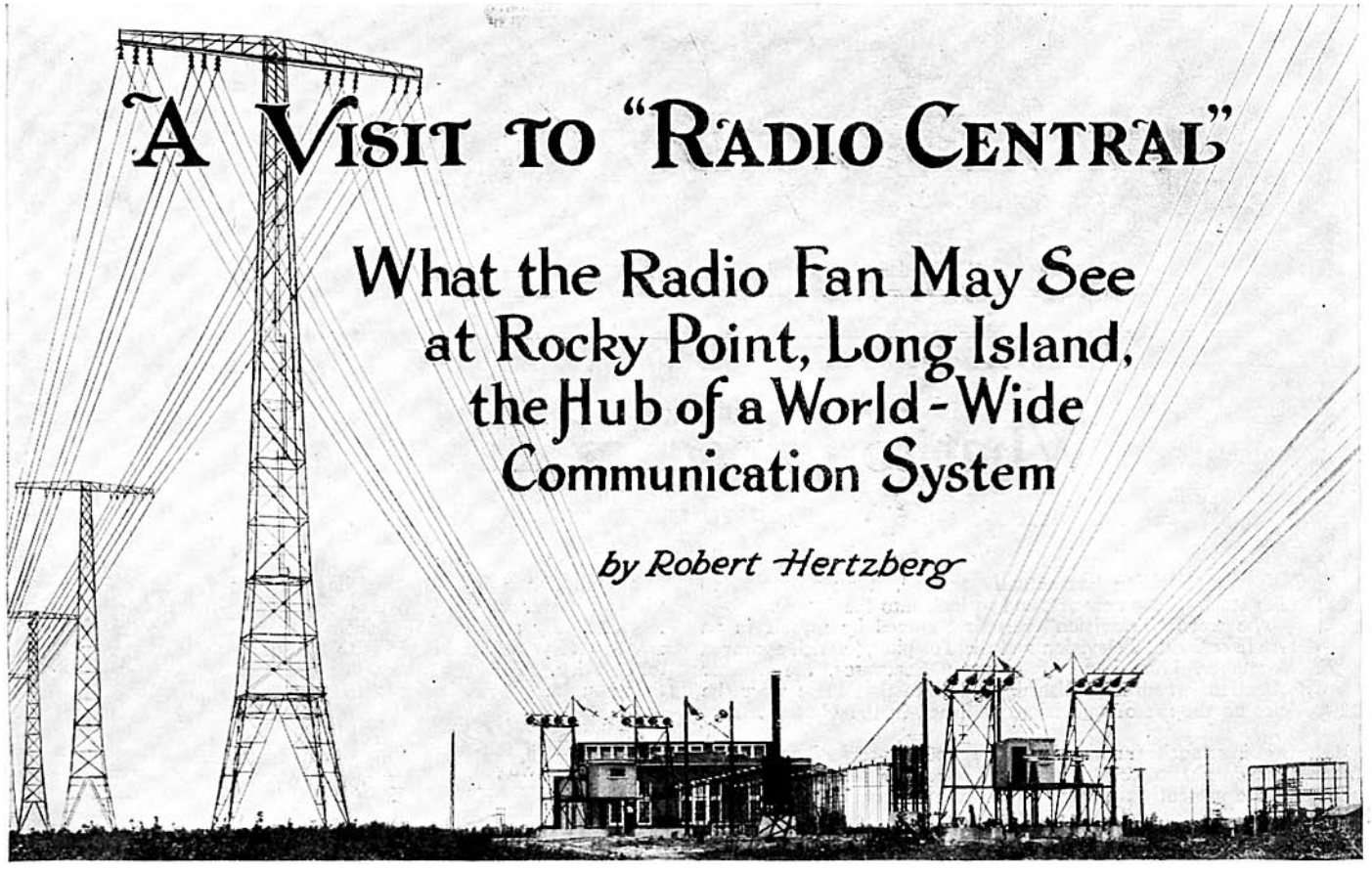


A Visit to "Radio Central"

What the Radio Fan May See at Rocky Point, Long Island, the Hub of a World-Wide Communication System

by Robert Hertzberg

The scene above includes the main transmitter house at "Radio Central," Rocky Point, Long Island (75 miles east of New York City), and the lead-ins from the two great aerials; the nearest towers of one aerial are seen at the left. They are 410 feet high.

