

# **EARLY HISTORY OF THE ELECTRO- MAGNETIC TELEGRAPH**

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Early History of the Electro-magnetic Telegraph by Alfred Vail & J. Cummings Vail

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**ALFRED VAIL & J. CUMMINGS VAIL**

**EARLY HISTORY OF  
THE ELECTRO-  
MAGNETIC TELEGRAPH**



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Early History of the  
**Electro-Magnetic Telegraph**

From Letters and Journals of Alfred Vail  
Arranged by His Son, J. Cummings Vail



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## PREFACE

On his forty-sixth birthday Vail's diary records: "Riches and honor I care not for." Riches he did not have, and this pamphlet, the labor of my declining years, will, I trust, show his share in bringing the telegraph into successful use.

It is not claimed that Vail invented the telegraph, but this work shows Morse invented "A *System of Telegraphs*," not "The Telegraph."

Vail's records now belong to the Smithsonian Institution at Washington, D. C., and are open to the public.

MORRISTOWN, N. J.

1914.



ALFRED VAIL

## ALFRED VAIL

### His connection with the Electro-Magnetic Telegraph

The Electric Telegraph had, properly speaking, no inventor. It grew little by little, each inventor adding his little to advance it towards perfection.

About 1617, Farnianus Strada of Rome claimed to have signalled without wires by means of two sympathetic compasses.

Sparks of electricity were sent through wire in 1729 and 1730.

About 1750, Mechanical Electricity was first suggested.

1753, it was proposed to send signals through insulated wires on poles.

1774, Lesage used 24 insulated wires and claimed to have contemplated for thirty years corresponding by electricity.

1787, Lomond used a single brass wire of some length.

1791, Samuel F. B. Morse was born.

1794, Rieser used 36 wires.

1795, Cavello used a Leyden jar and about 200 feet of copper wire.

1798, Salva successfully signalled 26 miles.

1807, Alfred Vail was born.

1808, Chemical Electricity used for signalling by Von Soemmering of Munich.

1812, Schilling exploded powder mines by electricity across the river Neva near St. Petersburg.

1816, Ronalds signalled through 8 miles of wire and his principle was successfully used by Wheatstone, 1839, by House, 1846, and by Hughes in 1850, and in same year (1816) Dr. Coxe of Philadelphia suggested communication by electricity.

1820, Oersted also suggested the same means of communication, and Ampere discovered galvanic magnetism.

1823, Baron Schilling signalled by electricity.

1824, Peter Barlow signalled with a Sturgeon's magnet and the *Edinburgh Philosophical Journal* for January, 1825, published his conclusions as follows:

"The details of this contrivance are so obvious and the principle on which it was founded so *well understood* that there was only one question which could render the result doubtful, and this was 'is there any diminution of effect by lengthening the wire?' Two hundred feet of wire so reduced the effect that he gave it up."

In 1828, Dyer, an American, strung wires on poles, with glass insulators.

1828 to 1831, Prof. Joseph Henry sent electric signals at Albany, N. Y.

Prof. Chas. A. Joy, Ph.D., writes in Frank Leslie's *Popular Monthly* for August, 1878, as follows:

"Prof. Morse in his report of the Paris Exhibition of 1867 lays claim to the following inventions and discoveries as having been made by him:



1. The recording telegraph, operated either electro-magnetically or electro-chemically.
2. The telegraphic relay circuit, or the opening and closing of a secondary circuit by means of a primary circuit.
3. The dot and line alphabet.
4. The use of sounds as a medium of receiving telegraphic communications.
5. The system of automatic transmission by the use of metallic type, or of the embossed paper strip from the register, as a means of opening and closing the circuit.
6. The use of a printing wheel and ink as a mode of recording, generally known as the "ink writer."

On page 159 of Alfred Vail's book "The American Electro-Magnetic Telegraph," 1845, is a chapter headed "Electro-Magnetic Printing Telegraph invented by Alfred Vail Sept. 1837."

Baxter Vail's mechanical assistant in 1837 and 1838, says: Alfred was exceedingly modest . . . . As the weak points developed . . . . Alfred began to draw upon the resources of his own wonderful power of invention . . . . We constructed the new lever . . . . and . . . . produced a register capable of making dots, dashes, and spaces. He saw in these new characters the elements of an alphabetical code . . . . and . . . . instantly set himself . . . . to construct such a code.

The history of trials and discouragements of the pioneers in the development of electric signalling can be read by those interested, in the Annual Report of the Smithsonian Institute for 1878 containing an exhaustive article by W. B. Taylor; and some account of Alfred Vail's connection therewith, is given in an article by Franklin L. Pope published in the *Century Magazine* for April, 1888.

"What Alfred Vail did for the Electric Telegraph?" is shown by extracts from his records, arranged to give the story of his work from 1837 to 1849, when he retired, as he writes from Washington, September 21, 1848, to S. F. B. Morse. . . . I shall in a few months leave Washington for New Jersey, family, kit and all, and bid adieu to the subject of the telegraph, for some more profitable business. . . . I have finished a most beautiful register with a pen lever key and an expanding reel.

And on October 5, 1848, to his brother George:

"The reason why I must give up remaining here is, that I am wearing myself out in the telegraph, for the interest of the patentees, without compensation, and the care and study is accumulating every day."

All notes here given are copied from his records, unless otherwise stated.

For a full understanding of Vail's connection with the Telegraph, I give here the original contract between Morse and Vail, followed by extracts from a contract made in March, 1838, between Morse, Smith, Gale and Vail, showing the part he agreed to assume in the mechanical development of the invention.

This contract is dated two days before Vail's thirtieth birthday; Morse was forty-six.

