Who Really Invented Radio

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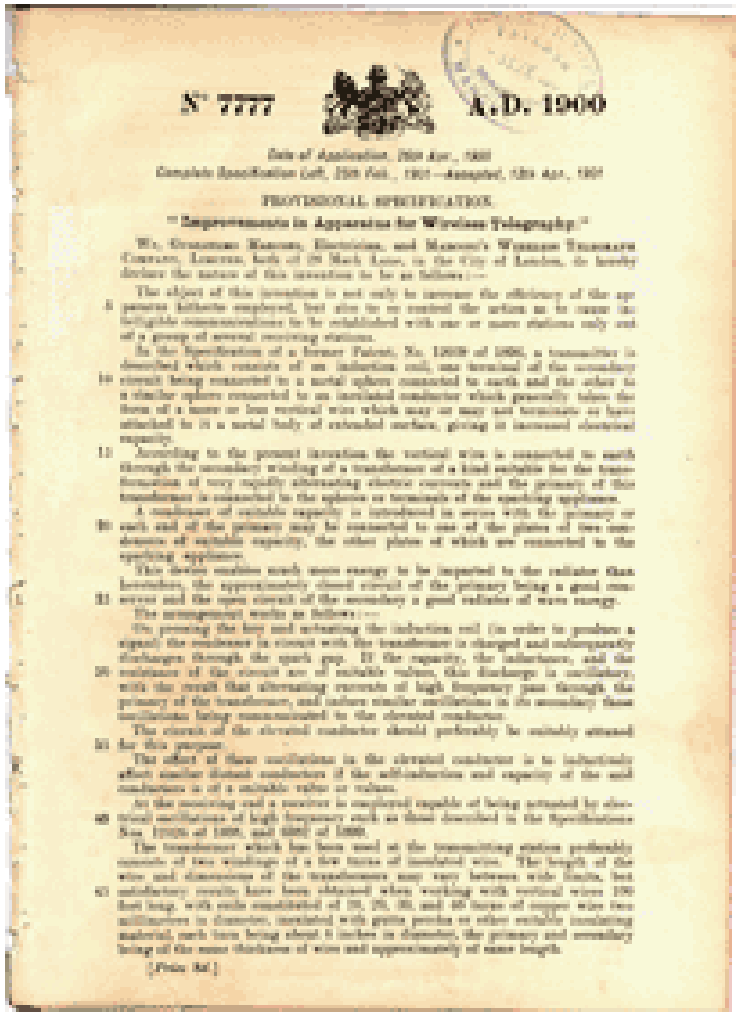
Traditional Answer

Marchese Guglielmo Marconi

Born 25 April 1874)
Palazzo Marescalchi, Bologna,Italy

Died 20 July 1937 (aged 63)
Rome, Italy



N° 7777 A.D. 1900

Date of Application, 26th Apr., 1900

Complete Specification Left, 25th Feb., 1901—Accepted, 13th Apr., 1901

PROVISIONAL SPECIFICATION.

"Improvements in Apparatus for Wireless Telegraphy."

We, GUGLIELMO MARCONI, Electrician, and MARCONI'S WIRELESS TELEGRAPH COMPANY, LIMITED, both of 18 Hatton Garden, in the City of London, do hereby declare the nature of this invention to be as follows:—

The object of this invention is not only to increase the efficiency of the apparatus hitherto employed, but also to so control the action as to render intelligible communications to be established with one or more stations only out of a group of several receiving stations.

In the Specification of a former Patent, No. 12039 of 1900, a transmitter is described which consists of an induction coil, one terminal of the secondary circuit being connected to a metal sphere connected to earth and the other to a similar sphere connected to an insulated conductor which generally takes the form of a more or less vertical wire which may or may not terminate in or have attached to it a metal body of extended surface, giving it increased electrical capacity.

According to the present invention the vertical wire is connected to earth through the secondary winding of a transformer of a kind suitable for the transformation of very rapidly alternating electric currents and the primary of this transformer is connected to the sphere or terminals of the sparking apparatus.

A condenser of suitable capacity is introduced in series with the primary or each end of the primary may be connected to one of the plates of two condensers of suitable capacity, the other plates of which are connected to the sparking apparatus.

This device enables much more energy to be imparted to the radiator than heretofore, the approximately closed circuit of the primary being a good conservator and the open circuit of the secondary a good radiator of wave energy.

The arrangement works as follows:—

On pressing the key and actuating the induction coil (in order to produce a signal) the condenser in circuit with the transformer is charged and subsequently discharges through the spark gap. If the capacity, the inductance, and the resistance of the circuit are of suitable values, this discharge is oscillatory, with the result that alternating currents of high frequency pass through the primary of the transformer, and induce similar oscillations in its secondary these oscillations being communicated to the elevated conductor.

The circuit of the elevated conductor should preferably be suitably attuned for this purpose.

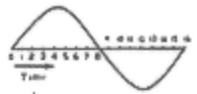
The effect of these oscillations in the elevated conductor is to inductively affect similar distant conductors if the self-induction and capacity of the said conductors is of a suitable value or values.

At the receiving end a receiver is employed capable of being actuated by electrical oscillations of high frequency such as those described in the Specifications Nos. 11578 of 1899, and 6567 of 1900.

The transformer which has been used at the transmitting station preferably consists of two windings of a few turns of insulated wire. The length of the wire and dimensions of the transformer may vary between wide limits, but satisfactory results have been obtained when working with vertical wires 100 feet long, with coils constituted of 10, 20, 30, and 40 turns of copper wire two millimetres in diameter, insulated with gutta percha or other suitable insulating material, each turn being about 6 inches in diameter, the primary and secondary being of the same thickness of wire and approximately of same length.

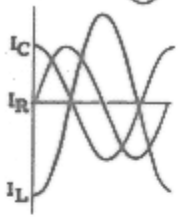
[Price 8d.]

Marconi's British Patent - 1900



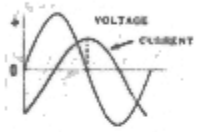
1831 Discovery and theory of induction by Michael Faraday and Joseph Henry.

1888 Radio waves detected and measured by Heinrich Hertz.

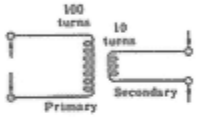


1890 Edouard Branly (1844-1940) invents a device, a "coherer," that becomes conducting in the presence of natural electric disturbances, such as lightning. (Powdered metal particles that attract one another as a field induces minute currents in them).

1892 William Preece (1834-1913), using loops of wire several hundred feet long, detects current interruptions in one with the other..

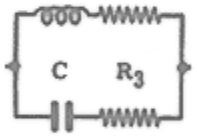


1894 Oliver Lodge (1851-1940) is first to employ the Branly coherer to sense "Hertzian waves" (radio waves).

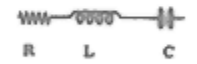


1895 Nikola Tesla is listening around New York to signals produced by high-frequency alternators at his Fifth Avenue laboratory. By tuning several sources at slightly separated frequencies, he is able to monitor the transmission at an audible beat frequency. In 1897, the year of his basic radio patent (U.S. No. 645,576), he is able to pick up a signal at West Point, 30 miles from his transmitter. (Tesla coils are in general use to power everyone's radio transmitters through the early years of the twentieth century.) He demonstrates a radio-controlled boat at Madison Square Garden in 1898.

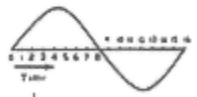
1896 Aleksandr Popov (1859-1906) transmits radio signals between buildings at the University of St. Petersburg.



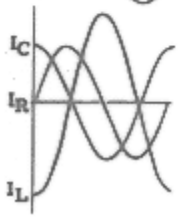
1896 Guglielmo Marconi (1874-1937) sends a radio signal nine miles across the Bristol Channel. In 1901, after weeks of effort, he sends a recognizable signal from England to Newfoundland, the first transatlantic wireless communication.



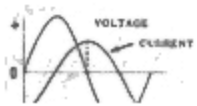
1899 Ferdinand Braun (1850-1918) contributes a "sparkless" antenna to the Marconi system, and shares with Marconi the Nobel Prize for Physics in 1909.



1902 Reginald Fessenden (1866-1932) conceives of "heterodyning" to simplify and improve radio receivers, though the principle wasn't of real use until De Forest's invention of the triode. (Two radio frequencies are beat together to give a single "intermediate" frequency.) He is first to broadcast speech and music, in 1906.



1904 John Fleming (1849-1945) produces the first vacuum-tube "diode detector," then known as the "thermionic valve."



1906 Lee De Forest (1873-1961) invents the three-element vacuum tube, or triode, making better signal processing and amplification possible. He called it an "audion."

1831

Discovery and Theory of Induction By Michael Faraday and Joseph Henry

Faraday's law of induction

is a basic law of electromagnetism, which is involved in the working of transformers, inductors and many forms of electrical generators.

