

A Bibliography on the History of Radio

This bibliography of the history of radio has been extracted from a book titled, "History of Electronics Bibliography," by George Shiers. Published by Scarecrow Press Inc. Copyright 1972.

This document provides references to other works pertaining to the subject of the history of radio. Some will be easy to locate, others may take some digging.

This document includes only pages from chapter 13 of the book. These pages were photographed and translated by Artificial Intelligence. Humans have made a good faith effort to review and clean up the translation, but some errors may still be found.

Many of these entries refer to other entries in different chapters. These have are not included here.

A list of abbreviations, publications and journals referenced in the bibliography can be found and the end of the document.

Early radio history is found in experiments and observations on electromagnetic waves; see Chap. 9, also 816 for a comprehensive survey of the early years. Contributions of some of the pioneers are contained in Sect. 4B, see especially 359, 369, 371. For the story of individual work, see Sect. 4C, especially the following: Armstrong, 379; de Forest, 396; Fessenden, 405; Hertz, 418; Marconi, 431; Maxwell, 436; Popov, 446. Other related items will be found in Sects. 3E, 3G. A. General Histories

1190 "The History of Radio." Radio News, 5:1730-1732, 1816-1820, June 1924. 8 ports., one group photo, 3 other pictures. From 1827 to February 1924. Abstracted from the Radio Service Bulletin.

1191 Dowsett, H. M., Wireless Telephony and Broadcasting. London: Gresham Publishing Co., 1925, 2 vols. Vol. 1, 210 pp., 12 plates (ports., maps, charts), numerous other diags. and plates, some in color. App., pp. 203-210, license and agreement, Post Office Telegraphs and the British Broadcasting Company, Jan. 18, 1923. Several historical chapters. Vol. 2, 233 pp., 19 plates (ports., apparatus), numerous other diags. and photos, some in color. Glossary, pp. 217-225. Biographical notes, pp. 227-230, 111 entries. Index for both vols., pp. 231-233. A few footnotes in both vols., otherwise not documented. A technical exposition and to the mid-1920s.

1192 Morse, A. H., Radio: Beam and Broadcast. Its Story and Patents. London: Ernest Benn, 1925. 192 pp., 3 plates, 56 illus.. about half from patents. First 100 pages is a survey up to the mid-1920s. App., pp. 101-186, contains abstracts from 21 important early patents. Bibliography, pp. 187, 188, has 30 entries. Numerous patent numbers and refs. in the text, others in footnotes. Also, Radio News, Vols. 6, 7, May-Sept. 1925. See 1369. numbers and refs. in the text, others in footnotes. Also, Radio News, Vols. 6, 7, May-Sept. 1925. See 1369.

1193 Blake, George G., *History of Radio Telegraphy and Telephony*. London: Radio Press, 1926; Chapman and Hall, 1928. 425 pp., 246 diags. and photos. App., pp. 342-351, various items. Reference list, pp. 353-403, 1125 entries, mostly papers, articles and patents. More than 150 footnotes and many other names and dates in the text. Early history of electrical signaling and the telephone, early wireless communication systems, electromagnetic wave experiments, coherers, magnetic detectors, electrolytic and crystal detectors, early radio telegraphy and telephony, spark, arc, and other high-frequency generators, microphones, facsimile, remote control, thermionic valves and circuits, direction finding. "The book is intended to provide a useful work of reference wherein will be found many now almost forgotten 'wireless' schemes and inventions" and is, indeed, a collection of entries rather than a formally organized history. The wide variety of miscellaneous materials and the extensive references relate mainly to components, circuits, experiments, proposals and systems.

1194 Archer, Gleason L., *History of Radio to 1926*. New York: The American Historical Society, 1938. 421 pp., 20 plates. App., pp. 375-399, contains various agreements and a list of broadcasting stations, 1920-1922, pp. 393-397. Detailed index, pp. 401-421. Treats early developments, in the beginning and during World War 1; origin of RCA and contemporary companies, early broadcasting and personalities, litigation and rivalries, early network activities, wavelength problems, Federal matters. Heavy emphasis on the American scene. 175 footnotes, mostly refs. See also 1417.

1195 *One Hundred Years of Radio Development*. Compiled from U. S. Government Sources. Washington Bureau, n. d. 4 pp. Brief entries from 1827 to late 1927.

1196 Clarkson, R. P., *The Hysterical Background of Radio*. New York: J. H. Sears, 1927. 257 pp. A nontechnical and light survey of electrical progress from the earliest times. Inventors, experimenters and organized research are discussed.

1197 Dunlap, Orrin E., *The Story of Radio*. New York: Dial Press, 1927. 226 pp., 15 plates. A popular account for the general reader. No refs.

1198 "Important Events in Radio--Peaks in the Waves of Wireless Progress, 1827 to 1928." *Radio Service Bulletin*, 141:16-26, Dec. 1928. Washington: Department of Commerce, Radio Division.

1199 Harbord, James G., "Radio." *A Century of Industrial Progress*, pp. 552-564. A brief historical view including marine communications, broadcasting and facsimile. See 336.

1200 Schubert, Paul, *The Electric Word: The Rise of Radio*. New York: Macmillan, 1928. 311 pp. A readable narrative of radio developments that lightly touches scientific matters as well as politics and business. No index, no refs.

1201 Codel, Martin (ed.), *Radio and Its Future*. New York: Harper and Brothers, 1930. 349 pp., 8 plates. Pt. 1, pp. 3-91, Broadcasting; Pt. 2, pp. 95-182, Communications; Pt. 3, pp. 185-215, Industry; Pt. 4, pp. 219-264, Regulation; Pt. 5, pp. 267-327, Some scientific and other considerations. A broad review for the layman with a little historical background.

1202 Marconi, Guglielmo, "Thirty-Seven Years of Radio Progress." *Radio News*, 13:(552), 553, 554, 608, 610, Jan. 1932. 6 illus. Talk by Marconi during the Faraday Centennial in London that was transmitted to the United States.

1203 Taylor, J. E., "Notes on Wireless History." *J. POEE.*, 25:295-299, Jan. 1933. A brief survey of radio progress.

1204 Eccles, William H., *Wireless*. London: Thornton Butterworth, 1933. 256 pp., 82 illus. Bibliography, pp. 245-249, 59 items. A semi-technical and popular survey from the experiments of Hertz to the "progress of recent years." This useful book by a recognized authority includes various pieces of historical interest and a few patent refs.

1205 Vyvyan, Richard N., *Wireless Over Thirty Years*. London: George Routledge, 1933. 256 pp., 16 plates, 12 diags. App., pp. 239-256, 12 diags. of Marconi's early circuits, 2 lists of stations, 6 tables of frequency bands, stations, services, allocations, etc. A general and nontechnical account with personal reminiscences by a close associate of Marconi. Early history, transatlantic wireless, high-power stations, histories of Imperial Wireless and beam development, wireless during World War 1, commercial development, broadcasting, and the work of the British Post Office. No index, no refs.

