

DESIGN NOTES

A Bit of Radio History—

The 1928 Third Edition of *Practical Radio* by Moyer & Wostrel has an interesting Appendix that lists early milestones in the history of radio, including some that are rarely mentioned in other historical notes. Here are some highlights of that Appendix:

1831—Faraday discovered electromagnetic induction between two entirely separate circuits.

1838—Steinheil discovered the use of the earth return.

1840—Henry first produced high-frequency electric oscillations and pointed out that the discharge of a condenser is oscillatory.

1842—Morse made wireless experiments by electric conduction through water.

1845—Lindsay made experiments in transmitting messages across the River Tay without wires, using the water as a conductor.

1862—Heyworth patented a method of conveying electric signals without the intervention of any continuous artificial conductor.

1867—Maxwell read a paper before the Royal Society in which he laid down the theory of electromagnetism, which was developed fully in 1873 in his great treatise on electricity and magnetism.

1879—Hughes discovered the phenomenon on which depend the action of the coherer, which was later used by Marconi.

1880—Prof. John Trowbridge of Harvard found that signaling might be carried out over considerable distances by electric conduction through the earth or water without metallic connection.

1882—Experiments with Trowbridge's method by Alexander Graham Bell on the Potomac River resulted in the detection of signals at a distance of 1-1/2 miles.

1882—Prof. Dolbear of Tufts was awarded a US Patent for a wireless transmitting apparatus that appears to be a predecessor to that used by Marconi.

1885—Edison and colleagues worked out a system of communications between railway stations and moving trains by means of induction. His patent on the method (issued in 1891) was later purchased by the Marconi Wireless Telegraph Company.

1887—Hertz showed that electromagnetic waves are in complete accordance with the waves of light and heat, founding the theory upon which all modern radio signal devices are based.

1892—Branley devised an appliance for detecting electromagnetic waves, known as the coherer.

1896—Marconi's first patent application was lodged. That year, he conducted experiments that successfully communicated over a distance of 1-3/4 miles.

1897—Through this year, Marconi demonstrated communication at increasing distances, up to 18 miles.

1898—Events of the Kingstown regatta in Dublin were reported by wireless for the Dublin newspaper from the steamer *Flying Huntress*.

1899—Three British warships interchanged messages at distances up to 74 nautical miles [85 mi.].

1901—The letter *S* was received by Marconi at St. Johns, Newfoundland, sent from Poldhu, England.

1901—Fessenden applied for his first patent for improved wireless apparatus, "...relating more especially to the transmission and reproduction of words or other audible signals."

1902—The first wireless message was transmitted across the Atlantic, dispatched from Cape Breton station to King Edward VII.

Wireless communication is firmly established by this time. We continue with only technical developments noted in the Appendix:

1906—DeForest is granted a patent for a vacuum rectifier, commercially known as the audion. General Dunwoody (USA) discovered the rectifying properties of carborundum crystals. Pickard discovered the similar properties of silicon crystals.

1908—Prof. Fessenden reported successful wireless telephonic communication over a distance of 600 miles.

1912—Kolster (Bureau of Standards) invented the decremeter, which is used to make direct measurements of wave length and logarithmic decrement.

1914—Armstrong was issued a patent covering the regenerative circuit, also called the feed-back and the self-hetrodyne circuit.

1916—The determination of the difference in longitude between Paris and Washington using radio was completed, with the result, in terms of time, being 5 hours, 17 minutes, 35.67 seconds.

1921—Amateur radio operators achieve the first transatlantic communication on short wave lengths.

1922—Armstrong is granted a patent for the super-regenerative circuit.

1924—A wireless lighthouse is set up on an island in the Firth of Forth. Wireless waves are concentrated by reflectors into a beam that can be sent 100 miles, giving ships their position in a fog.

1926—Advances in transmission of pictures continue, and commercial pictogram services begin.

1926—Experiments are successful at synchronizing two or more stations on the same wavelength, for simultaneous operation without interference.

1927—An experimental station at Bell Laboratories makes a successful television demonstration.