

Glass Insulators ...

The Beginnings

INTRODUCTION

With the widespread use of the telegraph throughout the North American continent for over a century, it is easy to assume that success was reached from the very beginning of its employment. Such was not the case. Samuel F.B. Morse labored for several years to perfect and promote his invention. As early as 1832 Morse had an interest in developing a practical electromagnetic telegraph. At that time little was known on the subject. Several men before him had engaged for decades through trial and error with the principles of electricity. By the end of 1836, Morse had completed his first telegraph apparatus, crude in form, but capable of both sending and receiving messages using a numerical code which represented letters of the alphabet. With the help of a colleague, Professor Leonard Gale, several improvements were made upon the apparatus. In the autumn of 1837 an exhibition of the working apparatus was given by Morse to friends and professors at the University of New York. At that time, Alfred Vail took an interest in one of the inventions, and a partnership was formed between the three men. Morse was fortunate to have joined forces with both Vail and Gale since each gentleman had knowledge which aided Morse in those formative years of the telegraph.

In February 1838 Morse traveled to Washington, D.C. to demonstrate the invention to the president of the United States and to other important politicians. A recommendation was made for an appropriation of \$30,000 to aid in the construction of an experimental line. While the money was not appropriated by the government at that time, Morse did succeed in stirring the interest of some high-ranking politicians. Still, the importance of the invention and the impact it would have as a communication system for the world went largely unrecognized. It was not until March 1843 that another telegraph bill, put before the Congress, was passed to appropriate \$30,000 for the building of the experimental line between Washington, D.C. and Baltimore, Maryland. Finally, after years of struggle, Morse received financial aid from the U.S. government to promote his invention.

An agreement was drawn up with the Baltimore and Ohio Railroad for the use of its right-of-way for the building of the line. It was decided to lay an underground line using a cable consisting of wires enclosed in lead. Ezra Cornell was entrusted with this work. He had devised

a trenching machine for laying cable. The autumn of 1843 saw the work underway. By December, the cable had been laid from the railroad station in Baltimore to Relay, Maryland, which was several miles away. With more than half the appropriation having been spent by that time, great concern was felt by the builders when the insulation on the wires in the cable was found to be faulty. The work was suspended, and a new plan to erect the wires on poles was chosen.

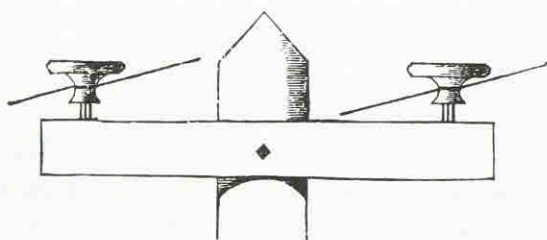
With the arrival of spring 1844, construction commenced once again. One of the main challenges facing the line builders was developing a means of insulating the wires at each pole. Cornell had devised a plan which consisted of sandwiching the wires, wrapped well in cloth saturated with gum shellac, between two plates of glass. This arrangement was inserted into a notched crossarm, over which a wooden cover was nailed to serve both as protection from rain as well as to hold the insulated wire in place. Two copper wires were strung in this manner between Baltimore and Washington. The line was completed, and on May 24, 1844, the first official message was sent. The words made famous on that day nearly a century and one half ago: "*What hath God wrought.*"

Following the completion and successful operation of the line, Morse attempted to convince the men of government of the great advantage it would be for all of mankind to have the U.S. government purchase control of the telegraph rather than have it go into the hands of private individuals. Even though the experiment had proven successful and the public had shown an interest in the invention, government leaders did not have confidence in the financial success of the telegraph. It seemed unlikely that the number of patrons would be great enough to pay for the expenses involved in operation and maintenance of the lines. Therefore, Morse and his partners turned to private funding for the building of the lines which were to follow.

