DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
George K. Burgess, Director

SUPPLEMENTARY LIST OF PUBLICATIONS OF THE BUREAU OF STANDARDS

JULY 1, 1925, TO JUNE 30, 1927

DEPARTMENT OF COMMERCE
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George K. Burgess, Director

SUPPLEMENTARY LIST OF PUBLICATIONS OF THE BUREAU OF STANDARDS

(JULY 1, 1925, TO JUNE 30, 1927)

For all previous papers see Circular No. 24, 7th ed., June 30, 1925

Issued December 13, 1927

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SUPPLEMENTARY LIST OF PUBLICATIONS OF THE BUREAU OF STANDARDS[1]

July 1, 1925, to June 30, 1927

For all previous papers see Circular No. 24, 7th ed., June 30, 1925

This supplementary list is issued annually to supplement the information given in Circular of the Bureau of Standards No. 24 (7th ed., June 30, 1925): Publications of the Bureau of Standards. This supplement will bring up to date the information listed below under "Contents."

CONTENTS

I. DESIGNATIONS OF PUBLICATION SERIES

Eight series are issued: S, Scientific Papers; T, Technologic Papers; C, Circulars; H, Handbooks; R, Simplified Practice Recommendations; L, Limitation of Variety Recommendations; BH, Building and Housing; and M, Miscellaneous Publications. The separate papers in each series are numbered consecutively. An initial letter preceding each number shows the particular series; S for Scientific Papers, T for Technologic Papers, etc.—thus T203 is "Technologic Paper No. 203." In referring to publications the series *initial* and the *number* are *both* needed to give complete identification. For information regarding the Technical News Bulletin see page 4.

[1] Compiled by George L. Jeffrey, assistant editor.

UNITED STATES GOVERNMENT MASTER SPECIFICATIONS

Bureau of Standards Circular No. 319 is an alphabetical and numerical list of all specifications promulgated by the Federal Specifications Board, together with instructions for obtaining same. Copies of Circular No. 319 will be mailed free to those interested. Address requests to Bureau of Standards, Washington, D. C.

II. ANNOUNCEMENT OF NEW PUBLICATIONS

A mailing list is maintained to which is sent at regular intervals a card giving titles and prices of new publications issued. Names will be added to this announcement list on request. Notice should be given promptly by those on this list of any change of address, giving the exact form of the old as well as the new address.

One of the objects of this supplement is to list new publications issued after the latest edition of Circular No. 24, Publications of the Bureau of Standards. Such new publications will be listed in the succeeding editions of this supplementary list.

III. PUBLICATIONS NOT AVAILABLE

The publications listed below are not available for distribution by the Bureau of Standards nor for sale by the Superintendent of Documents. They may be consulted at some of the designated depository libraries listed on pages 8 to 14.

Scientific Papers.—S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12, S13, S14, S15, S16, S17, S19, S20, S21, S22, S24, S25, S27, S28, S29, S30, S32, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S43, S44, S45, S46, S47, S49, S51, S52, S53, S54, S55, S56, S57, S58, S59, S60, S61, S62, S63, S67, S68, S69, S70, S71, S72, S74, S75, S77, S79, S81, S82, S86, S87, S89, S90, S92, S93, S94, S95, S96, S97, S99, S100, S101, S102, S103, S104, S105, S108, S111, S112, S113, S114, S115, S117, S118, S119, S120, S121, S122, S123, S125, S126, S128, S129, S130, S131, S132, S133, S138, S139, S140, S142, S143, S146, S147, S148, S149, S150, S151, S154, S155, S157, S159, S162, S165, S166, S167, S168, S170, S172, S173, S174, S175, S178, S179, S180, S181, S182, S186, S187, S188, S189, S190, S193, S194, S197, S199, S200, S201, S202, S203, S210, S212, S213, S215, S216, S219, S223, S224, S226, S230, S231, S232, S233, S236, S239, S241, S242, S243, S244, S247, S249, S250, S255, S256, S257, S258, S260, S262, S263, S264, S265, S266, S269, S272, S274, S275, S277, S279, S284, S285, S288, S290, S291, S297, S300, S301, S304, S305, S306, S307, S308, S317, S321, S322, S326, S336, S340, S341, S351, S358, S375, S397, S420, S443, S464.

Technologic Papers.—T1, T2, T3, T4, T5, T7, T8, T9, T10, T11, T12, T13, T14, T17, T19, T21, T22, T23, T24, T26, T27, T28, T29, T30, T31, T32, T33, T34, T35, T37, T39, T40, T41, T43, T44, T45, T46, T48, T50, T51, T52, T54, T55, T57, T58, T59, T60, T61, T64, T65, T66, T67, T68, T69, T71, T72, T73, T74, T75, T77, T78, T80, T82, T87, T88, T89, T90, T94, T96, T100, T101, T103, T105, T106, T109, T113, T122, T123, T133, T136, T139, T152, T153, T158, T164, T177, T186, T192, T198, T200.

Circulars.—C2, C4, C5, C7, C9, C11, C12, C14, C15, C21, C22, C23, C28, C29, C34, C36, C37, C39, C41, C45, C49, C50, C54, C57, C59, C72, C202.

Handbooks.—H1, H4.

Building and Housing.—BH8.

Miscellaneous Publications.—M1, M9, M11, M16, M18, M22, M25, M29, M30, M31, M34, M54, M73.

IV. ORDERING

Any of the publications in Circular No. 24 and this supplementary list, with the exception of those listed under "Publications not available," may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at the price indicated. **Purchase orders with remittance should be sent to the Superintendent of Documents.** (Do not send any such orders or remittances to the Bureau of Standards.)

Order by serial initial letter and number combined (for example, "Bureau of Standards publication T281"). If initial and number 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 destinations within a week or two.

For the convenience of the general public, coupons (good until used in exchange for Government publications sold by the Superintendent of Documents) may be purchased from his office in sets of 20 for $1.

Terms and Mailing.—(*a*) *Domestic.*—Remittance should be made by coupons, postal money order, express order, or New York draft payable to the "Superintendent of Documents, Government Printing Office, Washington, D. C." Currency may be sent at sender's risk. Postage stamps, defaced or smooth coins, or foreign money positively will not be accepted. Publications are forwarded under Government frank to addresses in the United States and its possessions; also to Mexico and Canada.

(*b*) *Foreign.*—With the exception of Mexico and Canada, include in your remittance, in addition to the price of the publication, about one-third of the price quoted to cover postage. Publications intended for Mexico and Canada will be sent under Government frank. If the amount remitted is in excess of the postage required, the balance will be refunded to you, and if additional postage is required you will be notified.

Kindly make remittance by international money order or New York draft, payable to the "Superintendent of Documents, Government Printing Office, Washington, D. C., U. S. A."

V. BOUND VOLUMES

In addition to the separate papers, both the Scientific and Technologic series are also issued in volumes of about 750 pages each, bound in cloth, consecutively paged, including title page and index. Subscription for either series may be placed in advance with the Superintendent of Documents to receive the bound volume as issued at $2 per volume. See price list on page 4.

The Scientific Papers may be obtained in bound form from volume 1 to 20. (Previous to volume 15 they were called "Reprints" and in the bound form were known as the "Bulletin.")

The Technologic Papers in the bound form begin with volume 16, Technologic Paper No. 203, and in bound form may be obtained up to volume 19. Previous to this they had only been issued as separates.

Price list and subscription basis

	Per volume
(*a*) Bulletins of the Bureau of Standards, vols. 1–14, inclusive; 1904–1914 (cloth)	$2. 00
(*b*) Series (*a*) continued—Scientific Papers of the Bureau of Standards, vols. 15–20 (cloth)	2. 00
(*c*) Unbound separates, reprints of (*b*), sent as issued	1. 25
(*d*) Technologic Papers of the Bureau of Standards, vols. 16–19 (cloth)	2. 00
(*e*) Unbound separates of Technologic Papers sent as issued	1. 25

VI. TECHNICAL NEWS BULLETIN

The "Technical News Bulletin" is a monthly publication designed to keep the public informed of the progress of work in the Bureau of Standards. New publications of the bureau issued during the month are listed in this bulletin.

The subscription price is 25 cents per year (United States, Mexico, and Canada); 40 cents per year (foreign). Mail your subscription with remittance to the Superintendent of Documents, Government Printing Office, Washington, D. C.

VII. DATA CONCERNING LATEST EDITIONS OF CIRCULARS

[Those marked (*) are out of print and no longer available]

Circular No.	Edition	Date	No. of pages	Price (cents)	Circular No.	Edition	Date	No. of pages	Price (cents)
1	2	Oct. 29, 1925	113	50	*21	1	Mar. 1, 1910	30	------
*2	5	Apr. 30, 1915	21	------	*22	2	May 15, 1911	12	------
3	3	Dec. 23, 1918	89	15	*23	1	July 15, 1910	93	------
*4	2	Jan. 3, 1905	2	------	24[2]	7	June 30, 1925	271	25
*5	3	July 16, 1917	19	5	24 (supt.)[2]	------	June 30, 1927	------	------
6	7	Dec. 30, 1916	30	5	25	8	June 26, 1923	14	5
*7	5	Oct. 1, 1913	19	------	25 (supt.)[2]	------	July 1, 1926	------	------
8	4	Oct. 14, 1926	18	10	26	4	Apr. 5, 1921	20	5
*9	8	Mar. 31, 1916	32	------	27	2	Aug. 9, 1918	41	10
10	4	Jan. 22, 1924	18	5	*28	1	Mar. 1, 1911	19	------
*11	3	June 23, 1917	18	------	*29	1	Dec. 21, 1910	13	------
*12[1]	1	July 16, 1906	7	------	30	2	July 6, 1920	25	5
13	10	Feb. 7, 1923	16	5	31	3	Oct. 1, 1914	76	20
*14	5	Mar. 20, 1916	17	------	32	4	Dec. 7, 1920	140	20
*15	3	July 1, 1911	7	------	33	4	Apr. 25, 1927	18	10
16	5	July 13, 1922	16	5	*34	3	May 15, 1915	16	------
17	4	Nov. 4, 1926	24	15	35	4	Dec. 1, 1919	2	5
18	2	July 1, 1911	4	5	*36	1	June 30, 1912	26	------
19	6	Oct. 31, 1924	72	15	*37	2	Jan. 1, 1915	13	------
20	2	May 28, 1915	57	15	38	4	Sept. 28, 1921	127	20

[1] Superseded by C44.
[2] Available free on application to Bureau of Standards.

VII. DATA CONCERNING LATEST EDITIONS OF CIRCULARS—Continued

Circular No.	Edition	Date	No. of pages	Price (cents)
*39	1	Dec. 16, 1912	14	------
40	3	Sept. 10, 1920	13	5
*41	3	Sept. 20, 1918	15	5
42	2	Aug. 29, 1921	11	5
43	2	Jan. 24, 1921	46	10
44	2	Jan. 30, 1918	196	25
*45	1	Nov. 1, 1913	89	------
46	3	Dec. 26, 1922	22	10
47	1	July 1, 1914	68	15
47 (supt.) [3]	1	Oct. 27, 1917	10	5
48	2	June 10, 1916	202	40
*49	2	May 4, 1915	50	------
*50	2	June 8, 1917	34	------
51	1	Dec. 1, 1914	39	15
52	2	June 28, 1916	44	10
53	1	Mar. 29, 1915	35	10
*54 [4]	2	Nov. 15, 1916	323	------
55	1	Aug. 28, 1915	149	45
56	2	Sept. 26, 1923	344	60
*57 [5]	2	May 11, 1916	64	------
58	2	June 22, 1923	93	30
*59	1	Apr. 5, 1916	13	------
60	2	Mar. 12, 1920	68	15
61	2	Aug. 31, 1920	44	10
62	3	Jan. 24, 1923	24	5
63	1	May 17, 1917	8	5
64	1	Apr. 20, 1917	6	5
65	1	July 23, 1917	19	5
66	1	July 25, 1917	13	5
67	1	Jan. 17, 1918	5	5
68	1	Oct. 6, 1917	8	5
69	1	Nov. 17, 1917	85	15
70	1	Dec. 5, 1917	259	25
71	1	Sept. 18, 1917	8	5
*72	1	June 17, 1918	84	20
73	2	Nov. 14, 1922	108	20
74	2	Mar. 10, 1924	345	60
75	1	Jan. 10, 1918	127	15
76	1	Apr. 21, 1919	120	20
77	1	Mar. 10, 1919	67	10
78	2	Mar. 20, 1923	14	5
79	2	Jan. 19, 1923	62	15
80	2	Sept. 2, 1922	34	20
81	2	Dec. 21, 1922	32	10
82	3	Apr. 26, 1927	8	5
83	1	Jan. 31, 1920	35	5
84	2	July 3, 1922	8	5
85	2	----do----	9	5
86	3	Oct. 11, 1926	10	5
87	2	July 3, 1922	8	5
88	2	----do----	8	5
89	3	Apr. 25, 1927	11	5
90	2	May 23, 1922	8	5
91	2	June 21, 1922	8	5
92	1	June 7, 1920	94	30
93	3	Apr. 29, 1927	10	5
94	3	Apr. 29, 1927	9	5
95	2	Mar. 5, 1925	32	10
96	1	June 15, 1920	5	5
97	3	July 3, 1922	10	5
98	2	Feb. 28, 1923	10	5
99	1	Nov. 12, 1920	44	10
100	2	May 9, 1924	162	40
101	2	Apr. 23, 1924	204	40
102	2	Sept. 22, 1922	5	5
103	4	Oct. 5, 1926	6	5
104	2	Jan. 30, 1923	7	5
105	2	Sept. 18, 1922	4	5
106	1	Nov. 24, 1920	15	5
107	1	Feb. 12, 1921	37	10
108	1	Jan. 3, 1921	21	5
109	1	----do----	9	5
110	1	Feb. 28, 1921	8	5
111	2	June 24, 1922	8	5
112	1	June 24, 1921	214	65
113	2	July 7, 1922	104	25
114	2	Apr. 17, 1925	10	5
115	2	Mar. 30, 1925	13	5
116	1	Aug. 17, 1921	5	5
117	2	July 3, 1922	6	5
118	1	Dec. 8, 1921	7	5
119	1	Feb. 6, 1922	3	5
120	1	Apr. 24, 1922	16	5
121	1	July 17, 1922	14	5
122	2	Sept. 12, 1923	16	5
123	2	Feb. 1, 1924	5	5
124	1	July 27, 1922	4	5
125	1	----do----	3	5
126	1	----do----	5	5
127	1	----do----	4	5
128	2	Feb. 1, 1924	5	5
129	1	July 27, 1922	4	5
130	2	Nov. 23, 1926	6	5
131	1	July 27, 1922	5	5
132	2	Feb. 1, 1924	4	5
133	1	Nov. 10, 1922	21	10
134	2	June 30, 1924	6	5
135	1	Oct. 16, 1922	14	5
136	2	Jan. 12, 1924	4	5
137	1	Feb. 23, 1923	19	10
138	1	Mar. 21, 1923	33	10
139	1	June 15, 1923	9	5
140	1	Mar. 26, 1923	6	5
141	1	Mar. 24, 1923	18	10
142	1	Apr. 16, 1923	48	15
143	1	June 25, 1923	5	5
144	1	July 6, 1923	7	5
145	1	Jan. 28, 1924	72	15
146	1	Sept. 25, 1923	6	5
147	1	Sept. 19, 1923	8	5
148	1	Oct. 10, 1923	9	5
149	1	Feb. 1, 1924	5	5
150	1	Dec. 28, 1923	6	5
151	1	Jan. 9, 1924	66	15
152	1	Dec. 8, 1923	7	5
153	1	Dec. 27, 1923	7	5
154	1	May 29, 1924	175	30
154 (supt.) [6]	1	Oct. 8, 1925	4	5
155	1	Apr. 8, 1924	11	5
156	1	Mar. 1, 1924	4	5
157	1	Apr. 8, 1924	10	5
158	1	Mar. 25, 1924	3	5
159	1	Apr. 8, 1924	10	5
160	1	----do----	9	5
161	1	Mar. 1, 1924	5	5
162	1	Apr. 8, 1924	7	5
163	1	Feb. 20, 1924	11	5
164	1	June 4, 1924	12	5
165	2	Apr. 29, 1927	12	5
166	1	Sept. 18, 1924	5	5
167	1	July 12, 1924	5	5
168	1	July 7, 1924	10	5

[3] This is a supplement to Circular 47, giving additional information.
[4] Superseded by H3 and H4.
[5] Superseded by C154 and supplement thereto.
[6] Abridged volume correction table for petroleum oils.

VII. DATA CONCERNING LATEST EDITIONS OF CIRCULARS—Continued

Circular No.	Edition	Date	No. of pages	Price (cents)
169	1	Aug. 12, 1924	37	10
170	1	July 8, 1924	3	5
171	1	ditto	3	5
172	1	ditto	3	5
173	1	ditto	3	5
174	1	ditto	4	5
175	1	ditto	3	5
176	1	ditto	3	5
177	1	ditto	3	5
178	1	ditto	3	5
179	1	ditto	3	5
180	1	ditto	3	5
181	1	ditto	3	5
182	1	July 23, 1924	4	5
183	1	Aug. 2, 1924	4	5
184	1	Aug. 2, 1924	2	5
185	1	ditto	3	5
186	1	July 25, 1924	4	5
187	1	Aug. 2, 1924	3	5
188	1	ditto	4	5
189	1	Aug. 19, 1924	5	5
190	1	Sept. 4, 1924	4	5
191	1	ditto	6	5
192	1	Oct. 9, 1924	5	5
193	1	Jan. 9, 1925	5	5
194	1	ditto	6	5
195	1	ditto	5	5
196	1	ditto	3	5
197	1	ditto	4	5
198	1	Feb. 3, 1925	8	5
199	1	Mar. 7, 1925	19	10
200	1	Feb. 7, 1925	4	5
201	1	Feb. 17, 1925	5	5
*202	1	Mar. 25, 1925	16	------
203	1	Mar. 6, 1925	4	5
204	1	Mar. 23, 1925	7	5
205	1	Mar. 7, 1925	5	5
206	1	Apr. 16, 1925	6	5
207	1	Apr. 1, 1925	6	5
208	1	May —, 1925	37	15
209	2	Oct. 7, 1926	4	5
210	1	May 2, 1925	3	5
211	1	Apr. 30, 1925	3	5
212	1	May 9, 1925	5	5
213	1	May 8, 1925	5	5
214	1	May 21, 1925	4	5
215	1	May 9, 1925	12	5
216	1	ditto	9	5
217	1	May 22, 1925	2	5
218	1	ditto	2	5
219	1	ditto	2	5
220	1	ditto	2	5
221	1	ditto	2	5
222	1	ditto	2	5
223	1	ditto	2	5
224	1	ditto	2	5
225	1	ditto	2	5
226	1	ditto	2	5
227	1	ditto	3	5
228	1	ditto	3	5
229	1	May 26, 1925	4	5
230	1	ditto	3	5
231	1	June 11, 1925	4	5
232	1	July 6, 1925	42	10
233	1	June 15, 1925	3	5
234	1	June 15, 1925	3	5
235	1	ditto	4	5
236	1	ditto	3	5
237	1	ditto	3	5
238	1	ditto	3	5
239	1	ditto	2	5
240	1	ditto	3	5
241	1	ditto	4	5
242	1	ditto	3	5
243	1	ditto	3	5
244	1	ditto	3	5
245	1	June 13, 1925	3	5
246	1	June 11, 1925	3	5
247	1	June 13, 1925	3	5
248	1	ditto	3	5
249	1	ditto	3	5
250	1	June 11, 1925	3	5
251	1	June 13, 1925	3	5
252	1	ditto	2	5
253	1	June 11, 1925	3	5
254	1	June 13, 1925	3	5
255	1	June 20, 1925	2	5
256	1	June 18, 1925	4	5
257	1	June 26, 1925	3	5
258	2	Oct. 5, 1926	3	5
259	1	June 26, 1925	5	5
260	1	ditto	3	5
261	1	ditto	3	5
262	1	ditto	3	5
263	1	ditto	3	5
264	1	June 20, 1925	3	5
265	2	Nov. 20, 1926	4	5
266	1	June 26, 1925	5	5
267	1	June 20, 1925	3	5
268	1	July 7, 1925	3	5
269	1	ditto	4	5
270	1	June 26, 1925	5	5
271	1	July 18, 1925	7	5
272	1	July 7, 1925	4	5
273	1	ditto	4	5
274	1	ditto	4	5
275	1	Aug. 29, 1925	47	15
276	1	Aug. 5, 1925	28	20
277	1	July 7, 1925	4	5
278	1	ditto	4	5
279	1	Dec. 3, 1925	85	25
280	1	Oct. 29, 1925	9	5
281	1	Jan. 22, 1926	81	30
282	1	Feb. 20, 1926	50	25
283	1	Mar. 2, 1926	52	20
284	1	Nov. 18, 1925	3	5
285	1	Nov. 7, 1925	6	5
286	1	Nov. 17, 1925	4	5
287	1	ditto	5	5
288	2	Dec. 21, 1926	4	5
289	1	Nov. 18, 1925	3	5
290	1	ditto	3	5
291	1	ditto	4	5
292	1	ditto	4	5
293	1	Dec. 1, 1925	8	5
294	1	Nov. 17, 1925	5	5
295	1	Jan. 16, 1926	3	5
296	1	Nov. 18, 1925	20	10
297	2	Oct. 20, 1926	5	5
298	2	ditto	6	5
299	2	ditto	7	5

