

Do Numbers Matter?  
A Study of Beer Bottle Bases  
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Background

The need for tighter dates in the study of the Fort Stanton beer bottle dumps caused Lockhart to reevaluate a few of the date ranges he had previously accepted for some manufacturer's marks. In addition, the closer examination of the site disclosed bases with manufacturer's marks Lockhart and Wakkinen had missed on their initial visit. Many of the marks were accompanied by numbers and/or letters. The use of those accessorial codes, generally called mold codes in the archaeological, collector, and industry literature, may have ramifications for further understanding dates, variations, or other information pursuant to our knowledge of the marks.

Toulouse (1971:8), in his groundbreaking study of manufacturer's marks, stated:

Numerals appearing with the trademarks are in almost all instances *not* a part of the mark. For purposes of control it has long been customary to assign serial numbers to the individual molds of the same design made at the same time. In later years a second number, denoting the *design* of the bottle, was also assigned to the mold—such numbers are usually of three or more digits, sometimes accompanied by a letter. All such numbers are ignored [in his book] in listing the trademark, both because they were *not* part of the trademark, and because they give no information of dates.

The Bottle Research Group (BRG), a consortium of archaeologists and collectors dedicated to the study of all aspects of bottles, has been testing the veracity of this Toulouse statement and have determined that many numbers *are* associated with dates, both in the form of obvious double-digit date codes and both numerals and letters that are counterintuitive. The group has also found that finish types, finish techniques, minor changes in manufacturing styles, colors, and virtually all aspects of the marks that accompany manufacturer's logos *are* important in determining dates, especially in cases where more than one configuration of a logo was used by a particular glass maker.

As an example of how and why these accompanying digits may be important, the Thatcher Mfg. Co., one of the largest makers of milk bottles during the first half of the 20<sup>th</sup> century, often included a single letter to identify the individual factory that made the bottle. Noting the “S” embossed on a Thatcher base means that the bottle could not have been made prior to the opening of the Streator, Illinois, plant in 1908. Similarly, the Illinois Glass Co. began using model or catalog numbers on the heels of its soft drink bottles about 1895 and discontinued those codes in 1916, setting a clear date range for the use of these two- to four-digit numbers accompanying their IGC<sub>o</sub> marks embossed on soda bottle heels.

In this particular study, we are attempting to discern patterns inherent in the numbers, symbols, and letters embossed above, below, and centered between manufacturer’s marks on export beer bottles from ca. 1880 to ca. 1896, possibly as late as 1900. The sequencing of the numbers involved eliminates the possibility that they are date codes. As an example, “C / MILW” was used by the Chase Valley Glass Co. only in 1880, but the marks are accompanied by numbers 1, 2, and 3. For all of these late 19<sup>th</sup> century bottles, the numerical sequence simply does not fit with dates.

Hopefully, this study will address the following research questions:

1. Was Toulouse correct? Are these merely “mold numbers” for “control” purposes? If so, what, exactly, was being controlled? How were these numbers, letters, or symbols helpful in this “control?”
2. What patterns can be observed in these numbers, letters, and symbols? Do they serve identical purposes – regardless of which company used them? If so, can the patterns lead us to deduce that purpose?
3. Can these numbers be used to give us a seriation or possible clues to help establish date ranges?
4. Are the minor variations in marks (including font types, a superscript and/or underlined “o,” different configurations, etc.) indicative of datable or explainable variation, or are these constructed at the whim of the mold maker?

To help aid the search, we have included a review of some of the more reliable literature that lists or illustrates numbers and letters in the description of manufacturer's marks on late 19<sup>th</sup> century beer bottles. Sources with sufficient numbers of examples are few and are usually found in archaeological reports rather than collectors' books. Archaeological literature is generally more helpful, as sites are often dated within the specific context of each excavation. The following sources were used in this study.<sup>1</sup>

Ayres et al. (1980)

This unpublished manuscript was the result of a major series of excavations undertaken as part of the Tucson Urban Renewal (TUR) project from ca. 1966 until at least 1976. The report was written over at least two years and has remained on file at the Arizona State Museum. In 2006, the BRG visited the museum and spent five days examining and recording information from the 140 boxes (beer and many other bottle types) that comprise the collection. Along with the bottles reported by the Ayres researchers, we found a few others that were apparently excavated after the report was written. Unlike most reports, this one included numbers and letters in both illustrations and text. Bottles in the study dated from at least the 1870s (or earlier) to at least the 1950s.

Clint (1976)

Although Clint only included side-embossed soda, liquor, and beer bottles (as opposed to those with no embossing or "slick sides") from Colorado, his illustrations are some of the best in the literature. Clint not only showed drawings of the bottle, itself, he included illustrations of the marks, numbers, and symbols on bases and heels; types of finishes; manufacturing technique of finishes; and dates for each bottle type. Rarely has anyone, collector or archaeologist, taken the trouble to be so thorough. Clint only listed bottles used between 1859 and 1915.

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<sup>1</sup> Since Lockhart originally wrote this study in 2006, we have added a large number of minor sources, usually without temporal contexts. These have added to the range of numbers and letters and are not included in the sources listed here. The most recent number and letter ranges as of December 2010, are shown in the tables accompanying the discussion of some marks or in the text describing the logos.

Herskovitz (1978)

Herskovitz presented a study of the material culture found in the excavation of Fort Bowie, a frontier outpost in southeast Arizona. Although he did not include any illustrations or configurations of the marks, he listed each mark and the accompanying numbers, letters, and symbols. Although his section on beer bottles is short, it is packed with information. The area of study was occupied between 1868 and 1894, the latter year effectively placing an end date for all bottles from the excavations. The BRG visited Fort Bowie and the collection housed at the National Park Service Western Area Curation Center at Tucson, Arizona. We recorded pertinent differences in data. Unfortunately, heavy undergrowth inhibited the full recording of marks and codes at the actual Fort Bowie dump.

Lockhart and Olszewski (1994)

The authors excavated and reported on a bottle pit behind a store in San Elizario, Texas. Although the report did *not* list details of the marks or the accompanying numbers, letters, and symbols, Lockhart retained a copy of the recording sheets. He also borrowed the collection from UTEP in 2005, recorded more details, photographed many of the bases, and re-dated the assemblage based on more up-to-date information to ca. 1881-ca. 1886.

Wilson (1981)

Wilson examined bottles excavated from Fort Laramie (1849-1890) and Fort Union (1851-1891). In Appendix A, Wilson (1981:113-128) provided drawings of all the manufacturer's marks found on "beer, bar, and possibly bitters bottles" from Fort Union. While his drawings are very helpful, they are depicted on a "template" which ignores the fine distinctions of fonts and other details. As with the Fort Bowie bottles, Fort Union's closing in 1891 places a solid end date for the individual marks.

## Technology

Although this was a time of dramatic growth in technology in the glass industry, itself, in general, manufacturing techniques – as applied to export beer bottles – did not change much during the period of study (ca. 1878-1900). For example, even though the manufacturers of



many other types of bottles switched from applied finishes to tooled ones during this era, makers of export beer bottles continued to use applied finishes until at least 1896, possibly until 1900. However, one technique has become an important dating aid.

Two-part finishes on export beer bottles were intended for use with wired-down corks. Historical and empirical data explored by Lindsey (2010) and Lockhart (2007) suggest that lower rings of the finishes with sharp edges (whether in wedge or flared forms) were generally used on earlier bottles (1873-ca. 1883). Rounded lower rings indicated a manufacture that was probably no earlier than the late 1870s, and they certainly had completely replaced sharp lower rings by the mid-1880s. Rounded lower rings continued in use on export beer bottles until ca. 1914.

### Manufacturer's Marks

#### BGCo and BGC<sup>o</sup>

The Belleville Glass Co., Belleville, Illinois, was open from 1882 to 1886, when it became the Adolphus Busch Glass Works. As noted by Jones (1968:10) and Herskovitz (1978:7), the BGCo mark was used by Belleville Glass during its entire tenure as a glass house. Along with great variation in symbols accompanying the BGCo logos, there were at least three variations of the letter “G” – all based on the serif, the main characteristic denoting a “G” from a “C” (Figure 1). We discovered several variations of mark and accompanying symbols at Fort Stanton, almost all from a single location (Locus 3, Eastern beer bottle dump site). One of these had the “G” upside down and backwards (Figure 2).



Figure 1 – Variations in the “G” on BGCo logos

Wilson (1981:114) illustrated four variations of the BGCo mark (all with the “Co” configuration): 1) a large “X” above the mark; 2) a “3” below the logo; 3) a “3” above the logo; and, 4) two dots above. Unfortunately, he did not record any variations in the “G.” BGCo marks from San Elizario, Texas, also included a single base with the “C<sup>o</sup>” variation and no accompanying symbols or numbers and two examples with two dots above the logo. The shape of the “G” was not recorded in the “C<sup>o</sup>” variation, but the “two dot” version had a “G” with what we now consider a standard “tail” or “serif.”



Figure 2 – BGCo (upside down G)

Although Herskovitz (1978:3) did not illustrate his marks, he noted only the “C” variation accompanied by either 1, 3, 4, H, I, T, X, one dot, or two dots. Ayres et al. (1980), too, also indicated only the “C” variation, one with an “X” below the mark. The illustrations showed normal “Gs,” although our photograph of one from the TUR collection (reported by the Ayres group) showed a “G” with a large, horizontal “bar” extending to both left and right.

We can find no discernable patterns associated with the numbers/letters that accompany this mark. Numbers extend from at least 1 to 4, with virtually all the letters of the alphabet and various symbols, including, a cross or plus sign (+), “X,” and dots. The numbers/letters/symbols may appear either above or below the logo.

