

# **A study of EC&Ms**

## **with special attention given to the characteristics of the “Skirt Embossed Group”**

### **Background:**

EC&M insulators have been known in the hobby since the earliest days of collecting. Until the early 1990s they have been found in several specific mold varieties (I'll call them the “traditional” molds, just to make it easier to refer to them in this report). Then in the early 1990s, a quantity of EC&Ms were introduced to the hobby that included at least one completely new mold style that had not been seen up to that point... that was embossed on the skirt rather than the dome. Also included in this group were some examples that looked to be made in the “traditional” molds. The varieties in this group included rare colors, including a few not seen before that point. It is this group that this study is primarily focused on, referred to here as the “Skirt Embossed Group” even though not all of them actually have the embossing on the skirt. I will attempt to record what is known about them, and examine them in microscopic detail. At this point, I know of no foolproof and reliable test that will authenticate or disprove them, so in the end the reader will have to come to his/her own conclusions. As time goes on and research continues into finding a test for determining the age of glass, perhaps that new data can be used to come to a clearer conclusion.

Shortly after this new group of EC&Ms was introduced to the hobby, yet more new EC&Ms started showing up in yet more mold styles that were different than the traditional ones, and different than the skirt embossed group. These included some units that were in truly outrageous colors. As time went on, these later specimens were eventually proved to be forgeries, and of modern production. I will not include information on these items in this report, as these items do not appear to be related in any way to the ones otherwise described here.

### **Part 1: A study of traditional EC&M insulators**

#### **What is known about the EC&M company:**

It will be useful to start by very briefly summarizing some of what is known about the EC&M company. The company was formed in 1870, but judging by field evidence from actual telegraph lines, EC&M did not sell its own insulators until approximately 1873 or 1874. It is most likely that EC&M never made their own insulators at all, but rather contracted with a local glassworks to have them made. This continued until 1878 when the company underwent some sort of change, and the California Electrical Works was formed. Exactly what this change was is still the subject of some debate and research, but it is interesting to note that many of the same people were involved in both companies, and they even shared some of the same business locations. It is also interesting to note that the EC&M company did not go out of existence, as they show up in various historical references as late as the early 1890s.

It would seem that the bulk of EC&M insulator use was in the years from 1874 to 1878, but at least two lines used them later; namely, on the Aurora to Candelaria, NV and on the Nevada Central lines in 1880 (CJ, April 2000, page 23 and various collectors, personal communication). Generally speaking though, in the years after 1878 California Electrical Works insulators were preferred over EC&Ms for most lines built in the far west; that is, until other insulator companies became increasingly popular (especially Western Union types made by Brookfield).

It has often been asked which glassworks actually made the EC&M insulators... the answer is almost certainly either the Pacific Glass Works or the San Francisco Glass Works. In June of 1876 the two companies were consolidated as the San Francisco and Pacific Glass Works, so the question becomes moot. I have found much interesting historical information on these glassworks, but those details are best left for another work.

#### **The traditional mold types:**

EC&M insulators have been sub-categorized since the early days of the hobby... specifically as to “mold types”. This was done based on physical features, and are commonly referred to as [a letter from A through H] – Molds. However, more careful examination reveals that several of these are really stages in the reworking of a smaller number of molds, and in the case of the “B” mold, there are actually two similar versions representing two physical molds.

#### **E-F-G-H:**

The first mold is represented by the letters E, F, G, and H. When first made, this mold was embossed upside-down, had a dot on the front skirt, and had a base formed differently than any subsequent mold type. This was probably the first mold made, and the unique base was a result of the company's first figuring out how to mold insulators efficiently. The few specimens I have examined personally appear to have had the base formed by squeezing hot glass up out of the space between the outer mold and the threaded plunger... that is, the plunger was of much smaller diameter than the insulator, so the mold really didn't form the base at all. It is not obvious how there would be much leeway to adapt to varying amounts of glass introduced into the mold... if too much glass was squeezed up out of the base area, it could deform, and indeed one specimen does show this feature. (It is possible that other specimens show differing characteristics.) This is referred to as the “E” mold. It is interesting to note that every specimen I have seen or heard of is a very similar green color, as if only one batch of them was made. (I have been told that there

are two distinct green shades, but have not seen enough of them to come to any personal conclusions. There is also a listing for “aqua” but I have never seen or heard of it’s actual existence.) In any case, they remain quite rare, supporting the idea of very limited production.

