miscellaneous Publications, and Technical Notes.

A complete listing of the Bureau's publications can be found in National Bureau of Standards Circular 460, Publications of the National Bureau of Standards, 1901 to June 1947 ($1.25), and the Supplement to National Bureau of Standards Circular 460, July 1947 to June 1957 ($1.50), and Miscellaneous Publication 240, July 1957 to June 1960 (Includes Titles of Papers Published in Outside Journals 1950 to 1959) ($2.25); available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Technical Notes

The Technical Note series is designed to supplement the Bureau's regular publications program. They provide a means for making available scientific data that are of transient or limited interest. Copies will only be available by purchase from the Department of Commerce, Office of Technical Services, Washington 25, D. C.
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Beginning July 1959, the Journal of Research of the National Bureau of Standards will be issued as follows:

The Journal of Research reports National Bureau of Standards research and development in physics, mathematics, chemistry, and engineering. Comprehensive scientific papers give complete details of the work, including laboratory data, experimental procedures, and theoretical and mathematical analyses. Illustrated with photographs, drawings, and charts.

After July 1959 the Journal will also present review articles by recognized authorities and compilations of information on subjects closely related to the Bureau's technical program.

All NBS nonperiodical publications and articles by the Bureau staff in professional journals will be abstracted in the appropriate section of the Journal. In addition, each section will carry a complete listing of all Bureau publications that are not abstracted in that section.

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A. PHYSICS AND CHEMISTRY

Papers of interest primarily to scientists working in these fields. This section will cover 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. Annual subscription: Domestic, $4.00; Foreign, $4.75.

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Studies and compilations designed mainly for the mathematician and 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. Short numerical tables. Issued quarterly. Annual subscription: Domestic, $2.25; Foreign, $2.75.

C. ENGINEERING AND INSTRUMENTATION

Reporting results of interest chiefly to the engineer and the applied scientist. This section will include many of the new developments in instrumentation resulting from the Bureau's work in physical measurement, data processing, and development of test methods. It will also cover some of the work in acoustics, applied mechanics, building research, and cryogenic engineering. Issued quarterly. Annual subscription: Domestic, $2.25; Foreign, $2.75.

D. RADIO PROPAGATION

Reporting research in radio propagation, communications, and upper atmospheric physics. Topics to be covered include propagation in ionized media; scattering by turbulence, effect of irregular terrain on propagation, diffraction and scattering by solid obstacles, propagation through time varying media, surfaces, waves, and antennas. Issued six times a year. Annual subscription: Domestic, $4.00; Foreign, $4.75.
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Technical News Bulletin

Summaries of current research at the National Bureau of Standards are published each month in the Technical News Bulletin. The articles are brief, with emphasis on the results of research, chosen on the basis of their scientific or technologic importance. Lists of all Bureau publications during the preceding month are given, including Research Papers, Handbooks, Applied Mathematics Series, Miscellaneous Publications, Monographs, and Technical Notes. Each issue contains 12 or more two-column pages; illustrated. Annual subscription: domestic, $1.50; foreign, $2.25.

Basic Radio Propagation Predictions

The Predictions provide the information necessary for calculating the best frequencies for communication between any two points in the world at any time during the given month. The data are important to all users of long-range radio communications and navigation, including broadcasting, airline, steamship, and wireless services, as well as to investigators of radio propagation and ionosphere. Each issue, covering a period of one month, is released three months in advance and contains 18 large pages, including pertinent charts, drawings, and tables. Annual subscription: domestic, $1.00; foreign, $1.50.
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Incoherent scattering by free electrons as a technique for studying the ionosphere and exosphere: some observations and theoretical considerations, K. L. Bowles, paper 65D1-97, p. 1.

Radio wave absorption of several gases in the 100 to 117 km/sec frequency range, C. O. Britt, C. W. Tolbert, and A. W. Straiton, paper 65D1-98, p. 15.


An atlas of oblique-incidence ionograms (a digest), V. Agy, K. Davies, and R. Salaman, paper 65D1-100, p. 35.


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236. Standard frequencies and time signals from NBS stations WWV and WWVH. December 1, 1960.

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62 (PB161563). Rapid determination of the order of chemical reactions from the time-ratio tables, J. H. Flynn. August 1960. $3.00.


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1 H28 and its 1950 supplement are superseded by H28(1957), pts. I, II, and III.

