

DEPARTMENT OF COMMERCE

BUREAU OF STANDARDS

S. W. STRATTON, Director

JULY (1922) SUPPLEMENT TO CIRCULAR NO. 24: PUBLICATIONS OF THE BUREAU OF STANDARDS

This supplement is issued from time to time to keep current, and to supplement, the information given in Circular of the Bureau of Standards, No. 24: Publications of the Bureau of Standards. This supplement will bring up to date the information listed below under "Contents."

CONTENTS

Page

1. Designations of publication series... 1
1. Publications not available... 1
2. Limited free distribution... 2
2. Bound volumes... 2
2. Purchasing publications... 2
3. Latest data concerning current editions of circulars... 3
4. Government depository reference libraries... 4
9. Announcements of new publications... 9
15. Subject index to new publications... 15

1. DESIGNATIONS OF PUBLICATION SERIES

Five series are issued: Scientific Papers, Technologic Papers, Circulars, Handbooks, and Miscellaneous Publications. The separate papers in each series are consecutively numbered. An initial letter preceding each number shows the particular series: S for Scientific Papers, T for Technologic Papers, C for Circulars, H for Handbooks, M for Miscellaneous Publications—thus T203 is "Technologic Papers, No. 203." In referring to publications the series initial and the number are both needed to give complete identification.

2. PUBLICATIONS NOT AVAILABLE

The publications listed below (not available for free distribution by the Bureau of Standards, nor for sale by the Superintendent of Documents) may be consulted at the designated Government depository reference libraries listed at the end of this supplement.

Scientific Papers.—S1, S2, S3, S4, S12, S13, S16, S19, S22, S24, S25, S27, S29, S33, S34, S35, S36, S37, S38, S39, S41, S42, S43, S44, S46, S49, S50, S51, S52, S55, S58, S59, S60, S61, S62, S68, S72, S77, S79, S81, S84, S89, S90, S93, S94, S95, S96, S100, S102, S103, S104, S105, S112, S113, S114, S115, S118, S121, S122, S123, S125, S128, S129, S130, S133, S138, S139, S140, S142, S143, S146, S147, S149, S151, S155, S162, S165, S168, S173, S174, S182, S187, S202, S203, S212, S213, S214, S216, S232, S233, S238, S241, S243, S255, S261, S275, S279, S291.

Technologic Papers.—T2, T3, T5, T14, T17, T19, T23, T26, T27, T28, T30, T31, T35, T37, T39, T44, T45, T46, T48, T51, T54, T57, T65, T68, T71, T74, T82, T100, T118, T122.

Circulars.—C1, C2, C4, C7, C9, C12, C14, C15, C21, C22, C23, C28, C29, C34, C37, C39, C45, C46, C50, C58.

Miscellaneous Publications.—M4, M5, M8, M9, M11, M16, M18, M20, M22, M25, M29, M30, M31, M33, M34, M35, M36, M38.

### 3. LIMITED FREE DISTRIBUTION

The small edition of each publication available for official distribution permits free distribution only to libraries, technical journals, and experts who cooperate in the work or who are directly concerned with it. Orders should be sent in accordance with paragraph 5. The large number of requests for Bureau of Standard publications precludes sending personally dictated replies in each case. Each request, however, is given careful attention and a typed form letter reply is prepared, stating fully the action taken on each item of the request or other information needed.

### 4. BOUND VOLUMES

The separate Scientific Papers (the original term "Reprints" should not be used) are consecutively paged up to 750 pages, which make up a complete volume. Title page and index are then printed and the completed volume is bound. Back numbers of the "Bulletin" (in which several Scientific Papers were formerly published under one cover) may still be obtained, but by purchase only. Four numbers of the Bulletin completed a volume, and fourteen of such volumes were issued entitled "Bulletin of the Bureau of Standards, Volume . . ." The title was changed to "Scientific Papers of the Bureau of Standards" beginning with Volume 15.

The separate Technologic Papers (beginning with T203) are now being consecutively paged until about 750 pages are reached. They will then be bound for sale by the Superintendent of Documents in the same manner as the Scientific Papers. The first bound volume of Technologic Papers will be Volume 16. Numbers 1 to 15 are reserved for those libraries who may wish to bind the separate papers into groups of approximately the same Volume size. Subscriptions for either series may be placed in advance with the Superintendent of Documents, \$1.25 for each volume (unbound), and \$1.75 for each bound volume.

### 5. PURCHASING PUBLICATIONS

Purchase orders with remittance should be sent addressed simply Superintendent of Documents, Government Printing Office, Washington, D. C. Do not send any such orders or remittances elsewhere. Order by serial initial letter and number combined (for sample, T203). If these are correctly given, the title is not needed. All publications are sent out by the Superintendent of Documents, as provided by law, and usually reach destination within a week or two.