1206 O'Dea, William T., *Radio Communication: Its History and Development*. London: H. M. S. O., 1934. 95 pp., 34 plates. Refs., p. 92, 14 books, 4 research reports and 15 other publications. An authoritative survey without specific refs. Objects in the Science Museum collection are noted in the text.

1207 Espenschied, Lloyd, "The Origin and Development of Radiotelephony." *Proc. IRE.*, 25:1101-1123, Sept. 1937. 8 illus. Bibliography, pp. 1121-1123, 45 items from 1880. A unified account primarily devoted to American contributions; 1912 through World War 1, post-war experiments, early broadcasting, radiotelephony of the 1920s, and ultrahigh frequencies.

1208 Reck, Franklin M., *Radio from Start to Finish*. New York: Thomas Y. Crowell, 1942. 160 pp. Diags. and ports. Radio history from 1895 to the early 1920s is surveyed in pp. 1-65. The remainder treats station operations and networks. Television, FM and military radio are mentioned. A beginner's book.

1209 Kelsey, Elizabeth (comp.), *Trail Blazers to Radionics and Reference Guide to Ultra High Frequencies*. Chicago: Zenith Radio Corp., 1943. 29,56 pp. Pt. 1, 45 brief biographies, from Pythagoras to Farnsworth, with refs. Pt. 2, bibliography, 726 articles and books, in 21 categories.

1210 Crawley, Chetwode, G., "Fifty Years of Radio-Communication." *Discovery*, 7 (NS): 150-152, May 1946. 2 views, 5 ports.

1211 McNicol, Donald, *Radio's Conquest of Space. The Experimental Rise in Radio Communication*. New York: Murray Hill Books, 1946. 374 pp., 69 illus., including numerous ports. A semi-technical record of radio progress from the mid-19th century, more or less in chronological order. Although some emphasis is placed on American records, with refs. in the text, from 1868. See also 429.

1223 "Weak Sparks." *Sci. Am.*, 33:385, Dec. 18, 1875. Editorial comment on Edison's experiments of November 22 on spark effects which soon became known as an "etheric force." A series of about 20 articles, letters and comments ensued. See next two items, also 866-870.

1224 "The New Phase of Electric Force." *Sci. Am.*, 33: 401 Dec. 25. 1875. 3 illus., including view of experimental apparatus. (Also editorial note, p. 400.)

1225 Houston, Edwin J., and Elihu Thomson, "Experiments With Ruhmkorff Coil and Spark." *J. F.I.* 101:270274, April 1876; *Sci. Am. Supp.*, 1:326, May 20, 1876. Also, "Notes on the Phenomena of Induction--Etheric Force." *English Mechanic*, 22:549, 550, Feb. 11, 1876; and "The So-called Etheric Force," 23:242, 243, May 19, 1876. For earlier experiments, see *J. F.I.*, 91:417-419, 1871.

1226 [Hughes, David E. J. Fahie, John J., "Researches of Prof. D. E. Hughes, F. R. S., in Electric Waves and their Application to Wireless Telegraphy, 1879-1886." A History of Wireless Telegraphy, App. D, pp. 289-296. Letters by Crookes, Fahie and Hughes on the latter's experiments of 1879, which were not made public for 20 years. See 1234, also Electrician, 43:40, 41, May 5, 1899; Elect. Review, 44:883-885, 1899; and 874 (3rd ed., pp. 88-94).

1227 Dolbear, Amos E., "On the Development of a New Telephonic System." J. Soc. Telegraph Engineers and Electricians, 11:129-149, 1882.

1228 Branly, Eduoard, "Variations of Conductivity Under Electrical Influence." Electrician, 27:221-223; 448, 449, June 26, Aug. 21, 1891. See also 874, 3rd ed., pp. 95-108; 1234, pp. 276-288. A pioneer paper on the coherer.

1229 Crookes, William, "Some Possibilities of Electricity," Fortnightly Review, 51:173-181, Feb. 1892. This famous paper contains a prediction of the means for radio telegraphy: transmitter, receiver, directive antenna, circuit tuning and selectivity.

1230 Lodge, Oliver J., "The History of the Coherer Principle." Electrician, 40:87-91, Nov. 12, 1897. See Radio also 874, 3rd ed., pp. 73-87.

1231 Marconi, Guglielmo, "Wireless Telegraphy." Proc. Roy. Inst., 16:247-256, 1899; J. IEE., 28:273-297, 300-316, 1899. A survey of his work up to the beginning of 1899.

1232 Kerr, Richard, Wireless Telegraphy Popularly Explained. London: Seeley, 1898. 5th ed., 1901. 116 pp., 17 illus., ports., and diags. Preface by William H. Preece. One of the first "popular" books, with background on science, vibrations, induction experiments, and Hertzian waves. No refs., no index.

1233 Thompson, Silvanus P., "Telegraphy Across Space," J. Roy. Soc. Arts, 46:453-460, 1898. Also, Smithsonian Institution, Annual Report for 1898, pp. 235-247 (Washington, 1899). A brief sketch of communication without wires by the conduction, induction, and electric wave methods.

1234 Fahie, John J., A History of Wireless Telegraphy 1838-1899. Edinburgh, London: Blackwood; New York: Dodd, Mead, 1899. 325 pp., frontispiece and 65 diags. Most of the book is devoted to "bare wire proposals for subaqueous telegraphs," as the subtitle states. G. Marconi's Method, pp. 177-245. App. E, pp. 296-320, Reprint of Signor G. Marconi's Patent (see 1334). D. E. Hughes' researches, pp. 289-296 (see 1226). 2nd ed., 1901, 348 pp. See also 1528.

1235 Pickard, George W., "History and Present Development of Wireless Telegraphy." Sci. Am. Supp., 49:20096-20098, Jan. 13, 1900.

1236 Bottone, Stanley R., Wireless Telegraphy and Hertzian Waves. London: Whittaker, 1900. 116 pp., 35 illus., mainly diags. A simple account with some constructional details for the amateur. Historical matter, pp. 13-59. A pioneer practical book in this field.

1237 Howe, G. W. O., "Alexander S. Popov." Wireless Engineer, 25:1-5, Jan. 1948. A review of Popov's life and work with observations on the invention of radio communication and the rival claims of Popov and Marconi. Also 25:135-137, May 1948; 26:141, 142; 249, 250, April, Aug. 1949. Royal Institution paper, March 3, 1905.

1251 Collins, A. Frederick, Wireless Telegraphy. Its History, Theory and Practice. New York: McGraw, 1905. 299 pp., 332 illus. A brief historical introduction is given with 13 of 20 chapters.

