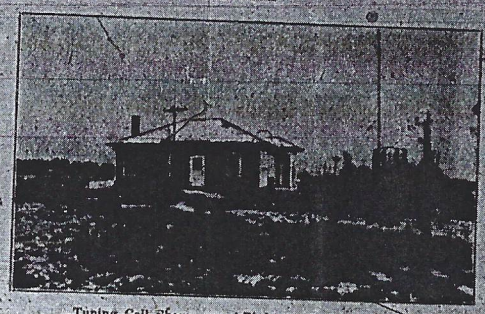
aug 29, 1925

Docmt 69

DITION

THE RELAY STATION OF THE RADIO CORPORATION OF AMERICA AT BELFAST, MAINE



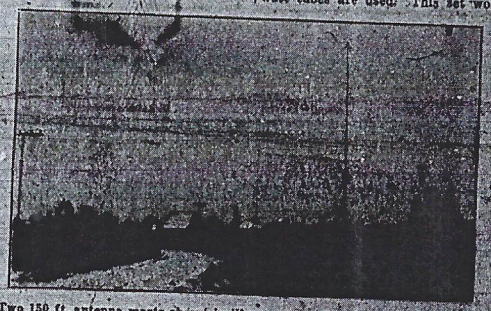
Tuning Coil Shown on Right of Illustration

The Radio Corporation of America, in addition to its activities in the fields of radio broadcasting and radio service to ships at sea, maintains a very elaborate and expensive system of direct radio telegraph service to England, France, Germany, Sweden, Norway, Poland and Italy, as well as to South America, Honolulu, and Japan. This service is operated in competition with the trans-ocean cables. The radio service is very speedy and reliable, but the RCA engineers are working day and night to make it even faster and better.

As a part of this improvement there has been built at Belfast, Maine an automatic radio relay station to relay these telegraph signals from Europe to the main traffic office at 66 Broad Street, in the very heart of New York City.

Extensive tests have proven to the RCA engineers that the receiving conditions for the European stations are very much better at Belfast than at Riverhead, Long Island, where the main receiving station is located. A survey of thunderstorms during the last ten years, made by the U. S. Weather Bureau shows that there are twice as many thunderstorms at Riverhead as at Belfast. A very bad thunderstorm center in the New England states is between Riverhead and Belfast and so affects Riverhead's reception. Although Belfast is nearly north of Riverhead, yet it lies almost directly on the great circle route from Riverhead to Europe and is 300 miles nearer than is Riverhead. For this reason the European signals are 30% louder at Belfast.

The effect of less static and stronger signals is to make Belfast a much more satisfactory receiving station than Riverhead. In order to take advantage of this the RCA has established an automatic relay station there.



Two 150 ft. antenna masts shown in illustration. There are 4 150 ft. antenna masts at this transmitting station

A land station constructed in 1920 by the International Radio Telegraph Company for working with the trans-Atlantic liners had become the property of the RCA and work to remodel it into a relay station was started in May 1923. By September the station was being regularly used to relay the European stations to Riverhead.

The receiver used at Belfast is the standard high power receiver used by the RCA at all of its trans-oceanic receiving stations. It comprises a wave trap and two tuned circuits in front of a three stage radio frequency amplifier, detector, and two-stage audio frequency amplifier. This receiver is used in conjunction with a special type of aerial known as the Beverage Broadside wave antenna.

This antenna is the invention of Mr. H. H. Beverage of North Haven, Maine, and is now used by the RCA at all of its trans-ocean receiving stations. There are two at Belfast, each being ten miles long. One is located eight miles from the station and is connected by a specially built transmission line. This antenna has the peculiar property of receiving very well from the direction of Europe, but of receiving practically nothing from any other direction. For European signals this antenna gives the effect of an antenna nearly a thousand feet high, or twenty times as high as the average aerial used for receiving broadcasting, yet it is really only twenty feet high.

A telephone transmitter is used at Belfast for relaying the received signals. It works on 1600 meters wavelength and puts 15,000 watts into the antenna. This is 15 times the power used by WJZ or WJY.

The so-called signal side band method of transmission is used, in which there is no carrier frequency transmitted as there is from the usual broadcasting station. This method also requires only one-half as much room in the ether as the usual type of telephone transmitter. If this method were used by all telephone stations we could have twice as many on the air at one time with only the same amount of interference between the stations as there is now. This method of relaying so faithfully reproduces the original message that even the static as received at Riverhead sounds the very same as it does at Belfast.

This transmitter is really nothing more than an enormous super-heterodyne receiver which puts the signal out onto the air again instead of putting it into head phones or a loud speaker. The frequency of the signal is changed just as in the super-heterodyne and is then put through four stages of amplification before it is put on the air again.

The first two stages are regular fifty watt tubes, the third stage uses two large glass tubes rated at one kilowatt each, and the fourth stage uses two big water-cooled tubes. These tubes are the largest that are made and have running water around the plates to keep them cool. The power given out to the antenna by this transmitter is two million times the power put into it by the receiver.

The small UV-199 tube takes only six one-hundredths of an ampere to light the filament, and the big water-cooled tube takes fifty-two amperes to light its filament. 10,000 volts are used on the plate of this big tube.

