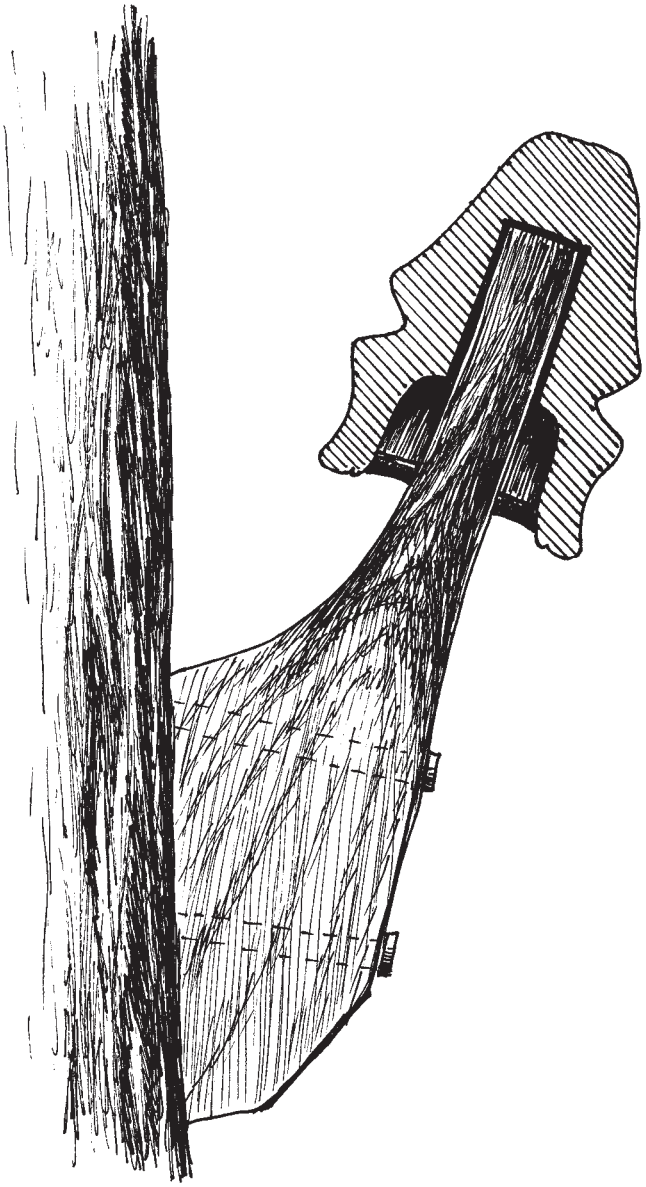
An Incomplete History and Timeline of the Electric Telegraph and the CD 731 Compromise Insulator



Revised Edition

Compiled by
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Hamilton, Ohio

November 2010

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Introduction

The purpose of this paper is to provide an educational, informational and somewhat entertaining journey into the history of glass insulators concluding with the development of the CD 731. I've chosen to do this through a brief history of the electric telegraph and the role of the insulator throughout that history. Let me be clear from the beginning--- I am NOT a "researcher" and this is not a research report per se, but I am a collector deeply interested in his specialty. Most of my comments in this paper can be substantiated through sources listed under *Acknowledgements* at the end of the document, but I have also included some of my own personal observations and opinions. I have handled and studied thousands of glass insulators over the years both early on in the 70's and since my return to the hobby in 2003. A goal for this paper was to organize information from numerous sources into a handy reference-type format that would be helpful to both beginning and long time collectors. I have also created a timeline of the development of the electric telegraph while giving readers a sense of the evolution of the glass insulator through 1865. I think giving readers an overview of the early development of the glass insulator is informative and clearly shows where the 731 fits into that development. From the invention of the electromagnetic recording telegraph (Morse) to the development of the 731 was only a period of 28 years, but it was a period of rapid growth for the railroad and the telegraph. Morse's invention launched telecommunications in this country and would have never been successful without the insulator.

Compared to the 2007 edition, this *Revised Edition* expands upon the historic research of the electric telegraph, insulators in general, and the CD 731 in particular. Our journey will culminate with the development of the CD 731 threadless concave skirt “Compromise” insulator with new information introduced into the hobby on its various mold characteristics. When I started collecting in 1971, I specialized in exotic blue glass insulators. Even then I had a fondness for the 731. I loved its place in history in the development of pin-type insulators, its shape, and the period in which it was produced. When I returned to the hobby in 2003 after a 25-year hiatus and liquidating my exotic blues collection in late 1978, I decided to focus on threadless and shortly thereafter, the CD 731.

