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DEPARTMENT OF COMMERCE  
BUREAU OF STANDARDS  
WASHINGTON

Letter  
Circular 257  
(Superseding LC 164)

February 6, 1929

SOURCES OF INFORMATION ON THE PROPERTIES OF METALS AND ALLOYS  
(BOOKS)

The Bureau receives requests for general and comprehensive information on the properties of metals and alloys which cover such a volume of information that it is really possible to answer only with a statement of sources where the information may be obtained. This letter circular attempts to give a working bibliography of reference and handbooks on this subject. No attempt has been made to list literature appearing in periodicals. Such literature is to be found abstracted in the indices and abstracts listed in this letter circular, and in the indices of the various periodicals. The Bureau itself is preparing circulars dealing with the properties of individual metals and alloys. Those so far issued are listed herein. Mechanical properties of metals and alloys are often described by standard specifications such as those of the American Society for Testing Materials. Suggestions for additions to this letter circular are invited.

Letter Circular 118 of the Bureau of Standards lists all publications of members of the Division of Metallurgy, either as Bureau papers or as magazine articles. A copy of that letter circular will be sent on request.

The sources contained herein are arranged topically; the reference books mentioned should be available in any large technical or scientific library.

Addresses of publishers occurring most frequently throughout the letter circular have been listed on page 3, only the name of the publisher being given after that of the book. Less common addresses follow the title of the book.



Index.

	<u>page</u>
Addresses of Publishers	3
Lists of Alloys	3
Abstracts and Indices	3
Bibliographies	4
List of Manufacturers	4
Handbooks	4
Statistics	6
Non-ferrous Metals and Alloys	6
Iron and Steel	8
Cast Iron, Foundry Practice	12
Individual Metals	13
Aluminum	13
Antimony	14
Arsenic	14
Beryllium	14
Bismuth	14
Cadmium	14
Chromium	14
Cobalt	14
Copper	15
Gold	15
Lead	15
Magnesium	16
Manganese	16
Mercury	16
Molybdenum	16
Nickel	17
Platinum	17
Silicon	18
Silver	18
Tin	18
Titanium	18
Tungsten	19
Uranium, Vanadium	19
Zinc	19
Zirconium	20
General Metallurgical Subjects	20
Metallography	21
X-Ray Study of Metals	23
Specifications	24
Mechanical Properties	25
Magazines and Journals	26
Engineering	26
Chemistry- Mining, Metallurgy, Metals	28
Foundry - Technical, Testing	29
Physics	30

<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
26	1924	Marks, L.S.	Mark's Mechanical Engineers Handbook. McGraw Hill (New edition in preparation).
27	1924		Mechanical Engineer's Handbook. McGraw Hill.
28	1924	Kent, R.T.	Mechanical Engineers Handbook. London: Chapman & Hall.
29	1923	Ledebur, A.	Handbuch der Eisenhutenkunde. I. Einfuhrung in die Eisenhutenkunde. A.Felix, Leipzig.
30	1923	Landolt-Bornstein-Roth	Physikalische-Chemische Tabellen. J.Springer
31	1923	Kempe, H.R., Smith, W.H.	Engineers Year Book of Formulae, Rules, Tables, Data and Memoranda for 1923. London: Crosby, Lockwood & Son.
32	1922		Handbook for Electrical Engineers. J.Wiley.
33	1922	Krupp, A.	Die Legierungen. Handbuch fur Praktiker. A. Hartleben Wien & Leipzig.
34	1922	Lumen Bearing Co. Buffalo, N.Y.	Handbook for Engineers & Machine Designers.
35	1922	Penders, H.	Handbook for Electrical Engineers. J.Wiley.
36	1922	Gee, G.E.	The Goldsmith's Handbook: Containing full instructions for the alloying and working of gold. London: Crosby Lockwood & Sons.
37	1921	Hopkins	Scientific American Cyclopedia of Formulas, Scientific American Publishing Co., N. Y.
38	1920		Hutte. W. Ernst & Sohn, Berlin, Germany.
39	1919	Brannt, W.T.	Metal Worker's Handy Book of Receipts & Processes. H. C. Baird.
40	1919	Tiemann, H.P.	Iron and Steel, a pocket encyclopedia. American Society for Steel Treating.
41	1919		Henley's Twentieth Century Book of Receipes, Formulas and Processes. N. Henley.
42	1918	Richards, J.W.	Metallurgical Calculations. McGraw Hill.

Ref.	Date	Author	Title
43	1918	Liddell, D.M.	Metallurgists' & Chemists' Handbook. McGraw Hill.
44	1918	Peele, R.	Mining Engineering Handbook. J. Wiley.
45	1916		Tablettes Annuelles de Constantes et Donnees Numeriques de Chemie, et Physique et de Technologie. Gauthier-Villars, Paris.
46	1913		Recueil de Constantes Physiques. Societe Francaise de Physique. Gauthier-Villars, Paris.
47	1909	Winkelmann, A.	Handbuch de Physik. J. A. Barth, Leipzig.
48	Annual		<u>Statistics</u> Mineral Industry. McGraw Hill.
49	"		Annual Statistical Report of the American Iron & Steel Institute. American Iron & Steel Institute.
50	"		U. S. Geological Survey. Mineral Resources of the United States (now issued by the Bureau of Mines). Government Printing Office.
51	"		Metal Statistics. American Metal Market Co., 11 Cliff St., New York, N. Y.
			<u>Non-Ferrous Metals and Alloys</u>
52	1927	Burstyn, W.	Das loten. J. Springer.
53	1927	Claus, W., Luder, E.	Loten und lote. Beuth Verlag.
54	1926	Regelsberger, F.	Chemische technologie der leichtmetalle und ihre legierungen. C. Spamer.
55	1926	Gowland, W.	Metallurgy of non-ferrous metals, Lippincott.
56	1926	Law, E. F.	Alloys and their industrial applications. C. Griffin & Co., London. 4th edition.
57	1926	Gulliver, G.H.	Metallic alloys. C. Griffin & Co., (5th edition).
58	1924	Czochralski, J. Welter, G.	Lagermetalle und ihre technologische bewertung. J. Springer.