There is, also, at Belfast a small transmitting set, called the service set, which is used to talk from Belfast to Riverhead and to send instructions there about the relay set, or about other matters. Three of the one kilowatt tubes are used. This set works on a wave length of 1750 meters.

The aerial used for the relay transmitter is made in the form of a triangle 500 feet on a side, with a steel mast 150 feet high, at each corner, and another one in the center. A lead-in is brought down to the big outdoor tuning coil at each corner of the triangle. One of these tuning coils is known in the picture of the transmitting building. These three lead-ins form what is called a multiple tuned antenna, and gives the effect of three antennas connected in parallel.

During the last summer the Belfast station was called upon to relay almost continuously and proved to be such a help that hundreds of messages were received nearly every day through the Belfast relay that could not have been received without it. During all the static of last summer there was only once when it was impossible for Riverhead to hear the Belfast relay, and on that day there was a terrible thunderstorm at both Riverhead and Belfast.

The Belfast station also played a very important part in the opening of the 1924 National Radio Show at the Grand Central Palace in New York City. Senatore Guglielmo Marconi pressed a button in London which actuated a 200 kilowatt transmitter at Carnarvon, Wales. This signal was received at Belfast, relayed by radio to Riverhead, and sent from there to New York to light a big American flag and open the show.

The Belfast station has become one of the necessary links in the communications system between this country and Europe, and will continue to function to great advantage.

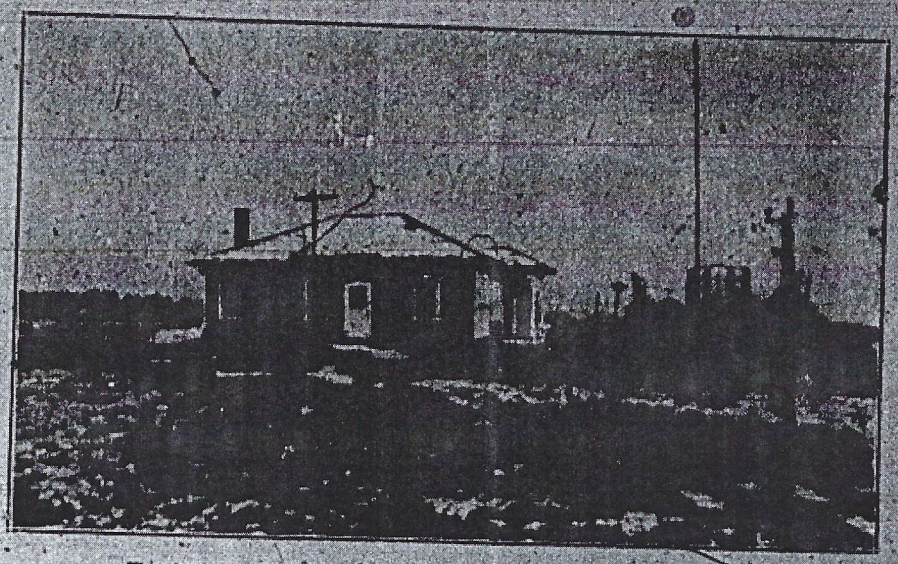
E. V. AMY

Belfast Station. Aug. 29, 1925.

Docket 69

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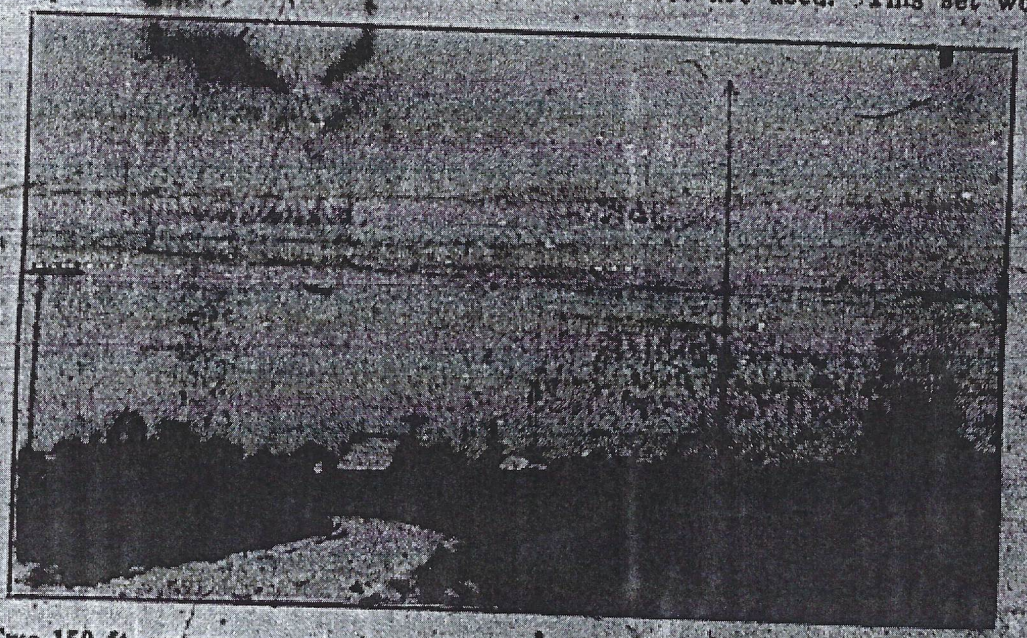
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