

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.

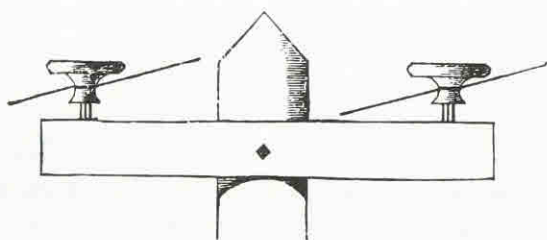
With the arrival of spring 1844, construction commenced once again. One of the main challenges facing the line builders was developing a means of insulating the wires at each pole. Cornell had devised a plan which consisted of sandwiching the wires, wrapped well in cloth saturated with gum shellac, between 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.

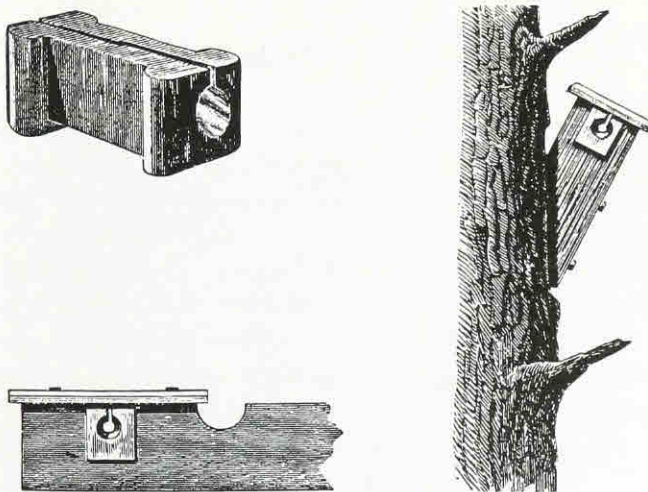
Mention should also be made at this time of two other articles of glass similar in shape to the CD 780 bureau knob. While exact information on their use has not been documented, they very closely resemble the CD 780, and they may have been used as a telegraph insulator. The first of these is the CD 782 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

design has a diameter which is larger at one end. This is the CD 1014 style.

Another form of the cylindrically-shaped block has been located in California. This is the CD 1010, and is similar in design to the CD 1014 but differs slightly. Rather than having one end that flares out from the main body of the insulator, this one has a more uniform taper from one end to the other. These most likely date from the 1850's.

SUSPENDED HOOK

This first insulator constructed to hold the wire by suspension on American lines appears to have been used in 1849. Credit for this mode of insulation has been attributed to two different people. One source states it was devised by John J. Speed, Jr. and used on a line between Detroit and Dearborn, Michigan, in that year. It was made of a cast iron casing with two glass interior parts which held the iron hook in place.

Another source gives credit to Amos Kendall as the inventor of the suspended hook. Regardless of who was the first to design the method, this type of insulator saw widespread use by a number of different telegraph companies. Dozens of different varieties were manufactured over the next twenty years. Some were very simple and made use of only an iron hook embedded in rubber or vulcanite. Others were composed of various parts consisting of glass and paraffin with iron covers. Two of the more widely used patterns included the Lefferts type and the Brooks paraffin insulator.

THE LEFFERTS HOOK

The Lefferts hook is named after Marshall Lefferts who had a large business in New York City which supplied telegraph wire. It consisted of a glass cylinder into which an iron hook was embedded. A small groove or notch was molded into one side of the glass. (Figure 3.) The insulator could be inserted into a hole drilled in the underside of the crossarm or in a block of wood. It was held in place by a wooden dowel or pin, driven through the arm or block, and received by the notch molded in the side of the glass.

The Lefferts hooks were largely employed on a line between Boston and New York City by the New York and New England Union Telegraph Company which was organized in 1849. They were also used by the Atlantic & Ohio Telegraph Company and in later years by the American Telegraph Company. It is likely several lines made use of them in the East. Lefferts became involved with various companies as an officer and could easily have used his influence in supplying wire, insulators and perhaps other telegraph supplies.

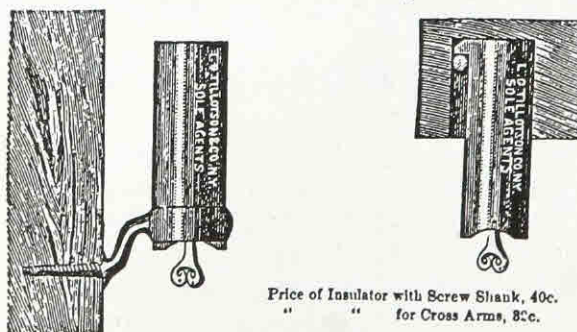


(Figure 3.) *The Lefferts hook.* (Courtesy of the collection of John Hall, Pearland, Texas; photograph by John McDougald)

BROOKS PARAFFIN INSULATOR

As was mentioned previously, the Brooks paraffin insulator was another suspension-type which was produced in large numbers. David Brooks had patented this insulator on August 6, 1867, and during the late 1860's produced vast numbers of them. It was reported that during peak production as many as 15,000 were manufactured in the span of one week. They consisted of an iron shell into which was cemented a glass cylinder, similar in shape to a bottle, into which was mounted an iron hook for receiving the wire. The interior surface was coated with paraffin which at the time was highly regarded for its insulating properties. (Figure 4.) These were largely used by railroads. Thousands were placed in service on the telegraph line built along the right-of-way of the Central Pacific Railroad, completed in 1869.

BROOKS' PATENT PARAFFINE INSULATOR.
L. G. TILLOTSON & CO., Sole Agents.

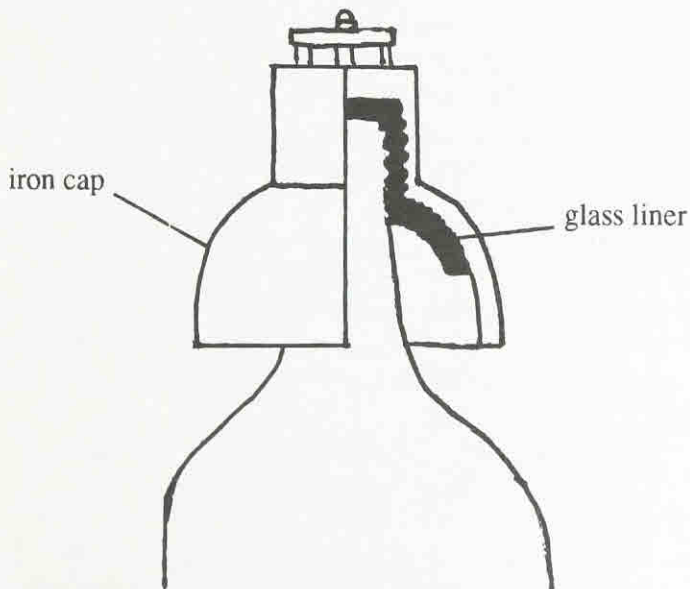
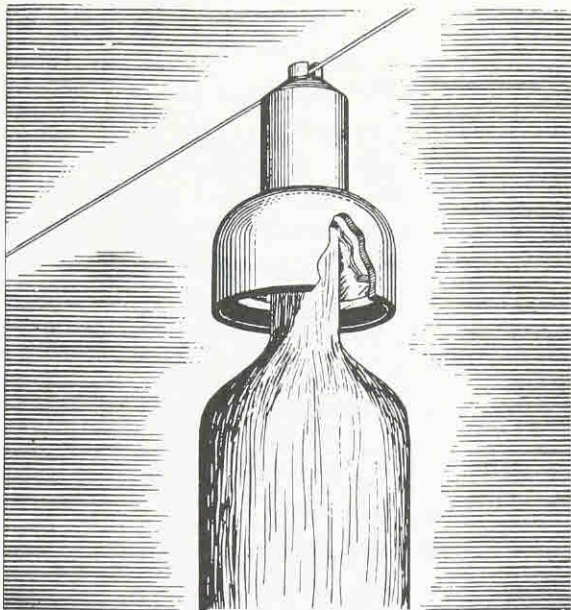


(Figure 4.) *An advertisement for the Brooks paraffin insulator which appeared in a catalog of the L.G. Tillotson & Co. Note the unit price for each application.*

HOUSE INSULATOR

Although Samuel Morse had patented his method of telegraph, there was nothing to stop another inventor from devising a system different enough from that of Morse to allow its use without patent infringement. One such man was a Vermonter by the name of Royal House. In the early part of 1846 he applied for a patent for a telegraph printing instrument. This instrument, rather than indicating a message of dots and dashes, printed the message upon a paper tape in Roman numerals. Lines using the House machines were built to create direct competition with those using the Morse system.

An insulator used on the House lines consisted of a coarse glass screw-like surface formed inside and out, as shown by the darkened area in the drawing. It was cemented into a bell-shaped iron cap as shown. (Figure 5.)



(Figure 5.) Pole top installation and cut-away drawing of the House insulator.

This large insulator, weighing from three to four pounds, was then fitted on the top of a pole which had been prepared to accept the arrangement. The line wire was held in place by the projecting points on the top of the iron cap. Although the House insulator saw extensive use on the lines using his system, only one surviving example is reported and resides in the Smithsonian Institution. No complete units have been reported by collectors, although fragments of both the iron shell and various colors of the glass cap have been found on the route of an early line constructed in Ohio.



House's Printing Telegraph envelope dated 1850. Advertisement reads: "Only Direct and Reliable line to New York, connecting with Boston, Buffalo, and intermediate stations." (Courtesy of Roy Licari)

LITTLE INSULATOR

The growth and development of the telegraph industry was pushed forward with an energy within its promoters unsurpassed by men of other trades. Vision of a vast network of wires, connecting every important town and city on the continent, filled the minds of many. With this energy came a creativeness in the invention of insulators. For every line built there seemed to be three new ideas for insulating the wires. This creativity seemed never-ending, and as more lines continued to be built, an even greater variety of insulators made their appearance.

This inventive creativity continued for decades and the result was thousands of varieties of insulators. Despite all the special designs, all the patented features, the variety of materials and arrangements devised in an attempt to make the "ultimate" insulator, the fact remains that a design developed by George Little in 1846 continues as a style not much changed and still in use today. James D. Reid, the telegraph historian, states:

In this field an English inventor, now a resident of Virginia, named George Little, better known in

connection with automatic telegraphy, produced in England, in 1846, one of the more valuable of practical and readily applied forms. The Little English insulator was of glass with umbrella or saucer base. Glass insulators in the form of bureau knobs were in that year in use in America. In 1847, with the rapid substitution of iron wire for copper, insulators of the Little form were employed. They were credited, probably with justice, to Ezra Cornell. Innumerable forms with this as a basis have since then been common, and almost universal.

