

# **Bromo-Seltzer in the Cobalt Blue Bottles**

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When Isaac E. Emerson began placing his headache remedy – Bromo-Seltzer – on the national market in 1891, he opened up a major chapter in bottle production. Although it is probable that Emerson’s initial bottles were generic and aqua in color, about the turn of the century he began buying cobalt blue bottles embossed with the name of the product and his firm, the Emerson Drug Co. In 1907, he incorporated his own glass plant – the Maryland Glass Corp. – and began making his own containers. Between ca. 1900 and the late 1970s, Emerson made or commissioned more than 20 variations of the Bromo-Seltzer bottles in at least seven sizes. This is the first study to place these bottles in datable contexts.

## **Histories**

### **Emerson Drug Co., Baltimore, Maryland**

Isaac Edward Emerson was born at Chapel Hill, North Carolina, July 24, 1859. Emerson attended the University of North Carolina from 1876 to 1879, graduating as a chemist. In 1880, Isaac E. Emerson opened his first drug store at Annapolis, Maryland, but moved to Baltimore the next year and ran three drug stores there during the 1884-1889 period. Emerson conceived the plan for a headache remedy at one of his Baltimore drugstores in 1888 and left the business on May 1, 1889, to concentrate on the wholesale manufacture of Bromo-Seltzer (Hall 1912:259-260; Munsey 1992:2).

According to Wikipedia (2014), Bromo-Seltzer received its name from sodium bromide, a tranquilizer.<sup>1</sup> Isaac E. Emerson, of Baltimore, Maryland, registered Trademark No. 16,599 for Bromo-Seltzer on May 21, 1889, claiming a first use of the mark on January 15 of that year. He

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<sup>1</sup> According to Munsey (1992:1), bromides were withdrawn from the U.S. market in 1975 because of their known toxicity.

sold a half interest in the trade mark to Waggaman for \$10,000 (Munsey 1992:1; West Publishing Co. 1894:585-586).

Although most sources claim that Emerson incorporated the Emerson Drug Co. in 1891, the firm actually was a copartnership between Emerson and John F. Waggaman, begun on April 16, 1890. Waggaman was apparently the financial backer of the enterprise, and the partners soon built a factory in Baltimore (Munsey 1992:2; West Publishing Co. 1894:585). According to the Brawner Co. (2014), “the United States Patent Office recorded an assignment by Isaac Emerson to John F. Waggaman of Emerson’s interest in Bromo-Seltzer Patent No. 9660 D 90” on May 6, 1890. This would be consistent with the partnership date, but we have been unable to locate the actual patent document. Waggaman reportedly sold his share of the business to Emerson in 1905 (Munsey 1992:1).

Emerson organized the Maryland Naval Reserve in 1894 and commanded the fleet until 1901. On May 25, 1898, Emerson was commissioned as a Lieutenant in the Navy and commanded the reserves, now on active duty, until the end of the Spanish-American War in July of that year. He was promoted to Captain on April 19, 1900, and held that rank until his resignation in 1901 (Hall 1912:260).<sup>2</sup>

The Spanish-American War created a new chapter in Bromo-Seltzer history. According to Munsey (1992:3),

Just after the war began, Congress passed the U.S. Revenue War Bill of 1898, “An Act to Provide Ways and Means to Meet War Expenditures and for Other Purposes.” After being signed by President William McKinley, the Act became effective July 1, 1898 and had the same purposes and requirements as “Schedule ‘C’ of the Revenue Act of 1862,” specifying that revenue stamps be affixed to a variety of items including patent and proprietary medicines such as Bromo-Seltzer.

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<sup>2</sup> We have not found any reference to who operated the Emerson Drug Co. during Emerson’s wartime absence.

Emerson ordered private die stamps in 1900, although the firm had earlier used regular stamps with the firm’s initials or name printed on the stamp face (Figures 1 & 2). The tax was removed as of July 1, 1901, so these were only in use for about seven months. The stamps were set according to the price of the item, so the 10¢ size used a ¼¢ stamp; the 25¢ size had a 5/8¢ stamp; a 1¼¢ stamp adorned the 50¢ size; and the largest \$1.00 size had a 2½¢ stamp (Munsey 1992:3; Hinstl 2014).



Figure 1 – Bromo tax stamps (rdhinstl's Page)

On May 6, 1903, Emerson brought suit against the Hanson Granule Co. for trademark infringement with Hanson’s Seltzer Supreme. On March 5, 1904, the court found in favor of Emerson, forcing Hanson to abandon



Figure 2 – Bromo tax stamps (rdhinstl's Page)

the bottles and labels similar to those of Bromo-Seltzer. The proceedings made note of “a peculiarly shaped bottle having a round shoulder and a short neck made of a peculiar color of glass . . . blue glass” (*Midland Druggist* 1904:1138).

The main ingredient in Bromo Seltzer was acetanilid (now known to have been poisonous), and several of the articles on medicine fraud in the early part of the 20<sup>th</sup> century targeted Bromo Seltzer, along with numerous other nostrums and patent medicines as being dangerous to the public. One of the reasons for the popularity of these medicines was their extravagant claims as cure-alls, often listing virtually every disease known to humans as being relieved by their medicines. Ingredients, however, were generally unnamed in all of these products. The Pure Food and Drug Act of 1906 changed all that by requiring that all ingredients be listed on the labels and that those ingredients had some noted effect on the illnesses claimed (Munsey 2010:1-2). Emerson revised the label to fit the 1906 requirement but did not change the formula. Although complaints continued into the late 1960s, Emerson never revised the ingredients (Munsey 1992:5-6).

Emerson expanded his factory on Lombard St. in 1909, spreading to Eautaw St. In 1911, Emerson built the Emerson Tower Building with its famous clock tower at S. Ewtaw and W. Lombard Streets in Baltimore. The tower featured four enormous clocks (facing different directions) with each number on the clock face replaced by “BROMO” in an arch and SELTZER” in an inverted arch (one letter replacing each numeral). Above the clocks was a 51-foot-tall Bromo-Seltzer bottle – topped by a crown – glowing blue at night (Figure 3). Emerson removed the bottle in 1936 due to structural concerns (Hall 1912:263; Wikipedia 2014).

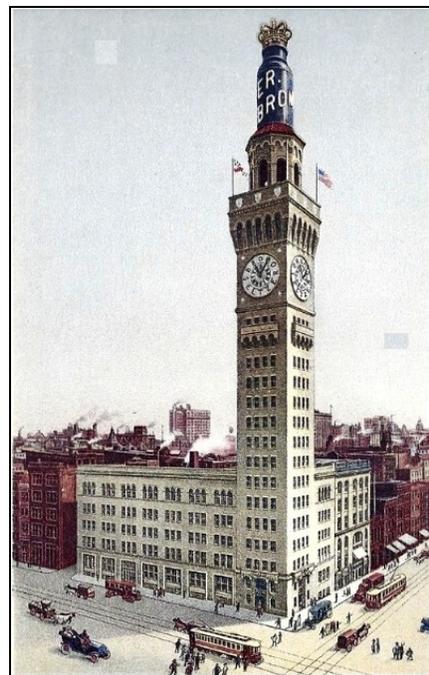


Figure 3 – Bromo Tower (eHive)

The Emerson Drug Co. sold the plants – both glass and medicinal – to the Warner-Lambert Pharmaceutical Co. in 1956, and Warner-Lambert sold the glass plant to the Dorsey Corp. in 1971 (Fike 1987:81; Toulouse 1971:340-341). It is unclear whether the Dorsey Corp. acquired both companies, but it is likely that Warner-Lambert retained the drug business. Dorsey certainly picked up the Maryland Glass Corp.; however, the point is probably rendered moot, since Bromides were withdrawn from the U.S. market in 1975. It is even possible that Warner-Lambert sold the glass plant because it had shifted to plastic bottles.

### **Maryland Glass Corp., Mt. Winans (Baltimore), Maryland**

With Isaac E. Emerson at the helm, a group incorporated the Maryland Glass Co. in 1907 at Mt. Winans, Maryland.<sup>3</sup> The firm was incorporated under the laws of New Jersey with a capital of \$100,000 – with Emerson owning almost the entire stock. The firm appointed J. Harry Williams as the plant manager on November 1, 1907. Williams was hired “as supervisor of [the plant’s] construction.” Thereafter, he was in “charge of manufacture of all bottles produced at above works, make all glass, hire all blowers, hire all other labor and office force necessary.” Williams left the firm in May of 1918 (Perkins 1920:322, 328).

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<sup>3</sup> Mount Winans was a small village southwest of Baltimore, along the Baltimore & Ohio Railroad. The area was engulfed by the larger city and is currently a neighborhood in Baltimore.

Philip I. Heuisler was apparently one of the incorporators and an early president of the firm. Apparently, the corporation acquired Olean semi-automatic machines about 1911 (Toulouse 1971:339-340). By 1913, Maryland Glass made a general line of glassware at three continuous tanks with 11 rings, entirely by semiautomatic machines (*Journal of Industrial and Engineering Chemistry* 1913:952). Assuming that Toulouse was correct about the installation of machines in 1911, Maryland Glass apparently ceased mouth-blown methods no more than two years later.

In 1913, Maryland Glass also captured the exclusive Owens license to manufacture Bromo-Seltzer in blue glass bottles (*National Glass Budget* 1913:1). Walbridge (1920:96) stated, "It was considered advisable to concentrate as far as possible, all the production of blue glass for which there was a limited demand, under the control of one factory." It is unclear just *whom* considered this concentration advisable, but it was most likely both Owens and Maryland Glass. By November 1916, the plant used one 6-arm Owens machine and one 10-arm machine to make "Bromo-Seltzer ware" (Palmer 1917:213).

The officers of the firm reorganized in late December 1914 as a Maryland corporation, again with \$100,000 in capital stock. As with the initial corporation, all the skilled laborers were union members (Perkins 1920:324-325). In 1917, the *Glassworker* (*Glassworker* 1917:4) presented a cameo view of the Maryland Glass Corp. operation:

The old tank at this plant is being worked with two Owens automatic machines, one Olean machine and one press shop are being worked and blue bottles and jars are being made. The new tank which was recently built is being equipped with an Owens automatic machine and will be put in blast July 10 and amber ware will be made. . . . The Olean machine is being worked two shifts and wide mouth ware is being made. Cream jars and stoppers are made on the press shop. About 90 per cent of the blue bottles used in the United States are made here and about 30 per cent of the ware turned out is used by the Bromo-Seltzer Company.