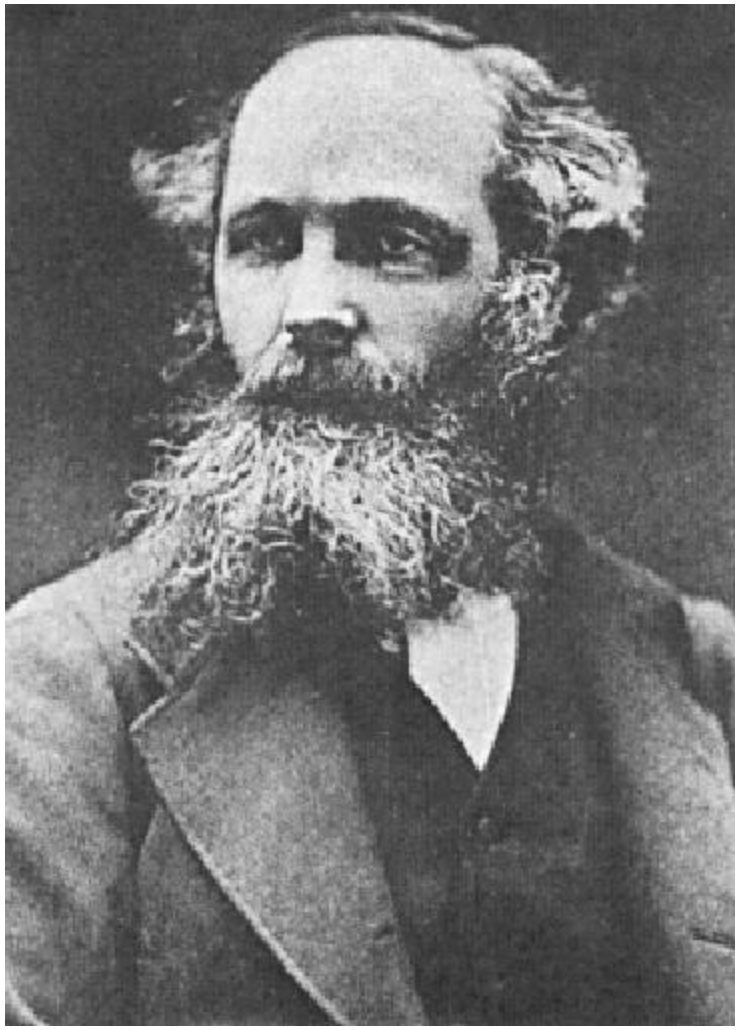
The induced electromotive force or EMF in any closed circuit is equal to the time rate of change of the magnetic flux through the circuit.

Faraday's law of induction is based on Michael Faraday's experiments in 1831. The effect was also discovered by Joseph Henry at about the same time, but Faraday published first.

In June 1832, the University of Oxford granted Faraday a Doctor of Civil Law degree (honorary). During his lifetime, Faraday rejected a knighthood and twice refused to become President of the Royal Society. In 1848, as a result of representations by the Prince Consort, Michael Faraday was awarded a grace and favour house in Hampton Court, Surrey free of all expenses or upkeep. This was the Master Mason's House, later called Faraday House.

Faraday died on 25 August 1867. He had previously turned down burial in Westminster Abbey, but he has a memorial plaque there, near Isaac Newton's tomb. Faraday was interred in the dissenters' (non-Anglican) section of Highgate Cemetery.

The history of radio really begins with the publication in 1873 of *Treatise of Electricity and Magnetism* by James Clerk Maxwell. Maxwell built upon the work of Faraday but his insights were extraordinary.



James Clerk Maxwell (1831 - 1879)

He calculated that the velocity of the induced electric waves was the same as the speed of light. He then realized that there was no set limit to the wave length (frequency) of these waves and he predicted the existence of other electromagnetic waves. His theory also suggested the ability to create electromagnetic waves artificially.

All these insights were combined in Maxwell's famous four equations -- Gauss' Law for Electrostatics; Gauss' Law for Magnetostatics; Faraday's Law; and Ampere's Law.

1892

Heinrich Hertz was the first to send and receive radio waves. James Clerk Maxwell had mathematically predicted their existence in 1864. Between 1885 and 1889, as a professor of physics at Karlsruhe Polytechnic, he produced electromagnetic waves in the laboratory and measured their wavelength and velocity. He showed that the nature of their reflection and refraction was the same as those of light, confirming that light waves are electromagnetic radiation obeying the Maxwell equations.

Annalen der Physik und Chemie
1887 - 1890

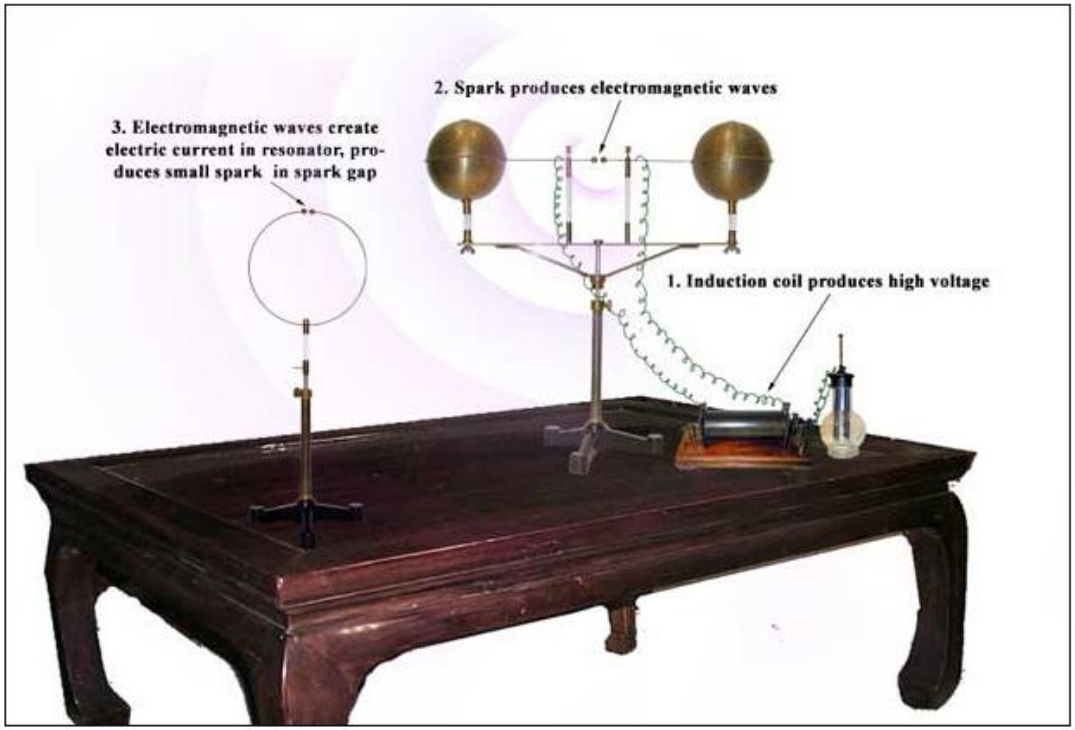
Early experimental Hertz radiator and resonator for creating and detecting Hertzian waves
~1890

1888

Radio waves detected and measured by Heinrich Hertz

Heinrich Rudolf Hertz
(1857-1894)

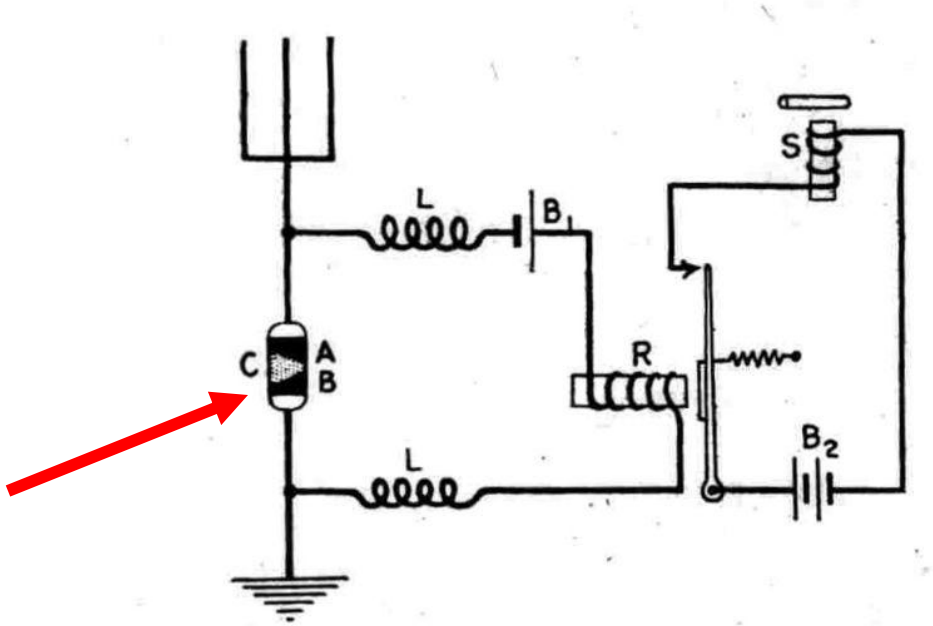
Hertz's Experiment:

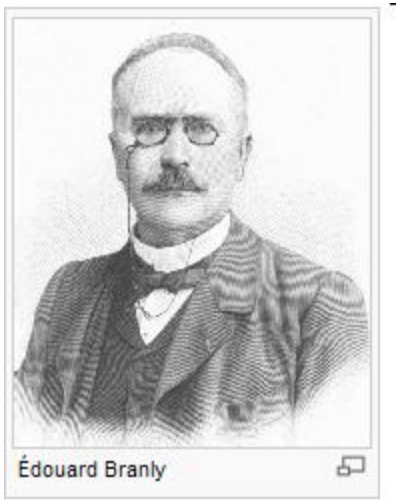


Heinrich Hertz was the first person to demonstrate experimentally the production and detection of Maxwell's waves. In 1887, using the spark of an induction coil, Hertz succeeded in producing and detecting electromagnetic waves. He showed experimentally that these waves possessed many of the properties of light, i.e., measurable velocity and wave length, reflection, refraction, and polarization. Hertz' demonstration of the existence of electromagnetic waves was originally of purely theoretical interest as confirmation of Maxwell's theory of the electromagnetic nature of electricity and light, but his discoveries led directly to the development of radio.