This mold was soon re-worked by adding an “extension” to increase the height of the mold, changing the plunger so it covered the base area, and correcting the embossing by covering the upside-down embossing with a metal plate and re-embossing on the opposite mold half. This caused the dot to appear on the rear of the insulator. The extension allowed the height of the insulator to vary as more or less glass was introduced into the mold, without overflowing the sides. The changes to the plunger gave the base more consistency in form, but also led to a sharp edge around the lower outside edge where the plunger met the mold surface. This feature remained constant for all subsequent mold types. This mold version is designated as the “F” mold.

Later, the mold was re-worked to make the insulator more cylindrical (the E and F molds had a more flared skirt). It is not known why this change was made; perhaps it allowed the height to vary even more by allowing the plunger to extend deeper into the mold if the amount of glass was small? In any case, this is the “G” mold.

As this mold wore over time, a chunk of metal broke off or was gouged out of the wire groove, in the front under the embossing. There were other similar damages to the mold in the wire groove at each mold line. This left raised “chunks” of glass in the wire groove. For some reason, this was designated as the “H” mold in the past, but it really isn’t a different mold at all, even in the sense of being re-worked. Evidence from lines indicates that this latest variation was being used in 1878, and again in 1880.

I won’t need to refer to this mold series much more in this report, as they are clearly not related to the skirt embossed group.

#### **A-C-D:**

The next mold was also made with a flared skirt, but no dot on the skirt. It has a normal base similar to later EC&M molds and correct embossing, so it was probably made a little later than mold type “E”. It also has a somewhat more rounded dome edge. This is mold type “A”. Colors found in various specimens would seem to indicate that this mold was used at the same time as the “F” mold, so it probably dates from around 1874.

This mold was also re-worked at some point to be more cylindrical, and at that time a dot was added to the front skirt. The reason for the dot is a real mystery. During this re-work the diameter was increased slightly, and the dome acquired a more beveled appearing edge. The embossing was also re-engraved, on the same side as before. This version is referred to as the “C” mold. It is interesting to conjecture that this might have been done at the same time that the “F” mold was re-worked to the “G” mold. One additional detail... some “C” mold examples have a normal period after the E, while some have a very large bold period. For some reason, the period was deepened or made more bold at a certain point. It does allow for quick recognition of earlier “C” molds.

Still later this mold started to wear in the wire groove, and began to acquire damage leading to raised chunks of glass in the wire groove at the mold lines. An attempt was made to repair this damage by re-working the entire mold line area, leading to a unique mold line appearance. This is sometimes referred to as the “tin mold” because of the superficial similarity to the seam on a tin can. It appears as a secondary line running parallel to the actual mold seam, on each side of the mold line. This is referred to as the “D” mold. This mold continued to be used until 1878 or so, but does not show up on the 1880 lines.

The details that allowed connecting the A, C, and D molds into the stages of re-working one physical mold are expanded on in my article in the Summer 2008 issue of Drip Points.

#### **B (two of them):**

At some point in the company’s history, it was apparently decided that more molds were needed. It is not known exactly when this was, but I would estimate that it was approximately 1875 or 1876. Two more molds were made, both very similar in appearance. They are roughly cylindrical, with a more squared off dome edge, and with a dot on the back (more details on the dot characteristics will be given later). These two molds differ very slightly in embossing details, but are quite similar. The easiest way to tell the difference between the two is by looking at the dome top. One of them has a couple deep scratches near the mold line, leading to a distinctive raised “hash mark”. The other has a very generally raised area shaped kind of like a football aligned with the mold line (the other one is more flat). Both of these are referred to as “B” molds. These distinctive differences remain constant throughout the entire life of the molds... specimens made in both new and old molds show them. These molds were used until 1878, and again around 1880. I base the conclusion that the molds were actually used this late (and not simply old stock being sold) on the fact that the 1880 specimens show evidence of more extreme mold wear well in excess of the 1878 specimens. (The photo on the right shows the hash marks.)



#### **Possible explanation of the mold histories, and transition to the Cal. Elect. Works Insulators**

This is a complicated historical question, and fully exploring it will go beyond what I can reasonably do in this report. But some brief exploration here provides some insight that may be useful in evaluation how the Skirt Embossed Group might relate to the traditional molds in a historical sense.

As stated above, it would appear that the “E-F-G-H” and “A-C-D” molds were made near 1873, with the “E” mold perhaps being the earliest. The two “B” molds were apparently made around 1875 or 1876. The “H” and “B” molds were used until as late as 1880, while the “D” mold was apparently retired in 1878 (that is, I have never heard of one coming from one of the 1880 lines). It is curious that the Ridge Line used California Electrical Works insulators in 1879 while EC&Ms were used again on the 1880 lines. More research is needed to firmly establish a reliable timeline of insulator type usage, and to determine if both types were used simultaneously or not. In any case, EC&M insulator usage seems to have ceased for lines built after 1880.