In 1845 Amos Kendall, who had previously been appointed by Morse as his agent, took steps to organize a company which would build a line from New York to Baltimore and on to Washington. Due to the lack of funds available at the time for such a large undertaking, it was decided to first solicit only enough funds to build the line between New York and Philadelphia. The incorporation of the first private telegraph company in this

country was granted by the legislature of Maryland, and the Magnetic Telegraph Company was formed. James D. Reid, in his book, *The Telegraph in America*, describes the events that followed:

The construction of the line was given to Dr. A.C. Goell, an excellent, energetic man, who built, at a subsequent period, most of the lines through southeastern Pennsylvania. Mr. Cornell personally directed the construction from Somerville to Fort Lee. The poles were small and two hundred feet apart. An arm thirty inches long, with a pin at each end, bearing a glass bureau knob, an insulation proposed by Mr. Cornell and approved by Prof. Henry, was secured to the upper end of each pole. [Figure 1.] Around the bureau knobs the conducting wires were wrapped. The wires were copper, No. 14, and unannealed.



(Figure 1.) Cornell's glass bureau knob.

The route of the line was from the Merchants' Exchange, Philadelphia, via the Columbia Railroad to Morgan's Corners, thence to Norristown, Doylestown, and Somerville, to Fort Lee, by the ordinary wagon road.

Early in November 1845, the line was first opened between Philadelphia and Norristown, Pa., distant fourteen miles, so as to gratify public curiosity, while the building was going on beyond. The office in Philadelphia was on the second floor of the Merchants' Exchange.

The line stopped at Fort Lee, since a method of spanning the wide North River to New York City had not yet been devised. A submarine cable had been attempted and proved a failure. Eventually two wires were strung from Newark to Jersey City, New Jersey, and from there messages were sent across the river on ferryboats to New York. The line to Fort Lee was no sooner completed when the insulators became a target for stone-throwing boys and marksmen. It was only the beginning of a problem that still exists today for owners of open wire circuits. A major setback occurred when freezing rain accumulated on the open wires one night and high winds the next day took down many miles of wire. The line was rebuilt with an iron cord of three strands.

The line from Philadelphia to Baltimore was built by Henry O'Reilly in 1846 with a single iron wire. It was insulated merely with India rubber cloth wrapped

around the wire and held in place with pine plugs. Difficulty arose using his method, and soon small glass blocks with V-shaped projections at the center were substituted.

It did not take long for other lines to be constructed throughout the East which headed in all directions. By 1850, thousands of miles of wire had been strung, with lines reaching south to New Orleans, north to Maine and westward to Milwaukee, Wisconsin, and Dubuque, Iowa. Our northern neighbors had constructed a growing network of lines throughout Canada, primarily belonging to the Montreal Telegraph Company which was organized in 1847.

With this rapidly growing industry came a great need for insulators. It was unfortunate that little was known about insulation by the telegraph companies of the time. Some companies were struggling financially from the start and if they happened to make use of poor insulators, it spelled death to many of the organizations.

GLASS THREADLESS INSULATORS

BUREAU KNOB

The first pintype insulator known to have been used in this country was the glass bureau knob mentioned in the writings by James Reid. These were used in the construction of the Magnetic Telegraph Company line in 1845. The only example known to exist among insulator collectors at this writing is one found a few years ago by a bottle digger excavating a privy in Norristown, Pennsylvania. The line had reached Norristown in 1845 and was on the route between Philadelphia and New York. The bureau knob is also reported to have replaced the glass plate insulating arrangement which was in use on the original 1844 experimental line between Washington and Baltimore, when the original method was found to have poor insulating ability. An exact date for this replacement of insulation is unknown, but most likely it took place in 1844 or 1845.

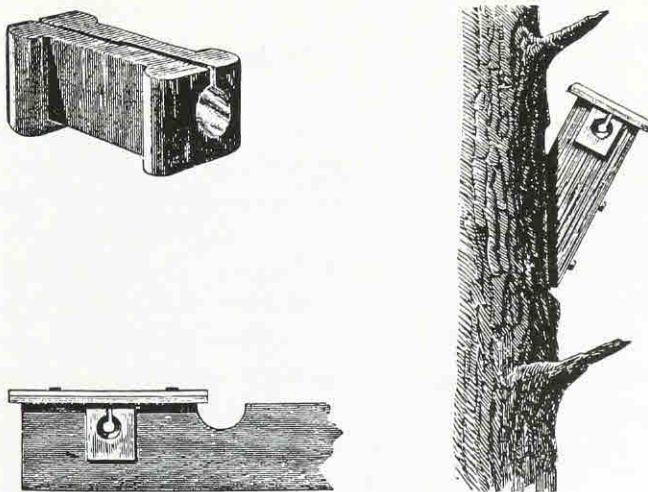
Mention should also be made at this time of two other articles of glass similar in shape to the CD 780 bureau knob. While exact information on their use has not been documented, they very closely resemble the CD 780, and they may have been used as a telegraph insulator. The first of these is the CD 782 which is embossed "M.T.CO.". There is little doubt they were made for the Montreal Telegraph Company. Two examples have been reported at this time and a fragment of a third was dug at the site of the Hamilton Glass Company in Hamilton, Ontario, indicating that glasshouse as a possible manufacturer.

