

472 - BOTTLES/GLASS

472.1 - IMACS Classification: See IMACS Users Guide for complete bottle and glass classification.

472.2 - Bottle Terminology:

The following definitions for bottle terminology are taken from Berge (1980:37-38). The definitions presented below are represented by the illustration on the following page.

The average bottle consists of six basic sections -- finish, neck, shoulder, body, insweep or heel, and base. The 'finish' is the top section of the bottle attached to the neck from which the bottle contents are obtained and to which a closure is applied to secure the bottle's contents from spoilage or spilling. The upper part of the finish to which a cap would seal itself is the 'sealing surface'. The diameter of the aperture opening is the 'bore'. Sometimes a ring of glass is placed around the neck at the base of the finish in order to secure the closure, usually on threaded closures, which are called a 'collar'. The collar, when present, is the basal portion of the finish. The 'neck' is generally an extension of the finish that connects the finish to the shoulder. The neck is usually the same general size and cylindrical shape as the finish. The part of the neck that connects the neck to the shoulder is termed the 'root of the neck'. The 'shoulder' is an extension between the neck and body which connects these sections to form the single unit. Often the body is wider than the neck, and the shoulder serves as a means of reducing the body diameter to the size of the neck and finish. The lower section of the body which attaches to the base is called an 'insweep'. The 'base' is under the section of the bottle on which the bottle rests when not in use. All the weight of the bottle may not rest on the entire surface of the base, if the base is not flat. Curved bases help to withstand internal pressure on the bottle, especially fermented or carbonated contents. If the base is convex, as in some soda pop bottle types, it is called a 'round bottom'. If the base is slightly concave, it is referred to as a 'push-up' (Glass Manufacturers' Federation n.d.:1). On wine bottles, the push-up is much deeper and is termed a 'kick-up'.

472.2A BOTTLE TERMINOLOGY ILLUSTRATION
(from Berge 1980:39)

472.2B BOTTLE NECK FINISHES
(from Fike 1987)

472.2C BOTTLE BASE PROFILES
(from Fike 1987)

472.3 Bottle Chronologies and Manufacturers Techniques:1) Bottle Chronology: (from Berge 1980)

- 1700-1800: Typical bottles were the tall and squat bottles with kick-up bases, squat types with long necks, and late types with high kick-ups. Another common bottle type was the Dunmore.
- 1780-1840: The most common feature of bottles before 1820 is the crude blow-over finish formed by simply cutting the container free from the blow pipe--also called a 'sheared lip' (Kendrick 1966:28). Other popular bottles included the Ludlow, Chestnut flasks, and the swirled bottle.
- 1840-1860: With the glass industry in full bloom diversification began to take place and new inventions were produced to satisfy the demands of consumers.

The bottles of this period and earlier were formed by open molds in which only the body was formed. The neck and finish had to be shaped by hand. This type of mold leaves a seam on the bottle body which terminates on the shoulder or the low neck (Kendrick 1966:47). It was the practice of glassmakers to form finishes by applying a strip of glass around the sheared end of the neck. The manufacture of free-blown bottles died out around 1860, so that the seamless bottles of irregular shapes are seldom encountered after this date.

A common feature up to 1860 on ordinary utility items was pontil marks. This mark, found on the base of bottles, consisted of an area somewhat circular, rough and sharp where a glass rod had once been attached to maintain control during the hand-making of the finish.

Between 1850 and 1860, the pontil was gradually replaced by the snap-case. The rod was not physically attached to the bottle base, but rather a tong that snapped tight to the bottle heel was used; when removed it left no marks on the base. This left the base free for lettering or decoration (Kendrick 1966:29).

There was little concern over the color of glass until food began to be bottled. Then came the desire to see what was in the bottle, so glass had to be made lighter. Dark olive-green or black glass, common up to 1860, began to be replaced by clearer and lighter colored types of glass.

- 1860-1880: The bottles of this period were still produced by somewhat crude manufacturing techniques, but a change was beginning to take place. Colors were still somewhat unimportant, though they were more refined and lighter. Also, clear glass containers grew in importance around 1880. There may have been a refinement in finish

preparation, because mold seams of this period end just below the finish, an obvious indication that the finish was made separate from the body (Kendrick 1966:47).

An important characteristic of some bottles that first appeared in 1869 was that of embossing them with the names of contents, manufacturers, distributors, slogans, and messages. This practice nearly died out with the advent of automatic bottle machines (1903); paper labels were used extensively on bottles made from such machines (Kendrick 1966:71).

Beer bottles were found in the West only after 1873. As stated by Woodward (1959:126-127), pasteurization of beer is a prime requisite for the proper bottling of beer and since Pasteur's process did not come into active use in the brewing business until 1873, we can safely assume that no bottled beer was shipped to Ft. Union or any other place in the United States prior to that year.

1880-1900: The common mold of this period was the closed mold in which the entire bottle, except the upper section of the finish or lip, was mold-made. On these bottles, the seam ends at about the middle of the neck. The contours of the finish became more controlled and standardized, resulting in more uniformity of closures (Kendrick 1966:47-48).