Reid's mention of Cornell is in reference to his adopting the Little style and promoting its use in America. The Little insulator was the type we now refer to as the "pilgrim hat" style. These were produced with either one wire ridge or two. T.P. Shaffner in *The Telegraph Manual*, printed in 1859, illustrates three hat styles and gives the following explanation:

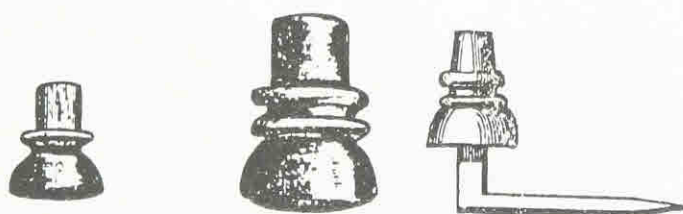


Figure 6.

Figure 7.

Figure 8.

In the adoption of the glass insulator the form first employed was the ordinary door-knob. It was found to be a partial success, but the large projection at the top of the knob was considered useless, and then the shape represented by Figure 6. was employed. The glass was set on a wooden pin fixed in a cross beam at the top of the pole. This form was then improved as shown by Figure 7. The wire was laid in the grooves of Figure 7. and on the projection in Figure 8. The line wire was then tied to the glass with a small wire, either No. 16, No. 14 or 12, according to circumstances and the opinion of the constructor.

While it is difficult at the present time to establish an exact date when each of the varieties of pilgrim hat or Little style insulators was produced, it is safe to assume that CD's 735.6, 735.7, 736, 737, 738 and 739 were most likely initially manufactured in the late 1840's to early 1850's. The type represented in the illustration (Figure 8.) was in use on Morse's Washington-New York line in 1853. The CD 735.6 and CD 739 have been found along the right-of-way of the New York & Erie Railroad, on a section of telegraph line built in 1850. While they could have been placed in use there at a later date, it is likely these types were being produced at that time.

The CD 736 was used as early as 1851, as near

as can be determined. In May of that year, the New York & Erie Railroad was completed from the Hudson River to Lake Erie with a telegraph wire for railroad use along the right-of-way. Both the CD 736 and CD 736.1 styles saw extensive use along the main line and branches of the Erie Railway which came into existence in 1861 with the demise of the NY&ERR.

Some of the larger pilgrim hat styles in the CD 735.6 through CD 739.2 series, which are among the oldest of pintype insulators, saw production into the late 1860's and possibly into the early 1870's. They were a popular design with some of the telegraph men of the time.

With the extension of lines into remote areas, it became advantageous to reduce in size this style of insulator to help in reducing weight and bulk in transporting materials. The result was the CD 735. The earliest confirmed use of that insulator style was on the Collins Overland Telegraph Company line being constructed in 1865-1866. The first shipment of insulators arrived in British Columbia in June 1865, after having been shipped from New York in late 1864.

They were also widely used on the route of the Union Pacific Railroad being constructed in 1868 and 1869. Other similar styles including the CD 734 McMicking and CD 734.5 "Baby Battleford" were produced as late as the middle 1870's. The large number of variations in the CD 734 through CD 739.5 grouping were produced by several glasshouses, but only a few can be accurately attributed.

Another group of the hat style insulators is the CD 740 through CD 742.3 group. While they are similar in some ways to the previously-described pilgrim hat styles, they differ primarily by having a more squatty form and in most cases a more rounded dome. While an exact date has not been determined for their earliest manufacture, it would stand to reason their production was started no later than the early 1850's, and perhaps the late 1840's.

The Canadian lines saw a widespread use of insulators in this category. Examples of CD 740, 740.2, 740.3, 740.7, 742, and 742.3 were used and most likely produced there. Literally millions of the various styles mentioned above were in use by the 1870's. The Montreal Telegraph Company, formed in 1847, monopolized the telegraph industry at the time and spread its lines to nearly every major town in the provinces of Ontario and Quebec, and later the Maritime provinces. It is likely their early lines were constructed with the CD 718 and 740, but in later years the CD 742 and 742.3 styles saw widespread use.

In the U.S., the unembossed CD 740 was used primarily in New York and the New England states, although they have been found in other areas. They were most likely produced at several different glasshouses over a period of years. Most of them are of dark coloration, usually green or amber. While the CD 740.1 is of Canadian origin, a few have surfaced in New England,

primarily on the Grand Trunk Railway line which entered Vermont from Quebec and terminated in Portland, Maine. This style, from the evidence available at this time, appears to have been used exclusively by the Grand Trunk Railway in Canada and on the above-mentioned line into the U.S.

Of the remaining variants in the grouping, the CD 740.4 has been found primarily in New York state. The embossed examples will be discussed in the chapter covering telegraph supply houses.

EGG

William Swain, who had been one of the incorporators of the Magnetic Telegraph Company in 1845, and a purchaser of a large amount of stock the following year in the Philadelphia to Baltimore section of the line, was elected president of the Magnetic Telegraph Company on July 9, 1850. He immediately set out to make the company's lines the best they could be and stated, "I am desirous to have the Magnetic Telegraph Company become a model for other telegraph lines to follow in its manner of conducting business, its correctness, promptitude and fidelity to the public."

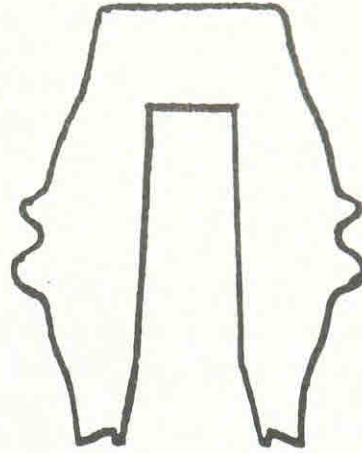
One area in which he felt an improvement was needed was in the style of insulator used on the lines. Taking James Reid into his office one day and showing him a drawing of what became known as the "egg" insulator, Swain exclaimed, "That is the insulator of the future." Years later, Frank Pope wrote the following article giving an account of the egg:

About the year 1850 or '51 Wm M. Swain, who was then President of the "Old Magnetic Line" between New York and Washington designed the well known "egg insulator." (Figure 9.) Considering the imperfect state of electrical knowledge at that time, there is a wonderful amount of ingenuity and adaptation to circumstances displayed in this design. It not only stamps its author as a man of decided originality but also of sound practical common sense. It is very much to be regretted, on this account, that he did not remain in the telegraph business the rest of his life.

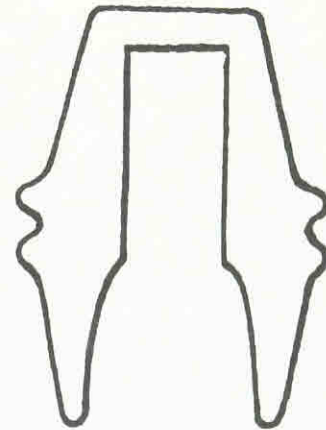
In designing the model of this insulator Mr. Swain succeeded in combining excellent insulating qualities with the highest degree of strength and durability. The general form of the egg or double cone is the strongest that could possibly have been selected. In fact, it has not been an uncommon occurrence for one of these insulators to be dropped from the top of a high pole upon a stone pavement without material injury. Under the ordinary conditions of exposure in the telegraphic service they are very rarely broken.

The egg insulator, upon an iron support, was also quite extensively used from 1851 to 1860 upon many

of the telegraph lines in the Eastern and Middle States.



(Figure 9.)



(Figure 10.)

An insulator (Figure 10.) which was taken from an old Fire Alarm wire in Providence, Rhode Island and, as near as can be ascertained, originated in Boston. As will be seen upon inspection, it is an improvement upon Mr. Swain's model in one very important respect, viz., the narrowness and depth of the inner cavity. Its only drawback is an insufficiency of material, and therefore of strength at the top, above the upper end of the support. Like the Swain model it is designed to be fixed upon an iron arm.

After the egg insulators had been in use several years the wires began to work very badly, and show a great deal of escape in wet weather. This was principally caused by the surface of the glass deteriorating from exposure, and becoming coated with dirt and smoke from locomotives and other sources.

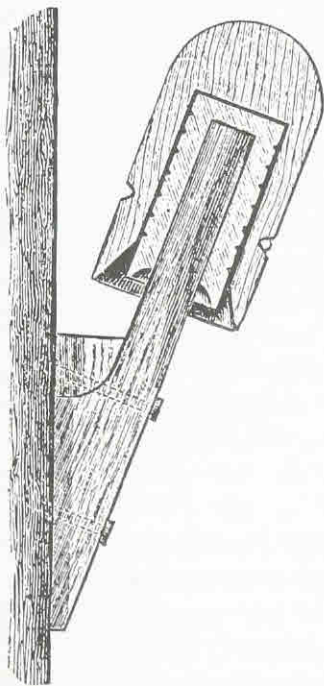
The true cause, however, was not at that time understood or even suspected. The managers of telegraph lines "jumped" to a conclusion, which, as usual, was an erroneous one--that the trouble was owing to the egg insulator being too small at the bottom. A certain distinguished advocate of glass insulation remarked:

in the Mid-west, constructing telegraph lines in several directions. He was a determined and energetic man, and one wise enough to see the advantages of consolidation rather than conflict with others in the industry.

He was partly responsible for the merger of various lines in 1854 resulting in the formation of the Western Union Telegraph Company. Wade became an agent for the new company, and for the next few years had great influence with the officers and managers of several competing lines, many of which were consolidated into Western Union. By the close of 1865, Western Union had in operation approximately 44,000 miles of wire. On July 26, 1865, Hiram Sibley retired from the presidency of the company and Jephtha Wade was chosen to succeed him. In a period of less than twenty years, Wade had gone from being a wandering portrait painter to the head of the largest telegraph company in the country.

The glass insulator with wood covering known as the "Wade type" because of the widespread use of them on lines built in association with Jephtha Wade, as near as can be determined, had its beginnings in Erie, Pennsylvania.

J.J. Speed, who was a close associate of Wade's in the late 1840's and 1850's, is credited with inventing a wood-covered glass insulator in 1849. It was adopted, modified in form by Wade, and largely promoted in the 1850's and 1860's. One of the more well-known lines making use of this insulator was the 1861 Transcontinental line. Several of the glass inserts have been located along this route, as well as a small number with the wood cover still intact. (Figure 11.)