The next year (1918), the plant operated "three Owens, two Olean machines and two blow shops (*Glassworker* 1918:12). Clearly, hand manufacture had not completely ceased by that time, or the plant had resumed hand production. Unfortunately, the source did not list

which products were made by which method. It is highly likely, however, that the plant made all Bromo-Seltzer bottles by machine.

A December 1921 ad noted that “automatic machinery of the highest type enables us to produce economically, bottles of sterling quality” (*Glass Container* 1921:22). This *may* indicate that the full conversion to automatic production occurred in 1921. The glass corporation was so connected to Bromo Seltzer that the company office was located in the Bromo-Seltzer Tower building, Baltimore, by 1923 (Kelly Publishing Co. 1923:1931).

By 1927, the factory made “prescriptions, patent, proprietary, and a general line of bottles; blue, green tint and flint” at three continuous tanks, adding O’Neill and Lynch machines in 1928. The dropped prescriptions from the list in 1933, and the plant added perfume the following year, along with the adjustment that products were made on “O’Neil and Lynch and I-S machines.” The machines were modified to “O’Neill and I-S machines in 1935 and continued through 1936. In 1940, the product list remained unchanged, but the plant now used Lynch and I-S machines. In 1943, flint was the only color listed (*American Glass Review* 1927:141; 1928:142-143; 1933:68; 1934:95-96; 1935:88; 1940:98; 1943:104).<sup>4</sup>

As noted above, the Emerson Drug Co. sold the plants – both glass and medicinal – to the Warner-Lambert Pharmaceutical Co. in 1956, and the Dorsey Corp. acquired the Maryland Glass Corp. in 1971 (Fike 1987:81; Toulouse 1971:340-341). Dorsey placed the Maryland Glass Corp. under the Chattanooga Glass Co. umbrella, although the factory continued production under its own name. On October 25, 1978, Chattanooga Glass sold the assets for the Baltimore plant to Stephen Kelly, under the name of Kelly Glass. Kelly soon adopted the older name of Maryland Glass Corp. (Leagle [2014] 1985).

Kelly almost immediately suffered financial difficulties and on, October 31, 1979, filed a voluntary petition for reorganization under Chapter XI of the Bankruptcy Reform Act of 1978. Maryland Glass began laying off its employees in December 1980 and closed all operations on February 25, 1981. On April 21, the firm was officially adjudicated as bankrupt, and liquidation proceedings began (Leagle [2014] 1985; Open Jurist 2014).

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<sup>4</sup> This listing is highly unlikely. We have found Cobalt Blue Bromo-Seltzer bottles in formats that could only have been made in the 1950s.

## Containers and Marks

Eastin (1965:16) stated that Bromo-Seltzer bottles were used as early as 1891. She noted that

the original bottles were partially hand-fashioned and were supplied by Hazel-Atlas.<sup>5</sup> In 1907, the Maryland Glass Corporation was established for supplying future containers for the product. . . . Cork closures were used until 1920, then replaced with metal seals. The changeover was completed in 1928. The change from metal seal to screw cap was made in 1954.

Toulouse (1971:162, 339), however, noted that the Cumberland Glass Co., Bridgeton, New Jersey, had made Bromo-Seltzer bottles prior to the inception of the Maryland Glass Corp. He noted that Cumberland was the “cobalt blue specialists of that period.” Although Toulouse did not specifically explain “that period” – he likely meant from the 1890s to the opening of the Maryland Glass Corp. Munsey (2010:13) claimed that the Cumberland Glass Co. made the first blue bottles for Bromo – apparently when the firm opened in 1891. Because Cumberland was unable to meet the demand for Bromo-Seltzer, Emerson and his vice president in charge of manufacturing, Philip I. Heuisler, organized the Maryland Glass Corp. to make the bottles and blue-glass tumblers – etched “BROMO- / SELTZER” – for the firm. The firm gave away the tumblers as premiums to drug stores for ordering Bromo and as gifts to people touring the glass plant.

At least two errors – a reversed “R” and a reversed “Z” – have been reported on Bromo-Seltzer bottles.

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<sup>5</sup> This is highly unlikely. The Hazel Glass Co. was in operation by 1885, but it originally made fruit jar glass lid inserts. It soon branched into fruit jar production, but bottles were never noted until 1900; even then, jars were the primary product. Hazel did not combine with the Atlas Glass Co. until 1902. Sources did not list Hazel-Atlas as producing blue glass until 1933, although the firm may have made cobalt blue Milk of Magnesia bottles earlier.

## Sizes

Over the years, the various factories that made the bottles produced them in at least six sizes. The exact measurement of the earliest bottles could vary because the hand manufacturing techniques were inconsistent. In addition, different factories made bottles of eight different heights – although some were only slightly divergent (see Table 1). In a practical sense, these divide up into only five sizes: small (1-ounce); 4-ounce; 5 ½-ounce; 13-ounce; and large 25-ounce.

Originally, Emerson only packaged Bromo-Seltzer in the small (1-ounce) sizes, and these continued to be used until the mid-1950s. The diameter of these small bottles, however, changed through time as glass formulas increased strength. Initially, the only way to make a bottle stronger was to use more glass – creating a thicker bottle. Gradually, as factories reduced the thickness of the glass, the diameter of the bottles decreased.

Emerson began using the four-ounce size about 1900 and continued to offer it probably into the 1950s. However, there was a brief period – ca. 1915-ca. 1920 – when bottles the three-lug finish and full-front embossing shifted to a five-ounce format that was one-half inch taller (see discussion of the finish and embossing below). The size returned to four ounces immediately following the period.

About 1905, the company adopted a five-and-one-half-ounce bottle, just slightly larger than the four-ounce container described immediately above and continued to use that size into the 1970s. The use of the five-ounce bottle (see above) was probably brief due to the almost minute difference (one ounce) between these two sizes. The closeness in size was probably also the reason behind the elimination of the four-ounce bottle (1.5 ounce difference) in the 1950s.

Emerson introduced a larger 13-ounce bottle about 1910. These 6 ½-inch containers were used into the 1950s, when they were replaced by a nine-ounce bottle that was only one-half inch shorter. These new bottles were tapered downward from shoulder to heel and had continuous-thread finishes. They were discontinued in the 1970s.

The final, largest sizes were slightly different. The earliest of these was adopted sometime in the teens and was used on bottles with both single-ring and four-lug finishes. The containers were 7 3/4 inches tall, held 25 ounces, and were used until the 1950s. The bottles with the full-front embossing had the embossing in the usual format, but the others, embossed at the heel, had embossing that was read with the bottle upside down. Each bottle fit into a dispenser on a stand, and they were marketed to drug stores. About the mid-1950s, when Warner-Lambert purchased the firm, it shifted to a slightly smaller variation, 7 1/4 inches in height, although we have not yet obtained an example to measure the volume. These were apparently discontinued in the 1970s.

**Table 1 – Bromo-Seltzer Sizes**

Height (")	Width (")	Ounces	Finish Types (Embossing Type)	Dates
2 ½ - 2 5/8	1 - 1 1/4	1	Single-ring; 3-Lug (heel);CT (heel)	1891-1950s
4	1 ½ - 1 5/8	4	Single-ring; ball-neck; 3-Lug (heel); CT (long - shoulder)	ca. 1900-1950s?
4 3/4	2	5	3-Lug (full-body)	ca. 1916-ca. 1920
5	2	5 ½	Single-ring; ball-neck; 3-Lug (both); CT (both); 1262/3 base	ca. 1905-1970s?
6	2 (base) 2 1/4 (body)	9	CT (short)	ca. 1956-ca. 1970
6 ½	2 ½	13	Single-ring; ball-neck; 3-Lug (both); 4-Lug (both)	ca. 1910-ca. 1956
7 1/4	2 3/4	?	CT (short)	ca. 1956-ca. 1970
7 3/4	3 1/4	25	4-Lug (both)	ca. 1916-ca. 1956

### **Bottle Types**

We have cataloged a total of 19 different types of Bromo-Seltzer bottles – plus a few sub-categories. Initially, we attempted to make a simple chronology based on manufacturing

techniques – with mouth-blown bottles first, followed by machine-made bottles. The problem with that idea is that different glass houses adopted different machines at different times – and those machines left distinct and unique characteristics on the bottles that they made. At least five glass houses made Bromo-Seltzer bottles, with at least three others as possibilities.

### **Manufacturers**

Five different glass houses certainly manufactured the bottles (see Table 2). The earliest was the Cumberland Glass Mfg. Co. – from ca. 1891 to 1907, although the George Jonas Glass Co. may have made some of the bottles during the ca. 1900-1905 period. Because Cumberland was unable to meet Emerson’s demand for Bromo bottles, Emerson passed the contract at least once – in 1905 – to the Ohio Bottle Co. Ohio Bottle’s successor was the American Bottle Co. in late 1905, and Bromo bottles we have found from the firm had the “A.B.CO.” logo embossed on the heels. It is possible that the Hazel-Atlas Glass Co. made Bromo bottles at some point during the 1905-1907 period, but we only have that information from Eastin (1965:16). Another possibility during this period is the Cape May Glass Co., although we only have that information (along with the reference to George Jonas) from Pepper (1971:271, 274). The Emerson Drug Co. formed its own glass house – the Maryland Glass Corp. – in 1907 and made bottles until the 1950s. Later containers had no manufacturer’s marks, so we do not know the identity of that glass house (or those glass houses).

**Table 2 – Chronology of Manufacturers of Bromo-Seltzer Bottles**

Manufacturer	Dates
Cumberland Glass Mfg. Co.	Poss. 1891-ca. 1907
George Jonas Glass Co.?	Poss. ca. 1900-1905
Ohio Bottle Co.	1904
American Bottle Co.	1904-1905
Hazel-Atlas Glass Co.?	Poss. 1905-1907
Cape May Glass Co.?	Poss. ca. 1908-1910
Maryland Glass Corp.	1907-1950s
Unknown	1950s-1970s

We should pause here for a word about the sources. Unfortunately, most of our sources did not explain where they obtained their information. Eastin (1965) was the earliest secondary source we have found with Bromo-Seltzer information. Although she did not specifically cite her sources in this instance, Eastin frequently wrote letters to the firms involved with her research.

Toulouse (1971) was actually a part of the glass industry, working for the Owens-Illinois Glass Co. As such, he had insider information found from no other source. He left a general list of sources at the end of each company description. Unfortunately, he also frequently guessed (incorrectly) at manufacturers, and his work was riddled with typographic errors, especially with numbers. Munsey (2010) listed sources in his bibliography but not in the text, so we cannot be sure of his sources for any specific information. In his work in general, he seems to have relied heavily on Toulouse – uncritically.