VII. DATA CONCERNING LATEST EDITIONS OF CIRCULARS—Continued

Circular No.	Edition	Date	No. of pages	Price (cents)	Circular No.	Edition	Date	No. of pages	Price (cents)
300	1	Feb. 25, 1926	9	5	320	1	Jan. 11, 1927	5	5
301	1	Feb. 5, 1926	4	5	321	1	Feb. 1, 1927	9	5
302	1	Feb. 9, 1926	6	5	322	1	do	4	5
303	1	do	7	5	323	1	Apr. 13, 1927	16	5
304	1	June 11, 1926	49	20	324	1	Feb. 19, 1927	7	5
305	1	Mar. 1, 1926	3	5	325	1	May 4, 1927	54	20
306	1	Apr. 1, 1926	3	5	326	1	Mar. 11, 1927	2	5
307	1	Apr. 19, 1926	3	5	327	1	Apr. 20, 1927	12	10
308	1	do	3	5	328	1	May 17, 1927	16	10
309	1	Dec. 8, 1926	109	40	329	1	May 13, 1927	15	10
310	1	Oct. 9, 1926	66	15	330	1	Apr. 28, 1927	8	5
311	1	Dec. 13, 1926	34	15	331	1	Apr. 29, 1927	11	5
312	1	Nov. 4, 1926	4	5	332	1	May 13, 1927	22	10
313	1	Nov. 11, 1926	3	5					
314	1	Nov. 23, 1926	5	5	334	1	June 8, 1927	3	5
					335	1	May 27, 1927	2	5
315	1	do	3	5	336	1	do	3	5
316	1	do	4	5					
317	1	do	5	5					
318	1	Dec. 12, 1926	4	5					
319[1]	1	Jan. 25, 1927	18	10					

[1] Available free on application to the Bureau of Standards.

VIII. GOVERNMENT DEPOSITORY REFERENCE LIBRARIES

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

In case the Superintendent of Documents or the Bureau of Standards receives a request for a publication which can no longer be supplied, the correspondent is referred to the nearest depository reference library at which this publication can be consulted.

The following libraries (arranged by States) maintain reference files of bureau publications. Except where marked "Complete," initial letters indicate the series which are available:

S, Scientific Papers.
T, Technologic Papers.
C, Circulars.
H, Handbooks.
A, Annual reports.
W, Reports of Weights and Measures Conferences.
M, Miscellaneous publications.

Location	Library	Publications received
ALABAMA		
Auburn	Alabama Polytechnic Institute	STCAWM.
Birmingham	Howard College	STHWM.
	Public	Complete.
Montgomery	State Capitol	Do.
Tuskegee Institute	Tuskegee Institute	STCH.
University	University of Alabama	Complete.
ALASKA		
Fairbanks	Alaska Agricultural College and School of Mines	Complete.
Juneau	Alaska Historical Library and Museum	SW.
ARIZONA		
Phoenix	Arizona State	A.
	Phoenix Public	STC.
Tucson	University of Arizona	Complete.
ARKANSAS		
Conway	Hendrix College	STCHWM.
Fayetteville	University of Arkansas	STCAWM.
Jonesboro	State Agricultural School	ST.
CALIFORNIA		
Berkeley	University of California	Complete.
Claremont	Pomona College	Do.
Eureka	Eureka Free	Do.
Fresno	Fresno County Free	Do.
Los Angeles	Los Angeles Public	Do.
Oakland	Oakland Free	Do.
Riverside	Riverside Public	Do.
Sacramento	California State	Do.
	City Free	Do.
San Diego	San Diego Public	Do.
San Francisco	Mechanics Mercantile	STCHM.
	San Francisco Public	Complete.
Stanford University	Leland Stanford, jr., University	Do.
Stockton	Stockton Free Public	STCHM.
COLORADO		
Boulder	University of Colorado	Complete.
Colorado Springs	Colorado College	Do.
Denver	Colorado State	Do.
	Public	Do.
	Regis College	SA.
	University of Denver	Complete.
Fort Collins	State Agricultural College	Do.
Pueblo	McClelland Public	TC.
CONNECTICUT		
Bridgeport	Bridgeport Public	Complete.
Hartford	Connecticut State	Do.
	Trinity College	STCAW.
Middletown	Wesleyan University	Complete.
New Haven	Yale University	Do.
Storrs	Connecticut Agricultural College	STCHWM.
Waterbury	Silas Bronson	STCH.
DELAWARE		
Dover	Delaware State	SA.
Newark	University of Delaware	STCA.
Wilmington	Wilmington Institute Free	Complete.
DISTRICT OF COLUMBIA		
Washington	Department of Agriculture	Complete.
	Department of Interior	Do.
	Department of Justice	HA.
	Navy Department	STCHW.
	Treasury Department	A.
FLORIDA		
De Land	John B. Stetson University	STA.
Gainesville	University of Florida	Complete.
Jacksonville	Jacksonville Public	STCHWM.
Winter Park	Rollins College	S.

Location	Library	Publications received
GEORGIA		
Athens	University of Georgia	Complete.
Atlanta	Carnegie	Do.
	Georgia State	W.
Savannah	Savannah Public	STC.
HAWAII		
Honolulu	University of Hawaii	Complete.
IDAHO		
Boise	Idaho State	STAM.
Moscow	University of Idaho	Complete.
Pocatello	Idaho Technical Institute	Do.
ILLINOIS		
Belleville	Belleville Public	STC.
Bloomington	Illinois Wesleyan University	Complete.
Chicago	Chicago Public	Do.
	John Crerar	Do.
	Newberry	H.
	St. Ignatius High School	STAM.
	University of Chicago	Complete.
Danville	Danville Public	S.
Evanston	Northwestern University	STCAWM.
Freeport	Freeport Public	STCHAW.
Galesburg	Free Public	Complete.
Jacksonville	Jacksonville Public	Do.
Lisle	St. Procopius College	ST.
McLeansboro	Mary E. C. McCoy Memorial	Complete.
Monmouth	Monmouth College	STA.
Normal	Illinois State Normal University	Complete.
Peoria	Peoria Public	Do.
Rockford	Public	STCHWM.
Springfield	Illinois State	Complete.
Urbana	University of Illinois	Do.
INDIANA		
Bloomington	Indiana University	Complete.
Crawfordsville	Wabash College	Do.
Fort Wayne	Public	Do.
Greencastle	Depauw University	Do.
Hanover	Hanover College	STC.
Indianapolis	Indiana State	Complete.
	Indianapolis Public	Do.
La Fayette	Purdue University	Do.
Merom	Union Christian College	STA.
Muncie	Public	STCHWM
Notre Dame	University	Complete.
Richmond	Morrison Reeves	STC.
Terre Haute	Indiana State Normal	Complete.
IOWA		
Ames	Iowa State College	Complete.
Council Bluffs	Free Public	STH.
Des Moines	Iowa State	STCHAW.
	Public	STCHAM.
Dubuque	Carnegie-Stout Free Public	T.
Fairfield	Fairfield Free Public	Complete.
Fayette	Upper Iowa University	STH.
Grinnell	Grinnell College	Complete.
Iowa City	State University of Iowa	Do.
Mount Pleasant	Iowa Wesleyan College	SCW.
Mount Vernon	Cornell College	STM.
Sioux City	Sioux City Public	Complete.
KANSAS		
Baldwin	Baker University	Complete.
Emporia	Kansas State Teachers College	STC.
Lawrence	University of Kansas	Complete.
Manhattan	Kansas State Agricultural College	Do.
Pittsburg	Pittsburg Public	Do.
Topeka	Kansas State	STCWM.
KENTUCKY		
Danville	Center College	Complete.
Glasgow	Glasgow Library Association	SH.
Henderson	Henderson Public	Complete.
Lexington	University of Kentucky	Do.
Louisville	Louisville Free Public	Do.
Murray	Murray State Normal School	CAW.
Somerset	Carnegie Public	ST.
Winchester	Kentucky Wesleyan College	STCHAM.

Location	Library	Publications received
LOUISIANA		
Baton Rouge	Louisiana State University	Complete.
Natchitoches	State Normal School	STA.
New Orleans	Howard Memorial	STWN.
	Louisiana State Museum	Complete.
	New Orleans Public	Do.
	Tulane University	Do.
Shreveport	Shreveport Memorial	Do.
MAINE		
Augusta	Maine State	STCHWM.
Brunswick	Bowdoin College	Complete.
Lewiston	Bates College	STCAM.
Orono	University of Maine	Complete.
Portland	Portland Public	Do.
Saco	Dyer	STCH.
Waterville	Colby College	STC.
MARYLAND		
Annapolis	Maryland State	A.
	United States Naval Academy	ST.
Baltimore	Baltimore City	Complete.
	Enoch Pratt Free	Do.
	Johns Hopkins University	Do.
	Peabody Institute	Do.
Chestertown	Washington College	STCW.
Westminster	Western Maryland College	ST.
MASSACHUSETTS		
Amherst	Amherst College	Complete.
	Massachusetts Agricultural College	Do.
Boston	Boston Public	Do.
	State Library of Massachusets	Do.
Cambridge	Harvard College	Do.
Lynn	Lynn Public	STCAWM.
New Bedford	Public	TCHA.
Salem	Essex Insitute	STA.
Tufts College	Tufts College	STCA.
Williamstown	Williams College	Complete.
Worcester	American Antiquarian Society	Do.
	Free Public	Do.
MICHIGAN		
Ann Arbor	University of Michigan	Complete.
Battle Creek	Public	W.
Detroit	Detroit College	T.
	Public	Complete.
East Lansing	Michigan State Agricultural College	Do.
Grand Rapids	Grand Rapids Public	Do.
Houghton	Michigan College of Mines	Do.
Kalamazoo	Public	Do.
Lansing	Michigan State	Do.
Muskegon	Hackley Public	STCAW.
Orchard Lake	Polish Seminary	STCHAM.
Port Huron	Public	Complete
Saginaw	Hoyt Public	Do.
MINNESOTA		
Duluth	Duluth Public	STC.
Fergus Falls	Carnegie Public	H.
Minneapolis	Public	Complete.
	University of Minnesota	Do.
St. Paul	Minnesota Historical Society	A.
	Minnesota State	Complete.
	St. Paul Public	Do.
MISSISSIPPI		
Agricultural College	Mississippi Agricultural and Mechanical College	Complete.
Greenville	Greenville Public	Do.
MISSOURI		
Cape Girardeau	State Teachers' College	Complete
Columbia	University of Missouri	Do.
Fulton	Westminster College	Do.
Jefferson City	Missouri State	ST.
Kansas City	Kansas City Public	Complete.
	Rockhurst College	STCHWM.
Liberty	William Jewell College	Complete.
Rolla	Missouri School of Mines	STCWM.
St. Joseph	St. Joseph Public	STCHW.

Location	Library	Publications received
MISSOURI—continued		
St. Louis	St. Louis Public	Complete.
	St. Louis University	Do.
	Washington University	Do.
Springfield	Drury College Library	STCHWM.
Warrensburg	Central Missouri State Teachers' College	SCHAW.
MONTANA		
Bozeman	Montana State College	Complete.
Butte	Montana State School of Mines	Do.
Helena	Helena Public	Do.
	Historical Society of Montana	Do.
Lewistown	Fergus County High School	STCAM.
Missoula	State University	Complete.
NEBRASKA		
Blair	Dana College	T.
Fremont	Midland College	STCWM.
Lincoln	Nebraska State University of Nebraska	Complete.
Omaha	Omaha Public	Do.
NEVADA		
Carson City	Nevada State	STAM.
Reno	University of Nevada	Complete.
NEW HAMPSHIRE		
Concord	New Hampshire State	STA.
Durham	New Hampshire State College	STCHAW.
Hanover	Dartmouth College	Complete.
Laconia	Laconia Public	STC.
Manchester	City	Complete.
NEW JERSEY		
Atlantic City	Free Public	STCHWM.
Bayonne	do	Do.
Camden	Camden Free Public	STC.
Elizabeth	Public	Complete.
Jersey City	Free Public	Do.
Newark	do	Do.
New Brunswick	do	Do.
	Rutgers College	Do.
Princeton	Princeton University	Do.
Trenton	Free Public	STCHAM.
	New Jersey State	Complete.
NEW MEXICO		
Albuquerque	University of New Mexico	Complete.
East Las Vegas	New Mexico Normal University	Do.
State College	New Mexico College of Agriculture and Mechanical Arts	Do.
NEW YORK		
Albany	New York State	Complete.
Brooklyn	Brooklyn Public	Do.
	Pratt Institute Free	Do.
Buffalo	Buffalo Public	Do.
	Grosvenor	Do.
Canton	St. Lawrence University	STCAWM.
Glens Falls	Crandall Free	ST.
Hamilton	Colgate University	Complete.
Ithaca	Cornell University	Do.
Keuka Park	Keuka College	S.
Newburgh	Newburgh Free	ST.
New York	College of the City of New York	Complete.
	Columbia University	Do.
	New York Public, Astor Branch	Do.
	New York Public, Lenox Branch	Do.
	New York University	Do.
	The New York World	A.
Poughkeepsie	Adriance Memorial	ST.
Rochester	Rochester University	Complete.
Schenectady	Union College	Do.
Syracuse	Syracuse University	Do.
Troy	Troy Public	Do.
Utica	Utica Public	STC.
NORTH CAROLINA		
Chapel Hill	University of North Carolina	Complete.
Durham	Trinity College	Do.

Location	Library	Publications received
NORTH CAROLINA—continued		
Newton	Catawba College	STC.
Raleigh	North Carolina State College of Agriculture and Engineering.	Complete.
	North Carolina State	Do.
Wake Forest	Wake Forest College	S.
Washington	Public Schools	Do.
NORTH DAKOTA		
Agricultural College	North Dakota Agricultural College	STCAW.
Bismarck	North Dakota State	TC.
University	State University of North Dakota	Complete.
Valley City	State Teachers' College	STCW.
OHIO		
Alliance	Mount Union College	Complete.
Athens	Ohio University	STA.
Chillicothe	Public	STH.
Cincinnati	do	Complete.
Cleveland	Western Reserve University	Do.
	Case	Do.
	Cleveland Public	Do.
Columbus	Columbus Public	Do.
	Ohio State	Do.
	Ohio State University	Do.
Dayton	Dayton Public	Do.
Delaware	Ohio Wesleyan University	STCHAW.
Gambier	Kenyon College	Complete.
Granville	Denison University	STAM.
Hiram	Hiram College	STCAWM.
Marietta	Marietta College	Complete.
Oberlin	Oberlin College	Do.
Oxford	Miami University	Do.
Sidney	Sidney Public	STCM.
Springfield	Warder Public	Complete.
Toledo	Toledo Public	Do.
Van Wert	Brumback	STCHM.
Youngstown	Reuben McMillan Free	Do.
OKLAHOMA		
Ada	East Central State Normal School	ST.
Alva	Northwestern State Teachers College	STHA.
Enid	Enid Carnegie	STCHM.
Miami	Miami Public	T.
Norman	University of Oklahoma	Complete.
Oklahoma City	Oklahoma State	STCAW.
Stillwater	Oklahoma Agricultural and Mechanical College	Complete.
Tahlequah	Northeastern State Teachers College	STCA.
OREGON		
Corvallis	Oregon Agricultural College	TCHAWM.
Eugene	University of Oregon	Complete.
Forest Grove	Pacific University	STCH.
Portland	Library Association of Portland	Complete.
	Reed College	Do.
Salem	Oregon State	Do.
PENNSYLVANIA		
Bethlehem	Lehigh University	STCHAW.
Bradford	Carnegie Public	STCA.
Erie	Erie Public	STCW.
Gettysburg	Gettysburg College	STC.
Harrisburg	Pennsylvania State	Complete.
Haverford	Haverford College	STCAWM.
Huntingdon	Juniata College	S.
Lancaster	Franklin and Marshall College	S.
Meadville	Allegheny College	ST.
Philadelphia	Free	Complete.
	Library Company of Philadelphia, Ridgway Branch	Do.
	Mercantile	S.
	Philadelphia Museum	STCHWM.
	University of Pennsylvania	Complete.
Pittsburgh	Carnegie Free of Allegheny	STCH.
	Carnegie	Complete.
	University of Pittsburgh	Do.
Scranton	Scranton Public	STHAM.
State College	Pennsylvania State College	Complete.
Swarthmore	Swarthmore College	Do.
Warren	Warren Library Association	STH.
Washington	Washington and Jefferson College	Complete.
Wilkes-Barre	Wyoming Historical and Geological Society	STCWM.
Williamsport	James V. Brown	ST.

