CHAPTER XVII

WHO'S WHO IN RADIO

RADIO has had its heroes, its romances, and its masterful pieces of research like all of the other great American industries. Many different workers have made valuable contributions to the art and not a few have died unsung and unhonored. The authors have decided that this chapter shall not only give honor where honor is due, but shall also give the reader a glimpse into the lives of those men of our own country who have devoted themselves to what promises to be the greatest American institution.

E. F. W. ALEXANDERSON

E. F. W. Alexanderson is the inventor of the famous Alexanderson alternator. In developing this machine Mr. Alexanderson successfully overcame one of the most perplexing problems of radio engineering. The Alexanderson alternator is now used in most of the transoceanic radio stations. Mr. Alexanderson is also the inventor of the magnetic amplifier, which has made many things possible. His contributions to radio literature have been of the most important nature. He now occupies the post of chief engineer of the Radio Corporation of America.

He was born in Upsala, Sweden, in 1878, and was

educated at the University of Lund, Sweden, and at the Royal Institute of Technology, Stockholm.

EDWIN H. ARMSTRONG

Edwin H. Armstrong is one of the outstanding figures in radio. He is the inventor of the Armstrong regenerative circuit, which has been the most important development since De Forest added the third element to the vacuum tube. He served two years in the American Expeditionary Force in France as captain and as major in the signal corps and as technical chief of the radio laboratories; and he was made a chevalier of the Legion of Honor. He is a member and director of the Institute of Radio Engineers and consulting radio engineer and co-worker of Professor M. Pupin in the Hartley Research Laboratory at Columbia University. He was born in 1890 and holds the degree of electrical engineer from Columbia University, which he received in 1913.

M. C. BATSEL

From 1915 to 1917 M. C. Batsel was engaged in very important research work, making measurements in capacity and inductance for the United States bureau of standards at Washington. He also did important work in the study of alternating current phenomena for the bureau. From 1917 to 1920 development work in connection with vacuum tube receiving and transmitting apparatus occupied his time. This was done for the army signal corps. He is at present designing engineer

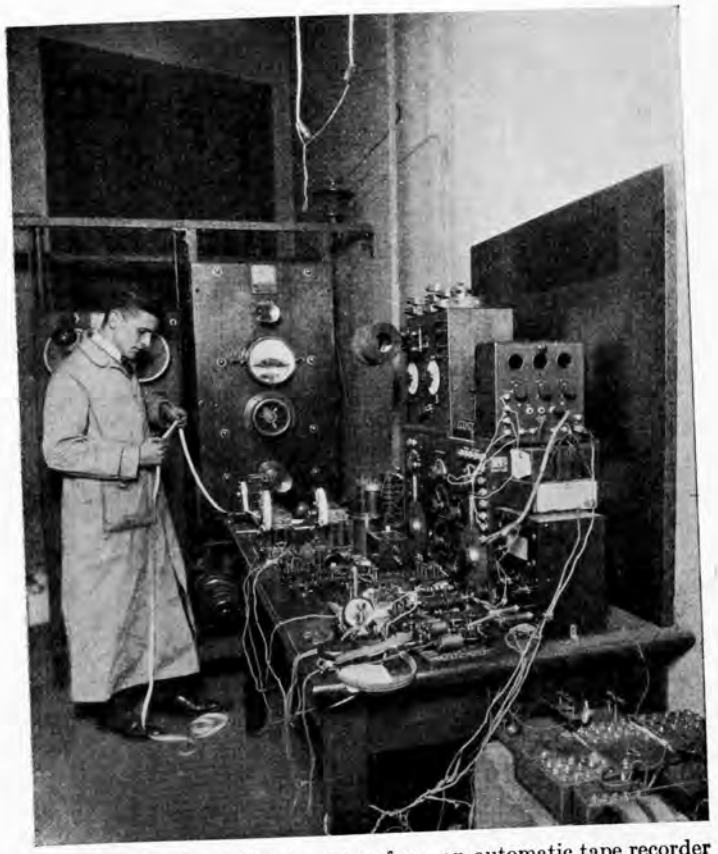
of receiving apparatus for the Westinghouse Electric & Manufacturing Co.