Unlike many of the logos discussed below, the important temporal patterns appear to be in symbols and the configuration of the letter “G” as used in the mark. All or most of these symbols may have been engravers’ “signatures” to identify their individual work. At present, we only know of three of these “signatures” that have been discussed in print (Lockhart et al. 2006; Lockhart & Whitten 2005; 2006; Toulouse 1971:556-557). The study of the letter “G” deserves its own report. The BRG will eventually publish on the G variations in the BGCo mark, but that study is not germane to this research (also see the discussion of one “G” variation near the end of this report).

## C / MILW

The Chase Valley Glass Co. opened in Milwaukee, Wisconsin, in 1880, at the farm of Dr. Enoch Chase. Later that year, Chase formed a corporation that opened a second factory on the same property, Chase Valley No. 2, and renamed the first plant as Chase Valley No. 1. The “C / MILW” mark was used by the initial company, limiting its tenure to 1880 – although the molds may have continued in use by Chase Valley No. 1 until they wore out (Figure 3).

Because this mark was unaccompanied by either “No. 1” or “No. 2,” it almost certainly was used by the original Chase Valley Glass Co. While not common, bases with this mark have appeared at several trash deposits in the southwest. Although the base we



Figure 3 – C / 2 / MILW  
(Fort Laramie)

found at Fort Stanton was embossed with a “K” in the center, one from the TUR collection had a “3” (Ayres et al. 1980); Herskovitz (1978:8) recorded 1, 2, and 3; and a “3” was discovered at San Elizario (Lockhart & Olszewski 1994). These first three numbers may be the only ones to accompany this mark, and we have only seen the letter “K.”

#### CVCo No. 2

This mark was used by the Chase Valley Co., No. 2 factory at Milwaukee, Wisconsin. The second plant (No. 2) was opened in July 1880, but the corporation was reorganized as the Wisconsin Glass Co. in August 1881. Thus, the mark was only used for a little over a year

Accompanying numbers are in the center. On our first trip to Fort Stanton, Wakkinen photographed an example embossed with a “3,” but we did not find that one the second time, when we recorded one with a “5.” Ayres and his associates (1980) listed examples of 3, 4, 6, and 8 accompanying the mark. Wilson (1981:115) only illustrated the mark alone. Herskovitz (1978:8) listed 1, 4, 5, 6, a backwards 7, 8, and T along with the logo but did not note the relative position. At San Elizario, the mark appeared with 4, 5, 6, and 8 (Lockhart & Olszewski 1994). Photos from eBay have shown a 1 or 2. Thus, the numbers accompanying the CVCo No. 2 mark may be limited to a range of 1-8, but the “T” from Herskovitz is the only recorded letter we have discovered so far.<sup>2</sup> See illustration on the title page of this section.

#### C&Co

Cunninghams & Co. made bottles from 1878 to 1907 at Pittsburgh, Pennsylvania. The firm became a limited partnership about 1886, although the plant continued to use the C&Co mark until ca. 1892. About 1903, the company incorporated and dropped the LIM from some of the marks. We found few of these bases at Fort Stanton, but they were marked with “M” or the numbers “3” or “13” below the logo. The C&Co or C&CO (without LIM) mark was apparently

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<sup>2</sup> We have assumed in this paper that numbers were always used sequentially. Thus, when we have only recorded a string of numbers (e.g. 4, 5, 6, 8 from San Elizario), we have assumed that export beer bottles were also made with numbers 1, 2, 3, and 7. While we have no documentary sources to back this assumption, each time we record major collections, we also add to the strings of numbers.

used during two periods, 1878-ca. 1891 and ca. 1900-ca. 1907, by Cunninghams & Co. (Lockhart et al. 2005c:17). At Fort Stanton, of course, the use was limited to the earlier period (Figure 4). These were only found on Loci #1, #2, and #3 of the Southern site and Loci #1 and #2 of the Eastern site.

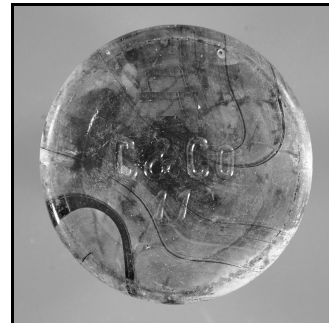


Figure 4 – C&Co / 11 (San Elizario)

Wilson (1981:114) only illustrated a single C&Co mark with no accompanying numbers or letters. Lockhart and Olszewski (1994) found three bases without numbers/letters, nine with a “6” below the logo, and 15 with an “11” below the mark. Herskovitz (1978:8) recorded one base with a “12” below the logo, but his example had a variation of “C<sup>o</sup>.” The Ayres group (1980) illustrated both a “4” and a backwards “7” below the mark. One in the Lockhart collection has a “1” below the logo. At this point, we know that numbers extend from 1 to at least 12, but the “M” is the only letter thus far recorded.

#### C&CoLIM

As discussed above, Cunninghams & Co. was a limited partnership from ca. 1886 to ca. 1903, but apparently only used the C&CoLIM mark from ca. 1892 (probably until all the old molds wore out). Even though the “LIM” was dropped from the company name ca. 1903, the company continued to use molds with the mark until they wore out. Some, apparently, lasted until the firm disbanded in 1907, creating a use range from ca. 1892 to 1907 (Lockhart et al. 2005c).



Figure 5 – 2 / C&CoLIM

The placement of numbers creates a dichotomy. One variation had numerals (1, 2, 3, and 5) placed above the mark that was embossed horizontally across the center of the base (Figure 5). The second variation had the numerals (4, 5, 6, 7, 8, 9, 11, 12, 13) embossed below the logo (Figure 6).

The “above” variation was found on Loci #3, #4, #5, and #6 at Fort Stanton’s Southern site, but only the “below” variation occurred on the Eastern site. The “below” variation was only found on Loci #3 and #4 of the Southern site. Although these could not have been date



Figure 6 – C&CoLIM / 12

codes, the lowest numerals (1-5) are found on the “above” variation with numerals 4-13 on the “below” variation. It is likely that the “above” variation represents a single order, with one or several orders comprising the “below” numbers.

The C&CoLIM mark was not found at San Elizario or Fort Union, suggesting that it was either uncommon or not yet used by 1891. Ayres et al. (1980) only found variations of “2” and “13” below the logo at Tucson. Herskovitz (1978:8) listed numbers 0-8, 10, 11, 13, 14, and 21, although he did not record the locations of the numbers relative to the logo. These data support Peters’ (1996:9) contention that the mark was used from ca. 1892 until 1905 or later.

## DOC

Dominick Cunningham left the firm controlled by his father and uncles to open his own company in 1880. Although the company remained in business until it was absorbed by All-Pac in 1958, it ceased glass manufacturing in 1931 (Lockhart et al. 2005c). Throughout this remarkable range (1880-1931), the factory continued to use the DOC mark (Figure 6). The mark was probably not used on *bases* of amber export beer bottles after 1896 (possibly as late as 1900), although the plant continued to make beer bottles with heelmarks until Prohibition.



Figure 7 – 4 / DOC (Fort Laramie)

Although the D. O. C. mark was used during the entire tenure of the company (1880-1931), it was usually embossed on the heels of soft drink and beer bottles. The earliest known use of the mark was on bottles made for Carl Conrad & Co. from 1880 to 1882. These had the Conrad monogram on the bases and the DOC logo on the back heels.

Although there are other exceptions, the mark was most often embossed on bases of export beer bottles from ca. 1882 to ca. 1900. Those at Fort Stanton, of course, only fell into the 1880-1896 timeframe. However, it is notable that the marks only appeared on bases found in Loci #3, #4, #5, and #6 of the Southern site along with Loci #1 and #3 to the East. Five of these loci were the latest in the seriation, and the remaining locus had only one DOC base.

This later use of the mark is supported by other studies. In San Elizario, where the assemblage was re-dated to ca. 1880-ca. 1886, there were no DOC marks (Lockhart & Olszewski 1994). At Fort Union, in an assemblage dated between 1863 and 1891, Wilson (1981:115) found only three DOC marks. However, Herskovitz (1978:8) listed 49 bases with the DOC mark found at Fort Bowie (1862-1894). It thus appears that D.O. Cunningham entered into the export bottle business ca. 1890.<sup>3</sup>

The ca. 1890 date has an interesting corollary. Two of the main suppliers of export beer bottles for Anheuser-Busch ceased operations during that period. The Lindell Glass Co. (see below) made export beer bottles from 1874 to ca. 1890. The Mississippi Glass Co. also began beer bottle manufacture in 1874 but ceased bottle making in 1885. This left a major gap in the beer bottle supply chain, and Cunningham may have stepped in to fill the void.

The dichotomy in the configuration of the mark/number is reminiscent of the one discussed for the C&CoLIM mark above. Indeed, it may contain the same numbers. Wilson (1981:115) illustrated three examples that included “4 / DOC,” “DOC / 5,” and “DOC / 17” (Figure 8) Lockhart recorded a “2 / DOC” at Fort Stanton and a “DOC / 5” – with the “5” upside down. The latter could have been intended as the “5” above the logo.

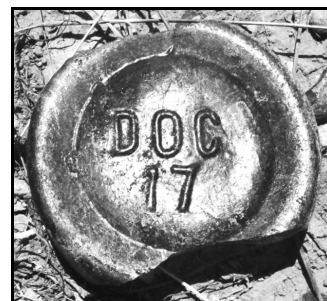


Figure 8 – DOC / 17

Higher digits had the logo embossed horizontally across but just slightly above center with the number just below it so that the logo/number arrangement, as a whole, was centered (Figure 8). However, there are exceptions. Numbers we listed at the beer bottle dumps include: 2 (above the logo), 4, 6, 8, 10, 11, 12, 14, 16, 17, 18, 19, 23, 83, as well as one upside down 5. We could not find the “83” mark during our last visit and consider it a recording error, as it does not fit into the sequence (we found several, however, marked “23”).