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DEPOSITORY LIBRARIES IN THE UNITED STATES RECEIVING NATIONAL BUREAU OF STANDARDS PUBLICATIONS

ALABAMA

Auburn: Alabama Polytechnic Institute Library.
Birmingham: Howard College Library.
     M. Paul Phillips Library.
     Public Library.
Florence: State Teachers College Library.
Jacksonville: State Teachers College Library.
Mobile (Spring Hill): Thomas Byrne Memorial Library, Spring Hill College.
Montgomery: Department of Archives and History Library,
     State and Supreme Court Library,
Tuskegee Institute: Hollis Burke Frissell Library,
University: University of Alabama Library.

ALASKA

College: University of Alaska Library.
Juneau: Territorial Historical Library and Museum.

ARIZONA

Flagstaff: Arizona State Teachers College Library.
Phoenix: Department of Library and Archives.
     Phoenix Public Library.
Tempe: Matthews Library.
Tucson: University of Arizona Library.

ARKANSAS

Clarksville: College of the Ozarks Library.
Conway: Hendrix College Library.
Fayetteville: University of Arkansas Library.
Little Rock: Little Rock Public Library.
Russellville: Arkansas Polytechnic College Library.
State College: Arkansas State College Library.

CALIFORNIA

Bakersfield: Kern County Free Library.
Berkeley: University of California Library.
Claremont: Pomona College, Honnold Library.
Davis: University of California Library.
Eureka: Eureka Free Library.
Fresno: Fresno County Free Library.
Long Beach: Public Library.
Los Angeles: University of Southern California Library.
     Los Angeles Public Library.
     Los Angeles State College of Applied Arts and Sciences Library.
     Loyola University Library.
     Occidental College Library.
     University of California at Los Angeles Library.
Northridge: San Fernando Valley State College Library.
Oakland: Oakland Public Library
Pasadena: California Institute of Technology Library.

CALIFORNIA (continued)

Redding: Shasta County Free Library.
Redlands: University of Redlands Library.
Richmond: Richmond Public Library.
Riverside: Riverside Public Library.
Sacramento: California State Library.
     City Free Library.
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.
     Regis College Library.
     University of Denver, Mary Reed Library.
Fort Collins: Colorado State College of Agriculture 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.
     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.
DISTRICT OF COLUMBIA (continued)

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


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


ILLINOIS (continued)


INDIANA


IOWA


KANSAS

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.
Lexington: University of Kentucky Library.
Louisville: Louisville Free Public 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.
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.
Chester: 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.
Boston: Boston Athenaeum Library, Boston Public Library, State Library of Massachusetts.
Brookline: Public Library.
Cambridge: Harvard College Library, Serials Division.
Lowell: Lowell Textile Institute Library.
Lynn: Lynn Public Library.
New Bedford: Public Library.
Tufts College: Tufts College Library.
Wellesley: Wellesley College 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, Wayne University, General 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.
Muskegon: Hackley Public Library.
Port Huron: Port Huron Public Library.
Saginaw: Hoyt Public Library.

MINNESOTA

Collegeville: St. John's University Library.
Duluth: Duluth Public Library.
Minneapolis: Public Library.
Moorhead: State Teachers College Library.
Northfield: Carleton College Library.
Stillwater: Stillwater Public Library.
MISSISSIPPI

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

MONTANA

Billings: Eastern Montana College Library.
Boxeman: Montana State College Library.
Butte: Montana School of Mines Library.
Helena: Helena Public Library.
Missoula: State University of Montana 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 Library.
Santa Fe: New Mexico State Law Library.
Silver City: New Mexico State Teachers College Library.
State College: New Mexico College of Agriculture and Mechanic Arts Library.

NEW YORK

Albany: New York State Library.
Brooklyn: Brooklyn College 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.
Colubmia 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.
Fotosdam: Clarkson College of Technology Library.
NEW YORK (continued)

Poughkeepsie: Vassar College Library,

Rochester: Rochester Public Library, Edgerton 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,


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 Experimental Station Library,

Grand Forks: University of North Dakota Library,

Minot: State Teachers College Library,

Valley City: State Teachers College Library.

OHIO (continued)

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 College 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,

Meadville: Allegheny College Library,

Philadelphia: Free Library of Philadelphia,

Philadelphia Commercial Museum Library,

Temple University, Sullivan Memorial Library,

University of Pennsylvania Library.
Reading: Reading Public Library.
Scranton: Scranton Public Library.
State College: Pennsylvania State University Library.
Swarthmore: Swarthmore College Library.
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.
Rhode Island State Library.
Westerly: Westerly Public Library.

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

SOUTH DAKOTA
Mitchell: Dakota Wesleyan University Library.
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.

TEXAS
Abilene: Hardin Simmons University Library.
Austin: Texas State Library.
Beaumont: Lamar State 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 College, Estill Library.
Kingsville: Texas College of Arts and Industries 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.
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.
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.


Office of Weights and Measures.

BOULDER, COLO.


