

By Vic Curtis, WA3YUV

Fessenden Lost and Found

When you think of the pioneers of radiotelephony, what names come to mind? The first on your list should be a person whose name you probably won't recognize—Reginald Fessenden.

I became aware of Reginald Aubrey Fessenden thanks to a special event operation sponsored by the Southern Maryland Amateur Radio Club (see the sidebar, "Radio's First Voice—the 100th Anniversary"). The club was invited to set up their station at the Vickers House on Cobb Island, Maryland (now the home of the Chapman family) where Fessenden made radio history with the first voice transmissions.

The year 2000 marked the 100th anniversary of Fessenden's remarkable achievement, and to commemorate the occasion I decided to research the history of the first wireless voice communication. I thought it would be a 10-minute read through an encyclopedia, but I quickly found myself immersed in a fascinating (and often entertaining!) story. Fessenden's tale is one of secrecy, presidents and sea captains. It also includes an anecdote about how his progress was almost scuttled by the power of Limburger cheese. More on that later.

"Reg"

Reginald Fessenden, or Reg as his friends called him, was born October 6, 1866 in Knowlton, Quebec, Canada. By the age of 21 he was working with the likes of Thomas Edison and other visionaries. He later experimented extensively with radiotelegraphy at Western University (now the University of Pittsburgh). Although he never did graduate from a university, his work at Purdue and Pittsburgh earned him the title of "professor."

From his earliest years as an inventor, Fessenden was obsessed with the idea that voices could be transmitted and received by radio. Conceiving such an idea was one thing; making it a reality was quite another.

A Radio Pioneer

It was a different world for the radio



experimenters in 1899. RadioShack was still decades in the future and tiny, solid-state transceivers with digital signal processing could not even be imagined. At the turn of the 20th century, you made your own radio components by hand.

Even in those early days, Fessenden was already ahead of his time. He had decided that the spark-gap transmitters were inadequate for the transmission of voice. He reasoned that he needed a *continuous wave* of radio energy to carry his voice, like the ripples in a pond after a rock is thrown in. In fact, Fessenden gave us the term "continuous wave," later abbreviated "CW."

The spark transmitters of the time were damped-wave types. The short bursts of energy provided by these transmitters were good enough for the buzzes and clicks of Morse code, but not terribly useful if your goal was to sing a Christmas carol or play the violin over the air.

Reg felt that it might be possible to generate something close to a continuous

wave if the transmitters could produce about 10,000 bursts per second. (This was like asking a car to do 150 miles per gallon today.) A fellow by the name of Kintner, an assistant who was working with Reg at the time, was given the task of designing such a transmitter. Another gentleman named Brashear, an optician by trade, became an RF technician and was assigned to build the interrupter. The working prototype was in Reg's hands by early 1900. It needed only to be tested in a practical application.

Cobb Island

The US Weather Bureau was interested in using radio to relay observations, but the range was not yet great enough to be practical. They contacted Fessenden and asked if he could perfect long-range radiotelegraphy equipment for them. Willis Moore, the Chief of the US Weather Bureau, asked Fessenden to write a proposal. Reg drafted the proposal and it was accepted.

Fessenden was given the job of extending the reach of radiotelegraphy for the princely sum of \$1.50 an hour or \$3000 a year. That was an excellent wage in 1900. His assistants would receive 60 cents an hour or \$1200 per year.

Reg asked another assistant, Frank Very, to join his team. Frank accepted and suggested that they might use the Vickers house at Cobb Island on the Potomac River as their headquarters. (Frank Very's sister lived on the island.) They thought it would be a good site far from prying eyes.

Perfecting Telegraphy or Telephony?

The Weather Bureau wanted to send Morse messages back and forth to ships at sea and other remote locations. That was fine, but Reg was more interested in continuing his voice transmission work—especially since he already had what he

believed to be a working transmitter.

The Bureau assigned Alfred Thiessen to help with the radiotelegraphy experiments. When Thiessen learned of Fessenden's ambition to send audio over the airwaves, he was captivated. Fortunately, Thiessen was discreet in his reports to the Bureau, and for good reason. If word had reached the Bureau that Fessenden was working on telephony, he would have been fired immediately. Willis Moore was quoted as saying, "We want nothing to do with that sort of quackery. My superiors would laugh me right out of the Bureau, right out of the country if they found me wasting the taxpayers' money on such tomfoolery."