Brose & Rupp (1967:90) included numbers up to “23” with an outlier of “94.” Their outlier, too, is likely a mis-reading of the mark, although the possibility of higher numbers cannot

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<sup>3</sup> D.O. Cunningham made export beer bottles for Carl Conrad & Co. at some point 1880 (when Cunningham opened) and late 1882 (Conrad declared bankruptcy in very early 1883). However, he may not have made other beer bottles until ca. 1890.

be entirely eliminated. Although Herskovitz (1978:8) failed to record where the numbers and letters were located, he listed 2-7, 10-12, 17, 18, 21, 23, A, G, and S. It is notable that, with the exception of the two outliers that are very high, all three studies listed the highest number at “23.”

There was always a strong connection between Dominick Cunningham and his relatives, and he gained control of Cunninghams & Co. in 1886. It is thus not surprising that the pattern of the configurations is similar, probably identical. The numbers embossed on the mold baseplates used by the two firms are also virtually identical (Figure 9).



Figure 9 – Comparison of C&CoLIM / 12 and DOC / 12

FHGW

For many years, this mark was misidentified as belonging to the Frederick Hampson Glass Works, Salford, England. Whitten (Lockhart & Whitten 2005; 2006) correctly identified the real user as the Frederick Heitz Glass Works, St. Louis, Missouri (1883-1896).

Numbers on all observed examples were placed below the FHGW logo (horizontally across the center of the base). The accompanying numbers from Fort Stanton were 2, 3, 6, 8, 11, 12, 16, 21, 29, and 33. An unusual variation had a 15 below the logo and a bar above it (Figure 10). This is consistent with other recordings of this configuration. Wilson (1981:115-117) also included numbers as low as “1” and as high as “38,” many accompanied by dots above the logo, and a single example with a “2” below it and a Maltese Cross above it. Ayres and his associates (1980) showed the mark with “13” and “31” and included the dot-above variation. Lockhart and Olszewski (1994) only found two bases with the FHGW mark, accompanied by “4” and “14.” The Ayres text included numbers as low as 2 and as high as 41. Photos from eBay add 5 and 7. It is a pretty safe assumption that the numbers range from 1 to at least 41 (Figure 11).



Figure 10 – Bar / FHGW / 15

## IGCo and IGCoL

The Illinois Glass Co. incorporated in 1873 and operated until it merged with the Owens Bottle Co. in 1929 to form the Owens-Illinois Glass Co. The company used the IGCo mark from ca. 1880 to ca. 1915. The mark was generally embossed on the heels of bottles. The only known possible exceptions are the amber, export beer bottles made during the ca. 1880-ca. 1896 period (Lockhart et al. 2005a). However, the Ihmsen Glass Co. also may have used the mark during the same period. Ihmsen certainly used the IGCoL mark on amber, export beer bottles (Lockhart et al. 2005b).



Figure 11 – FHGW / 40 (Lockhart)

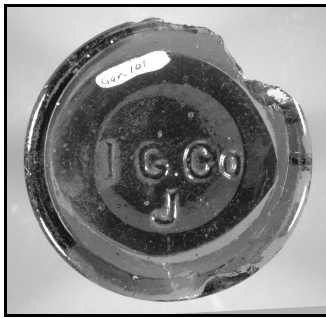


Figure 12 – IGCo / J (San Elizario)

We only found the letters “E” and “L” accompanying the IGCo mark at Fort Stanton. Wilson (1981:117-118) illustrated the mark without letters as well as with letters D-F, H, J, and L, all below the mark (horizontally across the center). The Ayres group (1980) showed a letter “J” below the mark and indicated that they also found a “C” on one example. Lockhart and Olszewski (1994) found letters “C,” “J,” “K,” and “L” below the mark (Figure 12). When we examined the TUR collection in 2006, we found three examples of the mark with an accompanying letter below the logo.

One of these had an applied, two-part finish with a sharp lower ring; another had an applied, one-part finish. The final example had a tooled, two-part finish. This suggests that the use of the IGCoL mark began no later than the early 1880s.

Lockhart and Olszewski (1994) also found two interesting variations of both the mark and accompanying digits. One base was marked IGCo<sup>o</sup> / 15; the other had a Maltese cross above the logo and the number “3” below it (Figure 13). In both cases, the “C<sup>o</sup>” had the underlined, superscript “o.” Herskovitz (1978:8) also indicated the C<sup>o</sup> variation and recorded letters “B” and “H” – along with “3+” on one example. It is likely that the lettered bases were IGCo and that the “3+” was actually a Maltese cross above and a “3” below.



Figure 13 – {Maltese cross} / IGCo / 3 (San Elizario)



Aside from the addition of the “L,” the IGCoL format also differed from the IGCo marks with the substitution of numbers for letters. Wilson (1981:118) illustrated four beer bottle bases with the IGCoL mark, accompanied by either a numeral 6 or a Maltese cross above the mark and a letter (I, D, or K) or nothing below the mark

Ayres et al. 1980:19-20) discussed and illustrated the IGCoL mark in two formats: 1) small letters with no numbers; and, 2) larger letters (as shown in all other examples we have found) with an inverted “4” below the logo. The Bottle Research Group also photographed a “12” below the mark at Fort Laramie (Figure 14). When the Bottle Research Group examined the TUR collection, we discovered only a single bottle that had an applied, two-part finish with a sharp lower ring. The others had either a rounded lower ring or a one-part finish. As with the IGCo mark discussed above, this suggests that the use of the LGCoL mark also began no later than the early 1880s.



Figure 14 – IGCoL / 12 (Fort Laramie)

Herskovitz (1978:8) reported four examples (I.G.CO.L.) accompanied by numbers (11-13). Feldhaus (1986:23, 38, 42) listed a bottle made for the St. Paul Bottling Co. (Minnesota) marked with IGCOL and the number 15 as well as two more examples with no accompanying numbers or letters. The bottler was in business from 1887 to 1889. Clint (1976:127) illustrated a single example of the mark on a beer or soda bottle from Denver, Colorado. The mark was accompanied by no numbers or letters and was embossed on the base of an aqua bottle with an applied blob finish.

The two variations (IGCo and IGCoL) could indicate two different companies or use by a single company at two different periods. Toulouse (1971:261, 264) claimed that the IGCo mark was used by both the Illinois Glass Co. and the Ihmsen Glass Co., and the Bottle Research Group has discussed this in articles on both firms (Lockhart et al. 2005a; 2005b). The IGCoL mark was certainly used by the Ihmsen Glass Co., Ltd., and it is often accompanied by letters or numerals (or both), and examples have both a Maltese cross above the logo and a letter or number below it (e.g., Wilson 1981:118).

The IGCo mark (with no “L” in the logo) appeared in two variations. The earliest style used the “C<sup>o</sup>” variation, with numbers embossed below the mark and a Maltese cross above it in some cases. The later marks had the more common “Co” and all had letters below the mark. These were likely made by the Illinois Glass Co. Since bottles with both IGCo and IGCoL basemarks also had both sharp lower rings and rounded lower rings on two-part finishes, the marks were probably used concurrently. These likely represent both firms joining the trend toward increased use of export beer bottles at Western forts following the president decree of Rutherford B. Hayes in March 1881 that enlisted personnel could only drink beer on military premises (Cozzens 2007; Wilson 1981:2).

### KGWCo

Whitten (2005:42-43) identified this mark as belonging to the Kentucky Glass Works Co., in business from 1879-1889. The company also used marks of KYGW, KYGWCo, and KYGCo. Unfortunately, he was unable to find a tighter range for each variation. What appears to be a KYGWCo mark from the San Elzario collection (Lockhart & Olszewski 1994) was partly obliterated by a break in the glass. Two of the same marks (KYGWCo) were also found at Fort Bowie (Herskovitz 1978:8) as well as a single example at Fort Stanton (Figure 15). None of the marks had any accompanying numbers, letters, or symbols.



Figure 15 – KGWCo

### LGCo

Although not clearly identified by previous researchers, the LGCo mark was used on export beer bottles made by the Lindell Glass Co. of St. Louis, Missouri – although LGCo marks were also used by other companies on other types of glass containers. Established in 1874 to produce export beer bottles for Anheuser-Busch, the company continued to make such containers until the plant closed in 1892 (see Lockhart et al. 2009).

Based partly on data about sharp and rounded lower rings, LGCo marks from the various sources appeared in five variations that were likely used in the follow order:

1. LGC<sup>o</sup> – “G” with a tail extending outward, i.e., to the *right* (also see the section on the “G” variations at the end of the Discussion section)
2. LGC<sup>o</sup> – “G” with a tail extending downward (like a “C” with a reverse comma added)
3. LGC<sup>o</sup>; standard “G” with a number below and sharp lower ring finish
4. LGC<sup>o</sup>; standard “G” with a number below and round lower ring finish
5. LG.Co with the letters crowded due to the limited space in a small post mold<sup>4</sup>

All marks recorded at Fort Stanton were from Variation 4 with numbers 3, 5, 16, 20, 21, 23, or 26 below the logo and one with dots both above and below the mark (Figure 16). Ayres et al. (1980) illustrated all five variations of the mark. The Ayres group included the numbers 3, 15, 16, and 22 for Variation 4 and 17 or 18 for Variation 3 with the numbers always below the mark. They listed no accompanying numbers for any of the other variations.



