# Did a West Virginian Invent Radio?

Henry W. Gould
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# About Prof. Gould

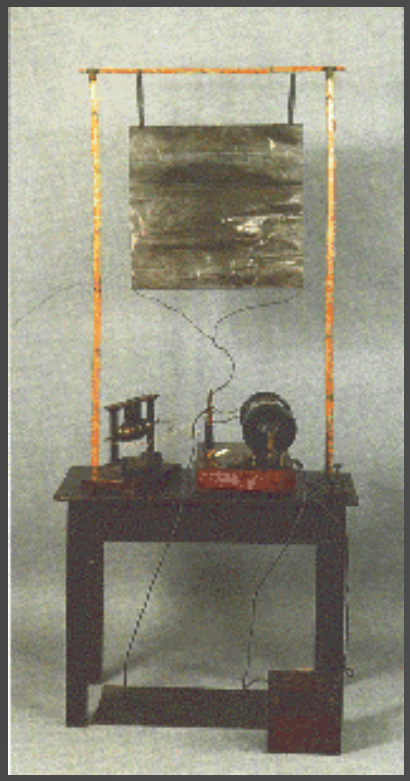
- Mathematician
  - Fellow, American Association for the Advancement of Science.
  - Fellow, Institute of Combinatorics and its Applications.
  - Consultant to the NSA.
  - Mathematics consultant to the Dear Abby column.
  - Benedum Distinguished Scholar, WVU, 1988.
- Radio Engineer
  - Graduate of National Radio Institute.
  - First class commercial radiotelephone operator.
  - Chief radio engineer of WUVA (U. Virginia).
  - U.S. Army Signal Corps, Southeastern Signal School, 1951.

# My Assistant

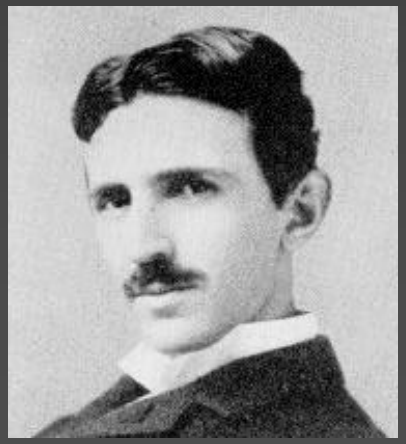
- ½ Professor Spotsie Ann.
- Attended all classes and seminars for 6 years.
- Joint journal publication.

# Who is the “Father” of Wireless?

- Marconi?
  - 1896: patent
  - 1897: 20 miles
  - 1899: English channel
  - 1901: Atlantic Ocean



- Tesla?
  - 1891: Tesla coil



# Mahlon Loomis

- Born July 20, 1826.
  - Oppenheim, NY.
  - 4th of 9 children.
  - Father was professor and founder of the American Ephemeris and National Almanac.
- Moved to Springvale, VA as boy.
- His oldest brother George was a city official in Parkersburg, then moved to Cranberry Summit.
  - Cranberry Summit was renamed Terra Alta, WV, in 1885 by George's daughter Carrie Loomis Schoeber.

# Loomis' Professional Background

- 1848: Studied dentistry in Cleveland.
- 1849: Practiced dentistry in VA and then worked as traveling dentist.
- 1856: After marrying Achsah Ashley (from Springfield, MA), set up his own practice in Washington, DC.
- Later, his wife left him and he moved to Terra Alta, since brother George owned property there.

# Terra Alta


38 miles from Morgantown

# Loomis' Final Resting Place

- Loomis died on Oct. 13, 1886 in Terra Alta, where he is buried.
- There is a West Virginia highway historical marker on WV Rt. 7 just north of the entrance to the cemetery which reads:

DR. LOOMIS' GRAVE

—•••—

In the cemetery is buried Dr. Mahlon Loomis, sender of first aerial signals, 1866-73, fore-runner of wireless telegraphy. Signals were sent 14 miles, using kites flown by copper wires. Patented 1872; company chartered by Congress, 1873.