## 6. LATEST DATA CONCERNING CURRENT EDITIONS OF CIRCULARS

Cir. No.	Edition	Date	No. of pages	Price	Cir. No.	Edition	Date	No. of pages	Price
1	1	Dec. 1, 1903	3	.....	61	2	Aug. 31, 1920	44	10
2	4	May 1, 1912	21	5	62	2	June 17, 1919	32	5
3	3	Dec. 23, 1918	89	15	63	1	May 17, 1917	8	5
4	2	Jan. 3, 1905	2	.....	64	1	Apr. 20, 1917	6	5
5	3	July 16, 1917	19	5	65	1	July 23, 1917	19	5
6	7	Dec. 30, 1916	30	5	66	1	July 25, 1917	13	5
7	5	Oct. 1, 1913	19	5	67	1	Jan. 17, 1918	8	5
8	3	Aug. 11, 1921	18	5	68	1	Oct. 6, 1917	8	5
9	8	Mar. 31, 1916	32	10	69	1	Nov. 17, 1917	85	15
10	3	May 9, 1918	19	5	70	1	Dec. 5, 1917	259	25
11	1	May 15, 1911	10	5	71	1	Sept. 18, 1917	8	5
12 <sup>1</sup>	1	July 16, 1906	7	.....	72	1	June 17, 1918	84	20
13	9	July 30, 1921	20	5	73	1	June 15, 1918	103	20
14	5	Mar. 20, 1916	17	10	74	1	Mar. 23, 1918	330	60
15	3	July 1, 1911	7	5	75	1	June 10, 1918	127	15
16	4	Feb. 23, 1916	16	5	76	1	Apr. 21, 1919	120	20
17	3	Mar. 18, 1916	50	15	77	1	Mar. 10, 1919	67	10
18	2	July 1, 1911	4	5	78	1	Jan. 28, 1919	9	5
19	3	Apr. 1, 1913	44	15	79	1	Apr. 25, 1919	44	10
20	2	May 28, 1915	57	15	80	1	Oct. 4, 1919	34	10
21	1	Mar. 1, 1910	30	5	81	1	Sept. 10, 1919	21	5
22	1	May 15, 1910	12	.....	82	1	June 14, 1919	9	5
23	1	July 15, 1910	93	15	83	1	Jan. 31, 1920	35	5
24 <sup>2</sup>	6	.....	.....	.....	84	1	Dec. 27, 1919	10	5
25	5	Sept. 1, 1913	12	5	85	1	Jan. 26, 1920	11	5
26	4	Apr. 5, 1921	20	5	86	1	Feb. 15, 1920	11	5
27	2	Aug. 9, 1918	41	10	87	1	Feb. 16, 1920	8	5
28	1	Mar. 1, 1911	19	.....	88	1	Feb. 16, 1920	8	5
29	1	Dec. 31, 1910	13	.....	89	1	Mar. 10, 1920	11	5
30	2	July 6, 1920	23	5	90	1	Apr. 3, 1920	8	5
31	3	Oct. 1, 1914	76	20	91	1	Apr. 15, 1920	8	5
32	4	Dec. 7, 1920	140	20	92	1	July 7, 1920	94	30
33	3	Jan. 18, 1917	43	10	93	1	Apr. 21, 1920	8	5
34	3	May 15, 1915	16	5	94	1	Apr. 21, 1920	8	5
35	4	Dec. 1, 1919	2	5	95	1	June 28, 1920	24	5
36	1	June 30, 1912	26	5	96	1	June 15, 1920	5	5
37	2	Jan. 1, 1915	13	5	97	1	Aug. 23, 1920	10	5
38	4	Sept. 28, 1921	127	20	98	1	Aug. 24, 1920	6	5
39	1	Dec. 16, 1912	14	5	99	1	Nov. 12, 1920	44	10
40	3	Sept. 10, 1920	13	5	100	1	Mar. 21, 1921	106	20
41	3	Jan. 1, 1921	15	5	101	1	Feb. 9, 1921	52	10
42	2	Aug. 29, 1921	11	5	102	1	Oct. 18, 1920	5	5
43	2	Jan. 24, 1921	46	10	103	1	Oct. 18, 1920	5	5
44	2	Jan. 30, 1918	196	25	104	1	Oct. 18, 1920	6	5
45	1	Nov. 1, 1913	89	10	105	1	Oct. 18, 1920	4	5
46	2	July 15, 1914	12	5	106	1	Nov. 24, 1920	15	5
47	1	July 1, 1914	68	15	107	1	Feb. 12, 1921	37	10
48	2	June 10, 1916	202	40	108	1	Jan. 3, 1921	21	5
49	2	May 4, 1915	50	10	109	1	Jan. 3, 1921	9	5
50	2	June 8, 1917	34	5	110	1	Feb. 26, 1921	8	5
51	1	Dec. 1, 1914	39	15	111	1	Mar. 11, 1921	8	5
52	2	June 28, 1916	44	10	112	1	June 24, 1921	214	65
53	1	Mar. 29, 1915	35	10	113	1	Sept. 7, 1921	104	25
				Cloth.			July 30, 1921	10	5
54 <sup>3</sup>	2	Nov. 15, 1916	323	30	115	1	Oct. 27, 1921	18	5
55	1	Aug. 25, 1915	149	15	116	1	Aug. 17, 1921	5	5
56	1	July 28, 1916	262	25	117	1	Nov. 8, 1921	6	5
57	2	May 11, 1915	64	15	118	1	Dec. 8, 1921	7	5
58	1	Apr. 4, 1916	68	10	119	1	Feb. 6, 1922	3	5
59	1	Apr. 5, 1916	13	5	120	1	Apr. 24, 1922	16	5
60	2	Mar. 12, 1920	68	15					

<sup>1</sup> Superseded by C44.<sup>2</sup> Forthcoming, not for sale.<sup>3</sup> Superseded by H<sub>3</sub> and H<sub>4</sub>.

## 7. GOVERNMENT DEPOSITORY REFERENCE LIBRARIES

Congress designates in the several congressional districts certain libraries as "Government depository libraries." These receive sets of Government publications on the understanding that they are kept available for consultation by the general public.

If a publication is requested which can not be obtained free from the bureau or by purchase from the Superintendent of Documents, the bureau refers the correspondent to the nearest depository reference library where the bureau's publications may be consulted.

State or Territory	City	Name of library	
Alabama	Athens	Athens College.	
	Auburn	Alabama Polytechnic Institute.	
	Birmingham	Howard College. Public.	
	Mobile	Association Public.	
	Montgomery	State Capitol. State and Supreme Court.	
	Tuskegee Institute	Carnegie.	
	University	University of Alabama.	
Alaska	Fairbanks	St. Matthews Free Public.	
	Juneau	Alaska Historical Society and Museum	
Arizona	Phoenix	Arizona State. Public.	
	Tucson	University of Arizona.	
Arkansas	Conway	Hendrix College.	
	Fayetteville	University of Arkansas.	
	Jonesboro	State Agricultural Schools.	
	Little Rock	Arkansas State.	
	Magnolia	State Agriculture Schools.	
	Pine Bluff	Branch Nor. College.	
California	Alturas	Public.	
	Berkeley	University of California.	
	Claremont	Pomona College.	
	Eureka	Free Library.	
	Fresno	Free.	
	Los Angeles	Public.	
	San Diego	California State. Free Public.	
	San Francisco	Free Public. Mechanics Mercantile. Public.	
	Santa Rosa	Free Public.	
	Stanford University	Leland Stanford Junior University.	
	Stockton	Free Public.	
	Colorado	Boulder	University of Colorado.
		Colorado Springs	Colorado College Coburn
		Denver	Colorado State. Public. Regis College.
Fort Collins		University of Denver.	
Pueblo		Agricultural College.	
McClelland		McClelland Public.	
Connecticut	Bridgeport	Public.	
	Hartford	Connecticut State. Trinity College.	
	Middletown	Wesleyan University.	
	New Haven	Yale University.	
Delaware	Storr	Agricultural College.	
	Waterbury	Silas Bronson.	
	Dover	Delaware State.	
	Newark	Delaware College.	
	Newcastle	Newcastle Library Co.	
District of Columbia	Washington	Free. Agriculture Department. Army War College. Interior Department. Justice Department. Navy Department. State Department. Treasury Department	