Upfront I want to recognize Ray Klingensmith and his opening work in McDougald's two-volume set on pin-type insulators in North America. Ray's research was a primary source for this work and I drew information on 731's from his work. His vast knowledge on threadless insulators not only helped inform this story of the 731, but was also useful as I developed the historical timeline. Ray has always made himself available to discuss insulators and especially with helping me better understand 731's in particular. Also, as I discovered any additional information, I've added it where appropriate. I've cited his and McDougald's work in the *Acknowledgments* along with J.B.Calvert’s 2004 revision of *The Electromagnetic Telegraph.*

Threadless research is very challenging. Accurate records were not kept on insulator production prior to 1875 since most insulator production at that time was by bottle companies making insulators as a side business. If records were kept, most usually fell victim to loss by fire, flood or other tragedy. Many were

just destroyed as a normal event when a glass business either quit producing insulators or went out of business altogether. One fairly good source for research is old supply house catalogues. Unfortunately, I have never had access to these. Some do show threadless illustrations on occasion and which companies may have provided them, but usually the glass manufacturer actually making the pieces becomes a guessing game for collectors. Collectors look for clues in the quality of the glass, color traits caused by glass components (usually sand) from certain areas, specific mold characteristics, and of course, markings. But it still boils down to a guess when trying to accurately identify most threadless insulator makers. I do find it interesting when a collector (or dealer) states emphatically that a particular unembossed threadless is, for example, a Brookfield product. The person might say, for example, they can tell by the glass quality and color that it is definitely a Brookfield product. But pin this person down on a suspected bogus piece and they're not so sure it's bogus since there really is no definite proof---they'll say it's all circumstantial. More on bogus pieces later.

The Compromise style in the U.S.A. actually encompasses CD's 727 through 732.4 (McDougald Price Guide, 2007). Many researchers feel the concave skirt preceded the straight skirt styles based on early articles in *The Telegrapher* and other sources. Remember that the Consolidated Design numbering system does not follow any chronological pattern and was created by N.R. Woodward in the 1960's. "Woody" introduced his CD numbering system in his 1967 publication "The Glass Insulator in America 1967 Report". In general, the CD system starts at 100 for the smaller pieces and goes through the 300's for larger power pieces. The 400 to 600 numbers are reserved for foreign glass and the 700's are for threadless. Visit the National Insulator Association website for more detail and photos (www.nia.org).

A Brief History

I have added this opening section simply because it shows how early that men were thinking about transporting information from one place to another, more distant place. Before we get too far into this incomplete history and timeline, a few early thoughts and experiments should be considered.

Let's begin with some early creative ideas expressed well before their time and well before Morse and his cohorts came onto the scene. For example, in the Bible, the author of the Book of Job raises this question while thinking the impossible, ***"Canst thou send lightnings that they may go, and say unto Thee, here we are?"*** Was the author thinking that words could travel through air like lightning? Did the author somehow associate the powerful electricity in flashes of lightning with using that power somehow to transmit words?

Or, the Neapolitan scholar of notable ability, who had devoted great attention to the study of natural and physical science and authored the work *Natural Magick*, John Baptista Porta, in one of his publications in approximately 1575 in the vicinity of Naples, Italy:

> ***"To a friend, that is a far distance from us, shut up in prison, we may relate our minds; which I do not doubt may be done by two mariner's compasses having the alphabet writ upon them."***

This quote came from "The Proeme" of Book VII on his experiments with Loadstones (magnets). His work was ultimately published in twenty books. His were the earliest experiments recorded that hinted at the development of the electromagnetic telegraph.

And finally, what about Charles Morrison of Scotland in 1753 writing in *The Scot's Magazine*:

> ***"It is well known to all who are conversant in electrical experiments that the electric power may be propagated along a small wire, from one place to another, without being sensibly abated by the length of its progress; let, then, a set of wires equal in number to the letters of the alphabet be extended horizontally between two given places parallel to each other and each of them about an inch distant from that next to it. At every twenty yards' end let them be fixed in glass or jeweler's cement at some firm body, both to prevent them from touching the earth, or from another non-electric, and from breaking from their own gravity."***

(Was this the first recorded thought of an insulator some 257 years ago?)

The electric telegraph grew from advances in electrical science, especially during the first forty years of the 19th Century. The discoveries of galvanic electricity by Luigi Galvani of Italy in the late 1770's, the electric battery by Alessandro Volta in 1799, research in electromagnetism by Hans Christian Oersted, Andre Marie Ampere, Joseph Henry, and Michael Faraday during the 1820's and 1830's all contributed to the discovery of the electric telegraph. These discoveries also propelled the advent of nearly instantaneous long-distance communication. During the 1830's the American painter and inventor, Samuel Finley Breese Morse, developed the recording electric telegraph. His contraption

used an electromagnet to record dots and dashes (Morse Code) onto a moving strip of paper. During the mid-1840's, telegraph operators began receiving messages by sound listening to the clicks of the electromagnet using what was called a key and sounder. Electric telegraph lines opened in England around 1836. It wasn't until 1844 that telegraph lines first opened in the U.S. As described above, men thought about such wonders long before technology and innovation permitted these ideas to come to fruition (Calvert, J.B., Troy, NY. May 2004).

The idea of a working electric telegraph and the need for some type of insulator has been around since the early 1700's. The first serious experiments to use a form of electricity were those of the static electricity attempts in Europe around 1726. These failed due to insufficient transmission of high voltages and the weakness of the effects produced. In America (or at that time, the American Colonies) in 1748, Benjamin Franklin, like many of the others experimenting, was using Leyden jar static electricity in experiments. He strung a wire across the Schuylkill River in Philadelphia at one point and used this method to ignite alcohol flares on both sides simultaneously. It was a crowd pleaser, but not much more.