A thorough coverage of electrical theory and contemporary practice with chapters on oscillators, induction coils, interruptors, detectors, transmitters, receptors, subsidiary apparatus, aerials and earths. syntonization, and wireless telephony. 139 footnotes.

1252 Collins, A. Frederick, *Manual of Wireless Telegraphy and Telephony*. New York: John Wiley; London: Chapman and Hall, 1906, 1909. 3rd ed., 1913, 300 pp., 129 plates, photos and diags., folding chart of North Atlantic Communications. Theory, commercial apparatus, transmitters, receivers, wiring diagrams, adjustments and operations, different systems, antennas and components. Chap. 12, pp. 244-259, Wireless telephony, by Newton Harrison. Book list, pp. 261-270, 41 items, including foreign-language books and government publications, with brief descriptions.

1253 Fleming, John A., *The Principles of Electric Wave Telegraphy*. London: Longmans, Green, 1906. 671 pp., 302 illus., 7 folding plates. App. 1, pp. 635-637, Wireless telegraphy act, 1904. App. II, pp. 638-641, Bibliography; 32 books, 44 original papers and lectures, from 1893. App. III, pp. 642-657, British patents relating to improvements in electric wave wireless telegraphy granted between 1896 and 1906, 273 items listed by year with name, number, date and title. Chap. 7, pp. 419-463, The inception of electric wave telegraphy, is a detailed historical record from early ideas up to 1905, with emphasis upon Marconi's progress and the work of Lodge and Fleming. Chap. 8, pp. 465-544, The development of electric wave telegraphy, deals thoroughly with progress by all workers in the field from 1897. Work in the United States is treated in detail with descriptions of some 170 patents of Fessenden, de Forest, Stone, Shoemaker. European contributions by Slaby and von Arco, Braun and the Telefunken company are similarly described along with patent references and illustrations of the various ideas and apparatus, 355 footnotes, mainly refs., some multiple entries. A foremost treatise and valApps., including bibliography, pp. 890-892, 45 entries. Chap. 7, pp. 511-635, The evolution of electric wave telegraphy. Chap. 10, pp. 844-865, Radiotelephony. 3rd ed., Radio 205 1916; 4th ed., 1919.

1254 Fessenden, Reginald A., "Recent Progress in Wireless Telephony." *Sci. Am.*, 96:68, 69, Jan. 19, 1907.

1255 Erskine-Murray, James, *A Handbook of Wireless Telegraphy*. London: Crosby, Lockwood; New York: D. Van Nostrand, 1907. 322 pp., plates, diags. and tables. Theory, practice and useful data for engineering, operators and students. Covers early history with details of apparatus and trials. Later eds.

1256 Fessenden, Reginald A., "Wireless Telephony." *Proc. AIEE.*, 27:558-627, July 1908. Also Smithsonian Institution, Annual Report for 1908, pp. 161-195 (Washington, 1909). 39 illus. (20 plates). Brief history of wireless signaling and wireless telephony, description of methods, apparatus, circuits and operation, discussion of possibilities. 98 footnote refs. from 1847, including many patents. An important early paper.

1257 Fleming, John A., *An Elementary Manual of Radiotelegraphy and Radiotelephony for Students and Operators*. London, New York: Longmans, Green, 1908. 340 pp., numerous diags. Includes an account of early history.

1258 Ruhmer, Ernest (James Erskine-Murray, trans.), *Wireless Telephony in Theory and Practice*. London: Crosby, Lockwood; New York: D. Van Nostrand, 1908. 237 pp., numerous diags. Bibliography, pp. 215-217.

1259 Marconi, Guglielmo, "Wireless Telegraphic Communication." Nobel lecture, Dec. 11, 1909. See 213, pp. -222. Biography, pp. 223-225. Presentation speech, pp. 193-195. 25 photos, maps, diags. 22 refs. from 1896. (With K. F. Braun, see 885.)

1260 Pierce, George W., *Principles of Wireless Telegraphy*. New York: McGraw-Hill, 1910. 350 pp., 235 illus., 15 tables. Technical exposition with much historical material. Pages 140-214, on detectors. Wireless telephony, pp. 305-311. 131 footnotes, mainly refs.

1261 Fleming, John A., "Wireless Telegraphy." *Enciclopedia Britannica*, 1911. 11th ed., 26:529-541. 16 diags. Early conduction and induction methods, space telegraphy, Marconi's system, transmitters and antennas, detectors and receivers, transatlantic telegraphy, directive telegraphy, instruments and measurements. 49 footnotes, list of refs.

1262 Taylor, J. E., "Early History of Wireless Telegraphy." *J. POEE.*, 2:1-6, 81-87, 157-162, 291-299; 3: 47-51, 124-127, 260-262, 347-351; 4:20-24. 1909-1912.

1263 Marconi Company. *The Year Book of Wireless Telegraphy and Telephony*. London: Wireless Press. First published in 1913 by The Marconi Press Agency. Regular features include: Calendar, historical record, conventions, world list of stations, formulas, glossary, dictionary of technical terms, tables of useful data, patents, companies, biographical notices, obituary, list of books and journals grouped by countries, directory of amateur societies, call letters, code signals, laws and regulations, etc. About 100 pages contain several articles by noted writers. Illustrations (usually about 20 plates) consist of portraits and views of installations and equipment. Advertisements for services, equipment and supplies usually occupy about 100 pages. Each issue (1000-1500 pp.) is a mine of contemporary information, despite the predominance of Marconi Company interests.

1264 de Forest, Lee, "Recent Developments in the Work of the Federal Telegraph Company." *Proc. IRE.*, 1: 37-57, Jan. 1913; *Proc. IEEE.*, 51:426-433, March 1963. 23 photos and diags. Description of the Company installations and operations, Poulsen arc generators, and other transmitting equipment. Service performance, frequency shift keying and selective fading are also discussed.

1265 Fleming, John A., *The Wonders of Wireless Telegraphy*. London: Society for Promoting Christian Knowledge, 1913. 280 pp., 55 illus. This explanation for the nontechnical reader deals with history and includes some early circuits.

1266 Hogan, John V.L., "A New Marconi Transatlantic Service." *Electrical World*, 64:425-428, Aug. 29, 1914. 7 photos, 3 refs. Brief historical background and description of the Marconi station at Carnarvon, Wales.

1267 Hogan, John V. L., "The Goldschmidt Transatlantic Radio Station." *Electrical World*, 64:853-855, Oct. 31, 1914. 4 photos, 2 diags., 2 refs. Description of the Radio 207 Goldschmidt 100-Kw high-frequency alternator and the plant at Tuckerton, New Jersey.