THE largest and probably the most interesting radio installation in the world is the one known as "Radio Central," located at Rocky Point, Long Island, at a distance of about 75 miles from New York City. It bears this name because of its massed facilities for radio-telegraph and radio-telephone communication between the United States and the countries of Europe and South America, on wavelengths ranging from 14 meters all the way up to 16,000 meters. It is owned and operated by the Radio Corporation of America, and is the hub of that company's world-wide radio system.

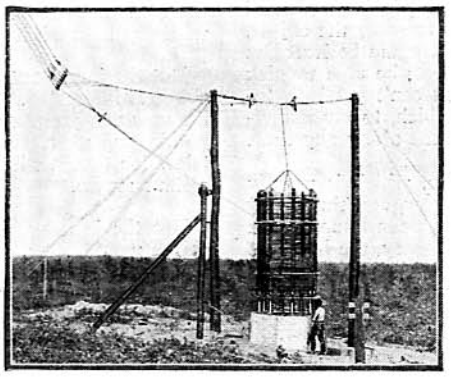
Radio Central was opened six years ago. At that time two powerful Alexanderson alternators, huge machines capable of generating the high-frequency current necessary for the production of radio waves, were installed in a temporary building. These worked with two aerials supported by twelve huge steel masts, each 410 feet high. The original plan was to build 72 such towers, arranged like the spokes of a wheel, with six towers to a spoke, and with an individual Alexanderson alternator for each unit.

However, the progress of American radio technique, particularly in the line of short-wave work, made a change in the plan advisable. In place of the projected additional towers and giant alternators, the Radio Corporation has erected short, simple aerials supported by wooden poles; and has installed silent vacuum-tube transmitters of compact construction.

AN IMPRESSIVE VIEW

In selecting a location favorable for the projection of radio waves, the R.C.A. engineers chose a stretch of land at Rocky Point because the terrain here is very flat and free of metallic obstructions that might affect radio transmission. Some six thousand acres of land are included in the property—sufficient to take care of the growing radio plant for several years.

On a clear day a motorist approaching Radio Central can see the outlines of the twelve main towers many miles away. The sight of the huge steel skeletons lined up in a row three miles long is a most thrilling one, the height and size of the structures being emphasized by the bareness of the surrounding countryside. Adding to the general effect is a series of four smaller towers, each about 200 feet high, recently erected for directive transmission on short wavelengths. When viewed from certain angles the whole system of towers, poles and suspended wires, honeycombing the sky in a dizzy manner, presents a picture not unlike those highly-imaginative drawings representing life on Mars that "Paul" used to paint for some of the old numbers of *The Electrical Experimenter*. On a slightly foggy day, when the tops of the aerials are clouded with mist, the towers appear to be miles high.



One of the coils which tune the sections of the "multiple-tuned" aerials. Compare it with the height of the man beside it.

THE MAIN POWER HOUSE

A short ride over a private road leading off one of the main Long Island highways brings the visitor to the main power house, or transmitting building. When this was first erected it was a plain brick affair, with unfinished sides of sheet metal. Today, however, it presents the Spanish Mission type of architecture, having cream-colored walls, attractive brick trim, and a red-tiled roof. It is located between the two sets of towers, which extend away from it a mile and a half in two directions. In front of the house is a large cement basin, in which jets of water are constantly spouting. These are not merely ornamental, but serve as a means of cooling the water which is fed to the alternators and vacuum tubes for cooling purposes.