<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
59	1924	Jeffries, Z., Archer, R.S.	Science of Metals. McGraw Hill.
60	1924	Ledebur, A.	Die legierungen in ihrer anwendung fur gewerbliche zwecke. Berlin: M. Krayn.
61	1923-5	Mellor, J.W.	A Comprehensive Treatise on Inorganic and Theoretical Chemistry. 6 vols. London: Longmans, Green & Co.
62	1923	Hobart, J.F.	Brazing and soldering. W. Henley.
63	1927	Evans, U.P.	Metals and metallic compounds. 4 vols. London: E. Arnold & Co.
64	1923	Glazebrook, R.	Vol. V. Aeronautics, Metallurgy, General Index. London: MacMillan & Co., Ltd.
65	1923	Aitchison, L., Barclay, W.R.	Engineering Non-Ferrous Metals and Alloys. London: H. Frowde & Hodders & Stoughton.
66	1923	Vickers, C.	Metals and their alloys. H. C. Baird.
67	1921	Hoyt, S.	Metallography. Vol. 2. Metals and their Common Alloys. McGraw Hill.
68	1921	Schnabel, C.	Handbook of Metallurgy. I. Copper, Lead, Silver, Gold. Trans. by H. Louis. London: MacMillan & Co.
69	1920	Buchanan, J.F.	Practical Alloying. Penton Publishing Co.
70	1920	Gowland, W.	Metallurgy of common metals. C. Griffin & Co., London.
71	1920	Downie, J.R.	Chemists Manual of Non-Ferrous Alloys. Spon & Chamberlain.
72	1915	Wood, R. A.	The Waterbury Book of Alloys. Law Printing Co., 222 Fulton St., New York, N. Y.
73	1914	Hofman, H.O.	Metallurgy of Copper. McGraw Hill.
74	1913	Ledebur, A.	Die Legierungen. M. Krayn, Berlin.
75	1909	Cavalier, J.	Alliages Metalliques. Vuibert et Nony, Paris.
76	1906	Guillet, L.	Etude Industrielle des Alliages Metalliques. H. Dunod et E. Pinat, Paris.
77	1903	Sack, M.	Bibliographie der Metallegierungen. L. Voss, Leipzig.

<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
			<u>Iron and Steel</u>
78	1928	Boylston, H.M.	An Introduction to the Metallurgy of Iron and Steel. J. Wiley.
79	1928	Firth, T., & Sons, Ltd.	Steels especially resistant to corrosion and heat. Firth & Sons, Ltd., Sheffield, England.
80	1928	Keller, J.F.	Lectures on steel and its treatment. American Society for Steel Treating.
81	1926	Sidner, L.P.	Pure iron, its nature, properties and commercial applications. E. Benn, London, England.
82	1927	Bullens, D.K.	Steel and its heat treatment. J. Wiley.
83	1927	Fremont, C.	Essai de corrosion des fers et des aciers. Published by the author, Paris.
84	1927	Fulton, C.H.	Principles of metallurgy. An introduction to the metallurgy of metals. American Society for Steel Treating.
85	1927	Spring, L.W.	Non-Technical Chats on Iron and Steel, American Society for Steel Treating.
86	1927	Urquhart, J.W.	Steel thermal treatment. American Society for Steel Treating.
87	1927	VonKerpely, K.	Siliziumstahl als baustahl und stahlformguss. Knapp; Halle.
88	1927	Wurth, C. F.	Über den einfluss des molybdans und siliziums auf die eigenschaften eines nichtrostenden chromstahls. Dusseldorf: verlag Stahl-Eisen, m.b.H.
89	1926	Lanham, E.T. Irvine, A.S.	Heat treatment of metals. American Society for Steel Treating.
90	1926	Barton, L.J.	Refining metals electrically. Penton Publishing Co.
91	1926	Cammen, L.	Principles of Metallurgy of Ferrous Metals American Society of Mechanical Engineers.
92	1926	Monypenny, J.H.G.	Stainless iron and steel. J. Wiley.

<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
93	1926	Sauveur, A.	Metallography and heat treatment of iron and steel. Cambridge, Mass. University Press.
94	1926	Weber, A.	Die naturliche und kunstliche alterung des geharteten stahles. J. Springer.
95	1925	Camp, J., Francis, C.B.	Making, Shaping and Treating of Iron and Steel. Carnegie Steel Co., Pittsburgh, Pa.
96	1925	Daniels, S., Sisco, F. T.	Metallurgy in aircraft construction. Eng. Div. Air Service, Dayton, Ohio.
97	1925	Gillett, H.W. Mack, E. L.	Molybdenum, cerium and related alloy steels. American Chemical Society Monograph, Chemical Catalog Co.
98	1925	Oberhoffer, P.	Das technische eisen. J. Springer.
99	1925	Rapatz, F.	Die Edilstahle, ihre Metallurgischen Grundlagen. J. Springer.
100	1924	Fulton, C.H., Henton, H.M., Knapp, J.H.	Heat treating: its principles and applications. Penton Publishing Co.
101	1924	Heyn, E.	Die theorie der Eisenkohlenstoff legierungen. J. Springer.
102	1924	Jeffries, Z., Archer, R.S.	Science of Metals. McGraw Hill.
103	1923	Allcut, E.A., Miller, E.	Materials and their application to engineering design. Lippincott Co.
104	1923	Harbord, E., Hall, J. W.	Metallurgy of steel, Lippincott Co.
105	1923	Stoughton, B.	Metallurgy of iron and steel, McGraw Hill.
106	1923	Schaefer, R.	Die konstruktion stahle und ihre Warmbehandlung. J. Springer.
107	1923	Hadfield, R.A. Burnham, T.H.	Special Steels. I. Pitman, London; New York.
108	1923	Bureau of Standards	Circular 58. Invar and Related Nickel Steels. Superintendent of Documents, Govt. Printing Office, price 10 cents.
109	1922	Aitchison, L.	Aircraft steels and materials. Constable & Co., London.