This is important because Toulouse is our only source for Cumberland Glass as the primary manufacturer of Bromo-Seltzer bottles from ca. 1891 to 1907, Eastin is our only source for Hazel-Atlas as a producer, and Pepper was the only one to connect George Jonas and the Cape May Glass Co. to Bromo-Seltzer. There is no question whatsoever that the American Bottle Co. made a single large order in 1905 (almost certainly preceded by some bottles made by the Ohio Glass Co.) or that the Maryland Glass Corp. became the exclusive source for the bottles after ca. 1909. Although Maryland Glass opened in 1907, Cumberland Glass probably continued making some Bromo-Seltzer bottles until at least 1909, while Maryland Glass was getting set up.

Because the Emerson Drug Co. had problems getting enough bottles from 1905 to 1907, Isaac Emerson created the Maryland Glass Corp. in the latter year. The plant apparently began making cobalt blue Bromo-Seltzer bottles in 1908 and continued to produce the containers until 1956. Maryland Glass adopted Olean semiautomatic machines ca. 1911 and obtained the Owens Bottle Machine Co. license for the exclusive production of cobalt blue containers in 1913 (Scoville 1948:106; Walbridge 1920:95-96; Miller & McNichol 2010:11). By 1921, the plant had ceased hand production, and it had eliminated both the Olean and Owens machines by 1927, replacing them with Lynch and O'Neill machines. We will discuss some of these dates in more detail in the sections on individual bottle characteristics below.

Several factors are important in dating these bottles and creating a chronology:

Manufacturing technique

Manufacturer's marks

Embossing and Finish styles (Table 3)

Historical references to machine types

**Table 3 – Embossing and Finish Styles**

Dates	Embossing	Finish	Mfg. Tech.
ca. 1900-1911	Front: BROMO-SELTZER / EMERSON / DRUG CO. / BALTIMORE, MD.	Single-Ring	Hand
ca. 1901-1920	Same	Single-Ring	Machine
ca. 1918-1922	Same	3-Lug	Machine
ca. 1918-1922	Same	4-Lug	Machine
ca. 1920-1956	Heel: BROMO-SELTZER EMERSON DRUG CO.	4-Lug	Machine
ca. 1920-1956	Same	3-Lug	Machine
ca. 1954-1956	Same	Continuous-Thread	Machine
ca. 1956-1970s	Shoulder: BROMO-SELTZER BROMO-SELTZER	Continuous-Thread	Machine

**1. Unembossed Aqua Bottles with Paper Labels (1891-ca. 1897)**

Unfortunately, mouth-blown bottles from two different periods are identical as far as manufacturing characteristics are concerned. Cumberland Glass made Bromo-Seltzer bottles by hand probably from the incorporation of Emerson Drug in 1891 to a period before the use of machines by Cumberland ca. 1901. These bottles may have been made as early as 1895, although the scarcity of the bottles may suggest a slightly later date.

Maryland Glass also made the bottles by hand from 1907 to ca. 1911. Almost every example that we have personally examined or seen on eBay had a one- or two-digit number embossed on the base. The embossed numbers ranged from 1 to 28 in the sample we have found, and the numbers were all roughly the same size. This suggests that the bottles in our sample were probably made by the same glass house.



Figure 4 – 1889 sheet music (National Museum of Play)

This leads to some interesting speculations. We consider the chances of two different glass houses producing the same size cobalt blue bottles with identical embossing on both the front and the base to be *very* slim. Logically, there should have been differences. Possible explanations include:

1. Cumberland Glass sold the old hand molds to the Baltimore firm when the latter began making the Bromo-Seltzer bottles.
2. Despite the odds, both firms *did* make identical bottles.
3. Most of the early, Cumberland-made bottles were unembossed.

If either of the first two scenarios is correct, there will be no way to detect a difference between the two bottles. We consider the third hypothesis as the most likely based on early drawings of the bottles – showing no embossing (Figure 4). It is likely that the original Bromo-Seltzer bottles were aqua in color and generic – with no embossing of any kind. The section just below describes the next bottles in the sequence, and some of them were aqua in color.

## 2. Mouth-Blown Bottles with Full-Front Embossing & Squared Finishes (ca. 1897-ca. 1903)

A single small group of mouth-blown bottles stands out as different. With one exception, mouth-blown bottles all had a single-ring finish (see the double-ring example #7 below). In the vast majority, that ring was rounded. This much smaller group is scarce, and they had squared rings. Some of these were aqua in color and were made in one-ounce (ca. 2 5/8") and four-ounce

(4") sizes – although some were made in cobalt blue glass. The base of our only example (in cobalt blue) was embossed only with a single large dot in the center. Whitten (2014) reported an example with a backwards “Z” (Figure 5).



Figure 6 – Bromo – squared ring aqua on left (eBay)

These were probably made by the Cumberland Glass Mfg. Co., possibly by ca. 1897, with bottles embossed “BROMO-SELTZER / EMERSON / DRUG CO. / BALTIMORE, MD.” on the front – in aqua color, with squared-ring finishes (Figure 6). Soon, the glass house changed formula and made the same bottles in cobalt blue glass (Figure 7). David Whitten (personal correspondence 12/3/2014) stated that his example of this bottle type was cobalt blue in color and was found in a Louisville, Kentucky, excavation

in 1997. The group of excavated bottles was dated to the 1885-1895 period. Thus, these bottles may have been made as early as ca. 1895. It is even possible that embossed bottles were made from the initiation of the partnership in 1891.

Although these mouth-blown bottles were likely manufactured until the molds wore out, production likely shifted to machine-made bottles ca. 1901. A 1903 trade card featured a bottle with a squared ring (Figure 8). Thus, the squared-ring, mouth-blown bottles – both aqua and cobalt blue colored – were probably made by the Cumberland Glass Mfg. Co., and all of the cobalt-blue, rounded-ring, mouth-blown bottles with basal numbers were likely made by the Maryland Glass Corp. Also see Bottle Research Group (2014) for the history of the Cumberland Glass Mfg. Co.



Figure 5 – Backwards Z (David Whitten)



Figure 7 – Bromo – squared ring blue finish



Figure 8 – 1903 trade card (Old Glass Bottles & Items of Antiquity)

### **George Jonas Glass Co., Minotola, New Jersey (ca. 1894-1911)**

Pepper (1971:271) was very specific about products made at the plant, probably during the very early 1900s. Furnace No. 1 made “handblown flint ware” including wine, whiskey, olive, cherry, and continuous-thread-finished catsup bottles – all mouth blown. Furnace No. 2 was “producing machine-made bottles” – although she failed to discuss either the type of machine or the products. This early, the machine likely made wide-mouth bottles or jars. Furnace No. 3 “a smaller one known as the dinky, was used alternately for blue glass in making Stafford inks and Bromo Seltzer bottles and for amber glass required in snuff and other jars and tonic bottles.”

These would have been mouth-blown bottles, and they would not have been made in large quantities – being made at the “dinky” furnace, alternating with Sanford ink bottles. If Pepper’s attribution is correct, the only bottles that would fit would be these square-finished, mouth-blown examples. If these were, indeed, made by George Jonas, they would still probably fit into the same temporal period: ca. 1901-ca. 1903. Aside from Whitten (2014c), who cited Pepper, we can find no other reference to cobalt blue glass or Bromo-Seltzer connected with George Jonas.

Pepper (1971:274) also mentioned Bromo-Seltzer bottles in her list of products made by the Cape May Glass Co. However, since Cape May Glass was in business from 1908 to 1924 – during the period when the Maryland Glass Co. was making bottles for Emerson – we consider this unlikely to be correct. If Cape May Glass *did* make Bromo-Seltzer bottles, it may have made them by machine. The plant certainly used some machines (as well as hand processes) by 1913. Alternatively, Cape May Glass could have inherited the Bromo-Seltzer molds from the related George Jonas Glass Co.

### **3. Machine-Made, Full Front Embossing, Prominent Neck-Shoulder Seam (ca. 1901-ca. 1904 or later)**

These bottles had the same full-front embossing – “BROMO SELTZER / EMERSON / DRUG CO. / BALTIMORE, MD.” – described above, although they were machine made (Figures 9 & 10). Each of these bottles had a cup bottom with a side seam that extended to the



Figure 9 – 1<sup>st</sup> Machine-made bottle (eBay)

center of finish. The single-ring finish had a horizontal seam around the center, intersected by each side seam. The single ring sloped toward the mouth to form a prescription finish (Figure 11). These finishes were developed to improve pouring, although that may have been unnecessary with Bromo's powder content. The most diagnostic feature was a prominent seam encircling the neck just above the shoulder. This seam was very flat at the top, sloping down to the neck (Figure 12 & see Figure 11). We have only found this set of characteristics on small (ca. 2 5/8") Bromo-Seltzer bottles.

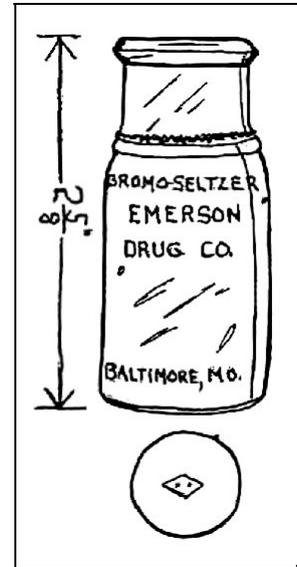


Figure 10 – Early machine-made Bromo (Eastin 1965:17)



Figure 11 – Prescription finish

There were two possible machines that could have left this type of seam around the neck just above the neck-shoulder joint. Cumberland adopted the Haley-Bridgwater machine quite early, ca. 1901. Jonathan Haley and Harry H. Bridgwater applied for their first patent on December 28, 1898, and received Patent No. 654,451 on July 24, 1900. This is likely the 1901 machine referred to by Scoville (1948:324). The inventors noted that the patent was for



Figure 12 – Side view of neck-shoulder ring

improvements in apparatus' for forming hollow glass articles; such, for instance, as bottles and jars; and the invention relates more especially to the formation of hollow glass articles by first pressing or molding a quantity of glass into a hollow form and then expanding the blank by blowing into the latter.

The patent drawing showed a neck ring that extended from the center of the finish to the shoulder of the bottle and a top plate that served as a plunger guide. The plunger entered the

neck and pressed the glass into a parison. The neck ring then lifted the parison from the parison mold and moved it to the blow mold. A separate top plate then positioned the blowing apparatus as the neck ring descended into the blow mold. A puff of air then completed the bottle. As shown in the patent drawing (Figure 13), the base should have had a cup bottom, and the neck ring should have left a horizontal seam encircling the shoulder of the bottle. A second horizontal ring should have encircled either the bottom of a squared finish or the center of a rounded finish. The shoulder ring would be distinctive and is rarely found on bottles or jars.