1890

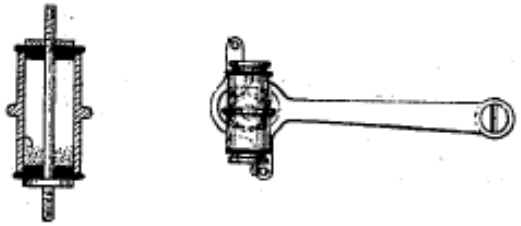
Edouard Branly (1844-1940) invents a device, a "coherer," that becomes conducting in the presence of natural electric disturbances, such as lightning. (Powdered metal particles that attract one another as a field induces minute currents in them).




Édouard Branly


Memorial to Edouard Branly in the Jardin du Luxembourg, Paris

The Coherer …. First Detector



Tesla's Coherer

U.S. Patent 613,809

Method of and Apparatus for Controlling Mechanism of Moving Vehicle or Vehicles

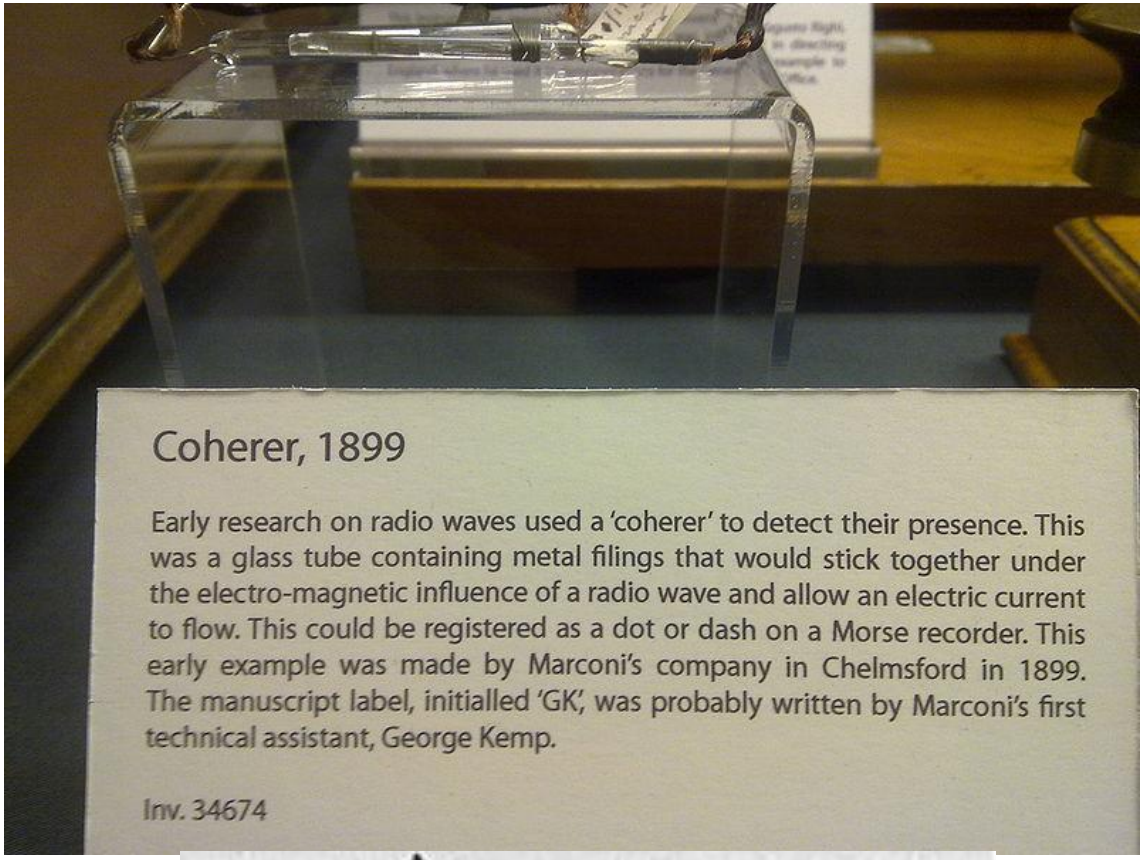
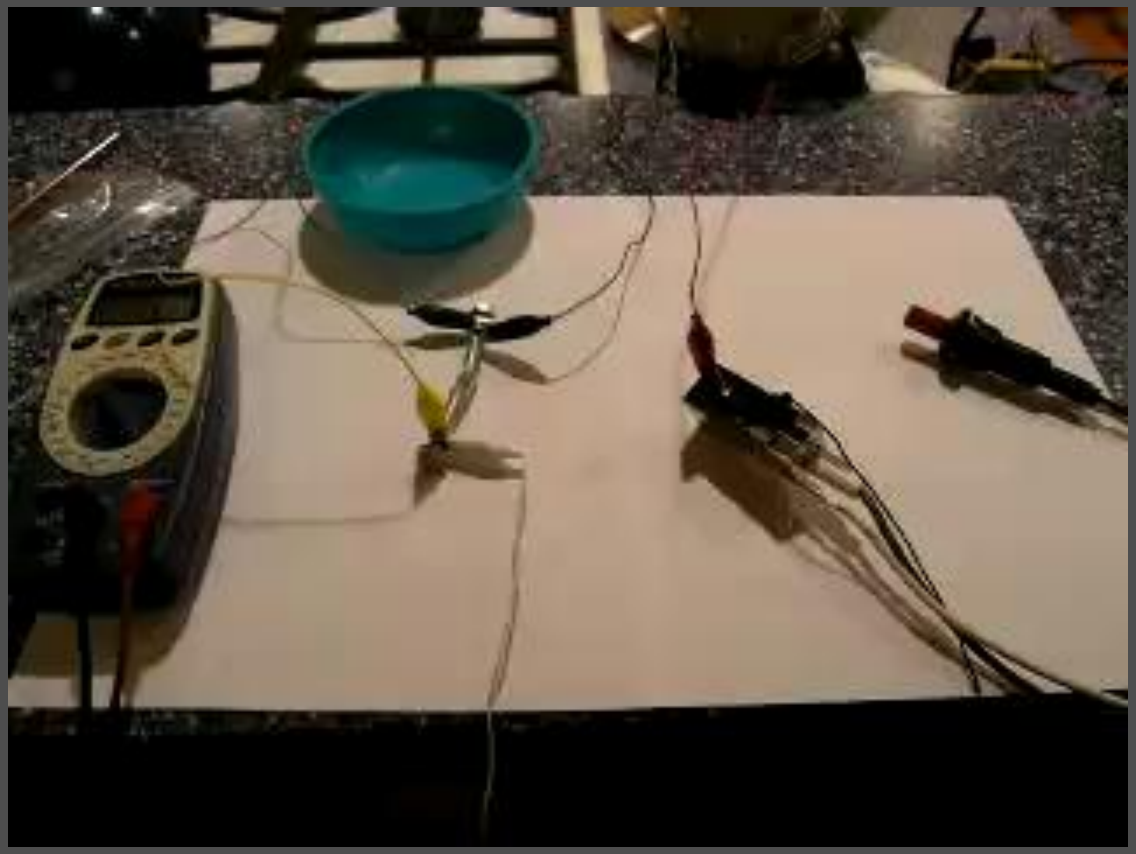
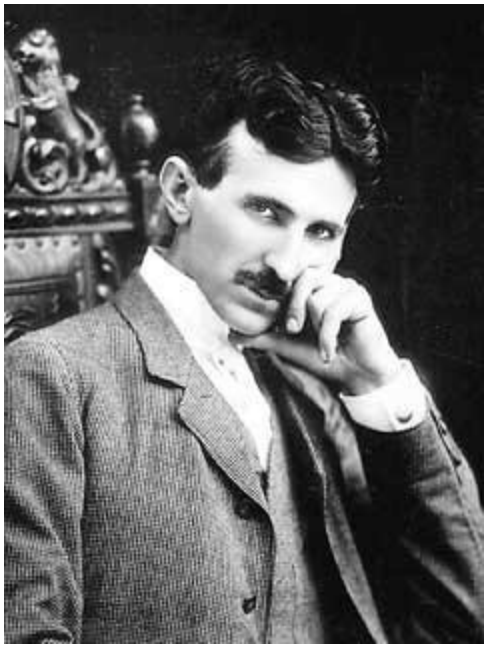