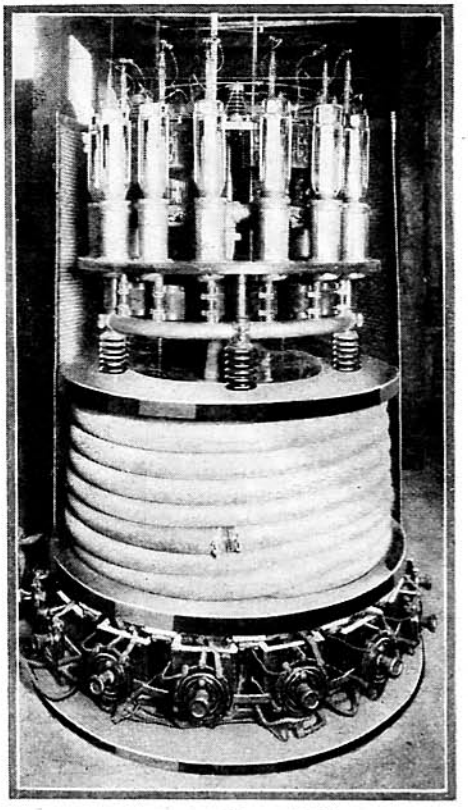
Entering the main entrance of the power house, the visitor finds himself in a large reception hall of Spanish atmosphere; large tiles underfoot, rough stucco walls, massive mission doors with wrought-iron fittings, marble benches and iron railings leading to a balcony. A door connects this room with the machinery hall, the atmosphere of which is strictly business. The unceasing whirr of the huge Alexanderson generators and of

dozens of different kinds of pumps and incidental generators and the constant slapping of the big relay keys which tap out the messages makes conversation here a bit difficult. The staggering amount of radio equipment in this hall, which is about half a block square, leaves the visitor helplessly confused until after he has gone around two or three times and identified each machine.

THE INVISIBLE OPERATORS

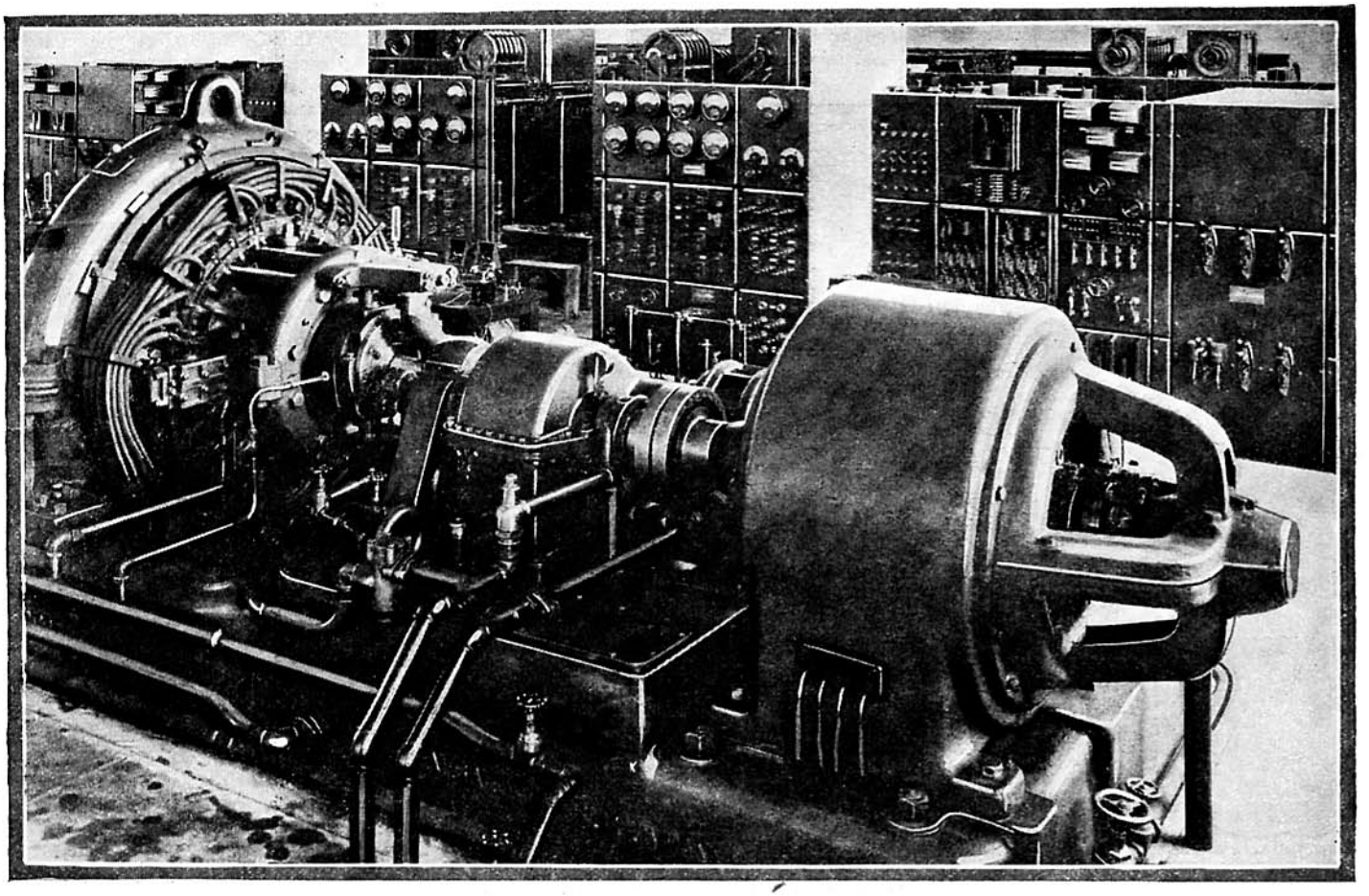
Radio Central is a transmitting station or, rather, it is eight or nine stations rolled in one, yet the number of people staffing it is surprisingly small. On the occasion of the writer's visit only half a dozen or so men were in sight, and these were attendants and mechanics who had nothing to do with the flow of dots and dashes passing through the equipment. It was explained that the actual operators are located in a central office at 66 Broad Street, New York, to which messages from all parts of the country intended for transoceanic transmission are routed for handling. However, practically all the members of the Rocky Point staff are experienced radio operators and capable of handling messages in an emergency. Special wire lines between Broad Street and Rocky Point enable the operators in New York to control the "keying" of the various transmitters at will.