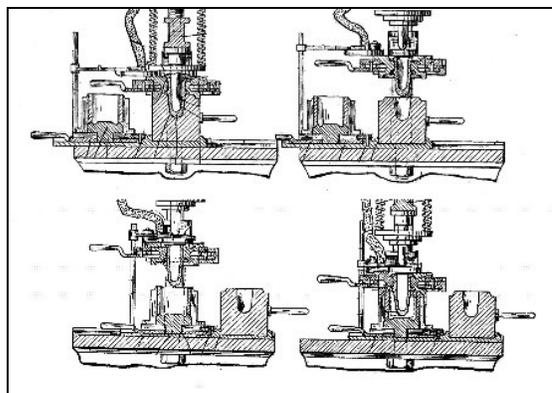


Figure 13 – Haley & Bridgwater 1900 patent



Figure 14 – Odd-colored bottles (eBay)

As noted above, the most interesting feature of this bottle was a distinctive horizontal seam just above the neck/shoulder joint. The size and prominence of the seam may have been caused by a fault in the early machine and was possibly the reason for improvements in the second machine (see Figures 10-12). Some of the bottles were teal blue (Figure 14). This type of bottle was probably made from ca. 1901 until the molds wore out, possibly 1903 or 1904.

Our very small sample of these off-color bottles are all this bottle type. We originally hypothesized that the color was the result of the early experimentation with glass formulas to create the cobalt blue color. Whitten (2014c) warned that

unscrupulous ebay auction sellers have recently listed old Bromo-Seltzer bottles in a peculiar dull greenish color (I would give the color a term such as swampy moss green, olive green amber, pukey sick green, burnt olive green, dirty oily mustard green). **THESE BOTTLES ARE ACTUALLY COBALT BLUE BOTTLES WHICH HAVE UNDERGONE “NUKING” (irradiation) to change their color to a “rare” color shade, increasing the “perceived” value.**

We have also discovered this type of discoloring on a mouth-blown Bromo-Seltzer bottle. Finding the same coloration on two bottles made with *different* manufacturing techniques supports Whitten’s identification of these as being irradiated.

The only flaw in our Haley-Bridgwater identification is that the lower seam is just *above* the shoulder rather than *below* it. However, the mold could easily have been modified slightly without violating the patent, and such minor adjustments were common. The mold design may have even worked better with the neck-ring joint above the shoulder than below for this style of bottle or for one of this size. While this placement slightly weakens the argument, the hypothesis is not rendered untenable.

A second possibility harkens back to Eastin’s suggestion that the Hazel-Atlas Glass Co. made some of the Bromo-Seltzer bottles. Hazel-Atlas used a machine created by Charles E. Blue. Blue designed a succession of machines from 1894 to 1901, and these were used to make Vaseline jars, fruit jars, and possibly other types of products. The notable feature on the Blue bottles was a unique seam that encircled the neck just above the shoulder joint. Like the seams on the Bromo-Seltzer jars, these were very

prominent. The major difference between the two was a notable V-shaped groove in the Blue machine seam on pomade-style Vaseline bottles (Figure 15) and fruit jars, but that groove was absent on the Bromo bottles. Because of this difference, we support the Haley-Bridgwater machine hypothesis – especially since the same lower-neck seams are found on ink and shoe polish bottles, and both of those types were made by Cumberland Glass. However, the Blue machine cannot be entirely discounted. It is possible that the machine left a slightly different scar/seam on the Bromo bottles, especially if these were produced during the 1905-1907 period when Cumberland Glass was unable to keep up with the demand from the Emerson Drug Co. See Lockhart & Bernas (2014) for more information about the Blue machines.



Figure 15 – V-shaped grooves in Blue machine bottles

A final characteristic that influenced our decision is basal characteristics. Both machines produced cup-bottom bases, with a horizontal seam at the heel of the bottle. Vaseline jars made



Figure 16 – Vaseline bases

on Blue machines had several different shapes (including concave, concave with a convex center, and a double-concave shape), but none had a typical machine scar or ejection/valve scar (Figure 16). The Bromo-Seltzer bottle had a concave base with a small



Figure 17 – Bromo-Seltzer base

had a concave base with a small circular scar in the center (Figure 17). This scar had a very thin line, unlike

the ejection or valve scars found on many jars and wide-mouth bottles. This slight difference also suggests that the Bromo bottles were made on a different machine from the Blue-machine Vaseline jars.

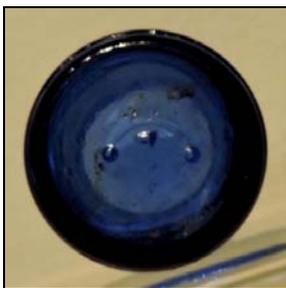


Figure 18 – Double-dot basemark (eBay)

Basal embossing on these jars was also somewhat unique. Some bases had only the thin-line, circular scar – generally in the center of the base but occasionally off center – but most had some form of symbol. These included two dots in a horizontal line, two dots in an elongated diamond, one dot in an elongated diamond, one dot in a square, and one dot in a triangle (Figures 18 & 19). Other symbols are, of course, possible. Although Whitten (2014c) identified the elongated diamond and dot as the Diamond-I logo of the Illinois Glass Co., we disagree. While the Illinois Glass Co. *did* occasionally use a dot in

place of the “I” in the mark, the use of other geometrical patterns on the bases of these bottles – especially the one with two dots inside the diamond – indicates that these were not specific glass house logos. They may have been a form of mold code for use in quality control.

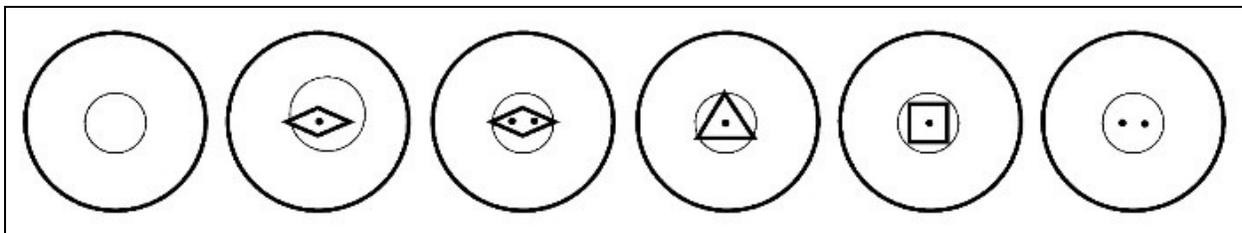


Figure 19 – Basal variations

4. Machine-Made, Full Front Embossing, Ball-Neck, Round Basal Scar (ca. 1903-ca. 1914)

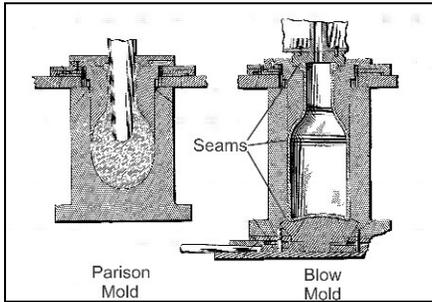


Figure 20 – Haley & Bridgwater 1902 patent

On August 18, 1899, Haley and Bridgwater applied for their second machine patent. They received Patent No. 693,130 on February 11, 1902. Again, the patent drawings showed a



Figure 21 – Ball-neck Bromo (eBay)

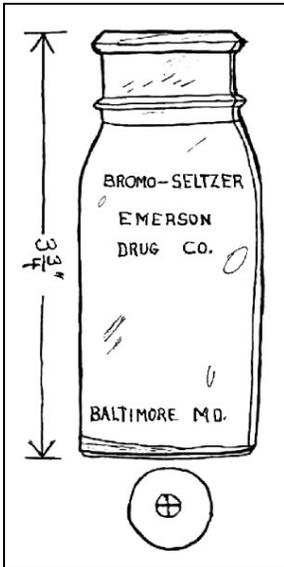


Figure 22 – Ball-neck Bromo (Eastin 1965:17)

machine that would leave horizontal seams at the same locations (Figure 20 – also see previous entry). This time, however, the glass house apparently concealed the seam just above the neck-shoulder joint by forming a “ball-neck” – an embossed ring around the lower neck area (Figure 21). On these bottles, there is a horizontal seam around the neck ring (ball-neck)

and another around the single-ring finish (Figure 22) as again shown by Eastin (1965:19). All of these were cobalt blue in color – as were most that followed. Production on these machines likely began ca. 1903 and continued until Cumberland lost the Emerson contract ca. 1908 or later. A 1908 ad illustrated the ball-neck variation (Figure 23) as did a 1911 postcard (Figure 24).

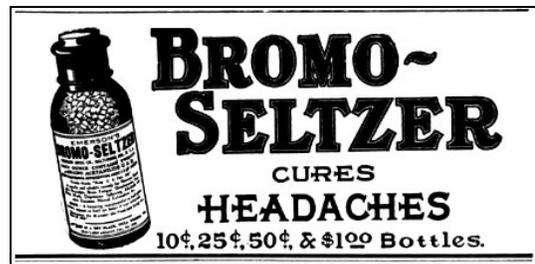


Figure 23 – 1908 ad (Prescription Drug Ads)



Figure 24 – 1911 postcard (eBay)



Figure 25 – Ball-neck [left] & rough [right] (eBay)

Again, the seam at the ball-neck is above the shoulder rather than below it, although the arguments rendered above fit this situation just as well.

The ball-neck makes the perfect cover for the seam – if that was the intention of the glass house. Another argument in favor of this bottle being a continuation of the Haley-Bridgwater machines is the base. Bases of these bottles had the same thin ring in the center, although the ring was slightly off-center in at least one example – as also noted in the earlier style.



Figure 26 – T bases (eBay)



Figure 27 – Elongated diamond base (eBay)

Three additional examples make the continuation almost certain. An eBay example of two bottles shows that the same mold was almost certainly used to make both the bottles with the rough neck seams (described above – #3) and the ball-neck bottles. Figure 25 shows both bottles, the rough-neck example on the left and the ball-neck variation on the right. Both

bases had identical markings – a “T” in the center, surrounded by the thin-line circle (Figure 26). A second example of the ball-neck bottle (in our possession) was embossed on the base with an elongated diamond – the type of mark typically found on the bases of the rough-necked types (Figure 27).



