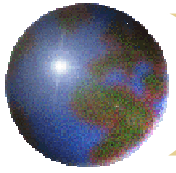


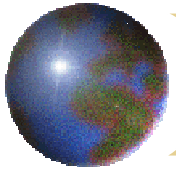
# *The Invention or Discovery of Radio*

David Treharne, N8HKU  
Ford Amateur Radio League  
March 8, 2007



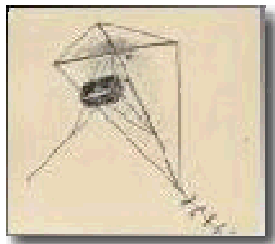
## *In the Beginning*

- ✿ The creation of this thing we call “Radio” is a culmination of both the observations of nature and the ingenuity of mankind. This story is both one of discovery and of invention.
- ✿ **Ra·di·o**  
**NOUN:**
  1. The wireless transmission through space of electromagnetic waves in the approximate frequency range from 10 kilohertz to 300,000 megahertz.
  2. Communication of audible signals encoded in electromagnetic waves.



## *Electric Fire in the Sky*

- 1752: Electricity was needed to be discovered before Radio. Benjamin Franklin's kite experiment, verifying lightning was electricity, inspired others



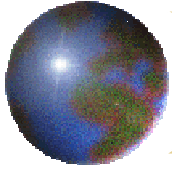
### *Franklin and his Electric Kite*

An Experiment That Took the World by Storm

Electrical terms attributed to Franklin:

- Battery, charge, condensor, conductor, plus, minus, positively, negatively, armature

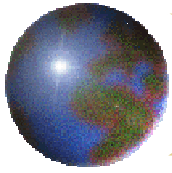




## *Early Discoveries*

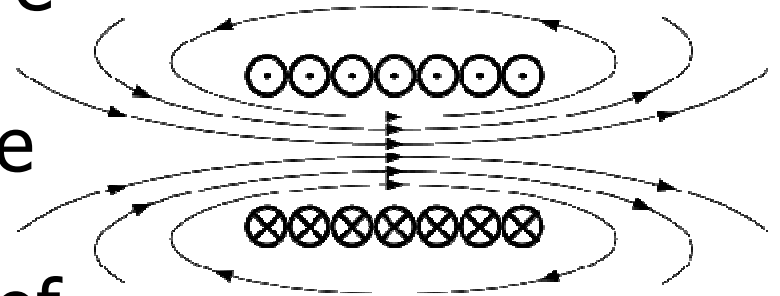
- 1800: Volta: Invention of the battery, which gave experimenters a source of electricity that powered early radios. (A Battery and B+ battery)
- 1819: Hans Oersted: Discovered electromagnetism: Current flowing through a wire deflected a compass magnet
- 1821: Faraday: Discovery of Magnetic induction, giving inductors and motor/generators

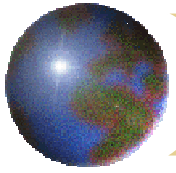




## *More Early Discoveries*

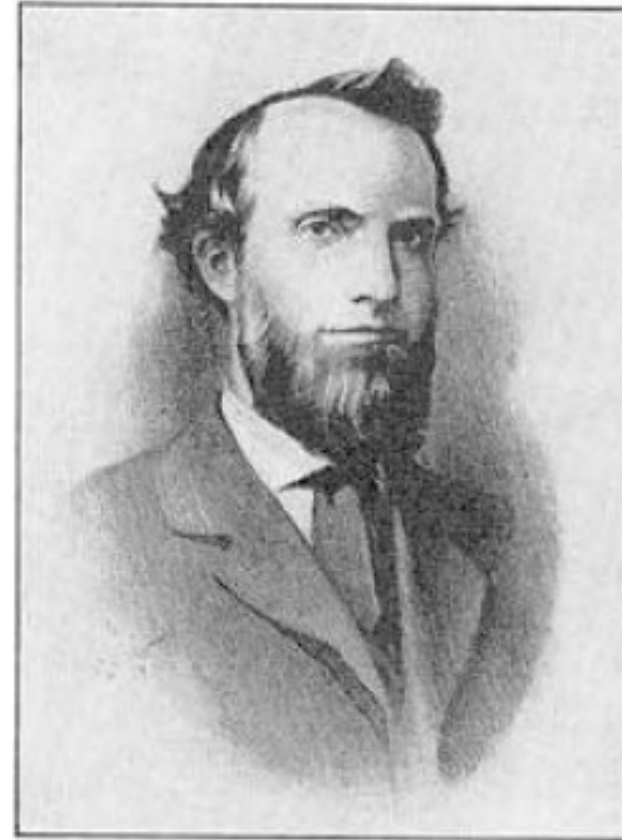
- ❖ 1831: Henry: Created the first relay, showing magnetic action at a distance.
- ❖ 1846-1861: Maxwell: Electricity and Magnetism are the same thing, gave wavelengths and verified the speed of light. (Also had an impact on Einstein's theory of relativity later)