At least one of the two Alexanderson alternators is always operating into one of the big aerials. The various short-wave units are likewise kept in continuous service; if there is a lull in the message traffic an automatic "keyer" is started and sends a series of test letters, usually ABC or XYZ, merely to let the receiving operators thousands of miles away know that the machinery is working properly. The other big aerial is used for transatlantic telephony on a wavelength of about 5,000 meters, being employed in conjunction with a 200-kilowatt transmitter. This latter outfit is operated by the American Telegraph and Telephone Company, and ties in with the entire American telephone system.



This circular bank of fifteen 20-kilowatt power-amplifier tubes is used in the transatlantic radio-telephone transmitter. It stands about seven feet high. The coils of hose carries the water required to cool the plates of the tubes.

Although great progress has been made in long-distance communication on short waves with low power, the Alexanderson alternators, operating on wavelengths above 16,000 meters with an output of 200 kilowatts each, represent the backbone of transoceanic message service. The long waves are required for uninterrupted communication from daylight to darkness, for uniform and reliable transmission 24 hours a day regardless of weather. A single short-wave transmitter working on one fixed wavelength cannot supply the same class of service; engineers are now conceding the necessity for a group of different transmitters which can be shifted at will to meet the peculiar effects of daylight and darkness on the carrying powers of their respective wavelengths. Marked economies are effected many times with the use of short waves instead of the longer ones, for less power is required and the transmitting speeds can be greatly increased. At Radio Central short-wave transmitters are handling more and more traffic to Europe and Latin America and are being used experimentally for directive transmission to selected countries.



One of the two 200-kilowatt Alexanderson alternators used to supply current for the long-wave transmissions at "Radio Central." The alternator, proper, is the generator at the extreme left, while its driving motor is in the right foreground. The various control switchboards supply the background. These big machines furnish current for stations WQK and WSS, from 1875 cycles down.

ADVANTAGES OF THE BEAM SYSTEM

Although the aerials of the "beam" transmitters produce waves that eventually spread over a considerable distance, the directive system offers the advantage of doubling the usefulness of each wavelength. For instance, two separate short-wave beam transmitters directed toward England and South America, respectively, may operate on the same wavelength, because the receivers in England will not pick up the waves directed at South America, and the receivers in South America will be free of serious interference from the waves directed toward England. Secrecy of transmission is not the primary object of the beam system, as many radio fans seem to think. From even the best beam stations, enough energy leaks out through the backs of the reflectors and splashes off through the sides to make the signals readable in unexpected parts of the world.