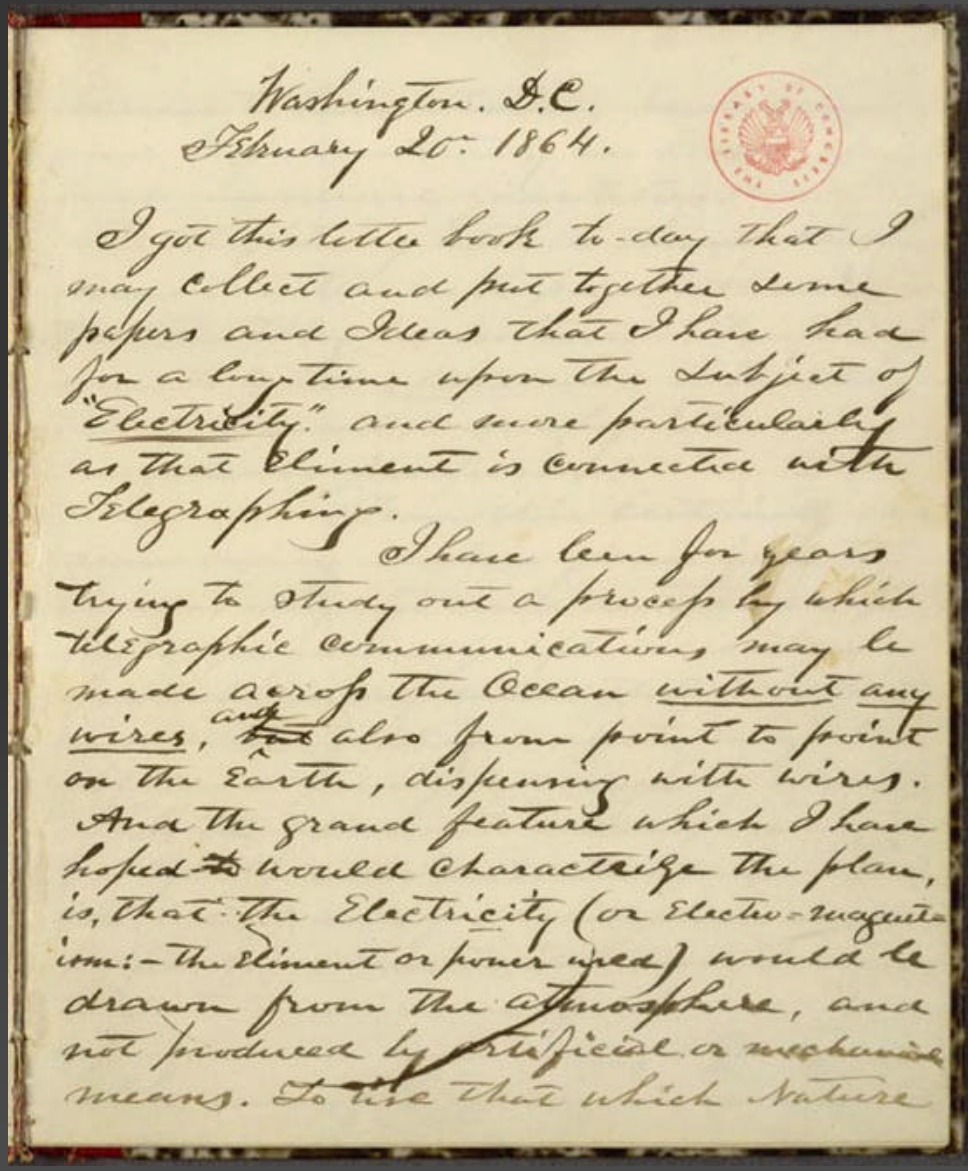
# Early Work with Electricity

- 1859-60: Loomis began experimenting with electricity.
  - First application was forced increase of plant growth.
  - Then investigated using kites to collect electrical charge in the upper atmosphere, as a replacement for batteries on a telegraph circuit.