State or Territory	City	Name of library	
Florida.....	DeLand.....	John B. Stetson University.	
	Gainesville.....	University of Florida.	
	Jacksonville.....	Public.	
	Tallahassee.....	Carnegie Library of the Florida State Normal and Industrial School.	
Georgia.....	Winter Park.....	Rollins College.	
	Athens.....	University of Georgia.	
	Atlanta.....	Carnegie. Georgia State. Young Men's.	
	Augusta.....	Georgia Agricultural College.	
	Dahlonega.....	Georgia Normal and Business Institute.	
	Douglas.....	Emery College.	
	Oxford.....	Georgia Historical Society. Georgia State Industrial College.	
Hawaii.....	Honolulu.....	College of Hawaii.	
	Idaho.....	State Normal School.	
Idaho.....	Boise.....	Idaho State.	
	Moscow.....	University of Idaho.	
Idaho.....	Pocatello.....	Idaho Technical Institute.	
	Illinois.....	Public.	
Illinois.....	Bloomington.....	Illinois Wesleyan University.	
	Chicago.....	John Crerar. Newberry. Public. St. Ignatius College. University of Chicago.	
Illinois.....	Danville.....	Public.	
	Evanston.....	Northwestern University.	
	Freeport.....	Public.	
	Galesburg.....	Free Public.	
	Jacksonville.....	Public.	
	Joliet.....	Public.	
	Lisle.....	St. Procopius College.	
	Monmouth.....	Monmouth College.	
	Normal.....	Illinois State Normal University.	
	Olney.....	Carnegie Public.	
	Peoria.....	Public.	
	Rockford.....	Public.	
	Springfield.....	Illinois State Historical Society. Illinois State. University of Illinois.	
	Indiana.....	Urbana.....	University of Illinois.
		Bloomington.....	Indiana University.
	Indiana.....	Crawfordsville.....	Wabash College.
		Evansville.....	Willard Library.
		Fort Wayne.....	Public.
		Greencastle.....	De Pauw University.
		Hanover.....	Hanover College.
Huntington.....		City Free.	
Indianapolis.....		Public. Indiana State. Jasper College.	
Jasper.....		Jasper College.	
La Fayette.....		Purdue University.	
Merom.....		Union Christian College.	
Muncie.....		Public.	
Notre Dame.....		Lemonnier Library of University of Notre Dame.	
Richmond.....		Morrison Reeves.	
Terre Haute.....		Indiana State Normal School.	
Iowa.....		Ames.....	Iowa State College.
		Boone.....	Ericson Free Public.
Iowa.....		Cedar Falls.....	Public.
		Council Bluffs.....	Free Public.
		Des Moines.....	Public.
		Dubuque.....	Carnegie Stout Free Public.
	East Des Moines.....	Iowa State.	
	Fairfield.....	Free Public.	
	Fayette.....	Upper Iowa University.	
	Grinnell.....	Iowa College.	
	Iowa City.....	State University of Iowa.	
	Mount Pleasant.....	Iowa Wesleyan University.	
	Mount Vernon.....	Cornell College.	
	Sioux City.....	Public.	
	Tabor.....	Tabor College.	
	Kansas.....	Baldwin.....	Baker University.
Emporia.....		Kansas State Normal.	
Hiawatha.....		Morrill Free Public.	
Lawrence.....		Spooner Library of University of Kansas.	

State or Territory	City	Name of library
Kansas (Contd.)	Manhattan	Kansas State Agricultural College.
	Pittsburg	Public.
	Sterling	Cooper College.
	Topeka	Kansas State.
	Wichita	Kansas State Historical Society.
Kentucky	Danville	Fairmount College.
	Frankfort	Centre College of Central University.
	Glasgow	Kentucky State.
	Henderson	Public.
	Lexington	Public.
	Lincoln Ridge	State University.
	Louisville	Lincoln Institute of Kentucky.
	Paducah	Free Public.
	Somerset	High School.
	Winchester	Carnegie Public.
Louisiana	Baton Rouge	Kentucky Wesleyan College.
	Natchitoches	Hill Memorial Library of State University.
	New Orleans	State Normal School.
		Howard Memorial.
		Louisiana State.
Maine	Ruston	Louisiana State Museum.
	Augusta	Public.
	Bangor	Tulane University.
	Brunswick	Louisiana Industrial Institute.
	Lewiston	Maine State.
	Orono	Public.
	Portland	Bowdoin College.
	Saco	Bates College.
	Waterville	University of Maine.
	Annapolis	Public.
Maryland	Baltimore	Dyer Library Association.
		Colby University.
		Maryland State.
		United States Naval Academy.
		Enoch Pratt Free.
		Johns Hopkins University.
		Peabody Institute.
		Washington College.
		Western Maryland College.
		Amherst College.
Massachusetts	Boston	Massachusetts Agricultural College.
		Athenaeum.
		Public.
		State Library of Massachusetts.
		Harvard College.
		City.
		Public.
		Public.
		Public.
		Public.
	Essex Institute.	
Michigan	Taunton	Public.
	Tufts College	Tufts College.
	Williamstown	Williams College.
	Worcester	American Antiquarian Society.
	Ann Arbor	Free Public.
	Battle Creek	General Library of University of Michigan.
	Benton Harbor	Public School.
	Detroit	Public.
	East Lansing	Detroit College.
	Grand Rapids	Public.
Houghton	Michigan State Agricultural College.	
Kalamazoo	Public.	
Lansing	Library of the Michigan School of Mines.	
Muskegon	Public.	
Orchard Lake	Michigan State.	
Port Huron	Hackley Public.	
Saginaw	Folish Seminary.	
Duluth	Public.	
Faribault	Hoyt Public.	
Fergus Falls	Free Public.	
Minneapolis	Public.	
Stillwater	High School.	
St. Paul	Public.	
Winona	University of Minnesota.	
	Public.	
	Minnesota Historical Society.	
	Minnesota State.	
	Public.	
	State Normal School.	

