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THE FIRST CENTURY
WIRELESS AND AMATEUR RADIO HISTORY

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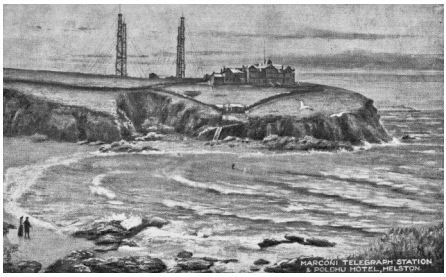
Marconi In the Short Wave Era

Guglielmo Marconi achieved many "firsts" during his career as physicist and world esteemed inventor extraordinaire. The conduct of the *first* two-way wireless message exchange between the United States and Europe was accomplished from the major Marconi station, CC, erected at South Wellfleet, Massachusetts. This particular achievement in early 1903 received great notoriety. But, contrary to popular belief, this station at Cape Cod was not the very *first* Marconi wireless installation in the United States. And, this was not the *first* and only impressive demonstration of the character of electromagnetic waves, which substantiated Marconi's theory that they were not affected by the curvature of the earth. As early as 1898, seeking to establish credibility of his theories, Marconi conducted several successful transmissions over the horizon, including one to a station near Paris from an English station at Dover—the *first* international wireless exchange. The investors in the Marconi enterprise were believers, but also were eager to see returns on their investments. To generate revenues from message traffic and inbound vessel sightings, the Marconi group established the *Lizard Wireless Telegraphy Station*, with the call sign LD, on the cliffs above Housel Bay, in Cornwall. LD, along with seven other similar stations on the British coast, enabled ships at sea to communicate with each other and with the shore for the *first* time, utilizing leased Marconi equipment and operators. This now commercial endeavor was expanded through the establishment of a larger scale principal station, call sign ZZ, at Poldhu, Cornwall in 1901 some ten miles from LD.

Simultaneously, applying the same concept of ship to shore spark gap transmission, in August 1901 the Marconi interests began operating a station on Nantucket Island, off the coast of Massachusetts. This station, using the call sign MSC, communicated with the Nantucket Shoals lightship 50 miles southeast and with vessels sailing the Atlantic route. MSC was constructed by the *New York Herald* newspaper and was equipped and staffed under contract with Marconi. Essentially, this was not a Marconi-owned station. Shortly thereafter, in 1902, The Marconi Wireless Telegraph Company of America began operating a wholly-owned station at Babylon, Long Island, New York, which exchanged traffic with vessels at sea. However, again this was not the *first* Marconi establishment in the United States—actually it was the second.



Artist's depiction of Marconi's early Poldhu Station.

Although his short range demonstration transmissions in Europe had begun to dispel skepticism, Marconi's "space telegraph" was still considered a novelty in the United States, and was not well recognized. In the late summer of 1899, Marconi set up a temporary receiving station at a lighthouse on the New Jersey shore and equipped the yacht *PONCE* with a com-

Site of the 1899 America's Cup competition.

plete station from which to report the conduct of the America's Cup yacht race. The competition was held in lower New York harbor off Sandy Hook.

Marconi's reporting of the September race between the yachts *Columbia* and *Shamrock* created a sensation. With yachtsman-like precision, Marconi keyed over 1,200 messages describing the event moment-by-moment. A waiting audience of newspapers across the United States and Canada were linked to the lighthouse stations by telegraph. Wireless had come to America for the *first* time and received exceptional positive publicity!

Marconi continued working in the United States. Over the next eighteen years he and his colleagues established phenomenal transoceanic stations on both coasts and in Hawaii. These stations maintained regular communications with Europe and Japan, and were links in the wireless chain which was envisioned to gird the globe. However, the First World War intervened and forever changed the nature of the presence of the Marconi Wireless Telegraph of America, in America.

RCA logo.

Nationalism prevailed in the United States. In the interest of enforcing American neutrality during the growing European conflict, President Woodrow Wilson issued a 1914 executive order imposing strict controls on radio stations, which American Marconi unsuccessfully challenged in court. After the United States entered the war in 1917, the government ordered most civilian radio stations to cease operating. The United States Navy assumed control of most radio operations during the war, and appropriated most of the Marconi interests. Following the conclusion of the war, the government, led by the Navy, pressured Marconi to transfer its American interests to a domestic owner. In 1919 the American Marconi interests were purchased by General Electric and absorbed into its newly formed and patriotically named subsidiary, Radio Corporation of America (RCA). Essentially, RCA was created by the amalgamation of the General

Cancelled American Marconi stock certificate.