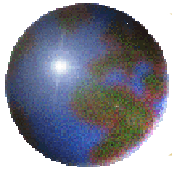




## *First Data Transmission*

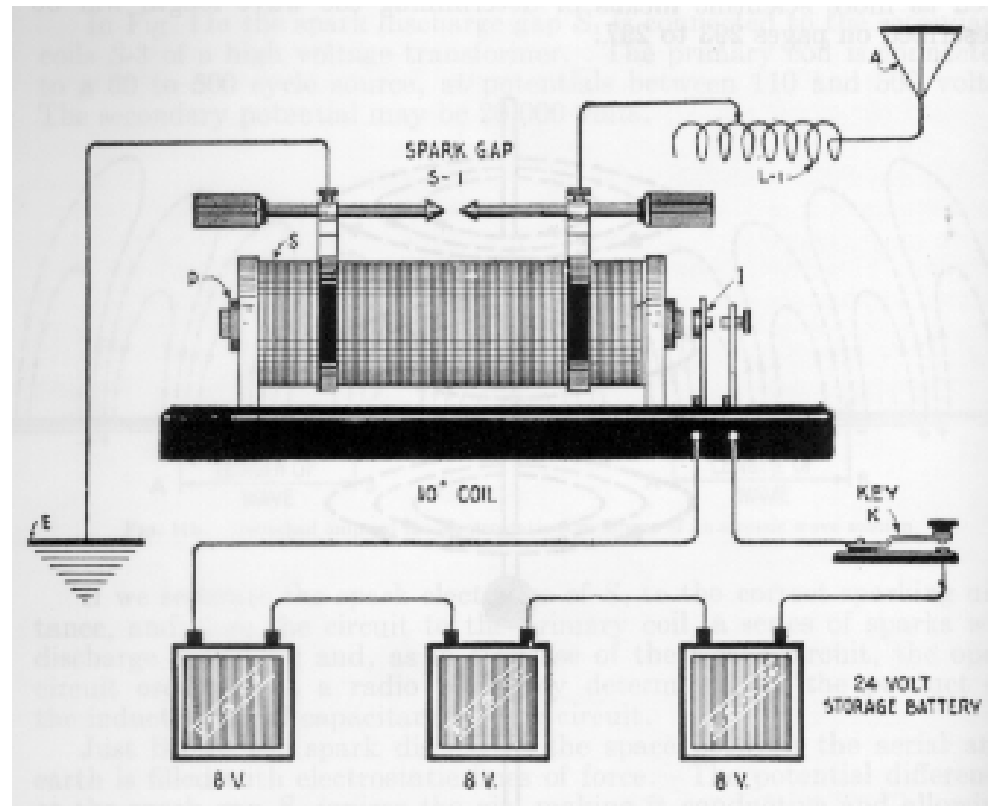
- ✚ 1868: Loomis: Sent a signal 18 miles with a pair of kites. Electricity sent through one kite wire deflected a galvanometer attached to the other kite.
- ✚ 1872: Patent 129,791: Improvement in Telegraphing, issued to Mahon Loomis

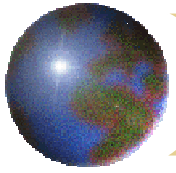




# *Transmitter Technology*

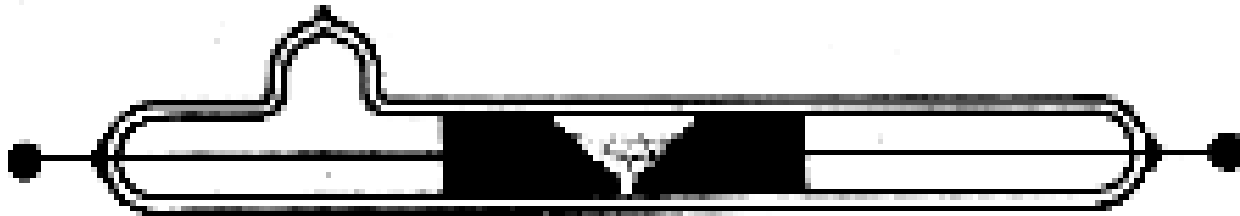
- 1886: Hertz: 1<sup>st</sup> spark gap transmitter and resonant circuits





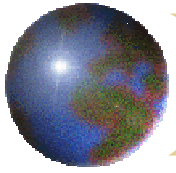
## *Receiver Technology*

- ❖ 1894: Huges Popov: Coherer Receiver
- ❖ This was a vast improvement over the crystal receivers of the time.