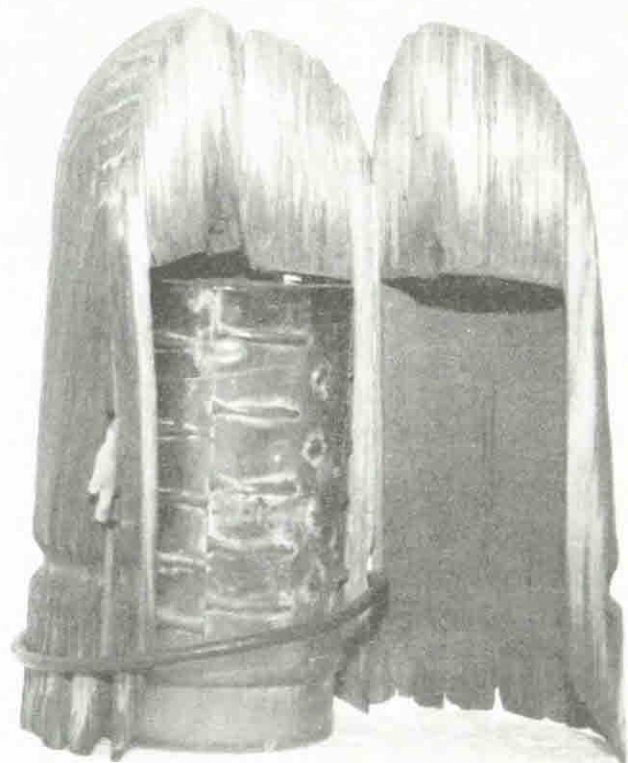
(Figure 11.) Drawing of the "Wade-type" insulator on a side bracket pin.

The insulator consisted of a glass cylinder, inserted into a wood covering which had been coated with coal tar. The tar helped in preserving the wood. Two of the more readily available types are the CD 723.3 with smooth sides and the CD 723 with raised dots and dashes. The purpose of the projections on the glass of the CD 723 type was to help grip the wood cover and to prevent accidental separation of the two parts. In some cases tar was also used as an adhesive between the wood and glass. (Figure 12.)

A similar type, although smaller in size, was also used on Canadian lines. The CD 721 and CD 722 have been found on lines following railroad right-of-ways, primarily in the province of Ontario. A couple of them have been located with the wood cover intact, which is also smaller in size than those found on the CD 723 American type.

Other styles, which most likely also had wood covers, have been found in various locations. A couple of the CD 723.5 were located in New England, the CD 723.6 was found on a railroad line in Ohio, and the CD 725 in Nebraska.

Another style, although similar in its use, is different in that a flared skirt or flange is found near the bottom. These are represented by CD's 724 through 724.6. While these are generally classified with the Wade-types, most were probably not used in association



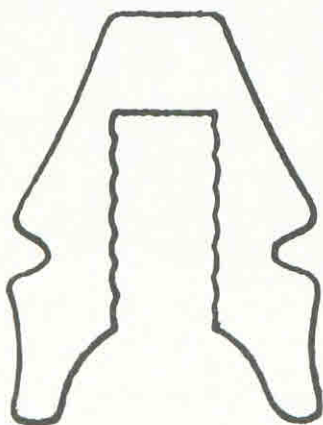
(Figure 12.) A CD 723 with raised dots and dashes still housed within its weathered wood cover. An Indian arrowhead is lodged in the wood cover at the lower left. (Courtesy of the collection of John Hall, Pearland, Texas; photograph by John McDougald)

with lines promoted by Jephtha Wade. Most of them have appeared in the East and the CD 724.3 has been found in eastern Canada. It should be noted at this time that all the items in the series of CD numbers 721-725 have been assigned a number in that grouping with the assumption that they were to be used as a pintype insulator with a wooden cover. Without further knowledge of their use, they have been classified with the Wade-types. It is entirely possible however that an example could have been used for other purposes. All of this type of design are quite scarce, the CD 724.3 having perhaps more known specimens than the other types, although it too remains a very scarce item.

COMPROMISE

When making reference to the "compromise" insulator, the shape that first comes to mind is that represented by CD 731. While this was probably the most widely used and largely produced insulator of the general pattern known as the "compromise", other similar varieties exist. They include all the examples in the series of CD's 729 through 732.2. This grouping has the general classification among collectors of "concave skirt signals". Before going further into a discussion of those items, perhaps it is best to study the following information written by Frank Pope for an article that appeared in *The Telegrapher* in 1871:

The pattern of insulator shown in FIGURE 13. was designed in 1865 by Mr. M. L. Wood, General Superintendent of the United States Telegraph Company. The internal screw thread shown was a subsequent invention, patented by L. A. Cauvet in 1865. This model was called the "Compromise" insulator. It was intended as a sort of



(Figure 13.) The "Compromise" insulator.

cross between the "egg" and "umbrella" insulators, and appears to have been designed under the very prevalent but entirely erroneous idea that the latter was theoretically the best form of the two, but that, to obviate too great a liability to fracture, it was necessary to approximate somewhat to Mr. Swain's pattern. Mr. Wood afterwards improved the arrangement very much by having a collar turned on the supporting pin, nearly filling the mouth of the insulator. When the Western Union Company took possession of the United States wires in 1866 they inherited this insulator and between that year and the present one that company has probably put up between one and two millions of them, carefully discarding, however, their only redeeming feature, the protecting collar on the supporting pin.

The Atlantic and Pacific, Pacific and Atlantic, Franklin, and other competing telegraph companies, who are always very careful to copy with ludicrous fidelity all the electrical blunders of their great rival, also adopted this model of insulator for their own wires.

The insulators were manufactured by various glass companies, saw very widespread usage, and are among the latest of threadless manufactured in this country. While they have been located in recent years throughout the eastern and central states as well as several western states, one right-of-way in particular has probably produced more of them than any other. Many were found along the route of the Union Pacific Railroad in Wyoming and Utah which was constructed in the late 1860's. They were primarily the CD 731, both unembossed and with the "S. McKEE & CO." embossing. Most of the ones along the UPRR right-of-way were used by a commercial telegraph company and were placed on poles on the opposite side of the track from the railroad company's line which made use of the CD 735 Mulford and Biddle.

The CD 731 was also largely used on a line connecting the eastern seaboard with the Maritime provinces of Canada. Many of the unembossed CD 731 as well as the CD 731 Tillotson have been located along a telegraph route between those two areas serviced by the American Telegraph Company, which was in turn taken over by Western Union upon the merger of the two companies in June 1866. The above-two-mentioned locations where the CD 731 saw extensive use are only a couple of the many areas where they were employed.

Of the other known insulators of the compromise pattern, the CD 732 and CD 729.1 are probably next on the list of availability. Most of the CD 729.1 units have been located in southern Pennsylvania. The CD 732, while not a common threadless type, has been located in various eastern states, primarily Ohio, Pennsylvania, and New York. Of the remaining compromise types, most are scarce or rare and have been found in scattered locations, once again mostly in eastern states.

STRAIGHT SKIRT SIGNALS

Another insulator group consisting of the CD 726 through 728.8 is similar to the compromise style. The main difference is a straight skirt rather than one that is concave in shape. The "straight skirt signal" grouping is probably an outgrowth of the compromise style, and most of them date circa 1868-1875. Many of them were produced during the time period when the transition from threadless to threaded types was taking place.

As near as can be determined, the first regular production of the threaded insulators took place sometime between mid-1867 and mid-1868. It is unlikely that large-scale production took place for several months after that time. By 1870, or shortly thereafter, it would seem likely that quantities of both threadless and threaded units were being distributed. By 1875, most contractors would have been making use of threaded units in new line construction. There were, however, unthreaded insulators and pins being advertised by telegraph supply houses into the late 1870's.

The CD 728.5, while it can't be classified as a "regular" threadless since it has a special lock-pin-type pinhole, still demonstrates a lingering of "unthreaded" units, and in this case probably dates from the 1880's. A patent was issued to L.C. Baldwin and J.C. Thurston on April 22, 1884, for a special pin arrangement which looks very much like the insulator described above. Some of the embossed signal-type threadless also date from the 1870's, but they will be covered more closely in another section of this writing.

The CD 726, the only example of Canadian origin in this grouping, has been found on several routes of telegraph in Canada, and at least one in the U.S. operated by a Canadian company. While some of these units have been found along routes of early line construction, it is possible those were used as a replacement item or as a need arose for the building of another circuit along the same route. Most have been located along railroad routes constructed in the years 1869 and 1870. These insulators are found in some very spectacular colors including at least three different vivid blues, puce, burgundy, amethyst, amber, deep green, and various shades of aqua.

BEEHIVE

The CD 743.1, 743.2 and 743.3 have been located in Canada, primarily along railroad right-of ways. Judging from the dates that most of these railroads were constructed, the production of these items took place primarily in the early 1870's. This general style was also made with threads, some in the same molds as the threadless units. Years later, the beehive shape with threads became the standard on Canadian railway lines. The CD 743.2 and 743.3 have been located in various aqua tints. The CD

743.1 has been found in aqua, green, and vivid blue.

SLASHTOP

The CD 788 is a very unusually-shaped insulator and remains quite rare at this writing. While it is likely they were used elsewhere and possibly others have been found, the only confirmed location of their use has been in one area of Alabama near where activity of the Confederate Army took place during the Civil War. It has been speculated that the grooved top on them was designed to help in the rapid construction of military lines when the lack of time prevented using a tie wire on every insulator. This theory seems to have some validity, although a similar item was patented in 1874, long after any need for rapid construction was necessary. Most of the CD 788 units found are deep in color, usually a dense amber. A few, however, have been located in lighter shades of green.

TEAPOT

Another of the interesting designs found in the same area as the CD 788 is the CD 790. These were located with the CD 788 in Alabama, and like the CD 788, are of a design which could have been used without a tie wire. Aside from that particular location, they have also been found elsewhere in Alabama, Georgia and in Florida. A CD 791 was purchased by a collector in Pennsylvania, although no documentation of its use there exists. At least two broken examples have been found in the South.

MANUFACTURERS OF THREADLESS GLASS

INTRODUCTION

The attribution of the source of manufacture of various insulators during the early years of their production is a difficult task. While there are sufficient records detailing the production of glass in the most recent 100 years, for the most part details are limited on the production of insulators for the first 25-30 years in this country. For many of the glasshouses that made insulators in the period from 1845 to 1875, the manufacture of them was in many cases only a secondary or sideline activity for a bottle-producing facility. Very few records on their production have remained for the collector to study today. This is not to say that more information cannot, or will not be

discovered. It is certain that valuable information has been recorded and is available to researchers in various depositories.

