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Ref.	Series	Price	
1	S24	OP	Radiation from platinum at high temperatures. G. K. Burgess. Bul. BS, <u>1</u> , 443 (1904-05).
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4	S78	OP	The best method of demagnetizing iron in magnetic test- ing. C. W. Burrows. Bul. BS, <u>4</u> , 205 (1907-08).
5	S55	OP	Radiation from the melting point of palladium and plat- inum. C. W. Waidner and G. K. Burgess. Bul. BS, <u>3</u> , 163 (1907).
6	S99	OP	Methods of obtaining cooling curves. G. K. Burgess. Bul. BS, <u>5</u> , 199 (1908-09).
7	S121	OP	The estimation of the temperature of copper by means of optical pyrometers. G. K. Burgess. Bul. BS, <u>6</u> , 111 (1909-10).
8	S109	OP	The testing of transformer steel. M. G. Lloyd and J. U. S. Fisher. Bul. BS, <u>5</u> , 453 (1908-09).
9	S124	OP	Platinum resistance thermometry in high temperatures. C. W. Waidner and G. K. Burgess. Bul. BS, <u>6</u> , 149 (1909-10).
10	S161	OP	The determination of vanadium in vanadium and chrome- vanadium steels. J. R. Cain. Bul. BS, <u>7</u> , 377 (1911).
11	T 6	OP	The determination of chromium and its separation from vanadium in steels. J. R. Cain. Tech. Pap. BS, T6(1911).
12	T 8	OP	A rapid method for the determination of vanadium in steels, ores, etc., based on its quantitative inclusion by the phosphomolybdate precipitate. J. R. Cain and J. C. Hostetter. Tech. Pap. BS, T8 (1911).
13	T11	OP	Comparison of five methods used to measure hardness. R. P. Devries. Tech. Pap. BS, T11 (1912).
14	S198	OP	A micropyrometer. G. K. Burgess. Bul. BS, <u>9</u> , 475 (1913).
15	S213	OP	Critical ranges $A_2$ and $A_3$ of pure iron. G. K. Burgess and J. J. Crowe. Bul. BS, <u>10</u> , 315 (1914). Trans. Am. Inst. Min. Met. Eng. <u>47</u> , 665 (1913).
16	T24	OP	The determination of phosphorus in steels containing va- nadium. J. R. Cain and F. H. Tucker. Tech. Pap. BS, T24 (1913).
17	T33	OP	Determination of carbon in steel and iron by the barium carbonate titration method. J. R. Cain. Tech. Pap. BS, T33 (1913).
18	S205	\$0.05	Melting points of the refractory elements. I. Elements of atomic weight from 48 to 59. G. K. Burgess and R. G. Waltenberg. Bul. BS, <u>10</u> , 79 (1914).
19	S222	OP	The emissivity of metals and oxides. I. Nickel oxide(NiO) in the ranges of 600 to 1300°C. G. K. Burgess and P. D. Foote. Bul. BS, <u>10</u> , 557 (1914).

<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
20	S242	OP	The emissivity of metals and oxides. II. Measurements with the micropyrometer. G. K. Burgess and R. G. Waltenberg. Bul. BS, <u>11</u> , 591 (1915).
21	T38	\$0.35	Observations on finishing temperature and properties of rails. J. J. Crowe, H. S. Rawdon and R.G.Waltenberg. Tech. Pap. BS, T38 (1914).
22	C31	.20	Copper wire tables. Cir. BS, C31 (1914).
23	S249	.05	The emissivity of metals and oxides. IV. Iron oxide. G. K. Burgess and P. D. Foote. Bul. BS, <u>12</u> , 83 (1915-16).
24	S250	OP	Characteristics of radiation pyrometers. G. K. Burgess and P. D. Foote. Bul. BS, <u>12</u> , 91 (1915-16).
25	S236	OP	Electrical resistance and critical ranges of pure iron. G. K. Burgess and I. N. Kellberg. Bul. BS, <u>11</u> , 457(1915).
26			Sound ingots and rails. G. K. Burgess and R. A. Hadfield. Trans. Am. Inst. Min. Met. Eng. <u>51</u> , 862 (1915). Proc. Iron and Steel Inst. Great Brit. <u>92</u> , No. 2, 199 (1915).
27	S254	OP	A study of the quality of platinum ware. G. K. Burgess and P. D. Sale. Bul. BS, <u>12</u> , 289 (1915-16).
28			On a supposed allotropy of copper. G. K. Burgess and I. N. Kellberg. J. Wash. Acad. <u>5</u> , 657 (1915).
29	T53	.20	An investigation of fusible tin boiler plugs. G. K. Burgess and P. D. Merica. Trans. Am. Inst. Met. (1915-21). Tech. Pap. BS, T53 (1915).
30	S243	OP	The emissivity of metals and oxides. III. The total emissivity of platinum and the relation between total emissivity and resistivity. P. D. Foote. Bul. BS, <u>11</u> , 607 (1915).
31			Magnetic studies of mechanical deformation in certain ferromagnetic metals and alloys. H. Haneman and P. D. Merica. Bul. Am. Inst. Chem. Eng. p. 2371 (1915).
32			Failure of structural brass. P. D. Merica and R. W.Woodward. Trans. Am. Inst. Met. p. 298 (1915).
33			Thermometry, pyrometry and heat conductivity. G. K. Burgess. Standard Handbook Elec. Eng. (1916).
34			Some problems in physical metallurgy at the National Bureau of Standards. G. K. Burgess. J. Franklin Inst. <u>182</u> , 19 (1916).
35	S280	OP	Further experiments on the volatilization of platinum. G. K. Burgess and R. G. Waltenberg. BS Sci. Pap. <u>13</u> , 365 (1916-17).
36	T61	OP	Some foreign specifications for railway materials; rails, wheels, axles, tires. G. K. Burgess and P. D. Merica. Tech. Pap. BS, T61 (1916).
37	S296	.05	Thermoelectric measurements of critical ranges of pure iron. G. K. Burgess and H. Scott. BS Sci. Pap. <u>14</u> , 15 (1918-19).

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38	S272	OP	Correlation of the magnetic and mechanical properties of steel. C. W. Burrows. BS Sci. Pap. <u>13</u> , 173 (1916-17).
39	S266	OP	Preparation of pure iron and iron-carbon alloys. J. R. Cain, E. Schram and H. E. Cleaves. BS Sci. Pap. <u>13</u> , 1 (1916-17).
40	T69	OP	Determination of carbon in steels and irons by direct combustion in oxygen at high temperatures. J. R. Cain and H. E. Cleaves. Tech. Pap. BS, T69 (1916). J. Wash. Acad. Sci. <u>6</u> , 225 (1916).
41	T59	OP	Standard test specimen of zinc bronze (88 Cu 10 Sn 2 Zn). C. P. Karr and H. S. Rawdon. Tech. Pap. BS, T59 (1916).
42	T83	OP	Failure of brass: II. Effect of corrosion on ductility and strength of brass. P. D. Merica. Tech. Pap. BS, T83 (1916).
43	T84	OP	Failure of brass: III. Initial stresses produced by the "burning in" of manganese bronze. P. D. Merica and C. P. Karr. Tech. Pap. BS, T84 (1916).
44	T60	OP	Microstructural changes accompanying the annealing of cast bronze. H. S. Rawdon. Tech. Pap. BS, T60 (1916).
45			Note on the occurrence and significance of twinned crystals in electrolytic copper. H. S. Rawdon. J. Am. Inst. Met. <u>10</u> , 198 (1916).
46			Report on ladle-test steel ingots. H. S. Rawdon and J. R. Cain. Proc. Am. Soc. Testing Materials <u>16</u> , 129 (1916).
47	T91	OP	Temperature measurements in Bessemer and open-hearth practice. G. K. Burgess. Tech. Pap. BS, T91 (1917).
48	T82	OP	Failure of brass. I. Microstructure and initial stress in wrought brass of the type 60 percent copper and 40 percent zinc. P. D. Merica and R. W. Woodward. Tech. Pap. BS, T82 (1917).
49	T90	OP	Structure of coating on tinned sheet copper in relation to a specific case of corrosion. P. D. Merica. Tech. Pap. BS, T90 (1917).
50			The embrittling action of sodium hydroxide on mild steel. P. D. Merica. Chem. Met. Eng. <u>16</u> , 496 (1917).
51			Notes on the thermocouple nichrome constantan. R. W. Woodward and T. R. Hanison. Chem. Met. Eng. <u>16</u> , 647 (1917).
52	C66	\$0.05	Standard samples of thermometric fixed points. Cir. BS, C66 (1917).
53	C76	OP	Aluminum and its light alloys. P. D. Merica. Cir. BS, C76 (1918). Chem. Met. Eng. <u>19</u> , 135, 200, 329, 587, 635 (1918). (C76 now superseded by C346, \$1.10)
54	T97	.05	Some unusual features in the microstructure of wrought iron. H. S. Rawdon. Trans. Am. Inst. Min. Met. Eng. <u>58</u> , 493 (1918). Tech. Pap. BS, T97 (1918).



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55	T103	OP	Typical cases of the deterioration of Muntz metal by selective corrosion. H. S. Rawdon. Tech. Pap. BS, T103 (1918). J. Am. Inst. Met. <u>11</u> , <u>12</u> , 148 (1918).
56			Use of mercury solution for predicting season cracking in brass. H. S. Rawdon. Proc. Am. Soc. Testing Materials <u>18</u> (2), 189 (1918).
57	C67	\$0.05	Combined tables of sizes in the principal wire gages. Cir. BS, C67 (1918).
58			Temperature measurements in steel furnaces. G.K.Burgess. Yearbook Am. Iron Steel Inst. p. 427 (1919).
59			Science and the after-war period. G. K. Burgess. Sci. Monthly, Feb. 1919; J. Wash. Acad. Sci. <u>9</u> , 57 (1919).
60	T109	OP	Conservation of tin in bronzes, bearing metals and solders. G. K. Burgess and R. W. Woodward. Tech. Pap. BS, T109 (1919). Trans. Am. Inst. Min. Met. Eng. <u>60</u> , 162 (1919).
61			Recent metallurgical work at the Bureau of Standards. G. K. Burgess. Blast Furnace & Steel Plant <u>III</u> (1), 130; (2), 195 (1919).
62			Report of ladle-test ingot investigation. Appendix of Report of Com. A-1. J. R. Cain and H. S. Rawdon. Proc. Am. Soc. Testing Materials <u>19</u> (1), 154 (1919).
63	S350	OP	Equilibrium conditions in the system carbon, iron oxide and hydrogen in relation to the Ledebur method for determining oxygen in steel. J. R. Cain. BS Sci. Pap. <u>15</u> , 353 (1919-20).
64			Rapid determination of carbon in steel by the barium-carbonate titration method. J. R. Cain and L. C. Maxwell. J. Ind. Eng. Chem. <u>10</u> , 520 (1919).
65	T118	OP	A critical study of the Ledebur method for determining oxygen in iron and steel. J. R. Cain and E. Pettijohn. Tech. Pap. BS, T118 (1919).
66	T126	OP	Study of the Goutal method of determining carbon-monoxide and carbon-dioxide in steels. J. R. Cain and E. Pettijohn. Tech. Pap. BS, T126 (1919).
67	T141	OP	Electrolytic resistance method for determining carbon in steel. J. R. Cain and L. C. Maxwell. Tech. Pap. BS, T141 (1919). J. Ind. Eng. Chem. <u>11</u> , 852 (1919).
68	S346	\$0.05	Oxygen content by the Ledebur method of acid Bessemer steels deoxidized in various ways. J. R. Cain and E. Pettijohn. BS Sci. Pap. <u>15</u> , 259 (1919-20).
69			Determining gases in steel and the deoxidization of steel. J. R. Cain. Bul. Am. Inst. Min. Met. Eng. <u>152</u> , 1309 (1919). Trans. Am. Inst. Min. Met. Eng. <u>62</u> , 209 (1920).

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70			Manufacture and properties of light wall structural tubing. H. J. French. Bul. Am. Inst. Min. Met. Eng. <u>153</u> , 1855 (1919); Trans. Am. Inst. Min. Met. Eng. <u>62</u> , 303 (1920).
71			Comparative tests of Palau and Rhotanium ware as substitutes for platinum laboratory utensils. L.J.Gurevich and E. Wichers. J. Ind. Eng. Chem. <u>11</u> , 570 (1919).
72			Tin fusible boiler plug manufacture and testing. L. J. Gurevich and J. S. Hromatko. Bul. Am. Inst. Min. Met. Eng. <u>152</u> , 1351 (1919). Trans. Am. Inst. Min. Met. Eng. <u>64</u> , 227 (1920).
73			Decomposition of metals. A. I. Krynitsky. Chem. Met. Eng. <u>20</u> , 277, 421 (1919).
74			Experience with a 91:9 copper-aluminum alloy. A. I. Krynitsky. Chem. Met. Eng. <u>21</u> , 770 (1919).
75	S337	OP	Constitution and metallography of aluminum and its light alloys with copper and magnesium. P. D. Merica, R. G. Waltenberg and J. R. Freeman, jr. BS Sci. Pap. <u>15</u> , 105 (1919-20). Bul. Am. Inst. Min. Met. Eng. <u>151</u> , 1031 (1919).
76	S347	OP	Heat treatment of duralumin. P. D. Merica, R. G. Waltenberg and H. Scott. BS Sci. Pap. <u>15</u> , 271 (1919-20). Bul. Am. Inst. Min. Met. Eng. <u>150</u> , 913 (1919).
77	S336	OP	A simplification of the inverse rate method for thermal analysis. P. D. Merica. BS Sci. Pap. <u>15</u> , 101 (1919-20). Bul. Am. Inst. Min. Met. Eng. <u>151</u> , 1021 (1919).
78	T129	OP	Notes on graphitization of white cast iron upon annealing. P. D. Merica and L. J. Gurevich. Tech. Pap. BS, T129 (1919). Bul. Am. Inst. Min. Met. Eng. <u>151</u> , 1063 (1919). Trans. Am. Inst. Min. Met. Eng. <u>62</u> , 509 (1919).
79	T132	\$0.05	Mechanical properties and resistance to corrosion of rolled light alloys of aluminum and magnesium with copper, nickel and manganese. P. D. Merica, R. G. Waltenberg and A. N. Finn. Tech. Pap. BS, T132 (1919). Bul. Am. Inst. Min. Met. Eng. <u>151</u> , 1051 (1919).
80	T139	OP	Some tests of light aluminum casting alloys. The effect of heat treatment. P. D. Merica and C. P. Karr. Tech. Pap. BS, T139 (1919). Proc. Am. Soc. Testing Materials <u>19</u> (2), 298 (1919).
81	T135	OP	Behavior of wrought manganese bronze exposed to corrosion while under tensile stress. P. D. Merica and R. W. Woodward. Tech. Pap. BS, T135 (1919). Proc. Am. Soc. Testing Materials <u>19</u> (2), 279 (1919).
82	C80	.20	Protective metallic coatings for the rustproofing of iron and steel. H. S. Hawdon, A. N. Finn and M. A. Grossman. Cir. BS, C80 (1919). (revised 1922). Chem. Met. Eng. <u>20</u> , 458, 530, 591 (1919).

<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
83			Applications of metal radiography. H. S. Rawdon. Year-book, Am. Iron & Steel Inst. p. 369 (1919).
84			Microstructure of flaky steel. H. S. Rawdon. Bul. Am. Inst. Min. Met. Eng. No. 146, pp. 185, 792, 804, 969 (1919); Trans. Am. Inst. Min. Met. Eng. <u>62</u> , 246 (1920).
85	S343	\$0.05	Location of flaws in rifle steel by magnetic analysis. R. L. Sanford and W. B. Kouwenhoven. BS Sci. Pap. <u>15</u> , 219 (1919-20).
86	S335	.05	Effect of rate of temperature change on the transformations in an alloy steel. H. Scott. BS Sci. Pap. <u>15</u> , 91 (1919-20). Bul. Am. Inst. Min. Met. Eng. <u>146</u> , 157 (1919). Trans. Am. Inst. Min. Met. Eng. <u>62</u> , 669 (1920).
87	S348	.05	Use of a modified Rosenhain furnace for thermal analysis. H. Scott and J. R. Freeman, jr. BS Sci. Pap. <u>15</u> , 317 (1919-20). Bul. Am. Inst. Min. Met. Eng. <u>152</u> , 1429 (1919).
88			Tests of clay for foundry uses. H. F. Staley. Trans. Am. Fdymen's Assn. <u>28</u> , 465 (1919).
89			Physical properties of certain lead-zinc bronzes. H. F. Staley and C. F. Karr. Bul. Am. Inst. Min. Met. Eng. <u>153</u> , 2485 (1919).
90			Metals for pyrometer standardization. C. W. Waidner and G. K. Burgess. Bul. Am. Inst. Min. Met. Eng. <u>152</u> , 1511 (1919).
91	C35	OP	Melting points of chemical elements and other standard temperatures. Cir. BS, C35 (1919).
92			Governmental research. G. K. Burgess. Trans. Royal Can. Inst. Toronto V, XIII, No. 1 (1920). Sci. Monthly, p. 341 (1920).
93			The microscope and the heat treatment of steel. G. K. Burgess. Yearbook Am. Iron & Steel Inst. p.154 (1920).
94			Report of the pyrometer committee of the National Research Council. G. K. Burgess. Trans. Am. Inst. Min. Met. Eng. (1920).
95			New deoxidizers for steel manufacture. J. R. Cain. Chem. Met. Eng. <u>23</u> , 879 (1920).
96			The heat treatment of a high chromium steel. H. J. French. J. Soc. Am. Eng. <u>7</u> , 103 (1920). Chem. Met. Eng. <u>23</u> , 13 (1920).
97			Tensile properties of boiler plate at elevated temperatures. H. J. French. Bul. Am. Inst. Min. Met. Eng. <u>158</u> , Sec. 15 (1920). Trans. Am. Inst. Min. Met. Eng. <u>67</u> , 67 (1922).
98			Some applications of alloy steels in the automotive industry. H. J. French. Am. Soc. Mech. Eng. Washington Section, Mar. 30, 1920.