1268 Gibson, Charles R., *Wireless Telegraphy and Telephony Without Wires*. London: Seeley, Service; Philadelphia: J. B. Lippincott, 1914. 156 pp., 9 plates, 19 diags. A popular history. Chap. 15, pp. 141-148, The evolution and development of wireless telegraphy, is a chronological record from 1831 to 1913, 41 entries.

1269 "Wireless Telephony. New Short Distance Apparatus," *Wireless World*, 2:589-591, Dec. 1914. Photograph of Marconi tube set, a combined transmitter and receiver. Report on Marconi's experiments in Italy earlier that year. A brief announcement appeared earlier in *Wireless World*, 2:35, April 1914.

1270 Fleming, John A., "Radiotelegraphy: A Retrospect of Twenty Years." *Electrician*, 77:831-836, Sept. 15, 1916. 4 photos, 2 diags.

1271 Round, Henry J., "Wireless Telephony." *The Year Book of Wireless Telegraphy and Telephony* (1915), pp. 572-582. 3 plates, 4 diags. An early description of the reaction valve (triode oscillator) and its use in wireless telephony. Experiments of 1914. See 1263.

1272 Zenneck, Jonathan (A. E. Seelig, trans.), *Wireless Telegraphy*. New York: McGraw-Hill, 1915. 1st German ed., 1909, 2nd ed., 1913. 443 pp., 461 illus. 13 tables, pp. 384-407. Bibliography and notes on theory, pp. 408-428, 355 entries referenced to the text and to some of the 370 footnotes, most of which supplement the text. A first-rate engineering text with a good deal of historical material.

1273 Coursey, Philip R., "The Methods Employed for the Wireless Communication of Speech." *Wireless World*, 4:47-52, 90-96, 216-223, 305-313, 385-387, April-Aug. 1916. 20 illus. Technical paper with historical treatment; arc, spark, vacuum tube and alternator systems, modulation, receivers. 29 refs.

1274 Bucher, Elmer E., *Practical Wireless Telegraphy*. New York: Wireless Press, 1917. Revised ed., 1921. 336 pp., 334 photos, diags., charts. A practical textbook for students of radio communication." Useful historical material. Not documented.

1275 Lansford, Willis R., "Aircraft Communication in World War I." *Radio News*, 29:50-54, 208-216, June 1943. 10 photos of early equipment. Historical survey from 1910 to October 1917.

1276 Eccles, William H., *Wireless Telegraphy and Telephony. A Handbook of Formulae, Data and Information*. London: Benn Brothers; New York: D. Van Nostrand, 2nd ed., 1918. 514 pp., 434 illus., 2 folding charts. Tables, pp.1-52. Formulae, pp. 53-115. Antennas and waves, pp. 116-185. Generators and plant, pp. 186-269. Detectors and receivers, pp. 270-357. High-frequency circuits, pp. 358-383. Systems and stations, pp. 384-484. Glossary, pp. 487-514. There is much historical matter in the text, with names, dates and other particulars, especially patents.

1277 Goldsmith, Alfred N., *Radio Telephony*. New York: Wireless Press, 1917. 247 pp., 226 photos, diags. and charts. The first comprehensive textbook of the period with numerous circuit diagrams and pictures of apparatus. Generators, pp. 21-126, includes arc, spark, vacuum tube and alternator systems. Modulation, pp. 127-204, includes microphones, vacuum tubes, magnetic amplifiers. Antennas and reception, pp. 205-229. 13 footnotes, other refs. in the text.

1278 Burrows, Arthur R., "Wireless Possibilities." *The Year Book of Wireless Telegraphy and Telephony* (1918), pp. 952-962. Brief history from Marconi's early work with speculations concerning future applications and services, especially the wireless distribution of public information and music, audible advertisements and other aspects of broadcasting. See 1263.

1279 Craft, E. B., and Edwin H. Colpitts, "Radio Telephony." *Trans. AIEE.*, 38:305-343, Feb. 1919. 43 photos, graphs, diags. Pt. 1, Historical; Pt. 2, Commercial development. Largely about AT&T, Western Electric, and army and navy apparatus through World War I. An engineering approach.

1280 Eccles, William H., "Wireless Telegraphy and Telephony during the War." *J. IEE.*, 59:77-84, Dec. 1920. Illus. Also, *Engineering*, 110:783-785, Dec. 10, 1920.

1281 Cusins, A. G. T., "Development of Army Wireless during the War." *J. IEE.*, 59:763-770, July 1921.

1282 Eccles, William H., *The Influence of Physical Research on the Development of Wireless*. London: Institute of Physics, 1930, 18 pp. Also "Physics in Relation to Wireless." *Nature*, 125:894-897, June 14, 1930. Brief survey of highlights to 1918. No refs.

1283 Coursey, Philip R., *Telephony Without Wires*. London: Wireless Press, 1919 414 pp., 249 illus. Brief list of achievements in wireless telephony, pp. 365, 366, 28 entries from 1885. List of refs., pp. 367-396, has 695 entries of articles and patents arranged by chapters. Name index, pp. 397-401, refers to the reference list as well as text pages. A comprehensive coverage of techniques, devices and developments with emphasis on the period 1905 to 1918.

1284 *The Principles Underlying Radio Communication*. Signal Corps, U.S. Army. Washington: G. P.O., 1919. 355 pp., illus. 2nd ed., 1921, 619 pp., 294 illus. Elementary electricity, dynamo-electric machinery, radio circuits, electromagnetic waves, transmitting and receiving apparatus (exclusive of electron tubes), electron tubes in radio communication. App. 8, pp.568-577, lists 27 radio books, 33 Bureau of Standards radio publications, and 33 pamphlets on communications issued by the Signal Corps. This Radio Communication Pamphlet No. 40 was prepared by the Bureau of Standards for the Signal Corps. There are various footnotes and many references in the text. Useful historical material.

1285 Elwell, Charles F., "The Poulsen System of Radiotelegraphy: History of Development of Arc Methods." *Electrician*, 84:596-599, May 28, 1920. 7 illus. Survey from 1902.

1286 Marriott, Robert H. (ed. Haraden Pratt), "Radio Ancestors--an Autobiography." *IEEE Spectrum*, 6:5261, June 1968. 4 illus. A condensation of miscellaneous matters and personal memories from the early days up to 1919. 47 refs. from 1870. Radio from 1921 The 1920s witnessed the rise of radio as a major industry centered on electron-tube technology (Chap. 10) and the world-wide spread of broadcasting (Chap. 6). Popular books and articles, surveys and reminiscences and works on amateur radio are included in this section. A few engineering papers and textbooks have been selected (from a mass of similar material) for their historical treatment or portrayal of contemporary equipment and practices. See also Sect. 1E, 52-62. For related material, see Chap. 3; 268, 283-285, 287, 295, 336, 337; Chap. 6; 609, 615, also 1012. See also Sect. 13F for related entries concerning circuits and patents. A useful survey of the radio art at the beginning of the decade is in *The Electric Journal*, April 1921. Three of the 18 articles are given below.