ELMER E. BUCHER

Elmer E. Bucher has had rich experience in the wireless field. He joined the De Forest Wireless Telegraph Co. as experimental engineer in 1903. In 1907 he joined the Wireless Telegraph Co. as installation and experimental engineer. He was the first to interest the Young Men's Christian Association in the teaching of radio. He joined the Marconi Wireless Telegraph Co. of America in 1912 as instructing engineer, and later he became director of the Marconi Institute, which he organized. He is the author of many books relating to wireless and is the holder of many patents pertaining to the art. He was technical editor of "Wireless Age" during the period from 1913 to 1918. He was born at Akron, Ohio, in 1885 and was educated at an academy in Oberlin, Ohio. At present he is sales manager of the Radio Corporation of America.

REAR-ADMIRAL W. H. G. BULLARD, U. S. N.

Rear-Admiral W. H. G. Bullard is a specialist in electrical engineering. He was the first superintendent of the Naval Radio Service, 1912–16; delegate plenipotentiary of the United States at the international conference for the safety of life at sea, London, November, 1913; in charge, on behalf of the United States navy, of the radio operations contained in the series of experiments carried out between the Eiffel Tower and



W. G. H. Finch reading the news from an automatic tape recorder which he developed for newspaper work

Arlington to determine longitude by means of wireless telegraphy. He was born in 1866 in the State of Pennsylvania and was graduated from the United States Naval Academy in 1886.

PROFESSOR E. L. CHAFFEE

Professor E. L. Chaffee has conducted courses in physics and radio telegraphy at Harvard, and has engaged in research and consultation work in radio telegraphy. He is the author of a number of papers dealing with electric oscillations and their analysis, etc. During the war he was engaged in developing radio apparatus with which he experimented in France in 1918. He was born in 1885 at Somerville, Massachusetts, and was graduated from the Massachusetts Institute of Technology with the degree of bachelor of science in electrical engineering in 1907. He was awarded the degree of master of arts in physics by Harvard University in 1908, and the degree of doctor of philosophy in 1911.

GEORGE H. CLARK

George H. Clark was one of the early workers in wireless. He was first in the employ of the Stone Telephone & Telegraph Co., for which he worked as a collaborator of Professor John Stone. He entered the employ of the Navy Department at Washington in 1908, where he was made general technical supervisor of naval projects and installations. He also prepared specifications for standard apparatus. He joined the

Radio Corporation of America in 1919. He was born in 1881, and was graduated from Massachusetts Institute of Technology as an electrical engineer in 1903.

LOUIS COHEN

Louis Cohen was on the scientific staff of the bureau of standards, 1905–09, and was chief of the research department of the National Electric Signaling Co., 1910–12. He has been in consulting practice since 1912 and is professor of electrical engineering in George Washington University. He is especially interested in electrical oscillations. He is the author of numerous papers dealing with the problems of wireless telegraphy and other kindred subjects. He was born in 1876 and was educated at the Armour Institute of Technology, the University of Chicago, and Columbia University.

FRANK CONRAD

Frank Conrad joined the Westinghouse Electric & Manufacturing Co. while a mere boy. His constant association with the trained technical men under whom he worked and his insatiable appetite for knowledge soon made him an engineer of high standing. He went into radio as a hobby and soon became one of the country's foremost experts. He did valuable work during the war in designing a combination transmitting and receiving set for the United States signal corps, and he also developed an extremely small but practical wave-meter. Mr. Conrad is one of the pioneers of broadcasting. It was he who coöperated with Rypinski

in establishing the first successful broadcasting station at Pittsburg. Conrad attacked and solved many of the technical problems that had to do with broadcasting and receiving. He is responsible for the design of all Westinghouse receivers and is the inventor of numerous devices. At present he is with the Westinghouse Electric & Manufacturing Co.

RAY CUMMINGS

Ray Cummings was at one time expert radio aide at the Navy Department, Washington. From 1917 to 1919 he was in charge of the design of spark transmitters for ship use at the bureau of steam engineering, Washington. From 1919 to 1921 he was in charge of arc, spark, and vacuum tube transmitter development and design in the laboratory of the navy yard at Washington. At present he is in the vacuum tube transmitter section of the radio engineering department of the General Electric Co. at Schenectady. He was born in 1891 at Lancaster, Pennsylvania, and received the degree of electrical engineer from Columbia University in 1907.

