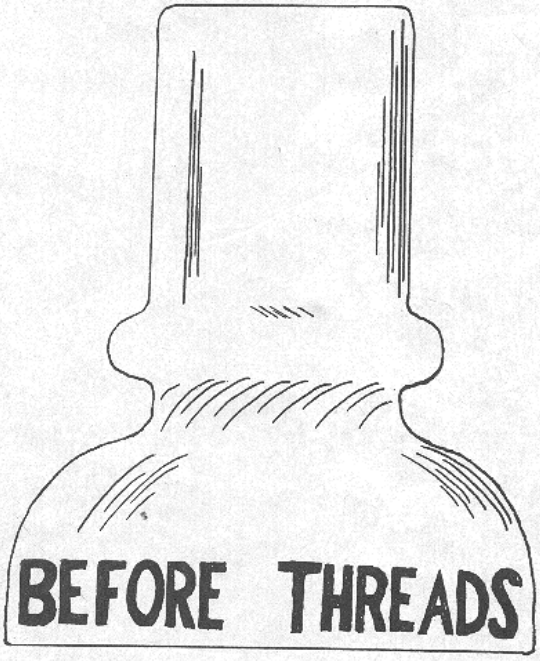
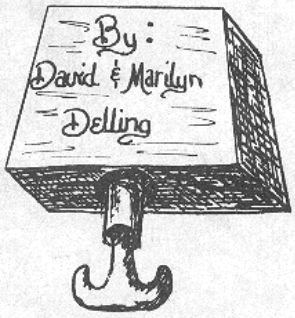


BEFORE THREADS



BEFORE THREADS

by

David & Marilyn Delling

Printed in U.S.A.

INTRODUCTION

History lies dormant until it becomes relevant to someone; then we begin to seek it out. The thirst for knowledge concerning early telegraph insulators has quickened to the point where such information is meaningful to many of us. Thus the effort to produce this book. This is an unfinished story: first, there will be many different (and presently unknown) insulators found in the future, and secondly, we haven't started to do justice to the fascinating historical aspect of the subject. This must await more leisure moments in the future or the attention of others who can devote the proper time and research.

The period to be examined is 1845 to about 1870, and we've primarily concentrated on information pertinent to insulators that have been found or that are likely to be found. It all starts when Morse's 44 mile demonstration line between Washington and Baltimore went commercial on April 1, 1845, by imposing a tariff of one cent per four characters transmitted. The telegraph is all we're concerned with since the telephone and power transmission came after our period of interest.

We've broken the story into two main divisions: threadless glass insulators and iron hooks. Although it is known that pottery insulators were tried in this country as early as 1848, these were not successful at that time and we have not included a section on pottery. Some ceramic insulators were used in the south during the Civil War and these were probably of European manufacture; we don't have any details on them.

No attempt has been made to judge rarity on all items; when a comment is offered it is just a personal evaluation and not gospel. There is no price guide; that is a matter to be settled between buyer and seller.

It is assumed that the reader is familiar with contemporary insulator jargon and knows something of Woodward's CD classification system. Also, the story of Cauvet's patent on internal threads in 1865 is known to all and it would be redundant to repeat it here.

FOREWORD

No collection exists that contains all the insulators described in this book and it is unlikely that such a collection will be assembled at any time in the near future. In spite of this, there is a growing number of collections that have a good representation of insulators from this difficult field. Such collections are located in most parts of the country now.

Our information has come from many different sources. The first spark was the accidental finding of a few threadless insulators several years ago. This led to the exploration of many miles of abandoned telegraph here in Wyoming where history and conditions make such hunting ideal. Then followed communication with other collectors and historians and before long the realization dawned that maybe we had something that should be shared.

Those who have given generously of their time, knowledge and information include: Esta and Gerald Brown, Doug Parks, Bob Anderson, Bob Henrickson, Roy Armstrong, Carol and Bob Meszaros, Mrs. Gilles Danis, Betty Crane, Edwin Wood, Dennis Rogers, Nick Budnowski, Jim Sanders, John Hayes, Rae Stanger, Mrs. E.L. Mead, Bob Hilfinger, Colin McIntosh, Floyd Audette, Bernard Finn, and J.E. Stebner.

Providing much additional information was our perusal of some of the literature contemporaneous with the pre-thread insulator period. Sources are outlined in the Bibliography.

We have not actually seen all of the insulators described herein but have relied heavily on detailed descriptions furnished by their owners. That all exist is beyond a shadow of a doubt and if anything is speculative, we've so stated.

THREADLESS GLASS INSULATORS

How to organize this section has been a problem since there seems to be a general lack of early design patents or other framework from which to build.

The basic concept of an inverted cup or umbrella insulator is credited to George Little, an Englishman, as revealed in the following article in The Telegrapher, dated December 5, 1868.

> ..."In the year 1846, Mr. George Little, who had been employed by the original Electric Telegraph Company of England to repair a line of telegraph on the North-Western Railway, which had been badly damaged by lightning, was led to study the difficulties attending the use of the Electric Telegraph, and to provide, if possible, a remedy for such as presented themselves to his observation, and this resulted in the invention of the inverted cup form of insulation, which began to be used extensively during the following year. ...For this valuable discovery Mr. Little has not received one cent of compensation from any government in the world...."

Ezra Cornell often is credited with this idea but it really was Little's and Cornell just promoted it in this country. Cornell does deserve credit for a glass bureau-knob insulator used on the Magnetic Telegraph Co. lines in 1845. Other names that associate themselves with glass insulators are W.M. Swain who designed the egg insulator in 1850 and J.H. Wade who invented the wood covered glass probably in the late 1850's.

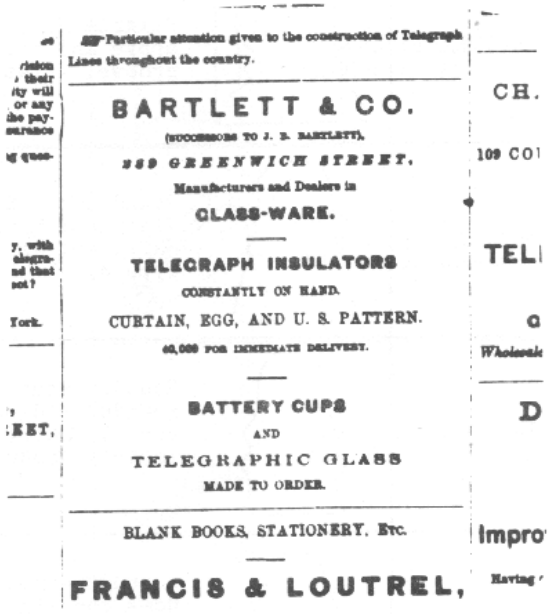
Lacking a framework, we've invented one. This has been done by establishing several different general types of insulators based on form; these pretty well cover the known insulators and should accommodate ones found in the future. Within each Type data has been tabulated on all known insulators. Following this are sketches of representative insulators from each Type. The system is expandable and does bring some degree of order out of chaos. Threadless insulators are as a rule somewhat more variable in their dimensions than ~~later~~ varieties, so the numbers we've shown are not necessarily absolute. Lastly, we've cross-indexed them with names to give you a fast reference; where we know threaded varieties are associated with the name we've so indicated but have not detailed the insulators.

Most of these insulators were made in two part molds similar to what Brookfield used on early threaded varieties; where the mold is appreciably different or noteworthy the difference has been mentioned. Most have a standard 1" diam-

eter pin hole; ones differing from this have been noted. The few abbreviations we've used are all familiar to the insulator collector. A slash has been placed in the embossing descriptions to show the start of a new line.

Some mention has been made of methods of attachment. The usual practice was to wrap the threadless pin with a coarse fabric, immerse it in an adhesive material and insert it into the insulator. The adhesive might have been pitch or other resinous material; molten sulfur was also used to attach the pin.

There are some blank spaces provided in the classification section; use these to record information on insulators that show up in the future.



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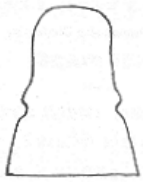
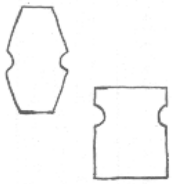
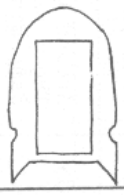
THREADLESS INSULATOR CLASSIFICATION SYSTEM			
TYPE	EXAMPLE	CHARACTERISTICS	
A	FOSTER BROS		Pilgrim Hat. Skirt merges into wire groove. Round top. Wide skirt.
B	CHESTER N.Y.		Pilgrim Hat. Skirt merges into wire groove. Flat top.
C	E.R.W.		Pilgrim Hat. Ridge above and below wire groove. Flat top.
D	M.T.CO.		Round top. Slightly flaring skirt. One ridge. Skirt not as wide as Type A.
E	L.G.T. & CO.		Rounded dome. Two rounded ridges, usually concave skirt. Approximately Woodward CD 431.
F	S. McKEE & CO.		Rounded dome. Skirt and dome contain wire groove. Concave skirt. Approximately Woodward CD 131.