1287 Alexanderson, Ernst F. W., "Central Stations for Radio Communication." *Proc. IRE.*, 9:83-94, Feb. 1921. 6 photos and diags. Brief historical survey, discussion of high-frequency alternators, and description of the Radio Central Station and its antenna system.

1288 Chubb, L. W., and C. T. Allcutt, "The Foundations of Modern Radio." *Electric Journal*, 18:120-122, April 1921. Brief survey of four notable landmarks; continuous wave transmission, heterodyne reception, the vacuum tube, the feedback circuit.

1289 Little, D. G., "Continuous Wave Radio Communication." *Electric Journal*, 18:124-129, April 1921. 6 photos of equipment. Arc generators, high frequency alternators, vacuum tubes, and wartime developments.

1290 Brackett, Q.A., "Radio Arc Transmitters." *Electric Journal*, 18:142-146, April 1921. 5 photos of equipment, 1 diag. History and technical description.

1291 Morecroft, John H., *Principles of Radio Communication*. New York: John Wiley; London: Chapman and Hall, 1921. 935 pp. 788 photos, diags. and graphs. There are chapters on spark telegraphy, vacuum tubes and circuits, continuous-wave telegraphy, radio telephony, antennas and radiation, wavemeters, amplifiers, and experiments, in addition to others on basic electrical

principles at high frequencies. A comprehensive treatise noteworthy for the many graphs and photos of waveforms obtained by the mirror oscillograph. No refs. except occasional footnotes. 2nd ed., 1927, 1001 pp. 3rd ed., 1933, 1084 pp. A basic text.

1292 Hooper, Stanford C., "Keeping the Stars and Stripes in the Ether." Radio Broadcast, 1:127-132, June 1922. Background of the Marconi Companies (British, U.S.) and the negotiations that led to the formation of Radio Corporation of America.

1293 Morecroft, John H., "What Everyone Should Know About Radio History." Radio Broadcast, July, Aug. 1922. Illus.

1294 Yates, Raymond F., and Louis G. Pacent, The Complete Radio Book. New York: P. F. Collier, 1922. (Vol. 17 of the Popular Science Library.) 330 pp., 77 illus., including 17 plates and one folding map. Popular, slightly historical. Chap. 17, pp. 286-315, lists 47 noteworthy persons with brief biographical details. No refs.

1295 Blake, George G., "Historical Notes on Radio Telegraphy and Telephony." Wireless World, 12:253-256, 286-293, 1922.

1296 Lodge, Oliver J., "The Origin or Basis of Wireless Communication." Nature, 111:328-332, March 10, 1923.

1297 Burghard, George E., "Eighteen Years of Amateur Radio." Radio Broadcast, 3:290-298, Aug. 1923. 7 illus. Reminiscences from 1905. Talk presented to the Radio Club of America by the club president.

1298 Elwell, Charles F., The Poulsen Arc Generator. London: Ernest Benn; New York: D. Van Nostrand, 1923. 192 pp., 150 illus. Bibliography, pp. 177-190, 127 entries. Chap. 2, pp. 22-26, History.

1299 Hogan, John V. L., The Outline of Radio. Boston: Little, Brown, 1923. New ed., 1925. 268 pp., 16 plates, 68 illus. Glossary, pp. 233-249. Bibliography, pp. 251-257, gives 10 books with comments, and 7 other items. Chap. 1, pp. 3-25, is a brief historical review. No refs.

1300 de Forest, Lee, "Quarter Century of Radio." Electrical World, 84:579, 580, Sept. 20, 1924.

1301 Elwell, Charles F., "Radio: Its Past, Present, and Future." J. Roy. Soc. Arts, 74:757-769, 1925.

1302 Lodge, Oliver J., Talks About Radio. With Some Pioneering History and Some Hints and Calculations for Radio Amateurs. London: Cassell; New York: George Doran, 1925. 267 pp. Pt. 1, pp. 17-119, on radio in general, is largely historical. A few refs. in the text.

1303 Marconi, Guglielmo, "Radio Dream Come True." Radio News, 11:784, 785, 849, 850, March 1930. 6 photos. Reminiscences from 1901 on long-distance transmission.

1304 Hammond, John H., and Ellison S. Purington, "A History of Some Foundations of Modern Radio-Electronic Technology." Proc. IRE., 45:1191-1208, Sept. 1957. 18 illus., most of them circuits. This important paper reveals early work done at the Hammond laboratory, primarily before and during World War I, most of it related to circuit developments for remote control by radio. Much of the material, from hitherto unpublished sources, concerns torpedoes, triode circuits, intermediate-frequency circuits, and frequency modulation techniques. 92 footnote refs., mainly to U. S. patents. Also, Espenschied, Lloyd, "Discussion of 'A History of Some Foundations of Modern Radio-Electronic Technology.'" Proc. IRE., 47:1253-1268, July 1959. 34

footnote refs. Includes rebuttal, replication and comments, with 35 additional footnotes. These papers contain highly personalized accounts of the background of some key radio researches, up to about 1930. They expose the student to the ramifications of radio-electronic history and provide a variety of valuable data. The contentious climate of the early decades of radio is brought to life by the critic's discursive remarks, 50 of which are dealt with individually in the rebuttal. See also 1346.

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1306 Lodge, Oliver J., "A Retrospect of Wireless Communication." *Sci. Mon.*, 33:512-521, Dec. 1931. Also, *Nature*, 128:591, 592, Oct. 3, 1931. A quick glance at some highlights.

1307 Quäck, Erich, "Ten Years of Transradio--A Retrospect." *Proc. IRE.*, 20:40-61, Jan. 1932. 21 photos, maps and diags., 3 tables. Description of transoceanic radiotelegraph progress on the Berlin-New York circuit and links to other countries, and development of shortwave operation.

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1309 Bragdon, E. L., "Radio's Evolution." *Radio News*, 14:82, 83, 122, Aug. 1932. 10 illus. A brief review of developments over 14 years with mention of some earlier events.

1310 Terman, Frederick E., *Radio Engineering*. New York: McGraw-Hill, 1932. 688 pp. 418 illus., mainly diags. and graphs, 16 tables. 302 footnotes, many multiple entries, including numerous mathematical derivations and supplements to the text. This comprehensive engineering text deals with circuit fundamentals, vacuum tubes, amplifiers, oscillators, detectors, modulation, power sources, transmitters, receivers, antennas, propagation, radio measurements. There are also chapters on special tubes, radio aids to navigation, and sound equipment. A key book of the period.