FIG. 41
Marconi coherer

The Coherer

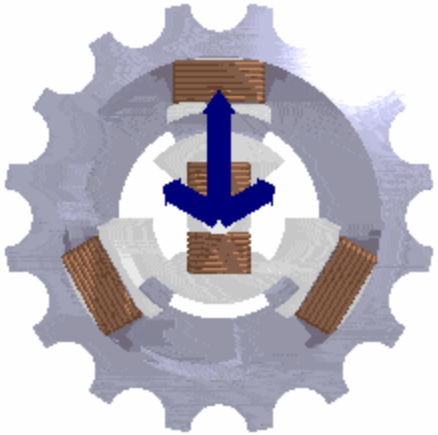




Nicola Tesla

Born 10 July 1856)
Smiljan, Austrian Empire
(Croatian Military Frontier)

Died 7 January 1943
(aged 86)
New York City, New York,
USA

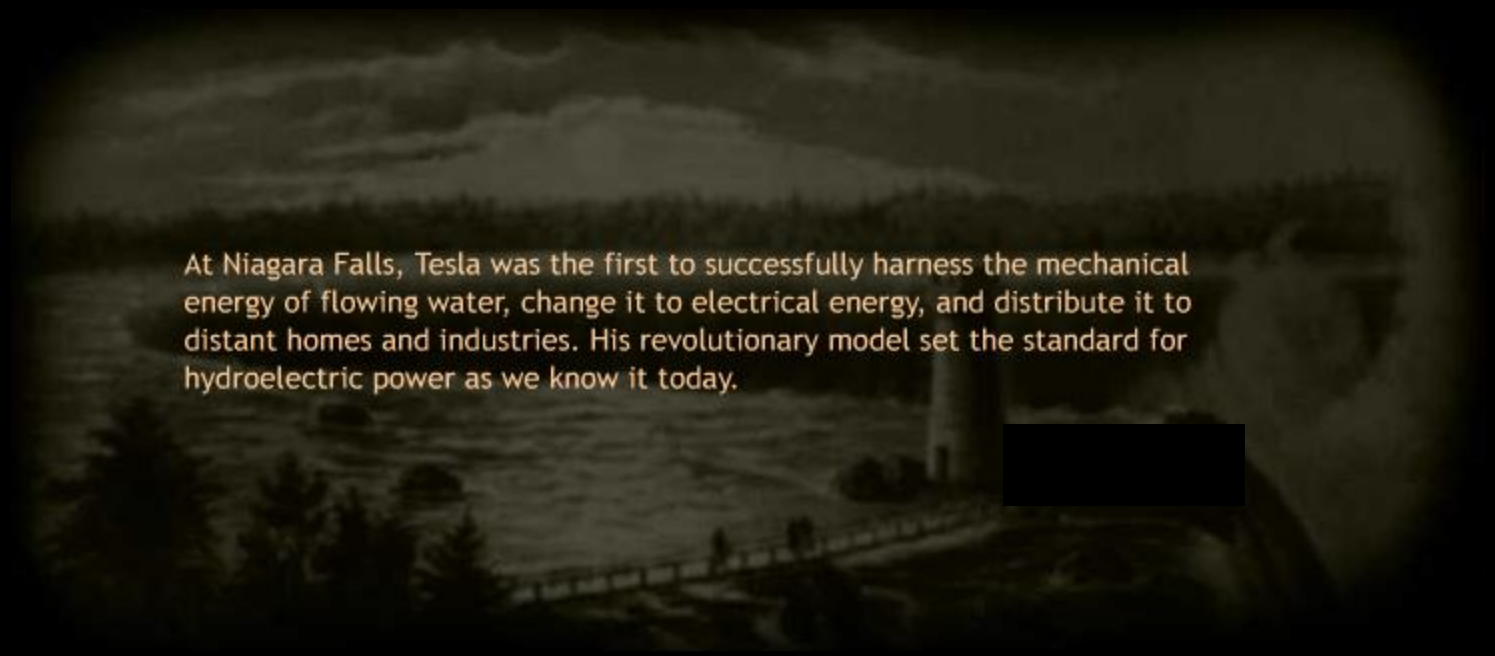


He is frequently cited as one of the most important contributors to the birth of commercial electricity and is best known for his many revolutionary developments in the field of electromagnetism in the late 19th and early 20th centuries. Tesla's patents and theoretical work formed the basis of modern alternating current (AC) electric power systems, including the polyphase system of electrical distribution and the AC motor, with which he helped usher in the Second Industrial Revolution.

Born an ethnic Serb in the village of Smiljan, Croatian Military Frontier, in the territory of today's Croatia, he was a subject of the Austrian Empire by birth and later became an American citizen. After his demonstration of wireless communication through radio in 1894 and after being the victor in the "War of Currents", he was widely respected as one of the greatest electrical engineers who worked in America.

Much of his early work pioneered modern electrical engineering and many of his discoveries were of groundbreaking importance. During this period, in the United States, Tesla's fame rivaled that of any other inventor or scientist in history or popular culture, but due to his eccentric personality and his seemingly unbelievable and sometimes bizarre claims about possible scientific and technological developments, Tesla was ultimately ostracized and regarded as a mad scientist.

Tesla never put much focus on his finances. It is said he died impoverished, at the age of 86.


At Niagara Falls, Tesla was the first to successfully harness the mechanical energy of flowing water, change it to electrical energy, and distribute it to distant homes and industries. His revolutionary model set the standard for hydroelectric power as we know it today.

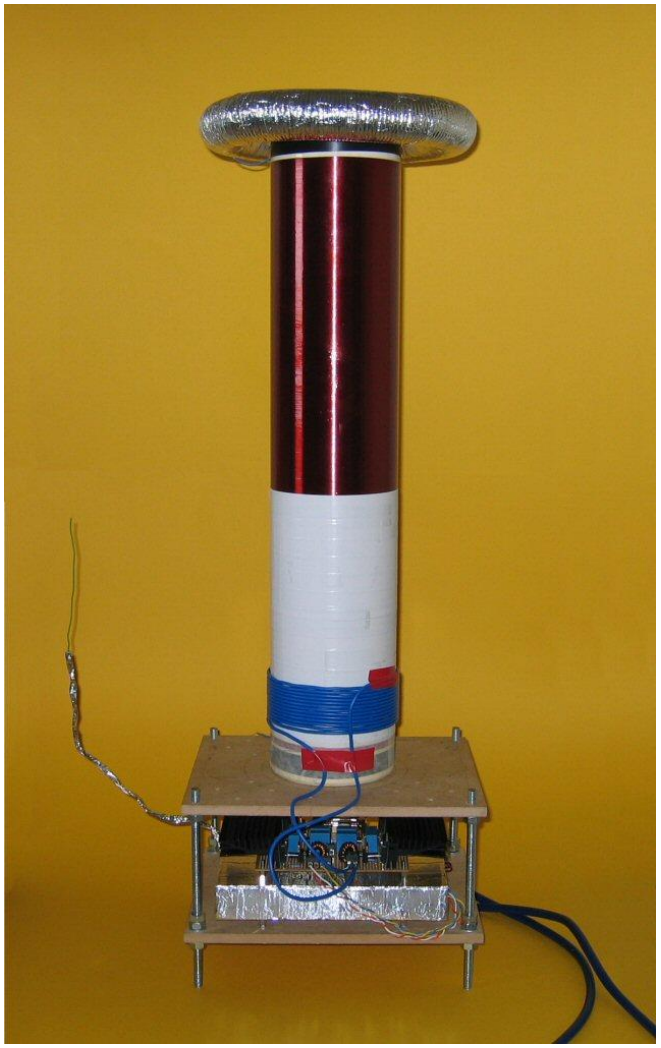
Tesla's AC System

At the core of Tesla's AC power system is the law of conservation of energy:

Energy cannot be created or destroyed...

...but it can be changed.

Tesla began his high frequency investigations by building rotary AC generators that could run at higher speeds; but as he approached twenty thousand cycles per second, the machines began to fly apart, leaving him far short of his goal. The answer came with a remarkable device still known today as a Tesla coil. Patented in 1891, this invention took ordinary sixty-cycle per second household current and stepped it up to extremely high frequencies—into the hundreds of thousands of cycles per second. In addition to high frequencies, the coil could also generate extremely high voltages.



With high frequencies, Tesla developed some of the first neon and fluorescent illumination. He also took the first x-ray photographs. But these discoveries paled when compared to his discovery of November 1890, when he illuminated a vacuum tube wirelessly—having transmitted energy through the air.

1895

Nikola Tesla is listening around New York to signals produced by high-frequency alternators at his Fifth Avenue laboratory. By tuning several sources at slightly separated frequencies, he is able to monitor the transmission at an audible beat frequency. In 1897, the year of his basic radio patent (U.S. No. 645,576), he is able to pick up a signal at West Point, 30 miles from his transmitter. (Tesla coils are in general use to power everyone's radio transmitters through the early years of the twentieth century.) He demonstrates a radio-controlled boat at Madison Square Garden in 1898.