Figure 28 – Shoulder seam (eBay)

The third example forms an atypical connection to the Haley-Bridgwater patents. Although this bottle had both seams in the same locations as found on the other examples (around the finish and ball-neck), it also had a fine-line horizontal seam around the shoulder – exactly where the patents showed such a seam (Figure 28). This bottle was also

apparently produced in an earlier, rough neck mold. The base was embossed with a horizontal diamond (Figure 29; also see Figure 27) surrounded by the thin-lined circle.

The 1908 ad and the 1911 postcard remain to be explained. Both dates extend after Emerson had opened the Maryland Glass Corp. in 1907. Toulouse (1971:339) also noted in one section that Cumberland “promptly dropped blue as a color because of the small demand which would not support two sources.” In another



Figure 29 – Base of shoulder seam bottle (eBay)

place, Toulouse (1971:162) stated that Cumberland “discontinued [blue bottles] in 1909 after Emerson Drug Co. had built Maryland Glass Co. . . . to make the Bromo-Seltzer bottles.” Two possible explanations present themselves. First, Cumberland may have continued to make Bromo-Seltzer bottles for Emerson until 1909 or even to 1911 or later. This is especially likely during the period when Maryland Glass was making bottles by hand. Having the extra capacity from Cumberland would likely have been welcomed. It is also possible that Maryland Glass purchased some of the Haley-Bridgwater machines and used them until they adopted the Olean machines in 1911.



Figure 30 – Ball-neck bottle (eBay)

Two eBay examples of this bottle type had all the typical characteristics described above, but the bases were different. In both cases, each base exhibited a typical Owens machine basal scar, and each had a very thin “ball” around the neck (Figures 30 & 31). Regardless of which continuation process (described above) was involved, it is obvious that the ball-neck variation remained in production until after Maryland Glass adopted the Owens machines in 1913. However, these bottles are uncommon – possibly scarce – so production on the Owens machines probably only extended for a year or so.



Figure 31 – Owens base (eBay)

## 5. Mouth-Blown, Full Front Embossing, 1261 / 23 Basemark (1905)

The *National Glass Budget* (1905:11) noted that the Ohio Bottle Co. “had recently taken . . . the immense order of the Emerson Drug Company, Baltimore, Md., manufacturers of Bromo Seltzer.” Despite a significant search, we have been unable to find a single Bromo-Seltzer bottle with an O.B.CO. logo. However, the bases of these mouth-blown bottles were embossed “1261 / 23,” “1262 / 3,” “1268 / 6,” or other similar numbers (Figure 32). Our reason for assigning this identification is because the following bottles, made by the the American Bottle Co. – successor to the Ohio Bottle Co. – had virtually identical numbers (see A.B.CO. entry below).



Figure 32 – 1262 / 3 base (eBay)

## 6. Mouth-Blown, Full Front Embossing, A.B.CO. Heelmark (1905-1906)



Figure 33 – A.B.CO. heelmark

“A.B.CO.” on the back heel make the identification virtually certain (Figure 33). American Bottle undoubtedly finished the “immense



Figure 35 – A.B.CO. base

order” for Emerson. The bottles were probably made during 1905 and 1906, although the production could have extended into the following year (Figure 34). It is again virtually certain that American Bottle used the molds of its predecessor after adding the “A.B.CO.” heelmark (Figure 35). Bottles in our sample had basemarks of “1261 / 19,”



Figure 34 – A.B.CO. bottle

“1261 / 17,” “1261 / 35,” or “1262 / 12” (Cooper 2001:141, A 2-3). See the American Bottle Co. A Volume or Lockhart et al. (2007) for more company information.

### 7. Full Front Embossing, Double-Ring Finish (ca. 1907?)

This bottle remains a mystery. After looking at literally hundreds of Bromo-Seltzer bottles and photos, we have only seen a single photo of a bottle with a double-ring finish (Figure 36). The bottle was probably machine made, but the photo is not high enough resolution to tell. Whatever the date and the story, these bottles are very scarce or rare and were certainly only made once. We have dated the bottle with a very uncertain ca. 1907 possibility because that was a period when many changes were occurring. If this were a test of a new closure system, it was unsuccessful.



Figure 36 – Double-ring finish (eBay)

### 8. Mouth-Blown, Full Front Embossing, 1- or 2-Digit Numbers on Base (1908-1911)



Figure 37 – Mouth-blown bottles (eBay)

These were mouth-blown bottles with the same full-front embossing described above (Figure 37). The main distinguishing feature was one- or two-digit number embossed on the base of each bottle (Figure 38). It is highly likely that these were the first bottles



Figure 38 – Mouth-blown base (eBay)

manufactured by the Maryland Glass Corp. According to Toulouse (1971:339-340), Maryland Glass acquired its first machine ca. 1911. Thus, the first four years of production must have been by hand. Although we have elected to use the

1911 date, it is possible that mouth-blown production continued for two or more years. We have recorded numbers between 1 and 28.

## Numbers

A bit of speculation about the numbering system is in order. In studying mold codes on mouth-blown export beer bottles from the late 19<sup>th</sup> century, we discovered some evidence that mold numbers may have been used sequentially (Lockhart et al. 2011). Thus, the mold with number 1 would have been used first, followed by number 2. This hypothesis rests on the assumption that the numbers were not reused.

An exact sequencing as an alternative dating method would not work. For example, the first six molds may have been used at the same time, and number 5 may have worn out first to be replaced by number 7. Over time, the numbers would have become even more mixed. However, under this system, it is reasonable to assume that number 87 was used later than number 8. Assuming the numbers were sequential, a new series seems to have been adopted for each bottle style (see below). Another hypothesis about numbers needs more testing. A new series of numbers also appears to have been used for each size of bottle. Thus, there should be a “1” for the one-ounce size, another “1” for the four-ounce size, etc.

### 9. Machine-Made, Full Front Embossing, Seam Just Below Finish (1911-ca. 1915 or later)



Figure 39 – Machine-made bottle (eBay)

These bottles were machine-made with full-front embossing and a single horizontal seam just below the single-ring finish (Figure 39). Each bottle had a countersunk base, embossed in the middle with a one- or two-digit number, similar to those on the mouth-blown bottles (Figure 40). Oddly, our sample had the same range as the mouth-blown bottles – 1-28. The bases had no machine scars. Although we have not discovered the patent, these bottles were likely made by the Olean machines, adopted by Maryland Glass in 1911. They were probably used for at least two years after Maryland Glass acquired the



Figure 40 – Machine-made base (eBay)

Owens Automatic Bottle Machine license – possibly later. The 1911 date was established by Toulouse (1971:339-340). He explained:

When Maryland became the first factory in Baltimore to install automatic equipment, with two Owens machines in 1915,<sup>6</sup> along with two Olean semiautomatics, one of the tank furnaces had to be rebuilt to serve these new machines. Maryland had had two continuous tanks since 1911, but at a level that would serve the hand shops and the hand transfer of glass to the semiautomatics.

Although his explanation is somewhat circuitous, Toulouse stated first that Maryland Glass had two semiautomatic Olean machines and second that the two continuous tanks – installed in 1911 – served hand processes *and* semiautomatic machines. Ergo, the Olean machines were installed ca. 1911. The Olean machines remained in use to ca. 1920, although it is unclear whether they continued to make Bromo bottles or some of the other products manufactured by the Maryland Glass Corp.

Of interest and virtually unrecorded, from this point in history, this horizontal seam encircling the neck just below the base of the finish becomes a defining characteristic for a machine-made bottle. Although this seam is absent from some of the early bottles and jars – including two in this study – it is found on virtually all others. And this seam is still present in almost all glass containers in the 21<sup>st</sup> century. In addition, these bottles were the first in the Bromo-Seltzer line to have more typical machine scars on the bases. These were thin lined and offset (see Figure 40).

Eastin (1965:16) noted that “the changeover [to metal seals] was completed in 1928.” Although, this is not intuitively obvious, a single ad supports her assertion, *if* the eBay seller included the correct date. The ad showed a line drawing of a nurse firing a cannon with a Bromo-Seltzer bottle as the barrel. The bottle had single-ring finish (Figure 41).



Figure 41 – 1929 ad (eBay)

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<sup>6</sup> Toulouse was incorrect. Maryland Glass adopted the Owens machines in 1913. This is likely another of the ubiquitous Toulouse typos.

Although we have not altered our dates for this bottle type, this ad – along with Eastin’s claim – suggests that conservative daters may want to extend the period for single-ring finishes to ca. 1928. As evidence below will show, a bottle with the single-ring finish, made after ca. 1920, would not have the Owens scar on the base.

#### 10. Machine-Made, Full Front Embossing, Owens scar on base (1913-ca. 1920)

These bottles looked just like the one described above, except that they had Owens scars on the bases. Like the ones above, these were embossed with one- or two-digit numbers on each base (Figure 42). The highest numeral we have found in our very small sample is “5” – a very low number. Walbridge (1920:95-96) noted that the Maryland Glass Corp. installed two Owens machines in 1913. At some point between 1920 and 1927 – probably close to 1920 – Maryland Glass eliminated the Owens machines in favor of Lynch machines and, eventually, individual section machines.



Figure 42 – Owens machine base (eBay)

The earlier bottles made by Owens machines were easy to identify due to the distinctive “feathering” on the Owens basal scars (see Figures 31 & 42). This was caused by the machine technique. The Owens machine used suction to draw the glass up into the parison or blank mold, then cut the glass with a sliding “knife” that sealed the bottom and formed a base for the parison. Because of the early glass formulas, design of the knives, and lack of sharpening, the glass on the base retained an off-centered, “feathered” circle. Later Owens machines did *not* have the feathered scar, although these machines and others – like the Lynch and Individual Section machines *did* leave a thin-line, off-center basal scar. Since the feathered scars show up on Owens-made bottles until at least 1925, the scar is a valid indicator of an Owens machine on Bromo-Seltzer bottles. Despite the emphases that most source place on the use of the Owens machines, very few Bromo-Seltzer bottles of any type have the feathered scars.

#### Lug Finishes

Eastin (1965:16) stated that “cork closures were used until 1920, then replaced with metal seals. The changeover was completed in 1928.” The “metal seals” were rolled-steel caps



Figure 43 – Knurled lid – top (eBay)

with three or four sections of the bottom of the skirt bent in to close against three- or four-lug finishes. These caps were lacquered a gold color and were embossed “EMERSON (arch) / TO OPEN / TURN / {arrow} (all horizontal) / BROMO - SELTZER (inverted arch). The skirts of the caps were knurled to create a better grip for opening and closing (Figures 43). The top lettering changed at some point – only on bottles with the Circle-M base logo – to “EMERSON (arch) / BROMO / SELTZER (horizontal) / KEEP TIGHTLY CLOSED (inverted arch – smaller letters)” in dark blue letters (Figure 44).