THREADLESS INSULATOR CLASSIFICATION SYSTEM			
TYPE	EXAMPLE	CHARACTERISTICS	
G	BROOKFIELD		Rounded dome. Skirt and dome contain wire groove. Straight skirt. Approximately Woodward CD 133.
H	EGGS, etc.		Eggs, knobs and barrels. Hole may be all the way through.
I	WADE		Styles furnished with wooden covers.
J	SLEEVES		Grooved insulators held horizontally in wooden blocks or crossarms.
K	MISCELLANEOUS		Anything that doesn't fit the above classification.

CLASS. NO.	HEIGHT in.	DIAM. in.	COLORS	LOCATION	EMBOSSING AND REMARKS
A-1	3 3/4	3 3/8	Deep olive green	Probably N.E.	Around base: FOSTER BROTHERS ST. JOHN. C.E. 1858
A-2	3 3/8	3 1/2	Deep olive green	Unknown	Dome: TILLOTSON / & CO. Skirt: 1∂ BROADWAY. N.Y.
A-3	3 1/4	3 3/8	Deep olive green	N.Y.	Unembossed. Local collectors feel that some of these were made during the 1850's at Mountain Glass Works, Saratoga, N.Y.
A-4	3 3/8	2 3/8	Aqua	British Columbia	Skirt front: McMICKING Skirt rear: VICTORIA, B.C. 75 This is a very petite insulator.
A-5	3 1/2	3 1/2	Aqua	Probably N.E.	Around base: E. DUPO__ ST JEAN The missing letters are probably "NT". Same style as A-3.
A-6	3 3/4	3 3/8	Aqua	N.Y.	Unembossed. Like A-3 except considerably taller.
B-1	3 3/8	2 3/4	Aqua & various greens	Wyoming California	Skirt: MULFORD & BIDDLE

CLASS. NO.	HEIGHT in.	DIAM. in.	COLORS	LOCATION	EMBOSSING AND REMARKS
B-2	3 3/8	2 3/4	Aqua, various greens & blues	Wyoming Utah	Skirt front: MULFORD & BIDDLE Skirt rear: U.P.R.R. This is the commonest embossed threadless.
B-3	3 1/2	2 3/4	Aqua	Nebraska Wyoming	Skirt: CHESTER / N.Y.
B-4	3 1/2	2 3/4	Aqua & blue	Wyoming	Skirt front: CHESTER / N.Y. Skirt rear: SO EX CO
B-5	3 3/4	2 7/8	Green-aqua	Utah Nevada	Skirt front: CHESTER / N.Y. Skirt rear: U.S. TEL. CO.
B-6	3 1/2	2 3/4	Aqua	Nevada	Dome: TILLOTSON & CO. (arc) Skirt: 16 BROADWAY (arc) / N.Y.
B-7	3 1/4	2 3/4	Emerald green	Mexico	Skirt: TELEGRAFICA DE JALISCO. COMP^{A} This same insulator has been reported with embossing inside the skirt.
B-8	?	?	Blue	N.E.	Skirt front: MULFORD & BIDDLE Skirt rear: N.Y.C. Unable to get details on this one, somewhat speculative.

CLASS. NO.	HEIGHT in.	DIAM. in.	COLORS	LOCATION	EMBOSSING AND REMARKS
C-1	4	3 3/8	Aqua	N.Y.	Skirt: E.R.W. Exactly like the threaded version.
C-2	4	3 1/2	Aqua	N.Y.	Around skirt: N.Y. & E.R.R. Identical with C-1 except for embossing.
C-3	4 1/4	3 3/8	Aqua	N.Y.	Unembossed. Very similar to C-1 and C-2 except wire ridges are more massive and prominent.
C-4	4	3 3/4	Deep olive (black)	N.Y.	Unembossed. Similar to C-1,2,3 except wire ridges are much smaller.
C-5	5	3 5/8	Swirly aqua	N.Y.	Unembossed. This is a huge insulator with a deep skirt and small ridges.
C-6	4 1/4	3 3/4	Aqua	East	Skirt: LEFFERTS Almost identical in size and shape with C-4.
C-7	3	3	Deep olive green	N.Y.	Unembossed. 3-part mold which breaks about 1/4 in. below top. Pin hole is 0.8 in. diameter.

CLASS. NO.	HEIGHT in.	DIAM. in.	COLORS	LOCATION	EMBOSSING AND REMARKS
C-8	3	2 1/4	Light green	?	Unembossed. Petite. Pin hole is 5/8in. diam.
C-9	3 3/4	3	Green	N.Y.	Unembossed. Similar to C-8 only larger. The dome of this insulator is unique in that it is striated with numerous irregular vertical lines.
C-10	4 1/4	3 1/2	Blue-green	N.Y.	Dome: TILLOTSON (arc) / & CO. skirt: 16 BROADWAY N.Y. Like C-1 and C-2.
D-1	3 7/8	3 1/4	Aqua	Eastern Canada	On base: M.T. CO.
D-2	3 3/4	3 1/4	Aqua	N.E.	Unembossed. Essentially identical with D-1.
D-3	3 3/4	3	Aqua	N.Y.	Unembossed. Like D-2 except top is flatter and there is a bit of a lower wire ridge.

CLASS. NO.	HEIGHT in.	DIAM. in.	COLORS	LOCATION	EMBOSSING AND REMARKS
E-1	3 1/2 to 4	3	Aqua & milky-green	Georgia N.Y.	Unembossed. 3-part mold with 1¼ in. diam. flat button on top. Glass is invariably crude with many bubbles.
E-2	4 1/4	3	Aqua	N.Y.	Skirt: L.G.T. & CO This is essentially identical with the familiar threaded version.
E-3	3 1/2	3 1/8	Deep olive green	N.Y.	Unembossed. Very prominent wire ridges. Skirt tapers inward continuously and is narrowest at base.
E-4	4 1/8	3 1/8	Deep olive green	N.Y.	Unembossed. Like E-3 except skirt is straight.
E-5	3 1/2	3	Aqua	?	Unembossed. Like E-4 except smaller.
E-6	3 7/8	2 3/4	Deep olive green	?	Unembossed. Like E-1 with flat top but mold is 2-part.

CLASS. NO.	HEIGHT in.	DIAM. in.	COLORS	LOCATION	EMBOSSING AND REMARKS
F-1	3 7/8	2 7/8	Aqua, green, cobalt, olive-amber	East	Dome: TILLOTSON (arc) Widespread in the east; many color varieties reported.
F-2	3 7/8	3	Deep aqua	Wyoming Utan	Skirt: S McKEE & CO. Unique 3-part mold with 1 in. diam. flat button on top.
F-3	3 7/8	2 7/8	Aqua	Texas	Dome: CAUVET (arc)/ PAT/JULY 25 1865 Skirt front:W.BROOKFIELD/55 FULTON ST NY Skirt rear: two 6's-different sizes Exactly like the threaded variety.
F-4	3 7/8	2 7/8	Aqua, milk glass, amber, green	East & West	Unembossed. Exactly like F-1 & F-3. Found both in the east (various colors) and west (aqua, amber).
F-5	3 3/4	3	Aqua	Wyoming Nebraska Utah	Unembossed. Unique 3-part mold with 1 in. flat button like F-2; frequently called unembossed McKee.
F-6	2 3/4	4	Deep olive green	?	Dome: J.S. KEELING Skirt: 16 BWAY N.Y. The wire groove on F-6,7,&8 is located higher on the insulator than on F-1-5.
F-7	3 5/8	3	Aqua or light SCA	N.J.	Dome: MULFORD Skirt: MULFORD & BIDDLE/83 JOHN ST N.Y.
F-8	3 5/8	3	Aqua or light SCA	N.J.	Skirt: MULFORD & BIDDLE/83 JOHN ST N.Y. Identical with F-7 except for dome embossing.

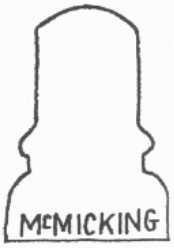
CLASS. NO.	HEIGHT in.	DIAM. in.	COLORS	LOCATION	EMBOSSING AND REMARKS
G-1	3 7/8	2 7/8	Aqua	N.Y. Texas	Dome front:W.BROOKFIELD (arc)/1(or5)/ 55 FULTON ST/N.Y. Dome rear:CAUVET'S (arc)/PAT/JULY 25 1865
G-2	3 7/8	3	Aqua	N.Y.	Unembossed.
H-1	3 1/8	2 1/4	Aqua	California	Unembossed egg. 5/8in. pinhole goes all the way through. Wire groove is at center and sides are gently curved.
H-2	3 3/8	2 1/4	Aqua	San Francisco	Unembossed egg. Like H-1 except pinhole is ½in. diameter. Sides are straighter.
H-3	3 3/8	2 1/2	Light green	Georgia	Unembossed spool. 3/4 in. pinhole goes all the way through. Cylindrical shape with straight sides. Wire groove is near top.