DR. LEE DE FOREST

Before Dr. Lee De Forest added the third element to the vacuum tube, this device was little more than an improvisation. Dr. De Forest's radio career has been an eventful one. As early as the summer of 1901 he undertook to report by radio the international yacht-races off Sandy Hook. He was the first to use the alternating current generator and transformer instead of the

induction-coil and unsatisfactory interrupter. In 1905 he designed and equipped the first long-distance navy wireless stations at Key West and Colon. During the year 1906 he developed the three-electrode vacuum tube, which put wireless development ahead fifty years at a single stroke. The addition of this third element or grid had a profound effect upon the wireless art. He was born in 1873 at Council Bluffs, Iowa, and in 1906 received from the Sheffield Scientific School of Yale University the degree of doctor of philosophy. The degree of doctor of science was conferred by Syracuse University in 1919. He was awarded the cross of the Legion of Honor in recognition of services rendered France by the three-element vacuum tube during the war. He received a gold medal and diploma at the St. Louis Exposition in 1904, and likewise at the Panama-Pacific Exposition at San Francisco in 1915. He is at present engaged in commercial research work in Berlin, Germany.

GEORGE SCARLETT DE SOUSA

George Scarlett De Sousa is both a technician and a man with sound business judgment—a rare combination. He entered the employ of the old Marconi Wireless Telegraph Co. of America in 1904, when the industry was in its infancy. He served as traffic manager of this organization from 1910 to 1918, when he became treasurer of the Radio Corporation of America, which absorbed the old company. He was born in 1884. He is a member of the Institute of Radio Engineers.

WILLIAM DUBILIER

William Dubilier is a consulting engineer and inventor who has devoted much time to wireless telegraph, telephone, and high-frequency experiments. Since 1904 he has been a consulting radio engineer and principal of the Dubilier Electrical Syndicate, Ltd., London, England, and of the Dubilier Condenser Co., New York. He is inventor of the Dubilier mica condenser, and has obtained more than 150 patents and applications for wireless apparatus. He was born in 1888, and is now president of the Dubilier Condenser Co.

LIEUTENANT WILLIAM A. EATON

Lieutenant William A. Eaton's radio work began in the United States navy in 1904. He assisted in the installation of the famous Arlington radio station at Arlington, Virginia. In 1914 he was assistant to Dr. L. W. Austin at the naval radio laboratory, bureau of standards. He developed there the capacitive back-coupling circuit for producing regenerative oscillations with the vacuum tube detector. He also developed other improvements in vacuum tube circuits which were put into use by the navy. From 1916 to 1921 he was in charge of the radio testing shop at the Washington Navy Yard. Here he developed the Eaton uni-wave key for arc transmitters. At present he is radio officer of the experimental radio battle-ship *Ohio*. He was born at Kanning, Kings County, Nova Scotia, in 1883, and was graduated from the Bliss Electrical School at Washington in 1903.

LLOYD ESPENSCHIED

Lloyd Espenschied began his career as a radio amateur and later was a radio operator at sea. He studied at Pratt Institute and after graduating became assistant engineer of the Telefunken Wireless Telegraph Co. of America. He later came to the engineering staff of the American Telephone & Telegraph Co., specializing in radio. He participated in long-distance wireless telephone experiments in 1915 as the engineer who did the receiving at Hawaii in the Hawaii-Arlington radiophone transmission tests. Mr. Espenschied has made a special study of radio wire carrier transmission. His contributions to the radio art are substantial and numerous. A great many patents bear his name.

REGINALD AUBREY FESSENDEN

Reginald Aubrey Fessenden was inspecting engineer to the Edison Co. at New York in 1886. He took up teaching work and conducted classes in physics and electrical engineering at Western University in 1892, became professor of electrical engineering at Western University, Philadelphia, 1893, and became special agent to the United States weather bureau in 1900. He has devoted much attention to a system of wireless telegraphy known by his name, and has also carried out important experiments in wireless telephony. He has been a contributor of articles on wireless telegraphy and telephony to many technical journals. He was born at Milton, Canada, in 1866, and was educated at New York and at Port Hope, Canada.

DR. ALFRED NORTON GOLDSMITH

Dr. Alfred Norton Goldsmith's name has been linked with radio for a number of years. A record of his research work would fill volumes. His scientific career began as tutor in physics at the College of the City of New York. He later was made instructor, assistant professor, and associate professor of electrical engineering. Subsequently he became a consulting engineer for the Atlantic Communication Co. and the General Electric Co. The Marconi Wireless Co. afterward engaged him as director of research; and he now holds the same post with the Radio Corporation of America. He is a fellow of the American Institute of Electrical Engineers, American Physical Society, and Institute of Radio Engineers, and a member of the American Association for the Advancement of Science. He has made valuable contributions to radio telegraphy and telephony, photo-physics, precision measurements, and the transmission of canal rays through thin partitions. He received the degree of bachelor of science from the College of the City of New York in 1907, and that of doctor of philosophy from Columbia University in 1911.

