GUGLIELMO MARCONI
Premio Nobel 1909 2009

Presentation Speech by the former Rector General of National Antiquities H. Hildebrand, President of the Royal Swedish Academy of Sciences, on December 10, 1909

Your Majesty, Your Royal Highnesses, Ladies and Gentlemen.

Research in physics has provided us with many surprises. Discoveries which at first seemed to have but theoretical interest have often led to inventions of the greatest importance to the advancement of mankind. And if this holds good for physics in general, it is even more true in the case of research in the field of electricity.

The discoveries and inventions for which the Royal Academy of Sciences has decided to award this year's Nobel Prize for Physics, also have their origin in purely theoretical work and study. Important and epoch-making, however, as these were in their particular fields, no one could have guessed at the start that they would lead to the practical applications witnessed later.

While we are, this evening, conferring Nobel's Prize upon two of the men who have contributed most to the development of wireless telegraphy, we must first register our admiration for those great research workers, now dead, who through their brilliant and gifted work in the fields of mathematical and experimental physics, opened up the path to great practical applications. It was Faraday with his unique penetrating power of mind, who first suspected a close connection between the phenomena of light and electricity, and it was Maxwell who transformed his bold concepts and thoughts into mathematical language, and finally, it was Hertz who through his classical experiments showed that the new ideas as to the nature of electricity and light had a real basis in fact. To be sure, it was already well known before Hertz's time, that a capacitor charged with electricity can under certain circumstances discharge itself oscillatorily, that is to say, by electric currents passing to and fro. Hertz, however, was the first to demonstrate that the effects of these currents propagate themselves in space with the velocity of light, thereby producing a wave motion having all the distinguishing characteristics of light. This discovery - perhaps the greatest in the field of physics throughout the last half-century - was made in 1888. It forms the foundation, not only for modern science of electricity, but also for wireless telegraphy. But it was still a great step from laboratory trials in miniature where the electrical waves could be traced over but a small number of metres, to the transmission of signals over great distances. A man was needed who was able to grasp the potentialities of the enterprise and who could overcome all the various difficulties which stood in the way of the practical realization of the idea. The carrying out of this great task was reserved for Guglielmo Marconi. Even when taking into account previous attempts at this work and the fact that the conditions and prerequisites for the feasibility of this enterprise were already given, the honour of the first trials is nevertheless due, by and large, to Marconi, and we must freely acknowledge that the first success was gained as a result of his ability to shape the whole thing into a practical, usable system, added to his inflexible energy with which he pursued his self appointed aim.

Marconi's first experiment to transmit a signal by means of Hertzian waves was carried out in 1895. During the 14 years which have elapsed since then, wireless telegraphy has progressed without pause until it has attained the great importance it possesses today. In 1897 it was still only possible to effect a wireless communication over a distance of 14-20 km. Today, electrical waves are despatched between the Old and the New World, all the larger ocean-going steamers have their own wireless telegraphy equipment on board, and every Navy of significance uses a system of wireless telegraphy. The development of a great invention seldom occurs through one individual man, and many forces have contributed to the remarkable results now achieved. Marconi's original system had its weak points. The electrical oscillations sent out from the transmitting station were relatively weak and consisted of wave-series following each other, of which the amplitude rapidly fell-so-called "damped oscillations". A result of this was that the waves had a very weak effect at the receiving station, with the further result that waves from various other transmitting stations readily interfered, thus acting disturbing at the receiving station. It is due above all to the inspired work of Professor Ferdinand Braun that this unsatisfactory state of affairs was overcome. Braun made a modification in the layout of the circuit for the despatch of electrical waves so that it was possible to produce intense waves with very little damping. It was only through this that the so-called "long-distance telegraphy" became possible, where the oscillations from the transmitting station, as a result of resonance, could exert the maximum possible effect upon the receiving station. The further advantage was obtained that in the main only waves of the frequency used by the transmitting station were effective at the receiving station. It is only through the introduction of these improvements that the magnificent results in the use of wireless telegraphy have been attained in recent times.

Research workers and engineers toil unceasingly on the development of wireless telegraphy. Where this development can lead, we know not. However, with the results already achieved, telegraphy over wires has been extended by this invention in the most fortunate way. Independent of fixed conductor routes and independent of space, we can produce connections between far-distant places, over far-reaching waters and deserts. This is the magnificent practical invention which has flowered upon one of the most brilliant scientific discovery of our time!

[reference: Nobelprize.org]