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Analysis of Historic Glass in Kittitas Valley Sites

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ANALYSIS OF HISTORIC GLASS IN KITTITAS VALLEY SITES

A Senior Honors Thesis

Presented to

The Department of Anthropology

Central Washington University

by

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June 2007

CENTRAL WASHINGTON UNIVERSITY
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ABSTRACT

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By

Minori Muramoto

June 2007

The purpose of this project was to investigate a sample of the historic glass artifacts from three excavation sites in the Kittitas Valley: the Grissom Site (45KT301), the Robber's Roost Site (45KT800), and the Sorenson Site (no site number). I addressed five questions about the glass artifacts: 1) what was the minimum number of vessels, 2) what functional types of glass were found, 3) what technologies were used to manufacture them, 4) when, where, and which company made this glass, and 5) what Ellensburg stores or companies are represented in the sample. I also used the data to estimate the date of the historic component of each site.

A total of 1,247 specimens were examined from the Grissom Site. These represented a minimum of 40 separate vessels. With the Robber's Roost Site, a total of 982 specimens were examined and there were at least 463 separated vessels. There were 10 glass specimens and nine vessels from the Sorenson Site. All sample vessels from these three sites were made with either mold-blown technology or by a machine. Twenty-one glass manufacturing companies were identified from embossing: 17 companies were located in the eastern US. Three Ellensburg companies were identified from embossed glass. They were the D.O. Woodworth drug store (1889 - 1895), the Elwood drug store (1899 - 1936), and the Sody-Licious Beverage Company (ca. 1916-1949) – which later became the Ellensburg Coca Cola Bottling Company (1949 – 1967).

The dates of the historic components of each site were between the 1840s - 1920s at the Grissom Site, around 1860 - 1970 at the Robber's Roost Site, and from the 1870s – 1920s at the Sorenson Site.

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Thank you to the Department of Anthropology for letting me have a great research opportunity, especially Dr. Patrick McCutcheon and Dr. Steven Hackenberger. Also, thanks for preserving and providing to me former anthropology students' research project papers; their bibliographies were invaluable.

Thanks also to the Central Washington University Brooks Library, including the University Archives and the Government Documents Department, the Ellensburg Public Library, and the Kittitas County Historical Museum staff for providing me with great Ellensburg history and research help, especially to Dieter Ullrich, Milton L. Wagy, Brian Bach, and Christopher Gwyn. I appreciate and admire these people's professional assistance and goodwill.

I have learned a lot of research and methodical skills, and part of Kittitas County and Ellensburg history through this project. I hope my project encourages other students to be interested in the history of Kittitas Valley archeological sites and to carry on related projects. I would like to contribute my research results to the residents of Ellensburg.

Parts of this project were posted at the Northwest Anthropological Conference in Pullman in 2007 and the Symposium On University Research and Creative Expression in May 2006 and

2007 at Central Washington University, Ellensburg, Washington. It received the C. Farrell Scholarship in 2007.

TABLE OF CONTENTS

CHAPTER	PAGE
1 INTRODUCTION.....	1
2 METHODS.....	5
3 45KT 301: GRISSOM SITE.....	11
Introduction to the Site and Background.....	11
The Historic Glass Sample.....	12
Discussion.....	15
4 45KT800: ROBBER’S ROOST SITE.....	18
Introduction to the Site and Background.....	18
The Historic Glass Sample.....	21
Discussion.....	29
Excavation Levels and Age Estimation.....	29
Excavation Level and Ellensburg History.....	32
5 SORENSON SITE.....	34
Introduction to the Site.....	34
The Glass Sample.....	34
Discussion.....	38
6 DISCUSSION: GLASS MANUFACTURING COMPANIES AND TRANSPORTATION.....	40
Glass Manufacturing Companies in the US.....	41
Glass Commercial Shipping and Transportation.....	44
7 ELLENSBURG STORES AND CUSTOM-MADE GLASS.....	47
D.O. Woodworth Druggist Store.....	47
Harry S. Elwood Druggist Store.....	49
Sody-Licious Beverage Company (Ellensburg Coca-Cola Bottling Company).....	52
8 CONCLUSION.....	58
REFERENCES CITED	59
TABLES.....	66
FIGURES.....	107