Harrison Gray Dyar of New York in 1828 set up an experimental line around a race track using static electricity produced by friction, bare iron wires and glass insulators of some sort. His message was to be chemically recorded by hand on damp litmus paper. Due to leakage, his experiment failed, and really had no effect on future developments. Similar experiments continued in America as well as Europe for the next 50-plus years. Some of these efforts required as many as 76 wires and proved not only ineffective, but would have been totally impractical to construct had they been successful.

This brief history leaves out an enormous amount of information on the development of the electric telegraph and threadless manufacturers and suppliers. Please refer to the endnotes for sources if you would like more detailed information. My purpose here is to share what I've learned in a sort of meta-analysis of the writings of several researchers, collectors, old publications, and online resources to bring those interested in threadless more information on the development of the CD 731 while giving readers a basic understanding of the development of the electric telegraph and insulators in general. The credit goes to those in my *Acknowledgments.* My real contribution is the characteristics of different CD 731 molds and keeping the discussion on bogus 731's an ongoing conversation.

Timeline 1837-1865

The timeline begins with Samuel F.B. Morse and his successful bid to create a working electromagnetic recording telegraph. He actually began work on his experiments with the telegraph in 1832, but it was not until late1836 that he had perfected it to the point of being able to present it effectively. Please note that Morse was the first *commercially successful* inventor of the electric telegraph in America. Many *technically* successful attempts preceded him. His was not the first telegraph, not the first electromagnetic telegraph, nor even the first recording telegraph, but his was a huge financial success for his patentees (Calvert, J.B., May 2004). It also paved the way for a worldwide telegraph phenomenon that ensued for the next decade. It represented the birth of commercially viable telecommunications in America and most importantly for us, the birth of insulators. Thank you, Sam.

1837 - First telegraph demonstration by Samuel F.B. Morse at the University of New York. This demonstration failed. Observed by Alfred Vail, he made improvements for Morse. Partnership formed among Morse, Leonard Gale (scientist used for title only), and Vail (who invented and who was never credited for, the code and instruments used by Morse). All (along with F.O.J. Smith and Amos Kendall) eventually became the Morse Patentees.

1838 - Morse goes to Washington DC to demonstrate his telegraph to President Van Buren and Congress. He asks Congress for $30,000 to construct an experimental line between Washington DC and Baltimore, Maryland -- about 44 miles. He is denied funding.

1839 - Englishmen Cooke and Wheatstone develop a working needle telegraph claiming it as an 'improvement of the electric telegraph'. Both Morse and Cooke/ Wheatstone created improvements on the electric telegraph. The Morse followers claimed for him all originality and priority disregarding decades of earlier development by others and soon, Morse believed it true as well. This 'unseemly and excessive pretense' was carried forward by the descendants of Morse.

1843 - Morse continued to experiment and Congress finally passed a bill to appropriate $30,000 to build the line between Washington and Baltimore, thanks to the assistance of Morse' newest partner, F.O.J. (Fog) Smith. Smith was a Representative from Maine, chair of the Congressional committee observing Morse's demonstration, and a bit of a scoundrel. President Tyler signs the bill. Ezra Cornell is retained by Smith to lay a lead-encased underground cable and an agreement with the Baltimore and Ohio Railroad is reached to use their right-of-way. By the end of 1843, half of the $30,000 appropriation has been spent on laying this underground cable and it reaches from Baltimore to Relay, MD. Work is suspended when it is discovered that the wire insulation (lead sheathing) was faulty.

1844 - A new plan to string the wires between wooden poles suspended high above the ground is devised and construction begins that spring. A primary challenge is how to insulate the wires from the poles. Cornell devises a plan to sandwich the wires at each pole between two sheets of plate glass by wrapping the wire in cotton thread, saturating it with a solution of asphaltum, beeswax, rosin and linseed oil. This unit would then be inserted into a notch in the cross-arm. A piece of wood could then be nailed over this glass sandwich and another coat of the solution applied to help hold the "insulator" in place. This is the year of commercial success for the Morse Patentees. Completed on or about May 22, 1844, we are all familiar with the now historic message "What hath God wrought?" sent between Baltimore and Washington on May 24, 1844. Morse sent the message from Washington and Alfred Vail received and sent it back from Baltimore. Did you know that the composer of this message was the daughter of the then head of the U.S. Patent Office and her name was Annie G. Ellsworth?

1845 - Continuing struggles with insulation issues lead to the creation of the "glass bureau knob" style insulator (Pope, F.L., New York, NY. September 1871). This improved insulator was conceived by Cornell and would be used on the proposed New York to Philadelphia line. This line would be constructed under the auspices of the nation's first private telegraph company -- the Magnetic Telegraph Company. It would be granted incorporation by the Maryland legislature in 1845. This route from Philadelphia to New York had many obstacles, including how to cross the North River to New York City, and challenges slowed progress on construction. Confronting rivers usually meant unsuccessful attempts at underwater cables and the temporary use of messengers or carrier pigeons. Glass bureau knob insulators, of which only a couple are known to be in collector's hands, are considered the first pin-type insulator (CD 780).

