

break D is closed, a stream of sparks passes between the spheres C and H, and these produce a series of surgings up and down the long wire (which Marconi calls the Antenna). The vertical surgings are electro-static effects, and these give rise to electro-magnetic waves, extending outwards horizontally in all directions, and affecting any wires encountered in their excursion. By closing the circuit C for longer or shorter intervals of time, dot and dash signals are transmitted

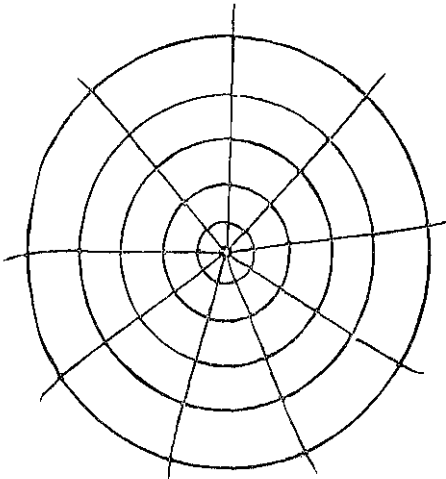


DIAGRAM 2.

This Sketch shows the plan of the line Y Z. The radial lines are the electric static surgings, the circles show the electro-magnetic waves emanating from the Antenna, or oscillator wire.

to any receiving apparatus capable of detecting the presence of Hertzian or electro-magnetic waves.

RECEIVER.

The Receiver in Marconi's system in principle combines the oscillator of Hertz with the coherer of Brunley (see figure 2.) MN are two metal plates termed the oscillators of size suited to receive the ether waves given off by the transmitter of the sending apparatus.

In what is called in telegraphy a shunt circuit J, connected to the coherer T are placed a battery cell K, and any ordinary telegraph receiving instrument L, sufficiently sensitive to work with small current strength. When etheric waves generated at the distant station strike the oscillators MN, the distur-

bance made in them cause the filings in the coherer tube T to conduct, in the manner previously described, and the battery K is enabled to send out a current in the circuit J, which works the telegraph instrument L.

Such are the diagrams of the principles involved in the transmission of the Marconi signals, but in actual practice considerable modifications have to be introduced. Thus in the oscillator plates only one is used, and this is raised to a great height above the ground, in some cases a hundred yards. Indeed the greater the distance the signals have to be sent, the higher the transmitting and receiving wires (or antennæ) must be raised, for very long distances, the use of a kite or balloon has been suggested.

There are also extra balls introduced between the spheres C and H, and one of the latter may be connected with the earth. The coherer undergoes decoherence by the action of a tapper worked automatically like the hammer of a trembling electric bell.

The coherer may be described as achieving for wireless telegraphy what the microphone does for telephony.

These are the essential parts of the space signalling apparatus as devised by Signor Marconi, but there are details in actual working that have been omitted as not vital to the principles involved, and which, therefore, it would be in the present discourse unnecessary to shew.

So far, in the practical application of Marconi's system, it has been possible to transmit messages over a distance of a hundred miles. Communications were sent and received from Wimmereux to Chelmsford, a distance of ninety miles. Ships at sea have spoken with each other when thirty-six miles apart. The Royal Engineer authorities, who are devoting great attention to this subject, are confident that it will in the near future be possible to establish efficient communications over distances of from two hundred to three hundred miles. It seems entirely to depend on the length of the antenna or oscillator wire. The distance to which signals can be sent vary as the square of the length of the wire; thus if a wire twenty feet long