Location	Library	Publications received
PHILIPPINE ISLANDS		
Manila	Philippine Library and Museum	Complete.
RHODE ISLAND		
Kingston	Rhode Island State College	Complete.
Providence	Brown University	Do.
	Providence Public	Do.
	Rhode Island State	Do.
Westerly	Westerly Public	H.
SOUTH CAROLINA		
Charleston	Charleston College	STH.
	Charleston Library Society	ST.
Clemson College	Clemson Agricultural College	Complete.
Clinton	Presbyterian College of South Carolina	Do.
Columbia	University of South Carolina	STCAWM.
Rockhill	Winthrop College	A.
SOUTH DAKOTA		
Brookings	South Dakota State College	Complete.
Huron	Huron College	S.
Mitchell	Dakota Wesleyan University	ST.
Pierre	South Dakota State	ST.
Sioux Falls	Carnegie Free Public	STCHA.
Vermilion	University of South Dakota	Complete.
Yankton	Yankton College	SAM.
TENNESSEE		
Chattanooga	Chattanooga Public	Complete.
Johnson City	Wayne Williams Public	Do.
Knoxville	University of Tennessee	Do.
McKenzie	Bethel College	C.
Memphis	Cossitt	Complete.
Murfreesboro	Middle Tennessee State Normal	STCAW.
Nashville	Carnegie Library	Complete.
	Vanderbilt University	Do.
TEXAS		
Austin	Texas State	Complete.
	University of Texas	Do.
Clarendon	Clarendon College	S.
College Station	Agricultural and Mechanical College	Complete.
Dallas	Dallas Public	STCAW.
El Paso	Public	Complete.
Fort Worth	Carnegie Public	Do.
	Texas Christian University	Do.
Galveston	Rosenberg	Do.
Georgetown	Southwestern University	Do.
Houston	Houston Public	Do.
San Antonio	Carnegie	ST.
Waco	Baylor	Complete.
UTAH		
Ephraim	Snow College	Complete.
Logan	Utah Agricultural College	Do.
Ogden	Carnegie Free	STCHAM.
Provo	Brigham Young University	Complete.
Salt Lake City	University of Utah	Do.
VERMONT		
Burlington	University of Vermont	Complete.
Middlebury	Middlebury College	Do.
Montpelier	Vermont State	Do.
Northfield	Norwich University	Do.
VIRGINIA		
Blacksburg	Virginia Polytechnic Institute	Complete.
Bridgewater	Bridgewater College	STA.
Emory	Emory and Henry College	S.
Lexington	Virginia Military Institute	Complete.
	Washington and Lee University	Do.
Richmond	Virginia State	Do.
Salem	Roanoke College	Do.
University	University of Virginia	Do.
University of Richmond	University of Richmond	ST.

Location	Library	Publications received
WASHINGTON		
Everett	Everett Public	SCHAM.
Olympia	Washington State	STCH.
Pullman	State College of Washington	Complete.
Seattle	Seattle Public	Do.
	University of Washington	Do.
Spokane	Spokane Public	Do.
Tacoma	Tacoma Public	STCHWM.
Walla Walla	Whitman College	Complete.
WEST VIRGINIA		
Athens	Concord State Normal School	SCWM.
Charleston	State	Complete.
Fairmont	Fairmont State Normal	ST.
Institute	West Virginia Collegiate Institute	Complete.
Montgomery	New River State School	SA.
Morgantown	West Virginia University	Complete.
WISCONSIN		
Appleton	Lawrence College	ST.
Beloit	Beloit College	Complete.
Eau Claire	Eau Claire Public	STCAWM.
Fond du Lac	Fond du Lac Public	SW.
La Crosse	La Crosse Public	A.
Madison	State Historical Society	Complete.
	State	CHAW.
Milwaukee	Milwaukee Public	Complete.
Racine	Racine Public	Do.
Superior	Superior Public	ST.
WYOMING		
Cheyenne	Wyoming State	STCHWM.
Laramie	University of Wyoming	Complete.

IX. SCIENTIFIC PAPERS

S509. Alternating Current Distribution in Cylindrical Conductors--Chester Snow

General theory of propagation of periodic waves along parallel cylindrical conductors and dielectrics. The existence and uniqueness of scalar and vector potentials is proven and their properties examined by the construction of a generalized Green's function and an analogous magnetic flux function. From the formal solutions, the physical concepts, coefficients of leakage, capacity, resistance, and inductance, and the propagation constant are given as functions of the frequency which reduce to the ordinary constants in case the frequency is so low or the cross section of the conductors so small that the current distribution is practically uniform in each section. High-frequency formulas are obtained for these quantities in the case of two unequal circular cylinders having different electrical constants. (July 24, 1925.) pp. 62. Price, 10 cents.

S510. Effect of Wear on the Magnetic Properties and Tensile Strength of Steel Wire----Raymond L. Sanford, Walter L. Cheney, and James M. Barry

In order to design intelligently apparatus for the magnetic testing of wire hoisting rope, it is necessary to have a knowledge of the fundamental principles involved. This paper describes experiments to determine the effect of wear on the magnetic properties and tensile strength of steel wire of the kind used in the manufacture of wire rope. It was found that the magnetic properties of the wire were altered by wear and that this change was accompanied by an increase in tensile strength. (July 24, 1925.) pp. 6. Price, 5 cents.

S511. A Nonintermittent Sensitometer (Time-Scale Exposure Machine) with Clock-Controlled Motor Drive----------Raymond Davis

The sensitometer described contains a gear driven sector wheel with which the time-scale exposures are made, during a single revolution. The sector wheel may be run at a wide range of speeds by power-of-two steps. A new arrangement of the sector apertures is shown and the method of construction and calibration is discussed. The speed of the motor which runs the apparatus is controlled by a clock so the precision is obtained in the exposure time. The method used and the electrical circuits are given in this paper. (Aug. 20, 1925.) pp. 26. Price, 15 cents.

S512. Temperature Estimates of the Planet Mars----------W. W. Coblentz

This paper gives the results of an investigation of four methods of estimating planetary temperatures, especially of Mars, from radiometric measurements using transmission screen of water, quartz, glass, and fluorite (see B. S. Sci. Papers Nos. 438 and 460).

The results obtained are concordant in showing that the bright areas on Mars are cooler than the dark areas, and that the sunset side of the planet is hotter than the sunrise side. The following temperatures were deduced at opposition (August 21, 1924); equatorial bright areas −10 to +5° C., dark areas 10 to 20° C., north polar region −70° C., south polar region 0 to 10° C., east limb 45° C., west limb 0° C., whole disk 30° C., night side below −70° C. (Sept. 22, 1925.) pp. 27. Price, 10 cents.

S513. Origin of Quenching Cracks_____**Howard Scott**

The causes of quenching cracks incident to the hardening of tool steels are examined both analytically and experimentally. The results indicate practical expedients for the avoidance of quenching cracks. (Sept. 25, 1925.) pp. 46. Price, 20 cents.

S514. Gases in Metals: II. The Determination of Oxygen and Hydrogen in Metals by Fusion in Vacuum_____**Louis Jordan and James R. Eckman**

A study was made of three types of vacuum fusion methods for determining gases in ferrous metals, viz, fusion of the metal (*a*) in a refractory oxide crucible, (*b*) with an alloy of antimony and tin, and (*c*) in a graphite crucible. The method finally selected as the most satisfactory procedure for determining oxygen and hydrogen in pure iron steels and cast irons was that of fusion in graphite. Metal samples contained in an evacuated fused silica tube were melted by high-frequency induction heating. A train of solid absorbents for the determination of H_2O, CO_2, CO, and H_2 was developed, tested, and used for the gravimetric determination of total oxygen and hydrogen evolved from the fused sample. (Oct. 9, 1925.) pp. 38. Price, 10 cents.

S515. Thermal Expansion of Tungsten_____**Peter Hidnert and W. T. Sweeney**

This paper gives the results of an investigation on the thermal expansion of tungsten (99.98 per cent) over various temperature ranges between −100 and +500° C. A summary of available data by previous observers on the thermal expansion of tungsten is included. The expansion of tungsten is given by the following empirical equation:

$$L_t = L_o[1 + (4.28\ t + 0.00058\ t^2)\ 10^{-6}]$$

where L_t represents the length of the metal at any temperature t between −105 and +502° C., and L_o the length at 0° C. Average coefficients of expansion for various temperature ranges are given in a table. (Dec. 1, 1925.) pp. 5. Price, 5 cents.

S516. A Shielded Resistor for Voltage Transformer Testing__**Francis B. Silsbee**

The equipment and method used at the Bureau of Standards for the precise testing of voltage transformers up to 30,000 volts is described in detail. A general discussion of the various errors which may arise in apparatus of this type as a result of capacitance between the various parts is included, together with suggestions as to other applications and limitations of shielded resistors. (Dec. 2, 1925.) pp. 26. Price, 15 cents.

S517. A Special Camera for Photographing Cylindrical Surfaces__**Raymond Davis**

This paper describes a camera designed for photographing the entire outside surface of short lengths of pipe which had been subjected to soil corrosion tests.

The pipe is rotated by means of a belt which is driven by a pulley of the camera. The film moves at speed equal to that of the image of the pipe. An automatic switch stops the camera after the complete surface of the pipe has been photographed. In this way a picture of the entire surface is obtained in one piece. The design is applicable to the photographing of other cylindrical objects. (Dec. 5, 1925.) pp. 12. Price, 10 cents.

S518. Metallographic Etching Reagents, III; For Alloy Steels
Edward C. Groesbeck

There has been lacking in the literature a rationale, which would guide one in making an intelligent selection of a suitable etching solution for identifying, by means of metallographic etching methods, the constituents present in various alloy steels, ferroalloys, and special alloys. This investigation was undertaken with the object of furnishing such a rationale for alloy steels containing chromium,

tungsten, and vanadium. Experimental data on the etching behavior of typical constituents, found present in these steels and ferroalloys, and in high-speed steels, toward various alkaline solutions were obtained. The principles governing this behavior were determined from these data, and results of tests made with certain solutions. A differentiation of the various constituents is thus made possible. (Dec. 11, 1925.) pp. 60. Price, 25 cents.

S519. The Preparation of Levulose

Richard F. Jackson, Clara Gillis Silsbee, and Max J. Proffitt

It is demonstrated that levulose, the sweetest member of the sugar group, can be prepared at moderate cost from the Jerusalem artichoke or the dahlia. Artichoke juices are, immediately upon extraction, acidified with sulphuric or hydrochloric acid and converted by heating to 70 or 80° C. for 30 to 45 minutes. Lime is then added to very slight alkalinity, neutralizing the acid and defecating the juice. From juices of sufficiently high purity levulose may be crystallized directly. From impure juices levulose may be isolated in the form of its insoluble compound with lime. By the latter process sirups of 94 per cent purity may be obtained. Crystallization, which has hitherto necessitated the use of expensive organic reagents, is accomplished directly from aquenous sirups. (Jan. 12, 1926.) pp. 31. Price, 10 cents.

S520. Nonflammable Liquids for Cryostats—C. W. Kanolt

Several very serious accidents have occurred in laboratories as the result of the use of flammable liquids in cryostats, in which a liquid of low-freezing point is required. In some instances burning liquid has been thrown upon the operator. The purpose of this work is to find liquids that will not burn, and are suitable for use in cryostats. By mixing several ingredients in suitable proportions liquids have been produced having lower freezing points than any of the ingredients. Their viscosities and corrosiveness have been investigated. Liquids that will not burn and can be used to −150° C. are described. (Mar. 17, 1926.) pp. 15. Price, 10 cents.

S521. Measurements of the Index of Refraction of Glass at High Temperatures—C. G. Peters

The index of refraction of a substance is equal to the ratio of the number of waves of light in a given distance in the material to the number of waves in an equal distance in vacuum. With the interference method described in this paper the number of waves under these two conditions can be determined and the change in the index with varying conditions can be measured. The indexes of nine different glasses, including flints, crowns, and pyrex, were measured for the temperature interval, 20 to 700° C. It was found that the glasses passed through a critical expansion region near 500° C. in which the expansion rate increased by 2 to 7 times. The index of refraction increased from 20° to the critical region, then decreased in the rapid expansion region, and increased again above the softening temperature. (Mar. 17, 1926.) pp. 25. Price, 10 cents.

S522. Pure Zinc at Normal and Elevated Temperatures

John R. Freeman, jr., Frederick Sillers, jr., and Paul F. Brandt

A study was made of the physical properties and crystal structure of pure zinc. Data are given on the following properties: Coefficient of expansion, density, sceleroscope and Brinell hardness, tensile properties and crystal structure at normal and elevated temperatures. Proof is given that zinc has but one allotropic form between normal temperatures and the melting point. (Apr. 3, 1926.) pp. 35. Price, 15 cents.

S523. Wind Pressure on Structures_____Hugh L. Dryden and George C. Hill

Available data on wind pressure are based on experiments made many years ago on models which do not resemble the forms commonly used for structures. The authors discuss the various features of the general problem and give a brief summary of pertinent results of modern wind tunnel investigations in the first section of the paper. A second section contains the results of measurements of pressure distribution over a model of a tall building with the wind blowing in various directions. (Apr. 3, 1926.) pp. 36. Price, 20 cents.

S524. Measurements on the Thermal Expansion of Fused Silica
Wilmer Souder and Peter Hidnert

This paper gives the results of an investigation on the thermal expansion of transparent and nontransparent fused silica for various temperature ranges between −125 and 1,000° C. A total of 48 expansion tests were made on 17 samples of fused silica. A critical temperature or minimum length was found at about −80° C. Expansion occurred on heating fused silica above the critical temperature or cooling below this temperature. The coefficients of expansion of the transparent samples differ slightly from the coefficients of the nontransparent samples. Typical expansion curves are shown and discussed. The authors' average expansion curve is compared with the results of previous investigators. The average coefficient of expansion between 20 and 1,000° C. was found to be 0.48×10^{-6} per °C. A description of the expansivity equipment used in making these tests is included in the paper. (Apr. 13, 1926.) pp. 23. Price, 10 cents.

S525. A Unicontrol High-Frequency Radio Direction Finder____F. W. Dunmore

This paper deals with the development of a special type of radio direction finder for use in taking bearings on a frequency of 2,100 kc (143 m). An installation on a 75-foot Coast Guard patrol boat is described. This direction finder is used in conjunction with a superheterodyne receiving set without alteration in the circuit. This receiving set is part of the radio equipment on these boats. The coil consists of 4 turns, 20 inches square, of heavy ignition cable. A special coupling transformer is used between the coil and the receiving set. A bearing is taken simply by rotating the direction-finder coil; the balancing condenser is operated automatically by means of a cam on the direction-finder shaft. (Apr. 16, 1926.) pp. 11. Price, 5 cents.

S526. Transmission and Absorption of Sound by Some Building Materials
E. A. Eckhardt and V. L. Chrisler

This paper contains a report of the work on sound transmission through partition walls, and on the sound-absorbing properties of these walls and of various other materials commonly used in building construction. A description is given of the new sound chamber erected for the purpose of this work; details of the experimental methods are described and relative results of both transmission and absorption measurements tabulated. These results are given for frequencies covering the range from 250 to 3,470 cycles per second. Specifications for the construction of the various panels used in transmission tests are appended. It is found that as far as transmissivity goes certain panels are sufficiently opaque to sound to reduce a sound of painful intensity to complete inaudibility. The poorest panels tested were capable of reducing such a sound to about the intensity of the ordinary speaking voice. (Apr. 28, 1926.) pp. 29. Price, 15 cents.

S527. Short Tests for Sets of Laboratory Weights_____A. T. Pienkowsky

This paper outlines rough checks for gross errors and two very short calibration systems for determining the actual error or correction for each weight of a set from 100 grams to one milligram, or of similar arrangements of other denominations.

Ordinary "direct" weighings may be used. Numerical examples are given, also notes on the balance, the buoyant effect of the air, the determination of relative instead of actual values for weights, and other details. (May 17, 1926.) pp. 92. Price, 10 cents.

S528. A Study of the Relation Between Intermittent and Nonintermittent Sector Wheel Photographic Exposures.....**Raymond Davis**

A comparison of sector wheel intermittent and equal nonintermittent exposures shows that the photographic density difference varies with the emulsion used, the illumination, the number of interruptions, and the rest periods between. When the illumination is above a certain level a greater effect results from the intermittent exposure; and conversely, for lower illuminations a loss is obtained. The magnitude of the loss or gain is affected by the number of exposures and the rest period after each exposure. The gain or loss, as the case may be, is accentuated by each interruption. (May 18, 1926.) pp. 45. Price, 20 cents.

S529. A Review of the Literature Relating to the Normal Densities of Gasses **Marion Smith Blanchard and S. F. Pickering**

In this review of the literature relating to the normal densities of gasses an attempt is made to choose the most reliable value for each gas. The number of sources of the gas in question, the methods used for its purification, the precautions observed in making the experimental measurements, the number of observations made, the agreement between observations of a set and the concordance between the results of the different observers have all been carefully considered in the selection of a final value. (May 28, 1926.) pp. 37. Price, 15 cents.

S530. Establishment of Radio Standards of Frequency by the Use of a Harmonic Amplifier.....**C. B. Jolliffe and Grace Hazen**

This paper describes a method used to establish the radio standards of frequency of the Bureau of Standards. It consists, essentially, in the production, selection, and amplification of harmonics from an electron tube driven standard tuning fork by the use of a harmonic amplifier. The primary standard frequency meters are standardized throughout the range of 10 to 3,000 kilocycles from the harmonics of a known audio source. Piezooscillator frequency values are established by the use of the harmonic amplifier with the aid of an auxiliary sonometer to determine the frequency of the beat note between a harmonic from the known source and the piezooscillator. A method for using the harmonic amplifier and sonometer for an accurate comparison of two audio-frequencies is also given. (July 15, 1926.) pp. 11. Price, 10 cents.

S531. A Principle Governing the Distribution of Current in Systems of Linear Conductors.....**F. Wenner**

The principle discussed in this paper may be stated as follows: In a system of linear conductors in which the current in every branch is proportional to the impressed electromotive force, the current in any branch is that which would result should an electromotive force, equal to the potential difference which would appear across the break were the branch opened, be introduced into the branch and all other electromotive forces be removed. It is shown that this principle may be used to advantage in the solution of many of that class of problems for which it is generally considered that a solution may be obtained only by the application of Kirchhoff's laws. (July 16, 1926.) pp. 18. Price, 10 cents.

S532. The Analysis of Dental Gold Alloys.....**William H. Swanger**

A detailed procedure for the complete chemical analysis of dental gold alloys is given. This includes the determination of silver, gold, platinum, palladium, iridium, rhodium, copper, zinc, nickel, tin, manganese, iron, and manganese,

iron, and magnesium. The methods were developed so as to give the highest possible accuracy for these determinations. Data are given showing the results obtained in the analysis of mixtures of known composition. The composition of 13 typical dental gold alloys is given. (Aug. 11, 1926.) pp. 31. Price, 10 cents.

S533. Relations Between Rotatory Power and Structure in the Sugar Group. Part I (1 to 10).....**C. S. Hudson**

In this volume there are reprinted the first 10 articles of a series, entitled "Relations between rotatory power and structure in the sugar group," which were originally published in the Journal of the American Chemical Society. As an introduction to them, there has been prepared a summary of the author's earlier researches on this subject, given as far as possible in the form of quotations in order that the present publication may be used as an original source of reference. A table of the rotatory powers of those substances which have been purified and measured in the course of these investigations and a thorough subject and substance index have been prepared as reference aids. It is hoped that the orderly presentation of the work may assist research workers and may be found suitable for the use of advanced students of organic, physical, and biological chemistry who may be interested in carbohydrate chemistry. (Aug. 24, 1926.) pp. 144. Price, 35 cents.

S534. Effect of Concentrated Loads on the Length of Measuring Tapes
Lewis V. Judson

The results of an experimental investigation are given, showing the agreement with physical fact of a formula expressing the effect of concentrated loads on the length of measuring tapes. The formula commonly used for determining the distance between the terminal marks of a tape suspended in a series of catenaries was also investigated experimentally and found to be valid for geodetic work. (Aug. 24, 1926.) pp. 9. Price, 10 cents.

S535. A Fundamental Basis for Measurements of Length.....**H. W. Bearce**

The paper discusses the difference in the relation between the units of length of the customary and the metric systems as legally defined in the United States and in Great Britain, points out some of the results of this difference, and suggests that the yard and the meter be defined in terms of light waves in such a way that a simple relation between yards and meters, inches and millimeters, will result. (Sept. 22, 1926.) pp. 14. Price, 5 cents.