<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
110	1922	Hall, J.H.	The Steel Foundry. McGraw Hill.
111	1922	Guillet, L., Portevin, A.	An introduction to the study of metallography and macrography. Trans. by L. Taverner. London. G. Bell & Sons, Ltd.
112	1921	Colvin, F.H., Juthe, K.A.	Working of Steel, Annealing, Heat Treating and Hardening of Carbon and Alloy Steel. American Society for Steel Treating.
113	1921	Giolitti, F.	Heat treatment of soft and medium steels. McGraw Hill.
114	1921	Grard, C.	L'Acier. Berger-Levrault. Paris.
115	1921	Aitchison, L.	Engineering Steels. Van Nostrand.
116	1920	Edwards, C.A.	The physico-chemical properties of steel. C. Griffin & Co., London.
117	1919	Backert, A.O.	The A B C of Iron and Steel. Fenton Pub. Co.
118	1919	Tiemann, H.P.	Iron and Steel. A Pocket Encyclopedia. McGraw Hill.
119	1919	Hibbard, H.D.	Manufacture and uses of alloy steels. J. Wiley.
120	1918	Oberg, F., Jones, F.D.	Iron and Steel. The Industrial Press.
121	1918	Carnegie, D.	Liquid steel. Longmans, Green & Co.
122	1918	Turner, T.	The Metallurgy of Iron. C. Griffin & Co. London.
123	1916	Harbord & Hall	The Metallurgy of Iron and Steel. J. B. Lippincott.
124	1916	Edwards, C.A.	Physico-chemical properties of steel. C. Griffin & Co., London.
125	1916	Howe, H.M.	Metallography of steel and cast iron. McGraw Hill.
126	1915	Giolitti, F., Richards, J.W., Rouiller, C.A.	The Cementation of Iron and Steel. McGraw Hill.

<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
127	1914	Breearley, H.	Case Hardening of Steel. Iliffe & Sons, Ltd., London.
128	1912	Mars, G.	Die Specialstahle. F. Enke, Stuttgart.
129	1911	Breearley, H.	Heat Treatment of Tool Steel. Longmans, Green & Co. London.
130	1911	Lake, E.F.	Composition and heat treatment of steel. McGraw Hill.
131	1910	Haenig, A.	Der konstruktions-stahle und seine mikrostruktur. M. Krayn, Berlin.
132	1910	Becker, O. M.	High Speed Steel. McGraw Hill.
133	1907	Camobell, H.H.	The manufacture and properties of iron and steel, Hill Publishing Co., New York.
134	1906	Taylor, F.W.	On the Art of Cutting Metals. American Society of Mechanical Engrs.
135	1904	Guillett, L.	Les aciers speciaux. C. Dunod, Paris.
136	1903	Howe, H.M.	Iron, Steel and Other Alloys.

Useful pamphlets can be obtained describing their products from the following companies. Names of other manufacturers with the type of product they manufacture and listed in the Iron and Steel Works Directory of the United States and Canada, American Iron and Steel Institute, 61 Broadway, New York, N. Y.

Bethlehem Steel Co., Bethlehem, Pa.  
 Midvale Steel Co., Nicetown, Philadelphia, Pa.  
 Carpenter Steel Co., Reading, Pa.  
 Crucible Steel Co. of America, Pittsburgh, Pa.  
 Central Alloy Steel Corp., Canton, Ohio.  
 American Rolling Mill Co., Middletown, O.  
 Vanadium Alloys Steel Co., Latrobe, Pa.  
 Latrobe Electric Steel Co., Latrobe, Pa.  
 Tacony Steel Co., Tacony, Philadelphia, Pa.  
 Carnegie Steel Co., Pittsburgh, Pa.  
 Firth Sterling Steel Co., McKeesport, Pa.  
 Titanium Alloys Mfg. Co., Niagara Falls, N. Y.  
 Vanadium Corporation of America, 120 Broadway, New York, N.Y.  
 Interstate Iron & Steel Co., 104 So. Michigan Ave., Chicago, Ill.  
 Universal Steel Co., Bridgeville, Pa.  
 Cyclops Steel Co., Titusville, Pa.

Ludlum Steel Co., Watervliet, N. Y.  
 Donner Steel Co., Buffalo, N. Y.  
 Timkin Steel & Tube Co., Canton, Ohio.  
 Simonds Saw and Steel Co., Lockport, N. Y.  
 Climax Molybdenum Company, New York, N. Y.  
 International Nickel Co., 67 Wall St., New York, N. Y.

Cast Iron, Foundry Practice

<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
137	1928	Hatfield, W.H.	Cast iron in the light of recent research. C. Griffin & Co., London.
138	1926	Smith, E.W.	Foundry sand, its uses and abuses. Published by the author, Chicago.
139	1926	Turner, T.H., Budgen, N.F.	Metal spraying. Lippincott.
140	1925	Field, S., Bonney, S.R.	Chemical coloring of metals. Chapman and Hall.
141	1925	Thompson, F.C.	A course of metallurgy for engineers. H. F. & G. Witherby, London.
142	1925	Trinks, W.	Industrial Furnaces, Vol. II. J. Wiley.
143	1924	Corbishley, H.	Iron foundry practice: a technical volume covering broadly the modern practice in iron foundry of special value to students and apprentices. Funk & Wagnalls, 354 - 4th Ave., New York, N. Y.
144	1924	Creutzfeld, W.H.	Korrosionsforschung von standpunkte der metall. kunde. F. Vieweg.
145	1924	Czochralski, J.	Moderne metallkunde in theorie und praxie. J. Springer.
146	1923	Trinks, W.	Industrial furnaces, Vol. I., J. Wiley.
147	1922	Hall, J.H.	Steel foundry. American Society for Steel Treating.
148	1922	Boswell, P.G.	A comparison of British and American foundry practice, etc. Hodders & Stoughton, Liverpool, England.
149	1920	Horner, J.G.	Practical iron founding. I. Pitman & Sons, Ltd., London and New York.
150	1918	Turner, T.	Metallurgy of iron. C. Griffin & Co., London.

<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
151	1917	Moldenke, R.	The principles of iron founding. McGraw Hill.
152	1917	Payne, D.W.	The Founders Manual. D. Van Nostrand Co.
153	1911	Kirk, E.	Foundry Irons, H. C. Baird.
154	1911	Geiger, C.	Handbuch der eisen und stahlgiesserei. J. Springer.
155	1910	Moldenke, R.	The production of malleable castings. Penton Publishing Co.
156	1904	West, T. D.	Metallurgy of cast iron. Cleveland Printing & Publishing Co., Cleveland, O.