State or Territory	City	Name of library
Mississippi.....	Agricultural College...	Mississippi Agricultural and Mechanical College.
	Brookhaven.....	Public.
	Greenville.....	Public.
	Jackson.....	Carnegie Millsaps.- Mississippi State.
Missouri.....	Oxford.....	Mississippi State University.
	Cape Girardeau.....	State Normal School.
	Chillicothe.....	Hazleton Public School.
	Columbia.....	College of Agriculture and Mechanical Arts of Missouri State University.
	Fulton.....	University of Missouri.
	Hannibal.....	Westminster College.
	Jefferson City.....	Free Public.
	Kansas City.....	Missouri State. Public.
	Liberty.....	Rockhurst College.
	Rolla.....	William Jewell College.
	Springfield.....	Missouri School of Mines.
	St. Joseph.....	Drury College.
	St. Louis.....	Public. Christian Brothers College.
	Warrensburg.....	Public. St. Louis University. Washington University.
Montana.....	Bozeman.....	State Normal School.
	Butte.....	Montana Agricultural College.
	Helena.....	Montana State School of Mines.
		Historical Department of Montana State.
Nebraska.....	Missoula.....	Public.
	Fremont.....	University of Montana.
	Grand Island.....	Public.
	Lincoln.....	Carnegie. Library of the University of Nebraska. Nebraska State.
Nevada.....	Omaha.....	Public.
	Carson City.....	Nevada State.
New Hampshire.....	Reno.....	University of Nevada.
	Concord.....	New Hampshire State.
New Jersey.....	Dover.....	Public.
	Durham.....	Hamilton Smith Public.
	Hanover.....	Dartmouth College.
	Laconia.....	Public.
	Manchester.....	City.
	Atlantic City.....	Free Public.
	Bayonne.....	Free Public.
	Camden.....	Free Public.
	Elizabeth.....	Public Library and Reading Room.
	Jersey City.....	Free Public.
	Newark.....	Free Public.
New Brunswick.....	Free Public. Rutgers College.	
New Mexico.....	Paterson.....	Free Public.
	Princeton.....	Princeton University.
	Trenton.....	Free Public. New Jersey State.
	Albuquerque.....	University of New Mexico.
	East Las Vegas.....	Normal University.
New York.....	Santa Fe.....	Territorial.
	State College.....	General Library of New Mexico College of Agricultural and Mechanical Arts.
New York.....	Albany.....	New York State.
	Brooklyn.....	Public.
	Buffalo.....	Pratt Institute Free. Governor. Public.
	Canton.....	St. Lawrence University.
	Farmingdale, L. I.....	State Institute of Applied Agriculture.
	Glens Falls.....	Grandall Free.
	Hamilton.....	Colgate University.
	Ithaca.....	Cornell University.
	Keuka Park.....	Keuka College Public.
	Newburgh.....	Free.
	New York.....	Astor Branch of New York Public. College of the City of New York. Columbia University. Lenox Branch of New York Public. New York Law Institute. New York University. The World.

State or Territory	City	Name of library
New York (Contd.)	Plattsburg.....	Public.
	Poughkeepsie.....	Adriance Memorial.
	Rochester.....	Rochester University.
	Schenectady.....	Union College.
	Syracuse.....	Syracuse University.
	Troy.....	Public.
	Ulica.....	Public.
	West Point.....	United States Military Academy.
	Yonkers.....	Public.
	North Carolina.....	Chapel Hill.....
Davidson.....		Union Library of Davidson College.
Durham.....		Trinity College.
Greensboro.....		Colored Agricultural and Mechanical College.
Newton.....		Catawba College.
Raleigh.....		North Carolina State.
Wake Forest.....		Wake Forest College.
Washington.....		Public Schools.
North Dakota.....	Agricultural College.....	Agricultural College.
	Bismarck.....	North Dakota State.
	University.....	State Historical Society.
Ohio.....	Valley City.....	State University of North Dakota.
	Alliance.....	State Teachers' College.
	Athens.....	Mount Union Scio College.
	Bucyrus.....	Carnegie.
	Chillicothe.....	Public.
	Cincinnati.....	Public.
	Cleveland.....	Adelbert College.
	Columbus.....	Case.
	Dayton.....	Public.
	Dayton.....	Ohio State.
Oklahoma.....	Dayton.....	Ohio State University.
	Dayton.....	Public.
	Dayton.....	Public Library and Museum.
	Delaware.....	Charles Slocum Library of Ohio Wesleyan University.
	Gambier.....	Kenyon College.
	Granville.....	Denison University.
	Hiram.....	Hiram College.
	Lebanon.....	Public.
	Marietta.....	Marietta College.
	Oberlin.....	Oberlin College.
	Oxford.....	Miami University.
	Portsmouth.....	Free Public.
	Sidney.....	Public.
	Springfield.....	Warder Public.
	Steubenville.....	Carnegie.
	Toledo.....	Public.
	Van Wert.....	Brumback Library of Van Wert County.
	Ada.....	East Central State Normal School.
	Altus.....	Public.
	Alva.....	Northwestern State Normal School.
Enid.....	Public.	
Guthrie.....	Oklahoma State.	
Langston.....	Colored Agricultural and Normal University.	
Miami.....	Public.	
Muskogee.....	High School.	
Norman.....	University of Oklahoma.	
Oklahoma City.....	Oklahoma State.	
Stillwater.....	Oklahoma Agricultural and Mechanical College.	
Tishomingo.....	Murray State School of Agriculture.	
Oregon.....	Corvallis.....	Oregon Agricultural College.
	Eugene.....	University of Oregon.
	Forest Grove.....	Tualatin Academy and Pacific University.
	Portland.....	Library Association.
Pennsylvania.....	Portland.....	Reed College.
	Salem.....	Oregon State.
	Bradford.....	Carnegie Public.
	Carlisle.....	J. Herman Bosler Memorial.
	Erie.....	Public.
	Gettysburg.....	Pennsylvania College.
	Harrisburg.....	Pennsylvania State.
	Haverford.....	Haverford College.
	Huntington.....	Juniata College.
	Lancaster.....	Watts De Peyster Library of F. and M. College.
	Meadville.....	Allegheny College.
	Norristown.....	William McCann.
	Philadelphia.....	Free.
	Philadelphia.....	Historical Society of Pennsylvania.
	Philadelphia.....	Library Company of Philadelphia.
Philadelphia.....	Mercantile.	
Philadelphia.....	Philadelphia Museum.	
Philadelphia.....	University of Pennsylvania.	