S536. A Portable Radio Direction Finder for 90 to 7,700 Kilocycles
F. W. Dunmore

This paper describes the development of a portable radio direction finder adapted to field use and capable of receiving over the frequency range from 90 to 7,700 kc (3,300 to 39 m). It is of the simple rotating-coil type. Only two controls are needed in operation. The receiving set is a superheterodyne arranged for operation by a single control. The wide frequency range is made possible by a set of seven interchangeable plug-in direction-finder coils, each with a corresponding plug-in heterodyne generator coil and a cam for operating an auxiliary tuning condenser and a dial calibrated in kilocycles. The complete apparatus, except the direction-finder coils, is housed in a shielding aluminum box. (Oct. 21, 1926.) pp. 22. Price, 10 cents.

S537. Formula for the Inductance of a Helix Made with Wire of Any Section.....**Chester Snow**

A formula is obtained by which the inductance of a helix may be computed with high precision. The current distribution is not assumed to be uniform. The formula takes account of the helical shape of the windings (and hence of

the axial component of current), of the shape of the wire section, and of the insulating space between windings. It holds for wires of any section, but the two special cases of greatest interest are those of circular and rectangular sections. (Nov. 10, 1926.) pp. 89. Price, 25 cents.

S538. Spectral Energy Distribution of the Light Emitted by Plants and Animals----------W. W. Coblentz and C. W. Hughes

The spectral energy determinations were made by a photographic method. The materials examined were a luminescent fungus (*Agaricus melleus*), a luminescent crustacean (*Cypridina*), a firefly (*Photinus pyralis*), and two phosphorescent zinc sulphides. The maximum emission in the spectral energy curve is as follows: The luminous fungus at 0.52 μ and possibly a weaker maximum at 0.58 μ; the luminous crustacean at 0.48 μ; the firefly at 0.565 μ; the zinc sulphide at 0.52 μ; and the ZnCdS at 0.52 and at 0.61 μ. (Nov. 12, 1926.) pp. 14. Price, 10 cents.

S539. Radiometric Measurements on the Carbon Arc and Other Light Sources Used in Phototherapy--W. W. Coblentz, M. J. Dorcas, and C. W. Hughes

Data are presented on the variation in the radiation from the carbon arc using various kinds and sizes of carbon electrodes. The effect of using a. c. and d. c.; also the effect of using a metal and a soft carbon core was studied.

The high intensity arc was studied, using currents up to 125 amperes. Comparative data are given on the spectral energy from the sun, from a 1,500-volt gas-filled tungsten lamp, the quartz mercury arc, and the arc between metal rods of tungsten and of nickel. (Nov. 19, 1926.) pp. 27. Price, 15 cents.

S540. Measurement of Surface Tension----------N. Ernest Dorsey

This paper (1) presents a brief survey of the more important of the methods which have been employed in the measurement of surface tension, (2) calls attention to some of the more important facts which must be kept in mind by one wishing to succeed in such measurements, (3) indicates certain errors which are frequently made and shows how they may be avoided, and (4) gives the working equations that are applicable to the methods considered. A bibliography of 112 papers is appended, together with a brief statement of the method employed in each instance. (Nov. 24, 1926.) pp. 33. Price, 15 cents.

S541. A Review of the Literature Relating to the Critical Constants of Various Gases----------S. F. Pickering

In this review of the literature on the critical constants of various gases an attempt has been made to include all of the available data on the more common gases and to select what appear to be the best values. A careful consideration of the precautions taken in the purification of the gas in question, the methods of making the determinations, and the agreement between the results obtained by different observers have been given in choosing the final value. (Nov. 26, 1926.) pp. 33. Price, 15 cents.

S542. Electric Field of a Charged Wire and a Slotted Cylindrical Conductor Chester Snow

A formula is obtained for computing the potential due to a charged wire and a concentric, cylindrical, conducting shell when the latter is divided into a number of equal, equally spaced circular pieces by means of slots parallel to its axis. The wire is treated as a line charge, and the distribution of induced charge over each arc is found. (Dec. 9, 1926.) pp. 16. Price, 10 cents.

S543. Linkage-Current Diagram for Representing Magneto Operation F. B. Silsbee and D. W. Randolph

A diagram is described in which magnetic linkage (flux turns) is plotted as ordinate against current as abscissa. It is possible to represent on such a diagram

the salient features of the cycle of operations passed through by a high-tension magneto or spark coil. Areas on the diagram are proportional to the energy changes involved. Typical diagrams are given to show the application of this method of analyzing and representing data on automotive ignition equipment. (Dec. 31, 1926.) pp. 53. Price, 20 cents.

S544. Effect of Eddy Currents in a Core Consisting of Circular Wires
Chester Snow

A formula is obtained showing the penetration of magnetic field into the core wires when the external or magnetizing current is a given function of the time. From this the e. m. f. is found by which the core reacts upon the external current. Simple formulas are obtained for the alternating current resistance and inductance of the circuit, and also a solution for the current when the applied e. m. f. is an arbitrary function of the time. The formula for alternating current resistance is compared with experiments. (Jan. 6, 1927.) pp. 25. Price, 10 cents.

S545. Determination of the Magnetic Induction in Sheet Steel
Raymond L. Sanford and James M. Barry

In view of the commercial importance of the magnetic testing of sheet steel an investigation was carried out to discover the sources of the discrepancies often found between the values obtained with the two permeameters most generally used and to determine the conditions under which the most satisfactory results can be secured. It was found that, under proper conditions, either the Burrows permeameter or the Fahy Simplex permeameter can be used, but the Fahy Simplex has certain advantages which make it more satisfactory for the general line of work. (Feb. 17, 1927.) pp. 16. Price, 10 cents.

S546. Magnetic Reluctivity Relationship.....Raymond L. Sanford

An experimental and theoretical study of the magnetic properties of pure iron near saturation leads to the conclusion that the so-called reluctivity relationship of Kennelly does not truly represent the magnetic properties of pure homogeneous materials, and consequently that the constants in the Kennelly equation are without definite physical significance. It appears from this conclusion that the reluctivity relationship will not serve as a basis of correlation of the magnetic and mechanical properties of iron and steel. (Feb. 17, 1927.) pp. 13. Price, 5 cents.

S547. Lovibond Color System. I. A Spectrophotometric Analysis of the Lovibond Glasses.....K. S. Gibson and F. K. Harris
(With a prefatory statement by Irwin G. Priest)

A spectrophotometric analysis of the Lovibond glasses has been made as the first step in the development of methods of grading these glasses. The spectral transmissions from 380 to 750 μ and the integral transmissions for white light are given in the paper. The glasses studied include the 60 unit glasses from 1.0 to 20.0 of the red, yellow (also yellow 35.0), and blue series of the bureau set, in addition to 32 red and yellow glasses submitted by the American Oil Chemists' Society.

Except for the erratic variations among the glasses, which necessitate their calibration, the following relation is shown to be true:

$$-\log T\lambda \pm kN + B$$

where

$T\lambda$ = the transmission at a given wave length,
N = the Lovibond number for a given series,
k, b = constants.

(Feb. 17, 1927.) pp. 46. Price, 15 cents.

S548. Wave-Length Measurements in the Arc and Spark Spectra of Zirconium
C. C. Kiess

Previous work on the spectra of zirconium has stopped short of wave length 7200 A in the red. The present paper extends our knowledge of the spectrum more than 2,000 units beyond this limit into the infra-red. In the spark spectrum a complete set of wave-length measurements is given extending from the red to the ultra-violet toward 2100 A. The origin of the various spectral features observed in the molecule, in the neutral atom, and in the singly, doubly, and trebly, ionized atoms is indicated in the tables. (Apr. 28, 1927.) pp. 14. Price, 5 cents.

S549. Wave-Length Measurements in the Arc Spectrum of Scandium
William F. Meggers

The wave lengths corresponding to approximately 700 lines photographed in the 220-volt arc spectrum of scandium were measured relative to secondary standards in the iron spectrum. These values extend from 2540.87 in the ultra-violet to 8644.48 A in the infra-red; the majority are lines characteristic of neutral scandium atoms, a considerable number of lines originate with singly ionized, and a few with doubly ionized atoms. Bands characteristic of scandium oxide molecules appear very prominently in the longer wave portions of the spectrum. (May 4, 1927.) pp. 11. Price, 5 cents.

S550. Application of the Algebraic Aberration Equations to Optical Design
I. C. Gardner

To design an optical system differing markedly from the type with which one is acquainted, it is desirable to apply the algebraic aberration equations in order to obtain a preliminary design which afterwards may be modified by subsequent adjustment based on trigonometric computation. The equations necessary for effecting this preliminary solution are presented in two parallel notations—the one built upon the Coddington equations as modified by H. Dennis Taylor, the second upon the system extensively used in German optical literature. A detailed discussion of the interpretation of the equations and the methods of their application to optical design, with detailed numerical examples, is given. Appendixes give working specifications for the different types of erecting prisms commonly employed in optical instruments and tabulated values of functions in convenient form for solving problems in optical design. (May 7, 1927.) pp. 131. Price, 45 cents.

S551. Absorption Spectra of Iron, Cobalt, and Nickel
W. F. Meggers and F. M. Walters, jr.

Condensed sparks between electrodes of iron, cobalt, and nickel under water were used to investigate the absorption spectra of these metals. The spectrograms show 265 iron lines (2166 to 4404 A), 340 cobalt lines (2137 to 4121 A), and 225 nickel lines (2124 to 3858 A) absorbed in the source. The spectral-term combinations producing these lines have been determined; they show that the normal states of iron, cobalt, and nickel atoms are represented by ^5D, ^4F, and ^3F terms, respectively. Certain lines characteristic of ironized atoms also appeared in absorption; they show that the normal states of ironized iron, cobalt, and nickel atoms are described by ^6D, ^5F, and ^4F terms, respectively. (May 13, 1927.) pp. 22. Price, 10 cents.

S552. Transmission of Sound Through Building Materials—V. L. Chrisler

This paper contains a report of the work on sound transmission through various stud partition walls covered with different wall boards and a few masonry walls and few compound walls. Attention is called to the fact that an equal degree of sound insulation can be obtained with lighter walls when they are made double or made of alternate layers of different material loosely fastened together.

The results are given for four frequency bands covering a range from 250 to 3,365 cycles per second. Specifications for the construction of the various panels used in transmission tests are appended. (June 16, 1927.) pp. 11. Price, 5 cents.

S553. Further Radiation Measurements and Temperature Estimates of the Planet Mars, 1926 ..... W. W. Coblentz and C. O. Lampland

Radiometric measurements and temperature estimates obtained at the Lowell Observatory during the opposition of Mars in 1926 verify and extend the observations of 1924, showing that the dark areas are warmer than the bright areas; the Southern (summer) Hemisphere is warmer than the Northern (winter) Hemisphere; and the east limb (sunrise) is cooler than the west (sunset) limb. Under a noonday sun temperatures up to 30° C. were observed. A conspicuous feature of this year's work was the measurement of the radiation from clouds on Mars. In an appendix a correction is made to the observations made in 1921 (B. S. Sci. Paper No. 438) on the star Sirius. (June 17, 1927.) pp. 40. Price 15 cents.

X. TECHNOLOGIC PAPERS

T290. Relation Between the Heating Value of Gas and Its Usefulness to the Customer.....E. R. Weaver

This paper contains a critical review of the data which have been made public regarding the relation between the heating value of gas and its usefulness to the customer. The data are divided into two classes—those relating to direct observations of the useful effects from the utilization of gases of different qualities in the applicances in common use and statistical data showing changes in quantity of gas used which accompanied changes in heating value. It is found that there is general agreement both between the two classes of data and within each class. Some of the consequences of the relation found are pointed out. (July 19, 1925.) pp. 117. Price, 30 cents.

T291. Tests of Hollow Tile and Concrete Slabs Reinforced in One Direction Douglas E. Parsons and Ambrose H. Stang

This paper describes the results of tests made for the purpose of obtaining information on the value of hollow tiles in resisting bending and shearing stresses when combined in hollow tile and concrete slabs reinforced in one direction. The test pieces consisted of 42 beams from 8 feet 10 inches to 15 feet 3 inches long. all 8 inches deep and having a maximum width of 30 inches. Observations were made of the deformation in the concrete tiles and reinforcement, deflection of the center of the beam, and development of cracks as the loads were supplied. The results indicate that the tiles assisted the concrete in resisting bending and shearing stresses. Tables and curves give a summary of the test data, and comparisons are made between these and the usual design computations for reinforced concrete beams. (Aug. 12, 1925.) pp. 50. Price, 25 cents.

T292. Relative Merits of Cotton and Jute Cement Sacks....Robert J. Morris

This paper contains information concerning the tests made and the apparatus used to determine the relative merits of cotton Osnaburg and jute burlap sacks used as containers for Portland cement. A brief description is given of the physical tests for breaking strength, thread count, length, width, stretch, and resistance to drop; also of the practical tests made, such as the service test, where the sacks were filled with hot, freshly ground cement; the humidity test, where samples were exposed to various atmospheric conditions; and the moisture test, where the sacks of cement were subjected to excessively damp conditions. (Aug. 7, 1925.) pp. 22. Price, 10 cents.

T293. Condensation of Water from Engine Exhaust for Airship Ballasting Robert F. Kohr

An airship in flight becomes lighter as fuel is consumed by the engines. In order to correct this effect without releasing lifting gas, apparatus has been developed to condense, from the engine exhaust gas, enough of the water of combustion, formed by combination of the oxygen of the air with the hydrogen of the fuel, to compensate for the weight of fuel burned. The exhaust gas is cooled in a bank of thin aluminum tubes exposed to the air stream, and such of the condensed water as can not be directly drained from the tubes is collected in a baffle-type separator at the outlet end. The ballast normally carried may be reduced so that the addition of the condensing apparatus need not increase the load carried. (Aug. 13, 1925.) pp. 41. Price, 25 cents.

T294. Wearing Qualities of Tire Treads as Influenced by Reclaimed Rubber
W. L. Holt and P. L. Wormeley

Service tests were made on 80 "sectional tread" tires in order to determine the comparative resistance to wear of tread compounds containing reclaimed rubber and those compounded using new rubber only. The tread of each tire was made in four sections, each section representing a compound under test. The results of tread wear as obtained from each individual tire are shown and for comparison data on laboratory wear tests of the same rubber compounds are also given. These results show that the substitution of reclaimed rubber for new rubber in these compounds reduces the resistance of reclaimed rubber used. (Aug. 13, 1925.) pp. 10. Price, 5 cents.

T295. Initial Temperature and Mass Effects in Quenching
H. J. French and O. Z. Klopsch

In this report are given results of quenching experiments with high-carbon steels in which the speed of cooling was determined at the center of spheres, rounds, and in plates of various dimensions quenched from various temperatures into different coolants, such as water, 5 per cent NaOH; oils; and air. The cooling velocity at 720° C. is taken as the best measure of hardening produced, and relations are developed between this and the size and shape of steel quenched. Knowing the described cooling rate at the center of any one size of the simple shapes quenched in any of the customary quenching media, such as oils and aqueous solutions, the velocity in any other size in such shapes can be closely approximated from the included data when the steel is quenched from any temperature between 720 and 1,050° C. Typical examples are given. (Aug. 25, 1925.) pp. 30. Price, 10 cents.

T296. Flow in a Low-Carbon Steel at Various Temperatures
H. J. French and W. A. Tucker

This report relates to flow (elongation) on 0.25 per cent carbon steel subjected to a fixed total load in tension at constant temperature within the range 70 to 1,100° F. (20 to 595° C.). The character of flow is described, and the factors governing selection of maximum allowable stresses are discussed for service in which very long life is required and the case in which both long life and freedom from appreciable deformation must be considered. Comparisons are also given between maximum allowable stresses and the stress-strain relations determined in the customary short-time tension tests at various temperatures. (Aug. 25, 1925.) pp. 22. Price, 10 cents.

T297. A Statistical Study of Conditions Affecting the Distance Range of Radiotelephone Broadcasting Stations.....C. M. Jansky, jr.

The conditions affecting radio transmission are too complex to permit a simple analysis, and the most satisfactory method of studying such conditions and their variations is the analysis of a large number of similar observations taken by a large number of observers. This paper describes the organization of such a group of observers by the bureau, the methods used for making observations, and the forms used for recording 8,500 observations made over a period of a year (1922–23) on transmitting station KDKA, of the Westinghouse Electric & Manufacturing Co., located at East Pittsburgh, Pa. The data obtained were analyzed on automatic machines and charts given showing (*a*) variation of strength of atmospherics, (*b*) variation of fading, (*c*) relative magnitude of obstacles to reception, (*d*) variation of interference from receiving sets, (*e*) relative magnitude of obstacles to reception grouped in bimonthly periods, (*f*) mean reliability as a function of distance. (Oct. 8, 1925.) pp. 10. Price, 5 cents.

T298. Radio-Frequency Resistance and Inductance of Coils Used in Broadcast Reception—August Hund and H. B. De Groot

This paper gives data on the radio-frequency resistance and inductance of coils of different shapes and kinds of wire within the range of frequencies used in radiotelephone broadcasting. The experimental results are presented by means of curves in order to give the reader a means for designing a suitable coil. This requires that the particular coil be constructed in accordance with the data given in a table. A statement of the important properties of coils is given. (Oct. 22, 1925.) pp. 18. Price, 10 cents.

T299. Dielectric Constant, Power Factor, and Resistivity of Rubber and Gutta-Percha—H. L. Curtis and A. T. McPherson

This paper describes an investigation of the electrical properties of rubber and gutta-percha to determine their suitability for submarine cable insulation. The adaptation of the form of specimen to electrical measurement is discussed. The properties of gutta-percha and rubber are affected by their composition and methods of preparation. Measurements are given on crude rubber of different varieties and gutta-percha of known composition. The properties of rubber are shown to be affected by vulcanization and by the compounding ingredients incorporated in it. The influence of moisture on electrical properties receives consideration. (Oct. 23, 1925.) pp. 54. Price, 20 cents.

T300. Development of a Standard Bending Test for Rope Yarns
Charles W. Schoffstall and Robert C. Boyden

The need for physical tests other than for breaking strength of cordage has made necessary a study of other methods of tests which would more nearly simulate service conditions. Apparatus to test the effect of bending a rope yarn was designed and built. The yarn under tension is bent over a cross arm at the rate of a certain number of oscillations per minute. An auxiliary instrument was designed which would enable the transfer of the specimen from the rope or coil to the clamps of the apparatus without losing any of the original twist. The variables of the apparatus were studied, and a method of test formulated. (Dec. 1, 1925.) pp. 10. Price, 10 cents.

T301. A comparative Study of Paper Fillers
Merle B. Shaw and George W. Bicking

Commercial paper fillers consisting of asbestine, talc, clay, crown filler, and gypsum were studied to determine their comparative paper-making value. Paper-making tests were made in the semicommercial paper mill of the bureau, amounts of filler added being 10 and 20 per cent of the beater furnish. The paper produced was tested for weight, strength, color, opacity, finish, degree sized, and filler retention. Asbestine, talc, and clay were found to have similar paper-making properties. Crown filler and gypsum being soluble in water yielded somewhat different results from the other insoluble fillers. Retention was considerably less for the soluble materials and, in general, the differences noted in the characteristics of the papers were due chiefly to the difference in the amount of filler retained. The sizing process and the other paper-making operations were not adversely affected by any of the fillers employed. (Dec. 5, 1925.) pp. 16. Price, 10 cents.

