

The works of the Marconi Wireless Company at Chelmsford were visited, and were found to be very interesting. Here were several sets of apparatus up to 10 kw. being prepared for testing. The workshops were large, and from the number of men employed it was evident that the wireless apparatus of this company was in demand. The most striking piece of work was a huge primary of a transmitting-jigger, which it was said was being made for the high-power station at Coltano, in Italy. This primary consisted of a single turn about 5 ft. 6 in. in diameter, made up of some hundreds of separate insulated wires laid up on a wooden core. Their military sets were of excellent design and manufacture, and were very compact.

This company very kindly invited me to visit as their guest the high-power station at Clifden, in Galway, which is used to communicate across the Atlantic Ocean with the company's station at Glace Bay. There are 1,000 kilowatts of power installed in two units of 500 kilowatts. The generating-station is quite an electric power-house, and is detached some distance from the building in which the transmitting-apparatus is placed. Cables underground convey the current to the apparatus-room. Steam power is used to drive two or three alternators, which generate current at 2,200 volts. This current is used to drive four motors, which are coupled to dynamos, each of which gives about 5,000 volts direct current. This direct current is used for charging accumulators which are used in transmitting. The steam at present is coal-produced. Alterations to the general lay-out of the steam-engines were in progress to provide for the use of peat as fuel. There are large areas of peat bog, and large quantities of peat are already cut. It is intended that there should be small cars filled with peat forming a sort of endless chain. These are to circulate in a closed-in chamber into which the waste heat from the furnaces will escape. By this means the peat put in at one place quite damp will arrive at the furnace-doors sufficiently dried for use. Coal is very expensive, as it has to be handled much. The accumulators and condensers were in the transmitting-apparatus room. There are about seven thousand accumulators of about 100-ampere-hours capacity. These are arranged so that if any work is to be done upon them they can be broken into sections to avoid risk of dangerous shock. They are not placed upon stands, but are suspended from the ceiling, each cell being carefully insulated with porcelain. The condensers are composed of great plates of iron hung vertically. The building is of wood and iron, two stories, and these plates extend over a large portion of the building for its full width and from the ceiling level almost to the ground. The plates are separated from each other about 6 in. or 8 in., and form what are known as air-condensers. The capacity is about 1·8 microfarads. Arrangements are provided by which plates may be cut in or out as required. The coupling between the primary and secondary coil is loose. These coils are provided in duplicate. The primaries are of the type referred to as seen in the works at Chelmsford being made up for Coltano. The secondaries consist of eight or ten turns of specially-made-up wire in the form of a rope. The turns are separated from each other by several inches, and are about 2 ft. 6 in. in diameter. There is no difficulty in quickly transferring from one set of coils to the other if necessary. A rapidly revolving disc between two more slowly revolving and smaller discs is used for the spark-gap, in conjunction with which blowers are employed. The power that was being used was about 120 to 130 kilowatts. Sometimes the distance can be compassed with 10 kilowatts; at other times much more than the maximum mentioned has to be used. The noise when the station is transmitting is deafening, and can be heard for a long distance. Before entering the building it is usual to stop the ears with cotton-wool. You cannot converse inside: it is necessary to come outside and close the door, which confines the noise somewhat. The aerial is supported upon eighteen masts. Sixteen of these, in four rows of four, about 200 ft. high, extend away from the station for about half a mile in a direction opposite to Glace Bay. The width is about 1,000 ft. The receiving-aerial is distinct from that used for transmitting, and is composed of two wires, which, besides extending over the whole half-mile referred to, are also carried forward about 1,500 ft. on to two other masts placed near the receiving-station. This station is removed from the transmitting-station about 500 or 600 yards. When inside the noise of the transmitting-station cannot be heard. Wires are run underground, and the manipulator of the Morse key in the receiving-station closes a circuit through a special relay at the transmitting-station, and so controls the high power. In the receiving-station it is arranged that when sending on the Morse key a low buzzing sound from a small spark is heard, so that the operator may know that the high-power signals are being emitted. The apparatus for receiving is very little more complicated than an ordinary ship's set. The Fleming valve is used as a detector. Telegrams are sent at a speed ranging from fifteen to twenty-five words a minute, according to the capabilities of the sending operator and the amount of business. It was noticed that two or three telegrams are sent in succession. The receiving-office does not repeat them, nor are they repeated by the transmitting-station, but request is made for repetition of any word that has not been clearly received. The writer listened to the signals from Glace Bay. These came clear and strong, and there was no difficulty in reading them. The note was good and flute-like. Simultaneously at about 10.30 a.m. signals from the station at Coltano were heard. These were from alternating current, and were less musical and not nearly so loud as those from Glace Bay. There was no difficulty in reading the Glace Bay signals while Coltano signals were coming, and when Glace Bay ceased Coltano was easily read.

There was a good deal of traffic being dealt with. In a separate room the instrument for use on the land line was seen. This line seemed to be kept well occupied, and it was said they were considering the matter of duplexing it.

It was the intention to work duplex by wireless across the Atlantic, and a station for receiving was being erected about fourteen miles north of the existing station. The proposal was to operate the transmitting-station from the receiving-station over wires run either underground or aerially, the wires to be insulated throughout their entire length in either case.