



The Forefathers of Radio

By Bob Buus, W2OD

Benjamin Franklin

Jan. 17, 1706 – April 17, 1790 (84)

- Born in Boston
- Apprentice Printer
- 1723 – to Philadelphia
- 1723-26 – in London
- Printing Business
- Retired in 1747
- Statesman
- Founder of USA



Franklin's Electrical Observations

- Peter Collinson sent “electric tube” in 1747
- Vitreous and Resinous electricity
- Claimed electricity was charge “flowing”
- Vitreous assumed positive, resinous negative
- Named collection of Leyden jars “battery”
- Proposed lightning was form of electricity
- Verified by French on May 10, 1752
- Flew Kite to verify in June 1752

Franklin's Electrical Publications

- Published observations in 1751
- Translated to French in 1752
- Followed by Italian, German, and Latin
- Five English editions by 1774
- Widely read by European scientists
- Cgs unit of charge is the Franklin (statcoulomb)

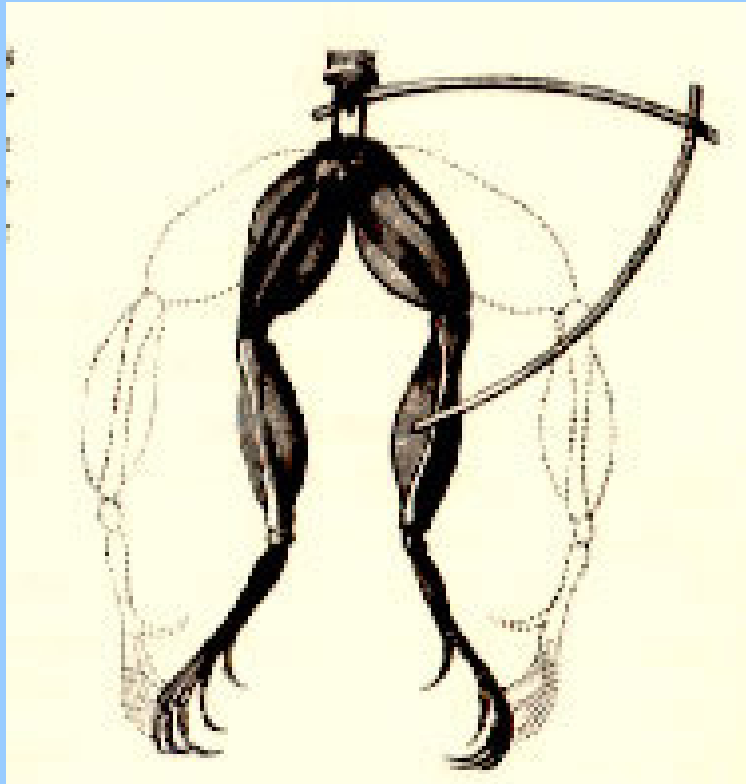
Luigi Galvani

September 9, 1737 – December 4, 1798 (61)

- Medical Doctor
- University of Bologna
- Electricity as life force
- Experimented with frog's legs
- Thought “animal electricity” was produced by the brain and flowed along nerves



Frog Leg Experiment



- Frog Legs hung on brass hook (top)
- If wire touching lower leg is Iron, leg will swing out
- If wire is copper or brass, there is no effect

Alessandro Volta

February 18, 1745 – March 5, 1827 (82)

- Friend of Galvani
- Prof. of Physics
- Disagreed with Galvani
- Univ. of Pavia 1779-1814
- Univ. of Padua 1815-
- Galvanic Cell
- Invented Voltaic pile in 1800