In 1892, a semi-automatic process called 'press and blow' was invented, which was adaptable only to the production of wide-mouthed containers. In this method, the glass was pressed into the mold to form its mouth and lip first. Then a metal plunger was forced through the mouth and the air pressure was applied to blow the body of the vessel. This process was used for the production of fruit jars and also our early milk bottles. It was not adaptable to narrow-necked bottles because of the 'bottleneck'. The necks were too small to allow the use of the metal plunger. So our conventional screw-topped bottle did not become common until after 1924, when the glass industry standardized the thread (Kendrick 1966:51).

By 1896, the first of the new semi-automatic machines was in successful operation at the Atlas Glass Works, and in 1898 Ball Brothers installed a similar machine for the making of fruit jars (James 1956:19).

1900-1940: D. James (1956:17-18) divides this time period into three phases: 1) 1898 to 1906 - semi-automatic machinery for the making of wide-mouth ware exclusively; 2) 1905 to 1917 the Owens automatic machine for the making of all kinds of bottles, wide and narrow mouth, and semi-automatic machinery for the narrow mouth ware; and 3) 1917 onward - semi-automatic machinery made automatic by the feed and flow devices.

At the beginning of the 20th Century, a new phase of bottle manufacture commenced.

Through the cooperation and financial backing of the Toledo Glass Works, the Owens machine was perfected in 1903. At first, the Owens machine made only heavy bottles, which were wanted in great number. In 1909, improvements allowed it to make small prescription bottles. By 1917, other completely automatic bottle making machines had been invented, and bottles were formed automatically throughout the civilized world.

Characteristically, bottles formed by the Owens machine will have heavy bottoms, thick even walls, and the seams of the neck molds will not line up with the seams of their bodies.

A distinguishing mark left by the Owens machine is a shallow wrinkle in the glass which forms a circle in the base of the bottles. The ring probably is off center and may complete its circle by extending up the sidewalls of the bottle.

This "Owens ring" formed when the glass, which was sucked up into the lip mold, was cut off from the rest of the glass in the pot (Kendrick 1966:81).

Before 1917, the only fully automatic bottle machine was the Owens, but after this, the importance of the Owens machine decreased. After 1917, the semi-automatic machines greatly decreased in the United States. Between 1916-1924 the Hartford-Empire Company was developing the gob feeder machine (James 1956:21-23). Kendrick 1966:83) describes this device as follows:

In 1917 an important invention of mechanized bottle production (not used by the Owens machine) was a way of forming a measured amount of molten glass from which a bottle could be blown. It is called a "gob feeder". In this process, a gob of glass is drawn from the tank and cut off by shears. Bottles which have been formed from such a gob, may show a design in the center of its base like a "V" with straight lines radiating out at right angles from the "V".

Bottles produced by the automatic machine have a mold seam that extends to the bore of the finish. By 1920, bottles were refined in that bubbles were eliminated and the thickness of the glass made more uniform.

Manganese was used in bottle glass up to about 1917 in order to give the glass a clearer effect. After this date, ultra-violet rays of the sun would not turn glass "purple", a change caused by the manganese content of the glass. Just when manganese began to be mixed with the glass is not definitely known, but it may date back as far as 1810 (Ferraro and Ferraro 1964:79). Newman (1970:74) suggests a beginning date of 1880 and a terminal date of 1925.

Pertaining to amber glass, Kendrick (1966:59-61) states:

With the advent of World War I, our main source of manganese (German suppliers) was cut off. In the U.S. bottle industry, selenium became the predominant chemical used to bleach out the unwanted iron-produced aqua color from the glass. A change-of-color event takes place in this glass which has a high selenium content. With exposure to sunlight its clear appearance changes to an amber hue, or, as I would describe it, the color of ripened wheat. It never gets any darker than a good grade of honey, and there is no need to confuse it with a brown bottle.

A characteristic embossing that takes place after 1933 is described by Ferraro and Ferraro (1966:56-60):

At the time of repeal of prohibition in 1933, the evils characteristic of the pre-prohibition era were well remembered and fresh in the minds of legislators, such antics as a saloon putting cheap whiskey in a bottle with a superior brand name or even bootleggers and moonshiners paying janitors of apartment buildings for empty liquor bottles. As a result, almost every conceivable safeguard or device which would avoid recurrence of those practices was included in Federal legislation. One of the basic changes which was brought about by repeal of prohibition was the type of packages which could be used at the consumer level. The new legislation restricted the sale of distilled alcoholic beverages at the retail level to glass containers of one gallon capacity or less. To avoid or prevent tax evasion, misbranding and adulteration, the law provided that liquor containers must bear the phrase "Federal Law Prohibits Sale or Reuse of This Bottle". The new legislation prohibited absolutely the reuse of liquor ware in any manner. Implemented in 1933, the law was in effect until 1964.

1940-Present

Most of the glass in common use today is one of three types:

(1) Lime glass:

Contains a large proportion of lime and soda or other alkalis. Between 80 and 90 percent of all glass used in the home is of this durable, inexpensive variety. Drinking glasses, milk bottles, jars and containers, and window panes are just a few examples of its varied applications.

(2) Lead glass:

Contains a substantial amount of lead oxide and potash or other alkalis. Most often used for more expensive, quality tableware and decorative pieces.

(3) Borosilicate glass:

Is heat-resistant glass used for cookware and baking dishes, in which a small percentage of boric oxide helps prevent expansion and cracking under temperature change (Glass Institute of America nd:3).