### The “Dots”

I covered the issue of the “dots” on the skirts of most EC&M insulators in the Winter 2008 issue of Drip Points. I will repeat most of that material here, as it relates directly to what I will be examining in a later section on the EC&Ms in question.

One thing that has always been a bit mysterious to me is the presence of the large glass dot (or button) on the skirt of most EC&M insulators. This dot is present on all mold styles except the “A” mold. I still have not heard of a good explanation of why the dot was put there, or what function it might have served. I have heard (and come up with) a few possible ideas, but nothing seems very satisfying. In any case, the following observations can be made.

- The “A” mold has no dot. The mold was re-worked into the “C” mold, and when the re-work was done the dot was added to the front of the insulator. It appears to be made by removing some material from the mold in a way that resembles the tip of a drill bit, and perhaps that is how it was done. It is somewhat “cone shaped” when viewed from the side. The dot tends to be slightly oval in the horizontal dimension, and upon careful examination has concentric rings around the center. This dot shows little or no change as the mold was used, even as the mold was re-worked to the “D” mold and on to the end of its use.
- The “E” mold had the dot on the front also. The mold was re-worked to the “F” mold (when the upside down embossing was corrected) which left the dot on the now rear side of the insulator. This dot is more rounded in cross section and slightly irregular in appearance. When the mold was further re-worked to create what we call the “G” mold, the overall diameter of the insulator was increased enough to significantly reduce the height of the dot. But the dot was re-engraved so as to appear very similar to the “F” mold. It is somewhat more round though, with a little of the “concentric circular” lines seen on the “C” mold sometimes being visible. This stays substantially unchanged as the mold aged to what we call the “G” mold.
- The “B” molds are interesting. The dot is relatively rounded to irregular, but has a larger diameter circle surrounding it. This area between the outer circle and the inner dot is sometimes raised to various degrees, causing the dot to sometimes appear on a “pedestal”. After examining many examples of “B” molds looking at other indicators of mold wear, I have come to the conclusion that the pedestal height is related to the age of the mold. The dot was seemingly created in a different way for these molds, as if a deep hole was drilled out and then filled in with a softer metal. The dot was formed in the softer metal, and as the mold was used this material gradually wore down making the dot appear “higher” and on a pedestal as the mold aged. I have found examples with very tight mold lines and crisp embossing (and very well formed bases) that have the outer circular “pedestal” barely visible and flush with the overall skirt surface. Specimens made from extremely worn molds show a tall pedestal (or “squared off”) dot in cross section, and always show mold wear in other ways such as heavy raised mold lines and cruder bases. The following two photos show an early and late example made in the same “B” mold.



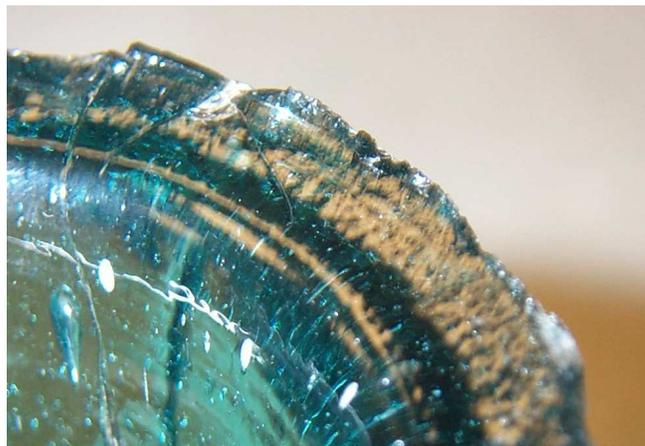
This variation in the wear features of the dot on “B” molds in particular can be used to approximately date a given specimen in relation to the lifetime of the mold. If we can establish the date of the first “B” mold usage, it would be useful in approximately dating other “B” mold examples. I have established that the most extreme “raised dot” examples were used on the 1880 Nevada lines (and possibly on other very late lines). Examples from the 1878 “Ridge line” are raised fairly high, but not as high as the 1880 line examples.