Figure 16 – LGC<sup>o</sup> / 26

Although Wilson (1981:118-121) did not show variation in letters, he illustrated differences in the abbreviation for “Co” from which we may make inferences, and he showed many variations in accompanying markings. He showed what was almost certainly Variation 4 (“Co”) with numerals 2-10, 15-21, 23-27, 36, and 38 as well as a horizontal line above the mark, and two examples with a Maltese cross above the logo. He showed what is most likely Variation 3 (“C<sup>o</sup>”) with two off-centered lines (above and below the mark), an off-center line above the logo and a dot below, a dot both above and below the mark, a horizontal line above the mark, and 0, 1, 15, 17-19, 20, and 22 below the logo (Figure 17). An eBay photo also shows the Maltese cross variation with a “2” below the logo.



Figure 17 – LGC<sup>o</sup> / 15 (Fort Laramie)

Lockhart and Olszewski (1994) only recorded the mark in Variation 3 with a dot above, a dot below, or no accompanying symbols or numbers. Herskovitz (1978:8) listed only Variation 4 with numbers 2-6, 10, 15-19, 21, 23-28, one dot, two dots, and letters A through C. An eBay

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<sup>4</sup> As in the BGCo marks discussed above, the study of the letter “G” variations deserves its own report.

photo shows the only example we have actually seen of Variation 2. It has no accompanying number but has a bar above the logo.

In summary, Variation 3 (LGC<sup>o</sup>) included numbers ranging from 1-28 and letters A through C, as well as dots. Variation 4 (LGCo) had accompanying numbers that ranged from 2-38, and this variation was sometimes accompanied by a variety of symbols either in place of the numbers or concurrent with them.

M {letter} or M / {number}

Although the identification is still in the hypothesis stage, these marks were probably used by Reed & Co., operators of the Massillon Glass Works, Massillon, Ohio, during its early period of production, ca. 1881-1887. The M {letter} configuration was probably the earlier of the two, followed by M / {number} (Figures 18 & 19). Letters ranged from A through D, and numbers comprised 1-9. The firm switched to the MGW logo ca. 1887. It is entirely possible that these variations indicated two separate mold orders, the earlier one for four molds, the latter one for nine molds (Lockhart et al. 2010). See Table 1 for mold numbers, letters, and date ranges.



Figure 18 – MA



Figure 19 – M/3 (National Park Service Western Area Curation Center [NPSWACC])

Wilson (1981:123) illustrated the M / {number} mark from Fort Union with an “M” in the center of the base and a “7” below it. To the left is “PAT” with “85” to the right; both are curved to fit the outer edge of the post bottom (Figure 20). The “PAT 85” refers to the Baltimore Loop closure and finish, patented that year. Herskovitz (1978:9) also listed MA (11 examples), MB (5), MC (3), and MD (4) at Fort Bowie. Three bases with the MA mark were found on Loci #3 and #4 at Fort Stanton, and we found a single base on Locus #3 embossed M.C., all at the Southern site.

Table 1 – Chronology of Basemarks for the Reed & Co. Factory

Mark	Date Range	Numbers or Letters
M {letter}	1881-1887	A-D
M / {number}	1881-1887	1-9
MGW	1887-1895	1-9
R&Co (horiz.)	1887-1895	1-58
R&Co (arch)	1892-1902	1-55 (poss. A-L)*
R&Co (arch over C)	1902-1904	42

\* Herskovitz (1978:9) did not record the logo variations but listed A-L; the BRG has only recorded a “K” – on an arched logo. We have found no letters on horizontal marks.

Lockhart and associates (2010) discovered that the MGW logo was definitely used by the Massillon Glass Works (the probable user of the “M” marks discussed above), operated by Reed & Co., from ca. 1887 to ca. 1895. The MGW marks may be sorted into four variations:

1. MGW horizontal across the center of the base, no numbers (champagne beer bottles)



Figure 20 – PAT 85 – M / 7 (Fort Bowie)

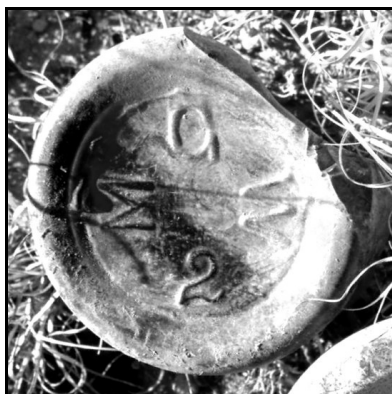


Figure 21 – MGW2

2. MGW horizontal across the center of the base with a “1” or “2” below the mark (champagne beer bottles)

3. MGW and the number “2” spread equidistant around the base like the cardinal compass directions, beginning on the left (or west) with “M” (export beer bottles) (Figure 21)

4. MGW in a downward arch at the top of the base with a single digit number (3-9) in the center (champagne beer bottles [only found with the number “9”] and export beer bottles) (Figure 22)

4a. Same but with PAT 85 in an upward arch at the bottom of the base and “6” below the logo (export beer bottles) (Figure 23)

At Fort Stanton, only the numeral “2” was found with Variation 3. Numbers accompanying Variation 4 included 3, 4, 6, 7, and 8. The Ayres researchers also found the “2” with Variation 2 and “6” with Variation 4a (Ayres et al. 1980). Wilson (1981:123) only illustrated two examples of Variation 4 accompanied by a “3” or a “4.” The mark was not found at San Elizario. Herskovitz (1978:9) did not distinguish between Variations 1-4 – and thus listed numbers 2-4, 6-8 and included no numbers with Variation 4a. We have only found Variation 2 with the numbers “1” and “2.” See Table 1 for all marks used by Reed & Co.



Figure 22 – MGW / 7

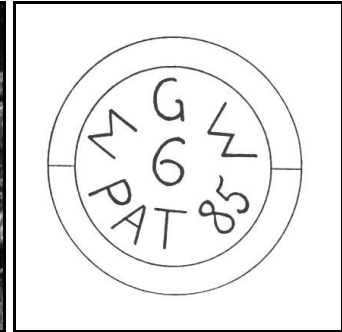


Figure 23 – MGW / 6 / PAT 85 (Ayres et al. 1980)

### MGCo

As with Lindell (above), the Mississippi Glass Co., also of St. Louis, was not previously identified as the user of its (MGCo) mark. The firm was established to manufacture export beer bottles in 1873, but the company ceased production of bottles in 1885 to concentrate on the manufacture of flat glass. The plant also made numerous other types of bottles and jars during its container-production period. The Bottle Research Group (Lockhart et al. 2009) had determined a total of six variations of the MGCo mark, but only four (those accompanied by numbers) are pertinent to this study.



Figure 24 – MGCo / 7 (San Elizario)

At Fort Stanton, we found the MGCo mark on a base with dot below the logo on Locus #4, Southern site. A second base, embossed with A / MGCo / 5, was found at Locus #7, also in the South (Figure 24). Wilson (1981:121-123) illustrated four variations of the mark. These are listed in the order of probable use. Parentheses below indicate digits found below the logo:

1. “MGC<sup>o</sup>” with a Maltese cross above the mark (1, 3, 4, 8, 9, 13) usually with a dot to the left of the number (although Wilson illustrated these as “Co” – all we have seen had the “C<sup>o</sup>” variation).
2. MGCo with no letter or symbol above the mark (1, 6, 14)
3. MGCo with the letter “A” above the mark (1-12)
4. MGCo with a plus sign (or cross – *not* Maltese) above the mark (3)



Figure 25 – A / MGCo / 9 [backwards] (Tucson Urban Renewal Project)

Ayres et al. (1980) only note the “A” variation accompanied by a “5,” although an example of the “A” variation we photographed in this collection had a backwards “9” below the logo (Figure 25). We also photographed an example with the plus sign above the logo. On close examination, it is possibly a Maltese cross where the swelled ends did not come out as strongly. Like the example from Fort Union, it had a “3” embossed below the logo (Figure 26).



Figure 26 – + / MGCo / 2 (San Elizario)

Lockhart and Olszewski (1994) found only the first three variations with two slight differences:

1. (1, 2, 7, 8), all with the underlined, superscript “o” in “C<sup>o</sup>.”
2. (2, 5, 7) the 7 with a superscript (but not underlined) “o” in “C<sup>o</sup>”; others are “Co.”
3. (1, 4, 5, 9, 12) including one (with the “12”) with an underlined, superscript “o” in “Co.”

Herskovitz (1978:9) noted variations 1, 2, and 4, although it is likely that is Variation 4 is really Variation 3. Even though he showed a plus sign above the mark, he also indicated an underlined, superscript “o” in “C<sup>o</sup>.” We have listed the mark as Variation 3 below:

1. (2, 4-6, 12), all with the underlined, superscript “o” in “C<sup>o</sup>.”
2. (1, 2, 4-9, 11, 12); normal “o.”
3. (2, 4, 6, 8); normal “o.”

Table 2 shows a summary of numbers associated with the MGCo variations.

Table 2 – Variations of Basemarks used by the Mississippi Glass Co.

#	Mark	Numbers
1	MGC <sup>o</sup> with a Maltese Cross above the mark	1-13
2	MGCo with no letter or symbol above the mark	1-14
3	MGCo with the letter “A” above the mark	1-12

OGCo monogram

We found a single base at Locus #1 of Fort Stanton with the OGCo monogram accompanied by two “x” marks above the logo (Figure 27). This mark with its variations is thoroughly reported and discussed in Lockhart et al. (2006). Although some of these monograms are accompanied by numbers, most have between one and four small “x” marks at the “corners” of the monogram. The “x” marks may be another type of engraver’s or mold maker’s “signature.”