Electric Company and the Marconi Wireless Telegraph Company of America. The transaction was effected by an intricate exchange of preferred stocks, and cross-licensing agreements. All nine of the Marconi radio installations in the United States—Massachusetts, New Jersey, California and Hawaii—were transitioned to RCA.

A key precipitator of the structure of this transaction was the fact that General Electric was the exclusive manufacturer of the Alexanderson alternator, an advanced high-technology, very low frequency (VLF), continuous wave transmitter. The much sought-after machine was then considered the ultimate in wireless transmission, for a time superseding the less efficient long wave spark gap

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transmitters. With the sanction of the Navy, a 50 kilowatt version of the Alexanderson apparatus was installed at the Marconi New Brunswick, New Jersey station in 1918. This resulted in excellent transoceanic service. The Marconi interests were anxious to obtain a license to purchase additional Alexanderson units. However, the Navy, citing national security considerations, resolved that alternators built in the United States could be used solely by domestic wireless entities. Accordingly, they promoted the amalgamation which produced the "all American" affiliation, RCA. Ultimately, RCA installed over twelve of these enormous and complex units.

Shortly afterward, the Radio Corporation purchased the International Radio Telegraph Company, owned by The Westinghouse Electric & Manufacturing Company, which in turn had licensing agreements with the Western Electric Company. Consequently, after negotiating a series of cross-licensing agreements, corporate rivals General Electric and Westinghouse became corporate partners in RCA. The Radio Corporation was now not only the sole radio telegraph entity in the United States but a significant factor worldwide. In November of 1921, RCA added a stupendous link to its worldwide wireless network, the Long Island, New York *Radio Central* station—the largest private radio facility ever built. *Radio Central*'s objective was to establish a worldwide communications network independent of the British Marconi *Imperial Wireless System.*

The enormity of the *Radio Central* project defied imagination at the time of its conception in 1920, as it does today, even when compared to mysterious modern military complexes and experiments. The facility was designed to utilize ten Alexanderson alternators. Huge "multiple tuned" antennas were required to radiate the VLF transmissions generated by these alternators. Accordingly, a ten square mile tract of land was purchased on the north shore of Long Island, near the island's eastern tip.

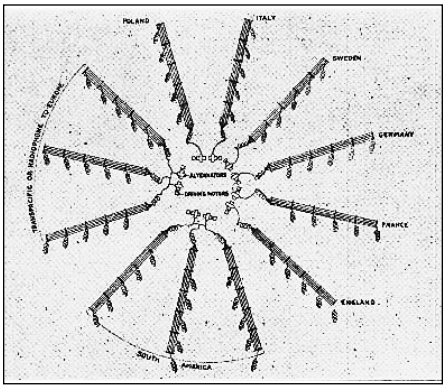
Five complete transmitter arrangements were planned to be in simultaneous duplex

Early RCA stock certificate.

communication with stations in Europe and South America. The antennas were to be supported by twelve 450-feet-high towers with 150-foot cross bars situated in a star pattern with the headquarters building and power station at the center. Each of the twelve arms of the system was to consist of six towers, 1,260 feet apart, extending on a radius of two and one-half miles.

The remote receiving station was located sixteen miles to the south at Riverhead, New York. Four receivers were placed in service. The principal receiving antenna, called a "wave" type, ran for an amazing nine miles, supported 30 feet off the ground by telephone poles to conform to the 14,000-16,000 meter transmissions it was intended to receive from the stations at Wales, Norway, Sweden, Germany and France.

Just as quickly as it was progressing from concept to full reality, aspects of *Radio Central* were overtaken by the rapid advance of technology. No sooner had two Alexanderson alternators been placed into service and two of the eight spokes of the antenna system completed than the entire design was rendered obsolete. The alternator concept was superseded by the advent of vacuum tube technology and the use of short wavelengths for communications, as advanced by British Marconi. The demise of the alternator was marked with its final use at low power to drive valve transmitters. Vacuum tube transmitters, amplifiers and receivers became increasingly more sophisticated and quickly became dominant as the apparatus of the period. Until it was gradually abandoned in the 1970s, *Radio*