CLASS. NO.	HEIGHT in.	DIAM. in.	COLORS	LOCATION	EMBOSSING AND REMARKS
H-4	4	3 1/4	Deep green	N.E.	Unembossed egg with flat top & pronounced wire ridges. Wire groove at center. Pinhole not through; may expand near top.
I-1	3 3/4	2 1/4	Deep aqua	Wyoming California Tennessee	Unembossed. 1¼ in.diam. pinhole. Covered with a beehive shaped piece of wood which carried the wire groove.
I-2	4 1/4	2 1/4	Deep aqua	Wyoming	Unembossed. Like I-1 with a ridge and a series of raised dots & dashes on glass. Punctations inside the pinhole.
I-3	4 3/8	2 1/2	Deep aqua	Nebraska	Unembossed. Like I-1 except gently dished on sides. Pinhole has punctations inside; sulfur used as pin cement.
J-1	2 1/2	1 1/2 - 1 7/8	Green-aqua	California	Unembossed circular sleeve. Tapers uniformly from one end to the other. Circular depressions in each end. Straight wire groove.
J-2	3 3/8	2 X 2	Aqua green	?	Unembossed rectangular sleeve. Flared slightly on each end on 3 sides. Wire groove has a jog in it.

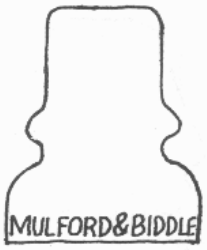
CLASS. NO.	HEIGHT in.	DIAM. in.	COLORS	LOCATION	EMBOSSING AND REMARKS
K-1	4	Unknown	Deep green	South	Unembossed. This is about like C-4 except that there is a curving arm extending from side of skirt. Possibly European.
K-2	Unknown	Unknown	Unknown	South	Unembossed. Tall insulator with a deep saddle groove. Probably of European origin.

CLASSIFICATION EXAMPLES

A-2

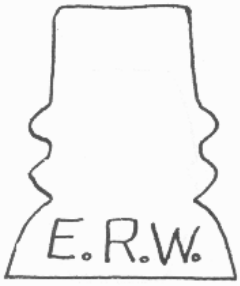


A-4

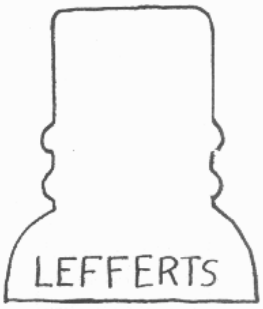


B-1, B-2

B-3, B-4



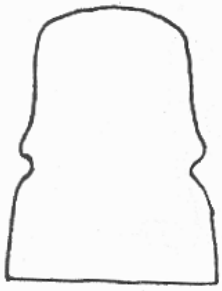
C-1



C-6

All
Half Scale

CLASSIFICATION EXAMPLES, cont.



D-1

E-2

E-4

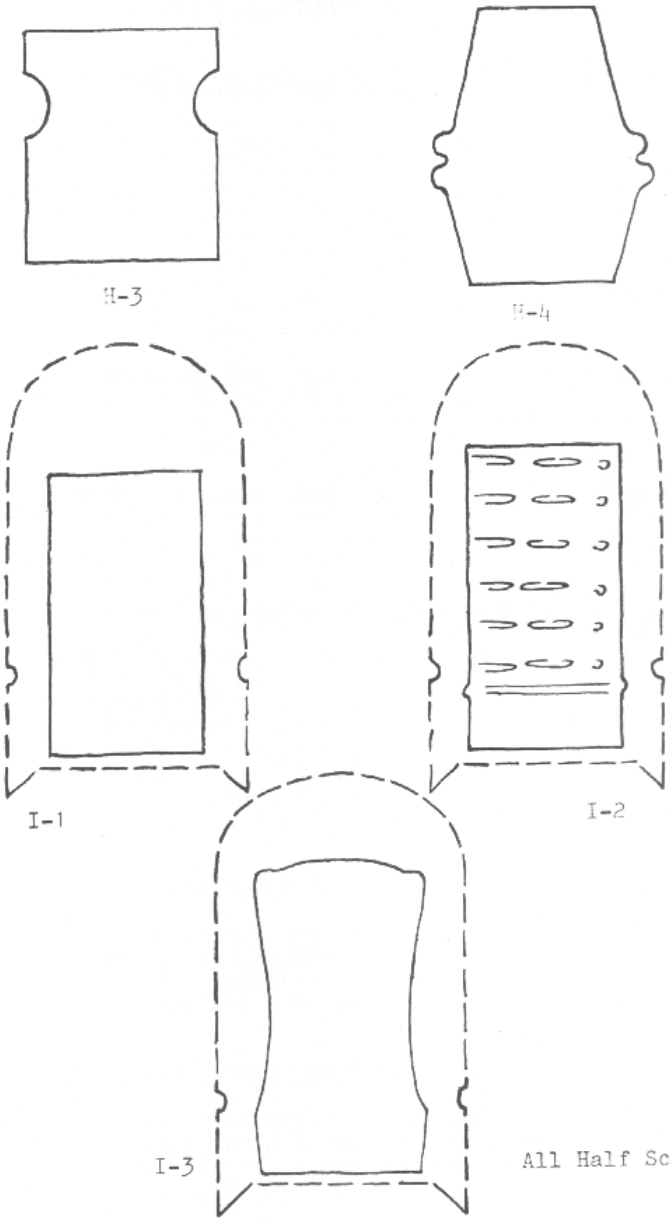
F-2

F-8

All
Half Scale

H-1

CLASSIFICATION EXAMPLES, cont.



All Half Scale

CROSS INDEX OF THREADLESS INSULATORS

Embossed Name	Classification Number
BROOKFIELD*	F-3, G-1
CHESTER*	B-3, B-4, B-5
DUPONT	A-5
E.R.W.*	C-1
FOSTER BROS.	A-1
JALISCO	B-7
KEELING	F-6
L.G.T. & Co.*	E-2
LEFFERTS	C-6
M.T. Co.	D-1
McMICKING	A-4
MULFORD & BIDDLE	B-1, B-2, B-8, F-7, F-8
N.Y.C.	B-8
N.Y. & E.R.R.	C-2
S. McKEE & Co.	F-2
SO EX CO	B-4
TILLOTSON*	A-2, B-6, C-10, E-2, F-1
U.P.R.R.	B-2
U.S. Tel. Co.	B-5

*Name is also represented on threaded insulators.

IRON HOOKS

These are the "ramshorns". The name is probably a modern attachment and doesn't seem to have been used in the past. Formerly these items were called iron hooks or were referred to by their inventor's name or some other feature of the insulator. They appeared in many different configurations and are the object of numerous patents. Most were fairly rugged and complex and as a result they were more expensive than glass insulators. Their insulating qualities varied widely and when in good condition some of them were very good. The iron hook concept is credited to Amos Kendall who invented it in the late 1840's; improved versions of the hook were still being used in the 1890's.

The iron hooks usually were mounted in the underside of a crossarm or wooden block and carried the line wire in suspension. One of their faults was that the wire would sometimes break at the point of suspension due to wear. Hooks were widely used but probably received their greatest employment in the west where generally dry weather reduced the need for perfect insulation but where a rugged device was needed that didn't require frequent replacement or attention. They also were often used in the cities or on short lines where perfect insulation wasn't required.

Several different styles of hooks are known and these are described; many others were produced and it seems likely that some of these will be found. As a simple classification system for the hooks we propose the following:

First: IH - General designator for all hooks
Second: Number - designating a style
Third: Letter - designating embossing or other variations within a style.

Thus a classification IH-2-A will rather completely describe an insulator.