JOHN HAYS HAMMOND, JR.

John Hays Hammond, Jr., is a master of the subject of radiodynamics, or the control of distant mechanisms by radio impulses. His system of radio control was used in the test with the battle-ship *Iowa*. He has

invented a radio-controlled torpedo for coast defense and many other radio devices. Mr. Hammond is also the author of many books and articles on this subject. He was born in San Francisco, and was graduated from the Yale University Sheffield Scientific School in 1910. He received the degree of doctor of science at the George Washington University in 1919.

EARL C. HANSON

Earl C. Hanson is a young man with a long list of radio inventions to his credit. His research work began when he was a mere boy. This was in the early days of radio, when, as Mr. Hanson says, "one stayed up all night listening to arc-lights and other strays." Probably Mr. Hanson's greatest and most important invention is the piloting cable used in guiding vessels and aëroplanes through fogs. This is described elsewhere in this book. In an effort to help his mother, who was afflicted with subnormal hearing, Mr. Hanson developed what he later called the Vactuphone, wherein a vacuum tube plays an important part. The Vactuphone is now in wide use. Mr. Hanson was one of the first men to experiment with radio telephoning from a moving train. He is the inventor of a long wave radio system, and of a vacuum tube electrotherapeutic device that was developed in collaboration with Wendell L. Carlson. An underground radio system has also been developed by Mr. Hanson. He was educated at St. Andrews College, Toronto, Canada.

L. A. HAZELTINE

Although trained for mechanical engineering, L. A. Hazeltine is now professor of electrical engineering in the Stevens Institute of Technology at Hoboken, New Jersey. Professor Hazeltine is recognized as one of the foremost authorities on vacuum tubes and their various uses. In 1917 he read a paper before the Institute of Radio Engineers which for the first time gave in English the general mathematical theory of oscillating vacuum tube circuits. He served during the war as consulting engineer of the radio laboratory of the Washington Navy Yard. He there designed a number of very successful receiving outfits for naval use. He has had taken out several patents covering improvements in radio apparatus. He was graduated from the Stevens Institute of Technology in 1906 with the degree of master of engineering.

RAYMOND E. HEISING

In 1915 the powerful government radio station at Arlington, Virginia, was used in a series of epoch-making experiments. The human voice was carried on the wings of radio from Arlington to Honolulu. The scientific world stood aghast. The apparatus used was designed, developed, and operated by Raymond E. Heising, who was then a man of twenty-six. He later developed and designed the radio system used in the signal corps aëroplane sets during the war. He also designed the submarine chaser sets, which so many landlubbers were called upon to operate.

Heising is a patentee with many important radio inventions to his credit. His research work and papers on modulation in radio telephony are looked upon as the most important contributions to this phase of the art. In 1921 Mr. Heising was awarded the Morris Liebmann prize by the Institute of Radio Engineers.

Mr. Heising was born in 1888 at Albert Lea, Minnesota, and was educated as an electrical engineer at the University of North Dakota. He is now connected with the research department of the Western Electric Co.

JOHN V. L. HOGAN

John V. L. Hogan began his wireless career as chief laboratory assistant to Dr. Lee De Forest, who was at that time in the midst of his work of developing the grid vacuum tube receiver. Mr. Hogan, as a colleague of Dr. De Forest, participated in the direction and operation of the first radiophone broadcasting station over which bulletins and music were transmitted on daily programs. He later served as telegraph superintendent of the National Electric Signaling Co., and afterward as chief of the operation, inspection, and erection department. He served in the capacity of chief research engineer with the International Radio Telegraph Co. He was later made manager with executive supervision over the design, manufacture, and sales operations of the company. Mr. Hogan holds the rights to various United States and foreign patents of importance which have to do with radio

telephone and telegraph apparatus. He is the author of many books and articles on the subject of radio science. He is past president of the Institute of Radio Engineers, and is connected with many other scientific societies. He was born in Philadelphia and was graduated from the Sheffield Scientific School of Yale University.