With his newly created Tesla coils, the inventor soon discovered that he could transmit and receive powerful radio signals when they were tuned to resonate at the same frequency. When a coil is tuned to a signal of a particular frequency, it literally magnifies the incoming electrical energy through resonant action. By early 1895, Tesla was ready to transmit a signal 50 miles to West Point, New York... But in that same year, disaster struck. A building fire consumed Tesla's lab, destroying his work.

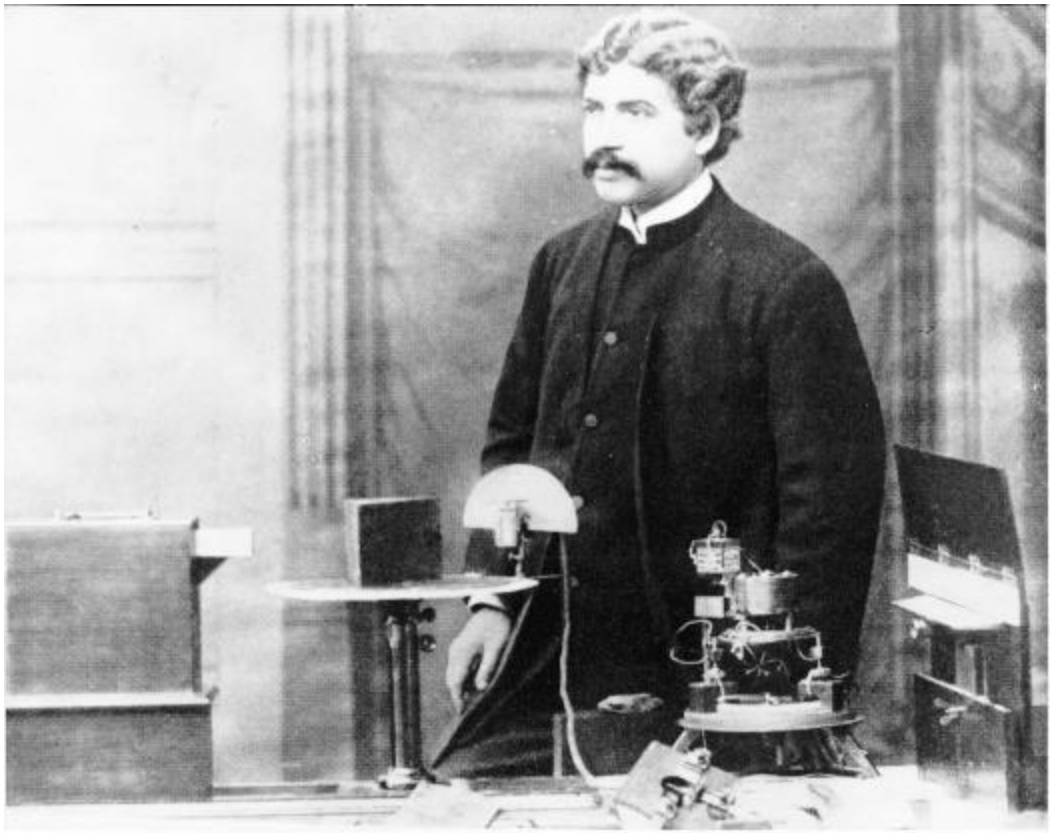
The timing could not have been worse. In England, a young Italian experimenter named Guglielmo Marconi had been hard at work building a device for wireless telegraphy. The young Marconi had taken out the first wireless telegraphy patent in England in 1896. His device had only a two-circuit system, which some said could not transmit "across a pond." Later Marconi set up long-distance demonstrations, using a Tesla oscillator to transmit the signals across the English Channel.

Tesla filed his own basic radio patent applications in 1897. They were granted in 1900. Marconi's first patent application in America, filed on November 10, 1900, was turned down. Marconi's revised applications over the next three years were repeatedly rejected because of the priority of Tesla and other inventors.

The Patent Office made the following comment in 1903:

“Many of the claims are not patentable over Tesla patent numbers 645,576 and 649,621, of record, the amendment to overcome said references as well as Marconi's pretended ignorance of the nature of a "Tesla oscillator" being little short of absurd... the term "Tesla oscillator" has become a household word on both continents [Europe and North America]. “

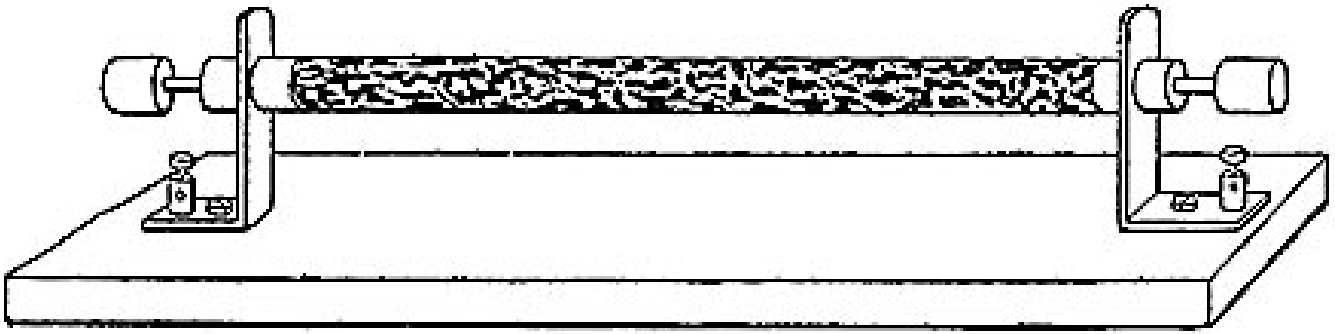
1894



Oliver Lodge (1851-1940) is first to employ the Branly coherer to sense "Hertzian waves" (radio waves).

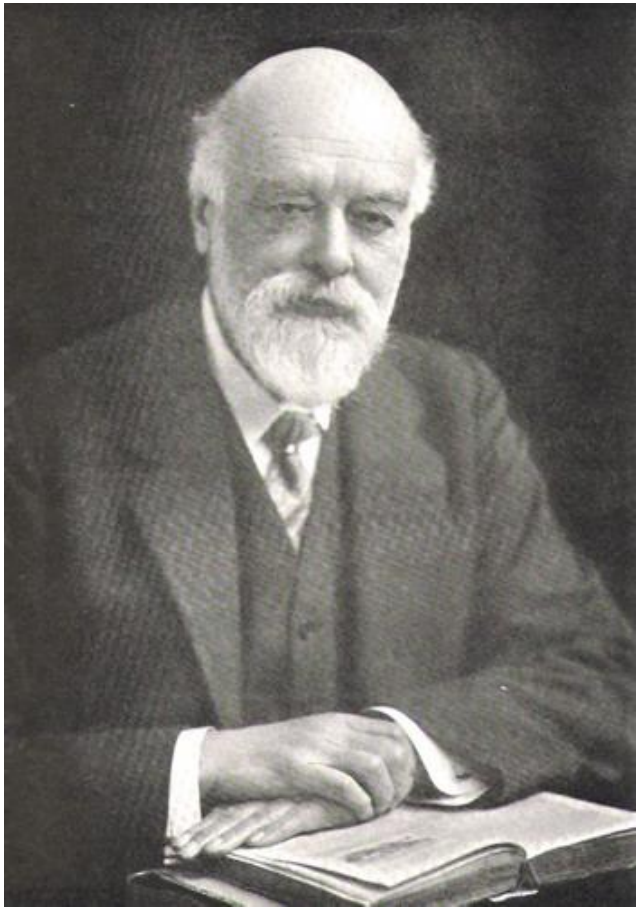
By the year 1887, the 36-year-old Oliver Lodge was already regarded in Great Britain as a highly accomplished scientist. A professor of physics at the newly-established University College in Liverpool, he was known for his brilliant scientific mind and ability to explain complex scientific principles in a manner that could be understood by virtually anyone. In 1887, the Royal Society of Arts asked Lodge to prepare a series of lectures, to be given the following year, concerning how buildings might best be protected from lightning damage.

Sir Oliver Lodge
Smithsonian Institution Photographic Services.



Perhaps Lodge's most important improvements to the filings tube coherer were the evacuation of the air from the tube and the development of an automatic "tapping back" device which utilized a rotating spoke wheel driven by a clockwork mechanism. The mechanical impulses provided by the tapping back device restored the filings tube coherer to its non-conducting state at regular intervals, independent of the detection of electromagnetic waves.

Lodge used his improved filings tube coherer, together with a Hertzian wave oscillator, as part of a demonstration for a commemorative lecture entitled "The Work of Hertz" given in London at a meeting of the Royal Institution in June of 1894. A sensitive mirror galvanometer was connected to the coherer so that the detection of the electromagnetic waves was visible to the audience in the form of a moving beam of light.