Some modern glass companies are readily identifiable by characteristic manufacturing attributes produced by the type of machine used or by specific patented shapes. Sometimes only the company that used the bottle can be established, since the manufacturer placed the product's name on the bottle and not his own. During the twentieth century, it has been a common practice to place the company's trademark on the bottle--usually on the base. For example, the Owens-Illinois Company was formed by the merger of the Owens Bottle Company and the Illinois Glass Company in 1929. The trademark of the Illinois Glass Company was an "I" in a diamond, with the long dimension of the diamond horizontal. The Owens Bottle Company had an "O" inside a square. After the merger, the trademark consisted of a combination of these two marks. This same trademark was used in 1941 when the term "Duraglas" was added. In 1954, the present trademark (an "I" within an "O") of the Owens-Illinois Company was adopted (Holscher 1967).

Underneath the trademark, another number identifies the mold in which the bottle was made. Holscher (1967) explains the mold numbers as follows:

These numbers would go up to the number of mold cavities made which might be, say from 1 to 22. They would be plain numbers if there was one mold cavity in each mold casting. However, many of our bottles are made in mold castings which contain two or three cavities. A plain number could also indicate the front cavity of a two or three cavity mold. A dot after the number indicates that the bottle is made in the rear cavity of a two or three cavity mold. If two dots follow the number, this would indicate quite recent production in which the bottle is made in the middle cavity of a three cavity mold.

Other companies have similar marking systems. For example, the Glass Container Corporation has the overlapped "G" and "C", the company trademark, on the base. Just below it to the left is the plant number, while to the right is the year of manufacture. Still lower to the left is the mold pair number, and at the bottom of the base is the mold or job number. Each glass company has its own layout, but that above may be representative.

1) Bottle and Glass Chronology (Including Introduction Dates): (from Berge 1980)

- 1785 - 1840-----Large production of lamp chimneys.
ca. 1800-----The mineral water bottle with a pointed bottom to lay on side for wet cork.
1800 to 1870-----The American Historical Flask Period.
ca. 1810-----Preserving (commercial) in glass in France, England, America.
ca. 1811-----Syrups for flavoring drinks.
1820 -----Invention of the metal mold in England.
1821 -----English patent on split iron mold, to shape whole bottle (externally).
1841 -----Nursing bottle patent.
1850s -
late 1870s-----High frequency of mold made bottles with applied finishes but sparse
-----frequencies of makers marks and lettered panels.
1850-1880-----Glass balls for trap shooting.
1857 -----The "snap" case - making "pontil" mark unnecessary on
hand-made glass bottles.
1858 The Mason fruit or canning jar.
Late 1870s
- 1903 -----High frequency of mold made bottles with applied
finishes, makers marks and lettered panels.
1860s -----Kerosene lamps appear.
1861 First lead glass medicine bottles. Shortly after this "French squares"
--- tall, four-sided bottles with beveled edges
--- were put on the market.
1860-1915-----Hey day of bitters (patent medicine) craze.
1871 -----Pressed glass fire extinguisher patented.
1879 -----Hutchinson stopper patented.
1879 -----Edison's first light bulb - hand blown.
ca. 1884 Introduction of milk bottles; very slow in acceptance; complete adoption after
World War I.
1885 - 1910-----A very wide range of closure concepts.
ca. 1885-----Introduction of semi-automatic manufactured bottles.
ca. 1891-----Safety glass with imbedded wire mesh produced.
1896 - 1900-----Bottled Coca-Cola.
1900 to 1920-----Introduction and wide use of metal screw closures.
1903 -----The patent of Owens automatic bottle machine.
1912 -----Crown cap universal for carbonated beverages (patented in 1892).
Post 1912-----Particle cork liners in crown caps.
Post 1917-----Little manganese used in making glass (gives purple tint).

1919 -----Machine-made bottles still heavier than hand-made bottles.
 Post 1920-----Introduction of radio tubes.
 1920 -----Complete transition to "crown" for beverages.
 1920 - 1930-----Era of wide range of commercial closures, replacing cork stoppers.
 1920 - 1933 -----Prohibition. Manufacture of alcoholic beverage bottles practically negligible.
 Use of older vessels and reuse by "bootleggers" is popular.
 1922 to 1926-----Introduction of the plastic closure (bakelite).
 1924 -----8 oz. and 10 oz. bottles for soft drinks.
 1926 -----Beginning of the baby food era (by 1939 largely in glass).
 1930 - 1935-----Standardization of wide range of bottle finishes and closures.
 1933 - 1964-----"Federal Law Prohibits..." embossed on liquor bottles.
 1934 -----Wide use of 12 oz. bottles for soft drinks.
 1938 -----Non-returnable beer bottles.
 Post 1940-----"No Deposit - No Return" embossed on soda pop bottles.
 1945 -----Bubblers in use in tank for homogeneity; the square milk bottle.
 1948 Larger capacity soft drink bottles; non-returnable soft drink bottles.
 1953 -----Synthetic sweeteners of soft drinks.
 1954 to 1958-----Introduction of plastic coated bottles for aerosols.
 1959 to 1961-----The advent of rigid polyethylene containers.
 1963 -----Wide use of low-calorie soft drinks.

(Above chronology is adapted from Berge 1980; Buckles 1978; and Lorrain 1968).