Individual Metals

Aluminum

157	1928	Newmann, W.A.C.	Manufacture and uses of aluminum. E. Benn.
158	1927	Bureau of Standards	Circular 346. Light metals and alloys. Supt. of Documents. \$1.10.
159	1927	Painton, E.T.	Working of aluminum. Chapman & Hall, 11 Henrietta St., WC 2, London.
160	1926	Corson, M.G.	Aluminum, the metal and its alloys. Van Nostrand.
161	1925	Debar, R.	Die aluminium industrie. V. Vieweg & Son.
162	1924	Anderson, R.J.	Metallurgy of aluminum and aluminum alloys. H. C. Baird & Co.
163	1924	Berg, H.	Aluminium und aluminium legierungen. H. Bechold, Frankfurt a.M.
164	1923	Krause, H.	Das aluminium und seine legierungen. A. Hartleben, Wien und Leipzig.
165	1922	Czochralski, Welter	Legermetalle und ihre technologische bewerking. J. Springer.
166	1921	Grard, C.	Aluminum and its alloys. Constable & Co., London.
167	1921	Hoyt, S.	Metallography. Vol. 2. Metals and their com- mon alloys. McGraw Hill.
168	1921	Borchers, W.	Aluminum. Halle: W. Knapp.



<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
169	1921	Escard, J.	L'aluminium dans l'industrie: metal pur alliages d'aluminium. Paris: Dunod.
170	1920	Pattison, J.	The manufacture of aluminum. Spon & Chamberlain.
			The Aluminum Company of America, Pittsburgh, Pa. has various pamphlets for distribution.

Antimony

171	1926	Wang, C. Y.	Antimony. C. Griffin & Co. 2nd edition.
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Arsenic

172	1884	Charleton, G.A.	See reference 175.
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Beryllium

173	1927	Bureau of Standards	Circular 346, Light metals and alloys. Supt. of Documents. \$1.10.
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Beryllium Corporation of America,  
5005 Euclid Ave., Cleveland, O.

Bismuth

174	1914	Gowland	See reference 70.
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175	1884	Charleton, G.A.	Tin, Arsenic, Bismuth and Wolfram. E. & F. Spon, Ltd., London.
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Cadmium

176	1924	Budgen, N.F.	Cadmium, its metallurgy, properties and uses. C. Griffin & Co. Ltd., London.
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177	1913	Liebig, R.G.M.	Zinc und cadmium. O. Springer, Leipzig.
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178	1911	Bouchonnet, A.	Zinc, cadmium, cuivre, mercure. O. Doin et Fils, Paris.
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Chromium

179	1929	A.S.S.T.	Handbook of the American Society for Steel Treating.
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180	1910	Ouvard, L.V.R.	Industries du chrome, du manganese, du nickel et du cobalt. O. Doin et Fils, Paris.
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181	1909	Escard, J.	See reference 290.
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Cobalt

182	1920	Friend, J.N.	Cobalt, nickel and the elements of the platinum group. C. Griffin & Co., London.
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183	1914	Gowland	See reference 70.
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<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
184	1913-6	Kalmus, H.T.	Researches on cobalt. Canada Dept. of Mines.
185	1910	Ouward	See reference 180.

Copper

186	1924	Davis, W.	The Story of Copper. Century Co., 353 - 4th Ave., New York, N. Y.
187	1922	Bureau of Standards	Circular 73, Copper. Supt. of Documents. 20 cents.
188	1914	Hofman, H.O.	Metallurgy of copper. McGraw Hill.
189	1911	Bouchonnet, A.	See reference 178.

Gold

190	1928	Boideaux, A.	L'or et l'argent. Balliere et Fils.
191	1927	Michel, F.	Tabell spezifische gewichte der gebräuchlichsten Au-Ag-Cu legierungen. J. Springer.
192	1926	Rose, T.K.	Metallurgy of gold. 6th edn. Lipincott.
193	1915	Rose, T.K.	The Precious Metals. Van Nostrand Co.
194	1914	Gowland	See reference 70.

Lead

195	1924	Harn, O.C.	Lead the precious metal. Century Co., 358 - 4th Ave., New York, N. Y.
196	1923	Smythe, J.A.	Lead, its occurrence in nature, the modes of its extraction, its properties and uses. Longmans, Green & Co., London; N.Y.
197	1918	Hofman, H.O.	Metallurgy of lead. McGraw Hill.
198	1910	Collins, N.F.	The metallurgy of lead. C. Griffin & Co.
199	1909	Richter	See reference 269.
200	1906	Ingalls, W.R.	Lead smelting and refining with some notes on lead mining. Engineering & Mining Journal, 10th Ave. at 36th St., New York.
201	1897	Hixon, H.W.	Notes on lead and copper smelting and copper converting. New York and London Scientific Publishing Co.

Ref.	Date	Author	Title
202	1888	Pulsifer, W.H.	Notes for a history of lead. Van Nostrand.  The National Lead Co., 129 York St., Brooklyn, N. Y. has various pamphlets for distribution.

#### Magnesium

203	1927	Bureau of Standards	Circular 346, Light Metals and Alloys. Superintendent of Documents.
204	1923	American Magnesium Corpn., Niagara Falls, N. Y.	Magnesium.  American Magnesium Corporation, Niagara Falls, N. Y. and the Dow Chemical Co., have pamphlets for distribution.

#### Manganese

205	1920	Weld, C.M. and others	Manganese: its uses, preparation, mining costs and production of ferro-alloys. Bureau of Mines Bulletin 173, Superintend- ent of Documents.
206	1910	Ouvard, L.V.R.	See reference 180.
207	1909	Escard, J.	See reference 290.

#### Mercury

208	1925	Duschak, L.H. Schuette, C.N.	Metallurgy of quicksilver. Bureau of Mines Bulletin 222. Superintendent of Documents. 30 cents.
209	1911	Bouchonnet, A.	See reference 178.