State or Territory	City	Name of library
Pennsylvania(Con.)	Pittsburgh.....	Carnegie. University of Pittsburgh.
	Scranton.....	Public.
	South Bethlehem.....	Lehigh University.
	State College.....	Carnegie Library of Pennsylvania State College.
	Reading.....	Reading.
	Warren.....	Public.
	Washington.....	Memorial Library of Washington and Jefferson College.
	Wilkes-Barre.....	Wyoming Historical and Geological Society.
Philippine Islands...	Manila.....	Philippine Library and Museum.
Rhode Island.....	Kingston.....	Rhode Island College of Agricultural and Mechanical Arts.
	Providence.....	Brown University. Public. Rhode Island State.
South Carolina.....	Westerly.....	Public.
	Charleston.....	Charleston College. Charleston Library Society.
	Clemson College.....	Clemson Agriculture College.
	Clinton.....	Presbyterian College of South Carolina.
	Columbia.....	South Carolina State. University of South Carolina.
South Dakota.....	Greenwood.....	Carnegie Public.
	Orangeburg.....	Colored Normal Industrial Agricultural and Mechanical College of South Carolina.
	Rockhill.....	Winthrop Normal and Industrial College Carnegie.
	Brookings.....	South Dakota State College of Agricultural and Mechanical Arts.
	Mitchell.....	Dakota Wesleyan University.
	Pierre.....	South Dakota State.
Tennessee.....	Sioux Falls.....	Carnegie Free Public.
	Vermilion.....	University of South Dakota.
	Yankton.....	Yankton College.
	Chattanooga.....	Public.
	Knoxville.....	University of Tennessee.
	Memphis.....	Cossitt.
	Murfreesboro.....	Middle Tennessee State Normal.
Nashville.....	Carnegie. Tennessee State. Vanderbilt University.	
Texas.....	Sewanee.....	University of the South.
	Spring Hill.....	Branahm and Hughes School.
	Austin.....	Texas State. University of Texas.
	Clarendon.....	Clarendon College.
	College Station.....	Agricultural and Mechanical College of Texas.
	Dallas.....	Public.
	El Paso.....	Public.
	Fort Worth.....	Carnegie. Christian University.
	Galveston.....	Rosenberg.
	Georgetown.....	Southwestern University.
Houston.....	Lyceum and Carnegie.	
Utah.....	San Antonio.....	Carnegie.
	Waco.....	Baylor.
	Logan.....	Agricultural College.
	Manti.....	High School.
	Ogden.....	Carnegie Free.
Vermont.....	Provo.....	Brigham Young University.
	Salt Lake City.....	University of Utah.
	Burlington.....	Fletcher Free. University of Vermont.
Virginia.....	Middlebury.....	Middlebury College.
	Montpelier.....	Vermont State.
	Northfield.....	Carnegie Library of Norwich University.
	Blacksburg.....	Virginia Agricultural and Mechanical College and Poly- technic Institute.
	Bridgewater.....	Bridgewater College.
	Emory.....	Emory and Henry College.
	Hampden Sidney.....	Hampden Sidney College.
	Lexington.....	Virginia Military Institute. Washington and Lee University.
	Norfolk.....	Public.
	Richmond.....	Richmond College. Virginia State.
Salem.....	Roanoke College.	
University.....	Virginia University.	

State or Territory	City	Name of library
Washington.....	Everett.....	Public.
	Olympia.....	Washington State.
	Pullman.....	State College of Washington.
	Seattle.....	Public. University of Washington.
	Spokane.....	Public.
	Tacoma.....	Public.
	Walla Walla.....	Whitman College.
West Virginia.....	Charleston.....	Department of Archives and History, State.
	Elkins.....	Davis and Elkins College.
	Fairmont.....	Normal School.
	Institute.....	West Virginia Colored Institute.
	Keyser.....	Preparatory Branch of West Virginia University.
	Morgantown.....	West Virginia University.
	Salem.....	Salem College.
Wisconsin.....	Appleton.....	Lawrence University.
	Beloit.....	Beloit College.
	Eau Claire.....	Public.
	Fond du Lac.....	Public.
	La Crosse.....	Public.
	Madison.....	State. State Historical Society.
	Milwaukee.....	Public.
	Racine.....	Public.
	Superior.....	Public.
	Cheyenne.....	Wyoming State.
Wyoming.....	Laramie.....	University of Wyoming.
	Sheridan.....	Carnegie Public.

8. ANNOUNCEMENTS OF NEW PUBLICATIONS

A mailing list is maintained to which is sent at regular intervals the list of titles of new publications. Names will be added to this announcement list on request.

One of the objects of this supplement is to list new publications issued after the latest edition of Circular 24, "Publications of the Bureau of Standards." Such new publications will be listed in the succeeding editions of this supplement until it becomes desirable to revise the complete list given in C24.

SCIENTIFIC PAPERS.

S430. High-Frequency Resistance of Inductance Coils.

.....Gregory Breit

The meaning of the term "resistance" needs careful consideration in the case of high-frequency alternating currents. Difficulties are caused by two effects—the skin effect and the capacity effect. Capacity effects in inductance coils, which are considered in this paper, are caused by the capacities which exist between different portions of the coil, and consist in the collection of charges at points on the wires of the coil, and in the nonuniform distribution of current in the coil which these charges cause. The measured resistance of an inductance coil assumes varying values, depending upon the point with respect to which it is measured. It is shown that if the resistance with respect to all points of the coil is known, then the current at any point of the coil may be computed as soon as the distribution of

emf's along the coil is assigned, and a formula is derived for this purpose. Values of current computed by this formula are checked experimentally. The computed value of the resistance is also checked experimentally. (Feb. 24, 1922.) 19 pp. Price, 5 cents.

S431. The Field Radiated from two Horizontal Coils. .

.....*Gregory Breit*

In order to facilitate the landing of airplanes, J. A. Willoughby, of the Bureau of Standards, devised a new type of radio transmitting antenna employing two horizontal coils. The behavior of this transmitting antenna is calculated in this paper. Expressions are derived for the current received in a coil antenna and in an open antenna located at a given distance from and in a given orientation with reference to the transmitting antenna. The variation of signal intensity is computed for the case of an airplane in horizontal flight over the transmitting station, and it is found that if the reception is by means of a vertical coil antenna, then a maximum signal is heard in a position in which the line joining the airplane with the transmitting antenna makes an angle of  $30^\circ$  with the vertical. (Mar. 10, 1922.) 18 pp. Price, 5 cents.

S432. An Improved Method for Preparing Raffinose. .

.....*E. P. Clark*

Owing to the demands made by chemists and bacteriologists for specifications and standards for raffinose, a convenient and economical method for its preparation has been developed. Cottonseed meal is extracted with water, the liquor freed from impurities with basic lead acetate, and the raffinose present removed from the liquid as an insoluble lime compound. This raffinose is decomposed with  $\text{CO}_2$  and the free sugar resulting is crystallized from its concentrated sirup by means of alcohol. A device for carbonating, which is useful for many other purposes, is also described. (Apr. 8, 1922.) 4 pp. Price, 5 cents.

S433. Thermal Expansion of a Few Steels.....

.....*Wilmer Souder and Peter Hidnert*

The critical regions of steel are used as a basis for heat treatment in securing or retaining desirable qualities, such as hardness, elastic properties, tensile strength, etc. Data are presented in tabular form and in curves showing the dimensional changes of steel in passing through these regions. Electrolytic iron and cast iron are also included. One specimen of hardened steel is analyzed, by dimensional changes, to show the release of strains on heating. (Apr. 10, 1922.) 16 pp. Price, 5 cents.

S434. Electromotive Force of Cells at Low Temperatures. .