Voltaic Pile

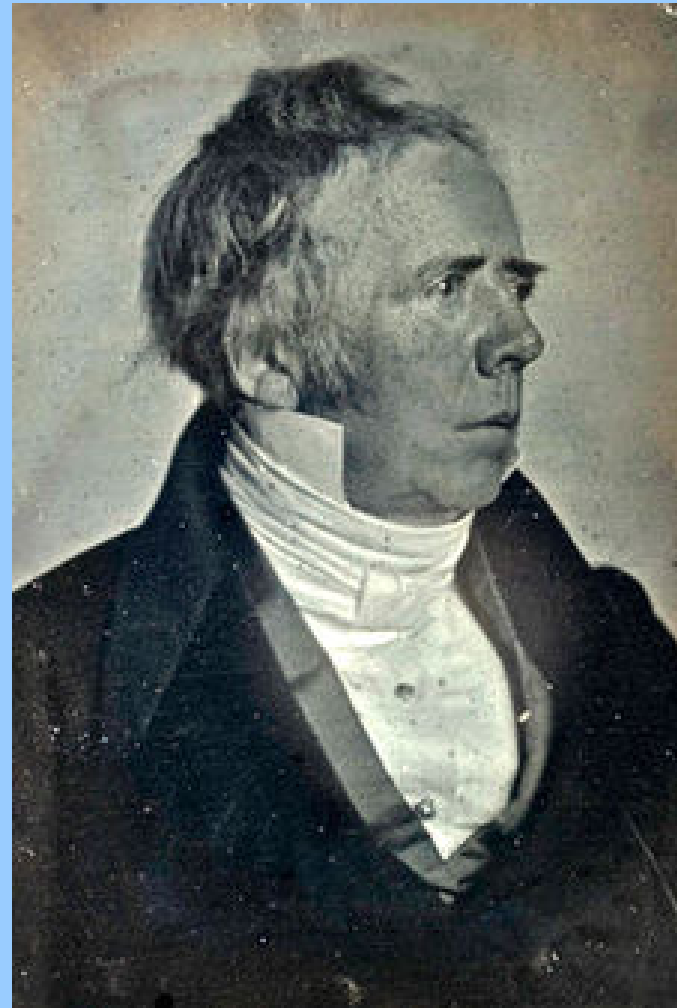


- A stack of Galvanic cells
- Each cell consists of a disc of copper, a blotter saturated with a mild acid (vinegar), and a disc of zinc
- Each cell produces about 1 volt, the SI unit of EMF

Hans Christian Oersted

August 14, 1777 – March 9, 1851 (73)

- Prof. University of Copenhagen
- Noticed compass deflection with current from voltaic pile
- Published results on April 20, 1820
- Produced Aluminum in 1825
- Cgs Unit of H-field



Andre Marie Ampere

January 20, 1775 – June 10, 1836 (61)

- 9/11/1820 – Heard of Oersted's work
- 9/18/1820 – Presented paper on magnetic fields around current-carrying wires
- Solenoid enhances magnetic field
- SI unit of current



Georg Simon Ohm

March 16, 1789 – July 6, 1854 (65)

- Voltaic Piles used
- Observed that flow of electricity was proportional to number of cells
- Called the ratio of voltage to current the resistance (1827)
- SI unit of resistance



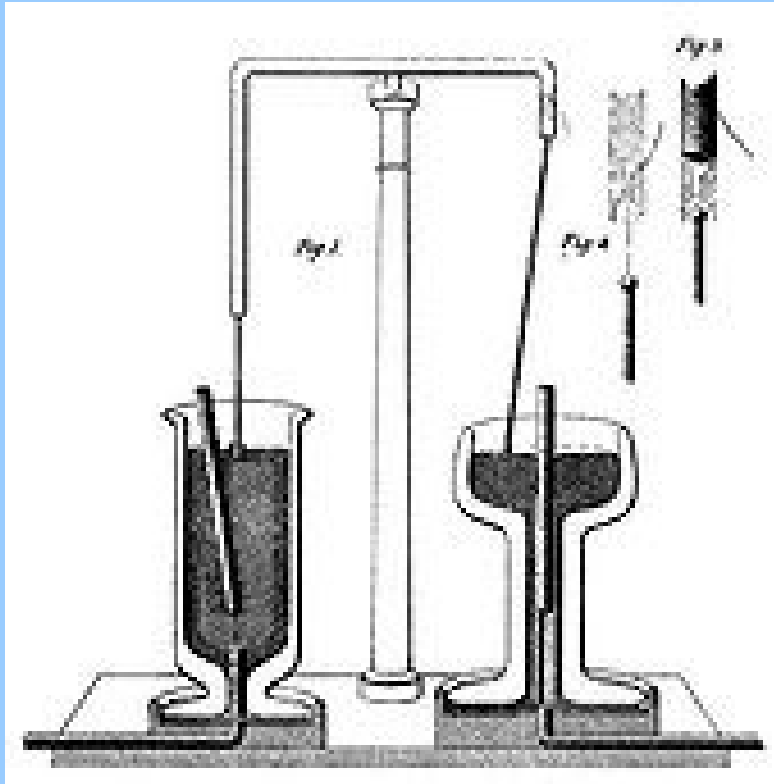
Michael Faraday

September 22, 1791 – August 25, 1867 (75)