Some of the material available to the researcher has been brought to light. The study of the several glasshouses to follow is the result of the work of many researchers, and while incomplete, it gives a general description of the many factories that produced insulators. It would be easy to make assumptions based on molding techniques, glass color and textures, localities in which items were found, etc., in determining where certain articles were made. While there is a certain amount of validity to this practice, researchers are constantly reminded that there is a difference between documented fact and speculation or theory. Once false information has been printed, or theory has been misinterpreted as fact, there will always be a student that is misinformed. Keeping all of this in mind, the following material is presented in a way that limits itself to documented material, or in cases of speculation, the material is presented as being just that.

It should be noted that in using the many directories and other sources for information on glasshouses, the term "glass company", "glassworks" and other variations in the name of the factory can change from source to source. At times the proprietors at a given factory may have changed while the general name used in referring to the factory remained the same. All of this can be confusing to the researcher. While information is presented in as clear a format as possible, the above should be kept in mind.

The number of glasshouses that have operated on the North American continent since Morse's experimental line was completed in 1844 numbers well into the hundreds. Many of them were short-lived, owing to financial difficulties, lack of available materials for production, transportation problems, poor management, and a long list of various obstacles. Others operated for decades, owing their existence to their ability to meet the demands created by their customers. The demand for insulators grew rapidly once the construction of various telegraph lines took place in the late 1840's. Most wires were strung using an average number of thirty poles to the mile. It staggers the imagination when one realizes that of the many telegraph companies in the United States, by the close of 1865 just three of those companies had approximately 73,000 miles of wire in use. In 1870 the Montreal Telegraph Company controlled over 12,000 miles of wire. The combination of the four mentioned companies totals over 85,000 miles of wire, all of it constructed with insulators made prior to the invention of threaded insulators, or at a time when the use of threaded units was just beginning. Millions of insulators were in use by that time. The following is a listing of a few of the glasshouses that are either confirmed or suspected of making threadless or special non-threaded insulators.

EARLY GLASS FACTORIES IN AMERICA

NEW ENGLAND GLASS COMPANY Cambridge, Massachusetts

This company was incorporated in 1818. The works was located at Lechemere Point in Cambridge, a suburb of Boston. The primary product of the company was fine-quality ornamental and table wares. Bottles are reported to have also been produced, at least in the early years of operation.

On July 16, 1845, an association was formed in Utica, New York, and arrangements initiated to construct the Springfield, Albany and Buffalo Telegraph Line. Trustees were appointed, one of which was Theodore Faxton. The line was to be constructed "with number 14 copper wire, to have 25 poles per mile and to be insulated with the wooden pin and glass knob of the 'Magnetic'." A change was made, and the eastern terminus became New York City rather than Springfield.

The following year Faxton contracted with Ezra Cornell to build the section of line between Albany and New York City. On April 1, 1846, a formal contract was signed stipulating the line was to be completed within ninety days.

Philip Dorf, in his book *The Builder, A Biography of Ezra Cornell*, makes three references to insulators having been supplied to Cornell by a Boston manufactory, two of which name the New England Glass Company. The first refers to Cornell's building of the above-mentioned Albany to New York line: "Most of April had already slipped away without any actual construction, but Cornell wasn't alarmed. He had made his calculations closely so as not to have idle gangs of men. All his materials had been contracted for: copper wire from Stephens & Thomas of Belleville; cedar poles from James Hallock of New York, wooden crossbars from Bliss near Ithaca; glass insulators from Smith's Boston manufacturer."

A year later Cornell was found being pulled in two directions. He was involved with the Erie & Michigan Telegraph Company in "the West" and was busy constructing a line north through Vermont into Canada. Dorf makes a second reference in his book to insulators supplied to Cornell in the autumn of 1847 when Cornell's worries were accumulating: "Running short of glass insulators, Cornell dispatched an urgent letter to the New England Glass Company. The matter was important enough for a visit to Boston, but he could not spare the time."

Cornell kept busy for the next couple of years and seemed to always be looking for the future. Rather than pay off his debts as income was arriving, he seemed to be more eager to invest the money in business ventures. The year 1850 found his debt growing even larger. Dorf made

another reference to the New England Glass Company in describing notices given Cornell in 1850: "From Ely of the New York Screw Co. to whom he owed \$4,000 for wire, 'I cannot consent to take notes again payable at a future time without security.' From Howe of the New England Glass Company, who several times had presented his bill for over \$1,200: 'Your neglect of my request is unpardonable. I am given to understand that you are fully able to pay the demand without great sacrifice.'"

All of the above information illustrates clearly that Cornell ordered insulators from the Boston area in 1846. Later, specifically, the New England Glass Company is named as a supplier. It is possible the New England Glass Company subcontracted with another company for the production of insulators, but at least at this time we have noted a very probable manufacturer, and have confirmed a supplier. With a debt amounting to \$1,200, one could assume the number of insulators supplied to Cornell by 1850 was many thousands.

BOSTON & SANDWICH GLASS COMPANY Sandwich, Massachusetts

The incorporation of the Boston & Sandwich Glass Company took place in 1826. The production of glass had started the previous year under the direction of Deming Jarves. The works produced glassware until the late 1880's. The main product of the factory was high quality table and ornamental ware.

The production of lightning rod insulators took place in the 1850's. The CD 701.1 egg style was also produced at the factory. Fragments of that type have been located at the factory site, as well as at least one whole specimen that is partially deformed. Production of the CD 701.1 took place from approximately the 1850's to the early or mid-1860's.

MASSACHUSETTS GLASS COMPANY/ BOSTON BOTTLE WORKS Somerville, Massachusetts

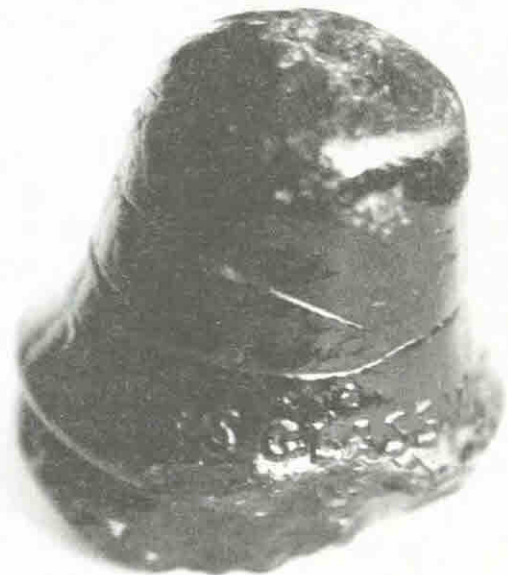
In May 1867 a corporation was formed under the name of "The Massachusetts Glass Company" with Samuel Oakman as president. That is the earliest reference found to date of Samuel Oakman being involved with the production of glass. In 1869 he received the first of his many patents, this particular one for a glass furnace. The first of his insulator patents was issued on July 26, 1870, for an insulator with a slotted threadless pinhole and matching pin. This patented feature has been found in insulators of the CD 728.7, 728.8 and 796 styles.

In 1871 the property at the site of the Massachu-

setts Glass Company was sold. While the name "Boston Bottle Works" was not recorded on any deeds at that property's location, it can be assumed that individuals purchased the land and operated the works under that name. The Boston Bottle Works was listed from 1872 to 1877 at the Mystic Avenue location in nearby Somerville, Massachusetts, in the Boston city directories. Some of the slotted pinhole insulators patented by Oakman are embossed with the July 26, 1870 patent date as well as "Boston Bottle Works". It could be assumed they were produced circa 1871 to 1872. It's quite possible the slotted pinhole units without the Boston Bottle Works marking were made by the Massachusetts Glass Company prior to the existence of Boston Bottle Works. (See The New England Manufacturers chapter)

THAMES GLASS WORKS COMPANY New London, Connecticut

The Thames Glass Works existed in New London, Connecticut, for approximately two years. The New London *Chronicle* reported on August 13, 1863, that "the glass works near Fort Trumbull" that had been idle had been purchased and was to be "operated by William Barry and Nathan S. Fish". On August 26, 1863, the *Morning Chronicle* stated: "GETTING READY - Carpenters, masons, blacksmiths and other mechanics are busily employed in getting the Glass Works ready for operations. They are tearing down walls, altering the general arrangement of things, building new rooms, etc. The new proprietors of the establishment hope to be under full headway in about two months."



(Figure 1.) Insulator embossed "THAMES GLASS WORKS". (Photograph courtesy of Doug MacGillvary)

The Norwich *Weekly Courier* noted on December 22, 1864, that "The Thames Glass Works Co. is manufac-

turing a large amount of light and dark green glass. The Co. has a first rate reputation." By December 1865 the property was sold and became the Fort Trumbull Glass Works.

At the time of this writing, only one insulator specimen embossed "THAMES GLASS WORKS" has been found. (Figures 1. and 2.) It was formerly in the famous bottle collection of the late Charles B. Gardner. The insulator mentioned is only about one-half complete, that being the upper portion. The embossing is positioned around the wire ridge just above the wire groove. From viewing the photo of that specimen, it is assumed to be a CD 718 or CD 731 or a similar style. The color is deep amber.



(Figure 2.) Insulator embossed "NEW LONDON". (Photograph courtesy of Doug MacGillvary)

LOUISVILLE GLASS WORKS Louisville, Kentucky

The Kentucky Glass Works was involved in the production of glassware in Louisville, Kentucky, in 1850, and possibly as early as 1849. It was located on Clay near Washington Street. The original partnership which operated the factory lasted only a short period of time, and in November 1850, George L. Douglass and James Taylor purchased the works. In about 1855 the factory was referred to as the "Louisville Glass Works" under the firm name of "Douglass, Rutherford & Co." In later years various other people shared an interest in the factory.

Ken Wilson, in *American Bottles & Flasks and Their Ancestry*, states the following: "Advertisements during the following ten years, up to about 1869, suggest that this was probably the company's most prosperous period. In addition to flasks and bottles, a wide variety of other glassware was advertised, including coal oil lamps, trimmings and tumblers, as well as glassware for druggists, confectioners, and grocers. In 1865 the works also supplied all the insulators for the first telegraph and fire alarm system in Louisville." The 1865 date would suggest either a threadless pintype insulator or one of the block-type styles. It would seem most likely that they

were a pintype insulator since most block styles were produced in earlier years.