Fessenden did indeed improve on the radiotelegraphy system as promised, even

though his evening hours were spent pursuing telephony. The progress in radiotelegraphy wasn't wasted. In fact, Reg and his assistants worked diligently at extending the distances covered for radio transmissions of all types. For example, Fessenden developed a detector that greatly improved the sensitivity of receivers. He called his detector a *barretter*, which means "exchanger" in French. He named it so because the barretter "exchanged" the RF energy to audio that he could hear in his headphones.

The letters that Very sent home describe some of the Cobb Island work. In May 1900 he wrote, "I am studying the entire subject of wireless telegraphy. A good deal of the writing of the record will perhaps fall to me, and I must do it intel-

ligently. The ideas are novel, and the whole thing is very interesting." In August of 1900 he writes, "My part of the work has been largely the construction of apparatus. I have been winding a great many coils of wire of different lengths and diameters; some of these are found to work better than others. The results can be partly explained by theory, but there are some things whose meaning we do not yet know, and shall be able to explain in time if we keep on experimenting."

December 1900

The date is December the 23, 1900. Reginald Fessenden is on Cobb Island. Alfred Thiessen is one mile away. Reg fires up the steam engine to run the generator and checks the connections to his

Radio's First Voice—the 100th Anniversary

On December 23, 1900, from Cobb Island, the small isolated island in the Potomac River at the southern tip of Maryland, Professor Reginald Fessenden made history when he used a modified spark gap radio to transmit the first words over the air.

Many know the achievements of Marconi, but very few heard of Reginald Fessenden. Nevertheless, efforts by Southern Maryland Amateurs to recognize and preserve Fessenden's contributions to the origins of voice communications have been ongoing for more than a decade.

On December 1, 1990, members of the Southern Maryland Amateur Radio Club (SMARC) operated a 90th anniversary commemorative station in the historic Vickers House, Fessenden's Cobb Island laboratory and the site of the first voice transmission. Ten years later, while the world was preparing for global meltdown from the Y2K bug, SMARC and the Charles County Amateur Radio Club (CCARC) planned a unique collaborative commemorative effort. To recreate the event, each club operated unique special event stations located as close as possible to the original sites where Fessenden and Thiessen conducted their experimental telephony transmissions. With the flip of a coin, SMARC would set up at the Vickers House using W3F and CCARC would set up at the Cobb Island Community Center using W3T (setting up at Neale Sound, the actual location of Alfred

Thiessen's receiving station, was rather impractical).

Over the next few months CCARC and SMARC planned different aspects of the "Radio's First Voice" operation. Historical research was conducted at the Library of Congress, with local and county historical societies, on the Internet, and the most important source, information gathered over many years by Joanne Chapman, the current owner and resident of the Vickers House. We soon nailed down the technical requirements for establishing dual HF stations one mile apart from each other as well as the operating frequencies, times, modes, special postal cancellation stamps and participation certificates. Distinctive QSL cards were designed to tell the history of the event while uniquely identifying each station. The activity managers and public information officers sent press releases to QST, local radio stations, television stations, and newspapers.

After a hardy breakfast on Saturday, December 16, a caravan of antennae vehicles worked its way to the southern tip of Maryland. We were grateful to find a well-maintained bridge onto the island, something that didn't exist in 1900. The weather cooperated by being rainy, damp, windy and cold. (Amateurs can't put up towers or antennas in nice weather. I believe that is a subset of Murphy's Law.) Slingshots in hand,



Here's most of the gang in the Cobb Island Community Center. From left to right: Lee Flick, N3YWZ; Ben Flick; Frank Carson, N3OCW; Jim Gormley, N3SFY; Vic Curtis, WA3YUV; Art Audley, AA3RT; Allen Stevenson, KA3ZPA; John Foote, KB3EHK; Greg Jones, K3GJ and Bob Martin, W3LZX (seated).



Frank, N3OCW, is making his first ever HF QSO from the house where Fessenden made *his* first voice QSO. Vic, WA3YUV, is struggling to stay awake (4 AM came awfully early!).

new telephony transmitter and interrupter.