- Apprentice Bookbinder
- Impressed Humphry Davy of Royal Institute
- To Europe with Davy
- Observed effects of changing magnetic fields
- SI unit of Capacitance



Electric Motor and Dynamo



- 1821 experiment showed current flow to give rotation
- 1831 built dynamo to generate electricity
- Built first transformer

Joseph Henry

September 17, 1797 – May 13, 1878 (80)

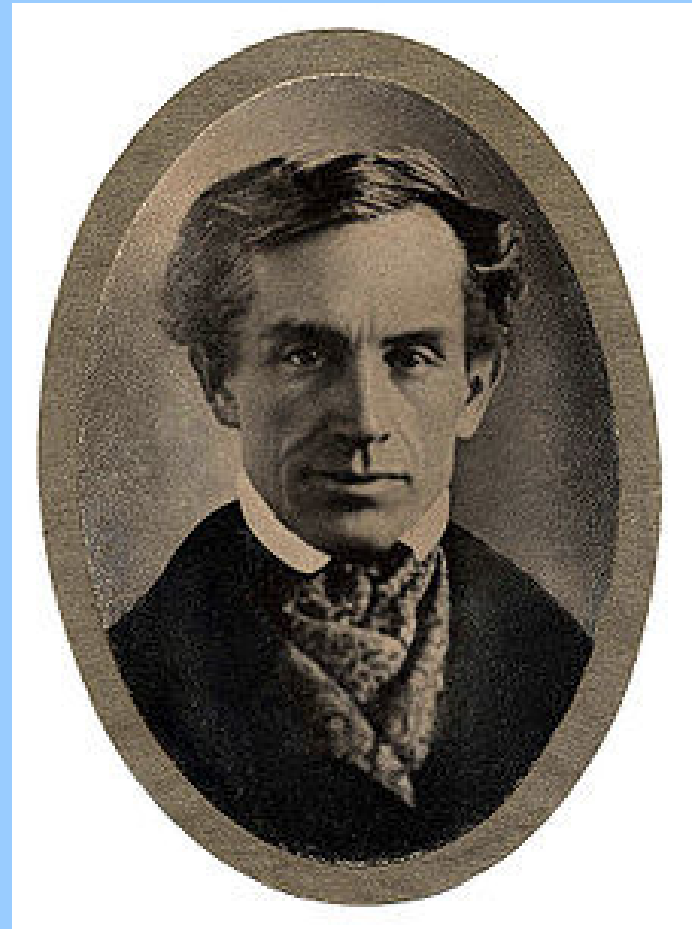
- 1830 electromagnet
- 1831 rocking electric motor
- 1832 Professor at Princeton
- 1835 invented relay
- 1846 Secretary to Smithsonian
- SI unit of inductance



Samuel Finley Breese Morse

April 27, 1791 – April 2, 1872 (80)

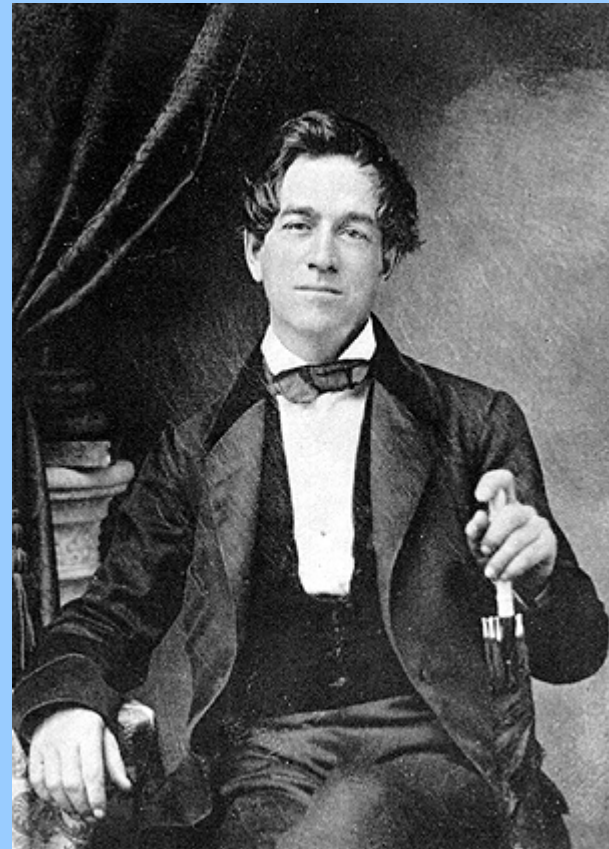
- Trained as an Artist
- Telegraph Idea while sailing from France on the SS *Sully* in 1832
- Discussed with Dr. Charles Jackson
- Worked on idea while teaching art at NYU