# The Idea

- Loomis' Journal
  - In Library of Congress
  - Dated Feb. 20, 1864

*I have been for years trying to study out a process by which telegraphic communications may be made across the Ocean without any wires, and also from point to point on the Earth, dispensing with wires.*



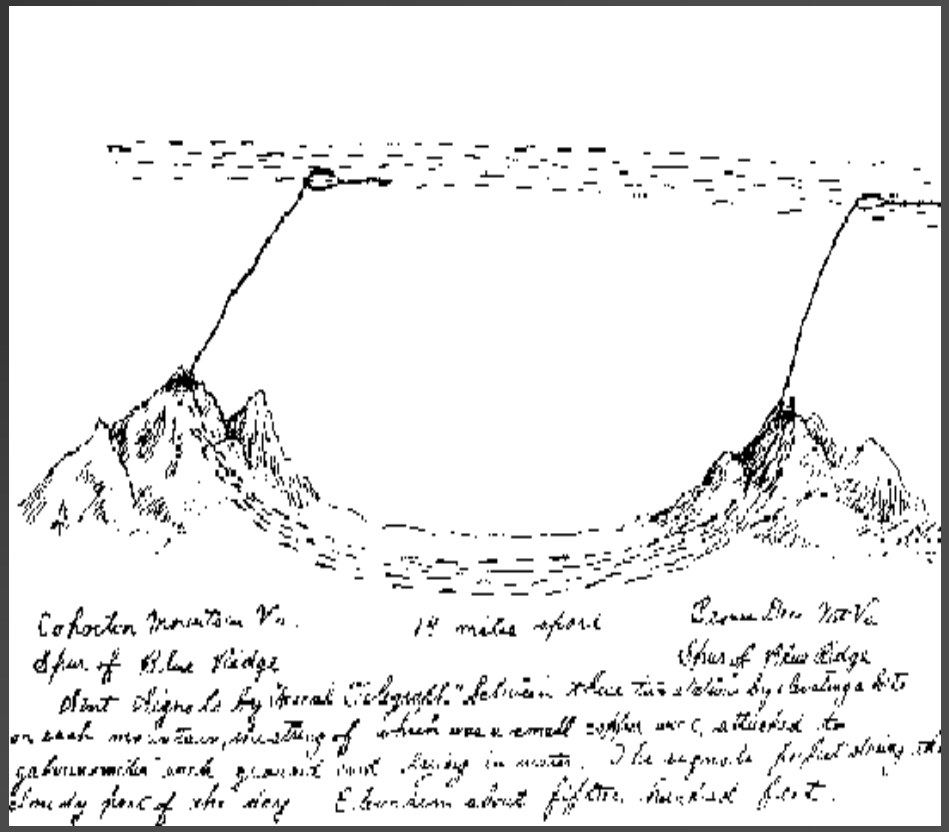
Washington. D.C.
February 20. 1864.

I got this little book to-day that I may collect and put together some papers and Ideas that I have had for a long time upon the subject of "Electricity" and more particularly as that Element is connected with Telegraphing.

I have been for years trying to study out a process by which telegraphic communications may be made across the Ocean without any wires, and also from point to point on the Earth, dispensing with wires. And the grand feature which I have hoped would characterize the plan, is, that the Electricity (or Electro-magnetism:- the Element or power used) would be drawn from the atmosphere, and not produced by artificial or mechanical means. To use that which Nature

# The Experiment

- October 1866.
  - Some sources say 1868.
- Two kites on two peaks in the Blue Ridge Mountains in Loudon County, VA.
  - Copper wire for kite string.
  - Peaks were 14 miles apart.
- Witnessed by Senator Pomeroy (KS) and Representative Bingham (OH).



# The Aparatus

# The Patent

- July 30, 1872.
- Patent number 129,971.
- “Improvement in Telegraphing”

# UNITED STATES PATENT OFFICE.

MAHLON LOOMIS, OF WASHINGTON, DISTRICT OF COLUMBIA.

## IMPROVEMENT IN TELEGRAPHING.

Specification forming part of Letters Patent No. **129,971**, dated July 30, 1872.

*To all whom it may concern:*

Be it known that I, MAHLON LOOMIS, dentist, of Washington, District of Columbia, have invented or discovered a new and Improved Mode of Telegraphing and of Generating Light, Heat, and Motive-Power; and I do hereby declare that the following is a full description thereof.

The nature of my invention or discovery consists, in general terms, of utilizing natural electricity and establishing an electrical current or circuit for telegraphic and other purposes without the aid of wires, artificial batteries, or cables to form such electrical circuit, and yet communicate from one continent of the globe to another.

To enable others skilled in electrical science to make use of my discovery, I will proceed to describe the arrangements and mode of operation.