T302. Investigation of Synthetic Tanning Materials—Edward Wolesensky

A preliminary study, chiefly qualitative, has been made of the methods of preparation and of the tanning properties of a number of synthetic materials, chiefly sulfonated condensation products of benzene, toluene, naphthalene, phenol, cresylic acid, and alpha and beta naphthol with formaldehyde, and in a few cases also with acetaldehyde and furfurol. Most of the products studied

possess tanning properties, and some of them are capable of producing a leather of good color, flexibility, and strength, but lacking weight and fullness. Some of these materials are suitable for the tanning of light leathers without the aid of other tanning agents, and, when used with other tanning of filling materials, may be used also in the tanning of heavy leathers. (Dec. 8, 1925.) pp. 45. Price, 15 cents.

T303. Causes of Some Accidents from Gas Appliances. An Investigation Conducted in Baltimore in Cooperation With the Baltimore Health Department, United States Public Health Service, and the Consolidated Gas Electric Light & Power Co.....I. Vernon Brumbaugh

Several fatal asphyxiations from carbon monoxide produced by unvented gas appliances during the beginning of the winter of 1922–23 prompted the mayor of Baltimore to order an investigation by the health department in which this bureau cooperated. Studies were made of causes of asphyxiation in 18 cases, which involved the death of 5 persons and the temporary disablement of 48 persons, 13 of whom were unconscious when found.

Eight water heaters, six room heaters, and five cooking stoves were found to produce carbon monoxide. The causes were attributed to faults in design, improper installation or adjustment, deterioration or clogging of the burners. (Jan. 11, 1926.) pp. 76. Price, 30 cents.

T304. A Method for Testing Gas Appliances to Determine Their Safety from Producing Carbon Monoxide

E. R. Weaver, J. H. Eiseman, and G. B. Shawn

The requirements which must be met by a successful method for testing gas appliances to determine their safety for household use are discussed. Recently developed methods for determining and clearly representing those characteristics of an appliance which determine the relative hazards of producing carbon monoxide are described. The results of tests upon numerous appliances of varied character are given in graphic form to illustrate the application and value of the testing methods, to show the range of hazard in existing appliances, and to indicate what may reasonably be expected of good appliances in service. (Jan. 11, 1926.) pp. 30. Price, 10 cents.

T305. Permeability of Stone.....D. W. Kessler

The paper describes an apparatus recently developed at the Bureau of Standards for determining the permeability of stone at various pressures. The results of tests on six types of stone are given. Some attention is given to determining the variation with the thickness of specimen. (Jan. 14, 1926.) pp. 17. Price, 10 cents.

T306. A Photometric Method for Measuring the Hiding Power of Paints

H. D. Bruce

In this paper is described a method for measuring the hiding power of paints. Measurements are made upon the dry paint film. A black and white plate is mechanically coated with paint. The contrast between the black and white portions of the plate is then measured with a Martens photometer. The thickness of the paint film is measured by a direct reading gauge. Formulas are developed and presented for the calculation of the hiding power. The method is applicable to all but very opaque paints. Laboratory data are tabulated showing the accuracy of the method to be quite satisfactory. (Jan. 16, 1926.) pp. 18. Price, 10 cents.

T307. Durability of Cement Drain Tile and Concrete in Alkali Soils; Fourth Progress Report, 1923.....G. M. Williams and Irving Furlong

This paper reports the results of the inspection in 1923 of experimental drain tile and concrete block installations at eight 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 attack, 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. (Jan. 20, 1926.) pp. 49. Price, 20 cents.

T308. Cement-Lime Mortars.....H. V. Johnson

This paper contains results of original research on the effects which changes in the composition of cement-lime mortars have upon the water requirement, plasticity, density, time of set, shrinkage, and strength—all of which are found to vary greatly with different percentages of cement, lime, and sand. There is given also a chapter on recommended practice and a bibliography on cement-lime mortars. (Jan. 29, 1926.) pp. 34. Price, 15 cents.

T309. Behavior of Synthetic Tanning Materials Toward Hide Substance
Edward Wolesensky

The solvent action of syntans on hide during tanning varies greatly with the individual syntan, and no relation has been found between this and other characteristics of the syntan. In one group of syntans combination with the hide takes place rapidly but to a limited extent and is apparently little influenced by the concentration of the solution. Another group possesses much greater filling power, requires longer time to reach a maximum, and the rate of combination is strongly influenced by the concentration of the solution. The combination with the hide seems to be mainly of a chemical nature, but in the second group there is also some evidence that the phenomenon may be partly colloidal. (Feb. 12, 1926.) pp. 13. Price, 5 cents.

T310. Properties of Potters' Flints and Their Effects in White-Ware Bodies
E. E. Pressler and W. L. Shearer

A report is given on an investigation of the commercial flints and of their effects in typical white-ware bodies. The flints were relatively pure silica with a small percentage of iron oxide and lime, varying from 0 to 0.45 per cent. Over 95 per cent of most of the flints would pass a No. 325 sieve and over 50 per cent a theoretical No. 1000 sieve. Heat absorption and thermal expansion effects were indicated at the quartz inversion temperature and appeared to be roughly proportional to the percentage of the quartz in the samples. The firing behavior of bodies was affected less by the type of flint used than by the fineness of the flint and the presence of impurities. (Feb. 12, 1926.) pp. 27. Price, 15 cents.

T311. Compressive and Transverse Strength of Hollow Tile-Walls
A. H. Stang, D. E. Parsons, and H. D. Foster

Seventy tile walls, 6 feet long and 9 feet high, built of various designs and grades of tiles and from different sources, were tested in compression. These walls were built with ordinary commercial workmanship and under average indoor conditions. Fifty-three were tested with central loading and the others with an eccentric loading. Twenty-seven of the centrally loaded walls were also subjected to transverse tests. The walls fall into groups, depending upon the kind of clay used in making the tiles, the design of the tiles, the construction, and the mortars used. The mortar affected the strength of the walls more than any other one factor. Side construction and end construction walls were about equally strong. (Feb. 25, 1926.) pp. 37. Price, 15 cents.

T312. A Study of Case-lining Papers for the Purpose of Developing Standard Specifications_____**B. W. Scribner and F. T. Carson**

Investigation of waterproofed case-lining papers was made at the request of the Bureau of Foreign and Domestic Commerce in order to develop information to aid overseas shippers in their selection of such papers. The type found most suitable was duplex asphalted kraft paper. As existing methods of testing the water resistance of such paper were found inadequate, research was made to find a suitable method of test. This resulted in the development of the "ground-glass" method, which is considered satisfactory for this purpose. Specifications of water resistance, strength, and weight were formulated, which are believed to define paper of suitable quality. (Mar. 12, 1926.) pp. 10. Price, 5 cents.

T313. Some Characteristics of Quenching Curves__**H. J. French and O. Z. Klopsch**

In this report is given a discussion of time-temperature cooling curves at the center of steel samples of various sizes and shapes quenched in ordinary coolants, such as water, a commercial quenching oil, and air. Based on the described experiments a method is outlined by which cooling curves for various sizes and shapes quenched from various temperatures can be derived, provided the curve for one size from one quenching temperature is available and one constant is known for the coolant. Typical examples are given. (Mar. 25, 1926.) pp. 21. Price, 10 cents.

T314. Shear Tests of Reinforced Concrete Beams_____**Willis A. Slater**

Large reinforced concrete beams, generally of I-shaped section, were tested to determine their resistance to shearing stresses. Shearing strengths as great as one-half the compressive strength of the concrete were developed. Generally, however, the shearing strength of the beam was dependent upon the amount of web reinforcement rather than upon the compressive strength of the concrete. Yield-point stresses in the web reinforcement were developed even when large quantities of web reinforcement were used. As a result of the tests, shearing stresses as great as 500 lbs./in.^{2} were used in the design of the concrete ships during the war. The results should be of value in fixing standards of design in general practice in reinforced concrete. (Apr. 13, 1926.) pp. 108. Price, 50 cents.

T315. Nondestructive Testing of Wire Hoisting Rope by Magnetic Analysis
R. L. Sanford

This paper describes an investigation of the magnetic properties of steel wire and the influence on them of stress, wear, and fatigue. The object of the investigation was to determine the possibilities of magnetic analysis as a nondestructive method for the routine inspection of wire hoisting rope. The connection between the magnetic and mechanical properties of steel is very close, but the relationships are so complex that more study will be required before application on a practical basis can be expected. (Apr. 16, 1926.) pp. 22. Price, 10 cents.

T316. Analysis of Synthetic Tanning Materials_____**Edward Wolesensky**

Methods are described for the determination of acidity, total sulphur, total inorganic matter, free sulphuric acid and sulphates, nonvolatile matter, total organic matter, and the tanning material in synthetic tanning materials which are sulphonated condensation products. These methods are mostly adaptations of principles or modifications of methods already known and are based on experience gained in the analysis of such synthetic tanning materials in the course of an investigation of these products. (May 19, 1926.) pp. 9. Price, 5 cents.

T317. Action of Sodium Suplhate in Synthetic Tanning Materials
Edward Wolesensky

Hide substance has such a marked affinity for sulphuric acid that it can remove the latter even from dilute solutions of sulphates in presence of other acids. Sulphuric acid thus combined with the hide can not be completely washed out

by water nor displaced by syntans; the latter can even be displaced to a certain extent from combination with hide by the sulphuric acid. Hence neutralization of excess sulphuric acid in syntans by sodium hydroxide does not entirely prevent the acid from reacting with hide during tanning. Whether this combined sulphuric acid is harmful to the leather has yet to be determined. This behavior of sodium sulphate in syntans also interferes in certain analyses of these products by the usual methods. (May 20, 1926.) pp. 16. Price, 10 cents.

T318. Endurance Tests of Tires_____**W. L. Holt and P. L. Wormeley**

For the past two and one-half years the Bureau of Standards has been making endurance tests of various brands and types of tires. In this paper test results of 230 cord tires of the 3½, 4, 4½, and 5 inch sizes and of 36 different brands are shown graphically. About 50 per cent of the tires tested meet the test requirements as established by the Federal specification. Photographs and descriptions of two types of endurance machines installed at the bureau are shown, together with a description of each and a short history of their development. (May 25, 1926.) pp. 7. Price, 10 cents.

T319. Holding Power of Wood Screws_____**I. J. Fairchild**

Tests on over 10,000 wood screws axially loaded and withdrawn from seven different kinds of wood are described, and the results given in both tabular and graphic form.

The woods used were poplar, cypress, Georgia pine, North Carolina pine, sycamore, hard maple, and white oak, ranging from the softest to the hardest woods in common use. The screws represent the product of 12 manufacturers and comprise all standard diameters in one-half of the lengths regularly furnished. The variables which affect the holding power of wood screws are discussed and methods for selection of proper size and quantity of wood screws for a given joint are suggested. (July 17, 1926.) pp. 28. Price, 15 cents.

T320. A Fabric Tension Meter for Use on Aircraft

L. B. Tuckerman, G. H. Keulegan, and H. N. Eaton

The fabric tension meter described in this paper was developed at the Bureau of Standards for the Bureau of Aeronautics, United States Navy, for the purpose of measuring the stresses in the cover fabrics of rigid airships. The operation of the instrument is based on the deflection of an isolated portion of the fabric of known shape. The relation between the hydrostatic pressure used to deflect the fabric, the tensions, and the principal radii of curvature of the fabric when deflected can be solved under proper conditions for the stresses. The mathematical theory of the instrument is developed, its construction and method of operation are described, and the accuracy obtained in service use are discussed. (July 24, 1926.) pp. 16. Price, 10 cents.

T321. A Study of Sieve Specifications_____**Lewis V. Judson**

This study of sieve specifications, made early in 1924, shows that by certain changes in the tolerances in the bureau's sieve specifications the specifications would become more practical. The principal change advocated is that made in April, 1924, a radical increase in the tolerance for wire diameter. The results of investigations of tested sieves are given, showing the relation between the measured dimensions of the wire cloth and the sieving results. The information obtained in this investigation shows that changes in the specifications for the United States Standard Sieve Series were feasible and desirable. These changes were made as of April 15, 1924. (Aug. 5, 1926.) pp. 8. Price, 5 cents.

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T322. Effect of Dry Cleaning on Silks. A Comparison of the Effect of Dry Cleaning and Some Service Conditions on the Strength of Silk
H. M. Goldman, C. C. Hubbard, and Charles W. Schoffstall

Samples of unweighted and weighted silks were exposed to sunlight after various treatments, including perspiration, dry-cleaning solvents, ironing, etc. Strength tests were made at intervals. Results show deterioration of the fabric resulting from sunlight and perspiration. Apparently no deterioration was caused by the dry-cleaning solvents. (Aug. 17, 1926.) pp. 30. Price, 15 cents.

T323. Use of Glue in Coated Paper
George I. Hamill, V. H. Gottschalk, and George W. Bicking

On account of the interest among manufacturers of coated papers in alternative adhesives for use in their industry, this investigation was made to gather data and information on the use of glue for coated paper. Through laboratory studies, semicommercial paper-coating runs, and printing tests of the papers coated, it is shown that the amount of glue required in coating mixtures varies with the grade of glue chosen and with the better grade glues may be less than that of casein; little change in present equipment and technic is required by the use of glue; uniformity of glue for coating purposes may be attained by drawing specifications to meet local conditions and produce requirements; the use of ordinary glue-bound coated paper offers no new difficulties in printing except in those lithographic and possibly offset processes where a high degree of water resistance is required. (Aug. 18, 1926.) pp. 32. Price, 15 cents.

T324. Standard Hosiery Lengths.....E. M. Schenke and C. W. Schoffstall

A study of existing practices in the hosiery industry relating to lengths of hosiery was made. A method of measuring hosiery was formulated, and samples from 30 different manufacturers were measured. From the data obtained standards were formulated for ladies', men's, children's ribbed, children's sport, infants' ribbed, and infants' and children's socks. Tolerances are also suggested. (Aug. 28, 1926.) pp. 14. Price, 10 cents.

T325. Recent Developments in Lamp Life-Testing Equipment and Methods
J. F. Skogland and R. P. Teele, jr.

Computing scales actuated by the motion of the photometer have been employed in rating life-test lamps at the Bureau of Standards for several years. On these scales the efficiency appears in line with the observed current without reference to lumens or watts, except in setting the scales for a given voltage. From additional scales recently constructed, percentage values of light output and efficiency are read directly between intervals of burning. The operations of reading and recording are quick, and the record is ready for summary. A rapid and easy method of determining mean values for light output and efficiency without sacrificing accuracy is described. The form of final summary is illustrated by a sample record. (Sept. 11, 1926.) pp. 22. Price, 15 cents.

T326. Measurement of the Degree of Sizing of Paper.....F. T. Carson

Existing methods for testing the degree of sizing of paper (38 in number) are described, critically discussed, and experimentally compared. Stress is laid on the essential difference between the degree of internal sizing of paper and the degree of surface sizing. The lack of concordance of the various methods has been traced to the influence of selectric adsorption from solution and an extraneous resistivity. A test of the rate at which water penetrates into paper is considered the most logical and useful test of the degree of internal sizing. This was confirmed by the results of tests using methods of this type developed at the Bureau of Standards compared with the other sizing tests most used. (Sept. 11, 1926.) pp. 29. Price, 15 cents.

T327. Compressive Strength of Column Web Plates and Wide Web Columns
Robert S. Johnston

The investigation was inaugurated to study the compressive strength of wide web plates for column sections. It also permitted the study of wide web column failure and the comparative value of single and double plate webs of equal total thickness. Especial care was exercised in determining the relation of structural strength to the mechanical properties of the material.

Relative to wide web compression strength the tests show the common design rule to be conservative, but that buckling is a function of the mechanical properties of the material as well as plate thickness and that there is close agreement between test results and theoretical analysis. (Oct. 2, 1926.) pp. 49. Price, 20 cents.

T328. Tests of Large Columns With H-Shaped Sections
L. B. Tuckerman and A. H. Stang

Sixty-nine large columns of H-shaped section, 12, 18, and 24 feet in length and approximately 35 and 85 square inches in sectional area, were tested with "flat" ends in the 10,000,000-pound vertical hydraulic testing machine of the Bureau of Standards. Thirty were fabricated of plates and angles, 36 were solid rolled H sections, and 3 were special sections constructed of channels. To determine the properties of the material, over 1,000 test coupons were cut from the columns and tested in tension. (Oct. 20, 1926.) pp. 88. Price, 40 cents.

T329. Research on the Production of Currency Paper in the Bureau of Standards Experimental Paper Mill--Merle B. Shaw and George W. Bicking

The investigation was requested to determine the durability factors of paper suitable for currency use, with a view to increasing the wearing qualities and thereby prolonging the life of paper money. The experimental paper-making tests were made on a semicommercial scale under practical mill conditions. The paper-making fiber was obtained from new linen and cotton rags. Various proportions of these materials were tried, but best results were obtained with a mixture of 75 per cent linen and 25 per cent cotton. Paper of satisfactory printing quality and more than double the strength of that being supplied for currency use was produced. The increase in strength was attributable chiefly to the very gradual application of beater-roll pressure and low concentration of beater furnish. (Oct. 20, 1926.) pp. 20. Price, 10 cents.

T330. Resistance of Conductors of Various Types and Sizes as Windings of Single-Layer Coils at 150 to 6,000 Kilocycles----------E. L. Hall

This paper gives experimental data on the resistance at frequencies between 150 and 6,000 kilocycles of single-layer coils wound with various sizes of solid bare copper wire, litz wire, and copper tubing. The purpose of these measurements was to obtain data which would assist in the selection of the conductors of lowest resistance for the coils of a standard frequency meter. The measurements were made by the resistance-variation method. The results are shown in graphs, which are directly comparable because they are plotted for coils of approximately the same inductance. Graphs are also given showing the increase in radio-frequency resistance at one frequency when numbers of strands of litz wire are removed from the circuit. The graphs are of value in selecting the size of wire of least resistance for a given frequency within the range from 150 to 6,000 kilocycles. Between frequencies of 150 to about 1,500 kilocycles the superiority of litz wire of a large number of strands is shown, while above that limit a large size solid copper wire or copper tubing is preferable. (Oct. 27, 1926.) pp. 11. Price, 5 cents.

T331. High Silicon Structural Steel_____**H. W. Gillett**

Tests of a structural steel from Germany containing about 0.12 per cent carbon and 1 per cent silicon substantiate the claims for high yield point combined with good ductility. Such steel is not new, the beneficial effect of silicon as an alloying element having been shown 40 years ago, and the properties of steel of the same composition as the German steel were fully recorded 14 years ago. The good properties gained by the use of the relatives cheap alloying element silicon make such a steel deserving of attention of American steel makers. (Nov. 1, 1926.) pp. 23. Price, 15 cents.

T332. Statical Hysteresis in the Flexure of Bars_____**G. H. Keulegan**

Various experimentors on the hysteresis of elastically deformed bodies have observed that major part of hysteresis is independent of time effects. Such hysteresis, in this paper, is called statical hysteresis and is interpreted as arising from a specific deviation from Hooke's law. A simple theory is given, together with its application to the flexure of bars. Some of the deductions, which are tested experimentally, relate to the dependence of hysteresis upon the load and the shape of the bar. A new constant of this secondary effect related to the loss of energy due to hysteresis is introduced as a fundamental property of matter. (Nov. 4, 1926.) pp. 18. Price, 10 cents.