1846 - Various glass block type insulators come into use. Widely used into the 1850's. The Little insulator is developed in England by George Little. This glass hat style is large and has a single or double wire groove ridge and an umbrella or saucer-like skirt. Proves very effective at getting water away from the wire. The Little design is similar to the CD 735 through CD 738 styles.

1847 - Ezra Cornell is credited with the adoption of the Little insulator in America. Used extensively in many design variations (CD 734-742.3). A former Cleveland, Ohio portrait artist, Jeptha Wade, began connecting Detroit and Jackson, Michigan with a telegraph line. This project eventually formed the Western Union Telegraph Company in 1856.

1849 - First use of the suspended hook insulator. Iron hooks shaped like ram's horns and set in glass, rubber or paraffin encased in a metal cylinder (typically). These units were attached to poles, cross-arms or wooden blocks. Wire was then suspended along its course hanging from the hooks. Prevalent and used extensively until about 1869. J.J. Speed invents the wood-covered glass insulator (McDougald, 1991).

1850 - William M. Swain (formerly editor of The Philadelphia Public Ledger) becomes president of the Magnetic Telegraph Company line between New York and Washington DC, designs what he calls '...the insulator of the future'. Swain designs what becomes referred to as the "egg" insulator (CD 701-701.8). He also calls it the '...double cone' (Pope, F.L., September, 1871). People claim it to be stronger and more durable and dependable than the umbrella style hats. Newsmen like Swain had great interest in the success of the telegraph and invested in them as well as became engaged in aspects of its progress, like his designing of the egg style insulator.

1855 - Amasa Stone of Philadelphia, PA, (this does not appear to be the same Amasa Stone of Cleveland who designed railroad bridges). He receives a patent on August 7 for a threaded pin cavity for

glass insulators (Patent No. 13,402), preceding Cauvet's patent by ten years. Stone dies before he is able to apply his invention. Stone's patent shows only two threads and is for use on a similarly threaded iron pin. The insulator would have required only a half or two-thirds turn and the result may have been only slightly better in service than a threadless application.

1860 - During the late 1850's and well into the early 1860's, now captain of industry, Jeptha Wade, adopts and modifies, designs, and produces the wood-covered Wade insulator first conceived by J.J. Speed in 1849. Ideal for prairie and wilderness applications because the glass insert is protected. Used extensively on lines from coast to coast. Smaller styles are used in Canada (CD 721-725). Smaller hat styles are developed for ease of transport into wilderness areas and may have incidentally improved insulation by their reduction in size (McDougald, 1991). These will continue to be produced into the mid-1870's (CD 734-735.3).

1861 - The Pacific Telegraph Act of 1860 called for the facilitation of communication between the east and west coasts of the United States of America. Hiram Sibley of the Western Union Telegraph Company won the contract. In 1861, Benjamin Franklin Ficklin joined Hiram Sibley in helping to form the Pacific Telegraph Company of Nebraska. At the same time, Jeptha Wade was asked by Hiram Sibley to consolidate smaller telegraph companies in California. While the Pacific Telegraph Company built west from Omaha, Nebraska, the Overland Telegraph Company of California was thus formed and built east from Carson City, Nevada. With their connection in Salt Lake City, Utah on October 24, 1861, the final link between the east and west coasts of the United States of America was made by telegraph. The First Transcontinental Telegraph led to the immediate demise of the eighteen-month-old Pony Express. The Pacific Telegraph Company and Overland Telegraph Company of California were eventually absorbed into the Western Union Telegraph Company (Casale, John, May 2004). The 731 was used on all of these lines as was the 735 Mulford & Biddle (McDougald, 1991).

1864 – The Western Union Telegraph Company with concern about Cyrus Field’s failure to connect the U.S.A. with Europe via a telegraph cable under the Atlantic Ocean decided to try another path. Their alternative was to connect San Francisco with Moscow by building an overland line from near Vancouver, British Columbia, up through Russian America (Alaska), under the Bering Strait into Russia, then overland again to Moscow. Russia committed to do their part and this project became known as the Collins Overland Telegraph Expedition, but its official name was the Western Union Russian Extension Company. Most of the Collins Line went through uncharted wilderness. Due to the rough wilderness terrain that had to be endured during construction of the Collins Line, mostly 735’s were used. Later, in 1867, the project was abandoned when Cyrus Field’s Atlantic cable was finally successful. (Casale, John, May 2004)

1865 - This historical timeline ends in this pivotal year in history: the end of the Civil War has come, improved threads are invented, and M.L. Wood creates the "Compromise" style glass insulator. As reported by Franklin L. Pope, the General Superintendent of the U.S. Telegraph Company, Merritt L. Wood is credited with the design of what is now known as the CD 731. It is a cross between two popular designs -- the egg and the umbrella (or hat) styles (Pope, F.L., September 1871). The 731 may have come sometime just after the concave skirt egg CD 701.8, also called the "National Road Egg", since it has been found only along the route (now U.S. Route 40) of that original wagon road that stretched east and west across Maryland, Pennsylvania, West Virginia, Ohio, Indiana, and Illinois (McDougald, 1991). (Timeline primary source: Calvert, J.B., May 2004)

Also in 1865, Louis A. Cauvet forever changes the future of pin-type insulator design with the invention of the threaded pinhole. Cauvet's patent is for a fully threaded pinhole requiring the insulator to be turned several times to be secured on a threaded pin. It is likely Cauvet was aware of Stone's 1855 patent and made improvements upon it allowing for a new patent. We may never know for sure if he was aware of Stone's invention or why it took ten years even if he was. Cauvet's patent date shows up on several threaded and at least two threadless (728.4 and 731) insulator styles with the date July 25,1865.