#### Molybdenum

210	1929	A.S.S.T.	Handbook. American Society for Steel Treat- ing.
211	1925	Eardley-Wilmot, V. L.	Molybdenum. Canada Dept. of Mines, Ottawa.
212	1925	Gillett, H.W., Mack, E.L.	See reference 97.
213	1918	Moore, R.B.	Molybdenum, political and commercial con- trol of the mineral resources of the world. Bureau of Mines Rept. 5, War Minerals Investigation Series.

<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
214	1916	Horton, F.W.	Molybdenum, its ores, etc. Bureau of Mines Bull. 111, Government Printing Office, 30 cents.
215	1909	Escard, J.	See reference 290.
216	1905	Truchot, P.	See reference 247.
			Molybdenum Corporation of America, Pittsburgh Pa. and the Climax Molybdenum Cornn., New York City have pamphlets for distribution.
<u>Nickel</u>			
217	1924	Bureau of Standards	Circular 100, Nickel and its alloys. Supt. of Documents. 40 cents.
218	1923	"	Circular 58, Invar and related nickel steels. Supt. of Documents. 30 cents.
219	1923	White, F.B.H.	Nickel: the mining, refining and applications of nickel. London: I. Pitman & Sons.
220	1922	Borchers, W.	Nickel. Halle-a.S: Wilhelm Knapp.
221	1920	Friend, H.M.	Cobalt, nickel and the elements of the platinum group. London: C. Griffin & Co.
222	1917		Report of the Royal Ontario Nickel Commission A. Wilgress, Toronto, Can.
223	1914	Gowland	See reference 70.
224	1910	Ouward, L.V.R.	See reference 180.
			The International Nickel Co., 67 Wall St., New York City has pamphlets on nickel for distribution.
<u>Platinum</u>			
225	1924	Smith, E.A.	Platinum metals. I. Pitman & Sons.
226	1921	Voison, J.	Les metaux precieux. Paris: J. B. Pailliere et Fils.
227	1920	Friend, J.N.	See reference 182.
228	1920	Lumb, A.D.	The platinum metals. London: J. Murray.
229	1919	Howe, J.D.	Bibliography of metals of the platinum group. Platinum, palladium, iridium, osmium, ruthenium.



<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
230	1		U. S. Geological Survey, Washington, D. C. Bull. 694 (out of print but available in libraries).
231	1915	Rose, T. K.	See reference 193.
232	1914	Gowland, W.	See reference 70.
233	1912	Molinie, M., Dietz, H.	See reference 241.

#### Silicon

234	1929	A.S.S.T.	Handbook - American Society for Steel Treating
235	1927	Bureau of Standards	Circular 346, Light Metals and Alloys. Superintendent of Documents. \$1.10.
236	1927	Von Kerpely	Siliziumstahl als baustahl und stahlformguss. Knapp.
237	1914	LeChatelier, H.	Le silice et les silicates. A. Hermann et Fils, Paris.
238	1909	Escard, J.	See reference 290.

#### Silver

239	1920	White, B.	Silver. London: I. Pitman & Sons.
240	1915	Rose, T.K.	See reference 193.
241	1912	Molinie, M., Dietz, H.	Industries des metaux precieux. O. Doin et Fils, Paris.

#### Tin

242	1928	Fundey, A.H.	Tin and the tin industry: the metal, history character and application. Pitman & Sons.
243	1911	Louis, H.	Metallurgy of tin. McGraw Hill.
244	1909	Richter, K.	See reference 269.
245	1884	Charleton, G.A.	See reference 175.

#### Titanium

246	1927	Thornton, W.M.	Titanium, with special reference to the analysis of titaniferous substances. Chemical Catalog Co.
247	1905	Truchot, P.	Les petits metaux, titane, tungstenne, molybdene. Gauthier-Villars, Paris.

Tungsten

<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
248	1929	A.S.S.T.	Handbook - American Society for Steel Treating.
249	1927	Schneider, K.	Die diffusion von eisen und wolfram in festem zustand. Universitats-Verlag von Robert Noske, Leipzig.
250	1927	Smithells	Tungsten. Van Nostrand Co.
251	1920	Hultgren, A.	Metallographic study of tungsten steels. J. Wiley.
252	1911	Lennicke, H.	Die metallurgie des wolframs. W. Krayn, Berlin.
253	1905	Truchot, P.	See reference 247.
254	1884	Charleton, G.A.	See reference 175.

Uranium, Vanadium

255	1929	A.S.S.T.	Handbook - American Society for Steel Treating.
256	1915	Parson, C.L. et al.	Extraction and recovery of radium, uranium and vanadium. Bureau of Mines Bull. 104 (out of print but available in libraries).  The Vanadium Corporation of America, New York City has various pamphlets for distribution.

Zinc

257	1928	Rawdon, F.S.	Protective metallic coatings. Monograph No. 40. Chemical Catalog Co.
258	1928	American Zinc Institute	Zinc and its corrosion resistance. Amer. Zinc Inst., 27 Cedar St., New York, N.Y.
259	1927	Kluytmans, C.	La galvanisation a chaud. Ed. de l'Usine, Paris.
260	1927	Richter, K.	Zinc, zinn und blei. A. Hartleben.
261	1924	Bablik, H.	Das verzinken von eisen. A. Hartleben.
262	1924	Hartmann, F.	Das verzinnen, versinken, vernickeln, etc. A. Hartleben.
263	monthly		American Zinc Institute Bulletin "Make It of Zinc". 27 Cedar St., New York, N. Y.

Ref.	Date	Author	Title
264	1920	Jones, T. E.	Zinc and its alloys. I. Pitman & Sons.
265	1918	Smith, E. A.	The zinc industry. Longmans, Green & Co.
266	1913	Liebig, R.G.M.	Zink und cadmium. O. Spinner, Leipzig.
267	1913	Ingalls, W.R.	The metallurgy of zinc and cadmium. The Engineering & Mining Jnl., 10th Ave. at 36th St., New York, N. Y.
268	1911	Bouchonnet, A.	See reference 178.
269	1909	Richter, K.	Zink, zinn und blei. A. Hartleben, Leipzig.
270	1905	Lodin, M.	Metallurgie du zinc. C. Dunod, Paris.
			The New Jersey Zinc Co., Palmerton, Pa. has various pamphlets for distribution.

