

North Carolina and the Birth of Radio Broadcasting

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In December 2006 the world will mark the one hundredth anniversary of radio broadcasting. When that happens, many people will learn about the remarkable—but almost forgotten—inventor behind the first broadcast. And they will learn that he did some of his most important work in North Carolina.

On December 24, 1906, Reginald Aubrey Fessenden (1866–1932) stepped up to a microphone in a makeshift studio at his experimental radio station in Brant Rock, Massachusetts. He introduced himself to an invisible audience he could only hope was tuning in. During the next half hour or so, he achieved a series of “firsts” that have been repeated many times since. Because he played phonograph records during his program, Fessenden was the first disk jockey. He became the first live musical artist, too, as he played the violin and sang songs. Finally, Fessenden read a few words from the Bible and wished his listeners a Merry Christmas, so he was the first religious broadcaster, as well. On New Year’s Eve, he staged a similar performance. To Fessenden’s relief, letters from stunned listeners arrived a few days later, some from as far away as the Caribbean.



Born in Canada, radio pioneer Reginald Fessenden is buried in Bermuda. Part of his memorial stone reads, “By his genius distant lands converse and men sail unafraid upon the deep.” *Image courtesy of the State Archives, North Carolina Office of Archives and History.*

Fessenden’s connection with North Carolina had begun a few years earlier. In 1898, three years after the invention of the wireless telegraph, he began investigating radio in his spare time. He was then a professor at Western University in Pennsylvania. But he started working full-time with radio in the southeastern United States. In January 1900 the U.S. Weather Bureau hired Fessenden to solve one of its most serious problems. To improve the accuracy of its weather forecasts, the agency needed instant communication with remote observation stations on islands and ships. Telegraph and telephone wires could not easily reach these stations.

In recruiting Fessenden to use radio to overcome this challenge, the Weather Bureau made a huge gamble. As a technology, radio was in its toddler stage. It could transmit and receive only telegraph messages, and it was unreliable. Yet only radio offered the promise of reaching across expanses of water. Thus, the Weather Bureau sent Fessenden and two assistants to build wireless stations on islands off the coasts of Maryland, Virginia, and North Carolina. These would be among the first radio stations in the world

and the first government-owned stations in the United States.



The Institute of Radio Engineers in 1921 awarded this medal to Reginald Fessenden for his pioneering work in radio communication. Fessenden received many honors, including induction into both the National Inventors Hall of Fame and the Radio Pioneers Hall of Fame. He held more than two hundred patents, including a version of microfilm, an early kind of sonar, and an automatic garage door opener. *Image courtesy of the North Carolina Museum of History.*

“detector,” to receive radio waves and turn them back into sound. The transmitter would generate smooth, spark-free waves that would “carry” speech and music. Fessenden called it a “high-frequency alternator.” In many ways the transmitter resembled the alternator that powers electrical devices in a modern car.

Fessenden christened his new detector, which resembled an overstuffed light bulb, the liquid barretter. Surprisingly, although he designed it to receive voice messages, the barretter turned out to be a superb receiver of telegraph messages, as well. Plus, it was relatively cheap and simple to build. Soon radio stations worldwide began using the device. The audience that heard Fessenden’s 1906 Christmas Eve broadcast used liquid barretters.

The high-frequency alternator, however, was complex and difficult to build. For several years it existed only

Fessenden and his men spent the first few months on tiny Cobb Island, on the Maryland side of the Potomac River. On December 23, 1900, he used a modified wireless telegraph to try to transmit speech to a station a mile away. Transmission was successful, he reported later, but the speech “was accompanied by an extremely loud and disagreeable noise.” Still, this was the first instance of radio waves carrying a human voice.

A few weeks later, Fessenden and his crew left Cobb Island and moved to Manteo, on North Carolina’s Roanoke Island. There he set up a permanent station: a beach shack that held a laboratory and electrical equipment. Outside, a few feet from the shack, an antenna stood fifty feet high. Fessenden began to think about a solution to the “loud and disagreeable noise” that had spoiled his Cobb Island experiment. In 1901 the wireless telegraph used electric sparks to send messages. He realized that sparks were like the lightning storms that still can ruin reception of AM radio programs today. Fessenden decided to invent a new system that did not use sparks. He imagined a revolutionary transmitter that would send speech by radio waves. He also imagined a new



Reginald Fessenden owned this Waltham chronometer. In 1943 his widow presented it to the USS Fessenden, a World War II destroyer later decommissioned. *Image courtesy of the North Carolina Museum of History.*

in Fessenden's imagination. In 1901 he wrote a letter from his Manteo station to the General Electric Company in Philadelphia, asking the firm to construct a high-frequency alternator. Initially, GE's engineers could not figure out how to do it. Fessenden persisted. Together he and they slowly fixed most of the problems. He originally wanted to use his alternator in North Carolina, but in late 1902, he resigned from the Weather Bureau to start his own company in Massachusetts. When GE delivered the first working high-frequency alternators in 1905, he lived in that state. One of these machines

introduced broadcasting to the world a year later.



Reginald Fessenden (center) and some of his assistants and supporters at his Brant Rock, Massachusetts, experimental station. *Image courtesy of the State Archives, North Carolina Office of Archives and History.*

Today no radio transmitter uses high-frequency alternators. The liquid barretter went out of style a few years after Fessenden invented it. But virtually all modern radio—indeed, all modern electronic communication—is based on Fessenden's concept of the sparkless "continuous wave." Yes, other devices have replaced the high-frequency alternator, but only ones that have made generating a continuous wave easier, cheaper, or more reliable. And Reginald Fessenden thought of the continuous wave when he was living on the

Outer Banks of North Carolina.

**At the time of this article's publication, Dr. Gary L. Frost worked as an independent historian who recently completed a temporary faculty appointment in history at the University of Auburn. He has written two master's theses on Reginald Fessenden's radio work, as well as a journal article for Technology and Culture on the inventor's work with underwater communications technology.*