Another item closely resembling the CD 780

bureau knob is the CD 784. This unembossed unit is very similar in shape and molding techniques. Rather than having a wide, mushroom-shaped top, there is a wire groove on top and a vertical notch on each side of the dome.

BLOCK TYPE

During the early years of line construction, the glass block was a popular form of insulator. While they were also placed in service in later years, their most widespread use in construction was in the 1846-1848 time period. They could be placed either in a crossarm, notched for the block to be dropped in place, or in a side bracket, shaped to receive the insulator. (Figure 2.) In some cases a notch was made at the top of a pole and the block inserted into the opening. In all three applications, a board was usually employed to form a roof over the insulator. Different sizes and variations of these insulators exist and the following is a study of them.



(Figure 2.) *The glass block and two installation options.*

GLASS BLOCK with V-SHAPED CENTER PROJECTIONS

The CD 1006 has been documented as being placed in service on the Philadelphia-to-Baltimore section of the Magnetic Telegraph Company line. They were used to replace the original crude form of insulation on that line. An exact date of this rebuilding is not known, but most likely it took place between October 6, 1846, and April 6, 1847, when James Reid was manager of the company. The V-shaped projection on either side most likely served as a means to help hold the block in place, preventing it from horizontal slippage from the strain caused by the weight of the wire.

GLASS BLOCK with ROUNDED CENTER PROJECTIONS

The CD 1007 is very similar to the insulator described above, but differs in that it has rounded projections at its center. At least one whole example surfaced in Ohio, and pieces of them have been located along the route of an early telegraph line constructed in Ohio.

GLASS BLOCK with FLANGED ENDS

This type is represented by CD's 1000, 1002 and 1004. It appears that this is a better design since the oblique opening would help to prevent the line wire from accidentally escaping, especially when side brackets were employed and the use of a board as a roof could not be placed in direct contact with the top of the insulator as was the case in applications using a crossarm. The earliest available documented use of this type insulator was on a line completed in December 1846 between Philadelphia and Pittsburgh, Pennsylvania. James Reid described its use as follows: "The insulation was chiefly with square blocks of glass, flanged at either end and grooved to receive the wire. The upper edge of the groove was oblique, so as to retain the wire when once it entered. A wooden roof covered the glass."

These were also widely used by one, and possibly two of the competing companies constructing lines between Louisville, Kentucky, and New Orleans, Louisiana. Many of the CD 1000's and one CD 1002 were found in a wood box in an old building in Gallatin, Tennessee, which was on the route of the line. They have also been found in Alabama in the vicinity of another line constructed between Washington, D.C. and New Orleans in the late 1840's. One of the CD 1004's was found with the other blocks in Gallatin and another was dug near Louisville, Kentucky.

THE CYLINDER TYPE BLOCK

On October 14, 1851, John Yandell was issued a patent for a telegraph insulator. This insulator was similar to the types of glass blocks outlined previously, but differed in that it was made in a cylindrical shape. It too could be placed into a pole or bracket with an appropriate opening for the insulator to be inserted. The CD 1012 has a slot at center for holding the wire and is similar in shape to the original Yandell patent drawing. It would fit snugly into the opening made for it in the pole, crossarm, or bracket. A small indentation or notch is also molded into the flanged end so as to receive a nail, driven through the wooden structure to help in preventing the insulator from accidentally slipping out. A modified variety of the Yandell