T333. Transmission of sound through voice tubes

E. A. Eckhardt, V. T. Chrisler, P. P. Quayle, and M. J. Evans

(With a Note on the Absorption in Rigid Pipes by Edgar Buckingham)

Voice tubes are still much used on shipboard. A good speaking tube should transmit spoken words with distinct articulation and with little diminution in loudness. These qualities were separately tested for tubes of brass, iron, fibers, and flexible material. Experiments were also made on elbows, fittings, diaphragms, and cones. Tables and diagrams of comparative performance are given, and a note on absorption in rigid pipes is appended. (Nov. 8, 1926.) pp. 31. Price, 15 cents.

T334. Relationships between the Rockwell and Brinell Numbers_**S. N. Petrenko**

Comparative Rockwell and Brinell tests were made on a great variety of ferrous and nonferrous metals. From the experimental relationships between the Brinell and the Rockwell numbers the semiempirical conversion formulas were derived. By means of these formulas the Brinell number may within an error of plus or minus 10 per cent be estimated from the Rockwell numbers. Similar formulas were derived also for the tensile strengths of steels which may within an error of plus or minus 15 per cent, be estimated from the Rockwell numbers. (Jan. 10, 1927.) pp. 28. Price, 15 cents.

T335. Thermal Expansion of Graphite_____**Peter Hidnert and W. T. Sweeney**

This paper gives the results of an investigation on the thermal expansion of longitudinal and transverse samples of artificial graphite (99.2 to 99.7 per cent carbon) over various temperature ranges between room temperature and 600° C. A summary of available data by previous observers on the thermal expansion of graphite (natural and artificial) and of other forms of carbon is included. The coefficients of expansion of graphite are low. The transverse samples expand considerably more than the longitudinal samples. For the temperature range from 20 to 600° C. the coefficient of expansion of transverse graphite is 3.7×10^{-6} per degree C., and the coefficient for longitudinal graphite is 2.7×10^{-6}. (Feb. 18, 1927.) pp. 8. Price, 5 cents.

T336. Comparative Tests of Six-Inch Cast-Iron Pipes of American and French Manufacture_____**S. N. Petrenko**

Comparative tests were made on 6-inch cast-iron pipe manufactured in France and on similar pipe manufactured in this country. The pipes were of "bell and spigot" type and were cast in sand molds. The tests, which included hardness, transverse, ring, shear, impact, and hydrostatic tests, had shown that the strength of the French pipe lay within the range of variation of the American pipe. Its deflection in transverse test was much lower than that of American pipe. The French pipe was also characterized by greater hardness, low impact values, and a higher content of phosphorus (about 1.85 per cent) than in American pipe. The compressive test of the rings cut from the pipe seemed to give results which are fairly representative of the properties of the pipe and is suggested as a substitute for transverse test of arbitration bars or coupons. (Mar. 1, 1927.) pp. 24. Price, 15 cents.

T337. Soundproofing of Apartment Houses_____**V. L. Chrisler**

This paper deals with some of the problems involved in building construction where the attempt is made to prevent sounds passing from one room to another. A theory is presented to show how sound travels through different types of wall and floor construction. Some of the factors which control the amount of sound transmitted are also discussed. It is pointed out that good heat insulators are not necessarily good sound insulators. In fact, the introduction of heat-insulating material into the air spaces of a partition wall usually increases the amount of sound transmitted because it forms a mechanical tie between the two sides of the partition. Some suggestions are made showing how the transmission of sound through a partition wall can be reduced by changes in construction. (Mar. 11, 1927.) pp. 6. Price, 5 cents.

T338. Color in the Sugar Industry. I. Color Nomenclature in the Sugar Industry. II. Colorimetric Clarification of Turbid Sugar Solutions
H. H. Peters and F. P. Phelps

A method for preparing sugar solutions for spectrophotometric examination has been developed whose accuracy and reliability is in keeping with the more modern instruments. The older method which has heretofore been in general use has been found unreliable and totally inadequate for the purpose. The paper discusses in detail the preparation and use of auxiliary materials, the method of making up solutions, the method of filtration which will produce a suitably transparent filtrate, and, finally, the method of reducing the observed spectrophotometric observations to a rational unit basis. Typical examples are given to illustrate the various methods of calculation. A table of true and apparent densities at 20° C. and apparent specific gravities at 20/20 is included for converting per cent into grams per unit volume and likewise a table of negative logarithms. (Mar. 12, 1927.) pp. 48. Price, 20 cents.

T339. Use of Sulphite Cellulose Extract as a Tanning Material
E. L. Wallace and R. C. Bowker

An investigation to determine the suitability of sulphite cellulose extracts, derived from the waste liquors discharged from pulp mills, for use in tanning. Analyses of the extracts are given, together with the results of color tests and tanning tests on both hide powder and pieces of rawhide. The tanned leathers are evaluated by physical, chemical, and aging tests. It is concluded that these extracts are suitable for use in tanning, particularly when blended with vegetable tanning materials, and that their use will help to eliminate the loss of a national resource now largely wasted. (Apr. 5, 1927.) pp. 13. Price, 30 cents.

T340. Caroá Fiber as a Paper-Making Material

Merle B. Shaw and George W. Bicking

Laboratory and semicommercial mill tests have been made to determine the paper-making qualities of caroá fiber. The tests have shown the material to be very suitable for the production of paper, especially for use with, or as a substitute for, rag and rope stock, of which there is a scarcity at the present time. Caroá is a South American plant now little used commercially, but production and cost estimates indicate that its use for paper making would be practical. The caustic-soda process was employed in preparing the pulp. There was made unbleached paper that compared favorably with papers made from rag stock. The chemical consumption and yield of pulp were satisfactory. A comparative micrographic study was included in the investigation. (May 23, 1927.) pp. 24. Price, 25 cents.

T341. A Portable Apparatus for Transverse Tests of Brick.....A. H. Stang

The increasing importance of knowing the transverse strength of building brick and the desirability of making such tests where the brick are to be used have led the Bureau of Standards to design a portable machine for making these tests. The machine consists of the equalizer apparatus for transverse tests of brick described in Bureau of Standards Technologic Paper No. 251, a hydraulic jack, a frame, and Bourdon pressure gauges which indicate the load. The machine, complete, weighs 40 pounds. (May 31, 1927.) pp. 6. Price, 5 cents.

T342. Aging of Soft Rubber Goods..R. F. Tener, W. H. Smith, and W. L. Holt

In this investigation typical rubber compounds were prepared and subjected to different conditions of exposure, tests, etc., in order to determine the influence of various factors which affect the deterioration of rubber goods. In this way the effect of factors, such as light, heat, oxygen, moisture, and the degree of vulcanization, was determined. It was found that while all these factors contribute to deterioration not all rubber compounds are affected in the same way. For instance, certain compounds were found to be resistant to heat but not to light, while in other compounds the reverse was true. Future work will include the analysis of these differences to determine fundamental causes. (June 6, 1927.) pp. 32. Price, 15 cents.

T343. Study of the Windows of Window Envelopes for the Purpose of Developing Standard Specifications.....R. E. Lofton

Gives information as to the number of window envelopes used annually by the Government, defines the different types, and gives the essentials in the manufacture of the windows. Describes briefly methods of testing for transparency and gloss and gives results of tests. Specifications for quality of one-piece and two-piece windows are given and also the Post Office Department's regulations relating to window envelopes. Glassine windows are more permanent in transparency than one-piece windows. Tests indicate that one-piece windows will remain practically permanent in transparency for a year or more if properly stored. (June 6, 1927.) pp. 15. Price, 5 cents.

T344. Comparison of American, British, and German Standards for Machined Fits.....Irvin H. Fullmer

A comparison is made of the American standard tolerances and allowances for metal fits, as published in American Engineering Standards Committee report No. B4a–1925, with those of the British and German national standards which correspond in fundamentals to those of the American system. By means of charts the significance of the differences among them are shown, and the particular fits of the British and German systems which correspond most nearly to those of the American system are selected. (June 7, 1927.) pp. 7. Price, 10 cents.

T345. Note on the Determination of Weight per Gallon of Blackstrap Molasses
Carl F. Snyder and L. D. Hammond

In commercial transactions involving molasses it is frequently necessary to determine the weight per gallon. A number of methods are used in making this determination. Attention has been called to a new balance of the torsion type for the direct determination of the weight per gallon. The performance of the balance has been investigated, comparing the values obtained with those obtained on an analytical balance using standard molasses picnometers. The comparative values are given for two stock samples of blackstrap molasses. (June 10, 1927.) pp. 4. Price, 5 cents.

T346. Electrodeposition of Chromium for Chromic Acid Baths
H. E. Haring and W. P. Barrows

A detailed study is made of the chromic acid plating solution and of the conditions for its operation and control. The three principal types of chromic acid bath which have been developed during the past 70 years are shown to be identical, not only in initial behavior but also in ultimate composition. The recent commercial success of chromium plating is therefore attributed not to any changes which have been effected in the composition of the bath, but to its more careful operation and control. It was found that minor improvements could be effected in the throwing power of chromic acid baths, but that there appears to be little possibility of materially improving this property which has hindered the more general adoption of chromium plating. (June 10, 1927.) pp. 41. Price, 15 cents.

XI. CIRCULARS

[For price and latest edition see table on page 4]

C1. National Bureau of Standards.

Gives general information concerning the organization, functions, and work of the bureau. Cites accomplishments and includes illustrations typical of work in laboratories and facilities for same.

C268. United States Government Master Specification for Steam Hose.

This specification was officially adopted by the Federal Specifications Board on October 6, 1922, for the use of the departments and independent establishments of the Government in the purchase of steam hose. The specification was prepared in cooperation with the Rubber Association of America. The hose is of wrapped construction, consisting of a rubber tube, cotton duck reinforcements, and a rubber cover.

C269. United States Government Master Specification for Rubber-Metal Gasoline Hose.

This specification was officially adopted by the Federal Specifications Board on May 1, 1924, for the use of the departments and independent establishments of the Government in the purchase of rubber-metal gasoline hose. The specification was prepared in cooperation with the Rubber Association of America. The hose is made with a flexible metal tube, a rubber tube, and a cotton jacket, in lengths of 10, 12, or 25 feet as ordered, and is adapted for use in conducting gasoline.

C270. United States Government Master Specification for Mercerized Cotton Airplane Cloth, Grade A.

This specification is intended to cover the Government's requirements for mercerized cotton airplane cloth, grade A. This specification was prepared by the technical committee on textiles of the Federal Specifications Board and officially promulgated December 6, 1924. In its preparation the committee had the cooperation of the National Association of Cotton Manufacturers and the American Cotton Manufacturers Association, so that the requirements specified are essentially in agreement with commercial practice.

C271. United States Government Master Specification for Rubber Gloves for Electrical Workers (For Use in Connection with Apparatus or Circuits not Exceeding 3,000 Volts to Ground).

This specification was officially approved by the Federal Specifications Board on July 6, 1925, for the use of the departments and independent establishments of the Government in the purchase of rubber gloves for electrical workers. The technical requirements of this specification are the same as those of Standard Specification D–120–23, adopted by the American Society for Testing Materials. Two classes of gloves are provided for. Class A gloves are intended for use with external protection of leather or other materials.

C272. United States Government Master Specification for Brown Cotton Sheeting.

This specification is intended to cover the Government's requirements for brown cotton sheeting. This specification was prepared by the technical committee on textiles of the Federal Specifications Board and officially promulgated

July 6, 1925. In its preparation the committee had the cooperation of the National Association of Cotton Manufacturers and the American Cotton Manufacturers Association, so that the requirements specified are essentially in agreement with commercial practice.

C273. United States Government Master Specification for Bleached Wide Cotton Sheeting.

This specification is intended to cover the Government's requirements for bleached wide cotton sheeting. This specification was prepared by the technical committee on textiles of the Federal Specifications Board. In its preparation the committee had the cooperation of the National Association of Cotton Manufacturers and the American Cotton Manufacturers Association, so that the requirements specified are essentially in agreement with commercial practice.

C274. United States Government Master Specification for Bleached Cotton Sheets (Medium and High Count Sheeting).

This specification is intended to cover the Government's requirements for bleached cotton sheets of medium and high counts. This specification was prepared by the technical committee on textiles of the Federal Specifications Board. In its preparation the committee had the cooperation of the National Association of Cotton Manufacturers and the American Cotton Manufacturers Association, so that the requirements specified are essentially in agreement with commercial practice.

C275. United States Government Master Specification for Builders Hardware.

This specification was prepared by the technical committee for builders hardware of the Federal Specifications Board for the use of all Government departments and independent establishments in the purchase of builders hardware, and covers such items as door locks, hinges, latches, catches, turns, bolts, brackets, pivots, door closers, transom lifters and operators, and cabinet locks. Standard finishes, rules for hands of locks, and correct sizes of butts are described. Methods for testing nickel plating, zinc coatings, and japan coating are specified.

C276. Motor-Vehicle Headlighting.

Requirements for good road lighting are discussed and the construction and operation of present-day types of electric headlights explained. Few so-called antiglare devices have been found to be really effective, and the most practical solution to the headlighting problem under present conditions is the proper adjustment of lighting devices by manufacturers and sales agencies on new cars and careful maintenance of such adjustments by owners and drivers. The methods used at the Bureau of Standards for making laboratory tests on electric headlight devices are briefly described. State law is presented. The Appendix contains the specifications under which tests for approval of devices by State officials are made.

C277. United States Government Master Specification for Bleached Cotton Pillowcases.

This specification is intended to cover the Government's requirements for bleached cotton pillowcases. This specification was prepared by the technical committee on textiles of the Federal Specifications Board and officially promulgated. In its preparation the committee had the cooperation of the National Association of Cotton Manufacturers and the American Cotton Manufacturers Association, so that the requirements specified are essentially in accord with commercial practice.

C278. United States Government Master Specification for Brown Wide Cotton Sheeting.

This specification is intended to cover the requirements of the Government for brown wide cotton sheeting. This specification was prepared by the technical committee on textiles of the Federal Specifications Board and officially promulgated. In its preparation the committee had the cooperation of the National Association of Cotton Manufacturers and the American Cotton Manufacturers Association, so that the requirements specified are essentially in agreement with commercial practice.

C279. Relations Between the Temperatures, Pressures, and Densities of Gases.

This paper gives a simple but thorough discussion of the relations between the temperatures, pressures, volumes, and weights of gases. The experimental data involving high pressures, such as are encountered in the commercial handling of compressed gases, are presented in a form which permits of ready application. The compressibilities of gases as calculated from the equations of state of van der Waals, of Dieterici, and of Berthelot are compared with existing data for the purpose of estimating their accuracy in predicting the compressibilities of gases for which no experimental data are available. There is also included an extensive bibliography of the literature covering the subjects of the circular.

C280. Time Thoroughout the World.

This paper gives a brief historical sketch of the development of the standard time system, a map showing the time zone boundaries in the United States, and a list of the official stations sending out radio time signals. Time in nearly every foreign country and in many foreign cities is also given, compared with both Greenwich mean time and with noon, eastern standard time.

C281. The Technology of the Manufacture of Gypsum Products.

A number of gypsum mills were visited in the spring of 1924. An account of the methods of manufacture, including a description of each of the mills visited, together with a discussion as to the relative merits of processes found in use, is given.

C282. Fire-Clay Brick: Their Manufacture, Properties, Uses, and Specifications.

The paper embodies (1) a brief history of fire-clay brick manufacture, (2) a discussion of the geology and classification of the raw materials used, (3) a nontechnical description of the methods of manufacture and the properties and uses of the finished product, (4) F. S. B. Specification No. 268 for the purchase of fire-clay brick, and (5) a short bibliography.

C283. United States Master Specification for Stitches, Seams, and Stitching.

Specifications for stitches, seams, and stitching for use by Government departments, as prepared by the committee on standardized stitches and seams of the Federal Specifications Board.

C284. United States Government Master Specification for Rubber Bands.

This specification was officially adopted by the Federal Specifications Board on September 1, 1923, for the use of the departments and independent establishments of the Government in the purchase of rubber bands. The specification was prepared in cooperation with the Rubber Association of America.

C285. United States Government Master Specification for Slat-Surfaced Asphalt Prepared Roofing and Shingles.

This specification was prepared by the technical committee on bituminous roofing and waterproofing compounds, Federal Specifications Board, after careful consideration of suggestions from manufacturers. The specification covers both

slate-surfaced roll roofing and shingles. These shingles and this type of roll roofing are in a form ready for application to a roof. Complete methods for sampling and testing are included.

C286. United States Government Master Specification for Asphalt-Saturated Rag Felt for Flashings.

This specification was prepared by the technical committee on bituminous roofing and waterproofing compounds, Federal Specifications Board, after careful consideration of suggestions from manufacturers. The specification covers a type of material suitable for use in the construction of flashings in connection with built-up roofing and when it is desired to use a sheet heavier than 14 pounds for unsurfaced built-up roofing. Complete methods for sampling and testing are included.

C287. United States Government Master Specification for Asphalt-Saturated Woven Cotton Fabric for Waterproofing.

This specification was prepared by the technical committee on bituminous roofing and waterproofing compounds, Federal Specifications Board, after careful consideration of suggestions from manufacturers. This specification covers a type of cotton fabric which has been saturated with asphalt and is suitable for use with asphalt for waterproofing and damp proofing, by the so-called membrane system. Complete methods for sampling and testing are included.

C288. United States Government Master Specification for Tender Hose (Corrugated).

This specification was officially adopted by the Federal Specifications Board on October 6, 1922, for the use of the departments and independent establishments of the Government in the purchase of tender hose. The specification was prepared in cooperation with the Rubber Association of America. The hose consists of (1) an inner rubber tube, (2) two plies of cotton duck, (3) a helix of wire, (4) a layer of rubber, (5) two plies of cotton duck, (6) an outer cover of rubber.

C289. United States Government Master Specification for Divers' Hose.

This specification was officially adopted by the Federal Specifications Board on October 6, 1922, for the use of the departments and independent establishments of the Government in the purchase of divers' hose. The specification was prepared in cooperation with the Rubber Association of America. The hose is of braided construction, one-half inch diameter, and consists of a rubber tube, three plies of braided cotton reinforcement, and a rubber cover.

C290 United States Government Master Specification for Gas Hose.

This specification was officially adopted by the Federal Specifications Board on October 6, 1922, for the use of the departments and independent establishments of the Government in the purchase of gas hose. The specification was prepared in cooperation with the Rubber Association of America. The hose is of wrapped construction, five-sixteenth inch diameter, and consists of a rubber tube, cotton duck reinforcements, and a rubber cover. It is branded "ACETHYD" for acetylene-hydrogen and "OXY" for oxygen.

C291. United States Government Master Specification for Water and Wash Deck Hose.

This specification was officially adopted by the Federal Specifications Board on October 6, 1922, for the use of the departments and independent establishments of the Government in the purchase of water hose. The specification was prepared in cooperation with the Rubber Association of America. The hose is of wrapped construction, consisting of a rubber tube, cotton-duck reinforcements, and a rubber cover.

C292. United States Government Master Specification for Water-Suction Hose (Smooth Bore).

This specification was officially adopted by the Federal Specifications Board on October 6, 1922, for the use of the departments and independent establishments of the Government in the purchase of water-suction hose. The specification was prepared in cooperation with the Rubber Association of America. The hose consists of (1) an inner rubber tube, (2) a layer of cotton duck, (3) a helix of wire with rubber filling between the coils, (4) a second layer of rubber, (5) layers of cotton duck, (6) an outer rubber cover.