As noted above, the various glass houses made Bromo-Seltzer bottles in several sizes. The smaller sizes ( one-ounce to



Figure 44 – Later knurled lid (eBay)

5½-ounce) used three-lug finishes; the 13-ounce size was made in both three- and four-lug sizes; and the largest, 25-ounce, bottle sported only the four-lug variation. The reason for different number of lugs was probably unimportant. It could be that the larger caps needed more lugs to seal well or that smaller bottles did not have sufficient room for the fourth lug.

Bromo-Seltzer was available in four variations with lug finishes (Figure 45). Two of these – one with a three-lug finish, one with a four-lug finish – had the same full-front embossing as on previous bottles. Bottles of the second style – also with three- or four-lug finishes – were only embossed “BROMO-



Figure 45 – Lug finishes (eBay)

SELTZER EMERSON DRUG CO.” around the heel. It is virtually certain that bottles with the full-front embossing were used earliest.

Examples from eBay and in our possession indicate that Eastin’s 1920 date is slightly incorrect. None of the bottles with lug finishes have Owens basal scars. Recall from above that Owens machines were discontinued sometime between 1920 and 1927. Meanwhile, the Circle-M trademark (#255,523) was registered by the Maryland Glass Co. on March 22, 1927, and was first used on “glass bottles” in January 1921 (Creswick 1987:154). We have never seen an Owens scar associated with the Circle-M logo. A final observation is that a number of both three-lug and four-lug bottles have bases with embossed numbers rather than the Circle-M logo. The data in this paragraph suggest several things.

1. Lug finishes were used prior to the adoption of the Circle-M logo, or the plant used the molds until they wore out without altering the baseplates, or both.
2. Maryland Glass discontinued the use of Owens machines prior to 1921, probably in 1920.
3. Bottles with the Circle-M logo could not have been made prior to 1921.



Figure 46 – Atypical Circle-M (eBay)

Possibly the earliest Circle-M Bromo bottles were embossed with the logo at the top of the base and a two-digit number at the bottom (Figure 46). Later bottles certainly had the Circle-M logo in the center with the number below it (Figure 47). Some of the bottles with Circle-M marks were cornflower blue in color, and some of these had the Circle-M



Figure 47 – Typical Circle-M (eBay)

in the center with a single-digit number to the side (Figure 48). The reason for the slight shift in color is unknown but possibly reflected a restriction in the use of cobalt during World War II. If this hypothesis is correct, cornflower blue bottles were only made during the ca. 1943-1945 period (Figure 49).



Figure 48 – Side number  
(eBay)

One bottle with full-front embossing and a four-lug finish was embossed “35” between two lugs. The bottle had a “1” (or “T” with no serifs) on the base. We have recorded “7,” “28,” “35,” and “42” between lugs on similar, full-front embossed bottles with three-lug finishes. The meaning of these is unclear, although they may be date codes. Until the mid-1940s it was not

unusual for glass houses to use single-digit date codes on bottles. Thus, the “7” could indicate a bottle made in 1917 or 1927. The other numbers could be two-digit date codes (i.e., “42” could equal 1942). All of these dates would have been within the period when the firm used lug finishes. Alternatively, these numbers could indicate which ring mold was used – for quality control purposes.



Figure 49 – Cornflower blue bottle (eBay)

### 11. Full Front Embossing, 3- or 4-Lug Finish, Numbers on Base (ca. 1915-1921)



Figure 50 – Lug finish bottle (eBay)

These bottles had the same full front embossing as all the earlier variations. However, they had either three- or four-lug finishes and corresponding caps (Figures 50 & 51). The bases of these bottles still had the one- or two-digit numbers, but they now had typical, thin-lined, offset machine scars. These were apparently made during the ca. 1915-1920 period and were the last of the bottles with full-front embossing. While the 1915 date is somewhat arbitrary, the bottles did not have the 1921 Circle-M logos.



Figure 51 – Numbered base (eBay)

## 12. Full Front Embossing, 3- or 4-Lug Finish, Circle-M on Base (1921-ca. 1925)

These were the same as the earlier three- and four-lug bottles, except that the bases were embossed with the Circle-M logo. Peterson (1968:49), however, placed the mark as being first used by the Maryland Glass Corp. in 1921 on “the bottom of its colorful bottles.” He obtained his information from the patent records.

## 13. Heel Embossing, 3- or 4-Lug Finish, Numbers on Base (ca. 1915-1921)

Even though Maryland Glass continued to use the older, full-front embossing – probably until the molds wore out – the factory adopted a new format with “BROMO-SELTZER EMERSON DRUG CO.” embossed around the heel (Figure 52). This left more room for a paper label. The earliest form of this bottle still used the embossed numbers on the base from ca. 1915 to 1921.



Figure 52 – Heel embossing (eBay)

## 14. Heel Embossing, 4-Lug Finish, Circle-M Base; Upside-down letters (ca. 1930-ca. 1954)

These four-lug bottles with the heel embossing and the Circle-M basemark were probably used from ca. 1921 to ca. 1954, when Bromo-Seltzer made a slight shift in style. These were large – 7 3/4" tall, holding 25 ounces – made to be used in a dispenser. The heel and base would be up, making the otherwise upside down message – “BROMO-SELTZER EMERSON DRUG CO.” – readable in the dispenser (Figure 53).



Figure 53 – Upside-down heel embossing

The dispenser was designed and patented by William Aloysius Whittle. Whittle applied for the patent for a “Dispensing Device” on March 6, 1929, and received Patent No. 1,772,377 on August 4, 1930. The actual dispenser (Figure 54) is clearly derived from the patent drawing (Figure 55). Whittle assigned the patent to the Emerson Drug Co. The bottle with the upside-down letters, therefore, could not predate the invention that inspired its creation.



Figure 54 – Dispenser (Cowans Auctions)

Walter W. White and John Vassos applied for a patent for a “Dispenser” on June 5, 1937. They received Design Patent No. D105,627 on August 10 of the same year (Figure 56). The pair assigned the patent to the Emerson Drug Co. This was an improvement on the somewhat stark style of Whittle’s dispenser (Figure 57).

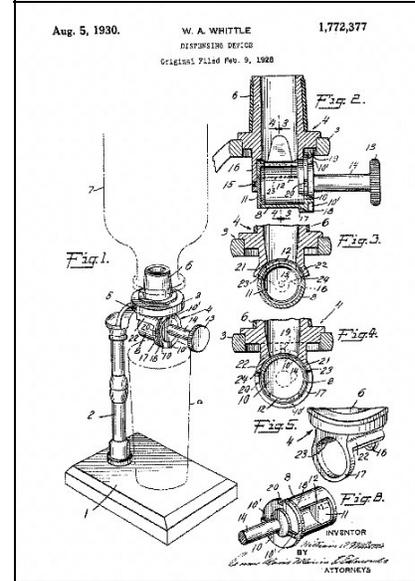


Figure 55 – Whittle 1930 patent

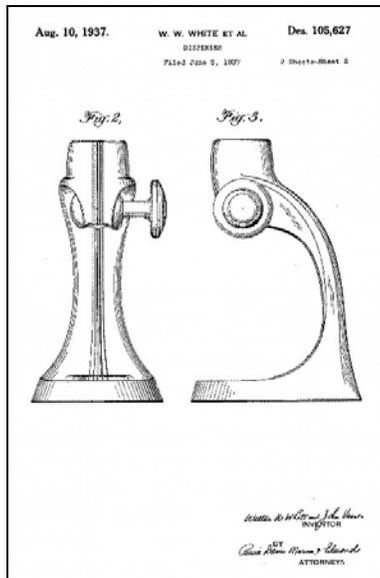


Figure 56 – Whittle 1937 patent



Figure 57 – 1949 ad (Vintage Ad Browser)

## 15. Heel Embossing, 3-Lug Finish, Circle-M on Base (ca. 1921-ca. 1956)

About 1921, Maryland Glass also adapted the heel embossing and Circle-M basemark to bottles with three-lug finishes. Although Eastin (1965:16) suggested 1954 as the date for the switch to continuous-thread finishes, these bottles likely continued in production until the sale of the Bromo-Seltzer and Maryland Glass Co. to the Warner-Lambert Pharmaceutical Co. in 1956.



Figure 58 – 1953 ad (eBay)

Unfortunately, our ad sample is not helpful in locating the end date. Our last ad showing the lid style used on a lug finish was from 1953 (Figure 58). Eastin (1965:16) claimed that Emerson adopted screw caps in 1954. This suggests that the lug finishes were discontinued at in that year, although Eastin did not specifically say that. The next ad we have is from 1956, and it shows the “new” screw cap.



Figure 59 – 2<sup>nd</sup> upside-down embossing (eBay)

### 16. Heel Embossing, 4-Lug Finish, Circle-M on Base; Upside-down letters (ca. 1954-1956)

These were essentially the same as the earlier four-lug bottle with upside-down heel embossing. The main difference was an inswept heel and a reduction in size to 7 1/4 inches in height (Figure 59). These are uncommon, probably only used between ca. 1954 and 1956.

### 17. Heel Embossing, Continuous-Thread Finish, Circle-M on Base (ca. 1954-1956)

These bottles still had the heel embossing and the older, straighter heel, but they had the new, continuous-thread finish (Figure 60). The finish had a sealing ring at the base with a continuous thread that wrapped one complete turn around the finish plus a small overlap (Figure 61). This finish was comparatively tall. The bases of these bottles all were embossed with the Circle-M logo. These bottles are



Figure 61 – Closeup of finish

uncommon and were probably only made for a short period, probably just prior to the sale to the Warner-Lambert Pharmaceutical Co. in 1956.



Figure 60 – 1<sup>st</sup> continuous-thread finish (eBay)

18. Shoulder Embossing, Continuous-Thread (Tall) Finish (ca. 1956-ca. mid-1960s)



Figure 62 – Shoulder-embossed bottle (eBay)

Bottles with continuous-thread finishes divide into several categories: tall v. short finishes; straight v. inswept heels; and basal embossing. The tall finishes were used prior to the shorter ones. The bottle described above is the only example with a continuous-thread finish and heel embossing. The next bottle in the sequence still had the older-style heel, but it had the shoulder embossing, the taller finish, and the Circle-M logo on the base (Figures 62). The bottle now had “BROMO-SELTZER” embossed twice around the shoulder (Figure 63), eliminating the Emerson Drug Co. reference. This was almost certainly the initial bottle made for Warner-Lambert in 1956 (see Table 4). A 1956 ad with a photograph of this bottle type supports this date (Figure 64). The ad calls the lid the “New Handy Self



Figure 63 – Closeup of shoulder (eBay)

Measuring Cap!”