It should also be noted that George L. Douglass became the secretary and treasurer of the New Orleans and Ohio Telegraph Company in 1853. The following year the N.O.&O. was leased to a group of Louisville businessmen, of which Douglass held the largest amount of capital in the newly formed company. Douglass and Norvin Green thoroughly rebuilt the line along the right-of-way of railroads. Later, Douglass became treasurer of Southwestern Telegraph Co. During the Civil War, a separate corporation was set up for that part of the Southwestern Telegraph Co. lines within the Confederacy, and Douglass became acting president of the Confederate corporation. With his involvement in the various telegraph lines in Kentucky and through the South, it seems likely that at least part of the insulators used on those lines could have been produced at the Louisville Glass Works.

VIRGINIA GLASS MANUFACTURING COMPANY Richmond, Virginia

The site of this glass company, at the corner of Main and Tyler Streets in Rocketts, Richmond, Virginia, was in earlier years (mid -1850's) referred to as the "Richmond Glass Works." The incorporation of the Virginia Glass Manufacturing Company took place on February 19, 1858. Jacob Atlee, the proprietor of the works, was very active in the production of various types of bottles and jars.

Advertisements from 1857 and 1858 list several types of bottles and flasks as being available. While insulators are not mentioned, it is apparent Atlee was involved with their production. During the Civil War, Atlee was charged and later acquitted for "supposed disloyalty". Mr. Atlee became involved in these charges partly in his endeavor to procure soda ash and a particular kind of clay, essential to the manufacture of telegraph wire insulators. Soda ash was one of several ingredients used in glassmaking. The clay referred to most likely was also used in the manufacture of glass, although one could speculate it might have been used in the making of porcelain insulators. An 1858 issue of the *Richmond Dispatch* made mention that Mr. Atlee had established a pottery in Virginia.

Several years ago, while excavating the site of the Virginia Glass Manufacturing Company, James Gergat found several fragments of bottles, as well as a large portion of an egg-style threadless insulator. The specimen, which is about two-thirds complete, appears in a photograph in *American Bottles & Flasks and Their Ancestry*, by McKearin and Wilson. As near as can be determined in viewing the photograph, the insulator is a deep-colored CD 701. Although the specimen could have

been brought in with cullet to be remelted, I feel safe in assuming it was made at the factory site. It would only stand to reason that some of the egg-style insulators used in the southern states were produced at the Richmond factory, especially during the Civil War when the supply of goods from the North was interrupted.

LANCASTER GLASS WORKS Lancaster, New York

Little is known of the production of insulators at this works which started operating in 1849. Kenneth Wilson in *American Bottles & Flasks and Their Ancestry* makes a reference that for a period during the Civil War, telegraph insulators were made in large quantities. It is unknown which styles were produced.

S. McKEE & COMPANY Pittsburgh, Pennsylvania

The firm of S. McKee & Company was established during the 1830's. Window glass and bottles were produced by the company, which is reported to have operated as many as three separate factories. Samuel McKee became sole proprietor of the business in 1860. Insulators were made by the the company during the mid-1860's. The "S. McKEE & CO." embossing is found on some CD 731 units. The only colors known to date are aqua variants.

ZANESVILLE GLASS MANUFACTORIES, G.W. KEARNS & CO. Zanesville, Ohio

George Kearns was involved with the production of glass in Zanesville, Ohio, in the early 1840's, having formed a partnership with several other glassblowers to manufacture primarily glass bottles and flasks. The factory was located at the corner of Muskingum Avenue and Harrison Street. The factory continued to operate for a number of years, under many different owners.

Later, in the 1850's and 1860's, George Kearns was involved with two different glass facilities on First Street in Zanesville. An advertisement in an 1868 directory lists many items produced: "Zanesville Glass Manufactories. G.W. Kearns & Co. Manufacturers of window glass, druggist's ware, fruit jars, demijohns, insulators and colored glass ware." The reference to insulators mentioned above stirs great interest within today's collector. While it could be assumed they were pintype insulators, there is always the possibility they were lightning rod insulators or another special type.

While the earlier reference is vague in its description of "insulators", the information shown below

appears on one end of an 1870 check from the company and clearly indicates telegraph insulators were produced by the company. (Figure 3.)



(Figure 3.) G.W. Kearns & Co. check dated 1870. (Courtesy of Bob Henrickson)

With this information, new questions like, "what is the Kearns Improved Telegraph Insulator?" arise. While the 1870 date was from the time period when both threadless and threaded insulators were being produced, it would be safe to assume that threadless units were produced at the factory in the 1868-1870 period. While further research has not been completed at this time, it is also possible that insulators were produced at the factory prior to the 1868 reference.

NEW GRANITE GLASS WORKS Stoddard, New Hampshire

The area of Stoddard, New Hampshire, is reported as the birthplace of five glasshouses in the period from 1842 to 1861. The first factory was constructed in 1842, when Joseph Foster, who had earlier worked at a glass factory in nearby Keene, New Hampshire, went to Stoddard and built a furnace in the lower part of town. Foster operated the plant until approximately 1850.

Another factory known as the "Granite Glass Works" had been in operation for three or four years in Stoddard by that time. Two sons of Joseph Foster, George and Henry, were employed by the operators of the Granite Glass Works in the 1850's. After gathering information from various sources, it appears that both Henry and George worked at the factory around 1850 when their father's business was no longer operated by him. George was still employed at the factory in 1856. In November of that year an auction was held offering equipment from the factory, and George purchased 49 cast iron molds for one dollar each. It is likely that George went to Canada shortly thereafter to take part in the production of glass at

St. Johns.

In 1861 another factory was in operation in Stoddard. It was known as the "New Granite Glass Works" and was organized by George Foster. George managed the works; brothers Charles and William were glassblowers, and a younger brother, Joseph E., made wicker covers for bottles. Their father Joseph also worked at the factory at some time prior to his death in 1863.

Insulators were one of the more important products to be offered by the works. A trade card from the factory offers "Glass Telegraph and Lightning Rod Insulators of any Pattern or Weight." A printed letter dated June 1861, which was circulated by George Foster states, "I shall pay particular attention, also, to the MANUFACTURE of GLASS TELEGRAPH and LIGHTNING ROD INSULATORS, and to those who use INSULATORS, I would refer them to the Montreal Telegraph Company, at Montreal, C.E. for information as to the quality of those I manufactured at my Canada Glass Works, St. Johns, C.E."

Ken Wilson, in his writings contained in *American Bottles and Flasks and Their Ancestry*, mentions George Foster moving to Massachusetts in 1862 where he set up a bottle and demijohn warehouse in Boston. He also states that about two years later George, and apparently his brothers, sold their interests in the New Granite Glass Works to Charles B. Barrett. George's brothers remained as glassblowers under the new owner. It has been reported that Barrett operated the works until 1871 when the factory was destroyed by fire.

While no embossed examples of insulators have been found with the name of any of the Stoddard glasshouses, it can be assumed that a fair quantity of insulators were made there. Bottles were the main product of all the factories mentioned, and the only factory in Stoddard that is known to have advertised insulators was the New Granite Glass Works. Perhaps future research will reveal which styles were produced, and which factories were involved.

MT. PLEASANT GLASS WORKS

Mt. Pleasant, New York

In 1844 the molds, equipment, and workmen from a glasshouse in Vernon, New York, were moved to a mountain site several miles from Saratoga, New York. A newly constructed works was put into operation and quantities of bottles were produced. The nearby mineral spring companies located in the Saratoga area were consistent buyers of bottles. The works operated until approximately 1870, when it was sold to spring water companies and was moved to Saratoga.

While excavating the Mt. Pleasant site in recent years, bottle diggers have unearthed broken insulators. At least one nearly whole unit was located. All of those

reported are of the CD 737.9 type, and are deep amber or olive amber in color.

BROOKFIELD GLASS COMPANY

Brooklyn, New York

Small numbers of both CD 728.4 and CD 731 have been located with the name of Brookfield embossed on them. It is interesting that those insulators are also marked with "CAUVET'S PAT. JULY 25, 1865", the patent date for a threaded pinhole.

William Brookfield operated a glassworks in the Bushwick section of Brooklyn, New York, starting in the 1860's. The works in later years produced large quantities of threaded insulators, and it was during the transition years from threadless to threaded, probably from the late 1860's to mid-1870's, that the threadless embossed units were made. The embossed patent date for a threaded insulator on a threadless had little significance at the time it was made. They were made in the same molds as the later threaded units. (See A Long Stretch -- Brookfield chapter)

EARLY GLASS FACTORIES IN CANADA

With the widespread construction of telegraph lines in the United States during the late 1840's and early 1850's, our northern neighbors in Canada were quick to follow with their own network of "talking wires". The Toronto, Hamilton, Niagara and St. Catherines Electro Magnetic Telegraph Company was formed in 1846, and in the following year the formation of the Montreal Telegraph Company took place. Both of the companies contracted with Americans for the construction of their first lines. It is probable that the materials used in the building of these earliest of Canadian lines, including the insulators, were supplied from the U.S. With the expansion of the Canadian telegraph network in the 1850's and later years, it would seem likely that Canadian glasshouses soon began production of insulators. The local production of insulators would save the line builders an increased cost from both the customs import duty as well as added expenses for transportation.

CANADA GLASS WORKS

St. Johns, Canada East

The earliest documented production of insulators in Canada took place at St. Johns, formerly "Canada East" and now known as the province of Quebec. The factory was operating in 1845, producing large amounts of window

glass. Frederick Smith of Burlington, Vermont, was associated with the company during its initial year of operation, and in 1846 he and at least two other merchants were involved with the manufacture of glass at the factory, having purchased the property at the factory site in May of that year. The works was in operation under Smith until at least 1851, and possibly as late as 1854.

Sometime between 1851 and 1856, one or more of the Foster brothers began operation of the factory. In the first few years, both George W. and Charles W. Foster were associated with the works. A business card exists showing both their names and lists the products made at the factory. Bottles were one of the main items produced. Glass telegraph insulators were also made. Examples of the CD 740 have been located with the embossing on the base: "FOSTER BROTHERS, ST. JOHN C.E. 1858". (It should be noted that the "N" in the word "John" is embossed backwards.) Other examples of the CD 740 have been located in Canada which are unembossed. Some of these units have characteristics very similar to the embossed Foster examples. One of the more noticeable characteristics is a small projection encircling the area inside the skirt, located between the base and pinhole. It is possible these are also items produced by the Fosters, but no documentation to verify this is available.

The embossed Foster examples are found primarily in very dark-colored glass, most notably deep amber and deep green, although a few exist in glass of a color lighter than the above-described colors.

The exact date when the Fosters ceased production at the factory is unknown, but was probably between 1858 (the date on the insulator) and early 1861. At least some of the Foster family, including Charles, were back in Stoddard, New Hampshire, in 1861, working at the New Granite Glass Works.