Basic style designators will be:

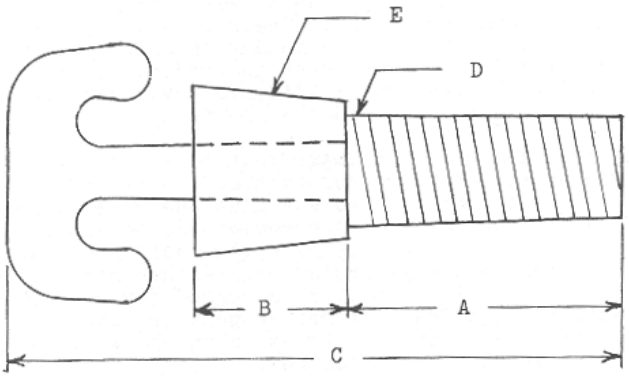
IH-1- Vulcanized Rubber Early
IH-2- Vulcanized Rubber Late
IH-3- Brooks' Parafine Insulator
IH-4- Miscellaneous Hooks

IH-1 & 2 Vulcanized Rubber Insulators

These are first described in a patent (No. 21,492) issued to M.G. Farmer and J.M. Batchelder dated September 14, 1858. The 1851 date found on some of these refers to Nelson

VULCANIZED RUBBER INSULATORS

Styles IH-1 and IH-2



General Dimensions

Style	A	B	C	Threads/Inch	Embossing
IH-1	2 1/8in.	1 1/8in.	4 5/8in.	10	at D
IH-2	2 1/2in.	7/8in.	4 3/4in.	6	at E

Classification:

IH-1-A	GOODYEARS PATENT 1851
IH-1-B	PATENT MAY 6 1851 GOODYEAR
IH-2-A	Unembossed
IH-2-B	GOODYEARS/PAT. 1865

Goodyear's "vulcanite" patent of May 6, 1851; this material being employed in the manufacture of the insulators. The Farmer and Batchelder patent also describes the method of mounting in a wooden block. The significance of the 1865 date found on the IH-2-B insulator is unknown.

IH-3 Brooks' Parafine Insulators

These complex devices were mounted in holes drilled through a crossarm and were held in place by the lug on the bottom of the casing. They were widely used in the late 1860's and are best known to collectors from along the original Central Pacific Railroad. Ones from that area are found with a surprising number of variations in embossing.

The parafine insulator consisted of an iron hook cemented inside a glass cylinder with molten sulfur; this assembly was then cemented inside a metal casing again using molten sulfur. A paper cylinder, covered with parafine (the namesake) covered the exposed surfaces of sulfur at the open end of the casing. The insulators were heavy and expensive. When new they were indeed excellent insulators but as the protective coating of parafine deteriorated the sulfur could attract moisture promoting current leaks. Also, if the concealed glass cylinder cracked, efficiency was lost and this type failure was very difficult to locate.

David Brooks obtained the basic patent (No. 45,221) for this type insulator on November 29, 1864; the patent was reissued on August 6, 1867 and this is the date that appears on most of the insulators. Brooks obtained two other patents on similar types of insulators: No. 63,206 on March 26, 1867 and No. 69,622 on October 8, 1867.

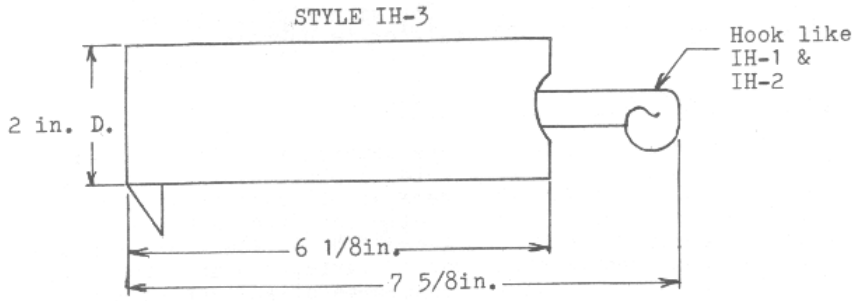
IH-4 Miscellaneous Hooks

The IH-4-A insulator is an iron hook held in an iron cylinder with glass; the iron cylinder is threaded on the exterior. The assembly was screwed into a wooden block which then could be fastened to a pole or tree. The insulators have been found on Mt. Washington, New Hampshire where they were original equipment on a line to the summit; the line was reportedly in use from 1871 to 1892. There are no known patents covering this device.

Another unusual hook device is illustrated in Tibbitts' Book 2, number 105. This consists of an iron hook with an extended shaft. Around the shaft is a beehive shaped mass of composition material which has a wire groove. The insulator looks as if it was intended to be a universal affair adaptable to many different situations. Its actual function, age and maker are all unknown. We'll call it IH-4-B.

BROOKS' PARAFINE INSULATOR

STYLE IH-3



IH-3-A

IH-3-B

IH-3-C

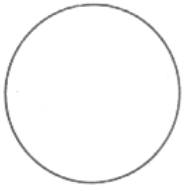
IH-3-D

IH-3-E

IH-3-F

IH-3-G

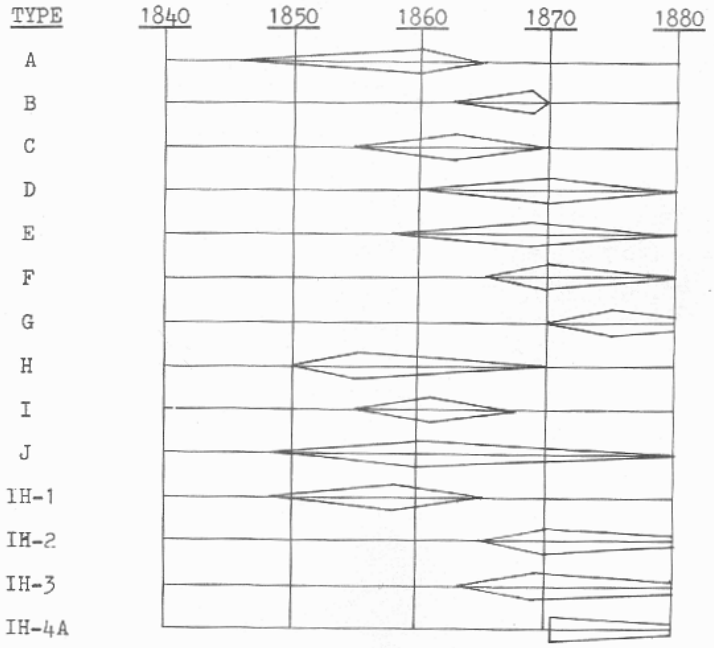
IH-3-H
(Printing is indented)



IH-3-I
(Unembossed)

CHRONOLOGY

Here's an attempt to put the various styles of early insulators into a time frame. This is risky business and certainly what's presented here is tenuous and biased by personal opinions; nevertheless, it should give you an idea of how the various insulators relate to one another. The thickest part of the time line is the period of estimated maximum use of the insulator. Past 1870 some of the glass insulators were probably threaded.



Here are some of the important gentlemen.

COMPANIES & PERSONALITIES

The following sketches tell you a little about the names on the insulators we've described. There is lots to be learned here yet. Following the sketches are actual advertisements from the 1860's; these have been the sources for much of our information.

Bartlett & Co.

Here is a name that has as yet to appear on an insulator but there is every reason to believe that Bartlett insulators may be found.

The firm was located at 289 Greenwich St. in New York City. They were manufacturers and dealers in glassware and produced telegraphic glass to order. Early in 1868 they advertised that telegraph insulators were constantly on hand; 40,000 were available for immediate delivery including curtain, egg and U.S. patterns. It seems possible that some of the insulators marked with names of other New York firms (Tillotson, Chester, Mulford & Biddle) were manufactured by Bartlett.

Brookfield

No introduction is needed here for this is the same firm that has been so well described by Woodward. Two threadless styles are known and both are exact counterparts of well known threaded varieties. Both include Cauvet's patent in their embossing. These were undoubtedly produced to satisfy a demand for new or replacement threadless insulators during the transition period to threaded equipment. Apparently Mr. Brookfield wasn't concerned about the contradiction between the pin hole and patent proclamation.

Brooks

David Brooks and his association with insulators goes back nearly to the beginning. We first find him in September 1845 near Lancaster, Pa. as an employee of the original "O'Reilly" line (Atlantic Lake and Mississippi Valley Telegraph Company). He was a young man and a relative of the colorful Henry O'Reilly. He is noted at this time as a participent in an abortive attempt to insulate wires with cotton cloth soaked in beeswax. By 1847 he was manager of the Pittsburg office of the line and in 1850 he was making unsuccessful attempts to develop complex iron hook insulators. He was the Superintendent of Telegraph of the Pennsylvania Railroad Company in 1855 and in September 1856 he assumed

the same position with the Atlantic and Ohio Telegraph Company.

Following this we know nothing until about 1866 when the Brooks Parafine Insulator Works was established in Philadelphia. The firm was located at No. 22 South 21st St. (also used 21 Aspen St.); until October 1868, a Wm. R. Allison was listed as proprieter. Early in 1869 the name was changed to Brooks Patent Parafine Insulator Works and it was advertised as such until at least mid-1871. Although Brooks apparently sold some of his insulators directly, both Chester and Tillotson claimed to be sole agents at various times during the period; Tillotson was advertising them as early as July 1866.

Some fine insight into the Brooks operation is revealed in an article in The Telegrapher dated September 1868. At that time the works was running day and night and turning out 15,000 insulators per week. Four or five varieties were being produced including one composed of earthenware saturated with parafine. Most of the insulators were being supplied to leading railway companies (no doubt at this time including the C.P.R.R.); others were being shipped to California, South America and Europe. Brooks maintained a laboratory and testing room along with his production facility.