Alfred Lewis Vail

September 25, 1807 – January 18, 1859 (51)

- Saw Morse demo at NYU in 1837
- Asked to partner with Morse
- Improved the Register
- Invented the Key
- Proposed New Code for Letters, Numbers, & Punctuation marks.



Thomas Alva Edison

February 11, 1847 – October 18, 1931 (84)

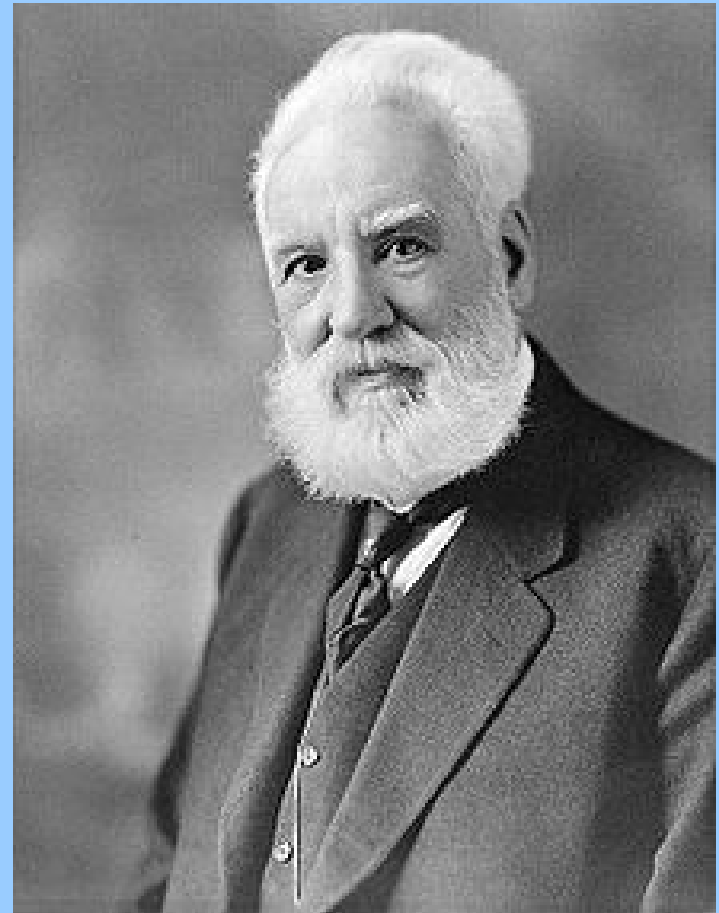
- Telegrapher
- Improved telegraph apparatus
- 1874 – Inductorium
- 1875 – Etheric force
- 1876 – Etherscope
- 1879 – Electric Light
- 1880 – Edison effect



Alexander Graham Bell

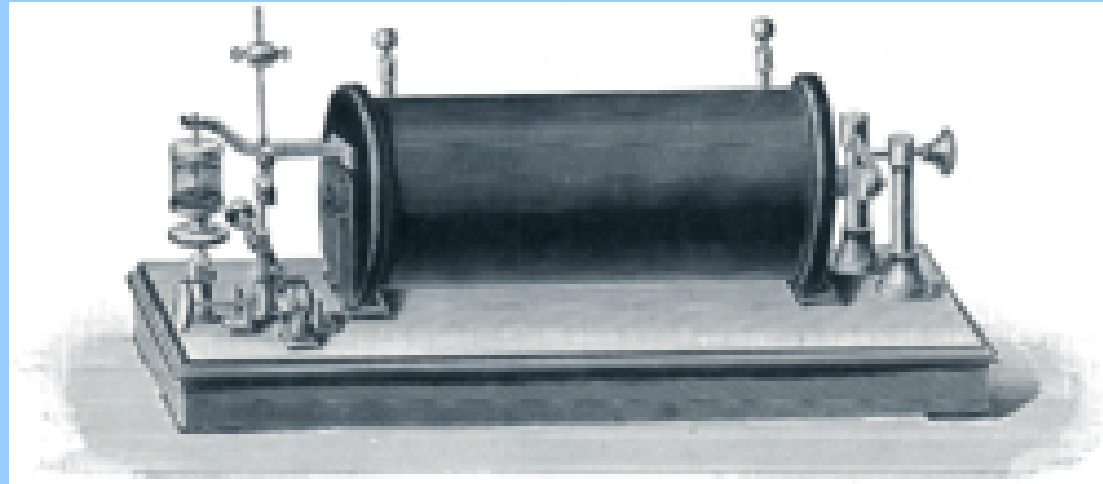
March 3, 1847 – August 2, 1922 (75)