Charles Foster has been reported to have been back in Canada in 1875, and in late 1879 or early 1880, he apparently sold the Foster interest in the St. Johns glass factory to William and David Yuile. The Yuile brothers operated the factory for only a short period of time. It should be noted that two hand-operated insulator presses were in the factory at the time of the Yuile ownership, although it is unknown what types of insulators may have been produced.

As is the case with so many of the early glass factories, more research needs to be completed to better understand the history of the earliest known glass factory in the province of Quebec.

CANADA GLASS COMPANY Hudson, Quebec

Although a nearby factory was operated as early as the middle 1840's, the earliest record of the works in Hudson was on a map dated 1864. An October 1865

edition of the *Montreal Herald* noted the works was "in full operation". Valuable information on the factory has been gained from a report dated 1868 relating to trade in the Dominion of Canada:

The Canada Glass Co.'s Works at Hudson, Province of Quebec, have been established for several years. The operations, which at first were limited to the manufacture of Druggist's Bottles, Telegraph Insulators, etc., have been recently much extended. The first addition made to the articles produced at the works consisted chiefly of chimneys and other lamp-ware. The capital has been increased by the sum of \$10,000; a steam-engine has been erected to drive all the machinery, which includes a crushing-mill, &c; and the manufacture of German Flint Glass is now carried on. The consumption of raw material at the Hudson Works in 1867 included, -- 180,000 lbs. of Soda-Ash, 3,500 lbs. of Saltpetre, 5,000 lbs Red Lead, 4,000 lbs. of Borax, and smaller quantities of chemicals for colouring. About 100,000 lbs. of lime, and 360,000 lbs of sand (from the Co's own property in neighborhood of the works), -- and the value of the Glass produced was \$56,000.

The works continued operating into the 1870's. The *Dominion Directory* for the year 1871, in referring to the Hudson factory, stated, "a large business is carried on in the manufacture of glass." Lovell's *Gazetteer* of 1877 listed a glass factory in the village of Hudson. An exact date when production of glass at the works ceased is unknown.

It would appear insulators were one of the chief products at the factory, as various sources list them among the items produced. Jack Hayes of Pakenham, Ontario, reported that fragments of insulators were found at the factory site many years ago.

While no whole units were found, a quantity of fragments were located including pieces of the CD 721 beveled dome baby Wade, the unembossed CD 726, and the CD 742 embossed "M.T.CO". The CD 726 is most often found in aquamarine-colored glass, although a small number have also been located in a variety of vivid colors.

Jack Hayes made note of a firebrick located at the factory site with a glass covering in a cranberry color. One example of a cranberry red CD 726 is known. It is possible that that particular unit, as well as many of the other CD 726 known today, were made at Hudson. Of course, another factory may have produced the same style. It is not surprising that the CD 742 embossed "M.T.CO." was produced at Hudson. Montreal is located near Hudson, and it would be logical for the Montreal Telegraph Company to order glass from a nearby supplier. The CD 742 was made in very large quantities and was probably produced at more than one factory over a period of years. While only the three mentioned types were found at the factory site, it is likely that other types were also produced.

HAMILTON GLASS WORKS Hamilton, Ontario

The Hamilton Glass Works was a large facility and one that existed for a great number of years. The works was operated by Gatchell, Moore & Co. as early as 1865. By 1872 directories show George Rutherford & Co. as proprietors. Various products were manufactured including bottles and jars, and while no documentation of the production of threadless-type insulators has come to light, it is strongly believed they were made by the company. Excavation at the factory site several years ago revealed a fragment of a CD 782 and a portion of either a CD 718 or CD 726.

The latter of the two mentioned specimens was not viewed by the author and therefore a style type was not positively confirmed. A whole CD 734.8 Baby Battleford in light green was also found at the factory site, and at the time of this writing is the only known example in this color.

Threaded insulators were also produced at the factory, including a CD 162 embossed "HAMILTON GLASS WORKS". The area at which the factory was located has been developed in recent years and therefore extensive excavation of the site has not been performed.

It seems probable that many of the threadless insulators found in Canada were manufactured at the above-mentioned factories. Other factories located in Montreal and Burlington may also have produced insulators.

TELEGRAPH SUPPLY COMPANIES FOR GLASS THREADLESS

INTRODUCTION

Because of his involvement with the construction of the original Morse experimental line between Baltimore and Washington in 1844, and the experience gained from building other lines in the following seven months, Ezra Cornell soon found himself the man other contractors and line promoters sought for advice, as well as requests for line material. Cornell complained that he was not a supply house for such material. Had he fully recognized the financial potential of forming a telegraph supply company at that time, he could possibly have started such a business, which could have proven to be a great asset.

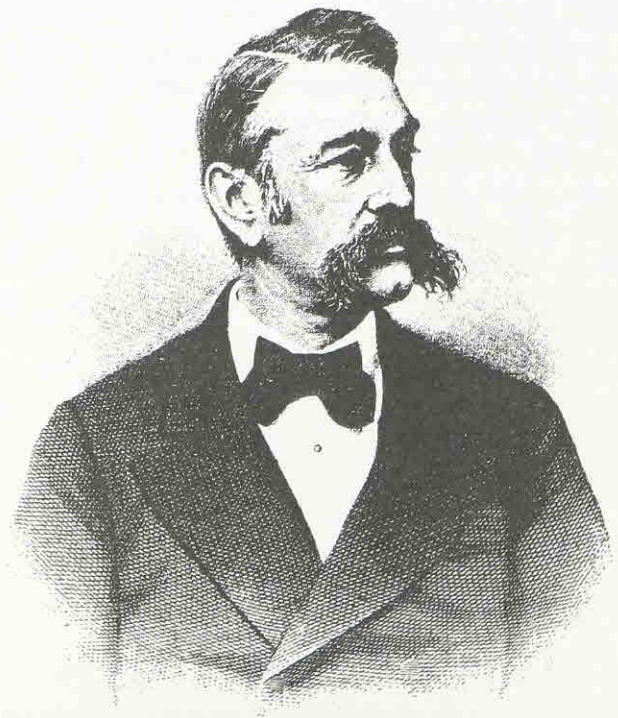
As it was, many years passed before any of the large telegraph supply companies, with great inventories

of all descriptions of material for line construction and equipment needed to operate lines, came on the scene. For a period of several years most of the articles required, such as wire, instruments, tools, insulators, etc., were purchased from individual firms specializing in one or more items.

As various supply companies appeared on the scene in the 1850's and 1860's, many of them listed insulators as items included among their inventories. Most of those supply houses did not have their firm name embossed on the insulators they supplied. Fortunately for the insulator collector of today, a handful of those companies did have their name marked on them. Those markings add much to the historical value of an insulator and give clues as to dates of manufacture and other information of interest to a collector.

LEFFERTS

The CD 737 embossed "LEFFERTS" is possibly the earliest of the insulators marked with the name of a telegraph material supplier. Marshall Lefferts was a New York merchant who supplied telegraph wire. Marshall Lefferts & Co. supplied galvanized iron wire, imported from England, for the first of the lines constructed for the Montreal Telegraph Company which was formed in 1847. Realizing the great demand for that product, a factory was set up by Lefferts in New York, and great quantities of wire were supplied to various telegraph companies.



Marshall Lefferts

Because of his exposure to several telegraph personalities involved with his wire business, Marshall Lefferts also invested in some of the telegraph companies of the time. He became an officer in some of those companies, and over a period of years became a very influential man in the industry.

Lefferts remained involved with the telegraph well into the 1860's. The embossed insulator could date from any time during the 1847-1860's period, including the late 1840's which was a time when the "umbrella", or "pilgrim hat" style, as we now call it, was gaining in popularity.

CHESTER

Both Charles and John N. Chester were involved in the trade of supplying telegraph materials. Charles is credited with forming the business in 1855 and reportedly was joined by John in 1858. Their partnership existed until 1871. After that time Charles operated the business for several years. During the years of their partnership they supplied several types of insulators embossed with their name. These include CD 724, 735, 735.3, 738 and 740.6 styles. All of these are scarce or rare. These styles have been located in a variety of colors including cobalt blue, deep green, emerald green, olive amber, various ambers, amber aqua mixture, and several shades of aqua. The CD 735 was used in large numbers on the 1866 portion of the Collins Overland Telegraph line in British Columbia. Some were also used along the route of the Union Pacific Railroad in Nebraska. The CD 735.3 is marked with the

CHARLES T. and J. N. CHESTER,
104 CENTRE STREET, N. Y.,
TELEGRAPH ENGINEERS,
AND MANUFACTURERS OF
INSTRUMENTS, BATTERIES
AND EVERY DESCRIPTION OF TELEGRAPH SUPPLIES,

Offer the best guaranty of excellence in their profession—in their long-established business—in the extent and variety of their manufacturing facilities—in the many improvements introduced by them now almost universally adopted or imitated—and in the extent of their business, domestic and foreign, enabling them to keep pace with telegraph progress.
They publish an Illustrated Descriptive Catalogue of their leading manufactures, to which they respectfully refer.

*Charles T. and J. N. Chester advertisement from an issue of The Telegrapher.
(Courtesy of Dario Dimare)*

"CHESTER" name on one mold half and "U.S.TEL.CO." on the other. They were supplied to the United States Telegraph Company. The CD 738 has been located in Panama along the route of a line which paralleled a railroad constructed across the Isthmus of Panama in the

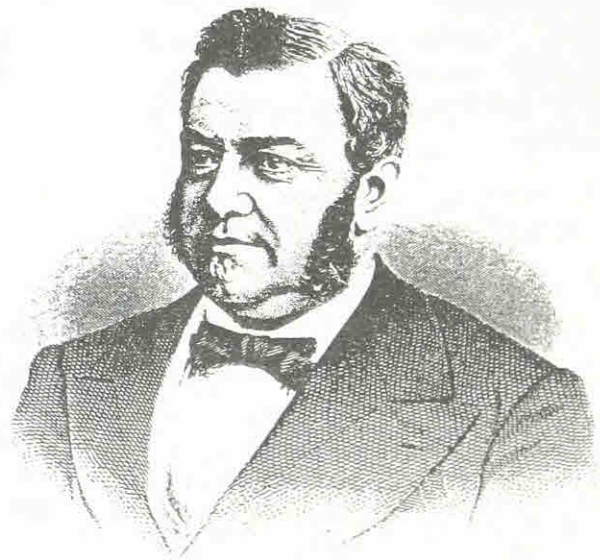
1850's. Charles later supplied threaded insulators as a part of his offerings. A brother Stephen was involved with Chester, Partrick & Company, a telegraph supply house in Philadelphia. The firm existed from approximately 1868 to 1872. A general line of materials was offered.