C.P.R.R.

This is the Central Pacific Railroad which was the western half of the first transcontinental railroad link. The C.P.R.R. joined the U.P.R.R. at Promontory, Utah, with the driving of the golden spike on May 10, 1869. The old C.P.R.R. right of way in Utah and Nevada has been good to insulator collectors yielding numerous Brooks' iron hooks, E.C. & M.'s and other good stuff.

Chester

The firm of Charles T. and John N. Chester was founded in New York City in 1855 at White and Leonard Sts., succeeding John W. Norton who had a telegraph instrument business there. Norton had been a member of the board of the Magnetic Telegraph Company as early as 1846; two years later he was contracting for construction of lines and early in the 1850's he established the New York firm. Thus the Chester firm had roots reaching nearly to the beginning of commercial telegraph history in this country.

Sometime prior to 1866 the Chester brothers had moved to 104 Centre St. where they remained for many years. During this period they advertised themselves as "Telegraph Engineers and Manufacturers of Instruments, Batteries and Every

Description of Telegraph Supplies". No advertising has been located that states specifically that they ever produced insulators so they probably had them made up elsewhere.

John Chester died in 1871 and the business was continued thereafter by Charles. A brother, Stephen Chester, was a partner in the firm of Chester, Patrick & Co. of Philadelphia and the same line of goods and services were offered. Chester instruments gained widespread recognition; some of the important early ones were the "Gold Indicator" (1866-67) used on the nation's first quotation system and the "Dial Instrument" (1871) used on the first private leased lines in New York. The Chester firm probably continued in business until at least the late 1870's.

Cowhorns

So as not to overlook anything we must relate that during the Civil War a line was built from Shreveport to Natchitoches and insulated the whole distance with cow horns. Why not? We should all be thankful that this wasn't too successful since it sure would have taken the fun and variety out of collecting.

E.R.W. and N.Y. & E.R.R.

The E.R.W. or Erie Railway and the N.Y. & E.R.R. or New York and Erie Railroad appear to refer to the same rail line although N.Y. & E.R.R. may have been an earlier usage than E.R.W.

At any rate, the Erie was a pioneer in this country in the usage of the telegraph to complement the operation of a railroad. In 1850 a telegraph line was built along the Erie and in January 1851 it was being used to relay freight information. In June 1851, Charles Minot, superintendent of the Erie, first used the telegraph to control rail traffic moving in both directions on a single track. It wasn't until 1855-60 that most other railroads began to take advantage of the telegraph in a similar manner.

During this period the Superintendent of Telegraph for the eastern section of the Erie was L.G. Tillotson. His association with the Erie apparently extended from 1851 until 1866. More on him later.

Foster Brothers

The story of the Foster Brothers insulator has been presented several times in various publications and we've been unable to turn up any additional information.

Briefly, three Foster brothers immigrated to St. John, then C.E. or Canada East, in 1855. They established a glass house which was operated until 1878. In that year it was sold and apparently moved to Montreal where it is understood that the plant is part of the present Dominion Glass Company.

Goodyear

Nelson Goodyear's only association with insulators appears to have been through the use of his "Vulcanite" on certain iron hook insulators. It's use is described in U.S. Patent 21,492 dated September 14, 1858:

"About three inches in length of the upper part of the hook is covered with hard india-rubber, commonly known as vulcanite or hard compound, being the invention of Nelson Goodyear, Letters Patent having been issued to him for the same on the 6th. day of May, A.D. 1851. This compound or gum is applied to the hook when in a plastic state, covering the end of the shank and about two-thirds of its length.... The hook, with its covering of rubber, is embedded in pulverized soapstone and placed in heaters or ovens, where it is exposed to a temperature of about 300 F. for about ten hours, until it becomes perfectly black and hard."

Jalisco Comp.[A]

Nothing much is known of this company except that it is Mexican; Jalisco being located in central Mexico. There has been some speculation on the age and validity of these insulators and we are unable to answer the questions one way or the other.

Keeling

Full page ads appeared in The Telegrapher during parts of 1865 and 1866 touting:

"The Great Depot of Telegraph Supplies"
No 16 Broadway, New York
J.S. Keeling, late
Tillotson & Co.

Ads for L.G. Tillotson & Co. were appearing at the same time and the firms appeared to be in hot competition. The situation is confusing but it seems that when the original Tillotson & Co. was dissolved or whatever and moved from Broadway to Dey St. to become L.G. Tillotson & Co., Keeling took up residence at the old location as a competitor. Perhaps he was a former employee of Tillotson.

M.T. Co.

The Montreal Telegraph Co. or M.T.Co. was organized in Montreal in 1847 and developed into one of the outstanding telegraph operations in North America. The firm was noted for the quality construction of its lines.

Growth came as a result of extending company lines, leasing, and purchase of other existing lines. Progress was as follows:

Year	Miles of Wire	Office	Employees	Messages
1847	540	9	35	33,000
1860	1900			
1870	12,400			
1875	20,000	1400	2000	2,000,000
1880	30,000			

In 1881 the company was merged into the Great North Western Telegraph Company with H.P. Dwight as General Manager. Dwight (father of the "Dwight Pattern") had started with the Montreal as an operator in 1847.

S.McKee & Co.

This was a Pittsburg glass house established in 1834; during the period 1863 to 1875 the firm was located at 62 Water St. They produced bottles and window glass and apparently insulators were only a small part of their business. McKee insulators are a uniform deep aqua color that is quite distinctive. Their mold left a flat one inch diameter "button" seam on the top of the insulator which is also distinctive; this button appears on some unembossed insulators. The Wade insulators were made of glass that resembles McKee material and there is a remote possibility that McKee produced some of these insulators.

One insulator patent, No. 107,075 dated September 6, 1870, is known to have been issued to Samuel McKee. This covered a tall threadless Type B insulator that had a screw thread moulded to the exterior of the "hat". This supposedly allowed the insulator to be screwed into a drilled hole in the bottom of a crossarm although it could be mounted as well on a normal threadless pin. None of these have been reported and they may never have been produced.

McMicking

The following information concerning Robert Burns McMicking is used with the permission of Colin McIntosh, author of the book "Canadian Insulators".

McMicking was born in 1843 in Ontario. His early telegraph experience was with the Montreal Telegraph Co. working under H.P. Dwight. In 1862 he migrated westward to British Columbia where he worked at different jobs for several years. In 1870 he was put in charge of the Western Union office at Victoria. In 1871 the Provincial Government took over all lines and McMicking became superintendent at Yale; he resigned this position in 1880. Following this, McMicking was active in pioneering telephone operations in British Columbia.

The "75" in the embossing on the McMicking insulator could well be a reasonable date (1875) for its manufacture.

Mulford & Biddle

We've found one ad in The Telegrapherfrom July, 1865 for the firm of Mulford and Biddle. They were manufacturers of black and galvanized telegraph wire with offices and warehouse at 83 John St., N.Y. Their mills were located at South Brooklyn. It seems unlikely that they produced insulators and we suppose that they had them made up with their name embossed and then furnished them along with the wire. Nothing is known of Mulford & Biddle before or after the 1865 reference although their insulators were installed by the thousands during the summer of 1868 along the Union Pacific Railroad. These may have been furnished two or three years earlier on contract to the U.P. and simply not used until 1868.

N.Y.C.

New York Central??

Novelty Works

Several mentions, related to insulators, have been found of the "Novelty Works" located in Pittsburg in the late 1840's. This apparently was not a glasshouse but rather a custom fabricating works. Reid mentions the firm while discussing one of Ezra Cornell's brainstorms:

> "The Novelty Works also, at Pittsburgh, Pa., made great quantities of the brimstone insulator, which consisted of an iron hat filled with hot brimstone, into which an iron stem, with hook, was held until cooled. There was disaster wherever it went."

None of these, or other products of the Novelty Works have been reported; its a possibility though.

SO EX CO

This one is a complete mystery. A wild guess is that the embossing stands for Southern Express Company.

Tillotson, L.G. Tillotson, and L.G.T. & Co.

All of the above relate to the same aggressive firm. D.T. Tillotson (L.G.'s father) was involved in telegraph matters as early as 1848 when he became Secretary and Superintendent of the Erie and Michigan Telegraph Co. L.G.'s first position of note was when he became Superintendent of Telegraph for the eastern section of the Erie Railroad in 1851. He apparently remained in this position until 1866 when he resigned to devote full time to his established equipment and supply business in New York. Just when the business was begun is uncertain but it probably was in the early 1860's while L.G. was still employed by the railroad; perhaps his father was involved in the original venture. A chronology of the firm follows:

? - 1865	Tillotson & Co.	No 16 Broadway
1865 - 1868	L.G. Tillotson & Co.	No 26 Dey St.
1868-about 1880	L.G.Tillotson & Co.	No 11 & No 8 Dey St.
Early 1880's	L.G. Tillotson & Co.	No 5 & 7 Dey St., office, salesroom, & warehouse. 139, 141, 143 Centre St. manufactory.
Mid 1880's	Taken over by E.S. Greeley & Co. at the Dey St. address.	