He taps out a message in Morse to Thiessen, warning that he is about to attempt voice communication. Reg shouts into his microphone. Thiessen telegraphs back, "Professor, your voice sounds like the flapping wings of a flock of birds; I can make no sense from it!"

Reg is frustrated to say the least. He shuts down the steam engine and ponders the situation. He decides to try one more time. Reg fires up the steam engine and notices that it runs faster and smoother than it did before. Could this have been the problem? He telegraphs Thiessen that he would try again.

Fessenden shouts into the microphone, "One, two, three, four. Is it snowing where you are, Mr. Thiessen? If it is, tele-

graph back and let me know."

"Yes, it is!" is Thiessen's excited response.

Reg noted the event in his log excitedly: "This afternoon, here at Cobb Island, intelligible speech by electromagnetic waves has for the first time in the world's history been transmitted."

Wireless voice was born that instant on Cobb Island, Maryland.

The Limburger Incident

In 1901 Fessenden was directed by the Weather Bureau to relocate his operations to Manteo, North Carolina. This was a serious undertaking, especially when you consider that he wanted to transport several huge wood antenna masts along with the rest of the heavy cargo.

Winter is not the best time of the year to take an overloaded ship out on Chesapeake Bay. As luck would have it, there was a storm waiting for them. With the masts in tow, the captain headed into the storm while Fessenden used the opportunity to enjoy a snack of one of his favorite foods: pungent Limburger cheese.

The captain was already upset, fearing he might lose his ship, and the "fragrance" of Limburger sent him over the edge. He raged at Fessenden, demanding that the masts be cut loose and that the offending cheese be thrown overboard. Fessenden resisted and the two nearly came to blows.

They finally compromised. The precious masts stayed, but the Limburger was cast overboard in a sack and towed

we began to raise antennas, feed lines appeared and soon radios began to crackle.

Concurrently, the great folks of Cobb Island set up historical displays and got the coffee and cookies flowing. At 10 AM all four stations (two at each location) roared to life. The next six hours were indescribable as pileup after pileup was worked as fast as we could operate and log. We later found out that one of our members, JD, W3SMD, was posting special event information on every DX cluster he could find. Like a decade before, a link with the actual historic event was made when Gwynne Very-Griswold, granddaughter of Fessenden's assistant, Frank Very, again stepped up to the microphone to make a contact, this time with a station in New Mexico. Despite the rain, many of the Cobb Island residents visited, as did members of the press and people who had heard about the event. Even after making 523 contacts, everyone wished we could have continued to give more folks the opportunity to participate in this special event.

A joint special-event memory book will be developed and presented to the Cobb Island Historical Society. The book will contain the background, pictures, articles, and other related materials about our activities.

What will the future bring? Maybe there will be a 105th

anniversary of "Radio's First Voice"; only time will tell. But we are satisfied that we have done our part in telling the world about the event that occurred on Cobb Island on December 23, 1900. Fessenden changed the way the world communicated.—Gregory W. Jones, Sr, K3GJ



Bill, KE3RE, and Bob, W3LZX, keep W3T on the air in a big way.



The Charles county crew fights the cold and rain to get the antenna up at the community center.



Frank, N3OCW, is learning how to hold a wire the proper way.

behind the ship with the masts. Somehow they made it to Manteo with the equipment intact and the masts were used again. The fate of the waterlogged Limburger is unknown.

North Carolina

It wasn't long after their arrival that Moore finally discovered that Fessenden had been working on the forbidden voice transmitter. Since "tomfoolery" had become reality, Moore recognized the vast potential. He responded by demanding that Fessenden sign over nearly half of the new telephony patents to him. If Fessenden refused, he would be out of a job and the Bureau's funding would cease.

On His Own

Reg continued his work with the Bureau and saw great progress, although he complained bitterly about the quality of the men sent by the Bureau to assist him. At one point he wrote directly to "His Excellency the President of the United States of America Mr Theodore

Roosevelt" to complain about the condition and the contract he had with the Weather Bureau.

In August 1902, Fessenden left the Bureau. The work continued for a few months without him with disastrous results. The stations were shut down and the equipment that had made history was sold at auction.

Soon after leaving the Weather Bureau, Fessenden, with the help of some wealthy partners, formed the National Electric Signaling Co (NESCO).