An interesting crossover appears about this time: the CD 731 and the threaded version, CD 131. One speculates that re-worked threadless molds could have easily become what we now call CD 131. Molds with no embossing could have been engraved with the Brookfield and sometimes along with the scarcer L.G.Tillotson name added and then a threaded plunger may have been used to update the insulator---all

done to extend mold life and reduce production costs. At least one known 131 style is unembossed and MLOD. It also looks identical to unembossed MLOD 731's, yet not an exact match to any embossed 131's I've seen. One final note on this crossover period, Pope reports that the CD 127 was designed and used around the 1870-71 period by Western Union to replace the 731 style (Pope, F.L., September 1871).

Threadless production continued into the mid-1870's probably due to the expense of production changeovers. I can only guess that threadless insulators remained in service until it was necessary to replace them even well into the production of threaded glass. At that time, they were replaced with the newer threaded pins and glass. There is at least one report that a 731 was found on a threaded pin on a Georgia railroad still in service and within the last twenty years or so.

A Journey

Imagine that the date is now 1866 and you're going on a walk along the Union Pacific Railroad (UPRR) in southeastern Wyoming. It's a clear, dry, and almost hot June afternoon with a slight breeze occasionally whipping up a tiny whirlwind near the railroad bed. Blooming spring flowers in purple and yellow sparsely dot the landscape. The smell of sagebrush is wafting in the breeze. Only three hundred yards from the tracks, coming out of a rolling swale, are a dozen Pronghorn antelope occasionally looking up sharply and rotating their large ears toward you. You freeze, and they continue to graze, flicking deer flies off their ears and tails satisfied that you're not a threat. Leading your horse alongside the track, you begin your slow walk again looking up at the azure, cloudless sky.

While looking up, you notice piercing rays from the bright sun are shining through a glass object on one of the telegraph poles on the north side of the right-of-way. It has a wire attached to it. You take out your spyglass and have a look, careful not to catch the rays directly. It's kind of a small, hat-shaped glass object. The color appears to be a light, powdery blue. You stretch your spyglass and zoom in a little adjusting the focus. There's writing on the side of the glass. Looks like "M-u-l-f-o-r-d & B-i-d-d-l-e". You walk a little to your right. There's something else written on the back. Looks like "U-P-R-R". Not sure about Mulford & Biddle, but UPRR must stand for Union Pacific Railroad, you think. Hmm...you wonder if Mulford & Biddle are guys who own the railroad or maybe the telegraph company. You glance across the tracks just as a Western lizard scurries for cover in a crevice in one of the ties. There are poles on the south side of the track, too. You see another glass object, this time glowing with the sun behind you now. The color is a little more greenish than the other one, like the bottle your daddy's liver medicine comes in. The shape is also different. It looks larger, has a bit of an angled top, sort of flat on top, with a groove around the middle -- similar to the other one -- and kind of a skirt with sides that curve in below that groove. You raise the spyglass. No writing on this one. Wait. There is something as you walk around to the side. Looks like a different kind of lettering. Not really a script, but certainly not like the one on the other side of the tracks. Looks like "S.-M-c-K-e-e-&-Co". You don't know what that means either. Maybe a man's name, or the name of some company. You amble on down toward the next pole to see what's on that one. As you walk, you wonder what these things are for. Maybe they insulate the telegraph wire for some reason. Wonder if they call them insulators? Probably not. Must be connectors or some other name. You get to the next pole and find another glass object very similar to the last one. Same shape. Color is different. Looks like a dark green color. The spyglass reveals no lettering at all on this one. Wonder why? Oh well, you pick up a good size rock and look intently at this tempting glass target perched way up there on the side of the pole. Seems to be asking you --- taunting you --- to try and hit it. But, for some reason, after staring at the beautiful glass glistening in the hot sun, you drop the rock and move on. You've got a stray steer out here somewhere on the prairie and your horse is getting thirsty.

Back to the Present

The above stroll along the UPRR may have been what you could have encountered on many lines throughout the West for several years just after the Civil War. Millions of 731's (and 735's) were in use all over the western states. The 731 was used throughout the central and eastern states as well. The McKee's were used extensively on the UPRR and Transcontinental lines (along with the unembossed 731's). A mint McKee was even recently found in Indiana still lying on top of the ground next to a railroad bed. The arc embossed Tillotsons were heavily used in the northeastern states and on up into Canada. A number of Tillotsons have been found in Maine and down the east coast. The beautiful sapphire blue Tillotson 731 has turned up on at least two occasions on the east coast, one fairly recently. The northeast was also the site of discovery of a mustard-olive-amber unembossed 731 about seven years ago. I wish I had one of either of these in my display to show you…

Much of what is known or assumed about 731's is speculation, though some researchers who collect threadless have connected some of the dots. For example, long a mystery, it is now fairly well established that the 731 with the "M" or "W" on the dome top is most likely an "M" referencing "Modes" and the maker was probably Beaver Falls Glass Company in Beaver Falls, PA. William Modes was their founder. The glass quality is very similar to that found in other Beaver Falls products (especially the CD 132.2 Paisley's) and the insulator has a fuller dome and is bulkier in general than other 731's. There are some unembossed 731's with these same glass qualities and these, too, are considered Beaver Falls products. They also have an unmistakable texture to the glass surface.