Early in 1868 a subsidiary firm called Bliss, Tillotson & Co. was established in Chicago at 126 South Clark St.; later in the same year they moved down the street to No 171. In 1871 the firm was located at 247 South Water St.; nothing further is known of them. They offered the same line of goods and services as the New York firm.

Tillotson handled everything a telegrapher needed; registers, relays and other instruments were manufactured and at least in the early days, the advertising indicates that insulators were produced also. This latter assertion is supported by a brief article in The Telegrapher dated June 27, 1868 as follows:

> "L.G. Tillotson & Co. have just got out a new pattern of glass insulator, which is the handsomest we have seen of that class of insulators. Telegraphers and others interested can examine samples at their warehouse, No 11 Dey St."

We feel that this was probably a Type E insulator. So far as can be found, Tillotson was the first to advertise threaded insulators.

Tillotson was a prolific advertiser and the firm was well represented in every issue of The Telegrapher and Journal of the Telegraph; annual catalogs were apparently issued, too. In addition he published J.E. Smith's Manual of Telegraphy which was a popular handbook.

As a sidelight, in 1868 Tillotson had become the proprietor of the Orange Hotel at Turner's Station on the Erie Railway, forty miles from New York. The place was described as "a great eating house" and "famous summer resort". His central position in the telegraph field is indicated when on June 10, 1871 he hosted 1000 delegates to the Morse Memorial Inauguration to an excursion on the ferry steamer James Fisk, Jr.

Collectors should remain alert for Tillotson items other than insulators. We recently acquired an old 20 ohm sounder inscribed with "Bunnells Patent July 1874"; the base plate is marked "L.G.T. & Co., 8 Dey St. N.Y.".

U.P.R.R.

This is the Union Pacific Railroad which, along with the C.P.R.R., completed the first transcontinental link in 1869. The first U.P.R.R. telegraph wires were strung on Type B-1 and B-2 insulators with a very few B-3's and B-4's here and there. How things were done in those days is well illustrated by the following taken from The Telegrapher, dated May 15, 1868:

> "The Construction Department of the Union Pacific Railroad has given Davis, Sprague & Co. of Fort Sanders, Dakotah Territory the contract for building the telegraph line ahead of the track to the North Platte a distance of one hundred miles and Edward Creighton the building contract from the North Platte to Salt Lake City, four hundred miles. The work is contracted to be completed in sixty days. Thirty five poles to the mile are being put in, and the common glass insulator used. The contractors furnish the poles and do the work for $125 per mile."

A later reference indicates that the line was in service by June 27, or about two weeks ahead of schedule. Fort Sanders was located just south of present-day Laramie, Wyo. and the North Platte crossing is at Fort Steele, east of Rawlins, Wyo. As things turned out the U.P. did not go to Salt Lake, passing instead through Ogden to the north. Another reference late in 1868 states that Creighton was extending the line to Ogden. Creighton was no stranger to line construction in this part of the west since he played an important part in building the first transcontinental telegraph in 1861 and other lines during the intervening years.

U.S. Tel Co.

The United States Telegraph Company was formed on August 3, 1864 by the consolidation of three other companies owning a total of about 6000 miles of wire. The new company expanded rapidly and by early 1866 about 20,000 miles of line had been developed. In 1865 a subsidiary was set up to build a line from San Francisco to the Missouri River; the line was completed from the west as far as Salt Lake City by January, 1866 and most, if not all, Type B-5 insulators in present collections have probably come from along this line. The U.S. Company encountered financial difficulties and was taken over by Western Union on March 1, 1866, after existing as an entity for only nineteen months.

An article in The Telegrapher by Frank L. Pope, dated November, 1869 reveals that the U.S. Tel. Co. is probably responsible for the Type F insulator design:

> "The glass insulator now employed is substantially that first used by the United States Company, being a sort of compromise between the 'egg' of the Magnetic line and the well-known 'petticoat' or 'umbrella' so much used a few years since."

The Type F insulator has been identified by other sources as the "compromise". How about someone finding one embossed U.S. Tel. Co.?

Wade

No embossed insulators have been found bearing the name Wade, but enough early references mention this style that the name can't be ignored. Type I insulators are all Wades, being distinguished by a wood covering over the glass. They are best known from Nebraska and Wyoming along the route of the first transcontinental telegraph line, but they've also been found in other widespread locations. It has been reported that the Wade insulators were patented but we've been unable to substantiate this. The wood cover was usually cemented to the glass with asphalt and either sulfur or asphalt was used to cement the glass to the pin. Some Wade insulators have punctations inside the pin hole.

Jeptha H. Wade was born in Seneca County, New York in 1811. His early career was varied and included a period where he was a wandering portrait painter. By 1847 he was active in telegraph construction and operation and in 1855 he was a party to the organization of the Western Union Telegraph Company; he later served as president of this company for one year in 1866. He also served as president of the Pacific Telegraph Company which built the eastern section of the first transcontinental telegraph in 1861. Its not surprising that Wade insulators were specified and used on this line.

Others

Here is a list of some other companies, etc. that we've encountered while researching the late 1860's; all were associated with the telegraph in one way or another. Perhaps some of these will show up on an insulator someday.

Bishop Gutta-Percha Co.; N.Y.; submarine cable etc.

Dr. L. Bradley; Jersey City, N.J.; instruments.

M.A. Buell; Cleveland, Ohio; instruments and supplies.

A.S. Chubbuck; Utica, N.Y.; supplies.

Clark & Co.; Philadelphia, Pa.; instruments and supplies.

James J. Clark; Harrisburg, Pa.; instruments, batteries, supplies.

S.F. Day & Co.; probably N.Y.; instruments.

Edmands & Hamblet; Boston, Mass.; instruments.

W.E. Facer; Philadelphia, Pa.; general manufacturing electrician.

Fleming, Potter & Co.; Philadelphia, Pa.; instruments & supplies.

Gray & Barton; Chicago, Ill.; instruments and supplies. These guys were the forerunners of Western Electric.

Lundberg & Marwedel; San Francisco, Calif.; apparatus & material.

Ottinger & Co.; Philadelphia, Pa.; contractors & telegraphic engineers.

Wm. P. Phelps; Brooklyn, N.Y.; instruments and apparatus.

Pope, Edison & Co.; New York, N.Y.; electrical & telegraphic engineers.

Shawk & Barton; Cleveland, Ohio; contractors, instruments, supplies.

Shawk & Foote; Cleveland, Ohio; instruments and supplies.

Josiah B. Thompson; Philadelphia, Pa.; covered wire.

C. Westbrook & Co.; Harrisburg, Pa.; instruments & supplies.

Charles Williams, Jr.; Boston, Mass.; manufacturer

Worl & Co.; Philadelphia, Pa.; engineers and contractors.

Pope's List

To show you how little is actually known about the names of various insulator styles we've tabulated a list given by F.L. Pope in 1869. Pope was testing insulators and here's how he identified them:

1.	Pacific & Atlantic	glass & brackett
2.	Western Union	" "
3.	Phil. & Reading R.R.	" "
4.	Midland (N.Y. & O.) R.R.	" "
5.	Bankers & Brokers'	" "
6.	Boston Egg	" "
7.	Collins Overland Telegraph	" "
8.	Large Umbrella	" "
9.	Elliot White Flint	(on brackett)
10.	Old Rubber	without clip
11.	New Rubber	with clip
12.	U.K. Porcelain	(English)
13.	Varlay	"
14.	Iron & Porcelain	"
15.	Wood & Ebonite	"
16.	Iron	"
17.	Small Porcelain	"
18.	Rubber Cap	"
19.	Prussian Porcelain	
20.	Prussian Porcelain	(parafinned)
21.	Brooks' 6 inch	
22.	Brooks' 12 inch	
23.	Brooks' Porcelain	A.M. McKay pattern

O.K., who's got all these sitting on the shelf?

MULFORD & BIDDLE,

MANUFACTURERS OF

BLACK

AND GALVANIZED

TELEGRAPH WIRE.

Office and Warehouse,

81 JOHN STREET,

New York.

MILLS AT

South Brooklyn.

AMERICAN MANUFACTURES.

THE

BISHOP GUTTA PERCHA COMPANY,

The only American Manufacturers of Pure Gutta Percha Insulated Telegraph Wire, for Submarine Cables, Office Wire, Electric Cordage, and for Mining and Blasting Use, etc., etc.

Submarine and other Telegraph Wire,

INSULATED WITH PURE GUTTA PERCHA.