As in dispensing with the double wire, (which was first used in telegraphing,) and making use of but one, substituting the earth instead of a wire to form one-half the circuit, so I now dispense with both wires, using the earth as one-half the circuit and the continuous electrical element far above the earth's surface for the other part of the circuit. I also dispense with all artificial batteries, but use the free electricity of the atmosphere, co-operating with that of the earth, to supply the electrical dynamic force or current for telegraphing and for other useful purposes, such as light, heat, and motive power.

As atmospheric electricity is found more and more abundant when moisture, clouds, heated currents of air, and other dissipating influences are left below and a greater altitude attained, my plan is to seek as high an elevation as practicable on the tops of high mountains, and thus penetrate or establish electrical connection with the atmospheric stratum or ocean overlying local disturbances. Upon these mountain-tops I erect suitable towers and apparatus to attract the electricity, or, in other words, to disturb the electrical equilibrium, and thus obtain a current of electricity, or shocks or pulsations, which traverse or disturb the positive electrical body of the atmosphere above and between two given points by communicating it to the negative electrical body in the earth below, to form the electrical circuit.

I deem it expedient to use an insulated wire or conductor as forming a part of the local apparatus and for conducting the electricity down to the foot of the mountain, or as far away as may be convenient for a telegraph-office, or to utilize it for other purposes.

I do not claim any new key-board nor any new alphabet or signals; I do not claim any new register or recording instrument; but

What I claim as my invention or discovery, and desire to secure by Letters Patent, is—

The utilization of natural electricity from elevated points by connecting the opposite polarity of the celestial and terrestrial bodies of electricity at different points by suitable conductors, and, for telegraphic purposes, relying upon the disturbance produced in the two electro-opposite bodies (of the earth and atmosphere) by an interruption of the continuity of one of the conductors from the electrical body being indicated upon its opposite or corresponding terminus, and thus producing a circuit or communication between the two without an artificial battery or the further use of wires or cables to connect the co-operating stations.

MAHLON LOOMIS.

Witnesses:
BOYD ELIOT,
C. C. WILSON.

# Other Demonstrations

- 1870: Communication between two ships on the Chesapeake Bay separated by two miles.
- Late 1870’s: Reliable communications over 20 mile distances.
- Mid-1880’s: Communications in Terra Alta between train station and pharmacy.

# The Company

- Jan. 13, 1869 Senator Charles Sumner introduces “The Aerial Telegraph Bill” into the Senate
  - Asked for $50K and incorporation of the Loomis Aerial Telegraph Company.
  - Bill was modified and passed in 1873. The final version incorporated the company but gave no funding.
- Other funding problems
  - Chicago fire of 1871.

# Loomis' Other Patents

- 1854: False Teeth from Porcelain.
- May 1881: Convertible Valise.
- Nov. 1881: Cuff-and-Collar Fastening.
- Mar. 1886: Electrical Thermostat Improvement.

# Loomis about his Invention

"I know that I am regarded as a crank, perhaps a fool by some, and as to the latter, possibly I am, for I could have discarded this thing entirely and turned my attention to making money."

"I have not only discovered a new world, but the means to invade it. My compensation is poverty, contempt, neglect, forgetfulness. In the distant future, when the possibilities of this discovery are more fully developed, public attention will be directed to it ś originator, and the congressional records will furnish the indisputable proof that the credit belongs to me."

# Contributions by Loomis

1. First to use a complete antenna and ground system
2. First experimental transmission of wireless telegraph signals.
3. The first use of kites to carry an antenna aloft.
4. The first use of balloons to raise an antenna wire.
5. First vertical antenna (steel rod mounted on top of a wood tower).
6. Formulation of the idea of ‘waves’ traveling out from his antenna.
7. The first Patent for wireless telegraphy.

# The Loomis Family

- Elisha Scott Loomis
  - 1852-1940.
  - Wrote *The Pythagorean Proposition*, which contained 250 proofs of the Pythagorean theorem.
- Mary Texana Loomis
  - Born in 1880.
  - Ran the Loomis Radio School in Washington, DC.
  - By 1922, the Radio School offered a four year degree in Radio Engineering.
- Jeremiah Loomis Gould
  - From Buckhannon, WV.
  - Served on the first Board of Governors  of WVU in 1867.