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99			Prevention of columnar crystallization by rotation during solidification. H. M. Howe and E. C. Groesbeck. Trans. Am. Inst. Min. Met. Eng. <u>62</u> , 341 (1920).
100	T163	OP	Stresses caused by cold rolling. H. M. Howe and E. C. Groesbeck. Tech. Pap. BS, T163 (1920). Proc. Am. Soc. Testing Materials <u>20</u> (2), 31 (1920).
101	T185	\$0.10	Experiments on copper crusher cylinders. A. I. Krynitsky. Tech. Pap. BS, T185 (1920).
102			The embrittling effects of cleaning and pickling upon carbon steels. S. C. Langdon and M. A. Grossman. Trans. Am. Electrochem. Soc. <u>37</u> , 543 (1920).
103	S404	.05	The magnetic reluctivity relationship as related to certain structures of an eutectoid carbon steel. C. Nusbauer, W. L. Cheney and H. Scott. BS Sci. Pap. <u>16</u> , 739 (1920).
104			Nature of the defects revealed by the deep etching of transversely fissured rails. H. S. Rawdon. Rail Com. Am. Railway Assn. <u>85</u> (1920). Chem. Met. Eng. <u>22</u> , 505 (1920).
105	S402	OP	The use of ammonium persulphate for revealing the macro-structure of iron and steel. H. S. Rawdon. BS Sci. Pap. <u>16</u> , 715 (1920). Iron Age <u>106</u> , 965 (1920).
106	S377	.05	The intercrystalline brittleness of lead. H. S. Rawdon. BS Sci. Pap. <u>16</u> , 215 (1920). Bul. Am. Inst. Min. Met. Eng. <u>158</u> , Sec. 7 (1920).
107			Contemporary foreign opinions on sulphur and phosphorus in steels. H. S. Rawdon. Chem. Met. Eng. <u>22</u> , 609 (1920).
108			Notes on electric welding. H. S. Rawdon. Mech. Eng. <u>42</u> , 567 (1920); Elec. Railway Eng. <u>11</u> , 441 (1920).
109	S397	.10	A study of the relation between the Brinell Hardness and the grain size of annealed carbon steels. H. S. Rawdon and E. Jimeno-Gil. BS Sci. Pap. <u>16</u> , 557 (1920).
110			Metallography of arc-fused steel. H. S. Rawdon, L. Jordan and E. C. Groesbeck. Chem. Met. Eng. <u>23</u> , 277 (1920).
111	S356	.10	Notes on microstructure of iron and mild steels at high temperatures. H. S. Rawdon and H. Scott. BS Sci. Pap. <u>15</u> , 519 (1919-20). Trans. Am. Inst. Min. Met. Eng. <u>62</u> , 246 (1920). Chem. Met. Eng. <u>22</u> , 787 (1920).
112	T153	OP	A peculiar type of intercrystalline brittleness of copper. H. S. Rawdon and S. C. Langdon. Tech. Pap. BS, T153 (1920). Bul. Am. Inst. Min. Met. Eng. <u>158</u> , Sec. 19 (1920).
113	T143	.10	A study of the deterioration of nickel spark plug electrodes in service. H. S. Rawdon and A. I. Krynitsky. Tech. Pap. BS, T143 (1920).

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114	T179	OP	Electric arc welding of steel: I. Properties of the arc fused metal. H. S. Rawdon, E. C. Groesbeck and L. Jordan. Tech. Pap. BS, T179 (1920).
115	S399	\$0.10	Metallographic etching reagents: I. For copper. H. S. Rawdon and M. G. Lorentz. BS Sci. Pap. <u>16</u> , 641 (1920).
116	T156	OP	Metallographic features revealed by the deep etching of iron and steel. H. S. Rawdon and S. Epstein. Tech. Pap. BS, T156 (1920).
117	S395	.10	Relation of the high-temperature treatment of high-speed steel to secondary hardening and red hardness. H. Scott. BS Sci. Pap. <u>16</u> , 521 (1920). Trans. Am. Soc. Steel Treating <u>1</u> , 551 (1920).
118	S376	.05	Critical ranges of some commercial nickel steels. H. Scott. BS Sci. Pap. <u>16</u> , 195 (1920). Trans. Am. Inst. Min. Met. Eng. <u>67</u> , 100 (1922).
119	S396	OP	Thermal and physical changes accompanying the heating of hardened carbon steels. H. Scott and G. H. Movius. BS Sci. Pap. <u>16</u> , 537 (1920).
120			Similarity of the magnetic change in ferrite and cementite. H. Scott and G. H. Movius. Chem. Met. Eng. <u>22</u> , 1069 (1920).
121	T172	OP	Cast iron for locomotive cylinder parts. C. H. Strand. Tech. Pap. BS, T172 (1920).
122	T155	OP	Cements for spark-plug electrodes. H. F. Staley. Tech. Pap. BS, T155 (1920).
123	S363	.05	Preparation and reflective properties of some alloys of aluminum with magnesium and zinc. R. G. Waltenberg and W. W. Coblenz. BS Sci. Pap. <u>15</u> , 653 (1919-20).
124			Recent developments in light aluminum alloys. R. W. Woodward. Report of Nat. Advisory Com. Aero. <u>6</u> , 35 (1920).
125	T178	.20	Steel rails from sink-head and ordinary rail ingots. G. K. Burgess. Tech. Pap. BS, T178 (1921). Chem. Met. Eng. <u>23</u> , 921, 969, 1017 (1921).
126	T192	.10	Tests of centrifugally cast steel. G. K. Burgess. Tech. Pap. BS, T192 (1921). Trans. Am. Soc. Steel Treating <u>1</u> , 370 (1921).
127			The government laboratory and industrial research. G. K. Burgess. Sci. Monthly <u>12</u> , 523 (1921).
128	T207	OP	Manufacture and properties of steel plates containing zirconium and other elements. G. K. Burgess and R. W. Woodward. Tech. Pap. BS, <u>16</u> , 123 (1921-22).
129	T209	.05	Thermal stresses in chilled iron car wheels. G. K. Burgess and R. W. Woodward. Tech. Pap. BS, <u>16</u> , 193 (1921-22).
130			The coprecipitation of vanadic acid with ammonium phosphomolybdate. J. R. Cain and J. C. Hostetter. J. Am. Chem. Soc. <u>43</u> , 2552 (1921).

Ref.	Series	Price	
131	T188	OP	Some properties of white metal bearing alloys at elevated temperatures. J. R. Freeman, jr. and R. W. Woodward. Tech. Pap. BS, T188 (1921).
132	T205	OP	Tensile properties of some structural alloy steels at high temperatures. H. J. French. Tech. Pap. BS, <u>16</u> , 77 (1921-22). Trans. Am. Soc. Steel Treating <u>11</u> , 409 (1921).
133			Motion pictures in the physical testing laboratory. H. J. French. Chem. Met. Eng. <u>24</u> , 131 (1921).
134			Review of recent Japanese metallurgical investigations. H. J. French. Chem. Met. Eng. <u>24</u> (Microstructure of chromium steels) 703, (Recent work on chromium-tungsten steels) 573, (Structure of tungsten steels) 745 (1921).
135			Elements of the heat treatment of steel. H. J. French. Am. Mach. <u>55</u> , 907, 960 (1921).
136			Artificial seasoning of steels. H. J. French. Chem. Met. Eng. <u>25</u> , 155 (1921); Am. Mach. <u>55</u> , 768 (1921).
137	T206	\$0.15	The effect of heat treatment upon the mechanical properties of one percent carbon steels. H. J. French and W. G. Johnson. Tech. Pap. BS, <u>16</u> , 93 (1921-22). Trans. Am. Soc. Steel Treating <u>2</u> , 467 (1921).
138	T203	OP	The effect of phosphorus upon the microstructure and hardness of low carbon open-hearth steels. E.C.Groesbeck. Tech. Pap. BS, <u>16</u> , 1 (1921-22).
139			Note on the properties of antimonial lead. J. S. Hromatko and L. Gurevich. Chem. Met. Eng. <u>25</u> , 62 (1921).
140	T185	.10	Experiments on copper crusher cylinders. A.I.Krynitsky. Tech. Pap. BS, T185 (1921).
141	C100	OP	Nickel. P. D. Merica. Cir. BS, C100 (1921). (Revised 1924 by E. C. Groesbeck). Chem. Met. Eng. <u>24</u> , 17, 73, 197, 291, 375, 558, 649 (1921).
142			Some mechanical properties of hot-rolled Monel metal. P. D. Merica and R. G. Waltenberg. Proc. Am. Soc. Testing Materials <u>21</u> , 922 (1921).
143	S405	.05	Effect of rate of cooling on the magnetic and other properties of an annealed eutectoid carbon steel. C. Nusbaum and W. L. Cheney. BS Sci. Pap. <u>17</u> , 1 (1922).
144			The microscopic study of the structure of metals. H. S. Rawdon. Am. Mach. <u>55</u> , 659 (1921).
145			The presence of internal fractures in steel rails and their relation to the behavior of the material under service stresses. H. S. Rawdon. Faraday Soc. <u>111</u> , 470 (1921).
146			The uses of X-rays in the examination of steel. H. S. Rawdon. Met. Heating <u>1</u> (1), 14 (1921).
147			Some types of non-ferrous corrosion. H. S. Rawdon. Trans. Am. Electrochem. Soc. <u>39</u> , 227 (1921).

<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
148			Fusion welding - a new use for castings. Discussion of fusion welding. H. S. Rawdon. Yearbook Am. Iron & Steel Inst. p. 340 (1921).
149			Some observations on season cracking. H. S. Rawdon. J. Inst. Met. <u>25</u> , 149 (1921).
150			Macroscopic examination of metals. H. S. Rawdon. Chem. Met. Eng. <u>24</u> , 385 (1921).
151			Preparation of small specimens for microscopic examination. H. S. Rawdon. Chem. Met. Eng. <u>24</u> , 475 (1921).
152			Effects of metallic structure upon properties. H.S.Rawdon. Chem. Met. Eng. <u>24</u> , 523 (1921).
153			Physical properties of arc-fused steel. H. S. Rawdon, E. C. Groesbeck and L. Jordan. Chem. Met. Eng. <u>23</u> , 677 (1921).
154	Fl91	OP	Some factors affecting the life of machine-gun barrels. W. W. Sveshnikoff. Tech. Pap. BS, Fl91 (1921).
155			Note on notched-bar impact tests and toughness of Monel metal. R. G. Waltonberg. Chem. Met. Eng. <u>25</u> , 322 (1921). Met. Ind. (London) <u>19</u> , 229 (1921).
156			Structural properties of metals and alloys. R.W.Woodward. Am. Mach. <u>55</u> , 296 (1921).
157	C26	OP	Analyzed iron and manganese ores - methods of analyses. Cir. BS, C26 (1921).
158	C101	\$0.40	Physical properties of materials. I: Strengths and related properties of metals and certain other engineering materials. Cir. BS, C101 (1921). (revised 1924).
159	M46	.70	War work of the Bureau of Standards. Misc. Pub. BS, M46 (1921).
160	C42	OP	Metallographic testing. Cir. BS, C42 (1921).
161			S. W. Stratton. G. K. Burgess. Technology Eng. News <u>3</u> , 146 (1922).
162			Standardization and research. G. K. Burgess. Am. Mining Congress, November 1922.
163			Effect of sulphur on rivet steel. Preliminary report of the Joint Committee on Phosphorus and Sulphur in Steel. G. K. Burgess and C. L. Warwick. Proc. Am. Soc. Testing Materials <u>22</u> (1), 94 (1922).
164			The physical properties of the A.S.T.M. tentative standard white-metal bearing alloys. J. R. Freeman, jr. Proc. Am. Soc. Testing Materials <u>22</u> (1), 207 (1922).
165			On precision altimeter design. J. R. Freeman, jr., and J. B. Peterson. Nat. Advisory Comm. Aeron. Report No. 126 (1921).
166			The effect of heat treatment on the mechanical properties of carbon-molybdenum and a chromium-molybdenum steel. H. J. French. Trans. Am. Soc. Steel Treating <u>2</u> , 769 (1922).



<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
167			Strength and elasticity of boiler plate at elevated temperatures. H. J. French. Chem. Met. Eng. <u>26</u> , 1207 (1922).
168			Boiler plate after cold work or work at the blue heat. H. J. French. Chem. Met. Eng. <u>27</u> , No. 5, 211 (1922).
169			Effect of rate of loading on tensile properties of boiler plate. H. J. French. Chem. Met. Eng. <u>27</u> , No. 7, 300 (1922).
170			Stainless steel at high temperatures. H. J. French. Iron Age <u>110</u> , 404 (1922).
171	S410	\$0.25	Thermal expansion of copper and some of its important industrial alloys. P. Hidnert. BS Sci. Pap. <u>17</u> , 91 (1922).
172	S448	OP	The decarburization of ferro-chromium by hydrogen. L. Jordan and F. E. Swindells. BS Sci. Pap. <u>18</u> , 327 (1922-23). Chem. Met. Eng. <u>27</u> , 1071 (1922).
173	S457	.05	Gases in metals: I. The determination of combined nitrogen in iron and steel and the change in the form of nitrogen by heat treatment. L. Jordan and F. E. Swindells. BS Sci. Pap. <u>18</u> , 439 (1922-23). Chem. Met. Eng. <u>27</u> , 1135, 1170 (1922).
174	T221	.05	The magnetic susceptibility and iron content of tin-red-brass. L. H. Marshall and H. L. Sanford. Tech. Pap. BS, <u>17</u> , 1 (1922-23).
175	S452	OP	The preparation and properties of pure iron alloys. I. Effect of carbon and manganese on the mechanical properties of iron. R. P. Neville and J. R. Cain. BS Sci. Pap. <u>18</u> , 411 (1922-23). Trans. Am. Electrochem. Soc. <u>42</u> , 21 (1922).
176			Chemical and mechanical properties of arc-fused steel. H. S. Rawdon. Proc. Welding Soc. <u>3</u> (1922).
177			Metallographic factors in carburization. H. S. Rawdon. Trans. Am. Inst. Min. Met. Eng. <u>67</u> , 377 (1922).
178	C80	.20	Protective metallic coatings for the rustproofing of iron and steel (revised). H. S. Rawdon. Cir. BS, 380 (1922).
179	C113	OP	Structure and related properties of metals. H. S. Rawdon. Cir. BS, C113 (1922). Trans. Am. Soc. Steel Treating <u>3</u> , 649 (1922).
180			Graphitization of a carbon tool-steel. H. S. Rawdon and S. Epstein. Chem. Met. Eng. <u>27</u> , 650 (1922).
181			Some observations on the "nick-bend" test for wrought iron. H. S. Rawdon and S. Epstein. Proc. Am. Soc. Testing Materials <u>22</u> (2), 193 (1922).
182	S452	.15	The structure of martensitic carbon steels and the changes in microstructure which occur upon tempering. H. S. Rawdon and S. Epstein. BS Sci. Pap. <u>18</u> , 375 (1922-23).
185			Corrosion patterns on cold worked tin and zinc. H. S. Rawdon, A. I. Krynitsky and J. E. T. Berliner. Chem. Met. Eng. <u>26</u> , 212 (1922).