.....*G. W. Vinal and F. W. Altrup*

The practical importance of a knowledge of the electromotive behavior of dry cells and storage batteries at low temperatures has arisen from their use in the Arctic and at high altitudes. Measurements on dry cells and storage batteries cooled to  $72^\circ \text{C}$  by carbon dioxide snow and to  $170^\circ \text{C}$  by the use of liquid air were made. The Gibbs-Helmholtz equation was applied to the observations, and excellent agreement between theory and observation found. At the lowest temperatures high values of voltage were sometimes observed and the polarity often reversed. A possible explanation based on the Nernst equation is given. (Apr. 17, 1922.) 8 pp. Price, 5 cents.

S435. Metallographic Etching Reagents: II. For Copper Alloys, Nickel, and the Alpha Alloys of Nickel.

.....*Henry S. Rawdon and Marjorie G. Lorentz*

This investigation constitutes the second part of the general study of metallographic etching reagents. Specimens representative of all of the types of alloys in the copper-zinc system and of the industrial bronzes and of aluminum bronze were examined. The etching characteristics of bronzes and bronzes are very similar to those of copper (S. 399) in that oxidation plays a very important part. Nickel is etched with very considerable difficulty, contrast is usually lacking, and pitting is apt to be excessive. A new reagent, concentrated hydrochloric acid, is described for etching this material by means of which very superior results may be obtained. The alpha nickel alloys are etched much more readily than is the metal itself, particularly the nickel bronzes. (Apr. 27, 1922.) 42 pp. Price, 15 cents.

S436. Interference Methods for Standardizing and Testing Precision Gage Blocks.....

.....*C. G. Peters and H. S. Boyd*

With the interference methods described in this paper the planeness and parallelism errors of precision gage surfaces can be measured and the length of standard gages determined by direct comparison with the standard light waves with an uncertainty of not more than a few millionths of an inch. The errors of other gages can be determined by comparison with these calibrated standards, with equal precision. (May 2, 1922.) 37 pp. Price, 10 cents.

S437. The Solubility of Dextrose in Water.....

.....*Richard F. Jackson and Clara Gillis Silsbee*

The equilibria in the system, dextrose and water, have been determined. For temperatures below 90° C three solid phases are capable of existence, namely, ice,  $\alpha$ -dextrose monohydrate, and anhydrous-dextrose. The cryohydric point lies at the temperature -5.3° C and concentration 31.75 per cent dextrose. The solid phase,  $\alpha$ -dextrose monohydrate, which occurs in lustrous plates, is stable between -5.3° C and 50° C. Its solubility shows a very high temperature coefficient. The observed melting point, 80-90° C, although located far from the extrapolated solubility curve, is shown to be compatible with the measurements. The anhydrous form, stable above 50° C, has a small solubility temperature coefficient. The solubility measurements of this phase in metastable state were continued down to 28° C. (May 5, 1922.) 10 pp. Price, 5 cents.

S438. Tests of Stellar Radiometers and Measurements of the Energy Distribution in the Spectra of 16 Stars.....

.....*W. W. Coblentz*

An account is given: (1) of the new tests of stellar radiometers, (2) of new measurements of the total radiation of stars, (3) of the spectral energy distribution in the complete spectrum of a star as determined by means of transmission screens, and (4) of estimates of the temperature of stars as determined from the spectral energy measurements. These radiation measurements indicate spectral energy distribution equivalent to that of a black body at 3000° K for red stars to 10000° K for blue stars. (May 12, 1922.) 26 pp. Price, 10 cents.

S439. Sensitometry of Photographic Emulsions and a Survey of the Characteristics of Plates and Films of American Manufacture . . . . .

. . . . . *R. Davis and F. M. Walters, jr.*

The properties of photographic emulsions are discussed from the standpoint of the relation between density and exposure, the growth of contrast with development, color sensitiveness, resolving power, and fogging in development. The apparatus used in testing photographic material at the Bureau of Standards is described. Charts are given of 90 negative emulsions made in the United States. These charts show the characteristic curves, the rate of development curve, the growth of fog with contrast, the color sensitiveness, the filter factors, the speed, the resolving power, and scale of the various plates and films. (May 5, 1922.) 120 pp. Price, 35 cents.

S440. The Spectral Transmissive Properties of Dyes: I. Seven Permitted Food Dyes, in the Visible, Ultra-Violet, and Near Infra-Red . . . . .

*K. S. Gibson, H. J. McNicholas, E. P. T. Tyndall, M. K. Frehajer, and W. E. Mathewson*

In this paper is presented the outline of an investigation of the spectral transmissive properties of dyes. The plans and purposes of this investigation are discussed, the methods and apparatus used to obtain the data described, and a tentative nomenclature presented. Four methods are used in the experimental work: (1) the visual method, using the König-Martens spectrophotometer; (2) the photographic method, with the Hilger sector photometer; (3) the photoelectric null method; and (4) the thermoelectric method. The total range of measurement is from 240 to 1360 millimicrons.

As a beginning, and to illustrate the methods of obtaining and presenting the data, the transmittances of seven permitted food dyes have been obtained in the visible, ultra-violet, and near infra-red spectral regions, at different concentrations, thicknesses, and temperatures. Discussion of the analytical and theoretical applications of the data is postponed until more data are available. (May 15, 1922.) 64 pp.

S441. Notes on Standard Wave Lengths, Spectrographs, and Spectrum Tubes . . . . .

. . . . . *W. F. Meggers and Kevin Burns*

I. Standard wave lengths in the cadmium spectrum are presented in the range 2980 to 5085Å. The values for 13 lines are given relative to the primary standard and are thought to be correct to one part in several millions.

II. A quartz rock salt spectrograph designed for the purpose of photographing interference phenomena in the ultra-violet is described.

III. The characteristics and performance of a stigmatic concave grating mounting are outlined, and detailed drawings of the apparatus are reproduced.

IV. Instructions and suggestions are given for the preparation of spectrum tubes commonly required for optical demonstration, testing, or research. (May 24, 1922.) 15 pp.

S442. Wave-Length Measurements in the Arc Spectra of  
Neodymium and Samarium . . . . . *C. C. Kiess*

This paper contains about 3000 wave lengths measured in the arc spectra of neodymium and samarium between 5475 Å in the green and 9200 Å in the infra-red. A supplementary list contains about 125 lines common to the spectra of both elements. They may be characteristic of the element coming between neodymium and samarium, but not yet isolated. A large concave grating spectograph was used for the work, the photographic plates being suitably sensitized for the regions investigated. The materials used were neodymium oxalate and samarium oxide prepared at the University of Illinois, and samarium oxalate prepared at New Hampshire College. (June 1, 1922.) 19 pp.