C293. United States Government General Specification for Textile Materials (Methods of Physical and Chemical Tests).

General methods of testing textiles have been drawn up for use in making determinations in textile specifications promulgated by the Federal Specifications Board so that variations introduced by different test methods may be eliminated. They are not intended to include all the textile test methods in use in the textile industry. It is probable that they will be revised and added to from time to time as the necessity arises.

C294. Standards for Paper Towels.

Results of an investigation made for the purpose of developing specifications for purchase of paper towels are given. Wide variation was found in this paper product as regards both quality and methods of marketing.

The composition of the different kinds of paper toweling is described and considerations involved in valuation discussed. Recommendations are made in respect to methods of testing, simplification of sizes, basis for expression of weight, unit of payment, and unit of packaging. Specifications are suggested for towels suitable for general use.

C295. Temperature Corrections to Readings of Baumé Hydrometers, Bureau of Standards Baumé Scale for Sugar Solutions (Standard at 20° C.).

In trade transactions involving the sale of molasses it is the general practice to make the Baumé determinations at various temperatures between 38° C. and 60° C. To facilitate the correction of the hydrometer readings to the standard temperature of 20° C. a table of temperature corrections has been calculated. This table is submitted as supplementary to the Baumé table of Bates and Bearce (B. S. Tech. Paper No. 115) and the table of temperature corrections for Brix hydrometers (Table 11, B. S. Circular No. 44).

C296. Research Associates at the National Bureau of Standards.

Recites history of research associate plan at the bureau, and discusses cooperation with the industries and advantages offered for research work at bureau. Gives list of organizations accorded research associate privileges, general fields of research, specific problems, and names of research associates. Specific illustrations of problems undertaken and value of results are given.

C297. United States Government Master Specification for Plastic Fire-Clay Refractories.

This specification, prepared for the Federal Specifications Board by its technical committee, provides for one class of material and specifies that this material shall contain not more than 65 per cent total SiO_2; that the softening point shall not be less than that of standard pyrometric cone No. 31; that when delivered it shall contain not more than 15 per cent water; that the total linear dry-and-burned shrinkage shall not exceed 4 per cent; and, when specified, that the material shall pass the simulated service test. The specification also contains detailed instructions for sampling and testing.

C298. United States Government Master Specification for Fire Clay.

This specification, prepared for the Federal Specifications Board by its technical committee, provides for two classes of material. Class F shall be ground to such fineness that not less than 96 per cent shall pass a 20-mesh sieve; it shall show satisfactory bonding power; the softening point shall be not more than 3 cones (approximately 60° C.) lower than that of the brick with which it is to be used; and, when required, it shall pass the Navy simulative service test. Material of class C shall have the same softening point and bonding power as that of class F, but only 90 per cent need pass a 20-mesh sieve, and the simulative service test shall not be required.

C299. United States Government Master Specification for Fire-Clay Brick.

This specification, prepared for the Federal Specifications Board by its technical committee, provides for six classes of material. The general requirements for fire-clay brick are given and, in addition, requirements for each class and methods of testing are detailed. The specification also contains definitions of each class based on the service for which the brick of each class is intended.

C300. Architectural Acoustics.

The fundamental principles governing the construction of an acoustically successful auditorium are no longer new, but are not yet generally understood by those engaged in such work. In this circular these principles are stated, and an example is worked out showing their practical application to the planning of a new auditorium or to the curative treatment of one that has proved to be unsatisfactory.

C301. United States Government Master Specification for Ink, Drawing, Colored Waterproof.

The specification calls for two types of ink—solution of dye and suspension of insoluble pigment. Each of these is in the colors, red, orange, yellow, green, blue, violet, and brown. Formulas are given for standard inks of the first type Tests for determining the quality of samples submitted are described.

C302. United States Government Master Specification for Flake Orange Shellac.

This specification was prepared by the technical committee on paints and oils of the Federal Specifications Board after carefully considering suggestions from shellac importers and varnish manufacturers. The specification covers requirements for orange-flake shellac for use in ship-bottom paints and in the preparation of orange-shellac varnish. Four types of shellac are covered and detailed directions for sampling and testing are included.

C303. United States Government Master Specification for Shellac Varnish.

This specification was prepared by the technical committee on paints and oils of the Federal Specifications Board after carefully considering suggestions from shellac importers and varnish manufacturers. The specification covers light, medium, and heavy body varnishes made from two types of orange shellac and two types of bleached shellac. Detail directions for sampling and testing are included.

C304. Properties and Manufacture of Concrete Building Units.

Numerous inquiries have been received at the Bureau of Standards from prospective makers or users of concrete units, who were interested in learning more of their properties or the details of the manufacturing methods. This circular endeavors to bring out the essential features concerning concrete brick, block, and building tile, and to give some information on their manufacture.

C305. United States Government Master Specification for Rubber Tubing.

This specification was officially adopted by the Federal Specifications Board on September 15, 1922, for the use of the departments and independent establishments of the Government in the purchase of rubber tubing. The specification was prepared in cooperation with the Rubber Association of America. Two grades of tubing are provided for as follows: Grade A, known as "pure gum" tubing, contains not less than 90 per cent by volume of rubber. Grade B, known as "compounded" tubing, contains not less than 60 per cent by volume of rubber.

C306. United States Government Master Specification for Rubber Matting.

This specification was officially adopted by the Federal Specifications Board on March 1, 1926, for the use of the departments and independent establishments of the Government in the purchase of rubber matting. The specification, which was prepared in cooperation with the Rubber Association of America, gives dimensions and general requirements for the construction of roll matting suitable for floor covering. It also includes detailed test requirements for the rubber compound and fabric used.

C307. United States Government Master Specification for Pneumatic Hose.

This specification was officially adopted by the Federal Specifications Board on October 6, 1922, for the use of the departments and independent establishments of the Government in the purchase of pneumatic hose. The specification was prepared in cooperation with the Rubber Association of America. The hose is of wrapped construction, consisting of a rubber tube, cotton duck reinforcements, and a rubber cover. It is branded "Rock-drill" or "Pneumatic-tool" as specified.

C308. United States Government Master Specification for Rubber Stoppers.

This specification was officially adopted by the Federal Specifications Board on March 1, 1926, for the use of the departments and independent establishments of the Government in the purchase of rubber stoppers. The specification was prepared in cooperation with the Rubber Association of America. The stoppers are suitable for general laboratory use. The specification provides detail requirements regarding composition of the rubber, sizes, dimensions, and methods of test.

C309. Gas-Measuring Instruments.

Classifies and describes the various instruments and methods used for measuring gas. The methods of calibrating the several grades of volume standards are described and many precautions to be taken therewith are noted.

Contains a description of the construction and operation of positive displacement meters, particularly the tin-case meter, The methods and precautions to use in testing and adjusting these meters is given.

The description and equations given in the sections on velocity and heating types of meter give a working knowledge of that class of meters. A bibliography is given containing a list of many of the articles related to this subject. Frequent reference is made to many of these articles throughout the test.

C310. United States Government Master Specification for Plumbing Fixtures (for Land Use).

This specification covers water-closet bowls, lavatories, sinks, bathtubs, laundry trays, shower baths, toilet and bath inclosures, water heaters, faucets, valves, bibbs and accessories, slate, soapstone, marble, and glass. It also covers the method of installation and describes the tests which may be required.

C311. Stucco Investigations at the Bureau of Standards with Recommendations for Portland Cement Stucco Construction.

During the past few years there has been a rapid and widespread growth in the use of stucco for the exterior finish of various types of buildings. The Bureau

of Standards in cooperation with interested associations and manufacturers has carried out a number of investigations for the improvement of stucco construction. This paper summarizes briefly these studies and outlines the essential factors to be considered for satisfactory stucco work. Several types of construction widely used for stucco are described, and illustrations are given of the details of good design. The requirements of the commonly used materials are specified and methods are given for proportioning, mixing, and applying the mortar. Several of the finish treatments are described and illustrated and some suggestions are given for the repair and painting of stucco.

C312. United States Government Master Specification for Rubber Matting for Use Around Electrical Apparatus or Circuits not Exceeding 3,000 Volts to Ground.

This specification was officially promulgated by the Federal Specifications Board on May 22, 1926, for the use of the departments and independent establishments of the Government in the purchase of rubber matting for use around electrical apparatus or circuits not exceeding 3,000 volts to ground. The specification is the same, except in form, as specification D–178–24 adopted by the American Society for Testing Materials.

C313. United States Government Master Specification for Huck Towels (With Woven Name).

This specification is intended to cover the Government's requirements for huck towels with woven name. It was prepared by the technical committee on textiles of the Federal Specifications Board and officially promulgated July 9, 1926. In its preparation the committee had the cooperation of the National Association of Cotton Manufacturers and the American Cotton Manufacturers Association.

C314. United States Government Master Specification for Soda Ash.

This specification is intended to cover the Government's requirements for soda ash for laundering and cleaning purposes. The material called for is the "58 per cent ordinary (or light) soda ash." This specification was prepared by the technical committee on miscellaneous chemical products of the Federal Specifications Board, in cooperation with the alkali manufacturers, and was officially promulgated by the Federal Specifications Board on September 25, 1926. The detail requirements cover the maximum and the minimum of the ingredients. Methods of sampling and testing are included. The specification does not apply to the grade of soda ash used in glass making.

C315. United States Government Master Specification for Caustic Soda (Lye) (for Cleaning Purposes).

This specification is intended to cover the Government's requirements for caustic soda or lye for general cleaning purposes. The material called for is the grade containing a minimum of 90 per cent of sodium hydroxide. This specification was prepared by the technical committee on miscellaneous chemical products of the Federal Specifications Board in cooperation with the alkali manufacturers, and was officially promulgated by the Federal Specifications Board on September 25, 1926. The detail requirements cover maximum and the minimum of the ingredients. Methods of sampling and testing are included.

C316. United States Government Master Specification for Laundry Soda (Washing Soda).

This specification is intended to cover the Government's requirements for laundry soda or washing soda suitable for general laundry work. The material called for is a so-called "modified soda"—a mixture of sodium carbonate and sodium bicarbonate. This specification was prepared by the technical committee on miscellaneous chemical products of the Federal Specifications Board in cooperation with the alkali manufacturers, and was officially promulgated by the

Federal Specifications Board on September 25, 1926. The detail requirements cover the maximum and the minimum of the ingredients. Methods of sampling and testing are included.

C317. United States Government Master Specification for Sodium Carbonate, Granular (Monohydrate Crystals).

This specification is intended to cover the Government's requirements for sodium carbonate, granular, for laundering and cleaning purposes. The material is also suitable for photographic purposes. The product called for is a granular sodium carbonate containing one molecule of water of crystallization and known in the trade as "monohydrate crystals." This specification was prepared by the technical committee on miscellaneous chemical products of the Federal Specifications Board, in cooperation with the alkali manufacturers, and was officially promulgated by the Federal Specifications Board on September 25, 1926. The detail requirements cover the maximum and the minimum of the ingredients. Methods of sampling and testing are included.

C318. United States Government Master Specification for Safety Matches (Full Size, in Boxes).

This specification is intended to cover the Government's requirements for safety matches. This specification was prepared by the technical committee on miscellaneous chemical products of the Federal Specifications Board and officially promulgated September 25, 1926. In its preparation the committee carefully considered suggestions from match manufacturers. The detail requirements cover the performance of the splints, heads, and box coatings. Methods of sampling, testing, packing, and marking are included.

C319. Index of United States Government Master Specifications Promulgated by the Federal Specifications Board. Alphabetical List and Numerical List.

This circular covers an alphabetical list and a numerical list of specifications, instructions for obtaining copies of specifications, a brief outline of the purpose of the Federal Specifications Board, and a reference to the Directory of Specifications and summary of commodities contained therein.

C320. Puncture-Sealing Compounds for Pneumatic Tires.

This circular was prepared as an answer to the numerous requests which the bureau receives for information concerning puncture-sealing compounds for pneumatic tires. The different methods which are employed to render tires "puncture proof" or self-sealing against punctures are described, and a discussion is given of the type which is the most common. Arguments for and against the use of such puncture-sealing compounds are given as well as answers to the usual questions which are asked concerning them.

C321. United States Government Master Specification for Masonry Cement.

This specification was officially promulgated by the Federal Specifications Board on October 28, 1926, for the use of the departments and independent establishments of the Government in the purchase of masonry cement.

C322. United States Government Master Specification for Integral Waterproofing Material, Water-Repellent Type (for Use with Portland Cement Mortar or Concrete).

This specification was officially promulgated by the Federal Specifications Board on October 28, 1926, for the use of the departments and independent establishments of the Government in the purchase of integral waterproofing material, water-repellent type (for use with Portland cement mortar or concrete).

C323. United States Government Master Specification for Plastic Magnesia Cement (Magnesia-Oxychloride) Used as Flooring, Bases, Wainscots, etc.

This specification was officially promulgated by the Federal Specifications Board on October 28, 1926, for the use of the departments and independent establishments of the Government in the purchase of plastic magnesia cement (magnesia-oxychloride), used as flooring, bases, wainscots, etc.

C324. United States Government Master Specifications for Manila Rope.

This specification was officially promulgated by the Federal Specifications Board on June 15, 1923, for the use of Government departments and independent establishments for the purchase of manila rope. The specification was revised on November 22, 1926.

C325. Ceramic Properties of Some White-Burning Clays of the Eastern United States.

This paper contains a rather thorough study of certain of the qualities of a large number of white-burning clays from the eastern United States. This study was made with a view to determining the possible domestic sources of clays of the character which are so largely imported for the pottery trade. The work covers the determination of the fineness of grain, the mineral constituents, and the burning properties of the clays, and also a study of the character of the porcelain produced when these clays were used as the source of china clay.

C326. United States Government Master Specification for Cotton Rope.

The attached specification was officially promulgated by the Federal Specifications Board on November 22, 1926, for the mandatory use of the departments and independent establishments of the Government in the purchase of cotton rope.

C327. Garden Hose.

This circular describes briefly the manufacture of garden hose, of which there are three general types known as "wrapped," "braided," and "cotton rubber-lined." The essential characteristics of the different kinds of hose are pointed out, and simple methods of inspection and test are given. The advantages and disadvantages of the different types of hose are outlined, and suggestions are offered as to the selection of hose to meet particular service conditions. Detailed directions for the use and care of hose are given, and a chart is presented to show the discharge capacities of ½, ⅝, and ¾ inch hose.

C328. Testing of Measuring Tapes at the Bureau of Standards.

The bureau's bench standard for testing the steel tapes used by engineers and surveyors is described, also the more elaborate apparatus for standardizing the base-line tapes used in geodetic measurements. The methods used at the Bureau of Standards in testing tapes are outlined and illustrated with specimen observation and computation sheets. The specifications for standard steel tapes are given. An analysis is made of the precision obtainable with the geodetic tape-testing equipment, and it is concluded that the absolute error of the determinations of the lengths of invar tapes with this apparatus does not exceed 1 part in 1,000,000.

C329. Calibration of a Divided Scale.

The method of calibrating a graduated scale is given in sufficient detail to enable one to carry out the calibration in ordinary cases. Modifications have been made in the computation forms to make the calculations more straightforward and to lessen the possibility of error.

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C330. United States Government Master Specification for Boiled Linseed Oil.

This revised specification, prepared by the technical committee on paints after consultation with the industry, was officially adopted by the Federal Specifications Board on March 5, 1927, for use of the Government in the purchase of boiled linseed oil. Two types of boiled linseed oil, kettle-boiled and quick process, are covered. The topics considered include maximum and minimum values of the significant properties with methods of sampling and testing.

C331. United States Government Master Specification for Chrome Yellow (Lemon, Medium and Orange; Dry, Paste on Oil, and Paste in Japan).

This specification, prepared by the technical committee on paints after consultation with the industry, was officially adopted by the Federal Specifications Board on March 5, 1927, for use of the Government in the purchase of chrome yellow. It covers a wide variety of lemon, medium and orange yellows, as dry pigments, as pastes in oil, and as pastes in japan. The topics covered include maximum values of the significant properties and methods of sampling and testing.

C332. Testing of Line Standards of Length.

Contains information on the primary standards of length, comparators and other apparatus for length measurements, and methods of comparing and verifying length standards. The edition of April 30, 1915, of Circular No. 2 has been completely revised and considerable new material added. It is now published as Circular No. 332. The circular gives regulations under which yard and meter standards, tapes, etc., are tested by the bureau; also shipping directions, etc.

C334. United States Government Master Specification for Asbestos Wick and Rope Packings.

This specification was officially promulgated by the Federal Specifications Board on May 12, 1927, for the use of the departments and independent establishments of the Government in the purchase of asbestos wick and rope packings. The specification was prepared in cooperation with manufacturers of gaskets and packing materials.

C335. United States Government Master Specification for Hard-Fiber Sheet Packing.

This specification was officially promulgated by the Federal Specifications Board on May 12, 1927, for the use of the departments and independent establishments of the Government in the purchase of hard-fiber sheet packing. The specification was prepared in cooperation with manufacturers of packing materials. The packing is made from all-cotton cellulose paper without sizing or foreign materials other than dyes or pigments.

C336. United States Government Master Specification for Metallic Incased Gaskets.

This specification was officially promulgated by the Federal Specifications Board on May 12, 1927, for the use of the departments and independent establishments of the Government in the purchase of metallic incased gaskets. The specification was prepared by the Federal Specifications Board technical committee on gaskets and packing materials, in cooperation with manufacturers of gasket materials. The gaskets are made of annealed sheet metal with an asbestos or cork core and are designated as type A and type B, respectively.

XII. HANDBOOKS

H6. Safety Rules for the Installation and Maintenance of Electrical Supply Stations.

This handbook contains that portion of the National Electrical Safety Code dealing with the installation and maintenance of electrical equipment in generating stations and substations. Regulations deal with the general protective arrangements of equipment and include special sections dealing, respectively, with rotating equipment, storage batteries, transformers, conductors, fuses, switches, switchboards, lightning arresters, and grounding. The rules have recently been revised according to the procedure of the American Engineering Standards Committee, and this publication represents the fourth edition. (Feb. 5, 1926.) pp. 56. Price, 10 cents.

H7. Safety Rules for the Installation and Maintenance of Electric Utilization Equipment.

This consists of section 9 and part 3 of the fourth edition of Handbook No. 3. (Mar. 12, 1926.) pp. 71. Price, 15 cents.

HB8. Rules for the Operation of Electrical Equipment and Lines.

This book gives the rules for the operation of electrical equipment and lines constituting part 4 of the National Electrical Safety Code. It covers both supply and communication equipment and lines, and rules are given for the guidance of both the employer and the employee. Special rules are included for the special activities involved in particular kinds of work. (July 15, 1926.) pp. 63. Price, 15 cents.

H9. Safety Rules for Radio Installations.

These rules cover the construction and installation of radio equipment, including antennas, constituting part 5 of the National Electrical Safety Code. Both receiving and transmitting stations are included, except that high-power transmitting stations are classed with generating stations and are expected to meet the rules for equipment of that type which is covered in Handbook No. 6. (July 15, 1926.) pp. 24. Price, 10 cents.

H10. Safety Rules for the Installation and Maintenance of Electrical Supply and Communication Lines.

This handbook comprises part 2 of the National Electrical Safety Code which is published complete as Handbook No. 3. Part 2 gives rules for the construction and maintenance of overhead and underground lines not only where alone, but where involved with other utility property in crossings, conflicts, or joint use of poles. Clearances and strength of construction are fully dealt with, as well as other details of line construction. (April 15, 1927.) pp. 322. Price, 60 cents.