While Oliver Lodge is remembered for numerous significant scientific achievements, including his contributions to the development of wireless telegraphy, it might be said that he let "the two big ones" slip through his fingers. Had he proceeded with his alternate path experiments a little more rapidly, Lodge might be the one whom we today credit with having experimentally verified Maxwell's predictions. Similarly, if Lodge had realized the potential of wireless communication, Marconi might have had to share with him the unofficial but commonly used title "Father of Radio."

1896

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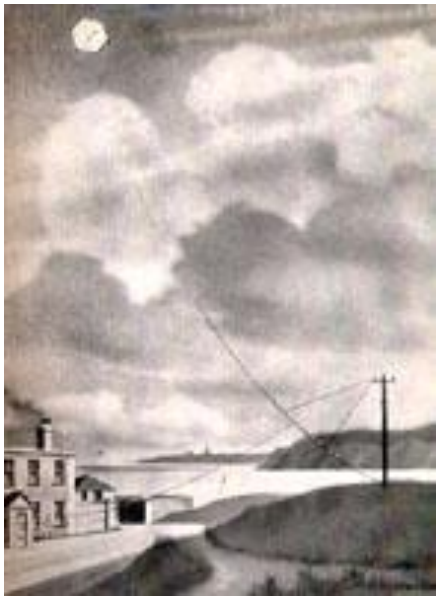
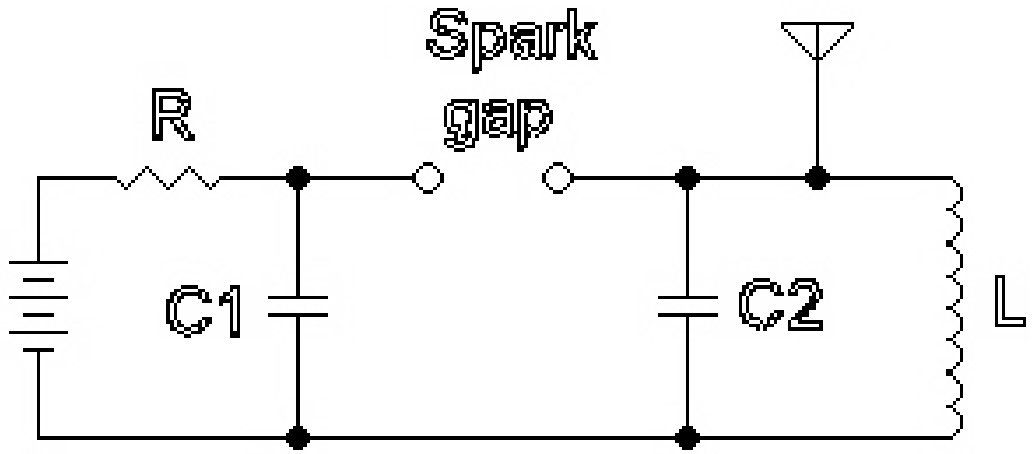


Guglielmo Marconi was born in 1874 into a wealthy family in Bologna, Italy, and educated by private tutors. He developed an interest in science, particularly the work of German physicist Heinrich Hertz on the transmission of electromagnetic waves through the air. Though he failed the entrance exam at the University of Bologna, Marconi began experimenting with wireless telegraphy on his own in 1894. He discovered that by connecting his transmitter and receiver to the earth (grounding them), and then increasing the height of the antenna, he could extend the range of the signal. Despite this important technical breakthrough, the Italian government declined to sponsor his work.

Marconi moved to Great Britain where his work received greater support. In 1896 he patented his first device for wireless telegraphy and in 1897 found investors for his Wireless Telegraph and Signal Company, which began manufacturing radio sets that were able to transmit and receive messages in Morse Code.



Marconi constructed a transmitter at Poldhu, Cornwall, in the west of England and another at Cape Cod in Massachusetts. When a storm damaged the Poldhu antenna, and it had to be replaced by a smaller one, Marconi decided to change the North American destination to St. John's Newfoundland. In any event, the Cape Cod station was itself destroyed in a storm.

In December 1901 Marconi assembled his receiver at Signal Hill, St. John's, nearly the closest point to Europe in North America. He set up his receiving apparatus in an abandoned hospital that straddled the cliff facing Europe on the top of Signal Hill. After unsuccessful attempts to keep an antenna aloft with balloons and kites, because of the high winds, he eventually managed to raise an antenna with a kite for a short period of time for each of a few days. Accounts vary, but Marconi's notes indicate that the transatlantic message was received via this antenna

At the appointed time each day his staff in Poldhu transmitted the Morse code letter "s" - three dots. This signal had been chosen as the most easily distinguished. On the 12 December Marconi pressed his ear to the telephone headset of his rudimentary receiver and successfully heard "pip, pip, pip" - 1700 miles from the transmitter.

Marconi continued to experiment with long-wave and short-wave transmission as well as to manage his business interests until his death in 1937. His work, and that of other scientists and inventors, had revolutionized communications at sea and on land and had created whole new industries, such as radio broadcasting. Marconi's patents and investments made him wealthy and his scientific achievements led to his sharing the Nobel Prize for Physics in 1909. But he is primarily remembered for his reception of the first wireless signal across the Atlantic Ocean at Signal Hill.

Guglielmo Marconi is generally credited with the invention of radio -- wireless transmission of a message. Around 1895 he developed an improved *coherer* -- a glass tube loosely filled with zinc and silver filings. The device was originally invented by Joseph Lodge and was used to detect radio waves. The coherer would become conductive in the presence of a strong radio wave. The coherer was the earliest true *radio receiver*. Marconi hooked the coherer to a crude *antenna* with its lower end grounded. He also improved the spark oscillator -- the earliest true *radio transmitter* -- and hooked it to an antenna. He used a telegraph key to turn the spark oscillator on and off thereby sending out a message to the antenna hooked to the coherer. The coherer actuated a telegraphic instrument through a relay.

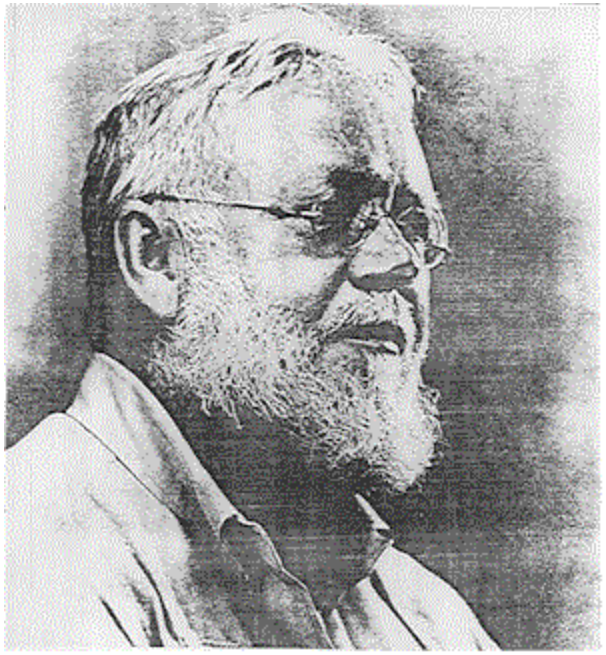
So

By 1903 Marconi was well into establishing an empire based largely on legislation requiring all large ships to have wireless on board

Tesla was on to other great things mostly involving the generation and distribution of electricity by AC transmission systems.

Tesla held the patent on “Radio” which Marconi (despite using a number of Tesla’s patents in his product), had several time failed to overturn in US courts.

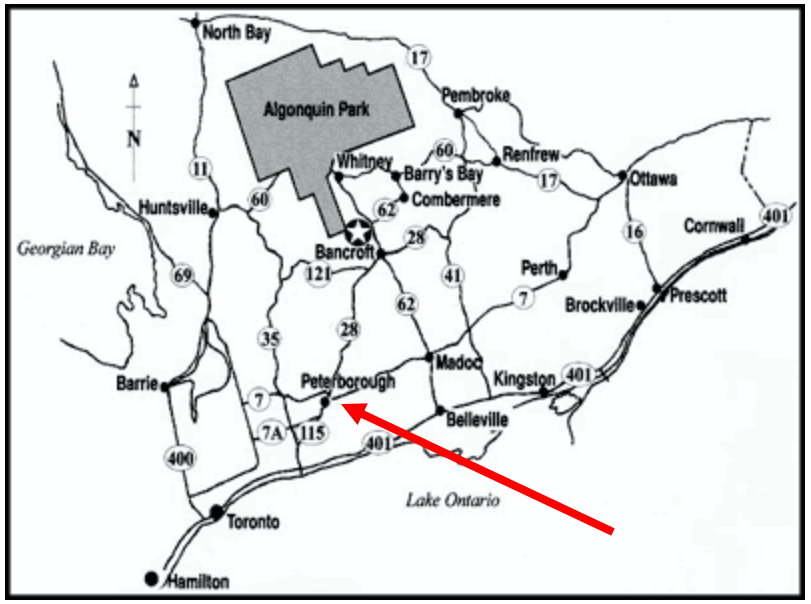
1902



Reginald Fessenden (1866-1932) conceives of "heterodyning" to simplify and improve radio receivers, though the principle wasn't of real use until De Forest's invention(?) of the triode. (Two radio frequencies are beat together to give a single "intermediate" frequency.) He is first to broadcast speech and music, in 1906.