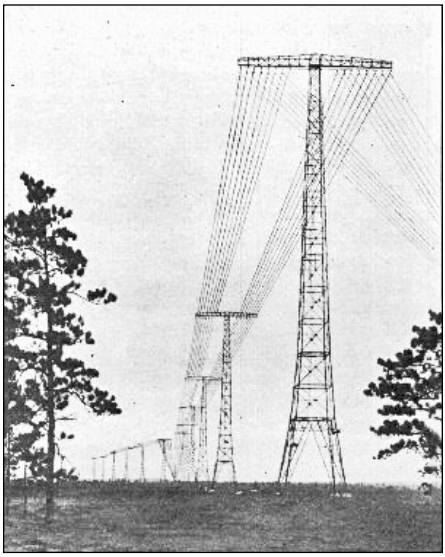


Schematic diagram of the planned Radio Central antenna system.

Central, WQK/WSS was the world's foremost shortwave station, renowned as it could be heard from any place on earth at any time of day.

The gigantic facility gradually diminished in size and was finally closed when communications technology progressed to the use of satellites, digital modes and fiber optic undersea cables. During its lifetime the scientists and engineers of *Radio Central* were at the forefront of communications technology entering the shortwave era and beyond. Many technological advancements can be attributed to their research and application including: the Beverage antenna concepts, high power vacuum tubes, single side band, frequency shift keying, radiophoto and facsimile, VHF and UHF television transmission, and the comprehension of the effects of sun spots on wave propagation.

There is much chronology and performance history to debate here. Which entities, and there were others, developed innovations perfected by whom. Marconi scientists, led by Marconi himself, achieved enormous leaps in basic technology. The Marconi interests, with many titles in individual countries, led the way through the most romantic period of radio—the short wave era of 1920 to roughly the end of WWII. During this period the Marconi Wireless Telegraph Companies continually upgraded a world-spanning global network



Two of the immense antennae at Radio Central.

which became to be known as the *Imperial Wireless System*. The Marconi institution was dedicated to scientific research and engineering excellence. Their application of advanced physics to engineering, and their leader's personal inventive genius and tireless quest for knowledge and advancement of the wireless realm, moved radio technology forward at a stunning pace. Beam tuning (selective) receivers and transmitters, the triode valve, the use of high frequency low wavelength transmissions, effective directional antennas, tropospheric scatter

Classic Marconi valves.

transmission, microwave communication, radar and other innovative technological leaps maintained the Marconi interests as world communications leaders.

Although there were divergences, the short wave era saw the world's giant communications companies grow enormously. But, like everything to do with radio, new discoveries and demands drew them into allied fields. These departures became their primary endeavors as the short wave era faded. Broadcast radio, television, defense and avionic electronics, and manufacturing are what these companies are known for today. Looking back we can envision the excitement of the time of their early development – the short wave era and the glow of the valves which were its hallmark.

SILENT KEYS

We record the passing of the following AWA member with deep regret.

LLOYD L. JURY

Longtime AWA member Lloyd L. Jury passed away on August 15, 2020 of natural causes at the age of 94. He was born in Canton, Ohio on May 7, 1926. He served in the Army Air Corps as a B17 ball turret gunner during WWII.

Following WWII, Lloyd was employed as a radio and television repairman at Eshelman Supply Co. and later as an electronic technician at Electronic Test Equipment Manufacturing Co. He was a member of the Antique Wireless Association for more than 50 years, and belonged to the Radio Club of America, the Tube Collectors Association and the Lancaster County Historical Society. Lloyd enjoyed making displays and won several AWA contest awards. At one time Lloyd had a remarkable collection of broadcast and early wireless equipment, early tubes and a reference library. He was a regular participant in the AWA annual convention. Over the years, Lloyd mentored several young collectors and introduced them to the AWA.

Lloyd was preceded in death by Ellen, his beloved wife of 57 years, his parents, a brother and a grandson. He is survived by his twin brother, Floyd, four daughters, a son, seven grandchildren and three great-grandchildren. He will be deeply missed.

This issue's submission was prepared by AWA Member Robert Millard. Please submit all information about members who have become Silent Keys to David D. Kaiser, Editor, 375 Yarmouth Road, Rochester, NY 14610, e-mail: awajournaleditor@antiquewireless.org. Silent Key notifications must confirm the person's death by one of the following means: a letter from a family member, a copy of a newspaper obituary notice, a copy of a death certificate, a letter from the family lawyer or the executor or mail returned by the U.S. Postal Service marked "Deceased."