2) Bottle Chronology: (taken in part from Rock 1980)

Free Blown
 to circa 1880

Bottle Molds:

1790-1810-----Dip Molds
 1870s-1920s-----Turn Molds
 1810-1880-----Iron-hinged bottom mold (2-piece mold)
 1870-1910-----Three-part mold
 1880-1910-----Closed mouth mold
 1904-present-----Automatic bottle machine

Base Marks:

pre-1840-ca. 1870-----Pontil or snap marks
 1904-present-----Cut-off scars
 1930s-1940s-----Valve marks (milk bottles)

Lip Forms:

1810-1840-----Sheared lips
 1840-1920-----Applied lips
 1840-1860-----hand applied lips
 1880-early 1900s-----fired lips

Lipping Tool Marks:

1870-1920-----Smooth-lipped

Closures:

1870s-1900-----Inside screw (whiskey bottles)
 1879-1915-----Hutchinson stopper
 1882-1920-----Lightning stopper
 1892-present-----Crown Cap
 1892-present-----with cork liner
 1955-present-----with plastic liner
 1924-present-----Roll on cap

3) Definitions of Mold Seams and Accessories: (from Berge 1980:61-66)

The types of bottle mold seams described herein are illustrated below. Illustration is taken from Berge (1980:63).

Changes that took place in the growing bottle industry during the nineteenth century resulted in many subtle characteristics found on the container. By 1800 the most widely used method of making bottles and other glassware was by blowing; glass produced by this method is termed hand-blown, free-blown, or off-hand-blown (Lorrain 1968:35).

Lorrain (1968:35) states:

Surfaces of hand-blown pieces are smooth and shiny and are without impressed designs or letters. Design may be art, engraved, or etched into off-hand-blown pieces after they are cooled but these are not an intrinsic part of the glass. Decorative globs or threads of molten glass may be added to the object before it is cooled but they will also have smooth, shiny surfaces.

Other characteristics of this technique of glass manufacture are the presence of a pontil mark, asymmetry and lack of mold marks.

Munsey (1970:38-50) provides specific details for recognizing techniques used by manufacturers as various molds changed through time. His methods of identifying the molds used on specific bottles and the time range in which these technological techniques were in operation are in part provided below (see Munsey for additional information and illustrations):

- I. Non-Shoulder Molds - This type of mold forms the body only and may or may not have mold seams at the shoulder.

Dip Molds. The body and base are formed in this one-piece mold. The bottom is slightly smaller than the shoulder, where there may be a mold seam. This type of mold produces a uniform body shape up to the shoulder, and the finish may be handmade.

A. Hinged molds (late 1700s and 1800s). This type of mold does not have to be tapered, since the mold apparatus opens at the shoulder. The side seams disappear at the shoulder and the body could be embossed.

B. Bottom-hinged mold (ca.1810 to ca.1880). The mold seams on bottles manufactured by this method have seams up the sides and across the base. The seams across the bottom come in two varieties: (1) straight across the bottom; and (2) curves around a slight push-up in the center. The bottom seams may be obliterated to some degree by a pontil scar, except when a snap-case was used, in which case the mold seam would be intact.

Three-part mold with dip mold body (1870 - 1910). This mold produces seams around the shoulder and up to the finish area. It allows versatility in designing the shoulder, such as embossing which, however, was not usually done. It did not provide for embossing on the lower half of the bottle.

C. Three-part leaf mold (handblown period of the 19th century). This type of mold produces three mold seams equally spaced up the sides of the bottle.

D. Post-bottom mold. From this type of mold, seams are produced down the sides and to a circle around the bottom.

E. Cup-bottom mold. The seams from this type of mold run down the sides to the heel and around the outside of the base.

F. Blow-back mold (Patent Nov. 30, 1858). This type of mold leaves a rough and ragged edge around the top of the finish. This rough area is ground down so that closure can seal on the sealing surface. This mold was used in early fruit jars, on which screw threads were molded with the rest of the bottle in one piece.

G. Semi-automatic bottle machine. Mold seams extend the length of vessel (unless obliterated by turn-molding) to within 1/4 inch of the top of the lip. No seams are visible on top. See illustration.

H. Automatic Bottle machine (1904 on). The advent of the automatic bottle machine produced bottles with new mold seams. These molds produce seams up over or around the top of the sealing surface. However, beverage bottles are fire polished to eliminate the seams so they will not cut the mouth of the drinker of the contents.

In addition to the above molds and others, there were processes, accessories or tools that produced distinguishing features on bottles. One such process produced in a full-height mold is called a turn-mold bottle, used between 1880 and 1910. In this process mold seams are obscured by turning the bottle in the mold. Bottles treated this way are highly polished, cannot be embossed, and show horizontal lines or grooves produced as the bottle is turned in the mold. These turn-mold attributes are found more commonly on wine bottles.

During the last half of the nineteenth century a plate mold was used to emboss lettering or designs on the body of bottles. In this process a plate with the particular desired motif was inserted into the mold. The plate mold, or slug plate, as it was known, helped in the standardization of many bottle shapes such as milk bottles.

The Owens automatic bottle machine from about 1904 on produced irregular circular marks, known as cutoff scars (not seams) on the base.

Between about 1930 and 1940 some bottle machines produced what is called a machine-made valve mark. This mark is a circle less than an inch in diameter, similar to a seam. It is found more commonly on wider mouth bottles and glass milk containers.