### Base details

The bases on nearly all EC&Ms have a distinctive characteristic of being sharp and often rough along the outside edge. This seems to be a result of the mold “plunger” that forms the pinhole and threads also being the same piece that forms the base. This part of the mold was inserted into the two mold halves that formed the outside of the insulator when the insulator was pressed. Thus, the seam that separates these pieces runs around the outside of the base edge. The mold was created to be very deep (leading to the possibility of some very tall EC&Ms). The height of each specific specimen was generally a function of how much glass was poured into the mold before plunging.

It appears that as the mold was used, the outside edge of the mold plunger would become worn, leading to a slightly rounded edge and slightly smaller diameter of the mold piece. This would lead to glass forcing its way into the crack and leaving a thin flange of glass extending down from the outside base edge. This was either broken off in use, or more likely (it seems), was trimmed off at the factory. This is why it is so common for EC&Ms to have chipping around the outside base edge. The photo at the right shows this outside edge of a typical EC&M.

It should be noted that this edge does vary amongst specimens. For example, I have seen specimens that seem to have been made when the molds were brand new, where this edge is virtually non-existent and the bases are finished quite nicely. This seems to be due to the mold pieces being new and tight-fitting, leaving no room for glass to force its way up into the cracks. I have also seen examples where it seems that the plunger piece was re-worked slightly, perhaps to remove damage along the outside edge, leading to a more tapered edge rather than a flatter edge. I think this led to the EC&Ms with very thin tapered bases as opposed to flatter bases.



Below is an example from a newer B mold:



...and from a more worn B mold:



This observation that the base edge is at least partly related to mold wear also seems to be supported by other evidence of mold age. For example, the specimens I have seen with a tight outside base edge also have very tight mold seams on the sides of the skirt, and show no other signs of mold wear. It should also be noted that the bases on EC&Ms can vary even more due to distortion of the soft glass during the molding and extracting process. This leads to an almost infinite variety of base details on various specimens. The distorted ones are usually easy to spot, and recognize that they do not necessarily represent the actual mold details.

### Pinholes and Threads

The pinholes of EC&Ms seem to be pretty constant throughout the life of the company. They are slightly smaller in diameter than a typical 1” insulator pinhole, often with sharp threads that are angular in cross-section. The ones that are not sharp seem to be due to poor molding rather than a plunger that was made to be that way. They also typically have a dot at the top of the pinhole, although the dot may vary from relatively small to large and sharp.

It is interesting to note that the distance from the base to the top of the pinhole is usually quite constant on most EC&M specimens. Thus, very tall examples will have a large amount of “dome glass” and short ones have very little. However, examples

with severely distorted bases will often have somewhat shorter pinholes, and I have also seen a few examples where the top thread of the plunger seems to have broken off, leaving a shorter than normal pinhole.

## **Part 2: a study of the “Skirt Embossed Group” of EC&Ms**

### **A short summary of their introduction to the hobby**

It would probably be good to start with a brief summary of how these insulators were introduced to the hobby. The story starts in 1994, when the presence of a group of EC&Ms was made known to a California bottle collector. The story is a bit involved, but basically involves the alleged discovery of a number of EC&Ms at a hazardous material cleanup site in northern California (there has been some speculation that it may have been in Sacramento since work of that nature was being done there at that time, but no specific claims were made). As the story goes, one or two construction workers removed the insulators (against strict company rules) and negotiated a sale to a person that was primarily involved in the bottle collecting hobby. He then consigned a number of them to the Open-Wire Insulator auction service, where they were sold into the hobby. Because of the risks (and probable illegality) of what the workers had done, they were insistent on remaining totally anonymous. So far, I have found no solid leads as to who they are.

It always makes it so much more difficult to authenticate something when the details of the discovery and identity of the finders remain hidden. My attempts to meet with even the bottle collector for an interview were unsuccessful. The details of the story explaining the secrecy does make some sense, but at the same time could also be a convenient story to hide the trail back to their source. Since any attempt to verify the exact location of the find, or identity of the parties involved seems impossible I will have to evaluate them based on their physical features alone.

For a good summary of their story and a table showing the quantity of each style found along with their colors, see Crown Jewels magazine, November 1995 p.12-15, and June 1996 p.27-31.

### **Detailed examination of their characteristics**

The “skirt embossed group” includes specimens representing several mold styles, in addition to the actual skirt embossed examples. One variety is very similar to previously known “C” molds, and another is very close to “B” molds. The actual skirt embossed examples are close to a “B” mold in physical details, except of course, for the embossing location. I will carefully examine each mold style in turn, followed by some general observations.



### Skirt Embossed mold

As stated previously, the skirt embossed examples closely resemble a "B" mold in details. The basic shape matches traditional "B" molds, along with the embossing details. The dot is on the back, and is squared in cross section (on a raised pedestal).