TECHNOLOGIC PAPERS

T208. Weighing by Substitution. . . *C. A. Briggs and E. D. Gordon*

This paper describes a plan for making accurate substitution weighings, applicable either to equal arm balances or compound lever scales, that has been developed in connection with the standardization of large weights at the Bureau of Standards. It has been prepared to meet a demand for an explanation of substitution weighing which has come from practical scale men in the field who have seen the plan used by the representatives of the bureau and who desire to adopt it. The description, however, will also be of interest and value to many workers in engineering and other laboratories who have occasion to weigh large objects accurately. A record form and computation sheet is presented which it will be found advantageous to follow. (Feb. 21, 1922.) 16 pp. Price, 5 cents.

T209. Thermal Stresses in Chilled Iron Car Wheels. . . . .  
. . . . . *G. K. Burgess and R. W. Woodward*

A method is described for testing car wheels in the laboratory under conditions approximating the application of brakes on long grades and for measuring the stresses developed in the wheels due to the heating of the tread while the hub is cool. Twenty-eight wheels were tested in this manner, of which sixteen failed by cracking in the plate. The maximum stresses measured were approximately equal to the tensile strength of the iron, or about 26 000 pounds per square inch. (Mar. 18, 1922.) 34 pp. Price, 5 cents.

T210. The Redwood Viscometer. . . . . *Winslow H. Herschel*

The Redwood viscometer is the standard instrument in England for determining the viscosity of lubricating oils. By methods of calibration explained in previous papers (T100, T112, T125) the equation was obtained

$$\text{kinematic viscosity} = .00260 t - \frac{1.88}{t}$$

where  $t$  is the time of flow in seconds. This equation makes it possible to calculate tables for converting Redwood readings into readings of any other instrument for which a similar equation has been determined. (Apr. 10, 1922.) 20 pp. Price, 10 cents.

T211. Radiators for Aircraft Engines.....  
 .....*S. R. Parsons and D. R. Harper, 3d*

The characteristics which determine the value of the radiator in discharging its functions are considered in detail. Measurements of air flow through the core, of head resistance, of cooling power, and of geometrical characteristics are described and an exposition given of the relations between these and the conditions under which a radiator operates and its characteristics of form and construction. The work was based on special laboratory investigations, including laboratory tests of over one hundred types of radiator core. A detailed record of the performance of these cores is included in the paper. (May 25, 1922.) 184 pp. Price, 50 cents.

T212. Carbon Monoxide in the Products of Combustion  
 from Natural Gas Burners.....  
 .....*I. V. Brumbaugh and G. W. Jones*

Carbon monoxide is liberated with the products of combustion from natural gas burners in quantities that are dangerous to health if the flame is insufficiently aerated and the room is poorly ventilated. The quantities depend upon: (1) Distance of the utensil above the burner; (2) height of blue inner cone of flame; (3) type of burner; (4) flame characteristic (ratio of volume of primary air injected into burner relative to volume of gas consumed); (5) rate of consumption of gas per hour. No carbon monoxide was found where the distance of the utensil from the burner was such that the blue inner cone of the flame did not touch the utensil. Ventilation is especially important where gas is consumed. A natural gas flame will smother out if the oxygen of the atmosphere has been reduced to about 15.5 per cent. (May 1, 1922.) 20 pp. Price, 10 cents.

T213. Power Losses in Automobile Tires.....  
 .....*W. L. Holt and P. L. Wormeley*

Paper describes the dynamometer equipment used to measure the power loss or energy dissipated into heat in automobile tires operated under different conditions of axle load, inflation, pressure, speed, temperature, and tractive effort. The influence of these factors on power losses is shown graphically. (May 5, 1922.) 11 pp. Price, 5 cents.

T214. Durability of Cement Drain Tile and Concrete  
 in Alkali Soils: Third Progress Report (1919-  
 20).....*G. M. Williams*

This paper reports the results of inspection in 1919 and 1920 of experimental drain tile and concrete block installations at 8 alkali-bearing projects in the west. The investigation has been carried on since 1913, and the conclusions to date are that the best quality of concrete will disintegrate when exposed to severe alkali attacks and that installations of concrete in soils containing more than 0.1 per cent of salts of the sulphate type should be preceded by an examination of surrounding conditions. (May 19, 1922.) 32 pp. Price, 10 cents.

## C120. Construction and Operation of a Simple Home-Made Radio Receiving Outfit.

The construction of a very simple radio receiving equipment for radio communication on wave lengths between 600 and 200 meters from high-power stations within 50 miles is described. This set may be easily constructed by anyone from materials which can be easily secured. The total cost of this equipment need not exceed \$10. A single circuit, with a crystal detector and an inductor variable by steps, are used. Instructions are given for the construction of the crystal detector, inductor, necessary switches, antenna, and other parts. Certain parts, such as the telephone receivers, must be purchased. Directions for operation are also given.

### MISCELLANEOUS PUBLICATIONS

## M49. Graphic Comparison of Screw Thread Pitches.

A graphic chart is given showing the number of threads per inch and pitch in millimeters for both inch and millimeter systems. A simple method permits finding the nearest equivalent of one system in terms of the other. A table is printed with the chart from which values may be given more closely than can be shown in the chart and for those who prefer to use a tabulated statement. 1 p. Price, 5 cents.

### 9. SUBJECT INDEX TO NEW PUBLICATIONS

The consolidated index in Circular 24 is designed to include citations to titles, cross references, and subsidiary topics of all printed publications of the bureau listed in that circular. The following index supplements the index in Circular 24 by giving the additional index references to cover new publications announced in this supplement. The circular and supplement and the two indexes contained therein cover all bureau publications up to the date the supplement goes to print.