Embossed 731's discovered to date include Brookfield, Tillotson, S.McKee & Co., and the "M" dome embossed style. Who knows what may turn up in the future as we treasure hunters keep looking. Maybe that's why we've seen some suspect 731's enter the hobby over the years.

Bogus? (or, Compromise vs. Compromised)

The 731 concave skirt signal---probably first called the "Compromise" style by Franklin L. Pope in 1871---must have been a fairly durable design just as M. L. Wood had predicted in 1865. They were produced in huge quantities for many years. The market was booming by 1865 with over 83,000 miles of telegraph lines around the country. That's three and a third times around the Earth at the equator, which is a lot of wire and insulators! Today, there are many 731's in collections that look brand new. A couple in my display look like they came right out of the barrel of sawdust. It's fun to speculate how so many survived in such good condition, but part of the reason has to be their durability. It may also be why the most recent suspected bogus 731's, which always seem to look new, have easily entered the hobby.

Maybe the commonality was a factor that has led some with minimal or no scruples to reproduce the 731. It certainly was not the value since current prices on aquas and blues on unembossed styles range in the $150-$200 (VNM) category. Counterfeiters never make ones, fives, or tens. You would think somebody making fake threadless would focus more on, say, CD 788 slashtops or CD 790 teapots. Nevertheless, we have seen questionable 731's enter the hobby periodically. A large group of different threadless CD's (including 731's) and some known CD's and some not, surfaced in Florida several years ago. All were fairly good copies, but in unusual colors and therefore raising immediate red flags among collectors. As with many reproductions, the glass color and quality tended to give away their recent manufacture, as did some CD's like 719... I would love to hear different theories on why anyone would reproduce 731's. The easy answer is a quick buck, but what if market prices overall would somehow be affected when these get into the market? Let me know your thoughts on this: *threadless@cinci.rr.com*

More recently, a 731 with a narrow dome and the typical Tillotson embossed in an arc on the crown entered the hobby. Only it's not typical. Both "O's" in Tillotson are noticeably smaller than the other letters. And the glass, usually black or very dark cobalt and other dark colors, looks like it was poured yesterday. Others of these now called "pointy (or "narrow") domes" are bubble-infused olive green like the one in my display. Some have an "art glass" quality about them that is easy to spot if you've handled enough old glass. I'm not sure of the official NIA stance on these, but I'll personally go on record officially right here -- my humble opinion is that these are recent reproductions. No evidence, of course, other than circumstantial, so that's just my opinion.

Then, most recently, some 731's have entered the hobby that are raising real concern. They are made so well that long-time threadless collectors and general collectors who have handled thousands of glass insulators have difficulty telling the difference. I am not going into why this is being done (or even if it is being done) anymore than I already have other than to say that the NIA's unofficial stance on these suspected bogus 731's is 'inconclusive'. I can't say that I blame them.

After all, there is no proof that these pieces are bogus. Nobody has been caught in their garage sticking a threadless plunger into molten glass in a 731 mold or having boxes and boxes of these on hand. But compare them side-by-side with known authentic 731's and you will see a difference -- in shape and glass quality. I've done this in pictures for you at the end of this paper.

These recent 731's do have some characteristics that are consistent and different from all of the known authentic 731's. These include a very subtle curvature of the upper and lower wire groove ridges. Also, the base of the wire groove itself has about a quarter-inch flat spot rather than a smooth,

concave shape (or a V-cut shape like the McKee styles). Other than these differences, the suspect 731's are very close to the embossed 731 Tillotson mold style, easily fooling even some of the most seasoned threadless collectors. But, guess what, I've seen a lot of 731's the past several years and I've yet to see an unembossed 731 that is a perfect match to the known authentic embossed Tillotson. If you have one, I would love to see it.

Glass quality, color, even some black and/or white flecks in the glass and light surface cracks --- especially inside the skirt --- give these suspect 731's even more attributes to make it difficult to determine their authenticity. I hope this paper and my display help you better understand the differences.

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Stop by my sales table and we can discuss 731's further. I am always looking for new information and styles I haven't seen. Feel free to bring your 731's for comparison. Not interested in 731's? Stop by and chat about insulators in general!

The CD 731 pictured left is the standard Tillotson with Tillotson arc embossed on the dome. It is MLOD and has the classic shape associated with the authentic CD 731 Tillotson. All letters are the same size.