The bases look similar to previously known EC&Ms, being sharp around the outside edge, and tapered down to the pinhole. The pinhole (and threads) also look similar to previously known EC&Ms. Note that the interior mold piece did not fit tightly into the outer pieces on at least some specimens, leaving a rough and sometimes extended fin of glass around the outside edge.

Skirt embossed example:

Traditional "B" mold example (dome):



**“C” mold:**

There were a few specimens included in the skirt embossed group that closely resemble traditional “C” mold examples. I have examined three specimens, with one being studied in intimate detail.

The dome top has the same “beveled” outside edge, and the dot is on the front. The dot character is a close match to the traditional “C” mold examples, as are the embossing details. The period is normal size, matching early “C” molds. I compared the dimensions with a micrometer, and they are close... the example in question being slightly larger in diameter below the wire groove (by 0.4 to 1mm), and slightly smaller above (differing by 0.3mm).

“C” mold example from this group:

Traditional “C” mold:



I found it useful to compare embossing length for this study, but did it in a slightly different way than in the past. Because of possible wear in the mold, it is difficult to define the exact end of the embossing on the right side. I found it convenient and most accurate to measure the distance from the center of the vertical bar of the “E” to the center of the vertical bar of the “F”. These positions were first marked on a piece of clear tape stuck over the embossing, then peeled off and placed on a flat surface. Under these conditions, the example under study measured slightly smaller than the traditional examples (about 64mm vs. 66 to 66.5mm for typical “traditional” examples). I only examined one specimen from this group in this regard.

“C” mold example from this group:

Traditional “C” mold:



Note that the embossing is a very close copy in all its details (although somewhat less “bold” than the traditional “C” mold). For example, note the underline of the “o” is off-center to the right, the same as the traditional “C” mold.

Close-up of dot at right. Note that the shape is similar but the detail is somewhat blurred on this specimen compared to most traditional “C” molds. It should also be noted that there are various other minor differences between these examples and the traditional “C” mold examples... for example, the absence of the scratch mark that appears on the dome as described in detail in my article in the Summer 2008 issue of Drip Points.

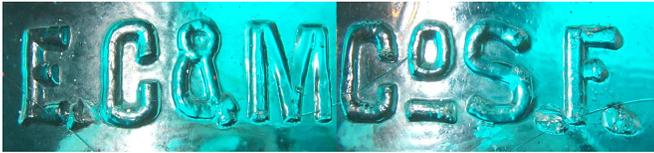


### “B” molds:

I was able to carefully examine 6 “B” mold examples from this group, and several others informally. It is interesting to note the existence of at least two different “B” molds in this group, similar to traditional EC&Ms. Several small mold irregularities allowed this determination. However, there is no evidence of the “hash marks” or the raised “football” shaped area on the domes. In fact, the domes on these units seem to be typically “flatter” than on traditional EC&Ms. Interestingly, the embossing details do match very closely to the two traditional molds. They are close enough in fact, to strongly imply a connection.

“Hash” B mold:

“Football” B mold:



First B mold under examination:

Second B mold under examination:



Note similarities in the “C”, ampersand, “o”, and underline under the “o”. It is not a perfect copy though, for example, interior of the “o” on the right example. (These details are hard to capture in a photo, but are apparent in person.)

A careful examination of the period after the “F” on the first B mold, compared to the “hash” B mold is instructive. The following photos will illustrate:



The first photo is from an early production “Hash” B mold (the dot is low profile, the mold lines are tight, and the embossing is crisp and unsmear). The second photo is of a late production “Hash” B mold (dot is very tall and squared, mold lines are cruder and raised more, and embossing of the last period is severely smeared to the right). The final photo is of the second B mold under examination. Note that the period is smeared to the right, similarly to a typical mid production “Hash” B mold example. (The other B mold and the skirt embossed examples show similar smeared final periods.)

Like the traditional “B” molds, the dots are on the back. The dot profile is squared off, with a raised area in the center of a “pedestal”. Examining the pedestal details, it appears as if the dot detail is similar to a traditional “B” mold of later age... approximately 1878 production. (Remember that a careful examination of the dot height of traditional “B” molds revealed a direct correlation between pedestal height and mold age.)

