

Book Review by the Antique Wireless Association by Eric Wenaas

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Before We Went Wireless: David Edward Hughes FRS His Life, Inventions and Discoveries (1829-1900)

Ivor Hughes and David Ellis Evans

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400 pages; 7"x10"

The title *Before We Went Wireless* is apropos for a book which chronicles the discoveries of Professor David Edward Hughes, FRS,* most of which were related to telegraphy and telephony by wire which predated Hertz's discovery of electromagnetic radiation in 1888. However, from my viewpoint, the most important and interesting part of this book is Chapter 9 in which author Ivor Hughes (no relation to David Hughes) skillfully relates how Professor Hughes became the first ever to transmit *and* receive electromagnetic signals though the ether over distances approaching 500 yards in 1879—predating Hertz's discovery of electromagnetic waves by nine years!

The author ably describes how Hughes's work in telephony by wire led to his discovery of wireless communication, and also how Hughes was dissuaded from presenting his discovery to a meeting of the Royal Society of London in 1880 by Sir George Stokes. Had he presented his work to the Royal Society as he originally planned, the unit of radio frequency would undoubtedly now be "hughes" rather than "hertz." Hughes's decision not to publish his work represents the greatest missed opportunity in the history of electricity and magnetism.

The book begins with several chapters describing David Hughes's roots in North Wales, his birth circa 1829, and his concert tours as a child prodigy playing the harp—first in the UK and later the US. His family settled in Virginia where Hughes's interest in science and experimentation emerged during his teens. While on a family trip through Mississippi in his late teens he was first exposed to the telegraph, then a new invention sweeping the country. He immediately saw the shortcoming of the Morse register or sounder which required the deciphering of code, and conceived of a revolutionary new type of printing telegraph instrument capable of transmitting letters of the alphabet by pushing on keys marked with letters, much like a typewriter, while simultaneously receiving and printing letters to form words, thus obviating the need for the operator to decipher code.

The next few chapters consist of a riveting account of how Hughes developed his concept into a working prototype and then struggled to have his new machine adopted in the US, only to be edged out by competing systems. In this endeavor, he encountered corporate intrigue, entrenched interests, feuding cable companies, infringers, greed and betrayal by associates. Learning from his experience in the US, David Hughes journeyed to Europe where he successfully introduced his system, first in France and then in many other countries, making it the international standard on the continent, if not in the UK. As a result, he achieved both fame and fortune as a respected inventor and experimenter, even though he was never formally trained as a scientist or theoretician.

Chapters seven and eight describe how Hughes discovered the microphone in 1878. His earliest devices consisted of loose contacts formed by crossed French nails, then metal filings, and finally carbon granules. Variations of these devices would become the detectors he used to receive electromagnetic radiation the following year. The publication of Hughes's work on microphones resulted in an imbroglio with Thomas Edison who accused Hughes of stealing his discovery in the popular press of both the US and UK. In the end, Hughes was vindicated and there was no doubt, at least in Europe, about who had invented the carbon microphone, a version of which was almost universally adopted as the transmitter of choice for telephones. His further researches into reducing noise on telephone lines using another one of his discoveries, the induction balance, ultimately led him to his last and greatest discovery—the wireless transmission and reception of signals though the ether.

This book was clearly written with attention to detail, relying almost wholly on original sources which are cited in the extensive Notes section at the end of the book. While researching this book, Ivor Hughes travelled far and wide—for example, walking the dusty red earth lanes of Buckingham, Virginia where a century before David Hughes farmed and played music with his family as a youth. Ivor also walked Great Portland Street in London imagining David Hughes walking a century before with his first-of-a-kind wireless receiver listening to emissions from the spark-gap transmitter in his home laboratory. While in London, Ivor visited the Science Museum of London where he examined and photographed many of the artifacts that David Hughes used in his experiments, a number of which are beautifully reproduced in the book. He also reviewed many of Hughes's notebooks containing detailed of his experiments, excerpts of which are sprinkled about the book.

The book ends by pointing out that David Edward Hughes never received the acknowledgements that were well deserved for his great accomplishments, an omission that this book is intended to redress. For those interested in the technical details of how Hughes's telegraph keyboard machines worked, the three appendices following the twelve chapters of text will be a welcome supplement. This is one fine book—a “must-read” for anyone who wants to know how wireless transmission and reception of a series of dots (each evocative of the letter “e”) was first achieved, documented, and disclosed to prominent members of the Royal Society of London in 1879.

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