Surrounding the two Alexanderson long-wave alternators at Rocky Point are six short-wave transmitters, which may be listed as follows:

WTT—40 kilowatts; 16.1 meters. Operating to South America, daytime only.

2XT—40 kilowatts; 16.18 meters. Operating to Europe, daytime only.

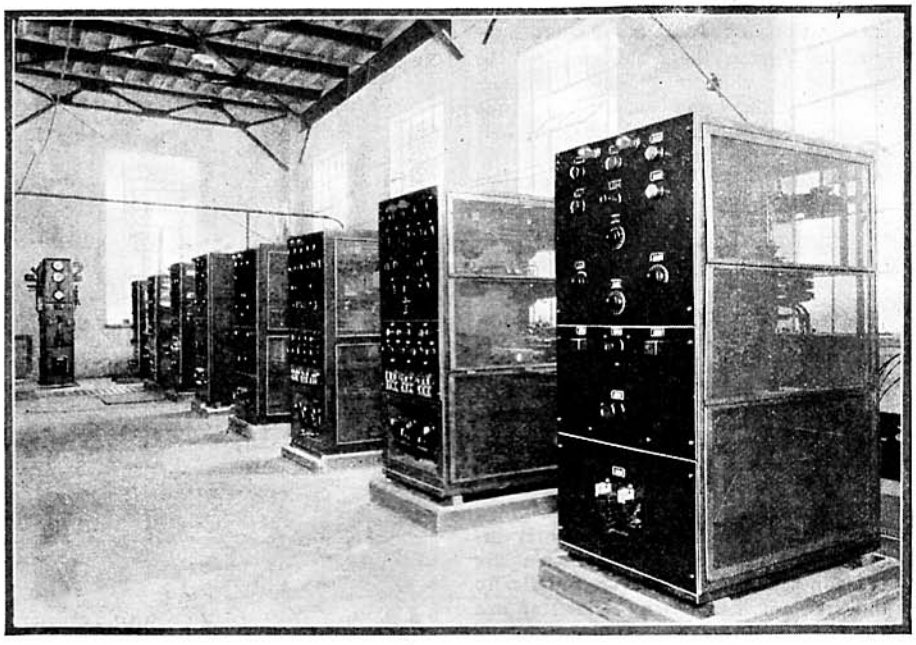
WBU—20 kilowatts; 14.1 meters. Operating to South America.

WIK—20 kilowatts; 21.75 meters. Operating to Central America, Porto Rico and Europe, 24 hours.

WQQ—20 kilowatts; 14.8 meters. Operating to South and Central Americas, from 5.00 a. m. to 11.00 p. m.

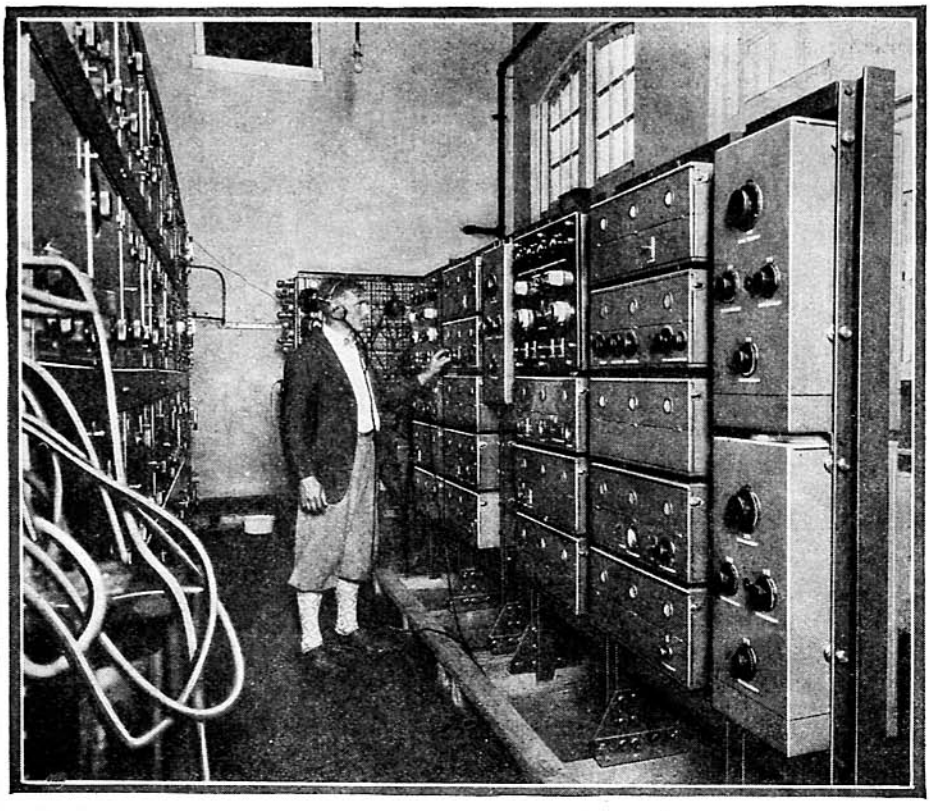
WLL—20 kilowatts; 16.01 meters. Operating to South America and Central America, from 5.00 a. m. to 11.00 p. m.