Careful measurements were made of several “B” molds, both traditional and the ones being examined. Results vary a little (indeed, some distortion may happen before the glass is fully hardened), but in nearly every case the “B” molds under examination were just a little larger in diameter than their traditional counterparts by about 0.2 to 1.0 mm. Embossing length, curiously enough, was actually shorter... one mold measuring about 2mm shorter, the other 1.5mm shorter. (The actual measurements for typical “hash” and “football” molds were about 58.7 and 56.4 mm respectively, while the two molds being examined measured 56.7 and 54.9 mm respectively. I saw about +/- 0.6 mm variation in the traditional examples I measured, so there is some variation. But I think the differences between traditional examples and the ones being examined was consistent and large enough to be considered significant. It should also be noted that the embossing that was most similar to the traditional “hash” mold was the longer of the two “B” molds from this group, again implying a connection.)

It should be noted that a few of the examples I examined were more difficult to classify as being clearly “first B mold” or “second B mold”. They were examples of rather poor condition, in light smoke colors (some of which were later turned to SCA). Because of the poor condition it was hard to match mold features with certainty, although they did seem closest to the first B mold. The example I examined carefully did have a much lower profile dot on the back, as do several other examples in this general color. It may be that they were made in one of the two molds being discussed, or they may represent a third mold.

Example from this group:



Traditional “B mold” example



First B mold from study



Second B mold from study



Traditional B mold (later production)



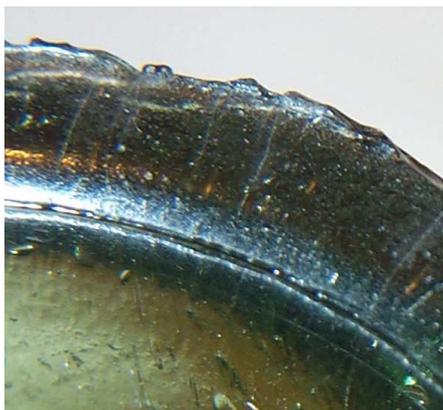
Embossing and dot from sca example:



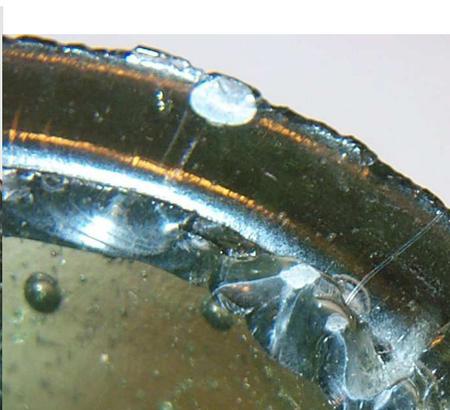
### Base details:

Base details are similar on all mold styles for the group being examined. They are quite similar to traditional EC&M bases, being tapered from the inside to the outer edge, and having a somewhat rough sharp edge around the lower outside edge. As mentioned before, there is quite a bit of variation within traditional EC&Ms, ranging from quite well made to crude and distorted, from flattish to very tapered. The ones being examined are fairly typical in general character. Most (possibly all) show a slightly raised line running around the inside edge of the base, and it has been suggested that this might be unique to this group. However, after careful study of many traditional examples, I can say that some of them have a similar characteristic (but not all), making this hard to use as a distinctive feature. There are some differences though, as these pictures will illustrate:

Line on a "B mold" from this group



Extreme example from this group



Line on traditional "C mold" example



The extreme example above seems to have resulted from a shift between two parts of the plunger, resulting in a raised sharp edge of glass around the inside of the base. This has been chipped away leaving a rough edge. I have not seen this kind of thing on any traditional EC&M example.

### Colors:

Colors found in this group include several similar to traditional EC&Ms, and some unique to this group. These include colors such as deep greens, yellow greens, olive green, teal blue & green, dark orange amber, slate blue, and smoke colors. Some of the smoke colored examples were exposed to sunlight, and subsequently turned to purple shades. Most of these colors were at least somewhat similar to previously known examples of EC&M insulators. However, at the same time most of them are just a little different. Some are completely new such as the orange amber, dark smoke and slate blue examples. Others are fairly close, such as the various greens, teal blues, and even the sca ones (after they turned color in the sun). Even the close ones are a little different to the experienced EC&M specialist's eye though.

It is worth mentioning that it was reported that there were a number of aqua specimens found with this group, but that the sellers wanted more money for them than they were worth. So far, I have seen no hard evidence of their existence... if they ever do show up their mold characteristics should allow them to be recognized.