Figure 27 – OGCo monogram (Hillsboro, NM)

R&Co

Although Toulouse (1971:438-439) identified the R&Co mark as used by Roth & Co., the actual firm was Reed & Co., Massillon, Ohio. Reed & Co. opened in 1881 and primarily made export beer bottles until the firm became part of the merger that created the Ohio Bottle Co. in 1904. Ohio Bottle became the American Bottle Co. in 1905. The Bottle Research Group dated each of the variations of the mark based on manufacturing characteristics, historical data, and context at archaeological sites (Lockhart et al. 2010):

1. R&CO across the center alone or with two-digit numbers below the mark (Figure 28)

A. Same as main variant but three-digit number in smaller font *instead* of the usual two-digit number





Figure 28 – R&Co (horizontal) / 38 (Fort Laramie)



Figure 29 – PAT / R&Co / 85 (eBay)



Figure 30 – PAT 85 / R&Co / 15 (eBay)



Figure 31 – R&Co (spread arch) / D (eBay)

2. R&CO across the center accompanied by PAT 85

A. PAT (arch) / R&CO (horizontal) / 85 (Figure 29)

B. PAT 85 (arch) / R&CO (horizontal) / {two-digit number} (Figure 30)



Figure 32 – R&Co (arch) / 5 (eBay)

3. R&Co in an arch with the letters spread out above a single letter located at the bottom of the base; both “R” and “Co” are positioned just above the cardinal compass positions (Figure 31).

4. R&Co in an arch with a single small dot (not always present) between the logo and a one- or two-digit number (Figure 32)

A. Same but “CO” – may have a large or small dot between “R&CO” and the two-digit number

B. In some cases, a three-digit number beginning with “0” in smaller font was below the two-digit number; these are always the “CO” variant (Figure 33)



Figure 33 – R&Co (arch) / 88 / 087 (TUR)

5. R&CO in an arch above a large serif “C” with a two-digit number inside the “C” (sometimes accompanied by a dot above the number) (Figure 34)

6. R.&CO. horizontal heelmark (ca. 1896-1904)

For the purposes of this study, Variations 1 and 2 are combined. Both Variation 3 and Variation 6 are so scarce that they are excluded from this research. See Table 1 for Reed & Co logos.

Variation 1 (horizontal across center)

The horizontal variation was the earliest R&Co mark, based on manufacturing characteristics. The mark was used from ca. 1887 to ca. 1895. At Fort Stanton, we found four examples of the R&Co logo embossed horizontally across the center of the base. One had PAT 85 above the mark, but none were accompanied by a number. Two were found on Locus #4 at the Southern site, with the remaining two at Loci #1 and #2 to the East. There were no R&Co bases at San Elizario.



Figure 34 – R&Co with C (TUR)

Herskovitz (1978:9) listed a similar mark with “R&Co / PAT 85.” The logo was accompanied by 14, 15, 17, or 18. Herskovitz (1978:9) also reported the R&Co mark with no patent date (but did not indicate the configuration of the mark – logically, this would have been the mark horizontally across the center of the base) accompanied by numbers extending from 1 to 58 (although not with every intervening number) and letters A to C, E, and L.

Wilson (1981:123) illustrated three examples of the R&Co mark across the center of the base with 36, 39, and 46 below the logo. A photo from Fort Stanton, however, shows a slight variation from the Wilson drawings with the mark a bit above the center (so that the mark/number combination is centered) rather than Wilson’s illustration with the mark, itself, across the center.

The TUR collection provided the most information about the R&Co marks and was an important component in determining the order of use for these logos. Ayres et al. (1980) reported the mark with 28, 32, 46, or 55 embossed below the logo. A complete bottle found at the Fort Stanton Site (a dump just north of the cemetery) had the horizontal logo with a “10” embossed below it. The horizontal variation of the R&Co mark is thus accompanied by numbers 1-58 and letters A-L. One variation of “PAT 85” is accompanied by numbers 14-19; the other has no additional numbers.

#### Variation 4 (arch at top of base)

The arched variation was probably used between ca. 1892 and ca. 1902 (Lockhart et al. 2010). We found a single example of this mark at Fort Stanton, on a base from a 12-ounce bottle – the only base that size on the entire site – at Locus #6, Southern site. The mark was accompanied by a “6” in the lower half of the base. Although smaller bottles (i.e., less than the typical 26-ounce “quart” size) were made in the export style as early as the mid 1870s, the size is totally unique for the ten export beer bottle dumps at Fort Stanton.

This variation of the R&Co mark was not present at San Elizario or Fort Union and was probably not found at Fort Bowie. This all suggests that the mark was not used prior to 1894. Marks from the TUR collection were found on applied one-part finishes, tooled one-part finishes, and tooled crown finishes, which supports a use between ca. 1892 and ca. 1902. Of particular interest, this date range was established by Lockhart based on the manufacturing and provenience data, and the identical date range was reached independently by the Bottle Research Group, using primarily historical data.

Ayres et al. (1980) showed this variation with numbers 5, 7, 15, 20, 28, 34, and 36, sometimes including a dot either above or below the number. A single example had the letter “K” below the mark, and one had a “36” with the “6” backwards. The BRG found an unusual exception at the TUR collection marked “R&Co / 38 / 087.” Photos from eBay add the numbers 1, 35, 49, and 55 as well as examples of the letter “K.” It seems odd that the only letter in the literature or eBay is “K” – but that shows up repeatedly. Aside from the letter “K,” numbers 1-55 are associated with the arched variation of the R&Co mark.

#### Variation 5 (arched logo with large “C” below)

The arched logo with the large, serif “C” was the final mark used by Reed & Co., probably between ca. 1902 and 1904, but none of these were found at Fort Stanton. The TUR study showed these with a “42” or “46” within the curl of the large “C.” A photo from the “Bottle House” at Rhyolite, Nevada, adds the number “49” for this variation. The only known numbers with this variation appear to be in the 40s.

## SB&GCo

The Bottle Research Group has cataloged four major variations of the SB&GCo mark, three of which were found at Fort Stanton, all connected with export beer bottles and mold codes. All the marks were used by the Streator Bottle & Glass Co., Streator, Illinois. The company was in business from 1881 until it became part of the merger that created the American Bottle Co. in 1905. We have devised approximate dates for the marks based on their use by individual breweries, manufacturing techniques, and presence in dated contexts of archaeological sites (Table 3). All but the final two variations could only have been used earlier than ca. 1896 based on finish manufacturing technique. All other dates in the ranges are approximate.<sup>5</sup>

Table 3 – Manufacturer’s Mark Data for the SB&GCo Logos

#	Mark	Dates	Numbers or Letters
1	SB&GCO in an arch on base	ca. 1885-ca. 1890	1-19
2	SBGCO in an inverted arch on base*	ca. 1888-ca. 1890	11-12
3	SB& (arch), with GCO (inverted arch) on base	ca. 1890-ca. 1894	A-O
4	SB&GCO horizontal at center of base	ca. 1890-1905	A-P; 1-38

\* The only information on this mark is from Wilson (1981:124), who showed a lower-case “o” in his drawings and illustrated the mark *without* an ampersand (&). This may reflect a single order where the request for an arch was misunderstood. However, we have seen an arched logo with a number “11” embossed below it.

### SB&GCo (arch)

This was probably the earliest of the SB&GCo logos used by Streator. Our best estimate for this logo (#1 in Table 3) is ca. 1885-ca. 1890. We only found a single example of this variation at Fort Stanton with a “12” in the center on Locus #4. Ayres et al. (1980) illustrated this variation with a “17” in the center and noted that it was also found embossed with “18”

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<sup>5</sup> As of this writing, we have not published our Streator Bottle & Glass Co. file.

Figure 35). We also photographed a base with number “19” at the National Park Service Western Area Curation Center. The TUR bottles only had applied finishes, as were associated with the variation at Fort Stanton. Wilson (1981:123) showed four examples, marked with numbers 3, 5, and 6 at the bottom of the base. Although the sample is very small, this variation is only known with numbers, probably ranging from 1-19. Our most recent sampling of numbers is shown in Table 3.



Figure 35 – SB&GCo (arch) / 19 (NPSWACC)

SB&GCo (inverted arch at bottom)

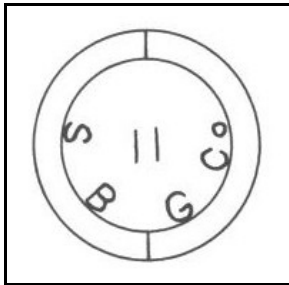


Figure 36 – 11 / SBGCo (inverted arch) (Wilson 1981:124)

This is the rarest of the Streator marks, and we found none of these at Fort Stanton. Of the cited sources, only Wilson (1980:124) showed examples accompanied by “11” or “12” in the center (Figure 36). These few examples may reflect a single order where the request for an arched logo was misunderstood. However, we have also recorded an example with a number “11” embossed below the logo.

SB& (arch) / GCo (inverted arch)

This variation (#3 in Table 3) was used from ca. 1890-ca. 1894. We found several of these marks at various Fort Stanton loci. They included letters (D, F, G, L) in the center of the base between the split logo (Figure 37). Wilson (1981:124) illustrated two of these marks accompanied by letters “C” and “E,” each with a dot to the right of the letter. We did not record any dots at Fort Stanton, but our few photos of the marks *do* show major bumps in the baseplate – rather than an embossed dot. No bases with the mark were found at San Elizario. Although Ayres et al. (1980) did not record any examples of this mark, the BRG found and photographed a base in the TUR collection with the split logo along with the letter “E” partly obliterated by a large dot. A photo from eBay shows a similar base, but the dot is to the left of the “E.”