COMMANDER STANFORD C. HOOPER

Commander Stanford C. Hooper is in charge of radio material, construction, supply, and development in the bureau of steam engineering attached to the United States navy. He began his career as telegraph operator for the Southern Pacific Co., afterwards going to the Postal Telegraph Co. He entered the naval academy at Annapolis, Maryland, on September 6, 1901, where he was graduated on January 31, 1905. He served as midshipman on the cruiser *Chicago*, the destroyer *Perry*, and the monitor *Wyoming*. He became ensign in 1907, lieutenant in 1910, lieutenant-commander in 1915, and commander in 1918. He was instructor in electrical engineering, physics, and chemistry at the United States Naval Academy in 1910–11, and fleet radio officer of the Atlantic fleet in 1912–13, taking part in the capture of Vera Cruz, Mexico. Early in the war he acted as observer in Europe. He was in charge of the radio division, bureau of steam engineering, Navy Department, 1915–17. After commanding the destroyer *Fairfax* in the Atlantic during the war he returned to take up duties in the Navy Department

in 1918. He was born in 1884 at Cloton, California, and was educated at San Bernadino.

ALBERT W. HULL

Albert W. Hull is master of the vacuum tube. He is the inventor of the dynatron and the magnatron, vacuum tube devices used in radio. The research work of Mr. Hull has greatly multiplied the use of pure electron discharges. He is the author of a number of important papers on the subject of X-rays and electron tubes. A modest, hard-working research engineer, he has been with the General Electric Co. since 1914. Before that time he was instructor in physics at Worcester Polytechnic Institute.

Mr. Hull was born at Southington, Connecticut, in 1880. He received the degree of bachelor of arts at Yale University in 1915 and the degree of doctor of philosophy in 1909.

LESTER L. JONES

Lester L. Jones studied two years in Switzerland and Germany. He was a test engineer with the Wireless Improvement Co. in 1913, inspector of radio materials at the Brooklyn Navy Yard in 1914, and then expert radio aide, for testing, installing, and designing radio transmitting equipment. He was a member of the standardization committee, Institute of Radio Engineers. He installed a high-power arc transmitter at the Guantanamo naval

station in 1915. He was transferred to the Washington Navy Yard for the design and construction of naval receiving equipment during the World War. In 1918 and 1919 he was research assistant to Dr. A. N. Goldsmith, and chief research engineer in the E. J. Simon Organization. In 1919 he devoted a year to public accountancy to broaden his business knowledge. Since then he has been consulting engineer for the Electrose Manufacturing Co., Intercity Radio Co., Dubilier Condenser Co., Pacent Electric Co., Commercial Cable Co., etc. He is president of Danziger-Jones, Incorporated, and a member of the Institute of Radio Engineers. He was born at New York in 1891.

FREDERICK A. KOLSTER

Frederick A. Kolster was assistant to John Stone Stone in 1902–08. He took an active part in wireless engineering up to 1912, joined the scientific staff of the United States bureau of standards in 1912, and has since been closely associated with the radio work of the United States Government. He is the inventor of the direct reading decremeter and other devices. He is a fellow of the Institute of Radio Engineers, and was an attaché to the delegation representing the United States in the London international radio convention in 1912. He is a member of the American Institute of Electrical Engineers and of the Cosmos Club at Washington. He was born in Geneva, Switzerland, in 1883, and was educated at Harvard University.

L. R. KRUMM

L. R. Krumm is a well-known figure in the radio field. He is superintendent of marine installations for the International Radio Telegraph Co. He has been chief radio inspector of the United States Department of Commerce, and during the war served as a lieutenant-colonel in the signal corps, being in charge of all the radio operations of the American Expeditionary Force.

DR. IRVING LANGMUIR

The name of Langmuir will always be associated with the vacuum tube. Dr. Irving Langmuir's pioneer work in electronics led him to form a complete theory of the pure electron discharge. His work made possible the development of many types of vacuum tubes. The vacuum tube was a mysterious device before Langmuir blazed his trail. Before entering the research laboratory of the General Electric Co., where he is now assistant director, Dr. Langmuir was instructor in chemistry in Stevens Institute of Technology at Hoboken, New Jersey. He has been awarded the Nichols Medal by the American Chemical Society, the Highes Medal by the Royal Society of London, the Rumford Medal by the American Academy of Arts and Sciences, and the Faraday Medal by the Faraday Society.

He was born in Brooklyn in 1881, was graduated from Columbia University in 1903 with the degree of metallurgical engineer, and studied three years under Professor Nernst at the University of Goettingen,

from which he received the degree of doctor of philosophy.

JOHN M. MILLER

John M. Miller is a physicist who has devoted his time to research work and the advancement of the radio art. During the years between 1907 and 1919 he was associate physicist and physicist of the United States bureau of standards. His later work was done with the bureau of engineering of the Navy Department. He has published papers on the theory and measurement of antennæ and thermionic vacuum tubes which are regarded as valuable contributions to the science. He was born in 1882 at Hanover, Pennsylvania. He received the degree of bachelor of arts at Yale University in 1904; and the same university made him a master of arts in 1907 and a doctor of philosophy in 1915.

