Wireless Telegraphy.

By E. H. Bold (Inspector of Telegraphs).

IN simple language the term Wireless Telegraphy implies signalling between distant places which are not connected by a connecting wire. Until quite recent times, the notions generally held with regard to the nature of electricity—assumed it to be a subtle and mysterious fluid—which in some of its many and varied effects (such as currents in conducting wires) behaved like water flowing through pipes, the quantity and pressure of flow being determined and regulated by the dimensions of the pipe and by the height of the source of supply. When considering currents of electricity in conductors, the dydraulic analogy just stated appeared to hold good, but when applied to electro-static phenomena, the comparison failed to satisfy the conditions.

To Professor Clerk-Maxwell is due the Electro-Magnetic Theory of Light, which is that now almost universally accepted; by its means can be explained optical, electrical, magnetic and heat effects, and indeed all, or nearly all, the phenomena pertaining to radiant energy generally. Professor Maxwell's theory, announced in 1865, postulated the existence of a medium, or *entity*, which not only fills all interstellar space, but occupies and interpenetrates all forms of matter from the densest to the most rarefied, similarly to the way water permeates a sponge—immersed in it. This medium or entity, in order to fulfil the duties required of it, is endowed with peculiar properties, some of which seem to our notions (with relation to ordinary matter) quite contradictory. Thus the ether is supposed to be perfectly elastic, and at the same time to possess the principal properties of a rigid body. By an elaborate mathemetical process, and aided by the discoveries of Faraday and others preceding him, Professor Clerk-Maxwell worked out his Electro-Magnetic Theory, shewing that if such a medium as the ether is existent, then all electro-magnetic phenomena were capable of explanation. Now, although the great significance of Maxwell's theory was admitted by all the leading physicists of the day, it had not been proved or established by objective test, and it was not until the completion of Dr. Hertz's researches that the possibility of generating electric waves as described by Maxwell could be experimentally demonstrated.

Dr. Hertz first contemplated enquiry in this task in 1879, in response to an invitation from the Berlin Academy of Science, that body having offered a handsome premium to anyone who would, by experiment, prove the Maxwellian theory.

Having commenced his investigations, Hertz found the difficulties greater than he anticipated. After a while he grew disheartened of achieving satisfactory results, and set the work aside. Later on he resumed his labours, and by an exhaustive process of scientific reasoning, with skilful experiment, finally arranged a simple apparatus by means of which he could propagate electro-magnetic waves in ether, could measure the wave lengths, their periodicity, together with other effects analogous to the attributes and properties of waves of Light. He found many peculiar features, among others that the electric waves passed through opaque bodies and solids under certain conditions. The appliances employed by Dr. Hertz were only adapted for the lecture hall. More recent investigators in Etheric Signalling have augmented in size and somewhat modified the original apparatus, but without altering the essential principles of its parts.