1311 Ladner, Alan W., and Charles R. Stoner, *Short Wave Wireless Communication Including Ultra-Short Waves*. London: Chapman and Hall; New York: John Wiley, 1932. 2nd ed., 1934, 3rd ed., 1936, 4th ed., 1942. 573 pp., 342 illus., 151 chap. refs. Chap. 2, pp. 8-22, brief history, with chronological table, 42 entries from 1887. A standard text.

1312 DeSoto, Clinton B., *Two Hundred Meters and Down. The Story of Amateur Radio*. West Hartford, Conn.: The American Radio Relay League, 1936. 184 pp. After an introduction of the radio amateur, the book is divided into three parts; pioneers, development and recognition, and international high-frequency communication. There are many names, dates, call numbers, personal references and extracts in the text. No index.

1313 Gernsback, Hugo, "The Old E. I. Co. Days." *RadioCraft*, 9:572-575, 630-640, March 1938. 45 small border illus. On the Electro Importing Company, founded by Gernsback in 1904, and radio history. Picture captions, p. 640.

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1316 Armstrong, Edwin H., "The New Radio Freedom." *J. F.I.*, 232:213-216, Sept. 1941. Historical and philosophical remarks pertaining to FM radio.

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1321 Rettenmeyer, Francis X., "Radio-Electronic Bibliography." *Radio*, 28:37, 38, 40, 42; 38, 40, 42, 44; 44, 46; 44, 46, 48, 50, Feb. to May 1944. 15, Household Receivers, 909 items from 1913. See 93.

1322 Rettenmeyer, Francis X., "Radio-Electronic Bibliography." *Radio*, 28:42, 44, 46, 48, 50, 52, 54, 56, 58, June 1944. 16, Transmitters, 366 items from 1913. See 93.

1323 de Forest, Lee, "Milestones in the Radio Industry." *Radio News*, 32:36, 37, July 1944. 7 illus. Also, Harbord, James G., "Radio Between Two Wars," pp. 39-42. 8 photos.

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1325 Armstrong, Edwin H., "Frequency Modulation--1922 and 1948." *Radio-Craft*, 19:20, 55, June 1948. 2 photos. Comments on the technical outlook of the 1920s and the prospects for FM radio broadcasting and receiver manufacturers.

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1328 Tucker, D. G., "The History of the Homodyne and the Synchrodyne." *J. Brit. IRE.*, 14:143-154, April 1954. Historical review, 62 refs. from 1922.

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Proc. IRE., 3:215-247, Sept. 1915; reprinted Proc. IEEE., 51:1083-1097, Aug. 1963. 26 circuits, graphs and photos. Based on the Electrical World article (1970) this extended paper was presented in New York on March 3, 1915. Includes discussion by de Forest and Armstrong that reveals the contentious atmosphere that perpetually surrounded these men. See: "Scanning the Issue," Proc. IEEE., 51:1082, Aug. 1963, for historical comments; also a letter by Benjamin F. Miessner, Proc. IEEE., 51:1798, Dec. 1963, for further comments on the question of prior invention.

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1346 Miessner, Benjamin F., On the Early History of Radio Guidance. San Francisco: San Francisco Press, 1964. 86 pp., 22 illus., mostly of notebook entries and letters. App. 1, pp. 63-80, two excerpts from the appeal brief in the Splitdorf case. App. 2, pp. 81-84, typescript on "selective transmitter-receiver unit." A personal story of the inventor's work on remote control and early electron-tube circuits, particularly from 1912 to 1916, with much information concerning radio litigation, patents, priorities, and personalities. Numerous extracts from correspondence in the text. See 1304.

1347 Armstrong, Edwin H., "A Study of Heterodyne Amplification by the Electron Relay." Proc. IRE., 5:145163, April 1917.

1348 Hull, Albert W., "The Dynatron--A Vacuum Tube Possessing Negative Electrical Resistance." Proc. IRE., 6:5-35, Feb. 1918; Wireless World, 6:148, 1918.

1349 Armstrong, Edwin H., "A New Method for the Reception of Weak Signals at Short Wave Lengths." Proc. Radio Club of America, pp. 1-6, Dec. 1919. 6 diags.. including two with a list of components and values for practical construction. This pioneer paper on the superheterodyne was presented in New York on Dec. 3, 1919. Also, "A New System of Short Wave Amplification," Proc. IRE., 9:3-27, Feb. 1921. 6 diags.

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1351 Coursey, Philip R., Telephony Without Wires, pp. 367-396. The list of references has 197 entries containing one or more patents. See 1283.

1352 Houck, Harry W., "The Armstrong Super-Autodyne Amplifier." Radio Amateur News, 1:403-405, 439; 469-471, 508-510, Feb., March, 1920. 16 illus. First publication giving constructional details of the new superheterodyne receiver. F. Circuits and Patents from 1921

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1354 Scott-Taggart, John, Thermionic Tubes in Radio Telegraphy and Telephony. There are numerous patent references in the text and footnotes. See 979.

1355 Armstrong, Edwin H., "Some Recent Developments of Regenerative Circuits." Proc. IRE., 10:244, Aug. 1922; "The Super-Regenerative Circuit," Proc. Radio Club of America, June 1922; "The Armstrong Super-Regenerative Circuit," Radio News, 4:239, 395, Aug. 1922. Photo of apparatus and 3 diags. Also Wireless World, 11:234, 1922.

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1357 Kesler, Charles H., "Famous Radio Patents." Radio Broadcast, 2:407-413, March 1923. 4 illus. On the de Forest and Armstrong regenerative circuits.

1358 Hazeltine, Louis A., "Tuned Radio-Frequency Amplification with Neutralization of Capacity Coupling." Proc. Radio Club of America, March 1923. Paper presented in New York, on March 2, on the Neutrodyne circuit (patented Aug. 1919), first used in the Navy SE-1420 radio receiver.

1359 Hazeltine, Louis A., "The Neutrodyne Receiver," Radio News, 4:1949, 2052, May 1923. 3 illus.

1360 Stark, Kimball H.. "The 'Neutrodyne' Receiving System. Radio Broadcast, 3:38-41, May 1923. 6 illus.

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1362 Armstrong, Edwin H. . "Improvements on the SuperHeterodyne Receiver." Radio News, 5:1576, May 1924. 2 diags., 2 photos. Brief account of a talk given by Armstrong. The full paper was published in October, see 1366.

1363 Brady, John B.. "The Vacuum Tube Patent Situation." Radio News, 5:1573, 1678-1685, May 1924. 3 diags.

1364 Arvin, W. B., "De Forest Now Controls Regeneration Patents, Radio News, 6:41, 129, 131, 132, July 1924. 2 illus. of original feedback circuits.

1365 Armstrong. Edwin H., "The Story of the Super-Heterodyne. Radio Broadcast, 5:198-207, July 1924. Its origin, developments and some recent improvements. 14 illus. of early receivers and circuits. Also, Proc. Radio Club of America, Feb, 1924.