Lipping tools first developed in England ca. 1830 and used in America ca. 1850 often erased seams on the finish. In this process, which shaped the top of the bottle, a rod was inserted into the bore while the associated clamp on the outside developed the finish as it was rotated. Seams were obliterated by the rotation of the lipping tool; but if the tool was pressed only, seams were produced to the top of the bottle.

Early in the nineteenth century and on, the finish was made by cutting the bottle from the glassblower's rod and reheating the lip or sealing surface to smooth it. In cases where mold seams came to the top of the finish, the seams were obliterated by the reheating. This process produced a flared or fired lip.

A wavy, dimpled, or hammered appearance on a bottle surface is more commonly known as whittle marks because they are thought to have been produced by wooden molds. These marks were actually made by blowing hot glass into a cold mold.

Hand-blown bottles were finished by a method known as empontilling. When the hand-blown bottle was at its desired shape and cut from the blowpipe, the finish had to be shaped and fire-smoothed. This was done by attaching a glass rod to the base to turn the bottle while the finish was formed. After the finish was completed the rod was broken off, leaving a mark known as a pontil scar or "punty".

The snap-case was a mechanical device that gripped the base of the bottle body. Occasionally it left a mark on the side of the bottle where it squeezed the hot glass a little too hard.

Machine blowing eventually eliminated the need for empontilling, and the automatic bottle machine did away with the snap cases.

Summary of bottle seams from Toulouse (1969:587).

1. When there are no seams whatever:
 - a. the piece may be free blown without molds, or
 - b. it may have been blown in a shoulder height dip mold with hand shaped shoulder
2. A seam disappearing at the shoulder means a bottle blown in a shoulder height hinged mold.
3. Seams disappearing in the neck area may be blown in any mold, but the seam rubbed out with a hand held finishing tool.
4. If a seam crosses the bottom the mold was a two piece, hinged bottom type.
5. A horizontal seam around the widest point, with two side seams going upward means a three part mold based on a dip mold bottom.
6. Three or more side seams from heel to finish means a three part (or more) mold for decorative designs.
7. Circular seam symmetrical with bottom, joining two or more side seams means a post bottom mold.
8. Irregular, feathery, non-symmetrical bottom seams usually mean a machine made bottle from suction machine equipment.
9. Small diameter, indented into surface rather than extending, non-symmetrical, on the bottom, usually is the valve mark of a (see next page)

press-and-blow machine.

10. Circular seam in heel-side wall tangent area means a cup bottom mold.
11. Seams to top of finish, which is then ground to level, usually indicate hand blown in blow-back mold, or snapped off by blow-over method.
12. Circular or oblong seams in side wall, not connected with other seams are made by plated molds.
13. Horizontal seams below finish area mean separate neck rings but do not prove machine manufacture.
14. One or more seams circling top of finish show machine manufacture.
15. "Ghost seams" seams come from the use of a separate blank mold - hence indicate machine manufacture.

472.3 TYPES OF BOTTLE MOLD SEAMS

472.4 Glass Color: (from Berge 1980:82-86)

Glass can be produced in practically all colors by adding specific ingredients to the basic glass mixture. Munsey (1970:37) suggests that the color of glass was obtained by adding the following compounds:

copper, selenium, gold	reds
nickel or manganese	purple (amethyst)
chromium or copper	greens
cobalt or copper	blues
carbon or nickel	browns
iron	greens, yellows
selenium	yellows, pinks
tin or zinc	opal or milkglass
iron slug	"black glass"

In order to obtain clear glass, the raw materials should be free of impurities in the sand. Very dark greenish-amber glass ("black glass") was popular until the middle of the nineteenth century. Before the turn of the century, bottles were predominantly green and aqua. Munsey (1970:37) further states:

A number of variables can affect the actual color produced including the amount of the compounds used, the degree to which the basic glass mixture is impure, the temperature and the time-temperature relationship, and the reheating necessary to complete a piece of glass.

In the late nineteenth century much of the glass sand, which came from Belgium as ballast for ships, was pale green. This may account for many bottles being this color (i.e., pale green or aqua), though it was not desirable for many products. This glass was decolorized by the addition of manganese, which causes glass to turn purple to amethyst when exposed to the ultra violet rays of the sun (Jones 1965a:40).

Chronological Implications of Glass Coloring: (from Rich Fike, personal communication January 1984)

Black glass -----	alcoholic beverages, e.g., stout, ale, wine, etc., and mineral water.	ca. 1870
Milk glass -----	medicine, cosmetic, toiletry, food and specialty items.	1890-1960
Aqua glass -----	has general and very versatile application, used commonly in nearly all functional categories.	ca.1800 - ca.1910
Green glass -----	has general, versatile use including wine and mineral water vessels.	ca. 1860-present

Amber or brown glass -----	has general application, including alcoholic beverages, e.g., beer, whiskey.	ca. 1860-present
Blue or cobalt glass -----	medicines, cosmetics, and specialty use.	ca. 1890 - 1960
Red glass -----	rare, specialty items.	
Clear glass -----	general application.	ca. 1875-present

472.5 Beverage Bottle Descriptions:

(B) Alcoholic - Whiskey: "A variety of shapes, including large 'case' bottles which were square in shape, figural bottles, 'coffin flasks' for carrying in the pocket (shaped like a coffin), 'picnic' flasks, or half-pints (which are self-explanatory as to use), small flat and ovoid (quite often embossed) pints or half-pints and the round 'fifth' size were, and are, commonly used for bottling whiskey. The common colors of whiskey bottles are aqua, clear, amber and pale green" (Buckles *et al.* 1978:423).