#### Zirconium

271	1925	Gillett, H.W. Mack, E.	See reference 97.
272	1922	Venable, F.P.	Zirconium and its compounds. Chemical Catalog Co.
273	1921	Marden, J.W., Fiele, M.N.	Investigations of zirconium. Bureau of Mines Bulletin 186, Supt. of Documents, 25 cents.
274	1917	Meyer, H.C.	The industrial applications of zirconium. Reprint from Mineral Foote Notes, Foote Mineral Co., Philadelphia, Pa.
275	1915	Johnstone, S.J.	See reference 285.

#### General Metallurgical Subjects

276	1928	DeLattre, G.	Protection des metaux contre la corrosion. Ed. de l'Usine, Paris.
277	1927	Tafel, V.	Lehrbuch der metallhüttenkunde. Hirzel, Germany.
278	1927	Vogel, J.H.	Schwissen, schneiden und metallspritzen mittel acetylen. Marhold, Germany.
279	1927	Wysor, H.	Metallurgy. Chemical Publishing Co., Easton, Pa.
280	1926	Hadfield, R.	Metallurgy and its influence on modern progress. Chapman & Hall.
281	1926	Speller, F.N.	Corrosion, its causes and prevention. McGraw Hill.

- | Ref.                 | Date    | Author                        | Title  |
|----------------------|---------|-------------------------------|--|
| 282                  | 1923    | Roberts-Austin, W.            | An introduction to the study of metallurgy. Griffin & Co.                              |
| 283                  | 1921    | Schnabel, C.                  | Handbook of metallurgy. MacMillan & Co.  |
| 284                  | 1920    | Spencer, J.F.                 | Metals of the rare earths. London: Longmans, Green & Co.                               |
| 285                  | 1915    | Johnstone, S.J.               | The rare earth industry. Crosby, Lockwood & Son, London.                               |
| 286                  | 1914    | Gowland, A.W.                 | See reference 70.  |
| 287                  | 1913    | Hofman, H.O.                  | General Metallurgy. McGraw Hill.   |
| 288                  | 1912-3  | Thorpe, E.                    | Dictionary of applied chemistry. 5 vols. Longmans, Green & Co.                         |
| 289                  | 1912    | Browning, P.E.                | Introduction to the rare elements. J. Wiley.   |
| 290                  | 1909    | Escard, J.                    | Les metaux speciaux. Lunoe et Finat, Paris.  |
| 291                  | 1905-13 | Abegg, R.<br>Auerbach, F.     | Handbuch der anorganischen chemie. 5 vols. S. Hirzel, Leipzig.                         |
| 292                  |         | Hopkins, B.S.                 | The Chemistry of the Rarer Elements. D. C. Heath, New York.                            |
| <u>Metallography</u> |         |                               |  |
| 293                  | 1928    | Joffe, A. F.                  | Physics of crystals. McGraw Hill.  |
| 294                  | 1928    | Smithells, C.J.               | Impurities in metals. J. Wiley.  |
| 295                  | 1927    | Hanemann, H.,<br>Schrader, A. | Atlas metallographicus I. Iron and Steel.<br>II. Non-ferrous metals. G. Borntrager.    |
| 296                  | 1926    | Benedicks, C.                 | Metallographic researches. McGraw Hill.  |
| 297                  | 1926    | Sauveur, A.                   | Metallography and heat treatment of iron and steel. Cambridge, Mass. University Press. |
| 298                  | 1925    | Clark, C. H.                  | Practical methods of microscopy. D. C. Heath, New York.                                |
| 299                  | 1925    | Montpillard, F.               | Macrographie et microphotographie. G. Doin & Co.                                       |



<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
300	1925	Tammann, G.	Text-book of metallography. Chemical Catalog Co.
301	1924	Greaves, R.H., Wrighton, H.	Practical microscopical metallography. American Society for Steel Treating.
302	1924	Dean, R. S.	Theoretical metallurgy. J. Wiley.
303	1924	Czochralski, J.	Moderne metallkunde in theorie und praxis. J. Springer.
304	1924	Pulsifer, H.B.	Structural metallography. Chemical Publishing Co., Easton, Pa.
305	1924	Jeffries, Z., Archer, R.S.	Science of Metals, McGraw Hill.
306	1924	Rinne, F.	Crystals and fine structure of matter. Trans. by W. S. Stiles. Methuen & Co., Ltd. London.
307	1924	Guillet, L., Portevin, A.	Precis demetallographie microscopique et de macrographie. Dunod, Paris.
308	1923	Tammann, G.	Lehrbuch der metallographie. Leipzig. L. Voss.
309	1923	Guertler, W.	Metallographie. Gebruder Borntrager, Berlin.
310	1923	Guillet, L.	Les methodes d'etude des alliages metalliques. Dunod, Paris.
311	1923	Schuberth, H.	Das atzen der metalle fur kunstgewebliche, zwecke. Wien u. Leipzig. A. Hartleben.
312	1922	Bureau of Standards.	Circular 113, Structure and Related Properties of Metals. Supt. of Documents. 25 cents.
313	1922	Desch, C.H.	Metallography. Longmans, Green & Co.
314	1922	Belaiew, N.T.	Crystallization of metals. University of London Press, Ltd., London.
315	1922	Goerens, P.	Einfuhrung in die metallographie. Halle a.S.: W. Knapp.
316	1922	Guillet, L.	Traite de metallurgie generale. J. B. Balliere et Fils, Paris.