<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
184			Resistance to corrosion of various types of chromium steels. H. S. Rawdon and A. I. Krynitsky. Chem. Met. Eng. <u>27</u> , 171 (1922).
185			Brittleness developed in aluminum and duralumin by stress and corrosion. H. S. Rawdon, A. I. Krynitsky and J. F. T. Berliner. Chem. Met. Eng. <u>26</u> , 154 (1922).
186			Brittleness developed in pure lead by stress and corrosion. H. S. Rawdon, A. I. Krynitsky and J. F. T. Berliner. Chem. Met. Eng. <u>26</u> , 109 (1922).
187	C73	OP	Copper (revised). H. S. Rawdon and M. G. Lorentz. Cir. BS, C73 (1922).
188	S435	\$0.15	Metallographic etching reagents. II. for copper alloys, nickel and the alpha alloys of nickel. H. S. Rawdon and M. G. Lorentz. ES Sci. Pap. <u>17</u> , 635 (1922).
189			Contrast etching for metallographic specimens. H. S. Rawdon and M. G. Lorentz. Chem. Met. Eng. <u>25</u> , 915 (1922).
190			Concentrated hydrochloric acid as a metallographic etching reagent for nickel. H. S. Rawdon and M. G. Lorentz. Chem. Met. Eng. <u>25</u> , 955 (1922).
191	S464	OP	Preparation and properties of pure iron alloys: The effect of manganese on the structure of alloys of the iron-carbon system. H. S. Rawdon and F. Sillers, jr. BS Sci. Pap. <u>18</u> , 637 (1922-23). Iron Age <u>110</u> , 1357 (1922).
192			The decomposition of martensite into troostite in alloy steels. H. Scott. Forging & Heat Treating <u>8</u> , 296(1922).
193			The mechanical properties of chrome-vanadium steels. J. S. Vanick. Trans. Am. Soc. Steel Treating <u>3</u> , 196 (1922).
194			Nitrides and oxides in boiler tube steels. J. S. Vanick and A. E. White. Trans. Am. Soc. Steel Treating <u>2</u> , 323 (1922).
195			The crystalline form of electrodeposition of metals. W. Blum and H. S. Rawdon. Trans. Am. Electrochem. Soc. <u>44</u> , 397 (1923).
196			The influence of the base metal on the structure of electrodeposits. W. Blum and H. S. Rawdon. Trans. Am. Electrochem. Soc. <u>44</u> , 313 (1923).
197			Presidential address, the trend of standardization. G. K. Burgess. Proc. Am. Soc. Testing Materials <u>23</u> (1), 40 (1923).
198			The study of steels for engineering structures. G. K. Burgess. Proc. Am. Soc. Civil Eng. <u>49</u> , 524(1923). Iron Trade Rev. <u>72</u> , 443, 503 (1923). Iron Age <u>111</u> , 281 (1923).

Ref.	Series	Price	
199	T241	\$0.10	A comparison of the decoxidation effect of titanium and of silicon on the properties of rail steel. G. K. Burgess and G. W. Quick. Tech. Pap. BS, <u>17</u> , 581 (1922-24).
200	T235	.15	Thermal stresses in steel car wheels. G. K. Burgess and G. W. Quick. Tech. Pap. BS, <u>17</u> , 367 (1922-24). Railway Age <u>74</u> , 951 (1923).
201			Second preliminary report. Joint Comm. on Investigation of S and P in Steel. G. K. Burgess and C. L. Warwick. Proc. Am. Soc. Testing Materials <u>23</u> (1), 105 (1923).
202	S463	.15	Preparation and properties of pure iron alloys. II. Magnetic properties of iron alloys. W. L. Cheney. BS Sci. Pap. <u>18</u> , 609 (1922-23).
203			Hardness and heat treatment of mining drill shanks. C. Clayton. Trans. Am. Inst. Min. Met. Eng. 1208-M (1923).
204			The microscopic examination of "dirty" steel. S. Epstein. Chem. Met. Eng. <u>28</u> , 482 (1923).
205			Review of present status of drill steel breakage and heat treatment. T. B. Foley, C. Clayton and H. S. Burnholz. Trans. Am. Inst. Min. Met. Eng. <u>69</u> , 643 (1923).
206			The influence of ratio of length to diameter in the compression testing of babbit metals. J. R. Freeman, jr. and P. F. Brandt. Proc. Am. Soc. Testing Materials <u>23</u> (2), 150 (1923).
207	T213	OP	Effect of temperature, deformation, and the rate of loading on the tensile properties of low carbon steel below the thermal critical range. H. J. French. Tech. Pap. BS, <u>16</u> , 679 (1921-22).
208	T230	.05	A recording chronograph for the inverse-rate method of thermal analysis. H. J. French. Tech. Pap. BS, <u>17</u> , 245 (1922-24). Trans. Am. Soc. Steel Treating <u>3</u> , 640 (1923).
209	T228	.15	Lathe breakdown tests of some modern high speed steels. H. J. French and J. Strauss. Tech. Pap. BS, <u>17</u> , 183 (1922-24). Trans. Am. Soc. Steel Treating <u>2</u> , 1125 (1923).
210			Tests for purchasing high speed steels. H. J. French and J. Strauss. Forging, Stamping and Heat Treating <u>9</u> , 376 (1923).
211			Effect of heat treatment on lathe tool performance and some other properties of high speed steels. H. J. French, J. Strauss and F. G. Digges. Trans. Am. Soc. Steel Treating <u>4</u> , 353 (1923).
212			Strength of steels at high temperatures. H. J. French and W. A. Tucker. Iron Age <u>112</u> , 193 (1923).
213	C58	.30	Invar and related nickel steel. E. C. Groesbeck. (rewritten). Cir. BS, C58 (1923).
214			The constitution of the alloys of iron and nickel. D. Hanson and J. R. Freeman, jr. J. Iron & Steel Inst. <u>107</u> , No. 1, 301 (1923).

Ref.	Series	Price	
215			Influence of temperature, time and rate of cooling on the physical properties of carbon steel. H. M. Howe, F. B. Foley and J. R. Winlock. Trans. Am. Inst. Min. Met. Eng. <u>69</u> , 722 (1923).
216			Gases in metals. L. Jordan. Proc. Am. Soc. Testing Materials <u>23</u> (2), 7 (1923).
217	T245	\$0.05	Embrittlement of malleable cast iron produced by heat treatment, as revealed by impact tests. L.H.Marshall. Tech. Pap. <u>17</u> , 677 (1922-24).
218	C78	OF	Solders for aluminum. P. D. Merica and L. Gurevich. Cir. BS, C78 (1923). Met. Ind. p. 500 (1918).
219			The preparation of platinum and platinum-rhodium alloy for thermal couples. R. P. Neville. Trans. Am. Electrochem. Soc. <u>45</u> , 571 (1923).
220			Structure and related properties of metals. H. S. Rawdon. Trans. Am. Soc. Steel Treating <u>3</u> , 649 (1923).
221			The effect of high temperature quenching on the microstructure of high carbon steels. H. Scott. Trans. Am. Soc. Steel Treating <u>3</u> , 593 (1923).
222			The magnetic change in silicon and in chromium steels. H. Scott. Chem. Met. Eng. <u>28</u> , 213 (1923).
223			Note on the swelling of machine gun barrels. W. W. Sveshnikoff. Army Ordnance J. <u>3</u> , No. 21 (1923).
224			Deterioration of steel and wrought iron tubes in hot gaseous ammonia. J. S. Vanick. Trans. Am. Soc. Steel Treating <u>4</u> , 62 (1923).
225			Coatings for selective carburization. J. S. Vanick and H. K. Herschman. Trans. Am. Soc. Steel Treating <u>3</u> , 505 (1923).
226			Thermal transformations in some chrome vanadium steels. J. S. Vanick and W. W. Sveshnikoff. Trans. Am. Soc. Steel Treating <u>3</u> , 501 (1923).
227			Investigations of the platinum metals at the Bureau of Standards. E. Wichers and L. Jordan. Trans. Am. Electrochem. Soc. <u>43</u> , 385 (1923).
228	C398	free	Standard samples - general information. Cir. BS, C398 (1923).
229	T257	.05	Development of a method for measurement of internal stress in brass tubing. R. J. Anderson and E. C. Fahlman (work of Bureau of Mines). Tech. Pap. BS, <u>18</u> , 229 (1924-25).
230	T263	.20	Tangent modulus and strength of steel columns in tests. O. H. Basquin. Tech. Pap. BS, <u>18</u> , 381 (1924-25).
231	S434	.05	Preparation and properties of pure iron alloys. IV. Critical ranges of Fe-C alloys by the thermoelectric method. J. F. F. Berliner. BS Sci. Pap. <u>19</u> , 347 (1923-24).

Ref.	Series	Price	
232			Reports of Joint Comm. on Investigation of P and S in Steel. G. K. Burgess. Proc. Am. Soc. Testing Materials <u>24</u> (1), 96, 108, 185 (1924).
233			Scientific work which our government is carrying on and its influence on the nation. G. K. Burgess. Sci. Monthly <u>19</u> , 113 (1924).
234	T261	\$0.10	Influence of sulphur, oxygen, copper and manganese on the red shortness of iron. J. R. Cain. Tech. Pap. BS, <u>18</u> , 327 (1924-25).
235			Electroplating worn machine gun barrels. W. W. deSveshnikoff and H. E. Haring. Army Ordnance J. <u>5</u> , 503 (1924).
236			Carburization as a factor in the erosion of machine gun barrels. W. W. deSveshnikoff. Army Ordnance J. <u>5</u> , 794 (1924).
237			Effect of impurities on compressive strength and hardness of babbitt metals at normal and elevated temperatures. J. R. Freeman, jr. and P. F. Brandt. Proc. Am. Soc. Testing Materials <u>24</u> (1), 253 (1924).
238			Quenching diagrams for carbon steels in relation to some quenching media for heat treatment. H. J. French and O. Z. Klopsch. Trans. Am. Soc. Steel Treating <u>6</u> , 251 (1924).
239			Available data on properties of irons and steels at various temperatures. H. J. French and W. A. Tucker. Proc. Am. Soc. Testing Materials <u>24</u> (2), 56 (1924). Trans. Am. Soc. Mech. Eng. <u>46</u> , 349 (1924).
240	S483	.05	Investigations on Pt metals. IV. Determination of Ir in Pt alloys. R. Gilchrist. BS Sci. Pap. <u>19</u> , 325 (1923-24).
241			Notes on some endurance tests of metals. H. W. Gillett and E. L. Mack (work of Bureau of Mines). Proc. Am. Soc. Testing Materials <u>24</u> (2), 476 (1924).
242			Chemistry in industry. Vol. 1, Chapter 13, Non-ferrous metallurgy. H. W. Gillett. The Chemical Foundation (1924).
243	T258	.15	Strength of steel tubing under combined column transverse loading. T. W. Greene. Tech. Pap. BS, <u>18</u> , 243 (1924-25).
244	S488	.10	Thermal expansion of molybdenum. P. Hidnert and W.B.Gero. BS Sci. Pap. <u>19</u> , 429 (1923-24).
245			Mercury poisoning from electric furnaces. L. Jordan and W. P. Barrows. J. Ind. Eng. Chem. <u>16</u> , 893 (1924).
246			Corrosion of underground pipe lines. K. H. Logan. Chem. Met. Eng. <u>31</u> , 1011 (1924).
247	M62	.05	Table of Brinell hardness numbers. S. N. Petrenko. Misc. Pub. BS, M62 (1924).
248			Mechanical meaning of hardness numbers. S. N. Petrenko. Mech. Eng. <u>46</u> , 926 (1924).



<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
249	T252	\$0.10	The nick-bend test for wrought iron. H. S. Rawdon and S. Epstein. Tech. Pap. BS, <u>18</u> , 115 (1924-25).
250			Notes on corrosion testing by different immersion methods. H. S. Rawdon and A. I. Krynitsky. Trans. Am. Electrochem. Soc. <u>46</u> , 359 (1924).
251			Types of apparatus for testing corrodibility of metals. H. S. Rawdon, A. I. Krynitsky and W. H. Finkeldey. Proc. Am. Soc. Testing Materials <u>24</u> (2), 717 (1924).
252			Effect of severe cold working on scratch and Brinell hardness. H. S. Rawdon and W. H. Mutchler. Trans. Am. Inst. Min. Met. Eng. <u>70</u> , 342 (1924).
253			Sketch of "permeability apparatus". C. M. Saeger, jr. Trans. Am. Foundrymen's Assn. <u>32</u> (2), 134 (1924).
254			Report on corrosion tests of iron and steel submerged in running water at the Bureau of Standards and at Annapolis, Md. F. P. Sager. Proc. Am. Soc. Testing Materials <u>24</u> (1), 228 (1924).
255			The present status of magnetic analysis. R. L. Sanford. Trans. Am. Soc. Steel Treating <u>5</u> , 577 (1924).
256			Quenching properties of glycerin and its water solutions. H. Scott. Trans. Am. Soc. Steel Treating <u>6</u> , 13 (1924).
257	T275	.05	Design of specimens for short time fatigue tests. L. B. Luckerman and C. S. Aitchison. Tech. Pap. BS, <u>19</u> , 47 (1924-25).
258			Deterioration of some metals in hot, reducing, ammonia gases. J. S. Vanick (work of Fixed Nitrogen Research Laboratory at Bureau of Standards). Proc. Am. Soc. Testing Materials <u>24</u> (2), 348 (1924).
259			Measuring metal's resistance to shock. R.G. Waltenberg. Chem. Met. Eng. <u>31</u> , 657 (1924).
260	T260	.10	Tests of some girder hooks. H. L. Whittemore and A. H. Stang. Tech. Pap. BS, <u>18</u> , 305 (1924-25).
261	T285	.15	Release of internal stress in brass tubing. R.J. Anderson and E. G. Fahlman (work of Bureau of Mines). Tech. Pap. BS, <u>19</u> , 235 (1924-25).
262			Chemistry in industry. Vol. II. Chapter 12, Electroplating and electroforming. W. Blum. The Chemical Foundation (1925).
263			Teaching principles of electrodeposition. W. Blum. J. Chem. Education <u>2</u> , 556 (1925).
264			Gages, a key problem. G. K. Burgess. J. Soc. Auto. Eng. <u>16</u> , 456 (1925).
265			Work of the Bureau of Standards. G. K. Burgess. Military Engineers <u>17</u> , 455 (1925).
266			What the Bureau of Standards is doing for American industry. G. K. Burgess. Industrial Management <u>70</u> , 257 (1925).



Ref.	Series	Price	
267			A laboratory high frequency vacuum furnace. J. R. Cain. Trans. Am. Electrochem. Soc. <u>48</u> , 138 (1925).
268			Physical properties of dental materials. Vol. II. Wrought gold alloys. R. L. Coleman, jr. J. Am. Dental Assn. (May 1925).
269	T267	OP	Effect of hot-rolling conditions on the physical properties of a carbon steel. J. R. Freeman, jr. and A. T. Derry. Tech. Pap. BS, <u>18</u> , 547 (1924-25).
270	T238	\$0.10	Comparative cold-rolling tests of open-hearth steel strip (deep drawing stock) and electrolytic iron strip. J. R. Freeman, jr., and R. D. France. Tech. Pap. BS, <u>19</u> , 297 (1924-25).
271			Experiments with nickel, tantalum, cobalt and molybdenum in high speed steels. H. J. French and T. G. Digges. Trans. Am. Soc. Steel Treating <u>8</u> , 681 (1925).
272	T295	.10	Initial temperature and mass effects in quenching. H. J. French and O. Z. Klopsch. Tech. Pap. BS, <u>19</u> , 589 (1924-25).
273	T296	OP	Flow in a low-carbon steel at various temperatures. H. J. French and W. A. Tucker. Tech. Pap. BS, <u>19</u> , 619 (1924-25).
274			Molybdenum, cerium and related alloy steels. H. W. Gillett and E. L. Mack (work of Bureau of Mines). Tech. Monograph Series, Am. Chem. Soc., Chemical Catalog Company (1925).
275			Active metallurgical research. H. W. Gillett. Iron Age <u>116</u> , 536 (1925).
276			Standards Bureau metal research. H. W. Gillett. Iron Age <u>116</u> , 461 (1925).
277			Principles and operating conditions of chromium plating. H. E. Haring. Chem. Met. Eng. <u>32</u> , 698, 756 (1925). Brass World <u>21</u> , 395 (1925). Met. Ind. (London) <u>27</u> , 310 (1925). Monthly Rev., Am. Electroplaters Soc. <u>12</u> (1925).
278	S497	OP	Thermal expansion of aluminum and its alloys. P. Hidnert. BS Sci. Pap. <u>19</u> , 637 (1923-24).
279			Strain detection in mild steel by wash coating. R. S. Johnston. Proc. Brit. Iron & Steel Inst. <u>CXII</u> , No. II, 342 (1925).
280			Oxygen content of coke and charcoal cast iron. L. Jordan, J. R. Eckman and W. E. Jominy. Trans. Am. Foundrymen's Assn. <u>33</u> , 431 (1925).
281			Report of soil corrosion investigation. K. H. Logan. Am. Foundrymen's Assn. Preprint No. 447 (1925).
282			Determination of uranium. G. E. F. Lundell and H. B. Knowles. J. Am. Chem. Soc. <u>47</u> , 2637 (1925).
283		\$1.25	National Directory of Commodity Specifications (27,000 specifications listed). A. S. McAllister (1925).