If Canadian radio archives do not contain as much material as they should, there is one historical event well documented - the achievement of Guglielmo Marconi, an Italian who made radio history by transmitting the letter "s" in Morse code from Cornwall, England to a receiving station on Signal Hill overlooking St. John's Harbour in Newfoundland on December 12, 1901.

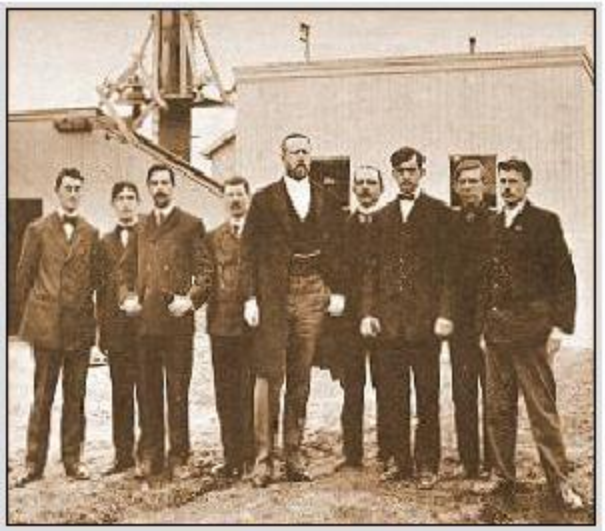
But an equally historic event, the achievement of a brilliant Canadian inventor, Reginald Aubrey Fessenden, is generally ignored and largely unknown. On December 24, 1906, at 9 P.M. eastern standard time, Reginald Fessenden transmitted human voices from Brant Rock near Boston, Massachusetts to several ships at sea owned by the United Fruit Company.



In 1896 Marconi's successful experiment on Salisbury Plains in the U.K. where he transmitted a radio signal netted the inventor £76,000 from the British government for the patent. Discouraged because Marconi seemed to be leading the race, Fessenden took off for a long holiday near Peterborough, Ontario. His radio ideas had dried up on him and he was thoroughly depressed. It was while he was daydreaming beside a lake during his holiday that the ripples on the lake spreading out from a stone he had dropped, gave him the idea he needed. What if sound waves travelling out from the centre were continuous like the ripples on the lake?

On that cold December night Fessenden knew he had given the world one of the greatest Christmas presents it would ever receive. Without wires across vast distances, he had transmitted human voices. The word was made known and Fessenden truly believed the world was now at his feet.

Instead, the rest of Fessenden's life was a constant struggle for recognition for his inventions and compensation from his rich partners who had sold his patents out from under him to large American companies. Fessenden returned to Canada from time to time but he never settled here again and died finally, relatively unknown, in Bermuda. American books that do condescend to recognize Fessenden's achievement describe him as the "American Marconi." Perhaps it is just as well he never had the chance to read that.



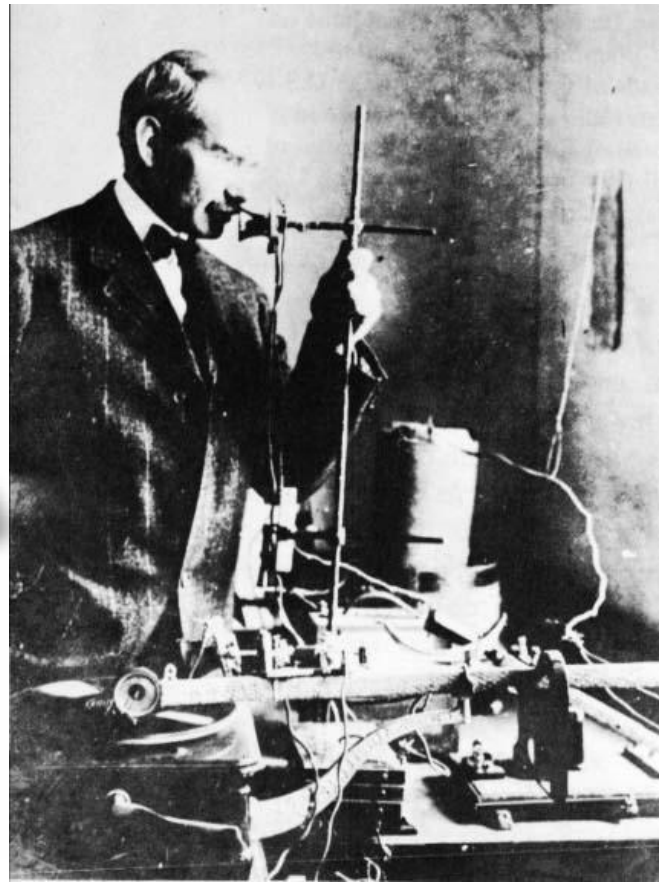
Reginald Fessenden and his associates at Brant Rock (Hammond Museum of Radio)

1904

Sir John Ambrose Fleming (1849-1945) produces the first vacuum-tube "diode detector," then known as the "thermionic valve."

1906

Vacuum tubes started with the Fleming valve at the upper left. The text explains how Lee De Forest added the grid, creating the triode or audion. A modern triode is shown immediately above at the left, with part of the plate broken away to show how the fencelike grid surrounds the M-shaped filament. Addition of a cathode gives the "screen grid," and of another grid, the "pentode." In these two tubes, the filament is simply a heater, and the cathode gives off the necessary electrodes. A screen grid tube is shown immediately above at the right.



Lee De Forest (1873-1961) invents the three-element vacuum tube, or triode, making better signal processing and amplification possible. He called it an "audion."

All these men made major discoveries that, in one way or another contributed to the "Invention of Radio"

Why then, did Marconi come to be publicly thought of as the "Father of Radio"?