The CD 731 here is what has been referred to in the hobby as a "pointy" or "narrow" dome. Note the shape of the dome compared to the authentic and suspect 731's pictured. Colors of these are typically dark and usually full of character (swirls, bubbles, etc.) like this one. Also, they have the arc embossed "Tillotson" on the dome, but the two O's in Tillotson are not the same size as the other letters---they are smaller. Some of these have surfaced as unembossed, but on close inspection they show distinct signs of alteration, such as grinding and buffing. The shape of the wire groove ridges is identical to those of the other suspect 731 on this page.

The CD 731 above is the shape that has recently appeared and one that I consider suspect. No embossing. MLOD. Note the rounded upper and lower wire ridges and the flat area at the base of the wire groove. It should be concave like the Tillotson above. NOT a pointy dome.

A final note on the suspect 731's like the lighter green one on the previous page---they have rarely appeared with damage of any kind. I think they will eventually, but for now, just like those in my display, they are typically mint. Pretty rare for an insulator that's supposedly been around for over 150 years. Some people will say maybe they were found still packed and unused---just like the story with the pointy domes. Maybe. But packed how long ago? Look closely before you buy.

Below I have listed the characteristics of authentic 731's in my collection. This list includes the different mold styles and sizes that I have. There are more out there for sure. I would like to hear from you if you have any that are radically different than what I've listed. Those in my collection have a variety of colors and glass impurities which I am not listing since these wonderful characteristics make great collector interest, but have little to do with real substance in manufacturing differences. What I have noticed is that sizes do not vary widely in the 731 since producers stayed pretty close to spec. Slumping of the glass can affect size and shape to some extent so I've allowed for this when I measured the pieces.

Mold Characteristics of My 731's

Mold Style

1. **Button Mold**---has a raised area on top about one inch in diameter. The mold lines terminate on both sides of this area indicating a three piece mold. Most common style in the unembossed 731's. Some have vertical lines texturing the dome and skirt to varying degrees, but this is not by design. Seems to be a mold defect or trait.

2. **MLOD**---the mold line over dome style. Two piece mold. Found in all embossed Tillotson styles and some unembossed styles. Less common than Button Mold style.

3. **Dome Circle**---related to Button Mold, but just a circle and not raised at all. Unembossed.

4. **Flat Dome**---has a very flat dome top. MLOD. Unembossed. Resembles, but doesn't match, CD 131 embossed pieces.

Mold Shape

1. **Tillotson-**---arc embossed across the dome. All letters identical in size. Strong mold seam, especially in wire groove. Concave at bottom of wire groove. Taller dome only somewhat more narrow toward top than most other styles. Wire ridges are not perfectly rounded, but have the hint of an edge to them. I've never seen an unembossed 731 that matches this shape exactly. Nice variety of colors. MLOD. Most likely a Brookfield product.

2. **S. McKee & Co.**---embossed straight across mid-skirt. Some styles have larger and/or a bit more script-like lettering. Some have different period locations, some have no periods. Only three colors observed: Shades of "McKee" blue, aqua, and green (teal) aqua. Shape is distinctly different than Tillotsons. Shorter, squattier, larger wire groove that has a "V" shape. Wire ridges are sharper with more distinct edges. Although slumping can affect size and wire groove shape, embossed styles seem very consistent while unembossed styles vary somewhat. Both Button and Circle molds noted. Probably another Brookfield product.

3. **Stoddard**---unembossed style usually in dark amber or dark olive colors. Both MLOD and Circle Mold styles seen. Thinner wire ridges and more narrow wire groove than even the Tillotson style. Somewhat flatter dome, but not a Flat Dome. Most likely a product of the New Granite Glass Works, Stoddard, NH, 1861-1871.

4. **Modes**---a Beaver Falls Glassworks product. Bulkier and heavier style with a fuller dome shape. Has a circle on the dome top with a serif style letter "M" embossed. Recently determined to stand for Modes after William Modes, president of Beaver Falls Glassworks operating from 1869 to 1879. Glass quality is very similar to other Beaver Falls products such as CD 132.2 Paisley styles. Most noticeable is a somewhat orange peel texture to the glass surface. Greens, blues, aquas.

Sizes

1. **Tallest**---Tillotson at 4 inches.
2. **Shortest**---Unembossed Button Mold at 3 5/8 inches.
3. **Widest**---Beaver Falls Glassworks "M" at 3 inches across base.
4. **Narrowest**---several unembossed styles---about half at 2 7/8 inches and half at 2 5/8 inches. NOTE: all styles in my collection have the standard 1" pinhole.

Glass Houses That Made Insulators

David Whitten developed a list online of glass factories that produced insulators. Below I've used his work to create a list of those factories operating during the dates when 731's were manufactured. **This does not mean that these houses actually produced 731s**, but the dates, the geography, the glass made by these factories, and the fact that many produced threadless insulators, all point to the possibility. As always, please let me know of any updates needed to this information. Remember, some of these companies could have changed names/locations in later years. For more information on some of these glass houses, see McDougald's two-volume set and Klingensmith's opening article on threadless in volume one.