Figure 37 – SB& (arch) / F / GCo (inverted arch)

At this point, all marks we have found of this type are only accompanied by letters (with a probable range of A-O) – no numbers. All examples we have found have been on whole bottles with applied finishes or on base fragments in association with applied finish fragments on archaeological sites.

Herskovitz (1978:9) did not distinguish between variations of the mark. He recorded the mark only as “SB&G C<sup>o</sup>” (note underlined, superscript “o”). Numbers extended from a low of 1 to a high of 35 with letters D-F, H, J, and O. Unfortunately, these could be associated with any of the variations.

#### SB&GCo (horizontal)

Although heelmarks were also used about the same time, this horizontal base variation is the most recent of the SB&GCo basemarks (#4 in Table 3). The mark is found on bottles with both applied and tooled finishes. It was used from ca. 1890 to 1905. We found several examples of this variation at Fort Stanton, all with numbers or letters embossed below the logo (which was usually horizontally centered on the base). These included 14, H, M, O, and P as well as some with no letters or numbers. The bases were found on Loci #2, #4, and #6 of the Southern site at Fort Stanton and Loci #1 and #2 from the Eastern site. Wilson (1981:124) illustrated eight of these bases with numbers 1, 7, 29, and 30 and letters K, L, and P. He also showed one with a Maltese cross above the logo and an “8” below it.

Ayres et al. (1980) found marks of this variation with numbers 3, 14, 17, and 25 as well as the letter “K,” all below the logo. In addition, they found the mark with no numbers or letters as well as one with two dots above the logo. Examples from eBay include numbers 2, 7, 8, 9, 16, 38, along with several with dots below the logo (most with no numbers/letters) and a single example with a teardrop above and dot below the mark (Figure 38). Clint (1976:102) illustrated this mark accompanied by 1 (or I), 2, and D, all on bottles with tooled finishes.



Figure 38 – SB&GCo / 9 (horizontal) (eBay)

Based on Clint's illustrations and eBay data, Streator (and apparently most others) was more likely to include a number or letter if the bottle were generic (i.e., intended for paper labels). The vast majority of the marks offered on eBay were placed on bottles with side embossing that identified specific brewers or soda bottlers. Almost all of these had no numbers below the logo, and none had letters.

We can make two hypotheses based on these observations. First, assuming that mold codes were used for quality control purposes, Streator primarily used the basal numbering and lettering systems to monitor generic (slick-sided) bottles. Second, since the previous logo (#3 in Table 3) was only accompanied by letters, it is logical that letters were used on the earliest of the horizontal marks (#4 on Table 3). Horizontal marks with no letters or numbers, however, may have been used at any point during the ca. 1890-1905 period. See Table 3 for the most recent summary of numbers and letters.

#### Wisconsin Glass Co. Marks

The Wisconsin Glass Co., Milwaukee, Wisconsin, used seven variations of marks that included some form of mold letters or numbers during its time in business. The corporation was the result of a reorganization of the two Chase Valley factories in 1881. The firm ceased production at some point during 1886. Table 4 presents the most recent span of numbers and letters for the mark variations, along with probable date ranges.

Since the firm grew out of Chase Valley No. 1 and Chase Valley No. 2, it is almost certain that the company continued to operate both factories. Table 4 and Table 5 show that the marks fall into two groups that parallel each other. This grouping was probably intentional, dividing the codes for each plant – letters to one factory, numbers to the other. Since Chase Valley No. 2 was considerably larger than the No. 1 plant, that disparity probably continued into the Wisconsin Glass Co. Thus, the logos accompanied by numbers probably belonged to Factory No. 2 (the larger one, corresponding to the larger number of molds the bigger plant would have used), and the letters likely indicated Factory No. 1. In the discussion below, we have abbreviated the detailed list of accompanying numbers and letters and only included the range. In most cases, we have not seen examples of all numbers and letters in between, but it is logical that they existed.

Table 4 – Wisconsin Glass Co. Basemarks – Factory No. 1\*

Logo	Code	Dates
WIS.G.C <sup>o</sup> (arch) / {letter} / MILW	A-S	1881-1884
WIS.G.CO. (arch) / {letter} / MIL	A-P	1883-1885
W.G.Co. (arch) / {letter} / MILW	P-V	1884-1886

\* This table only includes variations found on export beer bottles. A few additional variations appear on other bottle types.

### Factory No. 1

Table 4 indicates that Factory No. 1 marks can be divided into three variations.

#### WIS.G.C<sup>o</sup> (arch) / {letter} / MILW

The configuration of these bases consisted of “WIS.G.C<sup>o</sup>” in an arch at the top of the base, a single letter of the alphabet in the center, and “MILW” at the bottom (Figure 39). The range of letters we have recorded for this mark extend from A to S, for a total of 19 molds (assuming that there was only one mold per letter). In all cases we have examined so far, logos with a superscripted “o” in “C<sup>o</sup>” have always been used prior to the “Co” mark. Thus, we have assigned this as the initial logo/letter format for Factory No. 1. Thus far, all finishes that we have discovered on bottles with basemarks from the Wisconsin Glass Co. have had one-part finishes. Therefore, we have not been able to date the changes using the two-part finishes.



Figure 39 – WIS.G.C<sup>o</sup> (arch) / {letter} / MILW



WIS.G.CO. (arch) / {letter} / MIL

There are two differences between the configuration of this mark and previous one. The first is the “O” in “CO” being capitalized and in the normal position, and the second is “MIL” at the bottom instead of the “MILW” city designation (Figure 40). The range of letters we have recorded for this mark extend from A to P, a total of 16 molds.

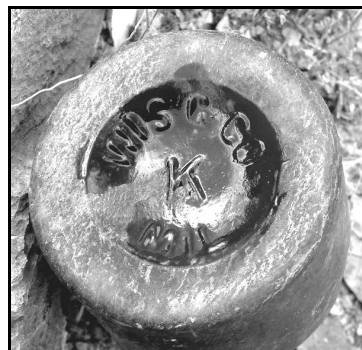


Figure 40 – WIS.G.CO. (arch) / {letter} / MIL (Fort Bowie)

W.G.Co. (arch) / {letter} / MILW



Figure 41 – W.G.Co. (arch) / {letter} / MILW (Fort Bowie)

The major difference in this mark is the simplification to “W.G.Co.” The associated letter range of “P-V” may be an extension of the second variation noted just above (Figure 41). Since molds were ordered by handwritten (cursive) letters, there was a great deal of room for error, so the “P” in both variations is not surprising.

Table 5 – Wisconsin Glass Co. Basemarks – Factory No. 2\*

Logo	Code	Dates
WIS.GLASSCO. (arch) / {number}	22-38	1881-1883
WIS.GLASSCo. (arch) / MIL	none	ca. 1884?
WIS.GLASSCo. (arch) / {number} / MILW	11-14	1882-1884
WIS.G.CO. (arch) / {number} / MILW**	4-27	1884-1886

\* This table only includes variations found on export beer bottles. A few additional variations appear on other bottle types.

\*\* At least one of these bases had a lower-case “o” in “Co.”

Factory No. 2

For Factory No. 2, there are four variations in the logo/number configurations.<sup>6</sup>

WIS.GLASSC<sup>o</sup> / (arch) / {number}



Figure 42 – WIS.GLASSC<sup>o</sup> / (arch) / {number} (Hillsboro, NM)



Figure 43 – WIS.GLASSC<sup>o</sup> / (arch) / {number}

We found this variation only on Locus #7 and at a bottle drop, both on the Southern site of Fort Stanton, although it is known from other sites. “WIS.GLASSC<sup>o</sup>.” was embossed in an arch at the top, with a two-digit number in the center and no city designation. The recorded numbers range from 22 to 38. Most of these had the underlined, superscript <sup>o</sup> (Figure 42), but at least one sub-variation was embossed “C<sup>o</sup>” – without the underline (Figure 43).

WIS.GLASSCo. (arch) / MIL

Although this variation had no numbers or letters, we have included it because we have never discovered an example anywhere but Fort Stanton. There was likely only a single mold made for an export beer bottle in this configuration, although it appears on the bases of other bottle types (Figure 44).



Figure 44 – WIS.GLASSCo. (arch) / MIL

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<sup>6</sup> Herskovitz (1978:9) listed a fifth variation: WIS.GLASSC<sup>o</sup> (arch) / {number} / MILW. We have not found this variation recorded in any other sources, nor have we discovered a single photograph of this configuration. We did not see an example in our examination of the bottles excavated from Fort Bowie (the ones Herskovitz reported). Since the variations of Wisconsin Glass Co. marks are confusing at best, it is likely that Herskovitz mis-recorded this configuration, and his numbers (11-40) may have referred to the WIS.GLASSC<sup>o</sup> / (arch) / {number} logo.

WIS.GLASSCo. (arch) / {number} / MILW

This configuration was more like the first one except for a change to “o” in “Co.” and, of course, the addition of the city designation (Figure 45). The observed numbers ranged from 11 to 14, a probable total of 14 molds, assuming that the first actual number was “1.”



Figure 45 –  
WIS.GLASSCo. (arch) /  
{number} / MILW

WIS.G.CO. (arch) / {number} / MILW

Like the final mark of Factory No. 1, this is simpler, with the initial “G” replacing “Glass.” The “MILW” city designation is in place, and the numbers in our sample range from 4 to 27, a probable total of 27 molds (Figure 46). At least one base was embossed “WIS.G.Co.” Since the example we have seen is numbered “9,” this *may* indicate that the lower numbers were associated with a lower-case “o” in “Co.” (Figure 47).