N. B. We are prepared to lay down and warrant Submarine Cables.

SAMUEL C. BISHOP,

General Agent of the Bishop Gutta Percha Company

NEW YORK

Blank Books, Stationery, &c.,

FRANCIS & LOUTREL,

45 MAIDEN LANE.

NEW YORK.

MANIFOLDS FOR TELEGRAPHERS AND REPORTERS.

DIARIES and DAILY JOURNALS.

COPY YOUR LETTERS.

Use Francis' Improved Manifold Letter Writer,

FRANCIS & LOUTREL,

45 Maiden Lane, New York.

THOMAS HALL,

MANUFACTURING ELECTRICIAN.

Manufacturer & Dealer, Wholesale & Retail, of

Telegraph Instruments, Batteries, Insulators, Materials and Chemicals for Telegraph Lines

Warerooms, 13 Bromfield Street, Boston, Mass.

CHARLES WILLIAMS, Jr.,

109 Court Street, (Minot Buildings,)

BOSTON, Mass.,

Manufacturer of Telegraph Instruments and Galvanic Batteries of all kinds.

WHOLESALE & RETAIL DEALER IN TELEGRAPH SUPPLIES &c

A. S. CHUBBUCK,

UTICA, N. Y.

INVENTOR OF THE "PONY SOUNDER."

FERD MAYER & CO

Practical Lithographers,

96 FULTON STREET, New York.

A. S. CHUBBUCK,

UTICA, N. Y.,

Inventor of the "Pony Sounder," Register and Key,

MANUFACTURER OF AND DEALER IN

ALL KINDS OF TELEGRAPHIC INSTRUMENTS.

Batteries and all Kinds of Telegraphic Supplies Constantly on Hand.

JAMES J. CLARK & CO.,

MANUFACTURERS OF

Telegraph Instruments and Materials,

Nos. 8 and 10 East Twentieth Street,

NEW-YORK.

Blank-Books, Stationery, etc.,

FRANCIS & LOUTREL,

45 MAIDEN LANE,

NEW-YORK.

Manifolds for Telegraphers and Reporters, Diaries, and Daily Journals.

COPY YOUR LETTERS.

Use Francis's Improved Manifold Letter-Writer,

FRANCIS & LOUTREL,

45 Maiden Lane, New-York.

REMOVAL to No. 15 Bromfield street.

THOMAS HALL,

MANUFACTURING ELECTRICIAN.

The largest assortment of Telegraph Instruments, Batteries, Insulators, Materials and Chemicals for Telegraph Lines in the United States.

No. 15 Bromfield St., Boston, Mass.

CHARLES WILLIAMS, Jr.,

109 Court Street, (Minot Buildings,)

BOSTON, MASS.,

MANUFACTURER OF

TELEGRAPH INSTRUMENTS AND GALVANIC BATTERIES

OF ALL KINDS.

Wholesale and Retail Dealer in Telegraph Supplies, etc

AMERICAN MANUFACTURES.

THE

BISHOP GUTTA PERCHA COMPANY,

THE ONLY AMERICAN MANUFACTURERS

Pure Gutta-Percha Insulated Telegraph Wire.

SUB-MARINE CABLES,

Office Wire, Electric Cordage, and for Mining and Blasting Use, etc., etc.

Submarine and other Telegraph Wire,

PURE GUTTA PERCHA,

N. B.—We are prepared to lay down and warrant Submarine Cables.

Apply to

SAMUEL C. BISHOP,

General Agent of the Bishop Gutta Percha Company

Office, 113 LIBERTY STREET,

NEW-YORK.

CHARLES T. and J. N. CHESTER,

104 CENTRE STREET, N. Y.,

TELEGRAPH ENGINEERS,

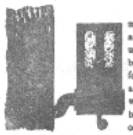
AND MANUFACTURERS OF

INSTRUMENTS, BATTERIES

AND EVERY DESCRIPTION OF TELEGRAPH SUPPLIES,

SAM. C. BISHOP, General Agent.

THE BROOKS
PATENT PARAFFINE INSULATOR
WORKS,
No. 22 South Twenty-first Street,
PHILADELPHIA.



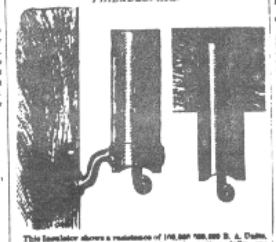
All varieties of Insulators manufactured at these Works are warranted to excel the usual style of Glass and Rubber more than one hundred fold. In view of the error and delay in transmission, Waste and consumption of battery material, the results of defective insulation, its fragile nature and expense of renewal, nothing is more manifest than its economy.

To RAILROAD COMPANIES relying upon the efficiency of their telegraph departments it is of great value.

CHESTER, PARTRICK & CO.,
TELEGRAPHIC AND ELECTRICAL
ENGINEERS.

1868

BROOKS'
PATENT PARAFFINE INSULATOR
WORKS,
21 ASPEN ST., North of 2122 CHESTNUT ST.,
PHILADELPHIA.



This Insulator shows a resistance of [illegible] R. A. Dudo, excelling ordinary Insulators in humid weather fully one hundred thousand fold.

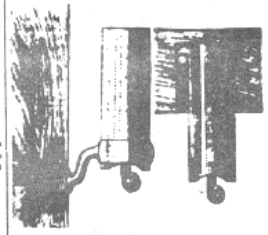
Its great strength and durability make it the most economical Insulator in use.

Every report received from them is of the most favorable character.

MODERN PRACTICE OF THE
ELECTRIC TELEGRAPH.
By FRANK L. POPE.
PRICE [illegible]

1869

BROOKS'
PATENT PARAFFINE INSULATOR WORKS,
21 ASPEN STREET, NORTH OF 2122 CHESTNUT STREET,
PHILADELPHIA.



The guarantees of this Insulator are

1st. A current resistance in rain or fog, or in rain and fog, combined of [illegible] ohms.

2d. To insulate a conducting wire of any length in rain or fog or rain and fog combined to the full working capacity, or the capacity of a similar wire or conductor placed upon any other Insulators under the most favorable circumstances of weather.

3d. Strength and tenacity of part to any strain by, or that a No. 8 wire will bear.

It is not injured by moisture in the general acceptance of the term.

It does not depreciate from exposure to smoke, soot and the gases from combustion to one hundredth part of the extent of ordinary Insulators.

It is not injured by atmospheric discharges. It is a protection to the poles from the same effects, there not being an authenticated instance of a pole being injured where these Insulators are

[illegible]

JOHN POLHEMUS, Printer and Stationer, 169 Nassau Street, N. Y.

1870

WHENCE THREADS ?

This is a good question and one that we can't resist commenting upon. Insulator collectors have probably made more of this point than did the telegraphers of old, for very little is recorded on the subject.

Reid comments about insulators in 1878: "Experience with numerous modes finally led to the adoption of Cornell's glass and pin method of insulation, used for copper wires of the early lines, but now enlarged, modified in form, and strengthened for bearing the iron wire. Of these several forms were introduced, but which were all essentially alike. The Cauvet insulator, glass and pin, was introduced in 1865. Then followed the screw glass and pin of the California Electrical Construction and Maintenance Company, which is essentially the insulator now in general use. It was adopted, somewhat modified in form, by the Western Union Telegraph Company, after a thorough examination of all other modes, and is likely to prove the standard American telegraph insulator of the future." Reid's book, which is 846 pages long, mentions Cauvet once (above) and Brookfield not at all.

In our own perusal of The Telegrapher and Journal of the Telegraph between the years 1865 and 1871 we saw no mention or advertising by Brookfield or the Bushwick Glass Works; the first observed mention of Cauvet appears in a Gray and Barton ad in 1871. Our examination was extensive but far from complete and there are many issues we've never seen so things could easily have been missed. The first advertising for threaded insulators that was found is dated January 15, 1870; this was a full page spread by Tillotson. It's reproduced following this section.

It's known beyond a doubt that lines along the U.P.R.R. and C.P.R.R. which weren't completed until the spring of 1869 were carried on insulators other than threaded styles; these are among the few early lines where it has been possible to establish what was used and when. The Gray and Barton ad mentioned above indicates that by July 1871 Western Union had standardized on threads. What all this says is that the transition to threads probably didn't start gathering steam until about 1870; the major switchover probably took ten years or so, but has yet to be completed. We know of several different cases in the past two or three years where threadless insulators have been found still in use!!

One gets the impression from the contemporary insulator literature that Brookfield, Cauvet, and threads are almost synonyms. This isn't supported in fact. The early Hemingrays and E.C. & M.'s were produced without mention or appar-

ent regard for Cauvet, and other similar examples can be cited. What about the P. & W.'s? They credit Cauvet but don't appear to be Brookfields. Although Tillotson marketed Brookfield insulators in later years there is no indication that this association existed early in the transition period. Tillotson seems to be the first to promote threads commercially. Two possibilities suggest themselves: Cauvet either licensed his patent to several manufacturers or they found ways to circumvent the patent.