<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
284			Periodic structural regularities in spectra as related to the periodic law of the chemical elements. W. F. Meggers. Nat. Acad. Sci. <u>11</u> , 43 (1925).
285	T281	\$0.10	Malleability and metallography of nickel. P. D. Merica and R. G. Waltenberg. Tech. Pap. BS, <u>19</u> , 155 (1924-25).
286			The malleability of nickel. P. D. Merica and R. G. Waltenberg. Trans. Am. Inst. Min. Met. Eng. <u>71</u> , 703 (1925).
287	T289	.20	Impact and slow bending notched bar tests. S. N. Petrenko. Tech. Pap. BS, <u>19</u> , 315 (1924-25).
288			Comparative slow bend and impact notched bar tests on some metals. S. N. Petrenko. Trans. Am. Soc. Steel Treating <u>8</u> , 519 (1925).
289			Report of Subcommittee V of E-4 on microhardness. H. S. Rawdon. Proc. Am. Soc. Testing Materials <u>25</u> (1), 442 (1925).
290			Report of Subcommittee VII of A-5 on accelerated corrosion tests. H. S. Rawdon. Proc. Am. Soc. Testing Materials <u>25</u> (1), 103 (1925).
291			Metallographic study of welded rails included in Progress Report No. 3, Committee on Welded Rails. H. S. Rawdon and S. Epstein. J. Am. Welding Soc. <u>4</u> , 80 (1925).
292			Note, "Observations on the 'hydrogen point' in iron". H. S. Rawdon and P. Mignert. Phys. Rev. <u>25</u> , 898 (1925).
293			Note, "Observations on the transformation in austenitic steel as induced by cooling in liquid air". H. S. Rawdon and F. Sillers, jr. Phys. Rev. <u>25</u> , 898 (1925).
294			Lead filings and zinc dust as pipe jointing material. S. J. Rosenberg. Am. Gas Assn. Monthly <u>7</u> , 701 (1925).
295			Magnetic analysis needs more study. R. L. Sanford. Iron Trade Review <u>77</u> , 555 (1925).
296			Physical properties of dental materials. W. Souder. J. Am. Dental Assn. (May 1925).
297			Protective value of nickel plating. C. F. Thomas and W. Blum. Trans. Am. Electrochem. Soc. <u>46</u> , 69 (1925).
298			Nickel plating of zinc and zinc base die castings. M. R. Thompson. Trans. Am. Electrochem. Soc. <u>47</u> , 163 (1925).
299			Nickel electrotyping solutions. J. H. Winkler and W. Blum. Int. Assn. Electrotypers (1925).
300	R54	.05	Sterling silver flatware. Simpl. Prac. BS, R54 (1926).
301			Chromium plating of gages proves successful. Auto. Ind. <u>55</u> , 1080 (1926).
302			Wear test for plug gages. Western Machinery World <u>17</u> , 535 (1926).
303	M72	.05	Strain lines developed by compressive tests on structural members of the Delaware River Bridge for the Delaware River Bridge Joint Commission. Misc. Pub. BS, M72 (1926).

<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
304			Effect of sulphur on rivet steel; conclusions. G. K. Burgess. Proc. Am. Soc. Testing Materials <u>26</u> (1), 114 (1926). Chem. Abst. <u>21</u> , 1436 (1927).
305			Organization and work of the U. S. Bureau of Standards. G. K. Burgess. J. Chem. Education <u>3</u> , 7 (1926).
306	S517	\$0.10	A special camera for photographing cylindrical surfaces. R. Davis. BS Sci. Pap. <u>20</u> , 515 (1924-26).
307			Oxygen affects charcoal iron. J. R. Eckman, L. Jordan and W. E. Jominy. Foundry <u>54</u> , 506 (1926).
308			Pyrometry of molten brass. C. O. Fairchild and W.F. Roeser. Trans. Am. Foundrymen's Assn. <u>34</u> , 675 (1926).
309			Recrystallization temperatures of cold rolled electro- lytic iron and open-hearth steel strip. J.R. Freeman, jr. Trans. Am. Soc. Steel Treating <u>10</u> , 67 (1926).
310			Tensile properties of soldered joints under prolonged stress. J. R. Freeman, jr. and G. W. Quick. Met. Ind. <u>24</u> , 7 (1926).
311	S522	.15	Pure zinc at normal and elevated temperatures. J. R. Freeman, jr., F. Sillers, jr. and P. F. Brandt. BS Sci. Pap. <u>20</u> , 661 (1924-26).
312			Relation between metallurgy and atomic structure. P. D. Foote. Trans. Am. Inst. Min. Met. Eng. <u>73</u> , 628 (1926).
313			Application of heat treated steels to industrial uses. Abst. of lecture. H. J. French. Trans. Am. Soc. Steel Treating <u>9</u> , 997 (1926).
314			Metals for service at high temperatures. H. J. French. Chem. Met. Eng. <u>33</u> , 591 (1926).
315			Metals to resist corrosion or high temperatures. H. J. French. Trans. Am. Electrochem. Soc. <u>50</u> , 47 (1926).
316			Methods of test in relation to flow in steels at various temperatures. H. J. French. Proc. Am. Soc. Testing Ma- terials <u>26</u> (2), 7 (1926).
317			Rough turning tests on alloy steels. H. J. French and I. G. Digges. Am. Mach. <u>65</u> , 957 (1926).
318			Rough turning with particular reference to the steel cut. H. J. French and T. G. Digges. Western Machinery World <u>17</u> , 533 (1926). Mech. Eng. <u>49</u> , 339 (1927).
319			Wear of steels with particular reference to plug gages. H. J. French and H. K. Herschman. Trans. Am. Soc. Steel Treating <u>10</u> , 683 (1926).
320			Initial temperature and mass effects in quenching. H. J. French and O. Z. Klopsch. Trans. Am. Soc. Steel Treating <u>9</u> , 33 (1926).
321			Mass effects in quenching. H. J. French and O.Z. Klopsch. Fuels & Furnaces <u>4</u> , 435 (1926).

<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
322	T313	0.10	Some characteristics of quenching curves. H. J. French and C. Z. Klopsch. Tech. Pap. BS, <u>20</u> , 365 (1925-26). Trans. Am. Soc. Steel Treating <u>2</u> , 8 (1926).
323			Behavior of steel under repeated stress. H. W. Gillett. Trans. Am. Soc. Steel Treating <u>10</u> , 159 (1926).
324			Chemistry in the metallurgical division of the Bureau of Standards. H. W. Gillett. J. Chem. Education <u>3</u> , 148 (1926).
325			Government co-operates in research. H. W. Gillett. Iron Age <u>118</u> , 673 (1926).
326			The problem of materials for extreme conditions. H. W. Gillett. Trans. Am. Electrochemical Soc. <u>50</u> , 35 (1926).
327			Research work of the Bureau of Standards. H.W.Gillett. Forging, Stamping, Heat Treating <u>12</u> , 368 (1926).
328			Research work at the Bureau of Standards. H.W.Gillett. Blast Furnace & Steel Plant <u>14</u> , 515 (1926).
329			Silicon as an alloy in steel. H. W. Gillett. Iron Age <u>113</u> , 481 (1926); Met. Ind. (London) <u>29</u> , 248 (1926).
330	T331	.15	High silicon structural steel. H. W. Gillett. Tech. Pap. BS, <u>21</u> , 121 (1926-27).
331	BH-8	OP	Recommended building code requirements for unit working stresses in building materials. J. Gries. Bldg. & Hous. BS, BH-8 (1926).
332	S518	.25	Metallographic etching reagents. III. For alloy steels. E. C. Groesbeck. BS Sci. Pap. <u>20</u> , 527 (1924-26).
333			Report on etching reagents for alloy steels. E. C. Groesbeck. Proc. Am. Soc. Testing Materials <u>26</u> (1), 569 (1926).
334			Solutions for carbides, etc. in alloy steels. E. C. Groesbeck. Proc. Am. Soc. Testing Materials <u>26</u> (1), 569 (1926).
335			Chromium plating on printing plates. H. E. Haring. Met. Ind. <u>24</u> , 68 (1926).
336			A simple method for measuring polarization and resistivity. H. E. Haring. Trans. Am. Electrochem. Soc. <u>49</u> , 417 (1926).
337	P337	OP	Statistical hysteresis in the flexure of bars. G.H.Heuligan. Tech. Pap. BS, <u>21</u> , 255 (1926-27).
338	S515	.05	Thermal expansion of tungsten. P. Hidnert and W.T.Sweeney. BS Sci. Pap., <u>20</u> , 483 (1924-26).
339			Compressive strength and deformation of structural steel and cast iron shapes at temperatures up to 950°C (1742°F). S. H. Ingberg and P. D. Sale. Proc. Am. Soc. Testing Materials <u>26</u> (2), 53 (1926).
340	P327	.20	Compressive strength of column web plate and wide web columns. R. S. Johnston. Tech. Pap. ES, <u>20</u> , 733 (1925-26).



<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
341			Determination of oxygen and hydrogen in metals by fusion in vacuum. L. Jordan and J. R. Eckman. J. Ind. Eng. Chem. <u>18</u> , 279 (1926). Met. Ind. (Lond.) <u>28</u> , 387 (1926).
342	S514	OP	Gases in metals. II. The determination of oxygen and hydrogen in metals by fusion in vacuum. L. Jordan and J. R. Eckman. BS Sci. Pap. <u>20</u> , 445 (1924-26).
343			Refractories for use in melting pure metals. L. Jordan, A. A. Peterson and L. H. Phelps. Trans. Am. Electrochem. Soc. <u>50</u> , 47 (1926). Met. Ind. (London) <u>29</u> , 367 (1926). Brass World <u>22</u> , 355 (1926).
344			Effect of manganese, silicon, and phosphorus on the pearlite interval. B. Kjerrman. Trans. Am. Soc. Steel Treating <u>9</u> , 430 (1926).
345			Some comments on Swedish steel practice. B. Kjerrman. Trans. Am. Soc. Steel Treating <u>9</u> , 585 (1926).
346			Rapid determination of small amounts of aluminum in certain non-ferrous materials. G. E. F. Lundell. J. Ind. & Eng. Chem. <u>18</u> , 60 (1926).
347			Thermal expansion of some fused oxides used as refractories. G. E. Merritt. Trans. Am. Electrochem. Soc. <u>50</u> , 165 (1926).
348			Elastic ring verification of Brinell hardness testing machine. S. N. Petrenko. Trans. Am. Soc. Steel Treating <u>9</u> , 420 (1926).
349			Laboratory tests on non-ferrous screen wire cloth. Report of Subcom. IV of D-14 on Testing Screen Wire Cloth. G. W. Quick. Proc. Am. Soc. Testing Materials <u>26</u> (1), 492 (1926).
350			Accelerated corrosion tests. H. S. Rawdon. Com. A-5. Proc. Am. Soc. Testing Materials <u>26</u> (1), 144 (1926).
351			Note on the protection of iron by cadmium. H. S. Rawdon. Met. Ind. (Lond.) <u>28</u> , 414 (1926). Met. Ind. <u>24</u> , 27 (1926). Trans. Am. Electrochem. Soc. <u>49</u> , 339 (1926).
352			Report of Subcommittee V of E-4 on microhardness. H. S. Rawdon. Proc. Am. Soc. Testing Materials <u>26</u> (1), 572 (1926).
353			Observations on phosphorus in wrought iron made by different puddling processes. H. S. Rawdon and S. Epstein. Am. Iron & Steel Inst. <u>16</u> , 117 (1926).
354			Some effects of hydrogen on iron and their bearing on a reported transformation at 370°C (698°F). H. S. Rawdon, P. Hidnert and W. A. Tucker. Trans. Am. Soc. Steel Treating <u>10</u> , 233 (1926).
355			Pests on welded pressure vessels. L. M. Roller. Proc. Am. Soc. Refrig. Eng. p. 215 (Jan. 1926).
356			Rate of loading sand test. C. M. Saeger, jr. Trans. Am. Foundrymen's Assn. <u>34</u> , 536 (1926).



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357			Sand testing spring compression apparatus. C.M.Saeger, jr. Trans. Am. Foundrymen's Assn. <u>34</u> , 487 (1926).
358			Sand wintering test. C. M. Saeger, jr. Trans. Am. Foundrymen's Assn. <u>34</u> , 527, 556 (1926).
359	S510	10.05	Effect of wear on the magnetic properties and tensile strength of steel wire. R. L. Sanford and W. L. Cheney. BS Sci. Pap. <u>20</u> , 339 (1924-26).
360	T315	.10	Non-destructive testing of wire rope. R. L. Sanford. Tech. Pap. BS, <u>20</u> , 497 (1925-26).
361			Dimensional changes accompanying the phenomena of tempering and aging tool steels. H. Scott. Trans. Am. Soc. Steel Treating <u>9</u> , 377 (1926).
362	S513	.20	Origin of quenching cracks. H. Scott. BS Sci. Pap. <u>20</u> , 399 (1924-26).
363	S532	.10	Analysis of dental gold alloys. W. H. Swanger. BS Sci. Pap., <u>21</u> , 209 (1926-27).
364			Acid zinc plating baths. M. R. Thompson. Trans. Am. Electrochem. Soc. <u>50</u> , 193 (1926).
365			Crystal spotting out of sulphide finishes. W. P. Barrows. Brass World, p. 409 (1927). Met. Ind. <u>25</u> , 498 (1927). Met. Ind. (May 1928).
366			Chromium plating. W. Blum. Met. Ind. <u>25</u> , 14 (1927).
367			Electroplating (symposium, Chemistry in automotive transportation). W. Blum. J. Ind. & Eng. Chem. <u>19</u> , 1111 (1927).
368			Principles of electrolytic corrosion. W. Blum and H. S. Rawdon. Am. Electrochem. Soc. Preprint 48 (May 1927).
369	S562	.10	Density of hot-rolled and heat-treated carbon steels. H. C. Cross and E. E. Hill. BS Sci. Pap. <u>22</u> , 451 (1927-28).
370			Progress in study of normal and abnormal steel. S. Epstein and H. S. Rawdon. Trans. Am. Soc. Steel Treating <u>12</u> , 337 (1927).
371	T363	.35	Endurance properties of rail steel (ordinary and sink-head ingots). J. R. Freeman, jr., R. L. Dowdell and W.J.Berry. Tech. Pap. BS, <u>22</u> , 269 (1927-28).
372			Comparison of the alloying elements Cr, Ni, Mo, V in structural steels. H. J. French. Trans. Am. Soc. Steel Treating <u>11</u> , 845 (1927).
373			Comparative high temperature tension tests on a C and a Cr-Mo steel. H. J. French et al. Mech. Eng. <u>49</u> , 1114 (1927).
374			Wear testing of metals. H. J. French. Proc. Am. Soc. Testing Materials <u>27</u> (2), 213 (1927). Eng. (London) <u>124</u> , 279 (1927).
375			Machinability of steel. H. J. French and T. G. Digges. Iron & Steel World <u>1</u> , 423 (1927).