- Invented telephone in 1876 (maybe)
- Offered telephone to WU for \$100,000
- Bought Edison's carbon mike patent (1879)
- Power ratio of 10 named after him



Heinrich Daniel Ruhmkorff

January 15, 1803 – December 20, 1877 (74)

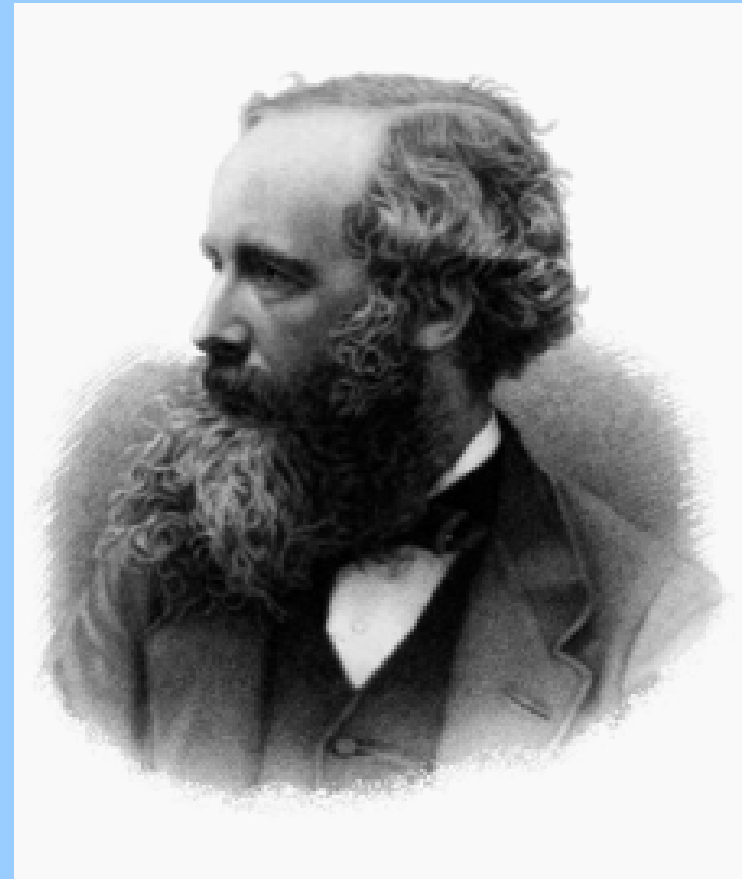


- Patented induction coil in 1851
- Inductive “kick” from interrupter creates high voltage across primary
- Voltage stepped up by multi-turn secondary
- Up to 12 inch sparks from low-voltage dc

James Clerk Maxwell

June 13, 1831 – November 5, 1879 (48)

- Studied light & color
- Inspired by Faraday's work
- Found that Light was electromagnetic wave
- Maxwell's equations published in 1864
- Cgs Unit of magnetic flux density, B