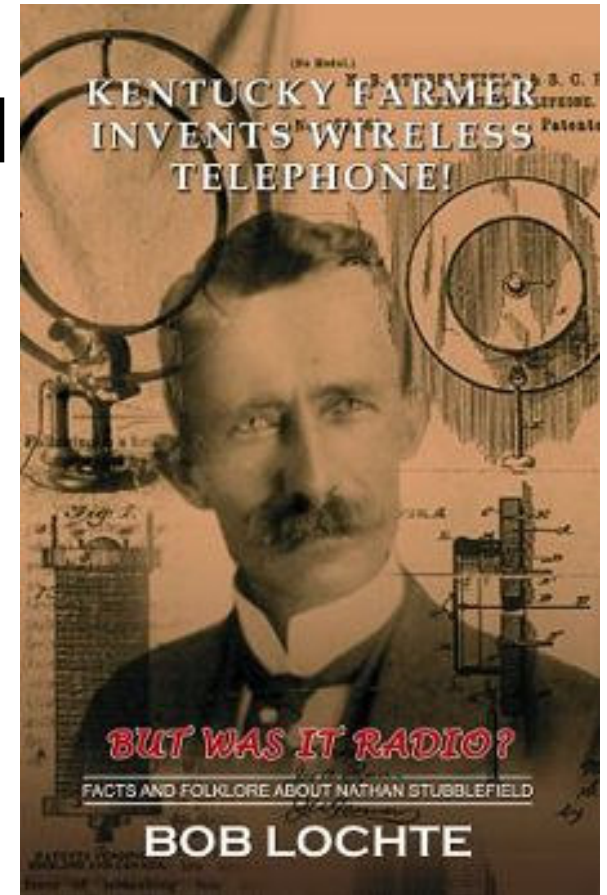
First amplified Receiver: RF would change the metal particles between the wedges, changing their resistance, and changing the current passing through the device

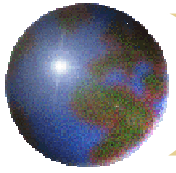




## *First Voice Transmissions*

- ❖ 1892: Stubblefield: Transmitted voice over 1 mile using RF at audio frequencies.
- ❖ 1902: Stubblefield repeated this experiment to a Steamship off shore. Patent: 1907.



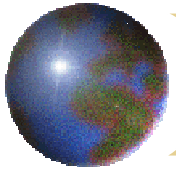


## *First Amateur Radio*

- ✿ 1900-1906: Reginald Fessenden: Used a microphone to talk to Morse radio operators at ships at sea. First disc jockey, transmitting and Edison Wax recording of Handel. First AM Radio.
- ✿ 1906: Other experimenters, "Amateurs", began setting up radios at this time.
- ✿ 1912: First U.S. laws regarding radio
- ✿ 1914: Amateurs relaying signals coast to coast, hence the American Radio Relay League.



Fessenden to his father at the age of 10, seeing a telegraph: "Why the wires?"

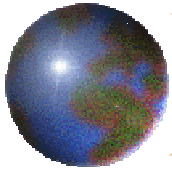


## *Marconi's work*

- ❖ 1901: First transatlantic signals sent via CW spark gap transmitter
- ❖ 1902: Two way transatlantic signals sent from North America to Europe
- ❖ 1903: Massachusetts to England communications