Ref. Series Price

- 376 Recent experiments relating to the wear of plug gages.  
H. J. French and H. K. Herschman. Trans. Am. Soc.  
Steel Treating 12, 321 (1927).
- 377 T344 \$0.10 Comparison of American, British and German standards for  
metal fits. I. H. Fulmer. Tech. Pap. BS, 21, 401  
(1926-27).
- 378 Data on the assay of rolled gold plate. R. Gilchrist.  
J. Ind. & Eng. Chem. 19, 827 (1927).
- 379 Active year at Bureau of Standards. H. W. Gillett. Iron  
Age 120, 327 (1927).
- 380 Alloys of iron. H. W. Gillett. Discussion. Eng. Founda-  
tion Bul. No. 1, p. 10 (1927).
- 381 Development of brass melting. H. W. Gillett. Brass  
World 23, 151 (1927).
- 382 Development of electric brass melting in the United  
States. H. W. Gillett. Chem. Age 17, No. 423, 9 (1927).
- 383 Miscellaneous non-ferrous metals and alloys in automotive  
transportation. H. W. Gillett. J. Ind. Eng. Chem. 19,  
109 (1927).
- 384 Non-ferrous electrothermics in America. H. W. Gillett.  
Met. Ind. (Lond.) 21, 55 (1927).
- 385 Traces non-ferrous melting in electric furnaces.  
H. W. Gillett. Foundry 55, 805 (1927).
- 386 25 years of non-ferrous electrothermics. 15 years of el-  
ectric brass melting. H. W. Gillett. Trans. Am. Elec-  
trochem. Soc. 51, 101 (1927). Brass World 23, 151 (1927).
- 387 T346 .15 Electrodeposition of chromium from chromic acid baths.  
H. E. Haring and W. P. Barrows. Tech. Pap. BS, 21,  
413 (1926-27).
- 388 Tension experiments on diaphragm metals. H.B.Hendrickson.  
Nat. Advisory Comm. Aeron. Tech. Note 261 (1927).
- 389 T358 .15 Air hardening rivet steels. H. K. Herschman. Tech. Pap.  
BS, 22, 141 (1927-28).
- 390 T335 .05 Thermal expansion of graphite. P. Hidnert and W.F.Sweeney.  
Tech. Pap. BS, 21, 223 (1927).
- 391 S565 .10 Thermal expansion of beryllium and aluminum-beryllium  
alloys. P. Hidnert and W. T. Sweeney. BS Sci. Pap. 22,  
533 (1927-28). Phys. Rev. 29, 616 (1927).
- 392 Thermal expansion of some nickel steels. P. Hidnert and  
W. T. Sweeney. Phys. Rev. 29, 911 (1927).
- 393 S563 OP Gases in metals. III. The determination of nitrogen in  
metal by fusion in vacuum. L. Jordan and J.R.Eckman.  
BS Sci. Pap. 22, 467 (1927-28).
- 394 T348 .15 Tarnish resisting silver alloys. L. Jordan, L.H.Grenell  
and H. K. Herschman. Tech. Pap. BS, 21, 450 (1926-27).

<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
395			The tarnish resistance and some physical properties of silver alloys. L. Jordan, L. H. Grenell and H. K. Herschman. Met. Ind. (Lond.) <u>30</u> , 484 (1927). Trans. Am. Inst. Min. Met. Eng. (Inst. Met. Div.), p. 460 (1927).
396		\$0.10	Iron-carbon-vanadium alloy. L. Jordan and G. W. Quick. U. S. Patent 1,638,855 (1927).
397	S548	.05	Wave length measurements in the arc and spark spectra of zirconium. C. C. Kiess. BS Sci. Pap. <u>22</u> , 47 (1927-28).
398			Bureau of Standards Soil Corrosion Investigation. 2nd progress report on unprotected pipe. K. H. Logan. Trans. Am. Foundrymen's Assn. <u>35</u> , 101 (1927).
399			Electrolysis and its place in considering soil corrosion. K. H. Logan. Oil & Gas J. <u>26</u> , G224 (1927).
400	C346	1.10	Light metals and alloys, aluminum and magnesium. M. G. Lorentz et al. Cir. ES, C346 (1927).
401	T355	0.30	Electrolysis testing. B. McCollum and K. H. Logan. Tech. Pap. BS, <u>22</u> , 15 (1927-28).
402			Effect of running-in on journal performance. S.A. McKee. Mech. Eng. <u>49</u> , 1335 (1927).
403	S551	.10	Absorption spectra of iron, cobalt and nickel. W. F. Meggers and F. M. Walters. BS Sci. Pap. <u>22</u> , 205 (1927-28).
404	S549	.05	Wave-length measurements in the arc spectrum of scandium. W. F. Meggers. BS Sci. Pap. <u>22</u> , 61 (1927-28).
405			Absorption spectra of Hg, Cd and Zn at high pressure. F. L. Mohler and H. R. Moore. Opt. Sci. Am. <u>15</u> , 74 (1927).
406	T334	OP	Relationship between the Rockwell and Brinell numbers. S. N. Petrenko. Tech. Pap. BS, <u>21</u> , 195 (1926-27). Now RP185 (1930). OP
407	T336	.15	Comparative tests of 6-inch cast iron pipes of American and French manufacture. S. N. Petrenko. Tech. Pap. BS, <u>21</u> , 231 (1926-27).
408			Iron-carbon-vanadium alloy for Brinell balls. G.W. Quick and L. Jordan. Trans. Am. Soc. Steel Treating <u>12</u> , 3 (1927). The Metallurgist, p. 75 (May 1927).
409			Data on Report of Com. B-3 on corrosion of non-ferrous metals and alloys. H. S. Rawdon. Proc. Am. Soc. Testing Materials <u>27</u> (1), 281 (1927).
410			"Ferroxyl" reagent in the laboratory study of corrosion. H. S. Rawdon. Min. & Met. <u>3</u> , 229 (1927).
411			The intercrystalline corrosion of metal. H.S. Rawdon. J. Ind. & Eng. Chem. <u>19</u> , 613 (1927). Met. Ind. (Lond.) <u>30</u> , 647 (1927).

Ref.	Series	Price	
412	S571	\$0.35	Unusual features in the microstructure of ferrite. H. S. Rawdon and P. Berglund. BS Sci. Pap., <u>22</u> , 649 (1927-28).
413			Tests to determine effect of sand rammer based on permeability values. C. M. Saeger, jr. Comm. Report. Trans. Am. Foundrymen's Assn. <u>35</u> , 123 (1927).
414	S545	.10	Determination of the magnetic induction in sheet steel. R. L. Sanford and J. M. Barry. BS Sci. Pap., <u>21</u> , 727 (1926-27).
415	S546	.05	Magnetic reluctivity relationships. R. L. Sanford. BS Sci. Pap., <u>21</u> , 743 (1926-27).
416	S567	.05	Some principles governing the choice and utilization of permanent-magnet steels. R. L. Sanford. BS Sci. Pap., <u>22</u> , 557 (1927-28).
417			Note on the crystal structure of electrodeposited chromium. F. Sillers, jr. Met. Ind. (Lond.) <u>30</u> , 533 (1927). Trans. Am. Electrochem. Soc. <u>52</u> , 391 (1927).
418			Stresses in a rail due to a falling weight. A. H. Stang. J. Am. Welding Soc. <u>6</u> , 64 (1927).
419			The protective value of nickel plating. II. Supplemental observations. C. T. Thomas and W. Blum. Trans. Am. Electrochem. Soc. <u>52</u> , 271 (1927).
420	T328	.40	Tests of large columns with H-shaped sections. L. B. Tuckerman and A. H. Stang. Tech. Pap. BS, <u>21</u> , 1 (1926-27).
421	T361	.15	Deterioration of steels in synthesis of ammonia. J. S. Vanick, W. deSveshnikoff and J. G. Thompson. Tech. Pap. BS, <u>22</u> , 199 (1927-28).
422			Testing gas welds. H. L. Whittmore. Welding Eng. <u>12</u> , 38 (1927).
423			Inorganic and analytical chemistry of Au-Ag and Pt metals. E. Wichers. Annual Survey Am. Chem. II (1927).
424			Health hazards in chromium plating. J. J. Bloomfield and W. Blum. Public Health Reports, Washington <u>43</u> , 2329 (1928).
425			Colloids in the electrodeposition of metals. W. Blum. Colloid Symposium monograph (1928).
426			Nickel electrotyping solution. W. Blum and J.H.Winkler. Trans. Am. Electrochem. Soc. <u>53</u> , 435 (1928).
427	RP32	.35	Physical properties of dental materials (gold alloys and accessory materials). R. L. Coleman. BS J. Research <u>1</u> , 867 (1928).
428	RP14	OP	Steel for case hardening -- normal and abnormal steel. S. Epstein and H. S. Rawdon. BS J. Research <u>1</u> , 423 (1928).
429	RP26	.05	Note on the effect of repeated stresses on the magnetic properties of steel. M. F. Fischer. BS J. Research <u>1</u> , 721 (1928).

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430			Fatigue resistance of rail steel. J. R. Freeman, jr. Iron Age <u>141</u> , 1743 (1928).
431	T363	\$0.35	Endurance and other properties of rail steel. J. R. Freeman, jr. and R. L. Dowdell. Tech. Pap. BS, <u>22</u> , 269 (1927-28).
432			Wear and mechanical tests of some railroad bearing bronzes. H. J. French. Proc. Am. Soc. Testing Materials <u>28</u> (2), 298 (1928).
433			Steel requirements of the aircraft industry. H.J.French. Iron Age <u>142</u> , 1161 (1928). Am. Iron & Steel Inst. Year-book, p. 350 (1928). Blast Furnace & Steel Plant <u>16</u> , 1436 (1928).
434	T362	OP	Creep in five steels at different temperatures. H. J. French, H. C. Cross and A. A. Peterson. Tech.Pap. BS, <u>22</u> , 235 (1927-28).
435			Safe loads for steels working at high temperatures. H. J. French, H. C. Cross and A. A. Peterson. Iron Age <u>121</u> , 1749 (1928).
436	RP13	.35	Wear and mechanical properties of railroad bearing bronzes at different temperatures. H. J. French, S. J. Rosenberg, W. Harbaugh and H. C. Cross. BS J. Research, <u>1</u> , 343 (1928).
437			Effects of Sb, As, Cu and Sn in high speed steel. H. J. French and T. G. Digges. Trans. Am. Soc. Steel Treating <u>13</u> , 319 (1928).
438			Studies of iron and its alloys at the Bureau of Standards. H. W. Gillett. Eng. Foundation Bul. 3 (Dec.1928).
439			Metals studied for 15 years. H. W. Gillett. Iron Age <u>122</u> , 509 (1928).
440			Research is conducted on qualities of metals and alloys as basis for establishing standards. Topic 29. Practices and standards. Research on standards for metals and alloys. H. W. Gillett. U. S. Daily, March 10, 1928. Specifications for steel. March 12, 1928.
441	RP10	.35	Accelerated laboratory corrosion test methods for zinc-coated steel. E. C. Groesbeck and W. A. Tucker. BS J. Research, <u>1</u> , 255 (1928).
442			Progress report on cast iron for enameling purposes. W. H. Harrison, C. M. Saeger and A. I. Krynitsky. Am. Ceramic Soc. <u>11</u> , 595 (1928).
443			Thermal expansion of beryllium and aluminum-beryllium alloys. P. Hidnert and W. T. Sweeney. Met. Ind.(Lond.) <u>32</u> , 397, 423 (1928).
444	S570	.10	Thermal expansion of alloys of the "stainless iron" type. P. Hidnert and W. T. Sweeney. BS Sci. Pap., <u>22</u> , 639 (1927-28).



<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
445	RP29	OP	Thermal expansion of magnesium and some of its alloys. P. Hidnert and W. P. Sweeney. BS J. Research, <u>1</u> , 771 (1928).
446	RP25	\$0.05	A study of the hydrogen-antimony-tin method for the determination of oxygen in cast iron. B. Kjerrman and L. Jordan. BS J. Research, <u>1</u> , 701 (1928).
447			Corrosion of pipe lines. K. H. Logan, L. F. Athy and C. T. Langford. Western Gas (Los Angeles), p. 32 (October 1928).
448	T368	.50	Bureau of Standards soil corrosion studies. I. Soils, materials and results of early observations. K.H.Logan, S. P. Ewing and C. D. Yeoman. Tech. Pap. BS, <u>22</u> , 447 (1927-28).
449			External corrosion of copper and brass service pipe. K. H. Logan and S. P. Ewing. J. Am. Water Works Assn. <u>20</u> , 390 (1928).
450			Status of soil corrosion investigation. K. H. Logan. Oil & Gas J. p. F-309 (Aug. 30, 1928).
451			Corrosion embrittlement of duralumin. H. S. Rawdon. I. Practical aspects of the problem. Nat. Advisory Comm. Aeron. Tech. Note 282. II. Accelerated corrosion tests and the behavior of high strength aluminum alloys of different compositions. Nat. Advisory Comm. Aeron. Tech. Note 283. III. The effect of the previous treatment on the susceptibility of sheet. Nat. Advisory Comm. Aeron. Tech. Note 284. IV. The use of protective coatings. Nat. Advisory Comm. Aeron. Tech. Note 285 (1928).
452		OP	Protective metallic coatings. H. S. Rawdon. Am. Chem. Monograph Series No. 40 (1928).
453			Protection of duralumin against embrittlement. H. S. Rawdon. Brass World <u>24</u> , 147 (1928).
454			Duralumin for airplane use. H. S. Rawdon. Mining & Metallurgy <u>2</u> , 234 (1928).
455	RP15	.05	Strain markings in mild steel under tension. H.S.Rawdon. BS J. Research, <u>1</u> , 467 (1928).
456			Strain effects in mild steel. H. S. Rawdon. Eng. News Record, p. 244 (Aug. 16, 1928).
457			Tensile properties of exposed (duralumin) specimens. H. S. Rawdon. Cir. 350, Am. Paint & Varnish Mfrs. Assn. (1928).
458	T367	.20	Effect of testing method on the determination of corrosion resistance. H. S. Rawdon and E. C. Groesbeck. Tech. Pap. BS, <u>22</u> , 403 (1927-28).
459			Heat losses from a 7 1/2 ton hot metal car. W. F. Roesser. Trans. Am. Foundrymen's Assn. <u>36</u> , 313 (1928).
460			Refractoriness test for foundry sand. C. M. Saeger, jr. Trans. Am. Foundrymen's Assn. <u>36</u> , 715 (1928).

<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
461			Rubber binders for foundry cores. C. M. Saeger, jr. Met. Ind. (N.Y.), p. 470 (Nov. 1928). p. 511 (Dec. 1928).
462			Specification for dental gold alloys. W. Souder. J. Am. Dental Assn. p. 627 (1928).
463			Effect of temperature and other factors on the performance of storage batteries. G. W. Vinal and C.L.Snyder. Trans. Am. Electrochem. Soc. <u>53</u> , 253 (1928).
464			Temperature measurements of molten cast iron. H.F.Wensel and W. F. Roeser. Trans. Am. Foundrymen's Assn. <u>36</u> , 191 (1928).
465			Purification of the six platinum metals. E. Wichers, R. Gilchrist and W. H. Swanger. Trans. Am. Inst. Min. Met. Eng. <u>76</u> , 604 (1928).
466			Properties of graphite used in electrotyping. J. H. Winkler and W. Blum. Trans. Am. Electrochem. Soc. <u>53</u> , 455 (1928).
467			Testing joints for aircraft structures welded under procedure specifications. H. L. Whittemore. J. Am. Weld. Soc. <u>7</u> , 31 (1928).
468			Principles of the heat treatment of steel. Members, metallurgical staff, Bureau of Standards. Trans. Am. Soc. Steel Treating <u>11</u> , 502, 744, 892 (1928).
469	C319	OP	Alphabetical index and numerical list of the U. S. Government Master Specifications promulgated by the F.S.E. Cir. BC, C319 (1928).
470	M90	OP	Directory of commercial testing and college research laboratories. Misc. Pub. BS, M90 (1927).
471	RP72	\$0.10	The spotting of plated or finished metals. W.P.Barrows. BS J. Research, <u>2</u> , 1035 (1929).
472	RP123	OP	Corrosion of open-valley flashings. K. H. Beij. BS J. Research, <u>3</u> , 927 (1929).
473			Steel owes much to research. G. K. Burgess. Iron Age <u>123</u> , 40 (1929).
474	RP39	.05	Reflecting power of beryllium, chromium and several other metals. W. W. Coblenz and R. Stair. BS J. Research, <u>2</u> , 343 (1929).
475			Observations on the iron-nitrogen system. S. Epstein. Metals & Alloys <u>1</u> , 226 (1929). Trans. Am. Soc. Steel Treating <u>16</u> , 19 (1929). (Symposium)
476	RP117	OP	Metallographic polishing. I. Automatic metallographic polishing machine. S. Epstein and J. P. Buckley. BS J. Research, <u>3</u> , 783 (1929). Metals & Alloys <u>1</u> , 226 (1929).
477	RP126	.20	Observations on the iron-nitrogen system. S. Epstein, H. C. Gross, E. C. Groesbeck and I. J. Wymore. BS J. Research, <u>2</u> , 1006 (1929).