EDWARD J. NALLY

Edward J. Nally is president and director of the Radio Corporation of America and of the Pan-American Wireless Telegraph & Telephone Co. He was a pioneer in different modes of communication in America. He began as a telegraph messenger boy in St. Louis, and later was chief clerk to the superintendent at Minneapolis. He was appointed assistant general superintendent of the Postal Telegraph-Cable Co., at Chicago, in 1890, and served this company for twenty years, being elected first vice-president and general manager at New

York in April, 1907. He left in 1913 to accept the office of vice-president and general manager of the Marconi Wireless Telegraph Co. of America, which he organized for commercial service; and in 1914 he opened a commercial wireless circuit between the United States and Hawaii, which in 1916 was extended to Japan. He was born in Philadelphia in 1859.

M. PAYNE

M. Payne's radio career dates from the year 1902, when he conducted experiments in wireless transmission and reception from an automobile. This was in the days of the Rumkoff coil. Mr. Payne has had wide experience with various types of radio equipment, and operated many of the stations that were famous in the earlier days. He is now associated with the Radio Corporation of America as assistant treasurer.

GREENLEAF WHITTIER PICKARD

Greenleaf Whittier Pickard has made a special study of wireless telegraphy and telephony and has taken out many United States and foreign patents for wireless inventions. He began his radio work at Blue Hill Observatory, Milton, Massachusetts, in 1899 under a grant from the Smithsonian Institution. He became associated with Harry Shoemaker in 1901, and was on the engineering staff of the American Telephone & Telegraph Co., 1902–06. He developed a practical system of radio telephony, obtaining successful speech transmission without wires in 1902. From 1906 until the

present time he has been connected with the Wireless Specialty Apparatus Co. as consulting engineer. He practises extensively as patent expert in wireless patent litigation. He is a fellow of the American Institute of Electrical Engineers, a member of the American Chemical Society, a member of the Society of Chemical Industry, and a member of the Institute of Radio Engineers. He was born at Portland, Maine, in 1877, and was educated at Westbrook Seminary, Lawrence Scientific School, Harvard, and the Massachusetts Institute of Technology.

DR. MICHAEL L. PUPIN

Among Dr. Michael L. Pupin's first original work may be mentioned the development of electrical resonance before the introduction of wireless telegraphy. Patents issued to him on electrical selectivity were licensed to the Marconi Wireless Telegraph Co. in 1903. He has worked extensively in the development of his inventions in connection with telephones and telegraphs, and many of his improvements are known by his name throughout the world. He has been engaged in the development of a new method of electrical selectivity to be used in connection with wireless telegraphy. He has also been engaged in research work in wireless telephony. He was born in Hungary in 1858 and came to the United States in 1874. He studied at Columbia and was graduated in 1883, continuing his studies at Cambridge, England, and at Berlin. He became professor of mathematical physics at Columbia in 1891.

BRIGADIER-GENERAL EDGAR RUSSELL

Brigadier-General Edgar Russell was instructor and assistant professor in the department of chemistry and electricity in the United States Military Academy from 1893 to 1898. He was made chief signal officer of the army, serving in that capacity until 1915. He developed artillery electric fire-control apparatus and portable army radio equipment. He was War Department delegate to the national radio conference of 1912, and was brigadier-general and chief signal officer of the American Expeditionary Force in France from 1917 to 1919, in charge of military telegraph, telephone, and radio work. He is the possessor of the Distinguished Service Medal, is a companion of the British order of the Bath, and commander of the French Legion of Honor. He was born in 1862, and was graduated at the United States Military Academy in 1887. At present he is located at Fort Sill, Oklahoma.

M. C. RYPINSKI

M. C. Rypinski is the man who fathered the first real broadcasting program of the Westinghouse Electric & Manufacturing Co. It was he who saw the vast possibilities of the scheme while working in colloboration with Frank Conrad, another Westinghouse engineer. Mr. Rypinski is a native of Texas, and received his primary and high school education in that state. He was graduated from Rose Polytechnic Institute, Terre Haute, Indiana, in 1897. From college he went to the General Electric Co., where he was soon made assistant