1366 Armstrong. Edwin H., "The Super-Heterodyne--Its Origin, Development, and Some Recent Improvements." Proc. IRE., 12:539-552, Oct. 1924. Presented in New York, March 5, 1924. 13 illus. of early receivers and circuits.

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1368 Brady, John B., "Regeneration and the Patent Situation." Radio News, 6:1424, 1545-1550, Feb. 1925. 15 illus. On the regenerative circuits of von Lieben, Armstrong, de Forest and others, and companies and litigation.

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1370 May, Myra. "From Figures to Fame." Radio Broadcast, 7:451-457, Aug. 1925. 5 illus. On Louis A. Hazeltine and his Neutrodyne receiver.

1371 Morse, A. H., Radio: Beam and Broadcast. Its Story and Patents. The text, or abstracts, and numerous diagrams from 21 basic patents are included in the App., pp. 101-186. Other patent numbers and references are given in the main text or in footnotes. See 1192.

1372 Tyne, Gerald F. J., "The Saga of the Vacuum Tube." Many refs. relate to electron tube and circuit patents, mostly up to the mid-1920s. English translations not given. Many patent diagrams are also shown. See 949.

1373 Schottky, Walter, "On the Origin of the Super-Heterodyne Method." Proc. IRE., 14:695-698, Oct. 1926. 11 refs. to patents and papers from 1913. Historical note on technical matters related to the writer's early work and the Armstrong superheterodyne receiver.

1374 Flam, John, "The Maze of Radio Patents," Radio, 8:41, 42, 70, 72, Dec. 1926. Discussion of tuned radio-frequency, grid leak, regeneration, superheterodyne, vacuum tube and other patents.

1375 Information on U.S. Radio Patents and Suits, New York: Radio Manufacturers Assoc., 1926. 175 pp.

1376 Wright, Milton, "Successful Inventors--X." Sci. Am., 137:328, 329, Oct. 1927. On Louis A. Hazeltine and his Neutrodyne radio circuit. 4 illus.

1377 Blake, George G., History of Radio Telegraphy and Telephony. Reference list, pp. 353-403, contains numerous American, British and German patents among the 1125 entries. See 1193.

1378 Cocking, W. T., "The Evolution of the Superhet." Wireless World, 32:182, 183, March 1933. A brief review of progress over the last ten years.

1379 Guy, R. F., "FM and UHF. A Revealing Study of Its Early History, Present Uses, and Future Applications." Communications, 23:30, 32, 34-36, 79, 84, 85, Aug. 1943.

1380 Howe, G. W.O.. "Early Radio Inventions: The Work of de Forest and Armstrong." Wireless Engineer. 20:521-523, Nov. 1943.

1381 McNicol, Donald, Radio's Conquest of Space. Patents are referred to in footnotes and in the text. See 1211.

1382 Armstrong, Edwin H.. "A Study of the Operating Characteristics of the Ratio Detector and Its Place in Radio History." Proc. Radio Club of America, 25:3-20, Nov. 1948. 13 circuit diags., 2 graphs, 5 waveform pictures, 3 tables. 4 Apps., on limiter circuits, disclosure of the regenerative circuit early in 1914, demonstration ratio detector circuit, and relevant RCA documents. This important paper by the inventor of wide-band FM critically appraises limiting circuits and also covers much history from the early years. 22 footnotes.

1383 Maclaurin, William R., Invention and Innovation in the Radio Industry. App. 2, pp. 269-291, contains 16 separate tables that summarize patent data, particularly litigation, with names of inventors and companies, patent numbers, dates, disposition of suits and related matter. The extensive footnotes include many items on patents. See 1212.

1384 Armstrong, Edwin H., "Some Recent Developments in the Multiplexed Transmission of Frequency Modulated Broadcast Signals." Proc. Radio Club of America. 30:3-13, Oct. 1953. 5 circuit diags., 4 photos of equipment and a view of the antenna tower and station KE2XCC (formerly W2XMN) at Alpine, N. J. A historical survey from 1906 is followed by detailed

discussion of the system problem, the receiver problem and field tests. A one-page appendix gives particulars of the demonstrations at Pupin Hall, Columbia University, October 13, 1953. 11 footnotes.

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1386 Sturmey, S. G., *The Economic Development of Radio*. Patents, licenses and related material are included in this survey of the British radio industry. See 1420.

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1394 Smith-Rose, Reginald L., and R. H. Barfield, *A Discussion of the Practical Systems of Direction Finding by Reception*. London: H. M. S. O.. 1923, Radio Research Board, Special Report No. 1.

1395 Engel, F.H., and Francis W. Dunmore, "A Directive Type of Radio Beacon and Its Application to Navigation." Washington: National Bureau of Standards, 1923. Scientific Paper No. 460.

1396 Dellinger, John H., and Haraden Pratt, "Development of Radio Aids to Air Navigation." *Proc. IRE.*, 16: 890-920, July 1928. 19 photos and diags. Development by Bureau of Standards of a radio beacon system (A-N radio range). 12 refs. from 1919.

1397 Joliffe, Charles B., and Elizabeth M. Zandonini, "Bibliography on Aircraft Radio." Proc. IRE., 16: 985-999, July 1928. Over 250 refs. from 1910 in 8 groups: including history, navigational aids, beacon systems and direction finders.

1398 Smith-Rose, Reginald L., "Radio Direction-Finding by Transmission and Reception: with Particular Reference to Its Application to Marine Navigation." Proc. IRE. 17:425-478, March 1929. A report on contemporary work with historical background. Over 100 refs. from 1907.

1399 Dellinger, John H., Harry Diamond, and Francis W. Dunmore, "Development of the Visual-Type Airway Radio Beacon." Proc. IRE., 18:796-839, May 1930. Summary of radio range development. 23 photos and diags. Bibliography, 33 items from 1907.

1400 Diamond, Harry, and Francis W. Dunmore, "A Radio Beacon and Receiving System for Blind Landing of Aircraft." Proc. IRE 19:585-626, April 1931. 34 illus., 11 footnote refs.

1401 Tuska, Clarence D., "Radio in Navigation," J.F.I. 228:433-443, 581-603, Oct., Nov. 1939. 8 diags.. 2 maps. Early history, technical characteristics of directional radio, direction finders, automatic radio bearing indicators, radio beacons. 94 refs. from 1888, including 45 patents.

1402 Rettenmeyer, Francis X.. "Radio-Electronic Bibliography." Radio, pp. 37-40, 44-46, May 1942. 1, Aviation Radio, 340 items in 8 groups, mainly from 1938. See 93.