- |   |  |
|---|--|
| Action of alkali on concrete, T214.             | Characteristics of American plates and films, S430.  |
| Air flow in radiators, T211.                    | Coil antenna, S431.                                  |
| Aircraft engine radiators, T211.                | Coils, high-frequency resistance, S430.              |
| Aircraft radiators, T211.                       | Coils, horizontal, field radiation of, S431.         |
| Airplane landing signals, radio, S431.          | Coils, use at high frequencies, S430.                |
| Alkali soils, cement tile durability, T214.     | Color sensitiveness, S439.                           |
| Alkali soils, concrete durability, T214.        | Comparison, graphic, of screw thread pitches, M49.   |
| Antenna, coil, S431.                            | Concrete block tests, T214.                          |
| Antennas coil, transmission from, S431.         | Concrete durability in alkali soils, T214.           |
| Arc spectra of samarium, S442.                  | Construction of simple radio receiving outfit, C120. |
| Arc spectra of neodymium, S442.                 | Contrast, photographic, S439.                        |
| Alpha alloys of nickel, etching reagents, S435. | Cooling power of aircraft radiators, T211.           |
| Automobile tire loss, T213.                     | Copper alloys, etching reagents, S435.               |
| Brasses, etching characteristics, S435.         | Crystal radio outfit, C120.                          |
| Bronzes, etching characteristics, S435.         | Density, photographic, S439.                         |
| Cadmium spectrum wave lengths, S441.            | Dextrose, solubility in water, S437.                 |
| Capacity of inductance coils, S430.             | Disintegration of concrete by alkali, T214.          |
| Carbon monoxide from natural gas burners, T212. | Distributed capacity of inductance coils, S430.      |
| Car wheels, iron, thermal stresses in, T209.    | Drain tile tests, T214.                              |
| Carbonating apparatus, S432.                    | Drop tests of car wheels, T209.                      |
| Cells, electromotive force of, S434.            | Durability of cement tile in alkali soils, T214.     |
| Cement tile durability in alkali soils, T214.   | Durability of concrete in alkali soils, T214.        |



- Dynamometer for tire tests, T213.  
 Dyes, spectral transmittancy of, S440.  
 Electromotive force, cells, S434.  
     at low temperatures, S434.  
 Emulsions, photographic, sensitometry of, S439.  
 Energy distribution measurements of star spectra, S438.  
 Engines, aircraft, radiators for, T211.  
 Equilibria of dextrose in water, S437.  
 Etching, metallographic, reagents, S435.  
 Expansion, thermal, of steels, S433.  
 Exposure, relation to photographic density, S439.  
 Factors of power loss in automobile tires, T213.  
 Failure of car wheels, T209.  
 Field radiated from horizontal coils, S431.  
 Films, American, characteristics of, S439.  
 Filter factors, optical S439.  
 Food dyes, S440.  
 Force, electromotive, at low temperatures, S434.  
 Gage blocks, testing and standardizing of, S436.  
 Gas burners, carbon monoxide, T212.  
 Graphic comparison of screw thread pitches, M49.  
 Grating, stigmatic concave mounting, S441.  
 Ground, capacity of inductance coils to, S430.  
 Grounding, effect on capacity of inductance coils, S430.  
 Head resistance of radiators, T211.  
 Heat dissipated by automobile tires, T213.  
 High-frequency resistance, inductance coils, S430.  
 Horizontal coils, field radiation of, S431.  
 Inductance coils, distributed capacity, S430.  
     high-frequency resistance, S430.  
     natural wave length, S430.  
 Inductance, effect of frequency, S430.  
 Inductance, effective, iron wires, S430.  
 Inductor, variable, for radio set, C120.  
 Influence of frequency upon self-inductance of coils, S430.  
 Interference methods for standardizing gage blocks, S436.  
     testing gage blocks, S436.  
     phenomena photography, S441.  
 Iron car wheels, thermal stresses in, T209.  
     cast, thermal expansion of, S433.  
     electrolytic, thermal expansion of, S433.  
 Light waves in standardizing gages, S436.  
 Losses, power, in automobile tires, T213.  
 Measurements, wave length, in neodymium spectra, S442.  
     energy distribution in star spectra, S438.  
     wave length, samarium spectra, S442.  
 Metallographic etching reagents, S435.  
 Method for preparing raffinose, S432.  
     interference, for standardizing gage blocks, S436.  
     for testing gage blocks, S436.  
 Metric screw threads, M49.  
 Natural gas burners, carbon monoxide, T212.  
 Natural wave length of inductance coils, S430.  
 Neodymium arc spectra wave-length measurements, S442.  
 Nickel, etching reagents, S435.  
 Operation of simple radio receiving outfit, C120.  
 Parallelism of gage blocks, S436.  
 Photographic emulsions, sensitometry of, S439.  
     filter factors, S439.  
     Photography of interference phenomena, S441.  
     Pitches, screw thread, graphic comparison of, M49.  
     Planeness of gages, S436.  
     Plates, American, characteristics of, S439.  
     Power losses in automobile tires, T213.  
     Preparation of spectrum tubes, S441.  
     Preparation of raffinose, S432.  
     Properties of steels and irons, S433.  
         spectral transmissive, of dyes, S440.  
     Quartz rock salt spectrograph, S441.  
     Radiation from horizontal coil antennas, S431.  
         of stars, S438.  
     Radiator core, investigations, T211.  
     Radiators for aircraft engines, T211.  
     Radio receiving outfit, simple, construction of, C120.  
     Radiometry, stellar, S438.  
     Raffinose, preparation of, S432.  
     Reagents, metallographic etching, S435.  
     Rock salt, quartz, spectrograph, S441.  
     Redwood viscometer, T210.  
     Resistance, effective, skin effect, S430.  
         high-frequency, inductance coils, S430.  
         inductance coils, S430.  
     Samarium arc spectra wave lengths, S442.  
     Screw thread pitches, graphic comparison of, M49.  
     Sensitometry of photographic emulsions, S439.  
     Simple radio receiving outfit, C120.  
     Skin effect, electrical resistance, S430.  
         inductance coils, S430.  
     Solubility of dextrose in water, S437.  
     Spectra, star, measurements of energy distribution, S438.  
     Spectral energy distribution of a star, S438.  
     Spectral transmittancy of dyes, S440.  
     Spectrograph, quartz rock salt, S441.  
     Spectrophotometry, S440.  
     Spectroscopic notes, S441.  
     Spectrum tubes, preparation of, S441.  
     Speed of photographic plates, S439.  
     Standard wave lengths, S441.  
     Standardizing gages, S436.  
     Star spectra energy distribution, S438.  
     Steels, thermal expansion of, S433.  
     Stellar radiometry, S438.  
     Stresses, thermal, in car wheels, T209.  
     Substitution weighing, T208.  
     Systems of screw threads, M49.  
     Temperature of stars, S438.  
     Tests of stellar radiometers, S438.  
     Thermal expansion of steels, S433.  
     Thermal stresses in chilled iron car wheels, T209.  
     Tire, automobile, loss, T213.  
     Transmissive, spectral, properties of dyes, S440.  
     Transmittancy, spectral, of dyes, S440.  
     Tubes, spectrum, S441.  
     Viscometer, Redwood, T210.  
     Viscosimeter, conversion tables, T210.  
     Water, solubility of dextrose in, S437.  
     Wave length measurements in neodymium arc spectra, S442.  
     Wave lengths measurements in samarium arc spectra, S442.  
         standard, in cadmium spectrum, S441.  
     Weighing by substitution, T208.  
     Wires, properties at high frequencies, S430.