Figure 46 – WIS.G.CO.  
(arch) / {number} / MILW



Figure 47 – WIS.G.Co.  
(arch) / {number} / MILW

## Answering the Questions

While a study of this type can give few absolute answers, we can at least address all four questions and provide at least partial answers to some of them.

### Question #1 – Mold Numbers

Was Toulouse correct? Are these merely “mold numbers” for “control” purposes? If so, what, exactly, was being controlled? How were these numbers, letters, or symbols helpful in this “control?”

The Bottle Research Group discussed this at some length and only came up with four ideas:

- a. Toulouse was correct; these are mold numbers for quality control purposes.
- b. The numbers and/or letters identify furnaces, shops, or some other production variable.
- c. They were used to identify bottle styles.
- d. They were used to identify customers.

These need to be examined separately in light of the sample used for this study.

### Mold Numbers

For a mold number to be effective, it must be unique. However, it is possible that numbers could be recycled. If quality control were restricted to the inspection of bottles immediately after production, then numbers could be almost instantly recycled. However, if the control were to extend to customers (e.g., reports of defective bottles that broke easily during the filling process), then numbers could only be recycled after a period of several years.

In some cases, we have been able to inspect multiple examples of the same number used with the same mark. In all but two cases, the marks we have seen appear to all have been made

by in the same mold. For example, the MGW2 mark is unique among the MGW configurations on export beer bottles. It is the only one with the digits spread out in the cardinal directions (as in a compass). These marks have shown up on multiple sites and are always identical.

Similarly, the “1” and “2” on C&CoLIM marks are very distinctive. Again, we have seen, recorded, and/or photographed multiple examples of numbers “2,” “11,” and “12” that appear to have been made by the same mold. We have not seen any apparent variation.

### Shop Numbers

One suggestion, originally made in 2004 by David Whitten, was that, since these are mouth-blown bottles, each letter or number may indicate the specific shop (i.e., group of bottle blowers and associated workers who operated as a team) that made the bottles or the specific location of production (i.e., the pot, tank, or port from which the glass was gathered). We would then expect to find larger numbers from larger factories, although the numbers and letters would increase with time.

The places in this study with the highest numbers, usually with letters on some bases, are also the largest plants – Streator, Wisconsin Glass Co., D. O. Cunningham, Illinois Glass, Ihmsen, Lindell, Reed & Co. That may in part support the shop idea, but it also lends credence to the mold number hypothesis, because higher numbers also correlates to length of time in business, and that applies to all of the above-named factories plus the much smaller Frederick Heitz Glass Works. Currently, we have not devised a way to test this hypothesis.

### Bottle Styles

The idea that these numbers were used to identify bottle types – or even bottle sizes – can be dismissed fairly easily. Almost all of the bottles addressed in this study were export beer bottles, and virtually all of them were the 26-ounce “quart” sizes. As strange as it sounds now, late 19<sup>th</sup> and early 20<sup>th</sup> century catalogs actually identified the size as 26 ounces but called the bottles “quarts.”

## Customer Identification

This idea, too, must be dismissed. Most of the bottles in this study were generic (i.e., unembossed sides) and could not be tied to any customer. Since the brewery was only identified by a paper labels, the bottles quickly disseminated to a variety of venues.

## Conclusions for Question #1

The numbers on the bases of bottles made by the Frederick Heitz Glass Works challenge the shop numbers hypothesis and support the mold code idea. Although Heitz was a small company, its bases included some of the highest numbers – to at least 41. However, the firm was in business from 1883 to 1896 – 14 years – using the same logo. The highest numbers accompanying a single mark style for most companies was in the high 20s. Most of those logos were in use for less than ten years.

If the numbers were connected with shops, pots, tanks, etc., we would expect high numbers to be associated with large firms, *regardless* of the length of time a mark had been used. The number of pots (or shops or tanks, etc.) would be the deciding factor. However, if the numbers and letters were mold codes, the number of molds would be more affected by time than by size of plant. Similarly, the ideas of bottle or customer identification are unlikely.

Although they were discussing 20<sup>th</sup> century uses, our contacts at the Owens-Illinois Glass Co. described the use of mold numbers as a form of quality control. It is thus likely, although not absolute, that the numbers and letters we have observed on export beer bottles were mold numbers used for quality control purposes.

## Question #2 – Patterns

What patterns can be observed in these numbers, letters, and symbols? Do they serve identical purposes – regardless of which company used them? If so, can the patterns lead us to deduce that purpose?

There are identifiable patterns connected to the logos and their accompanying letters and/or numbers. However, some areas where we expected patterns do not seem to have them.

## Letters versus Numbers

Jones (1963:[19-20]) quoted a letter from Thomas J. Carroll of Anheuser Busch discussing the AB-connected manufacturer's mark. In apparent reference to a proposition about the accompanying letters and numbers, Carroll stated:

I also assume, without any actual basis of fact, that you are correct in thinking that the brand [AB-connected] without identification insofar as letters of the alphabet or numbers were concerned, was the earlier type of bottle and was then followed in succession by the addition of a letter of the alphabet and then the addition of a number.

While Carroll was positing *adding* a letter/number combination, we have been involved in various discussions that suggested a significance in the use of letters versus numbers as mold marks. The discussions never yielded any clear-cut answers.

Unfortunately, neither did this study. There is no distinguishable temporal pattern for the use of numbers versus letters. Both were in use by at least 1881. In the case of the Wisconsin Glass Co., the letters indicated Factory No. 1, and numbers identified Factory No. 2. With some glass houses, only an occasional number shows up in our sample. The Streator Bottle & Glass Co. seems to have used numbers first, switched to letters, then returned to numbers. The most recent Streator bottles, used primarily for side embossed brewery identification, seem to have used no numbers at all.

## Time versus Size

As noted above, higher numbers or letters corresponded with the length of time using a single logo, but they also correspond to larger factories. For example, the Frederick Heitz Glass Works at St. Louis was not a large operation, but it used at least 41 mold numbers in 14 years of operation (1883-1896). Plant No. 2 of the Wisconsin Glass Co., however, only used the WIS.GLASSCO<sup>o</sup> logo for about four years, but it had at least 40 mold numbers during that much shorter period. Unfortunately, we can find no clear pattern connected to *either* length of operation or size of factory; the higher numbers could indicate either.

## Type of Bottle

During this 1880-1900 time period (and this is *not* true later), the basemarks and number/letter codes are associated with generic (slick-sided) export beer bottles. Two examples should explain. Mobley (2010) lists side-embossed beer bottles for 19 breweries in Milwaukee, Wisconsin, the home of the Wisconsin Glass Co. Of the older, pre-1900, bottles not a single one has a Wisconsin Glass logo. Most of those have no manufacturer's mark at all. The various "WISGLASSCo" and related logos on generic export beer bottles (i.e., lacking brewery names), however, are ubiquitous on archaeological sites and other datable contexts for the period the firm was in business.

When the Bottle Research Group investigated the MGW logo on beer bottles, we discovered that the mark was only accompanied by numbers 1-9. The logo also appears without accompanying numbers on the bases of champagne-style beer bottles that are embossed on the sides with the names of breweries. In the few instances where a number accompanies the logo, the configuration of the mark is usually horizontal (arched only with the number "9") and only appears on bases with 1, 2, 9, or no number. Generic, export beer bottles, however, are numbered 2-8. The configuration of the logo/number combination on each bottle type with number "2" are very different (see Lockhart et al. 2010).

## Use Life

In a study of Dyottville Porter Bottles, Von Meechow (2003b:11-14) showed that early molds used for these bottles seemed to last two to three years. Unfortunately, we have found no comparable study of non-embossed molds. We suspect that the high production rate involved with the manufacture of beer bottles would greatly reduce the life expectancy of molds. Large producers, such as Streator, probably went through three or more molds each year.

We had hoped that this study would provide some insight into the use life of molds. Dividing the total number of molds known to be connected to a specific mark by the total number of years the mark was used gives us the number of molds used per year. Unfortunately, this hypothesis was confounded by other variables, and we could find no pattern whatsoever. The logos varied from a low of 0.67 molds per year for the inverted arch SB&GCo mark to a high of 10 molds per year for the WIS.GLASSCo logo.



Two main factors made this approach impractical. First, higher-production plants used more molds than lower-production plants. If a plant only made a few hundred or a few thousand export beer bottles during the course of a year, it would likely only need one of two molds and may not have used any numbering system (e.g., the Kentucky Glass Works Co.). Conversely, a plant like No. 2 of the Wisconsin Glass Co. produced huge quantities of beer bottles and used more molds during the same period of time.

Second, molds wore out at different rates, depending on how often they were used. Cunninghams & Co., for example, only made beer bottles as a sideline; the firm made a huge variety of containers. Thus, we could expect export beer bottle molds to last longer in the Cunninghams plant than at one like the Frederick Heitz Glass Works, a plant that specialized in generic export beer bottles.

### Question #3 – Sequence

Can these numbers be used to give us a seriation or possible clues to help establish date ranges?

At least two other studies addressed this question. Speaking of Hostetter's Stomach Bitters bottles, Wilson and Wilson (1969:36) noted that "the numbering or other code system on the base plate was to identify a particular order of the bottles and one cannot use them to date a bottle." The numbers represented the order in which the molds were made, however, and were not a guarantee about the sequence in which the molds were used.

Siri (2005:58), in his study of Hostetter's Bitters bottles, noted the embossing of sequential numbers 1-19 on bases with the "L&W" mark (i.e., Lorenz & Wightman). The embossed side of each bottle (that he called the "face") was unique and matched only other bottles with the same embossed number on the base. He concluded that we can "assume the numbers correspond to the face molds and are not a batch number as previously thought." In one case (L&W / 4), Siri noticed two different baseplates with a single "face" mold and concluded that when the baseplate had broken, a new one was made – with the same number – to fit into the older mold.