### Surface etching

Apparently all of the insulators in this group had moderate to severe surface etching or mineralization when first seen. Unfortunately, all of the examples I was able to examine had been subsequently "tumbled" to clean this off. This process actually removes a very small amount of etched glass to reveal a clean smooth surface, thus improving their appearance. However, several examples that I examined did have traces of this etched surface up inside the pinhole and in other protected areas. It looked similar to other etched glass I have seen, but exhibited none of the iridescent rainbow hues I typically have seen on other glass. It is hard to draw any definite conclusions from this... not all etched glass shows the rainbow effect, and the tumbling process might still have altered their appearance. One person that knows the bottle collector that introduced them to the hobby and has experience with digging dumps for bottles, assured me that when he saw these items before they were tumbled they looked exactly right for dug items. On the other hand, I did some research on the internet and found many archaeological studies regarding restoration and preservation of historic glass, along with scientific studies of the processes involved in glass corrosion. One of these studies mentioned a process the researchers had come up with to accelerate the surface aging of glass, that they used to test various conservation techniques. (They were not too specific about just what this process is, which is probably just as well.) In the end, I can not use this feature to conclude anything either way.

This is a subject I intend to study further.

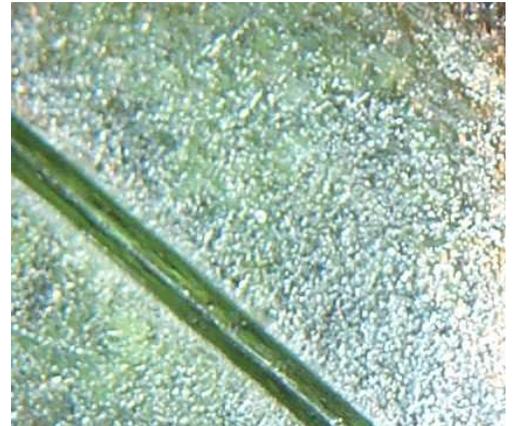
## Overpours & Underpours

It should be noted that of the 70 or so examples in this group, several with extreme underpours were present, along with one example that was such an extreme overpour that glass overflowed the mold leaving a flange completely circling the base of the insulator. This is also probably the tallest EC&M in existence (reportedly 5-3/4" tall). It is extremely rare to find a significant underpour on a traditional EC&M, in fact, I am aware of only one out of the thousands of examples in various collections. The only overpour I am aware of is the one "E" mold example mentioned previously.

## Misc. additional information

Careful examination of many specimens shows no evidence they were ever used on a line. No wear from wire, nor wire groove chips, or any other evidence related to use are seen. The story of their discovery includes mention of the remains of something like a wooden crate and packing material being found associated with them, so this is at least consistent with non-use. This also could explain the reason why the smoke colored specimens had not turned purple.

It has been pointed out to me that the surface texture on these is a bit unusual compared to traditional EC&Ms. Upon close examination they appear to have an almost satin like surface, or perhaps they could be described as very slightly grainy. Although they have been tumbled, it does appear to be a true indicator of the mold surface. This is shown by the presence of small details representing mold irregularities that appear in the same place on multiple specimens. Not all examples show this feature to the same degree though (perhaps some were pressed with "stiffer" glass, or perhaps tumbling smoothed some out more than others). At right is a close-up of the dome of a B mold from this group.



It should be noted that there are some early references to skirt embossed EC&Ms in the hobby. One of these is from a book titled "An Insulator Book for Collectors" by James Hill and Edward Pickett published in 1968. I had an opportunity to examine a copy of this book, and couldn't help noticing that it illustrated several styles of EC&Ms (such as flared skirt, straight, and extended skirt variations) all with skirt embossing. It seems extremely unlikely that this could be accurate, and in my opinion is highly likely to be an artists drawing error. I remember seeing other errors of this type in the book.

Finally, I have heard other "stories" of a skirt embossed EC&M turning up in the early days of the hobby. But none of them could pinpoint an owner that could be interviewed, or where the insulator might be now. I suspect these stories might be echoes of stories related to the illustrations in the above book, but nothing conclusive can be drawn from them in any case.

## Conclusions and discussion... what can be decided?

So, it can be fairly asked, what can we conclude from all this? I've tried to be as fair as I can in this regard, and take the attitude of giving them the benefit of the doubt if I can think of a way to justify it. In the end, I have to warn the reader that I have not found or thought of anything that definitely proves or disproves their legitimacy. With that in mind however, I think a few conclusions can be drawn with reasonable confidence.

*First, the "C" and "B" mold examples in this group were not made in the same molds as previously known EC&Ms.* This is clear from the examination of the mold details as presented above.

