Telephone to Link Four Continents

Radio

Electrical Engineers Told of Latest Radio Achievements

TELEPHONES on four continents will soon be within reach of each other when a radio telephone circuit between New York and Buenos Aires is opened in a few weeks, T. G. Miller, general manager of the long lines department of the American Telephone and Telegraph Co., announced to the American Institute of Electrical Engineers. Already 85 per cent. of the world's telephones, located in United States, Canada, Mexico, Great Britain, most countries on the continent and one point in Africa, can be connected through four radio circuits. One is a long wave circuit, the other three use short waves, below the broadcasting bands.

In another paper at the same session, A. A. Oswald, of the Bell Telephone Laboratories, told of some of the technical equipment used. Now stations have been established at Lawrenceville, N. J., for transmitting and at Netcong, N. J., for receiving. At the former center are located four transmitters, three for transmission to Europe and one for South America. For each transmitter there are three antennas, capable of sending on a different wavelength, so that the best length can be chosen, at any time. When transmission is unsatisfactory on one length, another can often be used to advantage. The antennas are directional. One set is oriented to give maximum strength in the direction of Buenos Aires, and the other three are aimed at London. They do not point in these directions, however. Actually, the direction in which they send is at right angles to that which they point, so the South American antenna runs almost east and west.

The receiving station at Netcong, is also equipped to handle four separate circuits simultaneously, one from South America and three from England, each with a choice of three separate wavelengths. This station is located about 50 miles from Lawrenceville, as this is about the distance at which the short waves are least effective. These waves show the so-called "skip distance," a point thousands of miles away receiving the signals better than one but a few miles distant. They are also placed so that neither station is in line with the direction of transmission or reception of the other.

In the case of the short waves, it is not so necessary to shorten the distance between the transmitter and receiver as with long waves, said F. A. Cowan, another A. T. & T. engineer, at the meeting. The original transatlantic telephony was with long waves, and the receiver for the English signals was placed at Houlton, Me., about 600 miles from New York, because of the shortening of the path over which the waves must travel. Land wires carry the messages to New York. This station is still in use, supplemented by three short wave circuits, all in addition to the South American short wave circuit.

To converse with Buenos Aires, only short waves will be used, Ralph Bown, of the A. T. & T. Company's department of development and research, told the engineers. Severe static may cause interruptions on both long and short waves at the same time, though the latter are less affected, he said; but on the other hand, fading, or poor transmission accompanying a magnetic storm, may hinder the short waves while the long waves are unaffected. In fact, he said, magnetic disturbances sometimes improve long wave daytime reception. However, with long circuits crossing tropical sources of static facing the directional antennas, short waves alone can be used.

Mr. Bown told of one source of interference that can be controlled.

"There is one other type of noise than that provided by Nature which is of particular importance at short waves—electrical noise from the devices of man," he said. "One of the worst offenders is the ignition system of the automobile. The short-wave transoceanic receiving station at Netcong, New Jersey, is so located that automobile roads are at some distance, particularly in the direction from which reception occurs.

EVEN though it has been a time of remarkable development in transatlantic radio, both telephone and telegraph, the decade since the war has seen an unprecendented increase in the speed of cable transmission, which has brought a corresponding increase in patronage. At the meeting of the American Institute of Electrical Engineers, L. S. Coggeshall, general traffic supervisor of the Western Union Telegraph Co., told of the recent advances in cable technique, and predicted still further increases in speed in the near future, along with such other improvements as the development of telephone cables.

Before 1918, said Mr. Coggeshall, the transatlantic cables were operated in sections with hand relays. That is, a message from New York to London would be sent to Nova Scotia, there an operator would receive it and send it on to Newfoundland, thence in the same way it was relayed to Cornwall, and finally to London. With skilled operators, however, the delay at each station was cut down to a few seconds, he stated.

Since 1918, however, automatic relays have been introduced, and even permit the use of printing machines, which type out the message ready to be delivered to the addresses. These improvements, said Mr. Coggeshall, have resulted at the end of the post-war decade in "transmitting speed of a different order of magnitude from those characteristic of its beginning."

Mr. Coggeshall predicted extensive use of electrical relay connections between land wires and cables, so that direct connection could be obtained between important points in all parts of Europe and America.

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