It will be noted that the transmitters operating below 17 meters are used for daylight work only, because of the peculiarities of these short waves. In some instances, a transmitter working with Europe in daylight becomes highly efficient for communication with South America at night, and vice versa.



A series of short-wave transmitters at "Radio Central"; the third unit from the right is that of WTT, which operates on 16.1 meters, sending messages to South America. Compare the compactness of these vacuum-tube outfits with the size of the Alexanderson generator on page 105.

While the high-power alternators work with lofty and widespread aerials, the short-wave transmitters use lower and less conspicuous antenna systems. The latter are supported by plain wooden poles, usually not over sixty feet high, the aerials themselves consisting for the most part of short vertical lengths of wire or copper rod. A few of the aerials are merely thirty-foot lengths of wire hanging from the guy cables of the big steel masts; yet with them reliable high-speed communication with Europe is maintained day after day.



This is a section of the receiving house of "Radio Central," located at Riverhead, west of the transmitters. The operator is adjusting one of the short-wave receivers, which will be left tuned to the proper wavelength. Behind him, at the left, are four long-wave receivers in their rack.

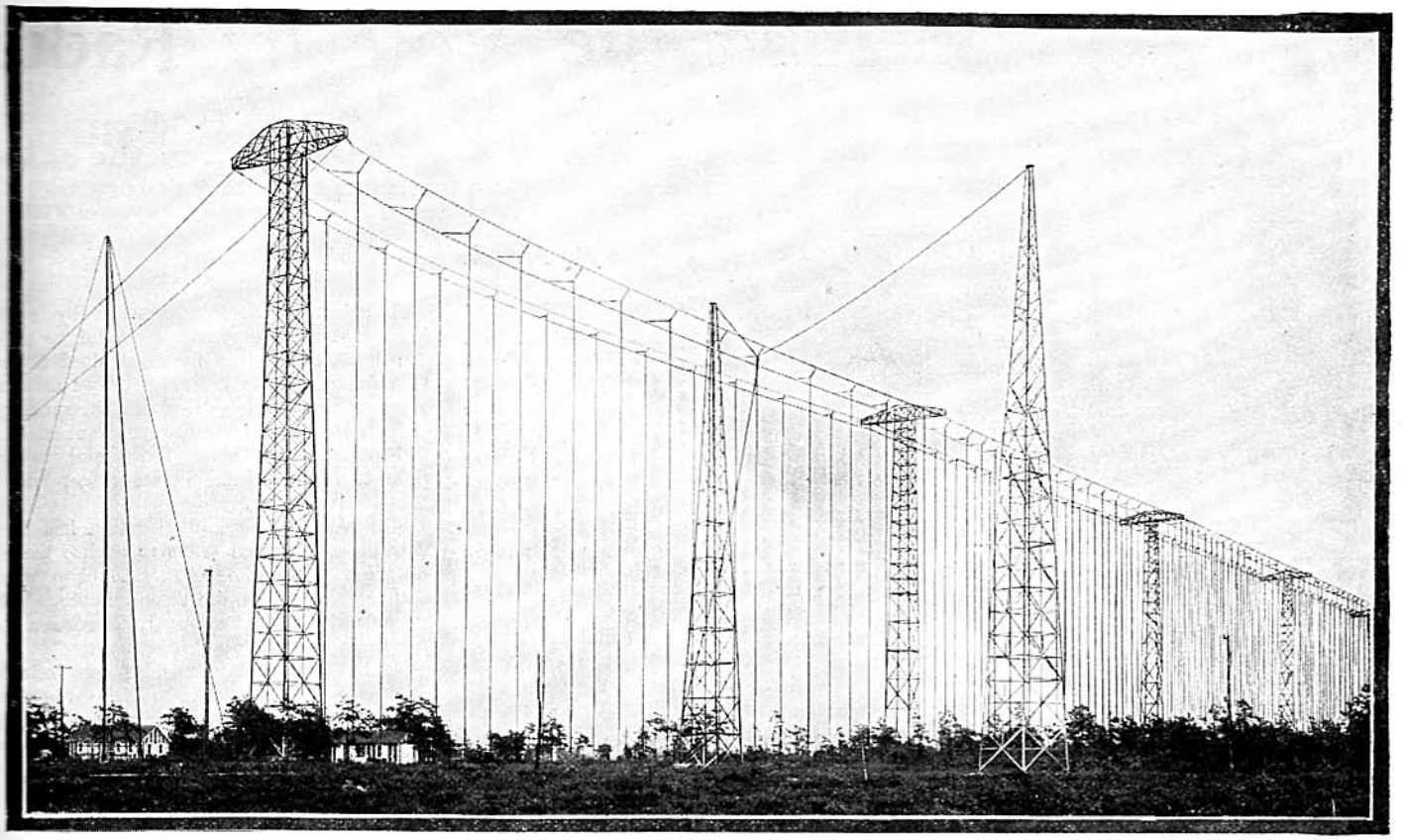
THE "MULTIPLE-TUNED" AERIALS

The lead-ins from the two aerials, supported by the 410-foot steel towers, drop to the ground a short distance from the transmitter house, and are connected to the generators and to the telephone transmitter by radio-frequency transmission lines. These big aerials are of the "multiple-tuned" type. Separate lead-ins drop from the overhead wires, where they pass under each of the twelve towers, and connect to huge exposed tuning coils. These tune each of the sections of wire between masts to the wavelength on which the transmitter is working. Thus it may be seen that each of the two big aerials really consists of six separate aerials forming a continuous stretch of wire.