*Second, these insulators were not made by the same glass maker as previously known EC&Ms.* This is strongly hinted at by the differences in color between many of these specimens and previously known EC&Ms. Even the ones that are close in color are just a little different. But more importantly, the underpours and extreme overpour speak of a glass maker experimenting or figuring out how to make these things. I am not sure why a glassmaker experimenting with the production of a new item would make them in such a wide variety of colors and mold styles, but perhaps there is an explanation. They must have been made after a point relatively late in the production history of EC&Ms since they replicate features only present on later production "traditional" EC&Ms. By this time, the manufacturer involved in the bulk of the production of EC&M insulators was very experienced in their manufacturing, and would not have had this kind of trouble using new molds.

*Third, when the molds for this group of EC&Ms were made, examples of traditional EC&M insulators were used as patterns to replicate.* This is also clear from the details presented above. Indeed, it is even possible to say that for the "B molds" that relatively late production example(s) were used, as the replication process faithfully copied such mold wear features as the squared dot and smeared period after the "F".

Now at first impression, this may seem to be hard to explain in a historical context... however, although this does indicate a copying process, it doesn't reveal when it was done. Is it possible that a mold maker could have been given examples of insulators along with instructions to "make molds to make more of these"? If the mold maker was uneducated in the ways of electricity or function for insulators, he may not have known what features were critical for their function and what were not. Could he have faithfully replicated a square dot on some molds? The smeared period is a little harder to explain, but maybe not impossible. Perhaps he knew that ongoing production would result in this kind of wear, and by anticipating it there was less chance the crisp

embossing would cause the insulator to “stick” in the new mold. Other mold features were replicated to various degrees of exactness, but not the “hash marks” on the dome of one of the traditional B molds, nor other clearly non-functional mold damage features.

### **The real question... young or old?**

The real question of course is, when were these made? It is possible that these items were made recently with intent to deceive. Unfortunately I know of no certain way of testing for the date of their production. The basic recipe for historic glass could be followed (for example, adding manganese to make glass that will turn purple with sun exposure). So glass composition may not be definitive. They could even have been recently pressed with re-melted old glass. It may be possible to test for the presence of elements not in common use during the late 1800s, but even this might not be fully conclusive as it's not like any new elements have been “invented” since then for use in glass. One might always claim accidental contamination with unintended elements (as long as the concentrations are reasonable for accidental contaminations). So, this remains an area of ongoing research. It is possible that tests for the date of “last melting” are available, or will be developed. When that day comes, perhaps we will have a definitive answer. I did look into glass “surface hydration” as one method, but found that both the variables associated with unknown storage conditions and later tumbling would render it inconclusive. This is also a subject of ongoing research, and if new information becomes available I will report it.

In the course of doing this research, one historic scenario has come up that may be plausible ( I have hinted at it above). Perhaps there are others. In this scenario, these items would date from sometime near the end of traditional EC&M production (near 1878). During this time, the company was going through some changes, and perhaps was looking for another supplier for its insulators. Or perhaps they were having some sort of trouble with their previous supplier, and were searching for alternatives. It is also possible that they date from the later years of the EC&M company's existence, shown by various historical sources to be as late as the early 1890's. In any case, perhaps another supplier did attempt to gear up to make insulators, and used existing examples of EC&M insulators as patterns to copy for making the molds for their production. It does seem clear that these were never used on any lines, so in this scenario the full production was never carried out. This could explain the basic observations outlined above, and why so few have been found.

One might fairly ask, why would the mold maker so faithfully copy both B molds of the traditional EC&Ms along with a C mold? Why copy the embossing in such intricate detail that we can even recognize the two variations? And why, given this level of faithful reproduction, would he then create another mold with the embossing in a completely new place (on the skirt)? Also, why do some of the “B” mold examples from this group have a low profile dot, while most have the taller squared dot? There may be answers to these questions; perhaps not all the molds were made at the same time, and further instructions were communicated to the mold maker for a later mold. Indeed, even if these items are of modern production, why make so many mold variations? In the end, the reader will have to decide for him/herself what to conclude from all this.

### **Credit and appreciations**

I have to express my thanks to the many collectors that have helped me in this study, both through personal interviews, solicitations of observations and opinions, and even lending of specimens from their collections. Special thanks go to Dwayne Anthony for lending multiple examples out of his personal collection for several months of close scrutiny. His unreserved help and willingness to talk with me repeatedly about everything he could remember about the initial introduction of this group of insulators was invaluable. Other collectors deserving of special mention include Ross Baird, Dennis Bray, and Kevin Jacobson for letting me closely examine and photograph their insulators.

Paul Greaves  
NIA Authentication & Classification chair