TILLOTSON

Luther G. Tillotson was involved with various segments of the telegraph all throughout his life. He was born in Ithaca, New York, in March 1834. His father Daniel T. Tillotson was involved with promoting the Erie & Michigan Telegraph Company in 1847. At the age of fifteen Luther began to learn telegraphy from his father, and in a short period of time became an expert. With the completion of the telegraph line along the right-of-way of the New York & Erie Railroad in 1851, Luther was made superintendent of the eastern section between Oswego and New York. In 1852 he was made sole superintendent of the whole line between Dunkirk and New York.

In 1862 Tillotson began dealing in railroad and telegraph supplies. He formed Tillotson & Co. in New York City, located at 16 Broadway. In about 1864 or 1865 the name of the company was changed to "L.G. Tillotson & Co." and from that time until 1885 the firm had various addresses on Dey Street in New York. In 1866 Tillotson resigned his position with the N.Y. & E.R.R. to devote all his energies to his growing supply business, which became one of the largest businesses of its kind during its existence. Tillotson's energy in the business brought him an ample fortune. He remained at the head of the company until his death on January 31, 1885. The L.G. Tillotson & Co. was succeeded by E.S. Greeley & Co.

During its existence, several types of threadless insulators were manufactured for the company. The earlier embossed units are marked "TILLOTSON & CO"



L.G. Tillotson

26 DEY STREET.
L. G. TILLOTSON & CO'S
CATALOGUE
TELEGRAPH MACHINERY AND MATERIAL,

All of which are kept constantly on hand, and sold at the lowest prices.

L. G. TILLOTSON, | NEW-YORK.
W. H. WOLFE.

<p>Acids—Nitric and Sulphuric, manufactured expressly for Telegraph purposes.</p> <p>Battery Brushes.</p> <p>Rins Vitriol.</p> <p>Cross-Arms.</p> <p>Cables, of any desired size, to order.</p> <p>Chamole Sides.</p> <p>Funnels, Glass Parols and Glass.</p> <p>Fluid, for Carbon Battery.</p> <p>Galvanometers.</p> <p>Ground Switches.</p> <p>Insulators—Glass, Rubber, Brooks' Patent, or any desired style.</p> <p>Insulator Brackets, Hooks, Spikes, and Screws.</p> <p>Keys, of the most approved patterns.</p> <p>Local Battery, complete.</p> <p>Local Battery Jars, Glass or Earthen.</p> <p>Local Battery Zincs.</p> <p>Local Battery Porous Cups.</p> <p>Local Battery Coppers.</p> <p>Magnet Wire, Silk and Cotton covered.</p>	<p>Main Battery, Complete, Grove or Carbon.</p> <p>Main Battery Pans.</p> <p>Main Battery Zincs.</p> <p>Main Battery Porous Cups.</p> <p>Main Battery Carbons.</p> <p>Office Furniture.</p> <p>Platinum, in Strips, Sheets, or Wire.</p> <p>Platinum Standards.</p> <p>Registers—a superior instrument.</p> <p>Register Weights and Cords.</p> <p>Register Paper.</p> <p>Relay Magnets.</p> <p>Relay Springs.</p> <p>Repairs' Tools, of all kinds.</p> <p>Sheet Copper and Brass.</p> <p>Solders, large and Fine.</p> <p>Solders for Main Circuits.</p> <p>Stationery, of any description, to order.</p> <p>Wire, Galvanized and Annealed.</p> <p>Wire for office purposes, Glass Parols or Cotton Covered.</p>
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Dealers in GALVANIZED and PLAIN WIRE, of the very best Quality, at the lowest Market Rates.

AGENTS FOR BROOKS' PATENT INSULATOR.

L. G. Tillotson & Co. advertisement from an issue of The Telegrapher. (Courtesy of Dario Dimare)

“16 BROADWAY N.Y.” Various styles are known, including CD's 718, 735, 736 and 740. Many of these types are found in vivid green, and the CD 718 has been reported in purple. In most cases the glass contains many long, seed-like bubbles which add to their beauty. Other types were produced for the company after the move to Dey Street. Only one style, CD 738, is embossed “L.G.TILLOTSON & CO” “26 DEY ST NY”. Two other embossing variants are known. “L.G.T.&Co.” is found on the CD 732.2, and the CD731 is marked simply “TILLOTSON”. Some of these threadless styles saw production after the introduction of threaded insulators, and were produced for Tillotson until about 1875. Tillotson became a large supplier of threaded insulators, and marketed vast quantities of insulators made by Brookfield.

J.S. KEELING

Little is known of this firm which appeared in 1864. Large advertisements were placed in *The Telegrapher* by J.S. Keeling in late 1864 showing a large assortment of supplies, very similar to the ads of L.G.Tillotson & Co. in later issues of *The Telegrapher*. Keeling was located at 16 Broadway which was Tillotson's address prior to the minor change in that company's name. It is interesting that Keeling lists Tillotson & Co. registers and relays among the articles it supplied. Keeling has been reported to have remained in business until 1867. While his

ads mentioned “insulators of all patterns”, only one style has been located embossed with the Keeling name. The CD 729.1 is marked “J.S. KEELING” “16 B'WAY N.Y.” Varieties of very dense blackglass exist, as well as a small number of examples in aqua, snowy-bubbly light green, vivid teal blue, and teal aqua.

THE GREAT DEPOT
Telegraph Supplies and Machinery of every Description
No. 16 BROADWAY,
NEW-YORK.
J. S. KEELING, LATE TILLOTSON & CO.

Assorted in a Catalogue of Books constantly on hand. Special Orders for particular kinds of Machinery promptly attended to. Insulators and Plain Wire, and Insulators of all Patterns, furnished at short notice.

<p>1. REGISTERS, Tillotson & Co.'s.</p> <p>2. " " " Other Manufacturers'</p> <p>3. RELAYS, Tillotson & Co.'s.</p> <p>4. " " " Other Manufacturers'</p> <p>5. SOUNDERS, all patterns.</p> <p>6. KEYS, " " "</p> <p>7. GROUND SWITCHES.</p> <p>8. CRYCOTS.</p> <p>9. REGISTER WEIGHTS.</p> <p>10. WIRE, Assorted, of the very best quality, for Telegraph Lines.</p> <p>11. " Galvanized.</p> <p>12. " Copper, of all sizes.</p> <p>13. " Brass, " " "</p> <p>14. ACIDS, Nitric.</p> <p>15. " Sulphuric.</p> <p>16. FLUID, for Carbon Battery.</p> <p>17. TUMBLES, Main Battery.</p> <p>18. " Local "</p> <p>19. POROUS CUPS, Main Battery.</p> <p>20. " " Local "</p> <p>21. ZINCS, Main "</p> <p>22. " Local "</p> <p>23. COPPERS, " " "</p> <p>24. PLATINUM, Sheet.</p> <p>25. " Wire.</p> <p>26. CARBONS.</p> <p>27. GROVE BATTERY, Complete.</p> <p>28. COBS, " " "</p> <p>29. DANIEL'S, " " "</p> <p>30. QUICKSILVER.</p> <p>31. REGISTER PAPER.</p> <p>32. OFFICE FURNITURE, OFFICE WIRE.</p> <p>33. BRIDGES' PAT. ELECTRIC COORD. for Offices.</p> <p>34. VARNISHED COTTON COVERED WIRE.</p> <p>35. SILK COVERED MAGNET WIRE.</p>	<p>36. RINS VITRIOL, manufactured expressly for Telegraph purposes.</p> <p>37. BATTERY BRUSHES.</p> <p>38. INSULATORS, of any desired pattern.</p> <p>39. BRACKETS.</p> <p>40. HOOPS.</p> <p>41. SPIRES.</p> <p>42. REGISTER CORDS.</p> <p>43. SHEET COPPER.</p> <p>44. SHEET BRASS.</p> <p>45. GALVANIZED WIRE.</p> <p>46. TELEGRAPH CABLE, all sizes and patterns.</p> <p>47. FUNNELS, Glass Parols, for sale.</p> <p>48. " Glass.</p> <p>49. RELAY SPRINGS.</p> <p>50. WATCH OIL.</p> <p>51. PLATINA STANDARDS.</p> <p>52. REPAIR TOOLS, Various.</p> <p>53. " " " Sponges.</p> <p>54. " " " Charcoal.</p> <p>55. " " " Hatches.</p> <p>56. " " " Oilsters and Straps.</p> <p>57. " " " Pins.</p> <p>58. " " " Vans.</p> <p>59. " " " Flyes.</p> <p>60. " " " Brass Pullies.</p> <p>61. " " " Strangling Irons.</p> <p>62. " " " Post-Box Angles.</p> <p>63. OFFICE FURNITURE, Desks.</p> <p>64. " " " Chains, etc.</p> <p>65. STATIONERY, Manilla Heads.</p> <p>66. " " " Marbles, Books, and Blanks of every description.</p> <p>67. GALVANIZERS.</p>
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Goods that are not our own manufacture are charged at the lowest manufacturers' prices.

A late 1864 issue of The Telegrapher contained this J.S. Keeling, Late Tillotson & Co. advertisement. (Courtesy of Dario Dimare)

MULFORD & BIDDLE

This firm manufactured wire for use on telegraph lines. Advertisements for them appeared in 1864 and 1865 issues of *The Telegrapher*. Their office and warehouse was located at 83 John St. in New York, with mills in south Brooklyn. The dates of their operation are unknown.

Insulators of the CD 735 style marked “MULFORD & BIDDLE” “U.P.R.R.” have been located along the right-of-way of the Union Pacific Railroad. Most of them were placed in service in 1868. While they were installed in that year, it is possible they were supplied by Mulford & Biddle some time earlier. Most are aqua variants, although some have been located in ink-cobalt blue. A few also exist in teal blue, robin's egg blue, and medium green. The same style without the U.P.R.R. embossing has been located in Nevada and California and on a line built in 1868 in British Columbia, Canada.

Another style, the CD 729.4, has also been located with the firm's name. They are marked “MULFORD & BIDDLE” “83 JOHN ST NY”. Most of them have been located in the eastern states and have been found in various shades of aqua, some of which are tints leaning toward the teal hue.

MULFORD & BIDDLE,
MANUFACTURERS OF
BLACK
AND GALVANIZED
TELEGRAPH WIRE.

Office and Warehouse,
83 JOHN STREET,
Mills, at **NEW-YORK.**
South Brooklyn.

The attention of purchasers is respectfully called to our card, as above, and their patronage solicited.
We are prepared to supply Wire of a quality equal to any in the market—and Orders with which we may be favored will be executed with promptness and dispatch.