(D) Alcoholic - Champagne/Wine: "These have changed little over the years. They are tall, cylindrical, may or may not have a 'kick-up', and can come in a variety of colors, but distinctive dark greens or ambers are the most common. Another distinguishing mark is the 'turn-mold'. This means that the mold was greased and rotated to remove the mold marks and a shiny patina was left. This was possible as wine bottles were not embossed, but identified with labels"(Buckles *et al.* 197:422).

(E) Alcoholic - Beer: "In glass, a standard beer bottle shape was adopted by the 1870s. The first bottles of this type were free of embossment, in quart size, and were approximately ten inches high. They featured a cylindrical body about six inches around, with slightly sloping shoulders and a tapered neck and lip about four inches in circumference. These bottles utilized a cork closure that was held in by a wire over the cork and twisted around beneath a ring of glass on the neck. Beginning in about 1870, the eastern and mid-western areas of the country used beer bottles with embossments. Many of these bottles were embossed by the plate mold process. By 1890 the western half of the country, too had an abundance of embossed beer bottles. Everywhere beer bottles were being manufactured mostly in pint and quart sizes" (Munsey 1970:116).

(F) Alcoholic - Ale/Stout: "Two ancient malt beverages, ale and stout, were popular on the frontier long before the appearance of lager. Of higher alcoholic content than beer, these two beverages have a heady character that permitted relatively safe shipment over considerable distances before the time of pasteurization. This factor accounted for their appearance in New Mexico and other remote regions of the West in the 1850s, if not earlier. Ale is a strong, fermented, aromatic malt beverage. It is darker, heavier,

472.5 - ILLUSTRATION OF TYPES OF BEVERAGE BOTTLES (from Fike 1987)

and more bitter than beer. Stout, a very dark ale, has a strong malt flavor and a sweet taste. A multitude of ale and stout bottles were recovered at Fort Union and Fort Laramie, many with remnants of paper labels or cork stoppers. Some of these bottles clearly predate beer bottles found at the same posts, and all indicate that Americans in the West brought with them a taste for these malt beverages" (Wilson 1981:7).

(G) Soda/Mineral Water: The varieties of these bottles consist of the three basic types stressed thus far, ie., blob-top, Hutchinson-type, and crown-cork bottles. However, there are several variations, involving pointed, or torpedo-shaped as it is frequently called, and the round bottom bottles were mostly imports from Europe, notably England. These vessels contained ginger ale primarily (Munsey 1970:105).

"The separation (between soda bottles and mineral water bottles) is hard to maintain because at one period mineral water and soda water were one and the same in many cases. The common sizes of mineral water bottles are pints and quarts but they are also discovered occasionally in other sizes. Since the period of greatest production for mineral water bottles was during the era of cork closures most of the ones located are crude and have hand developed necks and lips. Some, however, were made after the invention of the Lightning stopper and the Hutchinson stopper and are thus located with these closures. Some of these bottles even have crown cork closures. Shapes in mineral water containers are varied and range from the Saratoga types to the very unusual Moses figural bottle." One difficulty in mineral water bottle identification relates to soda water bottles: Both beverages used the blob-top soda water-type bottle. Although many mineral water vessels were produced in the common aqua and light green colors some were manufactured in amber and green. The Saratoga types are unusual because they have beautiful deep shades of green and amber. Blue mineral water bottles are known but are unusual (Munsey 1970:101-103).

Blob-top soda bottles: "The earliest of these bottles had tops that were applied separately during their manufacture. To hold the cork under pressure, a wire was placed over the top of the bottle and secured around the neck. These early blob-top soda bottles can be found with pontil scars and iron pontil marks, but are mostly found with plain bottoms because they became most popular after the development of the snap" (Munsey 1970:104).

Hutchinson-type: "The stopper consisted of a rubber gasket (which came in five sizes to accommodate neck diameters) held between two metal plates and attached to a spring wire stem (which came in three sizes to accommodate neck lengths). A portion of the looped wire stem protruded above the mouth of the bottle while the lower end with the gasket and plates extended far enough into the bottle to allow the gasket to fall below the neck. To seal the bottle after it had been filled the rubber disk was pulled up by the wire stem. The bottle was then inverted and righted; this motion formed the seal--the pressure of the carbonation forced the rubber gasket to remain against the shoulder of the bottle." (Munsey 1970:104).

Crown-cork: "It was Painter's (William) third closure, which was patented in its final form in 1891, that eventually made all other beverage closures obsolete. He called this device the crown cork. This closure was essentially the same as those used on beverage bottles today" (Munsey 1970:105).