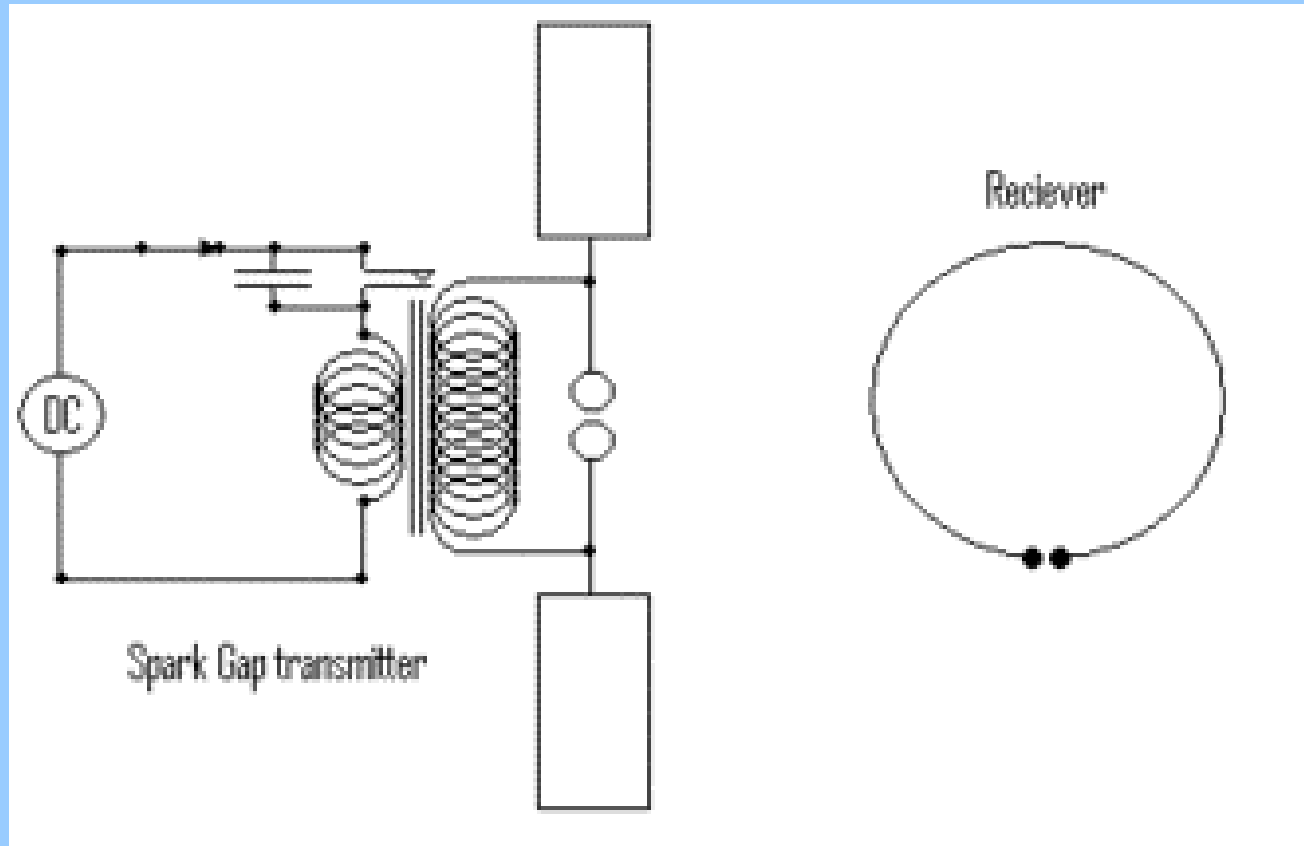
Heinrich Rudolf Hertz

February 22, 1857 – January 1, 1894 (36)

- Professor of Physics at the University of Karlsruhe, 1885-89
- 1886 – Experimented with 500 MHz EM waves
- Showed Reflection, Refraction, Polarization, Interference
- SI unit of frequency



Hertz Radio Experiment



Edouard Branly

October 23, 1844 – March 24, 1940 (95)