<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
317	1922	Guillet, L., Portevin, A.	An introduction to the study of metallography and macrography. Trans. by L. Taverner, London; G. Bell & Sons, Ltd.
318	1921	Hoyt, S. L.	Metallography, Vol. 2. Metals and common alloys. McGraw Hill.
319	1921	Bureau of Standards	Circular 42, Metallographic Testing. Superintendent of Documents. 5 cents.
320	1920	Heyn, E., Bauer, O.	Metallographie. 2 vols. Berlin & Leipzig: Walter de Gruyter & Co.
321	1920	LeChatelier, L.	Introduction a l'etude de la metallurgie et chauffage industriel. Paris: Dunod.
322	1920	Hoyt, S. L.	Principles of metallography. McGraw Hill.
323	1916	Howe, H.M.	Metallography of steel and cast iron. McGraw Hill.
324	1914	Rosenhain, W.	Introduction to physical metallurgy. Constable & Co. Ltd., London.
325	1912-3	Guertler, W.	Handbuch der metallographie. Gebr. Borntrager, Berlin.
326	1912	Martens, A. Heyn, E.	Materialienkunde fur den maschinenbau. J. Springer.
327	1912	Robin, F.	Traite de metallographie. A. Hermann et Fils, Paris.
328	1911	Borchers, W.	Metallurgy. J. Wiley.
329	1909-12	Bornemann, K.	Die binaren metallegierungen. 2 vols. W. Knapp, Halle a.S.
330	1909	Guillet, L.	Trempe, recuit, revenu. Dunod et Pinat, Paris.
331	1909	Cavalier, J.	See reference 75.
332	1906	Guillet, L.	Etude theoretique des alliages metalliques. C. Dunod, Paris.
333	1928	Joffe	<u>X-Ray Study of Metals</u> Physics of Crystals. McGraw Hill.

<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
334	1928	Morse, J.K.	Bibliography of crystal structure. University of Chicago Press.
335	1928	Bragg, W.H.	An introduction to crystal analysis. G. Bell & Sons, London.
336	1928	Kautner, C., Herr, A.	Die verwendbarkeit der rontgenverfahren in der rontgenverfahren in der technik. V.D.I. Verlag, G.m.B.H. Berlin.
337	1927	Glocker, vonR.	Materialprüfung mit rontgenstrahlen. J. Springer.
338	1927	Clark, G.F.	Applied X-rays. McGraw Hill.
339	1926	Kaye, G.W.C.	X-rays. 5th edn. Longmans, Green & Co.
340	1926	Clark, H.	Die verwendung der rontgenstrahlen in chemie und technik. J. A. Barth.
341	1924	Bragg, W.H., Bragg, W.L.	X-rays and crystal structure. G. Bell & Sons, Ltd. London.
342	1924	Wychoff, R.W.G.	The structure of crystals. Chemical Catalog Co.
343	1924	Jeffries, Z., Archer, R.S.	See reference 59.
344	1923	Tammann, G.	See reference 308.
345	1925	F.S.B.	<u>Specifications</u> National directory of commodity specific- ations. Bureau of Standards and Bureau of Foreign & Domestic Commerce. Supt. of Documents. \$1.25.
346	tri- annual	A.S.T.M.	Standards. American Society for Testing Materials.
347		Navy Dept.	U. S. Navy Department Specifications, pub- lished through the Bureau of Supplies and Accounts of the Department.
348		Navy Dept.	U. S. Navy Aeronautical specifications, pub- lished through the Bureau of Construction & Repair of the Department.

<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
349		U.S.Army	U. S. Army Aeronautical Specifications, published through the Director of the Air Service, War Department.
350		A.S.T.M.	Tentative Standards. American Society for Testing Materials.
351		S.A.E.	Society of Automotive Engineers Specifications, 29 West 39th St., New York, N. Y.
352		A.S.S.T.	Recommended Practices, see Handbook of the American Society for Steel Treating.
353		Army	U. S. Army Ordnance Department Specifications Ordnance War Department.  American Engineering Standards Committee.
<u>Books on Mechanical Properties</u>			
354	1928		Handbuch der Physik. V. Mechanik der Elastischen Korper. J. Springer.
355	1927	Nadai, A.	Der bildsame zustand der werkstoffe. J. Springer.
356	1927	Moore, H.F., Kommers, J.B.	Fatigue of Metals. Amer. Soc. Steel Treating.
357	1927	Moore, H.F.	Manual of the endurance of metals under repeated stress. Engng. Foundation, New York Publication 13.
358	1924	Bureau of Standards	Circular 101, Physical Properties of Materials. I. Strengths and related properties of metals and wood. Superintendent of Documents 40 cents.
359	1924	Gough, H.J.	Fatigue of metals. Van Nostrand Co.
360	1924	Descroix, L.	Engineering and Metallurgy. Charles Marie, 9 Rue de Bagneux, Paris.
361	1923	Turner, C.A.P.	Elasticity and strength of materials used in construction. C.A.P. Turner, Minneapolis, Minn.
362	1923	Dalby, W.E.	Strength and structure of steel and other metals. Amer. Soc. Steel Treating.



<u>Ref.</u>	<u>Date</u>	<u>Author</u>	<u>Title</u>
363	1923	Moore, H.F., Jasper, T.H.	Fatigue of metals. University of Illinois Bulletin 136.
364	1922	Batson, R.G., Hyde, J.H.	Mechanical testing. E. P. Dutton & Co.
365	1922	Mills, A.P.	Materials of construction. American Society for Steel Treating.
366	1921	Moore, H.F., Kommers, J.B.	Fatigue of metals. University of Illinois Bulletin 124 and others.
367	1920	Moore, H.F.	Text book of the material of engineering. McGraw Hill.
368	1919	Johnson, J.B.	Materials of construction. J. Wiley.
369	1916	Upton, G.B.	The structure and properties of the more common materials of construction. J. Wiley.
370	1915	Mills, A.P.	Materials of construction, their manufacture, properties and uses. J. Wiley.
371	1912	Martens, A., Heyn, E.	See reference 326.
372	1910	Unwin, W.C.	Testing of materials of construction. American Society for Steel Treating.

#### Magazines and Journals

##### Engineering

373		American Society of Mechanical Engineers.
374	monthly	Automobile Engineer, Dorset House, Tudor St., London.
375	annual	Carnegie Institute Yearbook. Washington, D. C.
376	monthly	Chemical and Metallurgical Engineering. Weekly up to March 1925, formerly Metallurgical and Chemical Engineer- ing, and Electrochemical and Metallurgical Industry, including the Metallographist. McGraw Hill.
377	weekly	Canadian Engineer. Monterey Times Printing Co. of Canada, 62 Church St., Toronto, Canada.
378		Cornell University Engineering Experiment Station, Ithaca, N. Y.

Ref.