The short-wave aerials are removed a considerable distance from the actual transmitters; as far away as a mile. The energy from the transmitters is carried to them over radio-frequency transmission lines, which are merely pairs of thin wires strung on poles about eight feet above the ground.

The beam aerials erected for directive transmission are rather unusual in appearance. At Rocky Point there are two types in use: the British and the American. The British system employs four 200-foot steel towers arranged in a straight line. A series of rigid messenger cables, suspended across their tops, supports a double row of vertical wires, running parallel to each other and separated about twenty feet. One set of these hanging wires acts as the aerial from which the radio waves are radiated; the other as a reflecting wall which throws back the waves and makes them travel only in the direction in which the first set face.

The American system is similar, but makes use of short, heavy wooden poles to support the rows of vertical wires which act as radiators and reflectors, respectively.



This unique aerial of vertical wires is designed for the reception of signals from an English "beam transmitter," and is located at Riverhead. One row of wires acts as a multiple aerial; the back row as a reflector which concentrates the radio waves upon the aerial, like a great concave mirror. The energy collected by this system is very much greater than that picked up by an ordinary antenna; and it is therefore possible to get a dependable signal with much smaller power in the transmitting station.

RECEIVERS AT RIVERHEAD

The receiving end of Radio Central is a few miles west at Riverhead, Long Island. The grounds surrounding the small building housing the receiving apparatus are covered with aerials of every imaginable type. The most outstanding one is a beam receiving aerial of the British type, the construction of which duplicates the transmitting aerial described in the preceding paragraphs.