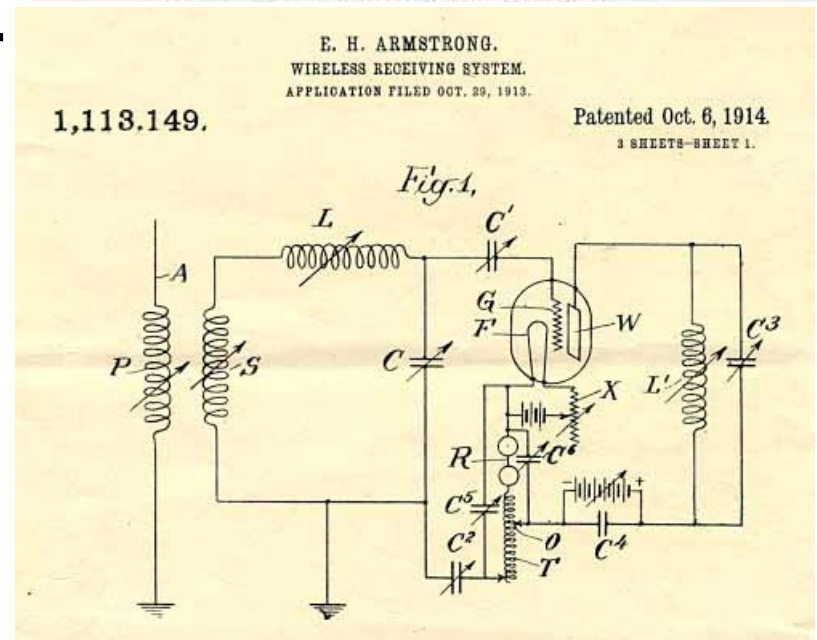
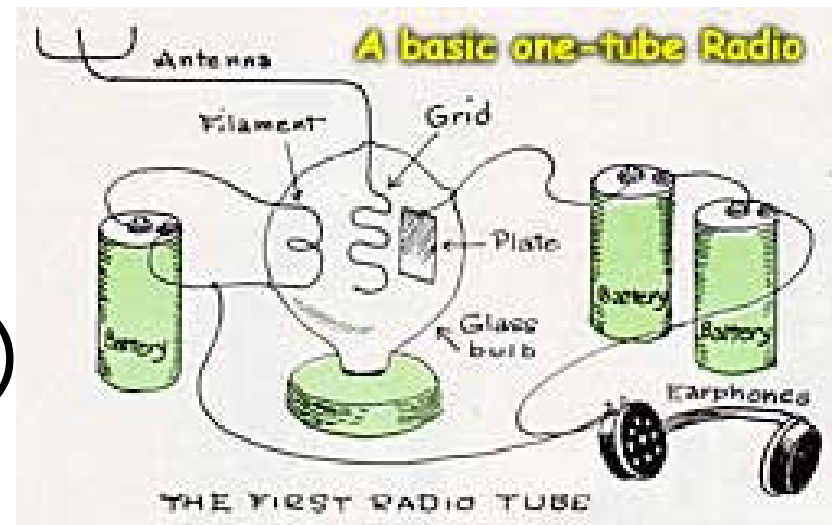


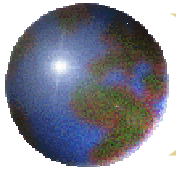
Marconi was a better marketer of technology than an inventor, making his name synonymous with radio.



# Radio Enhancements

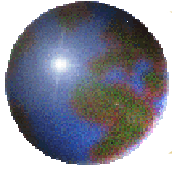
- 1906: Lee DeForest: Vacuum Tube (Audion)
- 1913: Armstrong: Regenerative Receiver
- 1933: Armstrong: Frequency Modulation





## *Conclusion*

- ⊕ Radio began with the investigation of the mysterious magnetism and electricity in the 1700's.
- ⊕ Electricity flowing through wires moved magnets, and caused electricity to flow in adjacent wires
- ⊕ Electricity through wires created the telegraph, but the wires were fragile and easily broken
- ⊕ The wires were separated, and signals sent between the wires, creating wireless telegraphs
- ⊕ Further refinement has taken place ever since with both transmitters, receivers, and voice communication
- ⊕ Many inventors, many simultaneous, all curious about nature and about solving problems in communication



# *Bibliography*

- Who Invented Radio? Doug Smith, KF6DX, World Radio, May, 2006
- <http://www.spartacus.schoolnet.co.uk/SCfaraday.htm>
- <http://en.wikipedia.org/wiki/Coherer>
- [http://en.wikipedia.org/wiki/Guglielmo\\_Marconi](http://en.wikipedia.org/wiki/Guglielmo_Marconi)
- <http://www.leedeforest.org/inventor.html>
- [http://en.wikipedia.org/wiki/Bipolar\\_junction\\_transistor](http://en.wikipedia.org/wiki/Bipolar_junction_transistor)
- The Man Before Marconi, QST, August, 1948
- <http://www.ushistory.org/franklin/info/kite.htm>
- <http://www.idealfinder.com/history/inventors/volta.htm>
- [http://en.wikipedia.org/wiki/Maxwell's\\_equations](http://en.wikipedia.org/wiki/Maxwell's_equations)
- <http://www.hammondmuseumofradio.org/marconi.html>
- <http://www.nathanstubblefield.com/>
- <http://www.hello-radio.org/historyofradio.html>
- [http://en.wikipedia.org/wiki/Reginald\\_Fessenden](http://en.wikipedia.org/wiki/Reginald_Fessenden)
- <http://users.erols.com/oldradio/eha1.htm>