472.6 Medical/Chemical Bottle Descriptions:

(K) Pharmaceutical/Drug Store: "There are essentially two major groups of drugs: ethical and proprietary. The bottles to be discussed here will be those used for ethical (prescribed) medicines and the various other types of bottles associated with pharmacies (drugstores), excepting poison bottles which are treated separately. There are two types of prescription bottles: plain and embossed. The plain bottles usually featured sunken panels into which paper labels were glued. These are not especially interesting because in most cases the labels are missing. The popular prescription bottles are the ones with embossments. Beginning in the late 1880s the large glass-manufacturing firms had inserted the customer's personalized plate and then blew a supply of bottles. This was an inexpensive means of obtaining the necessary prescription bottles, and almost all drugstores took advantage of it. Large drugstores and chains of drugstores usually had their own exclusive molds made and did not use plate-molded bottles. A number of bottles are lumped together in the category of drugstore bottles. As a result, sizes within this category vary a great deal. Labeled and glass-stoppered bottles that were reused by pharmacists were usually several inches to ten inches in height. Show-window bottles were generally as tall as several feet; other show bottles were shorter (one or two feet). Prescription bottles of all types seldom exceeded twelve inches in height. Shapes in all types of drugstore bottles varied greatly except in the reusable labeled bottles, which were mostly cylindrical or square, and prescription bottles, which were mostly oblong. Show-window and display bottles and jars were made in numerous original shapes. Although closures on the more expensive bottles and jars were usually glass stoppers, on the expendable and less expensive prescription bottles the cork closure was common. Embossments, though common on prescription bottles, were for the most part limited to descriptive lettering and some designs. Colors, though not rare prescription and reusable labeled bottles. In other types and most prescription and reusable labeled drugstore bottles, clear glass was predominant" (Munsey 1970:174-175).

(L) Patent/Proprietary Medicine: The term patent medicine has, however, become the generic one for all medicines sold without prescriptions. In 1906 there were over fifty thousand medicines being manufactured and sold in America. By far the majority of these came in glass bottles. Sizes and shapes of these bottles were fairly consistent; standard sizes up to a quart were common, and cylindrical or rectangular were the common shapes. They were also quite consistently aqua or light green. Almost without exception, patent and proprietary medicine bottles utilized a cork closure (Munsey 1970:69).

(M) Cosmetic: (perfume, scent, and cologne bottles) "Before the common use of hinged molds, perfume and scent bottles were either free-blown or blown in a dip mold. Around the turn of the century perfume and scent bottles of great beauty were beginning to be produced in hinged molds. These bottles were often highly decorated and as a result were comparatively expensive, as were their contents.

472.6 ILLUSTRATIONS OF TYPES OF MEDICAL/CHEMICAL BOTTLES
(from Fike 1987)

By the mid-1800s, double scent bottles came into vogue. These interesting containers usually consisted of two separately blown bottles welded together at the base during the manufacturing process the owner to carry both perfume and scent in what for all practical purposes was one container. Cologne bottles are generally larger than perfume bottles. Because of their close relationship, perfume, scent, and cologne bottles are usually considered to be one speciality in typology, and the term 'perfume' has generally become the generic one for all three types. The major interest of perfume bottles lies in their beauty and size. Usually, much time and effort are put into the designing of perfume and related containers. Perfume bottles are generally less than six inches in height and this factor has great appeal to many collectors who associate smallness with quality. Shapes of many kinds can be found in the perfume bottle collection, including figural types. Many shapes are predominantly geometric. In the more common bottle types embossments are of interest. Both lettering and design are to be found on many perfume bottles. While the majority of twentieth-century perfume bottles have been made from clear glass there are many specimens to be located in a wide range of colors. The pre-1900 specimens are especially noted for their colors. Most twentieth-century specimens were made with matching glass stoppers; on the more expensive bottles the stoppers were specially ground to fit. Before 1900 the common cork closure was popular. Sometimes a combination glass and cork stopper was utilized; such closures usually featured a cork ring within the neck of the bottle into which a glass stopper fit" (Munsey 1970:154-155).

(O) Poison: "In the early years of the 19th Century there wasn't the legislation or pressure required to make poison bottles 'different', but there was concern which produced brightly colored, odd shaped (i.e. skull and crossbones, coffin), embossed and textural bottles. All these methods were employed to warn both the literate and illiterate populace of the contents. The favorite color seems to be blue but a great variety of other bright colors were employed" (Buckles et al. 178:425).

472.7 Household Bottle Descriptions:

(O) Fruit/Canning Jars: "These were usually cylindrical in shape with a wide mouth and made of clear or aqua glass. They are relatively easy to recognize because of their familiar forms as 'Mason Jars' " (Buckles et al. 1978:424).

(P) Milk Bottles: "These were introduced in the latter part of the 19th century and the first recorded patent was in 1880. These were usually cylindrical (although other shapes do exist), widemouthed, made of clear glass and embossed" (Buckles et al. 1978:425).

(Q) Preserves/Pickles: "Among other late 19th century containers which are easy to recognize are pickle jars. They are generally large and have four to eight sides, are wide mouthed and are often embossed with Gothic arches" (Buckles et al. 1978:425).

(R) Peppersauce/Clubsauce: "Pepper sauces were commonly in bottles smaller than the pickle bottles, in shades of aqua or green, with longer and more slender necks and openings. These were usually square or cylindrical and sometimes employed the Gothic arch embossing similar to the pickle bottles" (Buckles et al. 1978:425).

(S) Mustard: Mustard bottles are generally the same shapes as are in use today. "Often, a particular bottle shape has been associated with a particular product for so long that it is seldom used by manufacturers for anything else" (Munsey 1970:152). Wilson (1981:81) says of these bottles found at Fort Union, New Mexico and Fort Laramie, Wyoming (ca. 1849 to 1891): "Pickle, mustard and relish jars are rare. All such products were packaged in glass and were in common supply as items of commercial trade by the late nineteenth century. It can be concluded that such products were standard items stocked in bulk by the army commissary and that their purchase in small containers was unnecessary. However, too great a reliance should not be placed on this explanation..."