Figure 64 – 1956 ad (eBay)

This was followed by a virtually identical bottle except that the new one had the inswept heel (Figure 65); however, the bottle still had the taller finish and the Circle-M basal logo, although it, too, was probably used immediately after 1956. The final sub-variation with the tall finish was almost certainly introduced in 1956 – with the change to Warner-Lambert – but likely only used for a few years, probably until the



Figure 65 – Tapered bottle (eBay)



Figure 66 – Basal number (eBay)

molds wore out. The only change was the elimination of the Circle-M basemark. These bottles had one- or two-digit numbers at the top or bottom of the base (Figure 66).

The lids on these bottles evolved through at least three changes, although all had “MEASURING CAP” on the skirt. Use of the first two likely extended throughout most of the 1956-mid-1960s period. Probably the earliest was white with a blue stripe across the center of the top and was lithographed “FILL CAP / POUR INTO EMPTY GLASS / HALF FILL WITH WATER” in

the upper white area; “BROMO ® / SELTZER” in the central blue stripe; and “TAP CAP TO EMPTY / BEFORE CLOSING / TIGHTLY” in the lower white area (Figure 67).



Figure 67 – Tall cap variations (eBay)

A second variation lacked the blue stripe and was lithographed “MEASURING CAP (arch) / SINGLE DOSE/ FIL CAP WITH / BROMO ® / SELTZER / POUR INTO HALF GLASS / COOL WATER (all horizontal) / KEEP TIGHTLY CLOSED (inverted arch)” (see Figure 67). The final one was much simpler, with “BROMO ® / SELTZER” in the central blue stripe and “KEEP TIGHTLY CLOSED” in an inverted arch in the lower white hemisphere (Figure 68).



Figure 68 – Tall & short caps (eBay)

## 19. Shoulder Embossing, Continuous-Thread (Short) Finish (ca. mid-1960s-ca. late 1970s)



Figure 69 – Closeup of short finish

The only notable change on this variation was a shorter continuous-thread finish (Figure 69). The inswept heel and numbered base remained. These were almost certainly used by Warner-Lambert beginning ca. 1960, extending to the mid-1960s. A final variation had stippling on the resting point of the base along with the number (Figure 70). They were probably phased with the sale to the Dorsey Corp. in 1971 – as plastic bottles became popular. Ads from 1966 and 1967 include photos of this bottle (with the shorter screw cap), showing that glass bottles with the inswept heel were in use at least to the late 1960s (Figure 71). The only lids we have seen for the short-finished bottles were identical to the final variation of the taller caps except for skirt size (see Figure 68).



Figure 70 – Stippled base (eBay)

Although our sample of bottles with paper labels is very small, all of the bottles with tall continuous-thread finishes, standard heels, and Circle-M logos had labels that identified the firm as the Emerson Drug Co. Labels with a Warner-Lambert identification were on bottles with short continuous-thread finishes, inswept heels, and no basal logos, although they were found on bases with and without stippling. Missing from our sample are labels on the transitional bottles – those with inswept heels and Circle-M logos. We can hypothesize that these had Emerson Drug Co. labels.

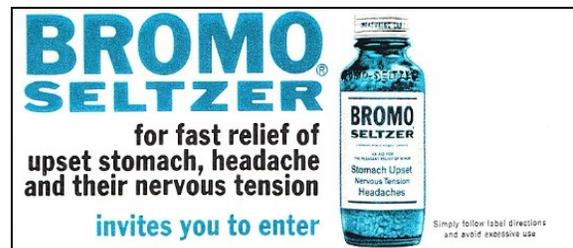


Figure 71 – 1967 ad (eBay)

**Table 4 – Changes in Continuous-Thread Finished Bottles**

Num.*	Finish	Heel	Base	Embossing	Dates
17	Tall	Straight	Circle-M	Heel	ca. 1954
18a	Tall	Straight	Circle-M	Shoulder	ca. 1954-1956
18b	Tall	Inswept	Circle-M	Shoulder	1954-ca. 1956
18c	Tall	Inswept	Number	Shoulder	ca. 1956-ca. 1960
19a	Short	Inswept	Number	Shoulder	ca. 1960-mid-1960s
19b	Short	Inswept	Number & stippling	Shoulder	mid-1960s-1971
	Probable shift to plastic bottles				ca. 1971

\* These correspond to the number of the bottle in the text.

## **Discussion and Conclusions**

### **A Note on Machines**

A major problem with bottle dating and identification is that both of these are only as good as the source material. As my history professor in grad school (Cheryl Martin) used to tell us, history is like putting together a jigsaw puzzle with most of the pieces missing. In this case, we have some resources that indicate changes in machine use for the various glass houses, although the puzzle is incomplete. The big question, partially addressed in the text above, is: How reliable are the sources?

Our earliest source about glass houses or machines was Eastin (1965:16). Eastin provided the first real hints about dating. She identified the Hazel-Atlas Glass Co. as the manufacturer of the early bottles but said that they were “partially hand-fashioned” – likely attempting to describe the mouth-blowing technique. She was the only source to attach Hazel-Atlas to Bromo-Seltzer bottles. Eastin correctly noted 1907 as the foundation date of the Maryland Glass Corp., although the factory probably did not begin production until the following year.

Eastin (1965:16) also cryptically asserted that “cork closures were used until 1920, then replaced with metal seals. The changeover was completed in 1928.” Other evidence suggests that “metal seals” – i.e., caps for the three- and four-lug finishes began ca. 1916. Eastin probably meant that Emerson continued to use cork seals (i.e., the one-part finishes) until 1928, even though the lug-finished bottles were phased in earlier. She finally dated the adoption of screw caps (continuous-thread finishes) at 1954 – very likely the correct date.

Two of her dates are either entirely correct or very close: 1907 for Maryland Glass and 1954 for screw caps. However, there is a question about the period of change from corks to lug caps. The evidence is sparse. We can find but few ads from 1915 to 1925, and most of those included no photos or drawings. By 1923, however, the ads (at least those we were able to locate) consistently showed the metal caps that covered lug finishes. This suggests that the changeover was complete by 1923, although some bottles *could* have still been made for cork closures.

Although Eastin rarely cited her sources, she certainly obtained some of her information by writing letters to glass houses and product producers. Although this statement is horribly unscientific, Eastin’s Bromo-Seltzer information has the “feel” of a letter from the Emerson Drug Co. Such information, itself, is often suspect – especially in the identification of glass houses that made products. As noted above, Eastin is the only source for Hazel-Atlas as a manufacturer of Bromo-Seltzer bottles. Although we have included Hazel-Atlas as a possibility, the information probably came from the memory of a single management employee, who was told the tale by another employee 20 or more years earlier. Hazel-Atlas has often been cited as the maker of wide-mouth bottles and jars for numerous products.

As noted in the text above, Pepper (1971:271) specifically mentioned that the George Jonas Glass Co. made Bromo-Seltzer and other cobalt blue bottles at the smallest of its three furnaces. Since she mentioned the only machine in connection with Furnace No. 2, the bottles made at Furnace No. 3 (the smallest) must have been produced by hand. We have found no other sources for machine use, cobalt blue production, or the manufacture of Bromo-Seltzer bottles in connection with George Jonas.

Pepper (1971:274) is our only source for the manufacture of Bromo-Seltzer bottles by the Cape May Glass Co. Since Pepper's research was on the spot in New Jersey, her information is generally good and *often* unique. The *Journal of Industrial and Engineering Chemistry* (1913:952) – a very reliable source – noted that the firm used both machine and hand methods in 1913. Pepper added that cobalt blue was one of the colors made at the plant. We have found no other sources for either cobalt blue glass or Bromo-Seltzer connected with Cape May Glass.

As noted in the text, Toulouse (1971:339-340) was our only source for the Maryland Glass use of Olean machines in 1911. As a glass manufacturing “insider,” Toulouse had access to information that is unavailable today. Unfortunately, we have also “caught” him guessing incorrectly and making it sound like genuine sourced information. Although we have accepted this particular bit of data, a second confirmation would have been helpful.

The next transition is better recorded. The *National Glass Budget* 1913:1, Walbridge (1920:96), and Scoville (1948:106) all place the Maryland Glass Corp. capture of the Owens Automatic Bottle Machine license for making cobalt blue bottles at 1913. The remaining machine information for Maryland Glass, while incomplete, is documented in glass factory lists from the *American Glass Review*. While not completely accurate at all times, these lists are often the best information available.

Toulouse (1971:162) was again our only source for the manufacture of Bromo-Seltzer bottles by the Cumberland Glass Mfg. Co. – with Munsey (1992; 2010) relying on Toulouse. In the same section, Toulouse noted the use of the Haley-Bridgewater machine by 1901, and, again, he was the only source for that information. Circumstantial evidence led us to agree with both these assertions, although it would be *very* helpful to have some form of corroboration for both of these data.

In 2014, we are blessed with a dramatically greater data set than Toulouse, Pepper, Eastin, or any of the other earlier researchers could access. We have blindingly fast internet connections, e-mail and eBay as sources and communications. Internet searches discover new information weekly. Still, there are so many missing pieces of the puzzle – so many unsupported sources.

## Bromo-Seltzer Bottle Identification and Dating

Aside from our one missing link – the bottle with the double-ring finish – all of the different types of Bromo-Seltzer bottles fit into a relatively neat, reasonably dated chronology (Table 5). Another possible exception is the very first bottle type. Although we have posited a generic original container, the first ones may have been embossed. Those squared-finished bottles that we placed in the second position may have been the original bottles. This 1891-ca. 1898 period may have been one where sales were low. Bromo-Seltzer, after all, was very new at this time. The combination of age and low sales may account for the scarcity of the bottles.

However, this study – while being definitive – should be considered a beginning rather than an end. Much of the information should be confirmed by other sources. Most of the dates we have presented need some form of corroboration. Surely, some of our hypotheses will be disproved. Paraphrasing Mike Miller, all bottle research is merely the latest information. There is always more to learn.