*This Mulford & Biddle advertisement appeared in an 1864 or 1865 issue of The Telegrapher.
(Courtesy of Dario Dimare)*

TELEGRAPH AND RAILROAD COMPANIES-- USERS OF GLASS THREADLESS

THE U.P.R.R.

The idea of linking the populous eastern states with the growing West Coast area by rail was in its infancy during the 1840's and 1850's. By 1860 there was a greater interest in making the idea a reality. However, the outbreak of the Civil War put a damper on the project. In December 1863, the roadbed grading got under way from Omaha, Nebraska Territory, but eighteen months passed before any rails were laid.

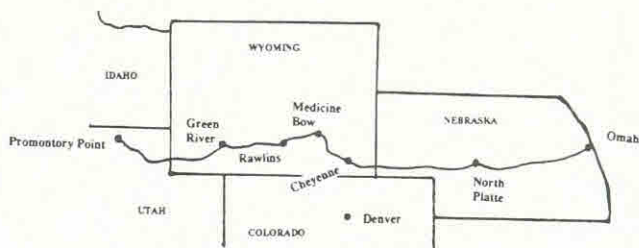
With the close of the war in 1865, the project got its real start. By the end of 1865 the rails reached 40 miles into Nebraska Territory. A year later, another 250 miles had been completed. In a short span of two and one half years, the workers pressed westward through wide open prairies, mountain ranges and rock lined canyons.

On May 10, 1869, the Union Pacific workers met at Promontory Summit, Utah, with those of the Central Pacific Railroad, who had been constructing eastward from California. The meeting completed the work of the age, and at last the transcontinental railroad was a reality. Telegraph lines were built along the right-

of-way.

In Nebraska Territory the CD 735 Chester was used. In Wyoming and Utah widespread use was made of the CD 735 marked "U.P.R.R." "MULFORD & BIDDLE". Most of the examples found are aqua, but striking blue variations as well as an attractive green coloration have also been found.

U.P.R.R. - 1869



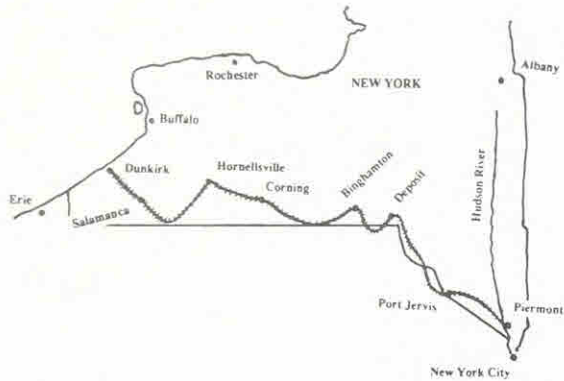
N.Y.&E.R.R.

First ground was broken for the New York & Erie Railroad on the morning of November 7, 1835, near Deposit, New York. Unfortunately the company met with many obstacles and the line between the Hudson River and Lake Erie was not officially opened until May 1851. The eastern terminus was at Piermont, New York, and the western at Dunkirk, New York. When completed it was the longest railroad in the world.

The railroad company had constructed a telegraph line along its right-of-way. In 1850 the line was completed between the end of the pier at Piermont and Goshen. West of Goshen portions of the line were up, but many gaps had to be closed in the building of the line before a through connection could be made. During the winter of 1851 the line was in operation as far as Port Jervis. As near can be determined the telegraph line was completed the entire length of the right-of-way when the railroad was opened in May 1851.

Although several types of insulators were used along the railroad, one was embossed "N.Y.&E.R.R.". The CD 736 has been located with two "N.Y.&E.R.R." embossing variations. One is marked "N.Y.&" on the front skirt and "E.R.R." on the reverse skirt. The other variety has all the embossing on the front skirt. Both types were used in great numbers. Examples of both have been located at various locations all along the right-of-way. Although thousands of both types were produced, both

N.Y. & E.R.R. - 1851



remain rare today.

As late as 1853, only one wire, 460 miles in length, is listed as being operated by the railroad company. At a later unknown date, another wire was erected which also was insulated with a threadless-type insulator. As mentioned earlier, a large variety of insulators was used on the line, primarily the CD 736 embossed "N.Y.&E.R.R." and the unembossed CD 736.1 style. The CD 736.1 has been found almost exclusively along this line, and lines controlled by the Erie company.

E.R.W.

The New York & Erie Railroad Company had financial difficulties from its very beginnings. By the late 1850's and early 1860's the company was met with obstacles it could not overcome and it went into receivership. In 1861 the Erie Railway Company was organized and the N.Y. & E.R.R. ceased to exist. The Erie Railway Company operated until 1878, when it became known as the "New York, Lake Erie & Western Railroad Company". During the existence of the Erie Railway an insulator was manufactured with the letters "E.R.W.". It has been found in both a threadless and threaded version, CD 736 and CD 135.5 respectively. The threadless type is very rare and has only been found in a couple of locations. Three or four of them were located many years ago in the attic of a railroad depot in Ohio. Aside from that, they are reported to have been used along the main line "Erie" in New York state.

U.S.TEL. CO.

On August 3, 1864, several telegraph companies merged nearly 10,000 miles of line into the "United States

Telegraph Company". Shortly thereafter the company opened dozens of new offices and constructed new lines in all directions. One of the major undertakings by the company was the proposed building of a line between San Francisco, California, and the Missouri River. Although the company saw rapid growth, it was short-lived, and by early 1866 it was absorbed by the Western Union Telegraph Company.

Even with U.S. Telegraph's short history, the company did build several thousand miles of line including a portion of the transcontinental line. It was built eastward through Sacramento, Folsom, and Placerville, California, and after going over the Sierras, it entered the desert area of Nevada. It was constructed to Salt Lake City, Utah, prior to the U.S.TEL. - W.U. TEL. merger. The CD 735.3 embossed on the front skirt with "U.S.TEL.CO." and "CHESTER, NY" on the rear skirt was used on that line. Examples have been found in Sacramento and in the valley eastward toward Folsom. A large number of broken units, apparently removed from the line in the surrounding area, were found at Cold Spring Station in Nevada many years ago. That particular line is the only one known on which the CD 735.3 has been located. On the same line at higher elevation through the Sierra mountains, where heavy snowfall accumulated on the wires, the wood block ramshorn was used.

SO. EX. CO.

The "SO.EX.CO." marking found on a small number of CD 735's has been a mystery to collectors since the first examples were found many years ago in Wyoming. Most of the insulators found in the dump where the SO. EX. CO. units were dug were CD 735's embossed "U.P.R.R." The SO.EX.CO. examples in aqua remain very rare and one amber unit is known to exist.

During the 1860's the Southern Express Company operated several hundred miles of telegraph lines, which were later absorbed by the Western Union Telegraph Company. It could be assumed they were manufactured to be used by Southern Express.

MONTREAL TELEGRAPH COMPANY

The Montreal Telegraph Company was organized in Montreal in 1847, making it the second telegraph company to be formed in the Dominion of Canada. It was fortunate timing for the company, as a period of trial and error had already taken place, and by 1847 a much greater knowledge had been gained regarding the successful construction of telegraph lines. One of the more important

features of the newly formed company was the exclusive use of galvanized iron wire by the company from its start. By the close of 1847 the Montreal Telegraph Company operated 540 miles of wire, had nine offices, and employed 35 persons. Strict building specifications were given, and all lines built for the company were constructed in a first-rate manner.

Sometime in the late 1850's or early 1860's, the company had insulators marked with "M.T.CO." on the base. They saw widespread use in the eastern provinces into the 1870's. Slight variations in the molds exist, all of which are included in the CD 742 series.

D.T.CO.

One example of the CD 742 embossed "D.T.CO." has been found. The marking is located on the insulator's base, and appears very much the same as the "M.T.CO."-marked units. It is assumed the initials represent the "Dominion Telegraph Company" which was formed in the late 1860's. In its early years the company lines were built within the provinces of Ontario and Quebec. In 1874 rights were granted to the company to construct lines in the eastern provinces. By 1879 the company operated over 7,000 miles of wire.

E. DUPONT

The name "E. DUPONT" appears in the 1851 *Canada Directory of Business*. He is listed as a "turner". It has been suggested that the CD 740 marked "E DUPONT ST. JEAN" was manufactured during the early 1850's with some association with the Dupont listed in the directory. Insulators with that marking remain rare. They represent one of, if not the earliest, of embossed Canadian insulators. Most of those found are either black glass or other dark colors with a small number of light green examples known.

MC MICKING

Robert B. McMicking was one of the "Overlanders" who migrated from eastern Canada to the western province of British Columbia in the early 1860's. Later he found employment working on the telegraph line constructed in 1865 by Western Union within the province.

With the resignation of F.H. Lamb as the superintendent of that line in 1871, McMicking applied for the position, which he was granted. He remained the superintendent for a number of years, during which time he received a patent for an insulator. He also had a regular threadless-type insulator manufactured embossed with his

name. They are marked "McMICKING VICTORIA B.C. 75".

Most of the CD 734 McMickings have been found at a location on the North Thompson River in British Columbia known as "Wire Cache". The insulators were stored at that location as part of a line being constructed ahead of the proposed transcontinental railway across Canada in the 1870's. The project was postponed, and later the route changed. Therefore the insulators and other material were not used and remained at the site for many years. Some were later recovered by area residents, and a number have been found by collectors in recent years.

While serving as superintendent of the British Columbia telegraph line, McMicking also supplied the CD 734 as a replacement for broken insulators on that line.

After his employment ended as superintendent of the British Columbia telegraph, he became greatly involved with the promotions of the telephone within the province.

"Glass Insulators -- The Beginnings" was researched and authored by Ray Klingensmith. Ray has been collecting since 1970. His collection consists primarily of early colored, threaded, and threadless glass. He feels an important part of the hobby is the preservation of the historical information associated with the wide variety of insulators available to the collector. His extensive research on various glasshouses, supply companies, and telegraph companies has resulted in numerous articles written for *Crown Jewels of the Wire* and various other publications.

Ray enjoys walking the routes of early telegraph lines in search of insulators and has travelled extensively for the past several years in search of items for his collection. One of his favorite lines is the "Collins Overland Telegraph Company" in British Columbia, Canada, where he has spent more than fourteen months during the past several years searching for historical relics from that line.

He also produces sales catalogs with color photographs of scarce and rare insulators and states: "The preservation of historical material and making available color photographs of rare items through my catalogs for all collectors to enjoy is a great pleasure to me. It gives me the opportunity to share information and deal with fellow collectors on a more personal and meaningful level."