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1408 Diamond, Harry, "Radio Aids to Aviation." Radio Engineering Handbook (1950), pp. 1068-1158. 40 diags., 3 tables. Description of U.S. government and commercial facilities and various navigational systems under general headings; radial, hyperbolic, circular, instrument landing, and integrated systems for traffic control, also radio altimeters and airborne installations. refs. to books, papers and technical publications. Also "Aircraft Radio" in previous eds. See 58.

1409 Briggs, Lyman J., "Early Work of the National Bureau of Standards." Sci. Mon., 73:166-173, Sept. 1951. 7 illus. Includes aircraft radio range, blind landing guidance, the proximity fuse.

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1411 Howeth, Linwood S.. History of Communications Electronics in the United States Navy. Several chapters on aircraft radio and the radio direction finder. See 305.

1412 Colin, Robert L., "Otto Scheller and the Invention and Applications of the Radio-Range Principle." Elect. Comm., 40:359-368, 1965. 2 diags. from German patents of 1907 and 1916. 21 refs. H. The Radio Industry See Sect. 3G for industrial histories, especially 336343; Sects. 5C, 5D, for company histories; Chap. 6 for broadcasting companies, especially 573, 576, 582, 593, 630, 642. Particulars of early commercial wireless telegraph companies are contained in 1263, various years. See also 1194, 1200, 1201, 1211, 1212.

1413 U.S. . Federal Trade Commission, Report on the Radio Industry. Washington: G. P. O., 1924. 347 pp. Development of the industry, patent agreements, practices concerning manufacture, sale and use of products. Much on RCA.

1414 Jome, Hiram L., Economics of the Radio Industry. Chicago: A. W. Shaw, 1925. 332 pp. Diags., tables. charts, map. Inventions, legal problems, growth, production and marketing.

1415 The Radio Industry. The Story of Its Development. As told by leaders of the industry to the students of the graduate school of business administration, George F. Baker Foundation, Harvard University. Chicago and New York: A. W. Shaw. 1928, 330 pp. Text of 11 lectures covering various aspects of radio: historical technical, legal, merchandising, advertising. A broad record of contemporary status to 1927, with light technical treatment and great emphasis on American radio. 29 illus. showing sales literature of the early 1920s. No refs.

1416 RCA . "The Radio Industry." The Development of American Industries. 1st ed., pp. 763-800. Early history, status in 1912, high-power stations, rise of radio telephony and broadcasting, status in 1919, radio patent conflicts, development of broadcasting after 1921, American short-wave experiments, facsimile. RCA licenses, broadcast transmitter infringements. 4th ed., pp. 768-801, "The Radio and Television Industry," has additional material on research and development and the growth of television. See 337.

1417 Archer, Gleason L., Big Business and Radio, New York: The American Historical Company, 1939. 503 pp., 21 plates. A business history of the radio industry in the United States. There are frequent and extensive quotes from company records, agreements, contracts, licenses, court records, FCC testimony and correspondence of prominent people. The first 250 pages portray events from 1922 to 1925; the next 100 pages bring the story up to 1930. There are chapters on radio and talking pictures, radio and the industrial depression, radio broadcasting of today, television and facsimile with some history. Nontechnical. 80 footnote refs. A companion book to the author's History of Radio to 1926. See 1194.

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1419 Batcher, Ralph R., "Radio Industry Marks TwentyFifth Anniversary." Tele-Tech, 8:34-37, May 1949.

1420 Sturme, S. G.. The Economic Development of Radio, London: Gerald Duckworth, 1958. 284 pp. 37 footnotes, 7 tables. List of company titles (50), pp. 12, 13. A thorough study of inventions, innovations, companies and group activities in the British radio industry, marine and long-distance communications, broadcasting, development of radio valves, patents, wire relays. Much of historical interest, with many useful references to items in trade and technical magazines, government reports and newspapers. 346 chap. refs. Proc. Roy. Soc., 171(A): 27-38, May 1, 1939.

1435 Scaff, J. H., and Russell S. Ohl, "Development of Silicon Crystal Rectifiers for Microwave Radar Receivers." B.S.T. J., 26:1-30, Jan. 1947. 18 diags., graphs, charts and photos, 2 tables. Point contact rectifiers, early microwave research, cartridge assemblies, shielded structures, types, applications, operating characteristics. 8 footnotes.

1436 Torrey, Henry C., and Charles A. Whitmer, Crystal Rectifiers. M. I. T. Rad. Lab. Series, Vol. 15, 1948. 443 pp., 215 photos, diags., graphs, 22 tables. Introduction, general properties, the crystal converter, special types, including fabrication, testing, applications. 290 footnotes and refs. See 798. B. Transistors and Diodes from 1948 The references given in 1444, 1461, 1465, 1467, 1468, 1475, are particularly useful guides to specific topics.

1437 Bardeen, John, and Walter H. Brattain, "The Transistor, a Semi-conducting Triode." Phys. Rev., 74: 230, 231, July 15, 1948. 2 illus., 4 footnotes. Letter announcing the transistor. See also pp. 231-233.

1438 [Bell Laboratories]. "The Transistor." Bell Lab. Rec., 26:321-324, Aug. 1948.

1439 Fink, Donald G., and Frank H. Rockett, "The Transistor--A Crystal Triode." Electronics, 21:68-71, Sept. 1948. 4 illus.

1440 Rockett, Frank H., "The Transistor." Sci. Am. 179:52-55, Sept. 1948. 6 photos. Introduction to the germanium point contact transistor.

1441 Becker, Joseph A., and John N. Shive, "The Transistor--A New Semiconductor Amplifier." Elect. Eng. 68:215-221, March 1949 12 diags. and graphs, 3 tables. Description of "the newly discovered device, the transistor." Construction, characteristics, performance, limitations, temperature effects. 9 refs. from 1947.

Abbreviations

App.	Appendix
Chap.	Chapter
c.	circa (about)
comp.	compile
diags.	diagrams
ed.	editor, edition
engrs.	engravings
G. P. O.	Government Printing Office
H. M. S. O.	Her (His) Majesty's Stationery Office
illus.	illustrated, illustrations
No.	Number
NS	New Series
pp.	pages
Pt.	Part
port.	portrait
refs.	references
rev.	revised
Sect.	Section
Ser.	Series
Supp.	Supplement
trans.	translator, translated
Vol.	Volume

Serial publications and journals referenced in the bibliography.

Am. J. Phys. American Journal of Physics. New York: American Institute of Physics, 1933.

Am. J. Sci. American Journal of Science. New Haven, Conn., 1818. From 1820 to 1879, American Journal of Science and Arts (Silliman's Journal...).

Ann. Am. Acad. Annals of the American Academy of Political and Social Science. Philadelphia, 1890.

Ann. of Sci. Annals of Science. A quarterly review of the history of science and technology since the Renaissance. London, 1936.

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