I'm only considering possible 731 production years. Since the 731 was first conceived by M.L.Wood as a re-design of the standard egg insulator of the period in 1865, and assuming it was put into production that same year (Cauvet's patent year for threads), my guess is that 731's were produced primarily from 1865-1872 or so and possibly into 1875. I would think that to have so many produced, several glass houses must have been making them:

1. Beaver Falls Glassworks, Beaver Falls, PA 1869-c.1879
2. Boston & Sandwich Glass Co., Cambridge, MA 1825-1888
3. Brookfield, Brooklyn, NY 1864-1906
4. Hemingray, Covington, KY 1852-1890
5. Kearns & Co., Zanesville, OH 1864-1886
6. Louisville Glass Works, Louisville, KY 1855-1873
7. Lancaster Glass Works, Lancaster, NY 1849-c.1908
8. Massachusetts Glass Works (precursor to Boston Bottle Works), Boston, MA 1867-1871
9. Mt. Pleasant Glass Works, Mt. Pleasant, NY 1844-c.1870
10. New England Glass Co., Cambridge, MA 1818-1888 (made insulators 1846-1850 for Ezra Cornell)
11. New Granite Glass Works, Stoddard, NH 1861-1871
12. Pacific Glass Works, San Francisco, CA 1862-1876 (possible maker of EC&M's)
13. E. Wormser & Co., Pittsburgh, PA 1854-1875 (source of unembossed CD 120's &133.4 bullets---could have produced unembossed 731's)
14. S.McKee & Co., Pittsburgh, PA c.1865-1875 for 731's (see Acknowledgments for source)

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Acknowledgments

Research on 731's is a difficult challenge since few, if any, records are available. The manufacturer of many remains a mystery in terms of who produced them and exactly when. Patent records seem non-existent on most as well. Hence, my focus on the history leading up to their development and listing characteristics only on those in my collection. I am constantly searching for any information on 731's and, of course, for any 731's. If you have either, feel free to contact me. I'm in the Crown Jewels Directory, an NIA member, and a member of ICON.

I would like to thank some people whose writings and conversations were very helpful in compiling this "Incomplete History and Timeline of the Electric Telegraph and the CD 731". The McDougald's *Insulators: A History of North American Glass Pintype Insulators -- Volume 1 (1991)* was, as always, a very useful resource. That volume begins with an introduction titled "Glass Insulators -- the Beginnings" by Ray Klingensmith and this is a terrific historical resource. The 2007 Price Guide was also a helpful resource. Like the McDougalds, Ray's contributions to this hobby are enormous, especially his knowledge of threadless. His auction catalogues were a very good resource as well. Information on glass houses that made insulators came from David Whitten's online "Glass Factories That Made Insulators". He states that some of the information may not be fully accurate, but it gives good basic info on manufacturers. I list only those that may have produced 731's. Whitten's website: www.myinsulators.com/glass-factories

Also helpful and insightful were the many conversations about 731's and the opportunity to trade for or purchase them for the display. Just a few of those always willing to share their knowledge include Doug MacGillvary, Gary Kline, Ray Klingensmith, John McDougald, Graham Barnes, Paul Greaves, Keith Roloson, Ross Baird, Doug Williams, Howard Banks, Jim Peach, Jim White, and Tom Katonak. I would also like to thank those collectors who have found themselves owning what they thought to be an authentic 731 that turned out to be suspect---and allowing me to purchase it for my educational display, sometimes at a loss for them. They shall remain anonymous.

A special thanks to Glenn Drummond for some editorial help on the 2007 paper and to Paul Greaves for this Revision. Not only have I known some of these guys off and on for 30-plus years, they continue to help and support my efforts in my hobby specialty by keeping their eyes open for both suspect and authentic 731's and that is much appreciated.

Some articles in *Crown Jewels* were also quite helpful (found at: www.cjow.com in the Archives)
Klingensmith, Ray. Crown Jewels of the Wire, *Threadless Corner.* February 1980.
Green, Mike. Crown Jewels of the Wire, *The Iron Horse and the Talking Wire.* April 2003.

Most online sources were too numerous to mention in their entirety, but most helpful and a source I used so much throughout this paper that citing it each time would have made the paper too long was this: J. B. Calvert, *The Electromagnetic Telegraph*, April 7, 2000 (revised May 2004). This paper is in 27 sections with section 11 dedicated to telegraph insulators. It's a great and detailed history of not only the Morse telegraph, but the House telegraph, the Bain and Vail alphabets, and an extensive bibliography spanning 1842-1999: <http://www.du.edu/~jcalvert/tel/morse/morse.htm#C>

The online source at: <http://www.tscnet.com> was very informative on John Baptista Porta and his *Natural Magick*.

Other online sources:
www.telegraph-history.org (about Frank L. Pope and the Western Union Telegraph Co. by John Casale of Troy, NY)
www.cjow.com (archives)
www.reference.insulators.info/publications (The Insulator Gazette)
www.profilesintime.blogspot.com/2007/h-sellers-mckee.html (history of McKee brothers and their glass houses)

F.L. Pope. *The Telegrapher,* Notes on the Glass Insulator. (New York, NY) September 30, 1871.

ICON and especially the NIA websites were extremely helpful due to their educational content and ease of access:
www.insulators.info
www.nia.org

Rick Jones NIA # 201
NIA Philanthropic Advisor
Mid-Ohio Show, Springfield, Ohio

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