The receiving house, naturally, is not as spectacular in appearance as the transmitter house, but it contains some interesting equipment. There are 17 separate long-wave receivers, each containing 13 tubes and tuned to a single wavelength. These outfits are arranged in racks, each rack being about twenty-five feet long. In a newly-constructed wing of the room a bank of twenty-four individual short-wave receivers is being installed, about a dozen being in operation at this time. Each receiver contains a total of thirteen tubes and, like the long-wave instruments, each is tuned to one wavelength and left alone. Standard screen-grid tubes of the 222 type are in use in the R.F. stages, three in number.

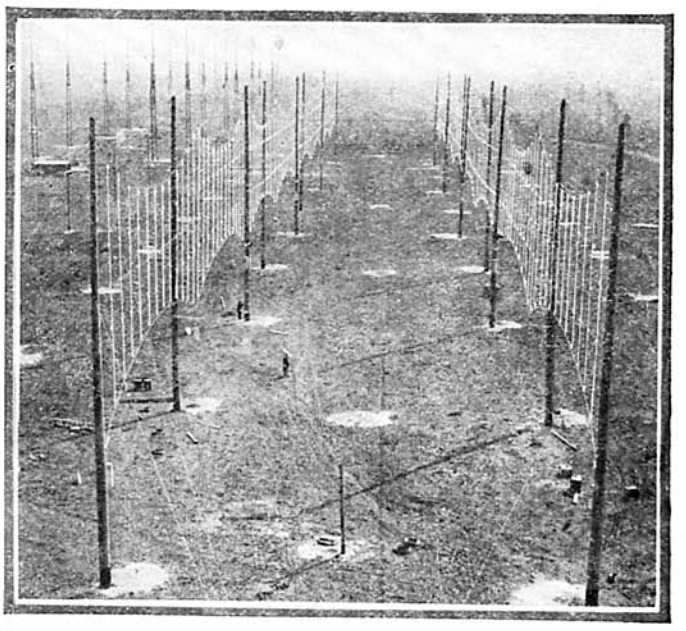
AN INTERNATIONAL SWITCHBOARD

The outputs of all the receivers are led to a switchboard resembling a telephone board. This is connected by land lines to 66 Broad Street, where the messages from the various foreign countries are copied and routed to their destinations. The radio operators at Riverhead think no more of switching into London or Berlin than a telephone operator in New York thinks of routing a call to Brooklyn, across the river.

While Rocky Point and Riverhead have been termed "Radio Central" because of the concentration of communication facilities at these points, the Radio Corporation of America maintains other stations for service to overseas countries. The central traffic office at 66 Broad Street in New York handles messages, not only through Radio Central, but also through two Alexanderson-alternator stations at New Brunswick and at Tuckerton, both in New Jersey, and through still another station at Marion, on the south shore of Massachusetts. In addition, another receiving station is maintained at Belfast, Maine, which, likewise, connects directly with Broad Street.

Radiating from New York are direct radio communication channels to England, France, Belgium, Germany, Italy, Holland, Norway, Sweden, Poland, Argentina, Brazil, Colombia, Venezuela and Dutch Guiana. On the Pacific Coast an office in San Francisco handles traffic to Hawaii, the Philippines, Japan, China, French Indo-China, and the Dutch East Indies.

Such have been the developments of a very few years; six since the inauguration of Radio Central, and twenty since the first commercial radio service was put in effect across the Atlantic between Clifden, Ireland, and Glace Bay, Nova Scotia.



The aerial at the right, which differs considerably in design from that shown at the top of the page, is a part of the "American" beam system; its method of functioning, however, is similar in principle to that of the "English" beam aerial shown above. This, however, is a transmitting aerial, and is so aligned that its emission is concentrated in the most favorable directions. The radio beam is not sharp, like that of a searchlight, but signal strength decreases progressively away from the line of greatest radiation. As in the picture above, one set of vertical wires (those on the left) forms the aerial, and the other the reflector. The length and the spacing of the wires is very carefully calculated, as it must be properly proportioned to the wavelength used, to secure best results. The wires are very rigidly secured to the wooden masts which support them, and kept taut by weights.