Articles of agreement made this 23d day of September, in the year of our Lord, one thousand eight hundred and thirty-seven, between Prof. Samuel F. B. Morse, of the University of the City of New York, in the City and County and State of New York, of the first part, and Alfred Vail, of Speedwell (Morristown),

in the Township and County of Morris, and State of New Jersey, of the second part, as follows, to wit, viz:

Whereas, the said Samuel F. B. Morse, of the first part, has invented a new machine for the transmission of intelligence, called the "Electro-Magnetic Telegraph," and to secure to himself the benefits of his invention, he is preparing to take out letters-patent of the United States, and he hereby associates himself with the party of the second part in this undertaking, upon the following terms and conditions:

FIRST. The party of the second part covenants to construct and put into successful operation, *at his own proper cost and expense*, one of the telegraphs of the plan and invention of the party of the first part, and to exhibit its full power and value before a committee of the Congress of the United States, on or before the 1st of January, eighteen hundred and thirty-eight.

SECOND. All expenses, which in the judgment of both parties shall necessarily be incident to the final completion and perfection of the said plan of telegraphic communication, shall be defrayed by the said Vail, of the second part, *who also agrees to devote his time and personal services faithfully to this object without charge*. The expenses of obtaining letters-patent from the United States are intended to be included as a part of the incidental expenses, as well as all machinery and apparatus which may be found to be necessary for testing, by actual and speedy experiment, the efficiency of the mode of transmitting intelligence.

THIRD. And it is hereby further agreed between the said parties of the first and second parts, that in case either of them shall make any new discoveries which will be applicable to said telegraph or any new invention which will tend toward perfecting the same in any manner, he will, as soon as practicable, communicate the same to the other, and it shall be held as the property of each, in the same proportion as their respective rights in the whole, and the expenses of taking out letters-patent for such new discovery or invention, if such letters-patent be mutually thought to be necessary, shall be defrayed by each, in the same proportion as he holds of the whole, by these presents hereinafter mentioned.

FOURTH. In consideration of the aforesaid payment of money (mentioned in Article 2 of this agreement), and such other aids as are promised, and shall be undertaken and fulfilled by the said Vail, of the second part, the said Samuel F. B. Morse, of the first part, doth hereby assign, transfer and convey to the said Alfred Vail, of the second part, and to his heirs and assigns forever, one equal undivided one-fourth part of all his interests and rights, which he now holds, or which may accrue by means of the said invention of the "Electro-Magnetic Telegraph" and by the proposed patent to be secured to him as aforesaid, so far as any benefits and advantages may arise therefrom.

FIFTH. It is also agreed by the said Morse, of the first part, that, provided that said Vail, of the second part, will procure to be taken out letters-patent for this invention, in any or all of the foreign countries of the globe, he shall be entitled to one equal and undivided one-half of all the benefits, profits and advantages arising therefrom, and it is further agreed by said party of the second part, that the said letters-patent for the exclusive right to use such invention of the "Electro-Magnetic Telegraph" in France, England, Scotland and Ireland shall be taken out in any or all of these countries with the least possible delay, and as soon as the models necessary for that purpose shall be sufficiently completed to

test their efficiency and that no unnecessary delay be incurred, these models shall be immediately commenced, as provided for in Article 2 of this agreement.

SIXTH. In event of the entire failure of the aforesaid invention, and its abandonment by the parties of this covenant, it is mutually agreed that all the machinery, apparatus, etc., made since the date of this agreement shall be the exclusive property of the said Vail.

SEVENTH. It is further agreed by the said party of the second part, that the letters-patent taken out for France, England, Scotland, and Ireland, in compliance with Article 5, shall be taken out in the name and for the exclusive benefit of said Morse, of the first part, and it is hereby agreed by the said party of the first part that as soon as he has obtained them, he shall immediately assign, transfer and convey to the said party of the second part, one equal undivided one-half of all his interest and rights by said letters-patent secured to him.

IN TESTIMONY WHEREOF we have hereunto set our names and seals.

(Signed), { SAMUEL F. B. MORSE,  
                  { ALFRED VAIL.

In the presence of

E. O. MARTIN,  
ROBERT BOYLE.

Extract from an agreement between Morse, Smith, Vail and Gale, signed in March, 1838:

"9th. That the said Vail hath agreed and hereby agrees to devote his personal services and skill in constructing and bringing to perfection, as also in improving the Mechanical parts of said invention, until the same shall be made the property of the Government of the United States, or otherwise be disposed of by the said proprietors—and without charge for such personal services to the other proprietors, and for their common benefit, said service to be in accordance with the general direction and supervision of the said Morse.

"10th. Treats of Gale's duties.

"11th. All expenses and charges incident to the perfection of said Morse's application for Letters Patent from the Government of the United States, and of obtaining said Letters Patent, shall be borne and paid by the said Morse and Vail exclusively, as are all expenses incident to and growing out of the improvement and perfecting of the mechanism of said invention, until said Letters Patent shall have been obtained."

The following extracts show Morse's original idea:

FROM PRIME'S LIFE OF MORSE: (P. 19.)

Morse, when a student, heard Dr. Day of Yale say, at a lecture on electricity: "If the circuit be interrupted, the fluid will become visible and, where it passes, it will leave an impression upon any intermediate body."

MORSE SAYS IN 1832: (P. 252.)

"If the presence of Electricity can be made visible in any part of the circuit I see no reason why intelligence may not be transmitted instantaneously by Electricity."

Were not these remarks, on the Sully," based on Dr. Day's lecture heard years before. Many before Morse had laboured to develop the same idea.