We have ample facilities for the execution of every

SCREW GLASS INSULATORS AND BRACKETS,

Of the size and thread used by the Western Union Telegraph Company.

Having secured an Exclusive Agency for these Insulators, (manufactured under the Cauvet patent,) we are filling orders promptly for large or small quantities, at prices as low as any Insulator can be sold for in the market.

GRAY & BARTON,

479 State St., Chicago.

July 1871

This list is offered to acquaint you with early lines that may have been located in your area. For a personal adventure, pick out the ones from your locality and start researching them; try the library, historical society, local university etc. Before long you'll know quite a lot about the regional telegraph history and if you're lucky you'll find some insulators too.

AMERICAN TELEGRAPH LINES.

1878.

COMPANIES	Offices.	Em-ployees.	Miles of Pole Line	Miles of Wire.
Atlantic & Pacific	528	794	8,853	22,243
Anglo American (Land)	23	89	1,006	1,180
Aurora and Rising Sun	5	5	30	30
Alabama and Chattanooga	24	24	295	295
Alabama and Nashville	3	3	31	31
Altahoma	2	2	38	38
Ashtabula, Youngstown & Pittsburgh	14	14	63	63
Alton Bay, N. H	3	3	25	25
American, of N. H	13	13	80	88
British North American	22	22	574	574
Burlington and Missouri	17	17	191	191
Black Diamond & Nortonville, Cal.	2	2	4	4
Burlington and South Western	18	19	130	130
Baltimore and Ohio	136	341	1,221	1,409
Buffalo, New York & Philadelphia	23	23	120	120
Boston Corners and Rhinebeck	7	7	35	35
Boston Corners and Poughkeepsie	10	10	43	43
Burlington and Lamoille	4	4	35	35
Brandon and Sudbury	2	2	7	7
Bar Harbor	1	1	9	13
Big Sandy	2	2	13	13
Bridgeport and Victoria, Tenn	3	3	20	20
Cape Breton Coal Co	3	3	28	28
Colusa Lake and Mendocino, Cal	27	32	260	260
Central Pacific	142	212	2,788	4,904
Cheyenne and Black Hills	6	6	200	200
Cairo and St. Louis	15	20	150	153
Chicago and Iowa	18	20	104	104
Camden, Fla	2	2	12	12
Columbia and Camden	2	2	63	63
Chesapeake and Ohio	24	32	421	421
Cattskill and Windham	4	4	25	25
Chester and Derry	3	3	7	7
Cumberland and Piedmont	2	2	20	20
Connecticut River	20	20	80	80
Covington and Somerset, Ky	18	18	158	158

AMERICAN TELEGRAPH LINES — *Continued.*

COMPANIES.	Offices.	Em-ployees	Miles of Pole Line	Miles of Wire.
Dominion of Canada	368	450	3,656	7,169
Deseret	64	65	948	1,109
Deer Lodge	3	3	150	150
Detroit, Lansing and Northern	34	34	184	184
Darien, of Georgia	2	2	34	34
Darlington and Timmonsville	3	3	30	30
Ellsworth and Tremont	2	2	22	22
Ellsworth and Deer Island	4	4	30	30
Florida Tel. Association	9	9	155	155
Fayette and Rodney	2	2	15	15
Gold Hill, Cal	2	2	11	11
Gold and Stock	30	216	120	1,193
Grand Tower Mining & Man. Co	3	3	25	25
Grand Rapids and Indiana	51	51	450	450
Good Intent Tow Boat Co	6	6	110	110
Greenville and Columbia	15	15	217	217
Great Falls and Conway	15	15	71	82
Homer and Minden, La	2	2	20	20
Hawkeye	24	24	190	200
Hillsboro and Blanchester	4	4	21	21
Harrington and Jonesport	3	3	17	17
International Ocean	22	37	736	1,500
Kesauqua and Iowa	2	2	4	4
Lebanon and Nashville	2	2	32	32
Little Rock and Fort Smith	13	13	168	168
Lumberton and Fayetteville, N. C	2	2	35	35
Larabees to Clarement	4	7	25	25
Lake Mohunc and New Paltz	2	2	6	6
Lake Ontario	22	22	146	146
Lexington and Mount Sterling, Ky	3	3	33	33
Montreal Telegraph Co	1,507	2,337	12,044	20,479
Montezuma	6	6	34	34
Merchants' Union, La	2	2	75	75
Mineral Range	3	3	13	13
McGungie and East Texas, Pa	17	17	30	30
McConnellsville Tel. Co	1	1	30	30
McArthur and Zaliski	2	2	7	7
Marietta and Cincinnati	34	56	293	486
Montclair and Greenwood	12	12	50	52
Moscow and Somerville, Tenn	3	3	14	14
Marion and Scio	2	1	7	7
North Western	550	1,130	2,100	5,400
Northern Pacific	28	28	343	343
New Iberia and Washington	7	7	61	61
New Bremen and Botkins, O	3	3	15	15
Nevada and Northern	7	7	460	460
New York and Midland	48	48	360	648
New Jersey Midland	19	19	78	160
New Hampshire Co	3	4	7	7
Northwestern Ohio Co	9	9	69	69
Ocean Tow Boat Co	6	6	112	112

AMERICAN TELEGRAPH LINES — *Continued.*

COMPANIES.	Offices.	Em-ployees.	Miles of Pole Line	Miles of Wire.
Oregon Steam Nav. Co	7	7	210	210
Paducah and Elizabethtown	14	14	110	110
Perry Tel. Co	2	2	13	13
Pensacola Tel. Co	14	14	100	100
Pittsburgh and Charlestown	10	10	32	32
Port Gibson and Grand Gulf	2	2	6	6
Pennsylvania R. R., Penn. Div.	215	440	1,053	1,900
" " N. J. Div	181	271	501	1,131
" " Erie Div	73	119	454	1,052
Philadelphia, Reading and Pottsville	297	398	884	1,999
Port Jervis and Milford	4	4	24	24
Phonicia and Gilboa	6	6	35	35
Poultney and Middletown, Vt	3	3	8	8
Puget Sound	7	7	54	54
Rock Island and Mercer	6	6	26	26
Richmond and York River	4	4	38	38
Raleigh and Augusta	7	7	77	77
Southern Minnesota	23	30	170	170
Suison and Rio Vista, Cal	6	6	34	34
Shelby Iron Co	2	2	5	5
Santa Clara and Saratoga	2	2	13	13
Santa Cruz and Felton	2	2	7	7
Saratoga and Schroon Lake	13	13	85	85
State of Maine Hospital	2	2	1	1
South Hadley Falls	2	2	1	1
Southern States Coal and Iron	2	2	6	6
Snohomish Tel. Co	3	3	14	14
Taylorville and Susanville	2	2	32	32
Texas and Pacific	60	60	324	403
Toledo and Woodville	8	8	90	90
Tennessee Coal Co	2	2	20	20
Terrebonne and Thiboudeaux, La	2	2	4	4
Troy and Union Springs	5	5	30	30
Tybee	2	2	20	20
United States	55	90	3,000	3,000
Union and Spartanburg	2	2	30	39
Ulster and Delaware	20	20	74	74
Utica and Black River	15	15	125	125
Utica and Rome	4	4	15	15
Utica, Watertown and Morristown	18	20	150	150
Vermont International	20	25	147	272
Vicksburg and Greenville, Miss	7	7	150	150
Western Union	7,672	12,224	77,861	199,022
Western (Hinckley's)	30	30	105	105
Washington and Ohio	7	7	52	52
Woodville and Bayou Sara	2	2	25	25
Wilmington and Reading	10	10	70	70
Yosemite Valley	5	5	65	65
Total	12,982	20,402	127,352	285,622

BIBLIOGRAPHY

For those who want to dig a lot deeper, consult the following six references and you'll have more than enough leads to investigate.

1. Electricity and the Electric Telegraph by G.B. Prescott; 1877. Good information on all telegraph aparatus, including insulators.

2. The Glass Insulator in America by N.R. Woodward; 1969. The best reference on threaded material.

3. "The Journal of the Telegraph"; official paper of the Western Union Telegraph Co.; semi-monthly starting in 1867. Lots of advertising and information on Western Union; on micro-film in Library of Congress.

4. "The Telegrapher"; official paper of the National Telegraphic Union; started as a monthly in September 1864, bi-monthly in December 1865, and weekly in August 1867; last issue in February 1877. Best reference of all, lots of ads, information on new lines, equipment, etc.; on microfilm in Library of Congress.

5. The Telegraph in America by J.D. Reid; 1879. 846 pages of meat concerning early telegraph history; concentrates on companies and people but has good insulator info, too. This is a rare book but it is available in some libraries.

6. Wiring a Continent by R.L. Thompson; 1947. Early telegraph history up to about 1866; concerns mostly companies and people. Presents outstanding bibliography that opens up many new possibilities for investigation.

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