Chapter 1: Introduction

Archaeology is the study of past human behavior through remaining materials. In North America, historical materials are associated with Native American and Euroamerican archaeological sites following early European and Euroamerican exploration and colonization (Luttrell *et al.* 1999:6.1-6.2). Unlike prehistoric artifacts, historic artifacts were used by people who lived far from the items' manufacturing places (Sutton and Arkush 2002:160). Artifact analysis can be complemented with archival research using official, unofficial local and factory records, company catalogs, and advertisements from period newspapers to provide researchers with great information regarding production dates, prices, and manufacturing technology associated with historical materials. Changes in manufacturing techniques are often well documented and can be associated with dates of use and occupation of a component at a historical site (Sutton and Arkush 2002:160). As with other archaeological remains, analyzing historical materials requires understanding of cultural context, such as broad and local history (Sutton and Arkush 2002:160). Following is a brief history of the area to provide this cultural context.

Following the passage of Meriwether Lewis and William Clark in 1805-1806, the fur traders entered the Pacific Northwest region (Luttrell *et al.* 1999:5.1). When the present border between British Canada and the United States was established by treaty in 1846, Congress created the Oregon Territory and passed legislation designed to encourage settlement of the Northwest region (Flanders 1998:132; Luttrell *et al.* 1999:5.3). In 1853, the Washington Territory was created from the northern portion of Oregon, and Isaac Ingalls Stevens was sent to assume the governorship of the Washington Territory (Luttrell *et al.* 1999:5.3).

During the middle of the 19th century, a few Euroamerican families settled and grazed cattle and horses in the Kittitas Valley and its surrounding foothills as an open range (Kittitas County Centennial Committee [KCCC] 1989:1; Luttrell *et al.*1999:6.2). The Kittitas Valley was known as a “Cattle-man’s paradise” because the valley had plenty of water and bunch grass on the hills for early grazing (KCCC 1989:7; Luttrell *et al.* 1999:6.2). Also, the location of the Kittitas Valley had an advantageous position closer to the markets in the Puget Sound area than other grazing areas (KCCC 1989:7; Painter 1972:48). A.J. Splawn built corrals at Robber’s Roost to hold cattle until herders were ready to drive them to market (KCCC 1989:7). In 1870, he established a trading post, called Robber’s Roost, on the route to The Dalles, which was the end of the land route of the Oregon Trail (KCCC 1989:7-8; Luttrell *et al.* 1999:6.2; Painter 1972:46; Smith 1976:40). The Robber’s Roost served as a post office from April 1873 to April 1894 (Luttrell *et al.*1999:6.20). John A. Shoudy platted a townsite of Ellensburg in April 1873, and the city of Ellensburg became incorporated in March 1885 (Luttrell *et al.*1999:6.20; Splawn 1917:302). Ellensburg became one of the populous areas in Kittitas County. The Washington State Normal School, now Central Washington University (CWU), was established to provide a better education for the residents and opened in 1891 (Painter 1972:54). The school later became the dominant economic factor in this area (Painter 1972:54,56).

In Kittitas County, many archaeological excavations have been done. Many prehistoric artifacts, such as lithics and faunal remains, have been analyzed by students with the mentorship of the curated faculty of the Central Washington University Anthropology Department. However, historic artifacts have been poorly studied. This project was primarily started as a class term project in Anthropology 321 in the Fall Quarter of 2005. I analyzed historic glass artifacts from three excavation units of the Grissom Site. After that, I wanted to continue to

study historic glass from the Grissom Site. Once done with Grissom, I knew that there were a couple more sites where historical glass was found, and that these historical artifacts were not analyzed yet. I wanted to examine other sites' historic glass because the glass at the Grissom Site was all in shards. I had never seen a single completely preserved glass artifact from the Grissom Site. I wanted to examine other Kittitas County archaeological sites because I had several questions about the glass artifacts at the Grissom Site.