<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
478			The carburizing test for quality in case-hardening steel. S. Epstein and H. S. Rawdon. Industrial Gas <u>7</u> , 9, 30 (1929).
479	RP65	\$0.10	A new determination of the melting point of palladium. C. O. Fairchild, W. H. Hoover and M. F. Peters. BS J. Research, <u>2</u> , 931 (1929).
480	RP92	.20	Effect of service on endurance properties of rail steels. J. R. Freeman, jr. and H. N. Solakian. BS J. Research, <u>3</u> , 205 (1929). Min. & Met. <u>10</u> , 539 (1929).
481			Bearing bronzes with and without zinc. H. J. French. Proc. Am. Soc. Testing Materials <u>29</u> (2), 450 (1929).
482			Surface cooling of steels in various quenching media. H. J. French, G. S. Cook and T. E. Hamill. Fuels and Furnaces <u>6</u> , 1515 (1929). Trans. Am. Soc. Steel Treating <u>15</u> , 217 (1929).
483	RP120	.30	Turning at high speeds with shallow cuts. H. J. French and T. G. Digges. BS J. Research, <u>3</u> , 829 (1929). Iron Age <u>124</u> , 1665 (1929). Am. Mach. <u>71</u> , 935 (1929). Am. Soc. Mech. Eng. Machine Shop Practice Section May-July 1930, p. msp 55-6.
484	RP103	.15	Hot aqueous solutions for the quenching of steels. H. J. French and T. E. Hamill. BS J. Research, <u>3</u> , 399 (1929). Iron Age <u>124</u> , 963 (1929). Fuels & Furnaces <u>7</u> , 1543 (1929). Trans. Am. Soc. Steel Treating <u>16</u> , 711 (1929).
485	RP68	.15	Bearing bronzes with and without zinc. H. J. French and E. M. Staples. BS J. Research, <u>2</u> , 1017 (1929). Black & White (Houghton Company), pages 9, 10, 13, 14 (1929).
486	RP62	.05	Thermal expansion of tantalum. P. Hidnert. BS J. Research, <u>2</u> , 387 (1929). Phys. Rev. <u>34</u> , 544 (1929).
487			The action of soils on metallic iron. H. D. Holler. J. Wash. Acad. Sci. <u>19</u> , 371 (1929).
488			Determining value of pipe coatings. K. H. Logan. Oil & Gas J. <u>27</u> , 33 (1929).
489			Report of Bureau of Standards soil corrosion investigation. K. H. Logan. Am. Petroleum Inst. (Dec. 5, 1929).
490	RP95	OP	Soil corrosion studies, 1927-28. K. H. Logan. BS J. Research, <u>3</u> , 375 (1929).
491			Correlation of laboratory corrosion tests with service. Weather-exposure tests of sheet duralumin. H. S. Rawdon. Am. Inst. Min. Met. Eng. Tech. Pub. 175 (1929).
492			Corrosion-embrittlement of duralumin vs results of weather-exposure tests. H. S. Rawdon. Nat. Advisory Comm. Aeron. Tech. Note 304 (1929).
493			Corrosion-embrittlement of duralumin. VI. H. S. Rawdon. Nat. Advisory Comm. Aeron. Tech. Note 305 (1929).

<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
494			Current metallurgical research at the Bureau of Standards. H. S. Rawdon. Metals & Alloys <u>1</u> , 144 (1929).
495			Effect of corrosion, accompanied by stress, on the tensile properties of sheet duralumin. H. S. Rawdon. Proc. Am. Soc. Testing Materials <u>29</u> (2), 314 (1929). Metal Stampings <u>2</u> , 510 (1929).
496			"High spots" of the 32nd annual meeting of the Am. Soc. Testing Materials. H. S. Rawdon. Metals & Alloys <u>1</u> , 38 (1929).
497	RP42	\$0.05	Laboratory corrosion tests of mild steel with special reference to ship plate. H. S. Rawdon. BS J. Research, <u>2</u> , 431 (1929).
498			Metallurgy plays its part. H. S. Rawdon. U. S. Const. Quar. <u>1</u> , 2nd Quar. (1929).
499			Properties of metals studied to determine new uses and to improve resistance to wear. H. S. Rawdon. U. S. Daily (Aug. 14, 1929).
500			Testing corrosion-resistance of Alclad; translation from E. Rackwitz and K. O. Schmidt. H. S. Rawdon. Metals & Alloys <u>1</u> , 235 (1929).
501	RP124	OP	Comparative properties of wrought iron made by hand puddling and by the Aston process. H. S. Rawdon and O. A. Knight. BS J. Research, <u>3</u> , 953 (1929).
502			Comparative properties of wrought iron made by hand puddling and by the Aston process. H. S. Rawdon. Metals & Alloys <u>1</u> , 46 (1929).
503			The corrosion problem as applied to power plants. H. S. Rawdon and K. H. Logan. Trans. Am. Soc. Mech. Eng. <u>51</u> , 19 (1929). Iron Age <u>123</u> , 666 (1929).
504	RP101	.10	Effect of oxidizing conditions on accelerated electrolytic corrosion tests. H. S. Rawdon and W. A. Tucker. BS J. Research, <u>3</u> , 275 (1929). Metals & Alloys <u>1</u> , 277 (1929).
505		.10	Metal spraying device using high frequency current device. C. M. Saeger, jr. U. S. Patent 1,721,092.
506			The refractoriness of molding sands; sintering test. C. M. Saeger, jr. Trans. Am. Foundrymen's Assn. <u>37</u> , 517 (1929).
507			Magnetic analysis. R. L. Sanford. J. Am. Inst. Elec. Eng. <u>48</u> , 7 (1929).
508			Field inspection of protective coatings applied to oil and gas lines. G. M. Scott. Am. Petroleum Inst. (Dec. 5, 1929).
509			Physical properties of dental materials (Some laboratory experiments for the dental school). W. Souder. J. Am. Dental Assn. <u>16</u> , 1829 (1929).

Ref.	Series	Price	
510	RP127	\$0.10	Melting, mechanical working and some physical properties of rhodium. W. H. Swanger. BS J. Research, <u>3</u> , 1029 (1929). Metals & Alloys <u>1</u> , 263 (1929).
511			A survey of amalgam alloys: A report to the Research Commission of the American Dental Association. N. Taylor. J. Am. Dental Assn. <u>16</u> , 533 (1929).
512			Strength of tubing under combined axial and transverse loading. L. E. Tuckerman, S. N. Petrenko and C. O. Johnson. Nat. Advisory Comm. Aeron. Tech. Note 307 (1929).
513			Annual report of Committee on Electrochemistry and Electrometallurgy. G. W. Vinal. J. Am. Inst. Elec. Eng. <u>48</u> (1929).
514			Measure temperature of molten cast iron. H. T. Wensel and W. F. Roeser. Foundry <u>57</u> , 184, 245 (1929).
515			Iron and steel products tested to insure safety in construction. Industry-Metals and Metal Products. H. L. Whittemore. U. S. Daily, Dec. 3, 1929.
516			Testing welded joints for aircraft structures. H. L. Whittemore. Airway Age <u>10</u> , 161 (1929).
517	RP206	.10	Cutting tests with cemented tungsten-carbide lathe tools. F. G. Digges. BS J. Research, <u>5</u> , 365 (1930). Metals & Alloys <u>1</u> , 836 (1930). Am. Soc. Mech. Eng. MSP52-13, p. 155 (1930).
518			Heat treatment of permanent magnet steels. R.L.Dowdell. Nat. Metals Handbook. Am. Soc. Steel Treating, p. 179 (1930).
519			Phases of the metastable iron-carbon constitutional diagram. R. L. Dowdell. Metals & Alloys <u>1</u> , 515 (1930).
520	RP182	.10	Endurance properties of some special rail steels. J. R. Freeman, jr. and R. D. France. BS J. Research, <u>4</u> , 851 (1930). Am. Railway Eng. Assn. Bul. <u>31</u> , No. 326, 16 (1930).
521	RP164	.20	Tensile properties of rail and some other steels at elevated temperatures. J. R. Freeman, jr. and G.W.Quick. BS J. Research, <u>4</u> , 543 (1930). Am. Inst. Min. Met. Eng. Tech. Pub. 269 (1930). Metals & Alloys <u>1</u> , 556 (1930). Metallurgist, p. 134 (Sept. 28, 1930).
522	RP129	.10	Reliability of fusible tin boiler plugs in service. J. R. Freeman, jr., J. A. Scherrer and S.J.Rosenberg. BS J. Research, <u>4</u> , 1 (1930).
523			A study of quenching of steel. H. J. French. Trans. Am. Soc. Steel Treating <u>17</u> , 645 (1930).
524	RP192	.25	Flow characteristics of special iron-nickel-chromium alloys and some steels at elevated temperatures. H. J. French, W. Kahlbaum and A. A. Peterson. BS J. Research, <u>5</u> , 125 (1930).



<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
525			Thermal expansion of "Carboloy". P. Hidnert. Phys. Rev. <u>35</u> , 120 (1930).
526			Thermal expansion of copper-nickel-tin alloy. P. Hidnert and W. T. Sweeney. Phys. Rev. <u>35</u> , 667 (1930).
527			Thermal expansion of lead. P. Hidnert and W. T. Sweeney. Phys. Rev. <u>35</u> , 226 (1930).
528			Constitution of iron-phosphorus alloys. L. Jordan. Trans. Am. Soc. Steel Treating <u>17</u> , 273 (1930). Nat. Metals Handbook (Am. Soc. Steel Treating), p.614(1930).
529			Review of "Lehrbuch für Metallhüttenkunde" Vol. II by V. Tafel. L. Jordan. Metals & Alloys <u>1</u> , 252 (1930).
530	RP257	\$0.10	The properties of pure nickel. L. Jordan and W.H.Swanger. BS J. Research, <u>5</u> , 1291 (1930).
531			The status of the double iron carbon diagram. A. I. Krynitsky. Correlated abstracts, Metals & Alloys <u>1</u> , 465 (1930).
532	RP179	.30	Blistering phenomena in the enameling of cast iron. A. I. Krynitsky and W. N. Harrison. BS J. Research, <u>4</u> , 757 (1930). J. Am. Ceram. Soc. <u>9</u> , 16 (1930). Trans. Am. Foundrymen's Assn. <u>38</u> , 332 (1930).
533	RP199	.05	Preliminary studies of the effect of deoxidation and mold conditions on the tensile properties of carbon steel castings. J. V. McCrae and R. L. Dowdell. BS J. Research, <u>5</u> , 265 (1930). Trans. Am. Soc. Steel Treating <u>18</u> , 159 (1930).
534	RP250	.15	A study of the so-called "over-reduced" acid electric steels for castings. J. V. McCrae, R. L. Dowdell and L. Jordan. BS J. Research, <u>5</u> , 1122 (1930).
535			Methods for the identification of aircraft tubing of plain carbon steel and chromium-molybdenum steel. W. H. Mutchler and R. W. Buzzard. Nat. Advisory Comm. Aeron. Tech. Note 250 (1930).
536			Atmospheric exposure and laboratory tests on non-ferrous screen wire cloth. G. W. Quick. Proc. Am. Soc. Testing Materials <u>30</u> (1), 864 (1930).
537			Corrosion of metals. H. S. Rawdon. Marks' Mechanical Engineering Handbook, 3rd revised edition (1930).
538			Corrosion-prevention methods as applied in aircraft construction. H. S. Rawdon. Aviation Eng. <u>5</u> , 23 (Oct. 1930). Proc. Am. Soc. Testing Materials <u>30</u> (2), 61 (1930).
539			Relation between alpha-veining and the Ag change in iron. Critical abstract of German article by Ammermann and Kornfeld. H. S. Rawdon. Metals & Alloys <u>1</u> , 354 (1930).
540	RP214	.15	The resistance of steel to abrasion by sand. S. J. Rosenberg. BS J. Research, <u>5</u> , 553 (1930). Trans. Am. Soc. Steel Treating <u>18</u> , 1093 (1930).

Ref. Series Price

- 541 Compression test for determining green bond of core-sand mixtures. C. M. Saeger, jr. Trans. Am. Foundrymen's Assn. 38, 505 (1930).
- 542 Methods for determining the volume change undergone by metals during casting. C. M. Saeger, jr. and E.J. Ash. Trans. Am. Foundrymen's Assn. 38, 107 (1930).
- 543 RP205 30.15 Bearing bronzes with additions of zinc, phosphorus, nickel and antimony. E. M. Staples, R. L. Dowdell and C. E. Eggenschweiler. BS J. Research, 5, 349 (1930). Soc. Automotive Eng. J. 27, 45 (1930).
- 544 C382 .10 Bismuth. J. G. Thompson. Cir. BS, C382 (1930).
- 545 Extrusion of bismuth wire. J. G. Thompson. Metals & Alloys 1, 826 (1930).
- 546 RP248 .10 The properties of lead-bismuth, lead-tin type metal and fusible alloys. J. G. Thompson. BS J. Research, 5, 1085 (1930).
- 547 C383 .05 Use of bismuth in fusible alloys. J. G. Thompson. Cir. BS, C383 (1930).
- 548 5.00 Storage batteries, 2nd edition. G. W. Vinal. John Wiley & Sons, New York (1930).
- 549 RP258 0.05 The freezing point of nickel as a fixed point on the international temperature scale. H. P. Wensel and W. F. Roeser. BS J. Research, 5, 1309 (1930).
- 550 Advantages of oxide films as bases for aluminum-pigmented surface coatings for aluminum alloys. R. W. Buzzard and W. H. Mutchler. Nat. Advisory Comm. Aeron. Tech. Note 400 (1931).
- 551 RP363 .05 Correlation of certain soil characteristics with pipe line corrosion. I. A. Denison. BS J. Research, 7, 631 (1931).
- 552 Machinability and tool life. T. G. Digges. Metals & Alloys 2, 44 (1931).
- 553 RP319 .10 The influence of chemical composition and heat treatment of steel forgings on machinability with shallow lathe cuts. T. G. Digges. BS J. Research, 6, 977 (1931). Trans. Am. Soc. Mech. Eng. p. MS54-40 (1932).
- 554 RP350 .10 Thermomagnetic investigation of tempering of quenched 0.75 percent carbon steel. G. A. Ellinger. BS J. Research, 7, 441 (1931).
- 555 Endurance testing of steel: comparison of results obtained with rotating beam vs axially loaded specimens. R. D. France. Proc. Am. Soc. Testing Materials 31 (2), 176 (1931).
- 556 Oxygen as a factor in submerged corrosion. F.C. Groesbeck and L. J. Waldron. Proc. Am. Soc. Testing Materials 31 (2), 279 (1931).

Ref.	Series	Price	
557	RP357	\$0.15	Aqueous solutions of ethylene glycol, glycerine and sodium silicate as quenching media for steels. T. E. Hamill. BS J. Research, <u>7</u> , 555 (1931). Metal Progress <u>20</u> , 53 (1931).
558			Quenches, intermediate between oil and water. T. E. Hamill. Metal Progress <u>20</u> , 55 (1931).
559	RP276	.10	The resistance of chromium plated gages to wear. H. K. Herschman. BS J. Research, <u>6</u> , 295 (1931).
560			A grain distribution index for sand grading. C.E.Jackson. Trans. Am. Foundrymen's Assn. <u>39</u> , 506 (1931).
561			The wear of metals. L. Jordan. Mech. Eng. <u>53</u> , 644 (1931).
562	RP270	.15	The tensile properties of alloy steels at elevated temperatures as determined by the "short-time" method. W. Kahlbaum, R. L. Dowdell and W. A. Tucker. BS J. Research, <u>6</u> , 199 (1931).
563	RP329	OP	Soil corrosion studies, 1930. Rates of corrosion and pitting of bare ferrous specimens. K. H. Logan and V. A. Grodsky. BS J. Research, <u>7</u> , 1 (1931).
564	RP359	OP	Soil corrosion studies. Non-ferrous metals and alloys, metallic coatings and specially prepared ferrous pipes removed in 1930. K. H. Logan. BS J. Research, <u>7</u> , 585 (1931).
565			Stress corrosion of metals. D. J. McAdam, jr. Int. Assn. Testing Materials, Zurich, Switzerland, p. 228 (Sept. 1931).
566			Influence of water composition on stress corrosion. D. J. McAdam, jr. Proc. Am. Soc. Testing Materials <u>31</u> (2), 259 (1931).
567			Surface coatings for aluminum alloys. W. H. Mitchler. Metals & Alloys <u>2</u> , 324 (1931).
568			Flow in rail steel. G. W. Quick. Met. Progress, p. 41 (April 1931).
569			Work on iron, steel and hardware at the Bureau of Standards. H. S. Rawdon. Research into properties of iron and steel. U. S. Daily, Dec. 17. Metallurgical studies to aid steel industry, Dec. 18. Evolving plant processes for making steel, Dec. 19. Cooperative research into making steel, Dec. 21. Certifying iron products for Federal purchase, Dec. 22. Establishing standards for iron and steel, Dec. 23 (1931).
570	RP326	.05	The freezing point of platinum. W. F. Roesser, F. R. Caldwell and H. T. Wensel. BS J. Research, <u>6</u> , 1119 (1931).
571			How carbon content and heat treatment can affect wear resistance. S. J. Rosenberg. Iron Age <u>128</u> , 1366 (1931).
572	RP348	.10	The resistance to wear of carbon steels. S.J.Rosenberg. BS J. Research, <u>7</u> , 419 (1931). Trans. Am. Soc. Steel Treating <u>19</u> , 247 (1932).