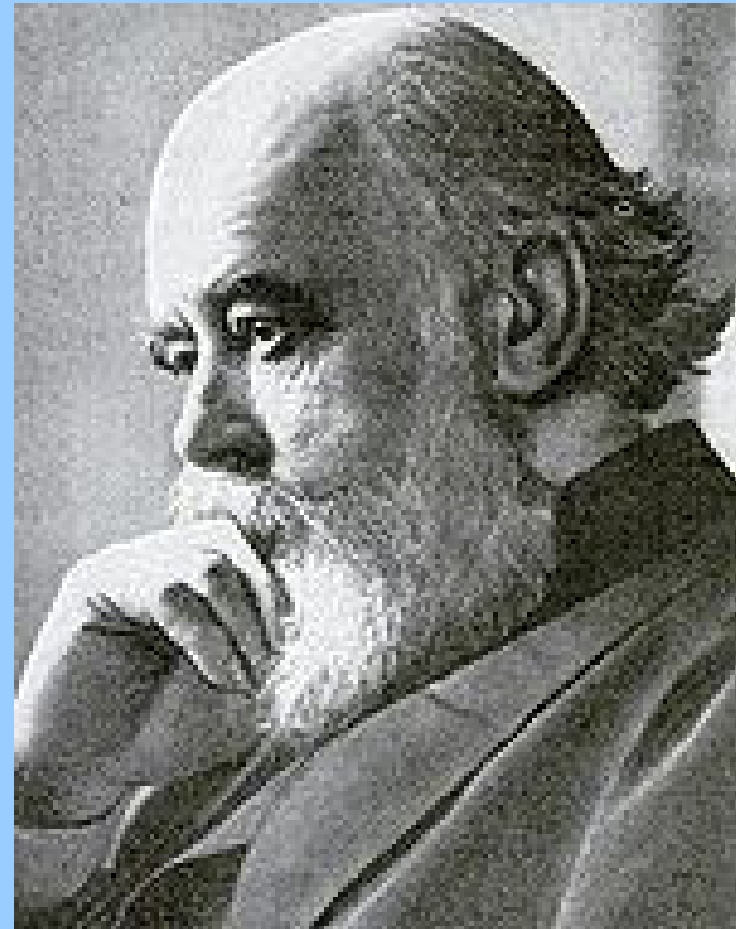
- Metal filings between electrodes decrease resistance with RF (1890)



Oliver Joseph Lodge

June 12, 1851 – August 22, 1940 (89)

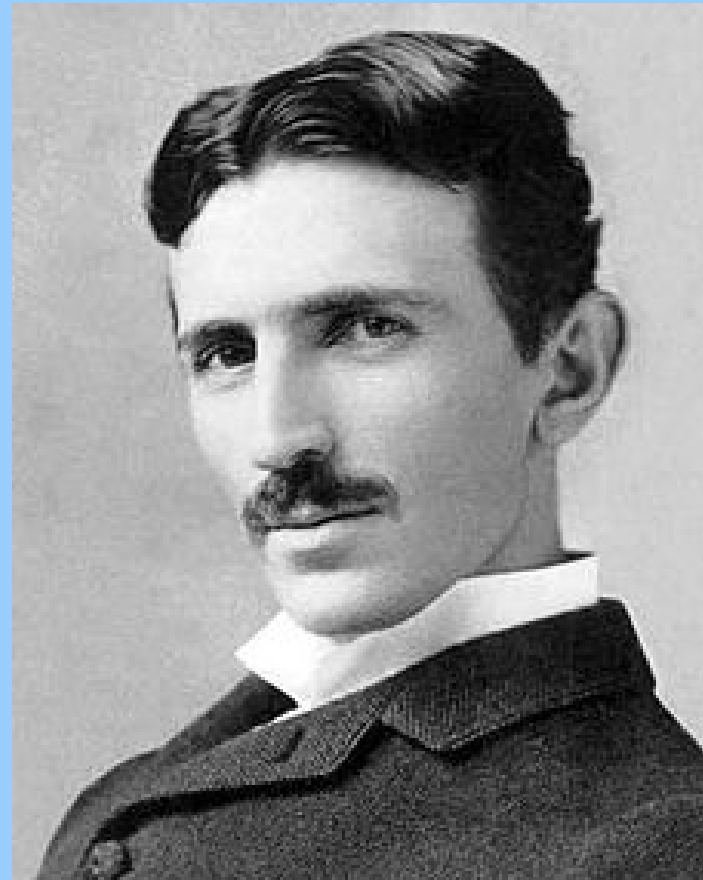
- 1893 – Named Branly's Coherer
- Grounding of Lightning Rods
- 1894 Royal Institution lecture with coherer, tapper, ruhmkorff coil, reflector
- Estimated range of 0.5 miles



Nikola Tesla

July 10, 1856 – January 7, 1943 (86)

- 1884 – Arrived USA
- Worked for Edison
- 1887 – Induction Motor
- 1891 – 15 kHz alternator
- 1892 – Patented a means of message transmission
- 1893 – Chicago Worlds Fair demo of AC, lighting
- SI Unit of magnetic flux density, B



Guglielmo Marconi

April 25, 1874 – July 20, 1937 (63)

- Learned telegraphy
- 1894 – learned of Hertz's work
- Experiments at home
- Improved coherer
- Antenna and ground
- 1895 – 1 mile thru walls and over hill
- 1896 – goes to England



The End