**Table 5 – Bromo-Seltzer Bottle Chronology**

Dates	M*	F**	Description	Glass House
1891- ca. 1900	H	1p	generic bottles, prob. aqua	Cumberland Glass
ca. 1900-1903	H	1p	Full-front emb.; square finish	Cumberland Glass
ca. 1901-1904	M	1p	Full-front emb.; seam center finish; rough seam lower neck	Cumberland Glass†
ca. 1903-1914	M	1p	Full-front emb.; ball neck	Cumberland Glass
1905	H	1p	Full-front emb.; 1261 / 23 basemark	Ohio Bottle Co.
1905-1906	H	1p	Full-front emb.; ABCO heelmark and 1261 / 23 basemark	American Bottle Co.
ca. 1907	?	2p	Full-front emb; double ring finish††	unknown
1908-1911	H	1p	Full-front emb.; 2-digit base numbers	Maryland Glass Corp
1911-ca. 1915	M	1p	Full-front emb.; seam below finish	Maryland Glass Corp

Dates	M*	F**	Description	Glass House
1913-ca. 1914	M	1p	Full-front emb.; ball neck	Maryland Glass Corp
ca. 1915-1920	M	1p	Full-front emb.; Owens scar on base	Maryland Glass Corp
1916-1920	M	3-4L	Full-front emb.; numbers on base	Maryland Glass Corp
1920-1922	M	3-4L	Full-front emb.; Circle-M on base	Maryland Glass Corp
1916-1920	M	3-4L	Heel emb.; numbers on base	Maryland Glass Corp
1920-1954	M	4L	Heel emb. (upside down letters); Circle-M on base	Maryland Glass Corp
1920-1954	M	3L	Heel emb.; Circle-M on base	Maryland Glass Corp
1954-1956	M	4L	Heel emb. (upside down letters); inswept heel; Circle-M on base	Maryland Glass Corp
1954-1956	M	CT (T)	Heel emb; Circle-M on base	Maryland Glass Corp
ca. 1956	M	CT (T)	Shoulder emb.; Circle-M on base; normal heel	Maryland Glass Corp
ca. 1956	M	CT (T)	Shoulder emb.; Circle-M on base; inswept heel	Maryland Glass Corp
1956-ca. 1960	M	CT (T)	Shoulder emb.; number at bottom of base; inswept heel	Warner-Lambert
ca. 1960-late 1960s	M	CT (S)	Shoulder emb.; number at bottom of base; inswept heel	Warner-Lambert
Late 1960s-1971	M	CT (S)	Shoulder emb; dots at resting point; no basal logo	Warner-Lambert

\* Manufacturing Technique: H = hand or mouth-blown; M = machine-made

\*\* Finish: 1p = one-part; 2p = two-part; 3L = three-lug; 4L = four-lug; CT = continuous-thread

† These *could* have been made by the Hazel-Atlas Glass Co.

†† We have only seen a single photo of a Bromo-Seltzer bottle with a double-ring finish.

## Sources

### *American Glass Review*

1927 “Glass Factory Yearbook and Directory.” *American Glass Review*, Pittsburgh, Pennsylvania.

1928 “Glass Factory Yearbook and Directory.” *American Glass Review*, Pittsburgh, Pennsylvania.

1933 “Glass Factory Yearbook and Directory.” *American Glass Review*, Pittsburgh, Pennsylvania.

1934 “Glass Factory Yearbook and Directory.” *American Glass Review*, Pittsburgh, Pennsylvania. Includes reprint of the *Glass Trade Directory for 1904*. Commoner Publishing Co., Pittsburgh, Pennsylvania.

1935 “Glass Factory Yearbook and Directory.” *American Glass Review*, Pittsburgh, Pennsylvania.

1940 “Glass Factory Yearbook and Directory.” *American Glass Review*, Pittsburgh, Pennsylvania.

1943 “Glass Factory Yearbook and Directory.” *American Glass Review*, Pittsburgh, Pennsylvania.

### Bottle Research Group

2013 “Encyclopedia of Manufacturer’s Marks on Glass Containers: Volume A.” Historic Glass Bottle Identification & Information Website: Glassmaking & Glassmakers.  
<http://www.sha.org/bottle/glassmaking.htm>

2014 “Encyclopedia of Manufacturer’s Marks on Glass Containers: Volume B.” Historic Glass Bottle Identification & Information Website: Glassmaking & Glassmakers.  
<http://www.sha.org/bottle/glassmaking.htm>

Brawner Co.

2014 "Complete History of the Family and the Company." Brawner Co.

[http://www.brawnercompany.com/pdfs/complet\\_hist.pdf](http://www.brawnercompany.com/pdfs/complet_hist.pdf)

Cooper, Doreen C.

2001 *A Century at the Moore/Kirmse House*. Klondike Gold Rush National Historical Park, Skagway, Alaska.

Creswick, Alice

1987 *The Fruit Jar Works, Volume II, Listing Jars Made Circa 1900 to Modern*. Privately printed, Grand Rapids, Michigan.

Eastin, June

1965 *Bottles West, Vol. I*. Press-tige, Ontario, California.

Fike, Richard E.

1987 *The Bottle Book: A Comprehensive Guide to Historic, Embossed Medicine Bottles*. Peregrine Smith Books, Salt Lake City.

*Glass Container*

1921 Advertisement – "Maryland Glass Corporation." *Glass Container* 1(2):22.

*Glassworker*

1917 "Factory Affairs in Baltimore." *Glassworker* 35(29):4.

1918 "All About Baltimore Plants." *Glassworker* 36(16):12.

Hall, Clayton Coleman

1912 *Baltimore, Its History and Its People: Volume II Biography*. Lewis Historical Publishing Co., New York.

Hinstl, R.D

2014 “Emerson Drug Company.” rdhinstl's Page.

<http://www.rdhinstl.com/mm/rs280.htm>

*Journal of Industrial and Engineering Chemistry*

1913 “The Present Status of the Glass Bottle and Hollow Ware Industries in the United States.” *Journal of Industrial and Engineering Chemistry* 5(11):951-954.

Kelly Publishing Co.

1923 *Kelly's Directory of Merchants, Manufacturers and Shippers of the World*. Vol. I. Kelly Publishing Co., New York.

Leagle

[2014] 1985 “in re Maryland Glass Corp.” Leagle.

[http://leagle.com/decision/19852028618FSupp1410\\_11815.xml/IN%20RE%20MARYLAND%20GLASS%20CORP.](http://leagle.com/decision/19852028618FSupp1410_11815.xml/IN%20RE%20MARYLAND%20GLASS%20CORP.)

Lockhart, Bill and Barry Bernas

2014 “Turning Blue: Charles Blue and the Early Jar Machines.” In *The Guide to Collecting Fruit Jars: Fruit Jar Annual 2014*, by Jerry McCann , pp. 19-47. Privately published.

Lockhart, Bill, Pete Schulz, Bill Lindsey, Carol Serr, and David Whitten

2007 “The Dating Game: The American Bottle Co., A Study in Contracts and Contradictions.” *Bottles and Extras* 18(1):47-56.

Lockhart, Bill, Carol Serr, and Bill Lindsey

2011 “Do Numbers Matter? A Study of Beer Bottle Bases.” In *The Beer Bottles and Breweries of Fort Stanton, New Mexico*, edited by Bill Lockhart. Privately published, Alamogordo, New Mexico.

*Midland Druggist*

1904 “Emerson Drug Co. Wins Its Case.” *Midland Druggist* 5(12):1138-1139.

Miller, George L. and Tony McNichol

2010 “Dates for Suction Scarred Bottoms: A Chronology for Owens Machine-Made Bottles.” Unpublished manuscript.

Munsey, Cecil

1992 “Bromo-Seltzer.” CecilMunsey.com

[http://cecilmunsey.com/index.php?option=com\\_docman&task=cat\\_view&gid=27&Itemid=34&mosmsg=You+are+trying+to+access+from+a+non-authorized+domain.+%28www.google.com%29](http://cecilmunsey.com/index.php?option=com_docman&task=cat_view&gid=27&Itemid=34&mosmsg=You+are+trying+to+access+from+a+non-authorized+domain.+%28www.google.com%29)

2010 “Bromo-Seltzer: A Subtle Poison.” CecilMunsey.com

[http://cecilmunsey.com/index.php?option=com\\_docman&task=cat\\_view&gid=27&Itemid=34&mosmsg=You+are+trying+to+access+from+a+non-authorized+domain.+%28www.google.com%29](http://cecilmunsey.com/index.php?option=com_docman&task=cat_view&gid=27&Itemid=34&mosmsg=You+are+trying+to+access+from+a+non-authorized+domain.+%28www.google.com%29)

*National Glass Budget*

1905 “An Owens Machine at Newark.” *National Glass Budget* 20(50):6.

1913 “Owens Company’s Earnings.” *National Glass Budget* November 15:1

Open Jurist

2014 [1983] “723 F. 2d 1138 - Maryland National Bank v. Mayor and City Council of Baltimore Maryland. Open Jurist.

<http://openjurist.org/723/f2d/1138/maryland-national-bank-v-mayor-and-city-council-of-baltimore-maryland-glass-corporation>

Palmer, Walter B.

1917 *The Glass Industry: Report on the Cost of Production of Glass in the United States*. Miscellaneous Series No. 60, Department of commerce, Government Printing Office, Washington, D.C.

Pepper, Adeline

1971 *Glass Gaffers of New Jersey*. Scribner’s Sons, New York.

Perkins, William H.

1920 *Reports Cases Argued and Adjudged in the Court of Appeals of Maryland, Vol. 134, Concluding the Cases of the October Term 1918 and the Cases of the January Term 1919 and Beginning the Cases of the April Term 1919*. King Brothers, Baltimore.

Peterson, Arthur G.

1968 *400 Trademarks on Glass*. Washington College Press, Takoma, Maryland.

Scoville, Warren C.

1948 *Revolution in Glassmaking: Entrepreneurship and Technological Change in the American Industry, 1880-1920*. Harvard University Press, Cambridge, Massachusetts.

Toulouse, Julian Harrison

1971 *Bottle Makers and Their Marks*. Thomas Nelson, New York.

Walbridge, William S.

1920 *American Bottles Old & New: A Story of the Industry in the United States*. Owens Bottle Company, Toledo, Ohio.

West Publishing Co.

1894 *Atlantic Reporter, Volume 29, Containing All the Decisions of the Supreme Courts of Maine, New Hampshire, Vermont, Rhode Island, Connecticut and Pennsylvania Court of Errors and Appeals Court of Chancery and Supreme and Prerogative Courts of New Jersey, Court of Errors and Appeals and Court of Chancery of Delaware and Court of Appeals of Maryland*. May 23-September 26, 1894. West Publishing Co., St. Paul, Minnesota.

Whitten, David

2014c "Glass Bottle Marks: Bromo-Seltzer~Cobalt Blue Bottles~Brief History: Bromo-Seltzer; Emerson Drug Co., Baltimore, MD."

<http://www.glassbottlemarks.com/bromo-seltzer-cobalt-blue-bottles/>

Wikipedia

2014 “Bromo-Seltzer.” Wikipedia. <http://en.wikipedia.org/wiki/Bromo-Seltzer>

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