<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
573			Wear of metals. S. J. Rosenberg and H. K. Herschman. Metals & Alloys <u>2</u> , 52 (1931).
574		\$0.10	Metal spraying apparatus. C. M. Saeger, jr. U. S. Patent 1,792,551 (1931).
575			A practical method for studying the running quality of a metal cast in foundry molds. C. M. Saeger, jr. and A. I. Krynitsky. Trans. & Bul. Am. Foundrymen's Assn. <u>2</u> , 513 (1931). Met. Ind. (Lond.) <u>45</u> , 171 (1932).
576			Use of ethylene phthalate anhydride as a high vacuum cement. T. P. Sager and R. G. Kennedy. Physics <u>1</u> , No. 6, 352 (1931).
577			Thermomagnetic analysis and the A <sub>0</sub> transformation in 0.75 percent carbon steel. P. L. Sanford and G. A. Ellinger. Proc. Am. Soc. Testing Materials <u>31</u> (2), 23 (1931).
578			Fatigue testing of wire. S. M. Shelton. Proc. Am. Soc. Testing Materials <u>31</u> (2), 204 (1931).
579			Properties of the rare metals for high temperature service. Symposium on effect of temperature on the properties of metals (book). W. H. Swanger. Published jointly by Am. Soc. Testing Materials - Am. Soc. Mech. Eng. p. 610 (1931).
580	RP327	CP	Special refractories for use at high temperatures. W. H. Swanger and F. R. Caldwell. BS J. Research, <u>6</u> , 1131 (1931). Met. Ind. (Lond.) <u>40</u> , 149, 197 (1932).
581			Bismuth alloys. J. G. Thompson. Metals & Alloys <u>2</u> , 92 (1931). Met. Ind. (Lond.) <u>39</u> , 7 (1931). Printing Equipment Eng. (Nov. 1931).
582	RP346	.10	The determination of oxygen and nitrogen in iron and steel by the vacuum fusion method. H. C. Vacher and L. Jordan. BS J. Research, <u>7</u> , 375 (1931).
583			The carbon-oxygen equilibrium in liquid iron. H.C.Vacher and E. H. Hamilton. Trans. Am. Inst. Min. Met. Eng. Iron & Steel Div. p. 124 (1931).
584			Shop method for determining volume changes in cast iron during casting. E. J. Ash and C. M. Saeger, jr. Trans. Am. Foundrymen's Assn. <u>40</u> , 188 (1932).
585	RP440	.05	Volume changes of cast irons during casting. E. J. Ash and C. M. Saeger, jr. BS J. Research, <u>2</u> , 601 (1932).
586	RP401	.10	Effect of casting temperature and additions of iron on bearing bronze (Cu 80, Sn 10, Pb 10). C.E.Eggenschweiller. BS J. Research, <u>8</u> , 67 (1932). Met. Ind. (Lond.) <u>40</u> , 471 (1932).
587	RP442	.05	Effect of antimony on the mechanical properties of a bearing bronze (Cu 80, Sn 10, Pb 10). C.E.Eggenschweiller. BS J. Research, <u>2</u> , 623 (1932).



Ref. Series Price

588			Factors affecting the physical properties of cast red brass (85 Cu, 5 Zn, 5 Sn, 5 Pb). H. B. Gardner and C. M. Saeger, jr. Proc. Am. Soc. Testing Materials <u>32</u> (2), 517 (1932). Met. Ind. (Lond.) <u>41</u> , 181, 199 (1932). Am. Met. Market <u>39</u> , 4, 12 (1932).
589			Mechanical properties of white-metal bearing alloys at different temperatures. H. K. Herschman and J.L.Basil. Proc. Am. Soc. Testing Materials <u>32</u> (2), 536 (1932).
590			Bonding magnesite linings for steel making furnaces without the use of iron oxide. L. Jordan. Metals & Alloys <u>3</u> , 22 (1932).
591			Investigating machinery performance and design. L. Jordan. Commercial Standards Monthly <u>8</u> , 301 (1932).
592			Structural stability of 18 percent chromium 8 percent nickel stainless steel at elevated temperatures in absence of stress. L. Jordan. Report of Chairman of Sub-com. M, Proc. Am. Soc. Testing Materials <u>32</u> (1), 170 (1932).
593			Metallurgical research at Bureau of Standards contributed to the design and performance of machinery. L. Jordan. U. S. Daily, Feb. 24, 1932.
594	RP474	\$0.05	Tensile properties of cast nickel-chromium-iron alloys and of some alloy steels at elevated temperatures. W. Kahlbaum and L. Jordan. BS J. Research, <u>9</u> , 327 (1932).
595	RP481	.05	Creep at elevated temperatures in chromium-vanadium steels containing tungsten or molybdenum. W. Kahlbaum and L. Jordan. BS J. Research, <u>9</u> , 441 (1932).
596	RP422	.10	Accelerated weathering tests of soldered and of tinned sheet copper. P. R. Kisting. BS J. Research, <u>8</u> , 365 (1932).
597	C395	.25	Zinc and its alloys. M. G. Lorentz et al. Cir. BS, C395 (1932).
598			Influence of stress on corrosion. D. J. McAdam, jr. Trans. Am. Inst. Min. Met. Eng. <u>99</u> , 282 (1932).
599	RP409	.05	The resistance to impact of rail steels at elevated temperatures. G. W. Quick. BS J. Research, <u>8</u> , 191 (1932). Am. Inst. Min. Met. Eng. preprint (1932).
600	RP408	.05	The tensile properties of rail steel at elevated temperatures. G. W. Quick. BS J. Research, <u>8</u> , 173 (1932). Am. Inst. Min. Met. Eng. preprint (1932).
601			Finding practical uses for nonferrous metals. H.S.Rawdon. U. S. Daily, April 19. Spectrochemical tests of nonferrous alloys, April 20. Studies of properties of nonferrous metals, April 21. Determining use values of nonferrous metals, April 22. Utilizing excess output of nonferrous metals, April 23. Standardizing products of nonferrous metals, April 25 (1932).



<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
602			Cold treating metallic alloys. Effect of cooling in liquid air or dry ice. H. S. Rawdon. Metal Progress <u>21</u> , 29 (1932).
603			Quality control of non-ferrous metals. H. S. Rawdon. Commercial Standards Monthly <u>9</u> , 109 (1932).
604			Studies of properties of non-ferrous metals. H. S. Rawdon. Commercial Standards Monthly <u>9</u> , 131 (1932).
605	RP399	\$0.10	A method for determining the volume changes undergone by metals and alloys during casting. C. M. Saeger, jr. and E. J. Ash. BS J. Research, <u>8</u> , 37 (1932).
606		.10	Core or mold binder coating or paste. C. M. Saeger, jr. U. S. Patent 1,889,905 (1932).
607			Thermomagnetic phenomena in steel and their application in the study of tempering of quenched 0.75 percent carbon steel. 1. Fundamental considerations; 2. Thermomagnetic analysis applied to the study of tempered steel. R. L. Sanford and G. A. Ellinger. Trans. Am. Soc. Steel Treating <u>20</u> , 263 (1932).
608	RP454	.05	Effect of zinc coatings on the endurance properties of steel. W. H. Swanger and R. D. France. BS J. Research, <u>9</u> , 9 (1932). Proc. Am. Soc. Testing Materials <u>32</u> (2), 430 (1932). Metallurgist, p. 156 (Oct. 1932).
609			Determination of oxygen, nitrogen and hydrogen in steel. J. G. Thompson. Am. Inst. Min. Met. Eng. Tech. Pub. 466 (1932).
610	RP494	.05	Nitrogen content of some standard sample steels. J. G. Thompson and E. H. Hamilton. BS J. Research, <u>9</u> , 593 (1932).
611	RP496	.05	Determination of alumina and silica in steel by the hydrochloric acid residue method. J. G. Thompson and J. S. Acken. BS J. Research, <u>9</u> , 615 (1932).
612			Oxygen, hydrogen and nitrogen as constituents in metals. H. C. Vacher. J. Chem. Education <u>9</u> , 47 (1932).
613			Some factors affecting the Preece test for zinc coatings. H. H. Walkup and E. C. Groesbeck. Proc. Am. Soc. Testing Materials <u>32</u> (2), 453 (1932).
614	RP605	.05	The utility of the spark test as applied to commercial steels. R. W. Buzzard. BS J. Research <u>11</u> , 527 (1933).
615	RP537	.05	Thermoelectric properties of Pt-Rh alloys. F. R. Caldwell. BS J. Research, <u>10</u> , 373 (1933).
616	RP516	.05	Effect of lathe cutting conditions on the hardness of carbon and alloy steels. T. G. Digges. BS J. Research, <u>10</u> , 77 (1933). Abst. Metal Progress <u>23</u> , 54 (1933). Mech. Eng. <u>55</u> , 644 (1933).
617			The effect of impurities, sulphur and iron, on the physical properties of cast red brass (Cu 85, Zn 5, Sn 5, Pb 5). H. B. Gardner and C. M. Saeger, jr. Proc. Am. Soc. Testing Materials <u>33</u> (2), 448 (1933).

Ref.	Series	Price	
618	RP558	\$0.05	The freezing point of iridium. F. Henning and H.T.Wensel. ES J. Research, <u>10</u> , 809 (1933).
619	RP551	.05	Pin-free leaded bearing bronzes. H. K. Herschman and J. L. Basil. ES J. Research, <u>10</u> , 591 (1933). Met. Ind. (Lond.) <u>43</u> , 219, 243, 325 (1933).
620		.10	Metal alloys (bearing bronzes). H. K. Herschman and J. L. Basil. U. S. Patent 1,895,261 (1933).
621	RP512	.05	White metal bearing alloys; mechanical properties at different temperatures and service tests. H.K.Herschman and J. L. Basil. ES J. Research, <u>10</u> , 1 (1933).
622	RP590	.05	Thermal expansion of columbium. P. Hidnert and H.S.Krider. ES J. Research, <u>11</u> , 279 (1933).
623			Surface tension of molten metals. A. I. Krynitsky. Metals & Alloys <u>4</u> , No. 6, 79 (1933). The Metallurgist <u>9</u> , 76 (1933).
624			Running quality of molten metals, an extended abstract of an article by M. Rene Berger. A. I. Krynitsky. Metals & Alloys <u>4</u> , No. 6, 176 (1933).
625			Exposure tests of wire cloth for insect screens. G. W. Quick. Commercial Standards Monthly <u>9</u> , No. 7, 151 (1933).
626	RP557	.05	Conditions affecting the freezing temperature of silver. W. F. Roeser and A. I. Dahl. BS J. Research, <u>10</u> , 661 (1933).
627	RP530	.05	Reference tables for Pt to Pt-Rh thermocouples. W. F. Roeser and H. T. Wensel. BS J. Research, <u>10</u> , 275 (1933).
628	RP573	.05	An international comparison of temperature scales between 660 and 1063°C. W. F. Roeser, F. H. Schofield and H. A. Moser. BS J. Research, <u>11</u> , 1 (1933).
629		.10	Core or mold binders, coatings or paste. U. S. Patent 1,893,684. Core or mold binders, coatings or paste, U. S. Patent 1,893,685. Processes of and products for attaching portions of molds or cores, U. S. Patent 1,897,149. Processes and products for coating molds and cores, U. S. Patent 1,901,124. Method and means for foundry practice, U. S. Patent 1,914,532. Metal coating method, U. S. Patent 1,940,814. J.M.Saeger,jr. (1933).
630			Fatigue tests of galvanized wire under pulsating tensile stress. S. M. Shelton and W. H. Swanger. Proc. Am. Soc. Testing Materials <u>33</u> (2), 348 (1933).
631			Thermal conductivity of irons and steels and some other metals in the temperature range 0 to 600°C. S. M. Shelton and W. H. Swanger. Trans. Am. Soc. Steel Treating <u>21</u> , 1061 (1933).
632			Some physical properties of commercial thorium. J. G. Thompson. Metals & Alloys <u>4</u> , 114 (1933).

Ref.	Series	Price	
633	RP572	\$0.05	Creep and structural stability of nickel-chromium-iron alloys at 1600°F. W. A. Lucker and S. L. Sinclair. BS J. Research, <u>10</u> , 851 (1933).
634	RP606	.05	The system liquid iron-carbon oxides. H. C. Vacher. BS J. Research, <u>11</u> , 541 (1933).
635	RP650	.05	Some physical properties of platinum-rhodium alloys. J. S. Acken. BS J. Research, <u>12</u> , 243 (1934).
636	RP712	.05	Protective value of nickel and chromium plating on steel. W. Flum, P. W. C. Strausser and A. Brenner. BS J. Research, <u>13</u> , 331 (1934).
637	RP664	.05	Determination of small amounts of zinc in steels and irons. H. A. Bright. BS J. Research, <u>12</u> , 333 (1934).
638		.10	Methods of and baths for anodic treatment of aluminum. R. W. Buzzard. U. S. Patent 1,977,622 (1934).
639			Corrosiveness of certain Ohio soils. I. A. Denison and S. Ewing. Soil Science <u>40</u> , 287 (1934).
640	RP696	.05	Corrosion of ferrous metals in acid soils. I. A. Denison and R. E. Hobbs. J. Research NBS, <u>13</u> , 125 (1934).
641	C404	.05	Cautions regarding gas-appliance attachments. J. H. Eiseman. Cir. BS, C404 (1934).
642	RP707	.05	Prolonged tempering at 1000°C and aging at room temperature of 0.8 percent carbon steel. G. A. Ellinger and R. L. Sanford. J. Research NES, <u>13</u> , 259 (1934). Trans. Am. Soc. Metals <u>23</u> , No. 2, 495 (1935).
643	RP638	.05	Preece test (copper-sulphate dip) for zinc coatings. E. C. Groesbeck and H. H. Walkup. J. Research NBS, <u>12</u> , 785 (1934). Met. Ind. (London) <u>45</u> , 393, 440 (1934).
644	RP665	.05	Thermal expansion of bearing bronzes. P. Hidnert. J. Research NBS, <u>12</u> , 691 (1934).
645	RP693	.05	Thermal expansion of artificial graphite and carbon. P. Hidnert. J. Research NBS, <u>13</u> , 37 (1934).
646	RP734	.05	Preparation of pure gallium. J. I. Hoffman. J. Research NBS, <u>13</u> , 665 (1934). Met. Ind. (London) <u>46</u> , 335, 391 (1934).
647			Graduation and calibration of precision-circles. L. V. Judson. Trans. Am. Geophys. Union (Nat. Res. Council), 15th Annual meeting (1934).
648			Dimensional changes in die casting alloys. R. G. Kennedy. Metals & Alloys <u>5</u> , 106, 124 (1934).
649	RP727	.05	Effect of melting conditions on the running quality of aluminum cast in sand molds. A. I. Krynsky and C. M. Saeger, jr. J. Research NBS, <u>13</u> , 579 (1934). Met. Ind. (Lond.) <u>46</u> , 119, 128 (1935). Resume, The Foundry, p. 21, 60 (March 1935).
650			Use of Bureau of Standards data in the design and protection of pipe lines. K. H. Logan. Nat. Petroleum News <u>26</u> , 28 (July 27, 1934).