to the chief of the standards laboratory, in which post he had charge of all electrical testing apparatus used in the Schenectady works, including the design, maintenance, and operation of this apparatus, the maintenance of laboratory standards, and the laboratory development of all apparatus of an instrument nature intended for commercial exploitation. He has made a number of inventions applying to electrical measuring instruments both for the General Electric Co. and for the Westinghouse Co. During the war Mr. Rypinski was chairman of the instrument manufacturers' committee and member of the transformer manufacturers' committee, both of which coöperated with the Government in the standardization and supply of electrical apparatus. He has been active in the work of national organizations, such as the National Electric Light Association, American Institute of Electrical Engineers, Illuminating Engineering Society, Electric Power Club, and Associated Manufacturers of Electrical Supplies. He was a charter member of the executive committee which organized the commercial section of the National Electric Light Association. A close student of literature on the subject of electricity and kindred matters, Mr. Rypinski was at one time recognized as one of the leading authorities and lecturers in this country on the subject of color photography and the little known subject of color music.

HARRY SADENWATER

Harry Sadenwater's radio career began in 1908 when he became an amateur operator. After serving for

some time as commercial operator, he became instructor of radio and assistant radio inspector for the United States Department of Commerce. He served in the navy as radio officer from 1917 to 1919. While in the naval aviation service he took part in the development of the naval aircraft radio equipment. This work resulted in the perfection of the first two-way radio telephonic connection between aircraft in flight and shore stations. He was communication officer of the naval seaplane *NC-1* during the first transatlantic flight. He is now in charge of radio field applications for the radio engineering department of the General Electric Co. He was born in 1894 in Brooklyn.

DAVID SARNOFF

If there is one man who understands both the technical and the business sides of radio, that man is David Sarnoff. He began his radio career when little more than a boy, serving as radio operator at ship and shore stations. He was apt at analyzing situations and at laying the foundation for a future in the wireless art. Promotions from operator to chief engineer, assistant traffic manager, contract manager, commercial department manager, and finally to general manager of the Radio Corporation of America, came rapidly. Trained as an electrical engineer at Pratt Institute, and with a rich business experience for a background, Sarnoff is a unique figure in the wireless field. His knowledge of wireless traffic, and his successful management of the problems connected with it, have allowed him to make

valuable contributions to the literature of the subject. He was born in 1891.

MAJOR-GENERAL GEORGE OWEN SQUIER

Major-General George Owen Squier is one of the most prominent figures in radio to-day. His army career began in 1887 when he was assigned to duty at Fort McHenry, Baltimore. A born physicist with a passion for experimenting, he became very friendly with the great scientists, Roland, Remsen, and Newcomb at Johns Hopkins University, and studied under them. There he formed lasting friendships and laid the foundation for his later inventions, which marked him as one of the world's leading investigators. He made noteworthy researches in electrochemical effects due to magnetization, the Sine wave system of telegraphy and ocean cabling, polarizing, photo-chronograph, tree telephony and telegraphy, multiplex telephony, and telegraphy over open circuit bare wires laid in the earth or sea. He is probably best known as the inventor of wired wireless. He represented the War Department as technical adviser of the American delegation at the international conference on electrical communication at Washington in 1920. He represented the Department of State at the sessions of the provisional technical committee of the international conference on electrical communication at Paris in 1921. He was expert assistant to the American commissioners representing the Government of the United States in the conference on the limitation of armament

at Washington in 1921, and was delegate to the international radio telegraph conference at London in 1912. He was awarded the John Scott Legacy medal and the Elliott-Cressen medal, both from Franklyn Institute. He was also awarded the Franklyn medal by the same institute. He was decorated with the insignia of knight commander of the order of St. Michael and St. George, the distinguished service medal of the United States army, and the Italian decoration of commander of the order of the Crown. He was born at Dryden, Michigan, in 1865, and was graduated from the United States Military Academy at West Point in 1887.

A. STEIN, JR.

A. Stein, Jr., associated himself with radio work in 1903, serving until 1910 as radio engineer. He was commercial engineer for the District & Printing Telegraph Co. from 1910 to 1916. He joined the Marconi Wireless Telegraph Co. in 1916, and served as chief engineer and works manager at the works at Roselle Park, New Jersey. At present he is managing engineer of the radio engineering department of the General Electric Co., Schenectady.