The data from Fort Stanton beer bottle bases support the sequencing of mold use in two ways. Most of the clearly older bottles (e.g., ones that have sharp lower rings on the two-part finishes) have no embossed numbers or letters in association with the marks.<sup>7</sup> This is notable, for example, with MGCo (Mississippi Glass Co.) and LGCo (Lindell Glass Co.) marks. All the bottles we have recorded with rounded lower rings on their finishes have numbers (or occasionally letters in the case of LGCo), but the older ones have no markings but the logo.

Second, numbers and letters were almost certainly used sequentially, and these began again at 1 or A with most logo changes. The Mississippi Glass Co. provides an excellent example. The firm used three variations of logos, and each of the three began with the number “1” and extended into the low teens. There were only two recorded possible exceptions, both from the Wisconsin Glass Co. However, most of the Wisconsin Glass Co. logo changes followed the pattern where the sequence began with the earliest digit or letter (i.e., 1 or A). In the case of very minor logo changes, in a very few cases, the sequence continued on the next logo.

#### Further Speculation on Mold Numbers

Some philosophical speculation is in order at this point, due to lack of historical documentation. We discussed the reasons that a manufacturer might use sequential numbers for identification purposes without reinserting a number that had already been used. Now, however, we should examine some practical reasons.

This requires a bit of historical information about molds. Only some of the largest glass houses made their own molds during the 19<sup>th</sup> century, although the numbers increased near the end of the era. To order a mold required a glass manufacturer to send a letter to a mold maker, such as the renowned Charles Yockel of Philadelphia. Unless the mold maker already had a model, the glass house had to also send a careful description of the bottle he wanted.

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<sup>7</sup> A notable exception to this was the mark used by Carl Conrad & Co. on the Original Budweiser bottles. Conrad’s CC&Co logo on the base was frequently accompanied by either a number or a letter. Marks on other beer bottles, however, did not seem to have the additional codes until after 1880.

All records had to be handwritten, both at the glass factory and the mold maker's shop. To assess these records could be time consuming and possibly difficult. This arduous task would be made more difficult if the same number were reused. For example, if a glass house had originally ordered molds with its mark and numbers 1-6, and it wanted to order two additional molds, the numbers 7 and 8 would follow in logical sequence. Later, molds numbers 2 and 5 wore out, so the company reordered two more molds. It would be logical to continue the sequence rather than fill in the same numbers.

While this would be less important with only eight molds, what happens when the company has been in business for a few years and has now reached mold number 35? It would be very simple to access the most recent mold order and continue the sequence, while it would require increasingly more difficulty to wade through all the records of the last few years to decide which missing numbers to replace. Therefore, logically, mold numbers should follow in a sequential order.

### Sequencing and Dating

Sequencing can be used as a relative dating format – with distinct caution. Frederick Heitz, for example, was in business from 1883 to 1896 and used the FHGW logo for the entire time – including numbers from 1 to 41, as well as some bases without numbers. Logic dictates that Mold No. 1 was very likely used during the earliest years, and Mold No. 41 entered the lineup late in the sequence.

As usual, the phenomenon is much more complex and belies any simple explanation. Factories ordered more than one mold at a time. We have four mold codes (1, 2, 3, K) associated with the “C” mark of the earliest Chase Valley Glass Co., only in business during part of 1880. It is very likely that the three numbered molds were ordered simultaneously at the start of the company, and the “K” code mold was added later. The sequencing, in this case, is meaningless.

It is very likely that most factories ordered several molds at one time. Thus, using mold numbers/letters for relative dating is reasonable when assessing marks with a long range of numbers or letters – with caution – but the method is virtually useless where the range is short. At the Chase Valley Glass Co., for example, the mold with the number 1 was *not* necessarily used prior to the one with number 3. They were almost certainly used simultaneously.

The idea propounded by Siri adds another dimension to relative dating. Siri (2005:58) suggested that, if baseplates wore out first, they were replaced *using the same number*, and used with the original mold. While this explains our two exceptions (same mold number in two different baseplates), it also poses a second issue: Do we date bottles made with a mold using the second baseplate from the date of the mold or the date of the new baseplate? The point, of course, is probably moot; baseplates used to make export beer bottles were probably heavily used and wore out in a few short years.

#### Question #4 – Variations

Are the minor variations in marks (including font types, a superscript and/or underlined “o,” different configurations, etc.) indicative of datable or explainable variation, or are these constructed at the whim of the mold maker?

As demonstrated in the body of this report, virtually all variations in logo sub-types are temporally sensitive. Using a combination of historical records, manufacturing techniques, and data about firms using the bottles (in this case, breweries), we have been able to create a logical order for almost all the variations in marks used by firms that made export beer bottles (and most other types).

It has also become clear that the superscript and/or underlined “<sup>o</sup>” in “C<sup>o</sup>” was used from the earliest manufacturer’s marks (ca. 1878) until ca. 1882. The vast majority of the superscript “C<sup>o</sup>” were found on export beer bottles topped by two-part finishes with sharp lower rings. These finishes were popular from the first export beer bottle (1873) to ca. 1878. Export beer finishes with round lower rings were adopted ca. 1878 and dominated the field by ca. 1880 (Lockhart 2007). The very few “C<sup>o</sup>” marks on bottles topped by finishes with round lower rings were a transition.

#### The Letter G

In general, we have not discovered any datable variation by font – with the exception of the letter “G.” The letter “G” can be formed in a number of ways, including using an upright post at the base with a horizontal bar at the top of the post. Eventually, the Bottle Research Group will analyze all the “G” variations, but, so far, we have only discovered a single “G” font

that is strongly associated with export beer bottles and sharp lower rings. This “G” has the “crossbar” slid to the right so that the entire serif extends in that direction. Other “G” styles appear to be pretty randomly distributed on most bottle types throughout the late 19<sup>th</sup> and early 20<sup>th</sup> centuries.

We have only found this “right-extended G” on export beer bottles used by four glass houses, three of which operated in the St. Louis area. All examples were on bottles topped by two-part finishes with sharp lower rings (Figure 48). Two of these firms, the Mississippi Glass Co. and the Lindell Glass Co., were some of the earliest firms to make export beer bottles. The Belleville Glass Co., however, opened on September 6, 1882.



Figure 48 – Bases with right-extended “G” in the logo

An oddity, however, is the IGCoL basemark with a right-extended “G” in the logo. We have identified the IGCoL mark as being used by the Ihmsen Glass Co., Ltd., from 1878 to 1896. However, the Ihmsen firms were located at Pittsburgh and were unlikely to use the same mold makers as the St. Louis glass houses.. There is, however, an ongoing debate about the user of the IGCo mark (without the “L”) on export beer bottle bases (see IGCo section above). Logically, we would expect to find the right-extended “G” on bottles made by the Illinois Glass Co., located relatively close to St. Louis, the area where all the other extended “G” marks were used. We have found no other Pittsburgh glass house that used molds with the right-extended “G” in the logo.

The molds with the right-extended G in the logos were all apparently made by the same engraver. Lockhart and Whitten (2005; 2006) noted this pattern of engraver “signatures” in the St. Louis area. The bottles were probably all made ca. 1880-1883. In general, the technique of making sharp lower rings on two-part beer bottle finishes ceased ca. 1882, but the Belleville Glass Co. appears to have continued the process later, probably not adopting rounded lower rings until late 1883.

## Conclusions

The most likely explanation for the numbers and letters embossed in association with manufacturer's marks on export beer bottles was certainly some form of quality control – commonly called mold codes or mold numbers. The question remains as to exactly how the system worked. Current research suggests that the numbers and letters probably were related to the order of manufacture, although not to actual dates.

In general, bottles from a given company with no number or letter codes were probably made earlier than those with numbers and/or letters, although there were certainly exceptions. The order in which numbers and letters were used is much less clear. In at least one case, the difference between numbers distinguished two factories rather than any temporal order.

The sequence of numbers or letters likely indicates the production order (e.g., a mold that created the embossed number “3” was probably made before one with number “12”). There are almost certainly exceptions, but this appears to be the general use across the manufacturing spectrum for glass houses making export beer bottles with applied finishes during the ca. 1878 to 1896 period.

Mouth-blown export beer bottles seem to have gone through a series of stages between their invention in 1873 and ca. 1914 (by which time, they were virtually entirely replaced by machine-made bottles):

1. 1873-ca. 1876 – no manufacturer's marks or mold codes
2. ca. 1876-ca. 1878 – generally no marks or codes; some bottles had large individual letters, numbers, or symbols on their bases
3. ca. 1876-1883 – CC&Co or OGCo monograms on bases
4. ca. 1878-ca. 1882 – manufacturer's marks on bases but no mold codes
5. ca. 1880-ca. 1914 – manufacturer's marks and mold codes

There were, of course, exceptions to most of these stages – including some heelcodes, especially on bottles with brewery embossing on bases.

## Photo Note

Wanda Wakkinen, attempted to photograph all variations of marks on the beer bottle dump sites. In many cases, however, the bases were too corroded, or the marks were too indistinct for legible photography. Where possible, the photographs used in this study are from Fort Stanton; however, two other sources were used to fill in where the Fort Stanton photos were indistinct. These include the Tucson Urban Renewal (TUR) Collection, the collection at Fort Laramie, the collection from San Elizario, bottles at Hillsboro, New Mexico, the collection at Fort Bowie, and the Fort Bowie bottles housed at the National Park Service Western Area Curation Center, Tuscon. These are credited; all unmarked photos are from Fort Stanton.

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