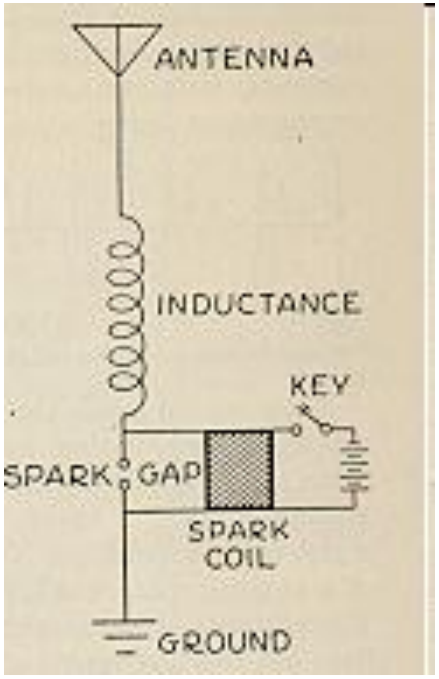
There were two things

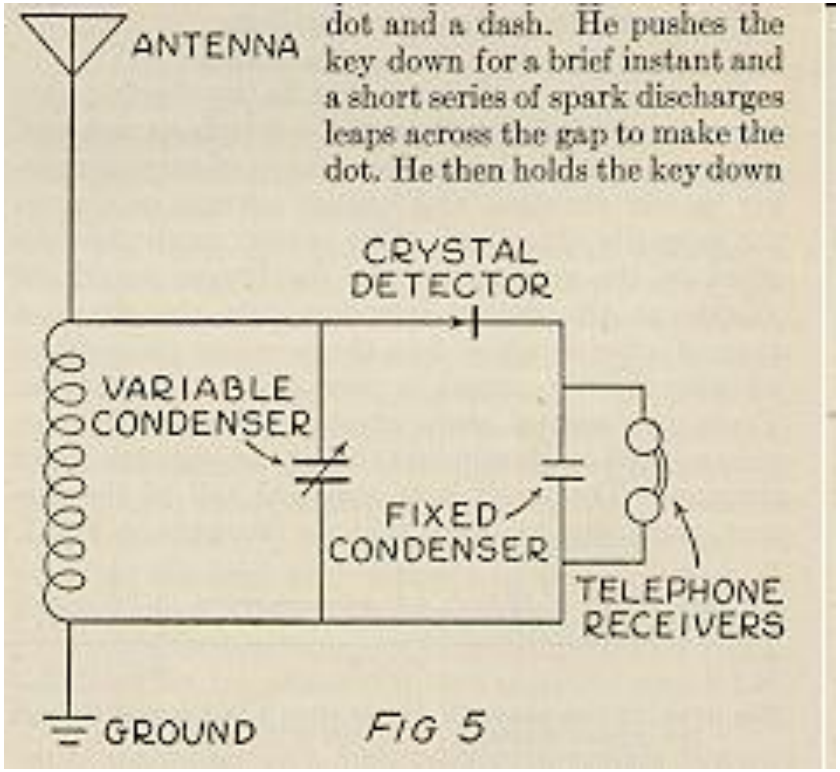
Titanic - 1912

The 1909 Nobel Prize

For Physics

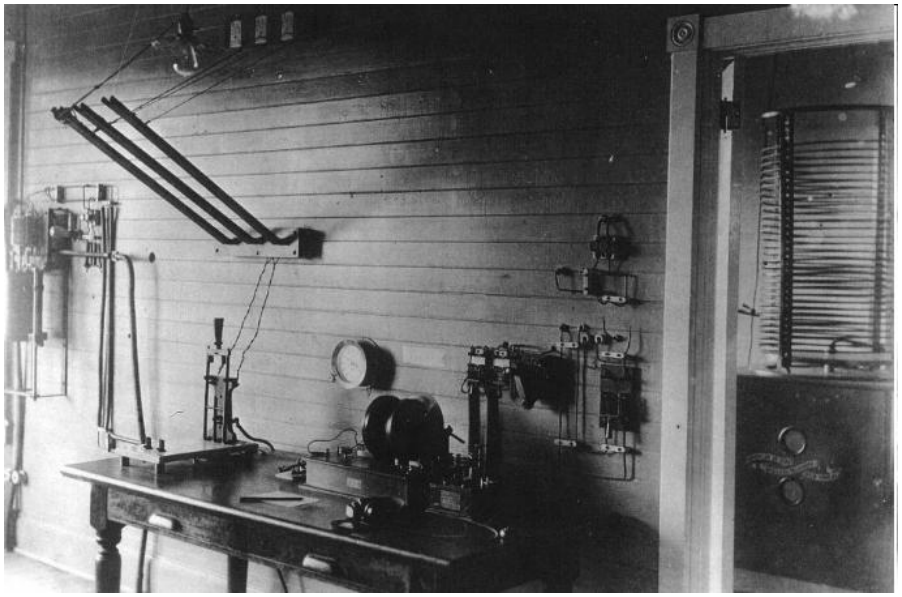
In 1896 Marconi succeeded in sending a message over a distance of 1 mile and by 1897 was able to send messages to a ship at sea 18 miles distant. In 1901 he sent messages over a distance of 200 miles and by 1902 across the Atlantic ocean.





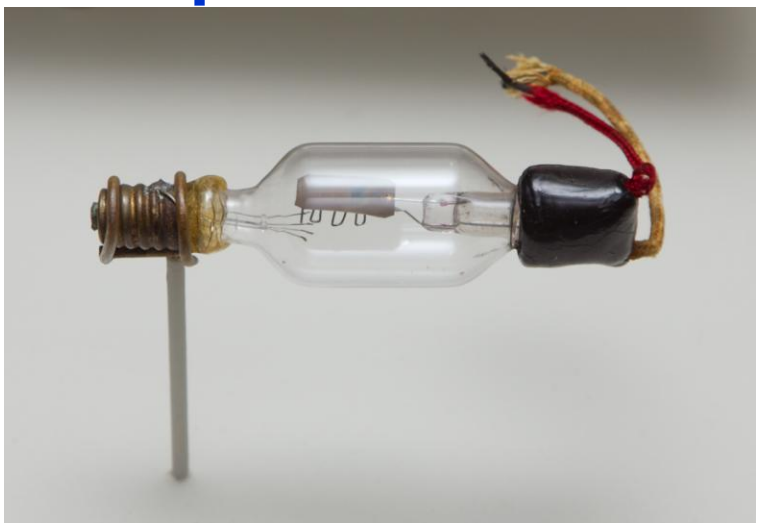
The early spark equipment could only be used to send and receive *morse code*. For voice to be transmitted the vacuum tube was necessary because voice required amplification and much more sophisticated detection. The original vacuum tube was developed by Thomas Edison. He discovered that a current will flow between the hot filament of an incandescent lamp and another electrode placed in the lamp and that this current will flow in only one direction.

In 1904 John Fleming developed the *diode*, or two-element tube. This tube was used as a detector, rectifier, and limiter.



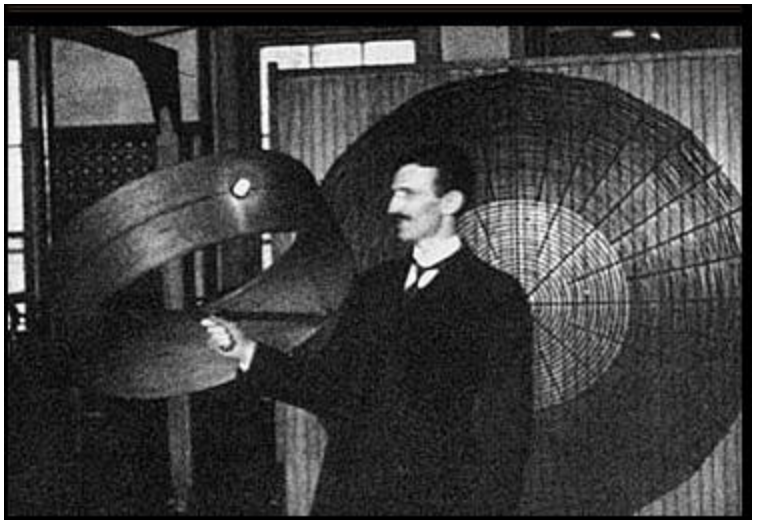
A key advance in the history of radio and the beginnings of the science of *electronics* was the creation of the triode tube by Lee De Forest in 1906. Although some claim that Reginald Fessenden was the real inventor and De Forest stole the design, nevertheless De Forest patented the design in 1906. The breakthrough was the addition of a *grid* between the filament and the plate.

This made the triode an *amplifier* and made voice transmission and reception possible.



What Happened to Tesla?

In life nothing is sure and no patent is truly safe, as Tesla's career demonstrates. In 1900, the Marconi Wireless Telegraph Company, Ltd. began thriving in the stock markets—due primarily to Marconi's family connections with English aristocracy. British Marconi stock soared from $3 to $22 per share and the glamorous young Italian nobleman was internationally acclaimed. Both Edison and Andrew Carnegie invested in Marconi and Edison became a consulting engineer of American Marconi. Then, on December 12, 1901, Marconi for the first time transmitted and received signals across the Atlantic Ocean.



Otis Pond, an engineer then working for Tesla, said, *"Looks as if Marconi got the jump on you."* Tesla replied, *"Marconi is a good fellow. Let him continue. He is using seventeen of my patents."*

But Tesla's calm confidence was shattered in 1904, when the U.S. Patent Office suddenly and surprisingly reversed its previous decisions and gave Marconi a patent for the invention of radio. The reasons for this have never been fully explained, but the powerful financial backing for Marconi in the United States suggests one possible explanation.

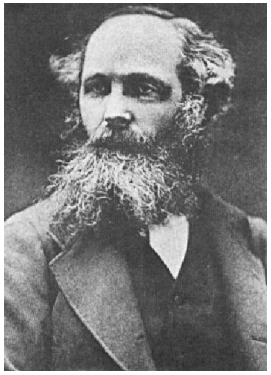
US Patent Office 1909

When Marconi won the Nobel Prize in 1911, Tesla was furious. He sued the Marconi Company for infringement in 1915, but was in no financial condition to litigate a case against a major corporation. It wasn't until 1943—a few months after Tesla's death— that the U.S. Supreme Court upheld Tesla's radio patent number 645,576. The Court had a selfish reason for doing so. The Marconi Company was suing the United States Government for use of its patents in World War I. The Court simply avoided the action by restoring the priority of Tesla's patent over Marconi.

So Who Really Did Invent Radio?

Marconi

Faraday



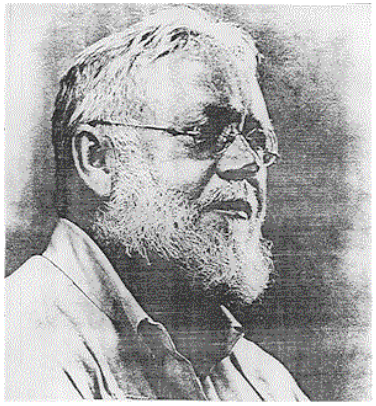
Maxwell

Hertz

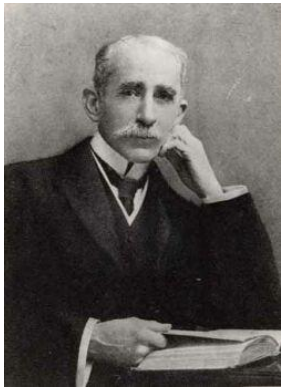
Branly

Tesla

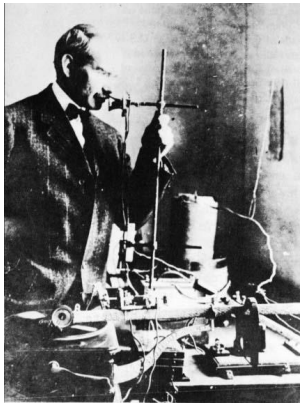
Lodge



Fesenden



Fleming



De Forest

If You ask the lawyers

The answer is Tesla whose US Patent number 645,576 was restored by the US Supreme Court in 1943

If you ask the average person

The answer is probably Marconi who is best known and did develop many of the practical applications

If You Ask Canadians Who Know Radio

The popular favourite would be Fesenden who broadcast and received voice long before anyone else and conceived of broadcasting as we know it today.

The Real Answer

Is probably that Radio was not so much "invented" as it was "discovered" over a period of history

All these men had a big hand in the discovery of radio.