JOHN STONE STONE

John Stone Stone was an experimentalist in the research laboratory of the American Bell Telephone Co. in 1890–99 and made investigations of telephones without wires in 1892. He was consulting electrical engineer and expert of the Ladd Wireless Telephone

Syndicate, experimenting on directional signaling, in 1899. He was retained in 1900 by the Stone Wireless Telephone Syndicate, and in 1902, when the Stone Telegraph & Telephone Co. was organized. He is the author of many papers on wireless. He has been granted more than one hundred United States patents in the radio field and a correspondingly large number of foreign patents. He is fellow of the American Academy of Arts and Sciences, fellow of the American Association of Advanced Science, fellow and past president of the Institute of Radio Engineers and member or associate of various other societies. His investigations have been principally directed along the lines of eliminating interference in wireless telegraphy. He studied at Columbia and Johns Hopkins universities

A. HOYT TAYLOR

A. Hoyt Taylor is a physicist and radio expert. He was at one time professor of physics and director of the radio station at the University of North Dakota. He was a lieutenant in the naval reserve in 1917, and was district communication superintendent of the Ninth, Tenth, and Eleventh naval districts. He was transatlantic communication officer in 1917–18, and is now a commander engaged in research and development work in connection with aircraft radio. He is the author of numerous papers on electrical measurements and radio subjects. He was educated at Northwestern University, receiving the degree of doctor of science, and holds the degree of doctor of philosophy

in electrical engineering from the University of Goettingen, Germany.

HAWLEY OTIS TAYLOR

Hawley Otis Taylor is a radio physicist. He was instructor in physics at Cornell University from 1907 to 1913 and later became research physicist for the National Electric Signaling Co. and special adviser to the Submarine Defense Association. He devised signaling methods by means of which enemy scouts could make known their presence. He later investigated means for static reduction and developed an acoustic telephone while serving in the capacity of radio engineer in the signal corps of the army. He became consulting physicist to the United States bureau of standards in 1919. At present he is in charge of the electrical department for the rehabilitation of ex-service men at Franklin Union, Boston. He has made many valuable contributions to the radio art. He was born in 1876 at North Derby, Vermont. He received the degree of bachelor of arts from Cornell University in 1909 and that of doctor of philosophy in 1913.

WILLIS H. TAYLOR

Willis H. Taylor is both a capable radio engineer and a patent lawyer, having ably defended several very important patents. He served two years with the American Expeditionary Force in France as captain and chief of the radio division of the signal corps, and cited for exceptionally meritorious service. He was

born in 1894 and received the degree of mechanical engineer from Stevens Institute of Technology in 1915.

NIKOLA TESLA

Nikola Tesla is one of the foremost of the world's electricians. He was graduated from Karlstadt in 1873. He devoted study to electrical investigations, and went to the Polytechnic School at Gratz, where he prepared for work as a professor of mathematics and physics. He visited America in 1882, when he captured the attention of the whole world with his fascinating experiments on high-frequency electric currents. Since 1890 he has devoted himself to studies of alternating currents of high frequency and very high potentials. He was born at Smiljan, Sika, Dalmatia, in 1857.

A. VAN DYKE

A. Van Dyke entered the radio field in the earlier days, making his début in 1911. He performed a great deal of important research work for the National Electric Signaling Co., which was at one time a very important factor in the wireless field. He also did important research work on high tension currents for the Western Electric Co., after which he served as an instructor in engineering at the Carnegie Institute of Technology at Pittsburg. Mr. Van Dyke is now in charge of the development and design of radio receiving apparatus in the General Electric Co. laboratories. He was graduated from Yale University in 1911 as an electrical engineer.

ROY A. WEAGANT

Roy A. Weagant studied physics under Sir Ernest Rutherford and first became interested in radio through witnessing some of his experiments with Hertzian waves. He gained engineering experience with the Montreal Light, Heat & Power Co., the Westinghouse Electric & Manufacturing Co., and the De Laval Steam Turbine Co. He took up commercial wireless work in 1908, and entered the service of the Marconi Wireless Telegraph Co. of America in 1912, where he soon rose to the position of chief engineer. He is a fellow of the Institute of Radio Engineers and a former member of its board of directors and standardization committee. He is the inventor of a novel method of eliminating static interference. He was born at Morrisburg, Ontario, Canada, and was educated at Stanstead College, Stanstead, Quebec, and at McGill University, Montreal. He was graduated in 1905 as an electrical engineer. At present he is an engineer with the Radio Corporation of America.

W. C. WHITE

There are very few men in this country who really understand vacuum tubes. W. C. White is one of them. Nine years of his life have been devoted to the development, design, and engineering of vacuum tubes in the laboratories of the General Electric Co. A number of very valuable patents have been issued in his name. The work of Mr. White is well known in

the radio field and he has earned for himself an enviable reputation.

Mr. White was born in Brooklyn in 1890. He received the degree of electrical engineer from Columbia University in the class of 1912.