<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
651	RP658	\$0.05	Rates of loss of weight and pitting of ferrous and non-ferrous specimens and metallic protective coatings. K. H. Logan and R. E. Taylor. J. Research NBS, <u>12</u> , 119 (1934).
652	RP725	OP	Influence of chemically and mechanically formed notches on the fatigue of metals. D. J. McAdam, jr. and R. W. Clyne. J. Research NBS, <u>13</u> , 527 (1934).
653			An abstract of above paper, June meeting of 4th Inst. Congress for Applied Mechanics (England). D.J. McAdam, jr. and R. W. Clyne (1934).
654	RP752	.05	Second spectrum of hafnium. W. F. Meggers and B. F. Scribner. J. Research NBS, <u>13</u> , 625 (1934).
655			Ferrous metallurgical developments during past five years. H. S. Rawdon. Metals & Alloys <u>5</u> , 207 (1934).
656			Reports of Joint Committee on Investigation of Effect of P and S in Steel.— Effect of S in forging steel. H. S. Rawdon. Proc. Am. Soc. Testing Materials <u>34</u> (I), 87 (1934). Effect of added P on low-carbon steel. Proc. Am. Soc. Testing Materials <u>34</u> (II), 113 (1934).
657	RP735	.05	Freezing point of gallium. W. F. Roeser and J.I. Hoffman. J. Research NBS, <u>13</u> , 673 (1934).
658	RP676	.05	Freezing point of rhodium. W. F. Roeser and H.F. Wensel. J. Research NBS, <u>12</u> , 519 (1934).
659			Silver may answer your corrosion problems. E. A. Rogers. Chem. Met. Eng. <u>41</u> , 631 (1934).
660	RP708	.05	Influence of oxide films on the wear of steels. S. J. Rosenberg and L. Jordan. J. Research NBS, <u>13</u> , 267 (1934). Trans. Am. Soc. Metals <u>25</u> , 577 (1935).
661			Speculum metal castings. C. M. Saeger, jr. Metal Progress <u>25</u> , 534 (1934).
662			Studies on cast red brass for establishment of a basic classification of nonferrous ingot metals for specification purposes. C. M. Saeger, jr. Am. Foundrymen's Assn. exchange paper. The Foundry <u>62</u> , 20, 49 (June 1934), 18, 20, 49 (July 1934). Met. Ind. (Lond.) <u>44</u> , 607, 631 (discussion) <u>45</u> , 15 (1934). Foundry Trade J. <u>50</u> , 359, 379, 395 (discussion) <u>50</u> , 414; <u>51</u> , 516 (1934). Trans. Am. Foundrymen's Assn. <u>V</u> (No. 3), 67 (1934). J. Inst. Brit. Foundrymen <u>27</u> , 268, 317 (1934).
663	RP726	.05	Properties of gray cast iron as affected by casting conditions. C. M. Saeger, jr. and E. J. Ash. J. Research NBS, <u>13</u> , 573 (1934). Trans. Am. Foundrymen's Assn. <u>V</u> , 449 (1934).
664	RP741	OF	Compression tests of structural steel at elevated temperatures. P. L. Sade. J. Research NBS, <u>13</u> , 715 (1934).
665			Silver equipment in chemical plants. I. C. Schoonover. Chem. Met. Eng. <u>41</u> , 545 (1934).



<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
666	RP669	\$0.05	Thermal conductivity of some irons and steels over the temperature range 100 to 500°C. S. M. Shelton. J. Research NBS, <u>12</u> , 441 (1934).
667	RP724	.05	Accelerated tests of nickel and chromium plating on steel. P. W. C. Strausser, A. Brenner and W. Blum. J. Research NBS, <u>13</u> , 519 (1934).
668	RP675	.05	Wear of dies for extruding plastic clay. R. T. Stull. J. Research NBS, <u>12</u> , 501 (1934).
669			Note on the frictional resistance of steel and of brass in shrink fits. W. H. Swanger. Proc. Am. Soc. Testing Materials <u>34</u> (II), 165 (with disc.) (1934). "Measures slip resistance in shrink fits". Steel (July 30, 1934).
670			Effect of gas content on commercial steel (news story). J. G. Thompson. Steel <u>94</u> , No. 20, 49 (May 14, 1934).
671	RP742	.05	Effect of cold rolling on the indentation hardness of copper. J. G. Thompson. J. Research NBS, <u>13</u> , 515 (1934).
672			Methods for determining oxygen in steel - a progress report. J. G. Thompson. Min. & Met. <u>15</u> , 215 (1934).
673	RP662	OP	Test of a flat steel plate floor under load. L. B. Tuckerman, A. H. Stang and W. R. Osgood. J. Research NBS, <u>12</u> , 363 (1934).
674	RP668	.05	Apparatus for determining the thermal conductivity of metals at elevated temperatures. M. S. vanDusen and S. M. Shelton. J. Research NBS, <u>12</u> , 429 (1934).
675			Observations on the effect of surface finish on the initial corrosion of steel under water. L. J. Waldron and E. C. Groesbeck. Proc. Am. Soc. Testing Materials <u>34</u> (II), 123 (with discussion) (1934).
676	RP677	.05	Establishment of a scale of color temperature. H. T. Wensel, D. B. Judd and W. F. Roeser. J. Research NBS, <u>12</u> , 527 (1934).
677		6.00	The metal - iron. H. E. Cleaves and J. G. Thompson. McGraw-Hill Book Co., New York City (published in monograph series of Iron Alloys Comm. of Eng. Foundation) (1935).
678	RP837	0.05	Hardening characteristics and other properties of commercial one-percent carbon tool steels. T. G. Digges and L. Jordan. J. Research NBS, <u>15</u> , 385 (1935).
679			Hardening characteristics of one percent carbon tool steels. T. G. Digges and L. Jordan. Trans. Am. Soc. Metals <u>23</u> , No. 4, 839 (1935).
680			Cathodic protection of pipelines from soil corrosion. S. Ewing. Natural Gas <u>16</u> (No. 3 and 4) 6, 16 (March, April 1935).
681			Suggestions for making and using a pipe line corrosion survey. S. Ewing. Western Gas <u>XI</u> (No. 714), (July 1935).
682			Observations on soil corrosion in the gas industry. S. Ewing. Am. Gas Assn. Monthly 17-12, 469 (Dec. 1935).



Ref. Series Price

- 685 A procedure for the separation of the six platinum metals from one another and for their gravimetric determination. R. Gilchrist and E. Wichers. J. Am. Chem. Soc. 57, 2, 565 (1935).
- 684 RP784 \$0.05 Thermal expansion of monocrystalline and polycrystalline antimony. P. Hidnert. J. Research NBS, 14, 523 (1935).
- 685 RP823 .05 Purification of gallium by fractional crystallization of the metal. J. I. Hoffman and B. F. Scribner. J. Research NBS, 15, 205 (1935).
- 686 Dropping tests for determining the local thickness of zinc and cadmium coatings. R. O. Hull and P. W. C. Strausser. Am. Electroplaters Soc. Monthly Rev. 22 (Mar. 1935).
- 687 RP757 .05 Use of the pipette method in the fineness test of molding sand. C. E. Jackson and U. M. Saeger, jr. J. Research NBS, 14, 59 (1935). Foundry Trade J. 52, 409 (1935).
- 688 International standardization of base-line tapes and wires. L. V. Judson. Trans. Am. Geophys. Union (Nat. Res. Council) 16th annual meeting (1935).
- 689 RP797 .05 Mechanism of chromium deposition from the chromic acid bath. C. Kasper. J. Research NBS, 14, 693 (1935).
- 690 RP812 .05 Infra red arc spectrum of chromium. O. C. Kiess. J. Research NBS, 15, 79 (1935).
- 691 RP813 .05 Use of 8-hydroxyquinoline in determinations of aluminum, beryllium and magnesium. H. B. Knowles. J. Research NBS, 15, 87 (1935).
- 692 Development of specifications for protective coatings. K. H. Logan. J. Ind. & Eng. Chem. 27, 1354 (1935).
- 693 Underground corrosion. K. H. Logan. Proc. Am. Soc. Chem. Eng. 61, 317 (1935).
- 694 RP838 .05 Atomic weight of gallium. G. E. F. Lundell and J. I. Hoffman. J. Research NBS, 15, 409 (1935).
- 695 .15 The weathering of aluminum alloy sheet materials used in aircraft. W. H. Mutchler. Nat. Advisory Comm. Aeron. Tech. Report 490 (1935).
- 696 RP803 .10 Atmospheric exposure tests of nonferrous screen wire cloth. G. W. Quick. J. Research NBS, 14, 775 (1935). Appendix to Report of Comm. D-14, Proc. Am. Soc. Testing Materials 35 (I), 458 (1935).
- 697 Continuous-flow corrosion tests of steel pipe. H. S. Rawdon and L. J. Waldron. Proc. Am. Soc. Testing Materials 35 (II), 233 (with discussion) (1935). Eng. 140, 208 (Aug. 23, 1935).
- 698 RP767 .05 Standard tables for chromel alumel thermocouples. W. F. Roeser, A. I. Dahl and G. J. Cowens. J. Research NBS, 14, 239 (1935).

<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
699	RP768	\$0.05	Methods of testing thermocouples and thermocouple materials. W. F. Roeser and H. F. Wensel. J. Research NBS, <u>14</u> , 247 (1935).
700			Sheet silver for chemical equipment. E. A. Rogers. Sheet Metal Ind. (London) <u>9</u> , 99 (Feb. 1935).
701	RP853	.05	Determination of gallium in aluminum. J. A. Scherrer. J. Research NBS, <u>15</u> , 585 (1935).
702	RP836	.05	Colorimetric method for quantitative determination of small amounts of silver using p-Dimethylaminobenzalrhodamine. I. C. Schoonover. J. Research NBS, <u>15</u> , 577 (1935).
703			Pipe line fabrics. G. N. Scott and S. Ewing. Oil & Gas J. <u>34-23</u> , 112 (Oct. 24, 1935).
704	RP754	.05	Fatigue properties of steel wire. S. M. Shelton and W. H. Swanger. J. Research NBS, <u>14</u> , 17 (1935).
705	RP854	.05	Accelerated service tests of pintle bearings. A. H. Stang and L. R. Sweetman. J. Research NBS, <u>15</u> , 591 (1935).
706	RP831	.10	Tests of steel tower columns for the George Washington Bridge. A. H. Stang and H. L. Whittemore. J. Research NBS, <u>15</u> , 317 (1935).
707	RP789	.05	Gold-cobalt resistance alloys. J. L. Thomas. J. Research NBS, <u>14</u> , 589 (1935).
708			Second progress report on determination of oxygen in steel to the Iron and Steel Division of Am. Inst. Min. Met. Eng. J. G. Thompson. Min. & Met. <u>16</u> , 184 (1935).
709	RP763	.10	Impact and static tensile properties of bolts. H. L. Whittemore, G. W. Nusbaum and E. O. Seaquist. J. Research NBS, <u>14</u> , 139 (1935).
710	RP866	.05	Mesle's chord method for measuring the thickness of metal coatings. W. Blum and A. Brenner. J. Research NBS, <u>16</u> , 171 (1936).
711	RP867	.05	Corrosive protective value of electrodeposited zinc and cadmium coating on steel. W. Blum, P. W. C. Strausser and A. Brenner. J. Research NBS, <u>16</u> , 185 (1936).
712			Mechanical properties of aluminum alloy rivets. W. C. Brueggeman. Nat. Advisory Comm. Aeron. Tech. Note 535 (1936).
713			Oxalic acid as an electrolytic etching reagent for stainless steels. G. A. Ellinger. Trans. Am. Soc. Metals <u>24</u> , 26 (1936).
714	RP920	.10	Inspection and tensile tests of some worn wire ropes. W. H. Fulweiler, A. H. Stang and L. R. Sweetman. J. Research NBS, <u>17</u> , 401 (1936).
715			The platinum metals (review of literature 1933-35). R. Gilchrist. Annual Survey of American Chemistry <u>10</u> (published by Nat. Research Council). (1936).

<u>Ref.</u>	<u>Series</u>	<u>Price</u>	
716	RP890	\$0.05	Thermal expansion of copper-beryllium alloys. P. Hidnert. J. Research NBS, <u>16</u> , 529 (1936). Met. Ind. (Lond.) <u>49</u> , 212 (1936).
717	RP938	.10	Thermal expansion of lead-antimony alloys. P. Hidnert. J. Research NBS, <u>17</u> , 697 (1936).
718	C409	.10	Production, heat treatment, and properties of iron alloys. L. Jordan. Cir. NBS, C409 (1936).
719			Discussion of "Austenitic grain-size in cast iron" by D. W. Murphy and W. P. Wood. A. I. Krynitsky. Trans. Am. Soc. Metals <u>24</u> , 89 (1936).
720	RP880	.05	An improved method for preparing cast iron transverse test bars. A. I. Krynitsky and C. M. Saeger, jr. J. Research NBS, <u>16</u> , 367 (1936). Edy. Tr. J. (Lond.) <u>55</u> , 485 (1936). Trans. Am. Foundrymen's Assn. <u>45</u> , 753 (1937).
721			The use of nonferrous metals underground. K. H. Logan. Oil and Gas J. (Tulsa, Okla.) <u>35</u> , No. 9, 137 (Sept. 24, 1936).
722			Underground corrosion. K. H. Logan. Trans. Am. Soc. Civil Eng. <u>101</u> , 811 (1936).
723	RP945	.10	Soil-corrosion studies, 1934. Rates of loss of weight and penetration of nonferrous metals. K. H. Logan. J. Research NBS, <u>17</u> , 781 (1936).
724	RP883	.05	Soil-corrosion studies, 1934. Rate of loss of weight and pitting of ferrous specimens. K. H. Logan. J. Research NBS, <u>16</u> , 431 (1936).
725	RP881	.05	Arc and spark spectra of columbium. W. F. Meggers and A. S. King. J. Research NBS, <u>16</u> , 385 (1936).
726	RP909	.05	Term analysis of the first spectrum of vanadium (VI). W. F. Meggers and N. N. Russell. J. Research NBS, <u>17</u> , 125 (1936).
727	RP903	.05	Determination of the Brinell number of metals. S. N. Petrenko, W. Ramberg and B. Wilson. J. Research NBS, <u>17</u> , 59 (1936).
728			Final report on effect of sulfur in steel. Joint Committee on Investigation of Effect of Phosphorus and Sulfur in Steel. H. S. Rawdon. Proc. Am. Soc. Testing Materials <u>36</u> (I), 88 (1936).
729	C412	.10	Silver: Its properties and industrial uses. B. A. Rogers, I. C. Schoonover and L. Jordan. Cir. NBS, C412 (1936).
730	RP894	.05	An alternating current magnetic comparator and the testing of tool-resisting prison bars. R. L. Sanford. J. Research NBS, <u>16</u> , 563 (1936).
731	RP871	.05	Distillation and separation of arsenic, antimony and tin. J. A. Scherrer. J. Research NBS, <u>16</u> , 253 (1936).
732	RP873	.10	Some tests of steel columns incased in concrete. A. H. Stang, H. L. Whittemore and D. E. Parsons. J. Research NBS, <u>16</u> , 235 (1936).

Ref.	Series	Price	
735	RP396	\$0.05	Tests of eight large H-shaped columns fabricated from carbon-manganese steel. A. H. Stang, H. L. Whittemore and L. R. Sweetman. J. Research NBS, <u>16</u> , 595 (1936).
734	RP397	.05	Tests of steel chord members for the Bayonne bridge. A. H. Stang, H. L. Whittemore and L. R. Sweetman. J. Research NBS, <u>16</u> , 627 (1936).
735			Failure of heat-treated steel wire in cables of the Mt. Hope R. I. suspension bridge. W. H. Swanger and G. F. Wohlgenuth. Proc. Am. Soc. Testing Materials <u>36</u> (II), 21 (1936). Abst. and disc., Metal Progress <u>30</u> , 67 (Aug. 1936).
736	RP363	.05	Electrical resistance alloys of copper, manganese and aluminum. J. L. Thomas. J. Research NBS, <u>16</u> , 149 (1936).
737			Large single crystals of copper (simplified method for their preparation). J. G. Thompson. Metals & Alloys <u>7</u> , 19 (1936).
738			Discussion of "A dilatometric study of the alpha-gamma transformation in high purity iron" by C. Wells, R. A. Ackley and R. F. Mehl. J. G. Thompson and H. A. Bright. Trans. Am. Soc. Metals <u>14</u> , 67 (1936).
739	RP360	.05	A summary of information on the preparation and properties of pure iron. J. G. Thompson and H. E. Cleaves. J. Research NBS, <u>16</u> , 105 (1936).
740	RP976	.10	Cooperative study of methods for the determination of oxygen in steel. J. G. Thompson, H. C. Vacher and H. A. Bright. Metals Technology (Dec. 1936). J. Research NBS, <u>18</u> , 259 (1937). Trans. Am. Inst. Min. Met. Eng. Iron & Steel Div. <u>125</u> , 246 (1937).
741			Discussion of "Equilibrium in the reaction hydrogen and iron oxide in liquid iron at 1600°C" by M. G. Fontana and J. Chipman. H. C. Vacher. Trans. Am. Soc. Metals <u>24</u> , 333 (1936).
742	ML60		Visitor's manual of the National Bureau of Standards. H. G. Boutell. Misc. Pub. NBS, ML60 (1937).
743	RP994	.10	Magnetic methods for measuring the thickness of nickel coatings on nonmagnetic base metals. A. Brenner. J. Research NBS, <u>18</u> , 565 (1937).
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- 775 Discussion of "Some factors influencing austenitic grain size in high purity steels", by Derge, Kommel and Mehl. T. G. Digges. Trans. Am. Soc. Metals 26, 167 (1938).
- 776 RP1092 .10 Effect of carbon on the critical cooling rate of high-purity iron-carbon alloys and plain carbon steels. T. G. Digges. J. Research NBS, 20, 571 (1938). Abst. Bul. Am. Phys. Soc. 13, 18 (April 13, 1938).
- 777 Discussion of "The rate of austenitic transformation in cast iron" by Murphy, Wood and Girardi. A. I. Krynitsky. Trans. Am. Soc. Metals 26, 188 (1938).
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In prese

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