XIII. SIMPLIFIED PRACTICE RECOMMENDATIONS

R34. Warehouse Forms.

Simplified Practice Recommendation No. 34 is one of a series of publications on the elimination of waste in industry. It contains a history of the development, report of the general conference, and the result obtained in an effort to eliminate excess variety of warehouse forms. It shows facsimiles of the approved forms. The specific recommendations of the general conference covered in this publication, which have been accepted by representative users, are to become effective forthwith. Price, 10 cents.

R37. Commercial Forms (Invoice, Inquiry, and Purchase Order).

Simplified Practice Recommendation No. 37 is one of a series of publications on the elimination of waste in industry. It contains a history of the development, report of the general conference, and the result obtained in an effort to eliminate excess variety of invoice, purchase order, and inquiry forms. It shows facsimiles of the approved forms. The specific recommendations of the general conference covered in this publication, which have been accepted by representative users, are to become effective at once. Price, 5 cents.

R38. Sand-Lime Brick.

Simplified Practice Recommendation No. 38 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a history of the development, report of the general conference, and the result obtained in an effort to eliminate excess variety in sizes of sand-lime brick. This project is to become effective from July 1, 1925. Price, 5 cents.

R39. Dining Car Chinaware.

Simplified Practice Recommendation No. 39 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a report of a general conference and a simplified list of items of chinaware for hotel, restaurant, cafeteria, hospital, Government service, plus the additional items adopted for the dining-car service. This program is to become effective from July 1, 1925, subject to annual revision. Price, 5 cents.

R40. Hospital Chinaware.

Simplified Practice Recommendation No. 40 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a history of the development, report of the general conference, and the result obtained in an effort to eliminate excess variety in sizes of hospital chinaware. This project is to become effective from July 1, 1925. Price, 5 cents.

R41. Package Sizes for Insecticides and Fungicides.

Simplified Practice Recommendation No. 41 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a report of the general conference and a standard list of package sizes for arsenate of lead, calcium arsenate, Paris green, and Bordeaux mixture. This program is to become effective from May 1, 1926, subject to revision semiannually by the standing committee of the industry. Price, 5 cents.

R42. Paper Grocers' Bags.

Simplified Practice Recommendation No. 42 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a history of the development, report of the general conference, and the result obtained in an effort to eliminate excess variety in capacities, colors, qualities, and strengths of paper grocers' bags. This project is to become effective from October 15, 1925. Price, 5 cents.

R43. Paint and Varnish Brushes.

Simplified Practice Recommendation No. 43 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a history of the project, survey of conditions in the industry, report of the general conference, and the result obtained in an effort to eliminate excess variety in sizes and types of paint and varnish brushes. This program is to become effective September 1, 1926. Price, 5 cents.

R44. Boxboard Thicknesses.

Simplified Practice Recommendation No. 44 is one of a series of publications on the elimination of waste in industry. It contains a history of the development, report of the general conference, and the result obtained in an effort to eliminate excess variety of thicknesses and colors of stock for containers and set-up folding boxes. It carries tables of thicknesses adopted by the industry for all kinds, grades, and qualities of box board considered by the conference. This program is to become effective from October 1, 1925. Price, 5 cents.

R45. Grinding Wheels.

Simplified Practice Recommendation No. 45 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a history of the development, report of the general conference, and the result obtained in an effort to eliminate excess variety of grinding wheels. This project is to become effective, as applying to new production, January 1, 1926, and for existing stocks before July 1, 1926. Price, 10 cents.

R46. Tissue Paper.

Simplified Practice Recommendation No. 46 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a history of the project, report of the general conference, and tables of the recommended sizes, weights, and counts of tissue paper. This project is effective from March 31, 1926. Price, 5 cents.

R47. Cut Tacks and Small Cut Nails.

Simplified Practice Recommendation No. 47 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a simplified schedule of styles, sizes and methods of packing, report of the general conference, and the result obtained in an effort to eliminate excess variety in this commodity. This program is to be effective from January 1, 1926. Price, 5 cents.

R48. Shovels, Spades, and Scoops.

Simplified Practice Recommendation No. 48 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a history of the project, reports of the first and second general conferences, and the result obtained in an effort to eliminate multiples, sizes, and grades of shovels, spades, and scoops. This project is to be effective July 1, 1926, subject to annual revision by a standing committee representing manufacturers, jobbers, retailers, and users. Price, 5 cents.

R49. Sidewalk, Floor, and Roof Lights.

Simplified Practice Recommendation No. 49 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a history of the development, report of the general conference, and the result obtained in an effort to eliminate excess variety in sizes, styles, and shapes of sidewalk, floor, and roof lights. This project is to become effective from March 1, 1926, subject to annual revision. Price, 5 cents.

R50. Bank Checks, Notes, Drafts, and Similar Instruments.

Simplified Practice Recommendation No. 50 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a report of the general conference, the recommended sizes and arrangement of subject matter on bank checks, notes, drafts, and similar instruments, and facsimiles of the national standard bank draft, checks, etc. This program is to become effective from March 1, 1926, subject to biennial revision by the standing committee of the industry. Price, 5 cents.

R51. Die Head Chasers (for self-opening and adjustable die heads).

Simplified Practice Recommendation No. 51 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a history of the project, survey of conditions in the industry, report of the general conference, and the result obtained in an effort to eliminate excess variety in sizes and types of chasers for self-opening and adjustable die heads. This program is to become effective from April 1, 1926, subject to annual revision. Price, 5 cents.

R52. Staple Vitreous China Plumbing Fixtures.

Simplified Practice Recommendation No. 52 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a history of the project, report of the general conference, and the result obtained in an effort to eliminate excess variety and types of vitreous china plumbing fixtures, to establish dimensional standards and a uniform system of nomenclature, grading, marking, and labeling. This program became effective October 1, 1926, subject to annual revision by the standing committee of the industry. Price, 5 cents.

R53. Steel Spiral Rods.

Simplified Practice Recommendation No. 53 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a history of the project, survey of conditions in the industry, report of the general conference, and the result obtained in an effort to eliminate excess variety in sizes and types of steel spiral rods. This program is to become effective December 15, 1926. Price, 5 cents.

R54. Sterling Silver Flatware.

Simplified Practice Recommendation No. 41 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a report of the preliminary and general conferences and a simplified list of stock items in sterling silver flatware patterns. This program is to be effective from January 1, 1926, subject to regular annual revision by a similar general conference Price, 5 cents.

R55. Tinware, Galvanized and Japanned Ware.

Simplified Practice Recommendation No. 55 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a history of the project, survey of conditions in the industry, report of the gen-

eral conference, and the result obtained in an effort to eliminate excess variety in sizes and types of tinware, galvanized and japanned ware. This program is to become effective July 1, 1926. Price, 5 cents.

R56. Carbon Brushes and Brush Shunts.

Simplified Practice Recommendation No. 56 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a history of the project, report of the general conference, and the results obtained in an effort to eliminate unnecessary variety in sizes and types of carbon commutator brushes and brush shunts. This program was made effective for new production, November 1, 1926, subject to regular annual revision by a conference of the standing committee. Price, 5 cents.

R57. Wrought-Iron and Wrought-Steel Pipe, Valves, and Fittings.

Simplified Practice Recommendation No. 57 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains a history of the project, survey of conditions in the field, report of the general conference, and the results obtained in an effort to reduce the variety of stock sizes of these items. This program was made effective, for new production on September 1, 1926, and for existing stocks, on January 1, 1927, subject to regular annual revision by a conference of the standing committee of the industry. Price, 5 cents.

R58. Classification of Iron and Steel Scrap.

Simplified Practice Recommendation No. 58 is of a series of publications on the elimination of waste in industry through standardization of commercial methods. It contains the report of the general conference of February 4, 1926, and the simplified classification covering iron and steel scrap. This program is to be effective from July 1, 1926, subject to annual revision by a standing committee of the industry. Price, 10 cents.

R59. Rotary-Cut Lumber Stock for Wire-Bound Boxes.

Simplified Practice Recommendation No. 59 is one of a series of publications on the elimination of waste in industry through simplified practice. It contains the report of a general conference and the simplified schedule developed to eliminate unnecessary thicknesses, widths, and lengths of rotary-cut lumber stock for wire-bound boxes. This new practice is effective from November 1, 1926, subject to regular semiannual revision by a general conference or the standing committee appointed by the conference of September, 1926. Price, 5 cents.

R62. Metallic Cartridges.

On October 19, 1926, a conference of manufacturers and distributers of metallic cartridges was held at Atlantic City, N. J. This meeting adopted a simplified practice recommendation which was later approved by the industry. This schedule is effective from January 1, 1927, subject to annual revision, and the metallic cartridges not covered by the simplified list are to be supplied as standard only until the stocks on hand on that date become exhausted. Price, 5 cents.

RXIII. A Primer of Simplified Practice.

A Primer of Simplified Practice is one of a series of publications on the elimination of waste in industry through simplified practice. This bulletin presents 50 of the most commonly-asked questions in connection with the methods and advantages of simplified practice and attempts to answer them in the most concise and understandable way. It illustrates the theoretical benefits to be gained with examples of the advantages which have accrued to various industries through the application of this method of waste elimination. Price, 15 cents.

XIV. BUILDING AND HOUSING

BH8. Recommended Practice for Arrangement of Building Codes.

A description of existing diversity of building-code arrangement with administrative advantages of uniform and logical sequence of requirements. Presents a recommended outline for chapters, sections, and principal subdivisions of building codes. The main divisions are arranged as nearly as possible in the sequence in which reference is necessary to code requirements when a building is planned, designed, and constructed. The content of each heading is plainly indicated by descriptive material explanatory of its meaning. The report provides for all types of municipal requirements having to do with safety of buildings or equipment, though it is expected not all sections or subdivisions will necessarily be utilized in any one code. (July 5, 1925.) 29 pp. Price, 10 cents.

BH9. Recommended Building Code Requirements for Working Stresses in Building Materials.

In its sixth report the Department of Commerce Building Code Committee presents recommended building-code requirements for unit working stresses in reinforced concrete, cast iron, steel, and timber. The report calls attention to the fact that improvements in materials and methods and particularly in construction supervision justify a reexamination of present code requirements. Marked economies over prevailing practice are held to be possible in most instances. The committee has given careful attention to the existing data on strength of materials and has had the benefit of constructive criticism from a large number of individuals and of organizations in the building industry. Its recommendations are expected to bring about more uniform building practice and to result in buildings that are structurally safe while permitting economies not possible in many localities at present. (June 1, 1926.) 53 pp. Price, 10 cents.

XV. MISCELLANEOUS PUBLICATIONS

M65. National Directory of Commodity Specifications: Classified and Alphabetical Lists and Brief Descriptions of Existing Commodity Specifications.

This contains an alphabetical list of such commodities as are paid for out of taxes and also a thoroughly classified list of the specifications for these commodities formulated not only by the public purchasing agencies, but also by other organizations having national recognition. In collecting the specifications correspondence was carried on with over 500 public purchasing organizations and more than 500 technical societies and trade associations vitally interested in specifications. The work has been carried on cooperatively by the Bureau of Foreign and Domestic Commerce and the Bureau of Standards in accordance with detailed plans formulated or approved by an advisory board composed of representatives of 14 national organizations interested in the preparation and unification of specifications, as follows: American Electric Railway Association, American Engineering Standards Committee, American Hospital Association, American Hotel Association, American Society for Testing Materials, Associated Business Papers (Inc.), Associates for Government Service (Inc.), Chamber of Commerce of the United States, National Association of Manufacturers, National Association of Purchasing Agents, National Conference of Business Paper Editors, National Conference of Governmental Purchasing Agents, National Electric Light Association, and the Society of Automotive Engineers. (Aug. 28, 1925.) 385 pp. Price, $1.25.

M66. Second Technical Conference of State Utility Commission Engineers.

Contains an address by the Director of the Bureau of Standards, and papers with extended discussions on problems involved in making public utility valuations and rates; rural extensions and rural electric service; a proposed classification of quantity units for telephone service; and informal discussion on engineering problems of interest to public service commission engineers, such as voltage classification of circuits, gas service conditions and production of carbon monoxide, and voltage variations on electric circuits. 98 pp. Price, 15 cents.

M67. Kilocycle-Meter Conversion Table.

A card 6 by 11 inches giving a table to be used in converting meters to kilocycles or kilocycles to meters. Both units are extensively used in radio, and this publication fills the need of a rapid means of obtaining one in terms of the other. Pairs of values are given for every tenth number from 10 to 10,000. Price, 5 cents.

M68. Adjust your Headlights.

A chart (folder) 9 by 23 inches describing and illustrating manner of properly adjusting automobile headlights. Price, 5 cents.

M69. Annual Report of the Director of the Bureau of Standards to the Secretary of Commerce for the Fiscal Year Ended June 30, 1925.

Beginning with the annual report for the fiscal year ended June 30, 1925, the annual report has been amplified to include more complete reference to and description of the completed and pending research and testing for the year. In addition, there has been introduced a general section at the beginning outlining the functions, organization, and location of the bureau. The functions relate to

standards of measurements, standard physical constants, standards of quality, standards of performance, and the relation of the bureau's work to the public. A chart gives an analytical synopsis of the functions of the bureau with the scope, purpose, and effect of each function. At the end are given brief summaries of the work of publications, library, correspondence, stores, personnel, appropriations, and accounts, as well as mechanical plant, construction facilities, and the care of buildings and grounds. There is a concluding section relating to recommendations.

M70. Report of Eighteenth National Conference on Weights and Measures of the United States. (1925.)

Contains addresses by the Secretary of Commerce and the president of the conference; papers and discussions on methods of sale of ice cream, methods and equipment for field and factory tests of heavy-capacity platform scales, practicability of sale of commodities on basis of moisture-free ingredients, methods of test of taximeters, test-car accuracy, Post Office Department program for maintaining accuracy of scales, necessity for tolerances in excess weighing in the Customs Service, progress of weights and measures in the far West, railroad supervision of baggage and freight scales, meeting problem of pedlars and transient vendors, supervision of weighmasters, and activity of Bureau of Standards in increasing accuracy of freight weighing; and reports on specifications and tolerances for vehicle tanks (adopted) and for taximeters (adopted tentatively), on tolerances for bread (adopted) and on amendment to model law with reference to sales of service (adopted). 187 pp. Price, 50 cents.

M71. Compressibilities of Gases.

This paper contains 13 graphs (8 x 9½ inches) for computing the compressibilities of air, argon, helium, hydrogen, methane, neon, nitrogen, and oxygen, and for computing the volumes delivered from cylinders containing argon, helium, hydrogen, nitrogen, and oxygen at high pressures. Price, 10 cents.

M72. Strain Lines Developed by Compressive Tests on Structural Members of the Delaware River Bridge at the United States Bureau of Standards for the Delaware River Bridge Joint Commission.

Although the Luder or Hartman lines on the surface of a steel specimen which has been stressed to the yield point have been known for many years they could not be readily photographed because of the lack of contrast. It was found in testing portions of the Delaware River Bridge under compressive loads that the surface of the specimen could be coated with a thin mixture of white Portland cement and water, which dried to a clear white. The portions of the specimen which reached the yield point of the steel were clearly shown and readily photographed. The method is described, and two typical photographs illustrate the results which were obtained. A poster 14¾ by 18 inches. Price, 5 cents.

M73. Subject Index of United States Government Master Specifications.

Alphabetical list of specifications which have been officially adopted and promulgated by the Federal Specifications Board as United States Government master specifications, for the mandatory use of all departments and independent establishments of the Government. 6 pp. Price, 5 cents.

M74. Report of Nineteenth National Conference on Weights and Measures.

Contains addresses by the Secretary of Commerce and the president of the conference; papers and discussions on subjects, such as bottles for dispensing lubricating oils, gauging of fuel-oil storage tanks, transmission drive for taximeters, problems in livestock weighing, testing of clinical thermometers, measurement of petroleum products, cooperation of compulsory sales-by-weight statutes, solving weights and measures problems in the South, weights and measures

prosecutions, use of auxiliary automobile tanks for checking gasoline deliveries, testing standards of mass, regulating the sale of eggs, weighing in industry, mandatory net-content marking of all commodities in package form, testing methods for portable devices for weighing loaded trucks on highways. With relation to specifications and tolerances, some amendments were made to the code for liquid-measuring devices, the code for taximeters was adopted in final form, and tolerances were adopted for devices used for weighing loaded trucks on highways. 172 pp. Price, 60 cents.

M75. Annual Report of the Director of the Bureau of Standards to the Secretary of Commerce for the Fiscal Year Ended June 30, 1926.

Beginning with the annual report for the fiscal year ended June 30, 1926, the annual report has been amplified to include more complete reference to and description of the completed and pending research and testing for the year. In addition, there has been introduced a general section at the beginning outlining the functions, organizations, and location of the bureau. The functions relate to standards of measurements, standard physical constants, standards of quality, standards of performance, and the relation of the bureau's work to the public. A chart gives an analytical synopsis of the functions of the bureau with the scope, purpose, and effect of each function. At the end are given brief summaries of the work of publications, library, correspondence, stores, personnel, appropriations, and accounts, as well as mechanical plant, construction facilities, and the care of buildings and grounds. There is a concluding section relating to recommendations.

M76. Mollier Chart, Properties of Ammonia.

The chart presents in graphic form complete data in metric Engineering units on the thermodynamic properties of ammonia over the range of temperature and pressure useful in refrigerating engineering. It provides a rapid and convenient means for the solution of practical problems. The chart itself is about 40 cm high by 110 cm wide. Price, 10 cents.

M77. Standards Yearbook, 1927.

The Standards Yearbook is a reference book on the subject of standardization. The subjects treated are the trend of standardization, international standardizing agencies, the national standardizing agencies, the fundamental standards of the United States, Federal standardizing agencies, the work and recent activities of the Bureau of Standards, State and municipal standardizing agencies, standardizing activities of technical societies and trade associations, and the testing and certification plan for the consumer. 398 pp. Price, $1.

M90. Directory of Commercial Testing and College Research Laboratories.

A list is given of commercial testing laboratories throughout the country with indications of the types of commodities which they are prepared to test. Special care has been exercised to make this list complete. There is also presented a list of college laboratories which are used not only for purposes of instruction, but also to a considerable extent for research work. An outline is given of the certification plan in accordance with which there have already been compiled lists of manufacturers who have expressed their willingness to certify to purchasers that material supplied on orders based on the indicated United States Government master specifications complies with the requirements and tests of these specifications. 39 pp. Price, 15 cents.

M96. Organizations Cooperating with the National Bureau of Standards.

There is presented a list of organizations actively cooperating with the Bureau of Standards in the formulation of standards and the simplification of commodities, together with projects sponsored by the bureau, also committees on which the bureau is represented. 11 pp.

XVI. PUBLISHED PAPERS BY THE BUREAU STAFF PRINTED IN OUTSIDE JOURNALS ON SUBJECTS WITHIN THE BUREAU'S FIELD OF WORK

[July 1, 1926, to June 30, 1927. For papers prior to this, see "Supplementary List of Publications of the Bureau of Standards," issued October 5, 1926; also Annual Reports of 1922 and 1923.]

These articles are not available either from the Superintendent of Documents or the Bureau of Standards. The proper issue of the periodical should be consulted at a library maintaining files of scientific and technical papers.

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XVII. 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 supplementary list. The circular, supplementary list, and the two indexes contained therein cover all bureau publications except those published in outside journals up to the date the supplement goes to print.

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