On Christmas Eve 1906 from Boston he made a special broadcast, playing "O Holy Night" on his violin, speaking and singing. It was the first radiotelephony broadcast to the general public.

The next 10 years were fraught with conflict. In 1912 he was ousted from NESCO after he had some disagreements with his partners. In 1914 the American Marconi Company purchased a license to Fessenden's patents from NESCO. The Marconi Company capitalized on Fessenden's discoveries, and soon began

developing products that infringed on his patents. Other companies did the same. Fessenden protested, then sued Marconi, General Electric, Westinghouse and finally RCA, accusing them all of patent infringement. Years after he started the fight they reached an out-of-court settlement for \$500,000, with \$200,000 going to his lawyers.

Reginald Fessenden died at his seaside home on the island of Bermuda in 1932. Among the inscriptions on his burial vault is a curious line of Egyptian hieroglyphics. They translate to: "I am yesterday and I know tomorrow."

The author wishes to thank Dr John S. Belrose, VE2CV, for his assistance. Jack's article on Reginald Fessenden can be found at: www.ieee.ca/millennium/radio/radio_about.html.

Event photos by Ken, KA3POX.

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QST

NEW PRODUCTS

2.4-GHZ BASE STATION ANTENNA FROM ANTENEX

Antenex Inc has released a new family of omnidirectional base station antennas that are suitable for use on the upper end of the amateur 13-cm band: 2.4 to 2.45 MHz.

The FG24003 features a white, high gloss, heavy wall, fiberglass radome and a gold anodized aluminum mounting sleeve and top cap. A trace on PC board material within the radome serves as a collinear element.

The FG24006 is a very similar—but taller—antenna that delivers a higher level of performance. Both use nickel-plated brass female N connectors for feed line connection. A mast mounting kit for these antennas—the FM2—is sold separately.

For more information on the FG24003 and FG24006 and the entire line of Antenex antennas, antenna mounts and antenna related products, visit your favorite Amateur



Radio equipment dealer or contact Antenex, 2000-205 Bloomingdale Rd, Glendale Heights, IL 60139; tel 800-323-3757 or 630-351-9007, fax 630-351-9009; www.antenex.com.

VERNIER DIALS WITH INTEGRATED SCALES FROM NATIONAL RF

National RF has released a new series of vernier driven analog dial assemblies that can be used in a variety of tuning applications.



Three models are available. The NPD-1 has a scale that measures $2\frac{3}{4} \times 3\frac{3}{4}$ inches and utilizes a $1\frac{1}{2}$ -inch diameter 6:1 vernier drive, the NPD-2 has a $5\frac{1}{8} \times 3\frac{5}{8}$ scale and a 2-inch diameter 6:1 drive, and the NPD-3 features a $5\frac{1}{8} \times 3\frac{5}{8}$ scale and a 2-inch diameter 8:1 drive. The couplings on all three models are set up for $\frac{1}{4}$ -inch shaft diameters. Each comes complete with two uncalibrated paper scales and a clear plastic scale protector.

Price: NPD-1, \$34.95; NPD-2, \$44.95; NPD-3, \$49.95. For more information contact National RF Inc, Radio Engineers Division, 7969 Engineer Rd, Suite 102, San Diego, CA 92111; tel 858-565-1319, fax 858-571-5909.

AUTOMATIC LOGGING ADDED TO CSS MULTIMODE TNC SOFTWARE

Creative Software Services has announced the addition of "AutoLogging" to their PacTerm '98, PKTerm '99 and MultiComm host/multimode software packages.

This new feature allows users of CSS's Log Windows and Scientific Solutions' DXBase 2002 logging programs to input contact information directly from within the TNC software, eliminating the need to toggle between two separate applications.

PacTerm '98, PKTerm '99 and MultiComm run under Windows 95/98/Me, NT, 2000 and the forthcoming Windows XP.

The host/multimode software packages sell for \$79 each. Demo versions are available for download from the company's Web site. For additional information visit your favorite Amateur Radio products dealer or contact Creative Services Software, 503 W State St, Ste 4, Muscle Shoals, AL 35661; tel 256-767-3739, fax 256-381-6121; info@cssincorp.com; www.cssincorp.com.

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Next New Products