- 379 quarterly Colorado School of Mines. Golden, Colorado.
- 380 weekly The Engineer. The Engineer, London.
- 381 weekly Engineering. Engineering, Ltd., 25-6 Bedford St., Strand, London.
- 382 Engineering Index. Published in Mechanical Engineering, American Society of Mechanical Engineers, Mining and Metallurgy.
- 383 weekly Engineering, Mining Journal Press. McGraw Hill.
- 384 weekly Genie Civil. 6 Rue de la Chaussee d'Antrin Paris 9<sup>e</sup>, France.
- 385 monthly General Electric Review. General Electric Co., Schenectady, N. Y.
- 386 Glasgow Royal Technical College Metallurgical Club Journal, Glasgow, Scotland.
- 387 weekly Illinois University Experiment Station, Urbana, Ill.
- 388 monthly Iron and Steel World, Iron & Steel Publishing Co., Pittsburgh, Pa.
- 389 Iron and Steel Engineer, Pittsburgh, Pa.
- 390 monthly Kyoto College of Science Memoirs, Kyoto, Japan;  
" " " Engineering " " "
- 391 monthly Marine Engineering & Shipping Age. Simmons Boardman Publishing Co., 30 Church St., New York, N. Y.
- 392 Michigan University Department of Engineering Research Bulletin, Ann Arbor, Mich.
- 393 Missouri University Engineering Experiment Station Bulletin, Columbia, Mo.
- 394 Ohio State University Experiment Station, Columbus, O.
- 395 monthly Science Reports, Tohoku Imperial University, Sendai, Japan.
- 396 weekly Verein deutsche Ingenieure. V.D.I. Verlag, G.m.g.H. Berlin, NW 7.

Ref.  
397 monthly Society of Automotive Engineers, Journal, 29 West 30th St., New York, N. Y.

Chemistry

398 bi-monthly Chemical Abstracts. American Chemical Society, 1709 G St., N.W., Washington, D. C.

399 monthly Canadian Chemistry and Metallurgy. Westman Press Ltd., 56 Queen St., Toronto, Canada.

400 monthly Industrial and Engineering Chemistry. American Chemical Society, Mills Bldg., 17th at Penna. Ave., Washington, D. C.

Mining, Metallurgy, Metals, etc.

401 monthly Transactions of the American Society for Steel Treating.

402 Bulletins and technical papers of the Bureau of Mines, Department of Commerce, Washington, D. C.

403 monthly Brass world. Brass World Publishing Co., 153 Waverly Place, New York, N. Y.

404 monthly Blast Furnace and Steel Plant. Anderson Co. Inc., Thaw Bldg., 108 Smithfield St., Pittsburgh, Pa.

405 daily Daily Metal Reporter. Atlas Publishing Co.

406 weekly Iron Age. The Iron Age Publishing Co., 239 West 39th St., New York, N. Y.

407 weekly Iron Trade Review. Penton Publishing Co., Cleveland, O.

408 bi-annual Journal of the Institute of Metals. Caxton House, Westminster, S. E. London.

409. annual Journal Iron and Steel Institute. E. & F. Spon, Ltd. London.

410 monthly Mining & Metallurgy. American Institute of Mining and Metallurgical Engineers.

411 monthly Korrosion u. Metallschutz. Verlag Chemie, G.m.b.H. Corneliusstr. 3, Berlin.

412 monthly Metal Industry. 99 John St., New York, N. Y. Including the Aluminum World, The Brass Founder and Finisher and the Electroplaters Review.

Ref.

- 413 weekly Metal Industry. 34 Bedford St., Strand, WC 2 London.
- 414 monthly Metallurgist. Published by The Engineer, See Engineering Section.
- 415 Metallurgie. W. Knapp, Halle. Now issued as Metall u. Erz (and Ferrus, discontinued after 1917).
- 416 monthly Mining Congress Journal. American Mining Congress, Washington, D. C.
- 417 Metall und Erz. See Metallurgie.
- 418 monthly Revue de Metallurgie. Dunod et Pinat, Paris.
- 419 monthly Revue Universelle des Mines. 16 Quai des Etats Unis, Liege, France.
- 420 weekly Stahl u. Eisen. Stahl-Eisen, m.b.H. Dusseldorf, Germany.
- 421 monthly Verein Deutsche Eisenhüttenleute. Verlag Stahleisen m.b.H. Dusseldorf, Breit Strasse 27, Germany.
- 422 monthly Zeitschrift für Metallkunde. Formerly International Zeit. f. Metallographie. Gebr. Bornträger, Berlin, Germany.

Foundry

- 423 quarterly American Foundrymen's Association, 140 So. Dearborn St., Chicago, Ill.
- 424 monthly Canadian Foundryman. Maclean Pub. Co., Toronto, Can.
- 425 monthly The Foundry. Penton Publishing Co., Cleveland, O.
- 426 weekly Foundry Trade Journal. Bessemer House, 5 Luke St., Adelphi, London, WC 2.
- 427 monthly La Fonderie Moderne. 15 Rue Bleu, Paris 9, France.
- 428 monthly Fuels and Furnaces. Iron & Steel Publishing Co., Pittsburgh, Pa.
- 429 monthly Metal Stampings. Iron & Steel Publishing Co., Pittsburgh, Pa.

Technical, Testing

- 430 monthly American Machinist. McGraw Hill.



Ref.

- 431 monthly Forging and Heat Treating. Thaw Bldg., 108 Smithfield St., Pittsburgh, Pa.
- 432 monthly Journal of the American Welding Society, 33 West 39th St., New York, N. Y.
- 433 monthly Machinery. Industrial Press.
- 434 monthly Power. McGraw Hill.
- 435 monthly Welding Engineer. Chicago, Ill.
- 436 annual Proceedings of the American Society for Testing Materials.
- 437 1907 Proceedings of the International Association for  
1912 Testing Materials. McGraw Hill.
- 438 Tests of Metals. Reports of tests made at U. S. Watertown Arsenal. Government Printing Office.

Physics

- 439 weekly Comptes Rendus. Gauthier-Villars, Quai du Grand Augustus 55, Paris.
- 440 monthly J. Franklin Inst., Franklin Institute of Pennsylvania. Philadelphia, Pa.
- 441 monthly Physical Review. American Physical Society, Minneapolis, Minn.