(T) Catsup: "Food containers included a wide variety of sizes, shapes and colors. Many are still in use and easy to recognize, such as catsup and mustard bottles" (Buckles et al. 1978:425).

472.8 Domestic Bottles Descriptions:

472.7 ILLUSTRATION OF TYPES OF HOUSEHOLD BOTTLES
(from Fike 1987)

(V) Ink: "Ink bottles were made in a variety of shapes and colors. The most common shapes are 'cone shapes' with a wide base tapering up to a narrow neck. A variation of the cone shape was called the 'umbrella shape' which had greater heights" (Buckles et al. 1978:424).

(W) Shoe Polish: Shoe polish bottles come in a variety of sizes and shapes. In general shapes can include square, rectangular, and cylindrical. Colors include green, amber, clear, and blue. In general bottle heights appear to range from 2 1/8" to 7 7/8". Embossing and paper labels are common. (Description drawn from examples in Wilson 1981:93-94).

(X) Tooth Powder: "These rather small containers were produced in attractive shapes. Tablet jars featured glass stoppers while most tooth powder bottles had screw caps or cork-encircled stoppers. These tooth powder stoppers usually had a second screw cap at the tip of the stopper; this was to allow for the use of small amounts of tooth powder. Table jars and tooth powder bottles were usually one to several inches high" (Munsey 1970:175).

(C) Other: Includes baby nursing bottles, paste/glue bottles, etc.

472.9 Specialty Bottle Description:

(Y) Figural: "There is a popular parlor game based on the idea that all things in the world can be divided into three general categories: animal, vegetable, and mineral. A similar statement can be made in defining figural bottles, i.e., they are made in the shape of things: animal (including humans), vegetable, and mineral. Figural bottles of both ceramic and glass range from fractions of an ounce to a full gallon. Some of the smallest are the fragrance bottles and some of the largest are spirit containers. In glass specimens, all colors are represented... and each bottle is generally limited to one color. The majority of figural bottles of the earlier types utilized the common cork closure and the more recent specimens come quite often with screw cap closures" (Munsey 1970:95-96).

472.10 Other Glass/Non-Containers Descriptions:

(1) Window: "Window glass is obviously that glass used in windows. However, there are problems in the differentiation of flat side panel bottle fragments from window glass fragments. After considerable observation it was decided that window glass must be flat and between .045 to .130 inches thick. Teague and Shenk (1977:125-126) report that window glass may be datable by seriation of thicknesses and recordation of thicknesses is suggested, if feasible" (Buckles et al. 1978:405).

(2) Chemical Related: Laboratory equipment including mining(assay), medical, beakers, flasks, test tubes, pipettes, thermometers, etc.

(3) Lamp Chimney: "Lamp chimney fragments are very common. They are identifiable as fragile curved glass which breaks into very small pieces. Lamp parts are also common and often have patent dates. Lanterns are less common than lamps and may have been related more to outdoor rather than indoor activities" (Buckles et al. 1978:429; also see Roenke 1978:1-117).

472.11 Decorative Technique Description:

(1) Plain

(2) Embossed

(3) All other decorative glass including cut, pressed, engraved, etched, applique, etc.

472.12 Trademarks:

"Trademarks, whether registered or not, brand names, and other marks and symbols of identification found on bottles are datum points in determining the history and ages of the collectors' bottles. When the owner of the mark is known, and when more exact dates can be assigned to its use, the mark becomes a means of dating the piece upon which it appears. If the mark was used for many years, we may have to rely on other considerations in order to date the piece within the mark's span of years. If the period of use of the mark was short, the age of the bottle may be pinpointed to a short period of time. In some instances, lucky for the collector but unlucky for the user of the mark, the period may be reduced to one or two years. One factory making beer bottles in the 1880s, whose ownership, name, and mark changed five times in eleven years, has helped historical archeologists date a number of sites in the western United States" (Toulouse 1971:7).

"Bottles which are made in molds commonly exhibit some intentional markings which are produced from the molds as identifications of the bottle makers (Toulouse 1972). These 'makers marks' are primarily located on the bottle bases. The marks evolved over time and the time spans of many of their stylistic variants can be identified. These distinctive makers marks are the most exact and wide-spread attributes of bottles which aid in dating bottles of the late 19th and early 20th Centuries" (Buckles et al. 1978:427).

The most useful publication for identifying makers marks is *Bottle Makers and Their Marks* (Toulouse 1971). In addition, local makers marks can usually be traced through local telephone directories and informants.

"A factor to consider when identifying bottles of the past is that the functions bottles were manufactured for may not have been their function at a site. 'Used bottle dealers' were common up until prohibition (1918), particularly in the west (Wilson 1968:24). Bottles were reused for a number of functions but most commonly for containers for beer, whiskey, wine and other liquors and 'spirits'. These 'liquid refreshments' were commonly sold to saloons or stores by the barrel (whiskey and wine) or keg (beer) and then drawn off as ordered by the customers for home consumption. The customer would have to provide his own bottle, or quite often a bucket (necessitating fairly rapid consumption before the contents went flat) (Wilson 1968:22,168)" (Buckles et al. 1978:426).