The purpose of this project is to investigate a sample of the historic glass artifacts from three excavated sites in Kittitas Valley: the Grissom Site (45KT301) excavated during the 1960s and the 1970s, the Robber's Roost Site (45KT800) excavated in 1986 and 1988, and the Sorenson Site excavated in 2004. I address five questions: 1) which companies provided custom-made glass for Ellensburg, 2) what local stores or companies used the glass, 3) where they were located, 4) who owned them, and 5) how was this glass shipped to Ellensburg. I recorded the following information from the glass artifacts: the color, portion (e.g., base and lip), lip and base form, embossing, pattern, seam and scars, makers' marks, metrics, and bottle closure type. I used this information to determine 1) the minimum number of vessels (MNV), 2) what functional types of glass were found, 3) what technology, techniques, or processes were used to manufacture them, 4) when and where this glass was made. I also use these data to estimate the date of the historic component of each site, and determine how these three sites were associated with one another.

In the following thesis, I discuss my glass analysis and history of these three sites. Chapter 2 describes my analytical methods. In Chapters 3-5, I discuss glass analysis results and site history of the Grissom Site (45KT301), Robber's Roost (45KT800), and Sorenson Site, respectively. In Chapter 6, I discuss the glass manufacturing company locations and glass

commercial shipping pattern. In Chapter 7, I discuss Ellensburg stores, custom-made glass, and the owners of these stores. In Chapter 8, I conclude my project.

Chapter 2: Methods

I examined all of the historic glass from the Grissom Site and the Sorenson Site. I arbitrarily chose a 20% random sample of historic glass artifacts from the Robber's Roost Site. This 20% sample was chosen to gain a fair idea of the nature of glass at the site, without gaining too large sample, from the 20 boxes of glass in storage. Details of the sampling protocol are in chapter 4.

Each specimen in the same bag from the Grissom and Robber's Roost Sites was marked with a sub-sequence number (e.g., 3506-01, 15004-21, etc) to follow its original catalog number. From the Sorenson Site, there were ten historic glass specimens, and no field specimen or catalog numbers. I arbitrarily labeled each Sorenson Site glass artifact specimen.

The procedure for collecting information from the glass specimens was as follows:

1. Classify the specimens as having a portion of base (with embossing and/or pattern), heel, body, shoulder, neck, finish, lip (bottle portion or jar portion), rim, or closure (see Figure 2.01). Lip portion indicates part of bottle; rim portion indicates part of tableware (a general term applied to glassware used on the table and associated with food and drink, e.g., tumbler and dish (Jones and Sullivan 1989:127)). Specimens with intact base portions were classified in terms of cross-sectional shape, called a base profile, using terms from IMACS (1992:4 see Figure 2.02) as well as the terms from Jones and Sullivan (1989:101-105). Bottle specimens with intact finishes were classified by profile using terms from IMACS (1992:3; see Figure 2.03) and Lindsey (2007a; see Figure 2.04). Glass tableware specimens with intact rims were classified using terms from Jones and Sullivan (1989:127-145). Glass specimens with intact closures were classified using terms from Jones and Sullivan (1989:149-167) and Lindsey (2007a; see Table 2.01, Figures 2.05-2.11).

2. Identify the color (aqua, amethyst, brown, blue, colorless, green, light green, olive, red, and white) according to Lindsey criteria (Lindsey 2007b).
3. Identify whether or not there is a seam or mold mark, and, if so, what kind, and where the mold marks are found, especially the base, body, neck, and finish. Specimens with mold marks were placed as possible into one of nine types: dip mold, hinged shoulder-height mold, bottom-hinged mold, three-part dip mold, three-part leaf mold, post-bottom mold, cup-bottom mold, machine-made (see Figure 2.12) and keyed mold. Keyed mold bottles have a side seam like bottom-hinged mold but a curved base seam (Lindsey 2007e; see Figure 2.13). In addition to Figure 2.12, I used the criteria in Table 2.02 and 2.05 and Figure 2.14-2.15. These observations were used to identify the manufacturing technique (free blown, mold-blown, or machine-made) using criteria from Sutton and Arkush (2002:184-187), Toulouse (1969:526-589), and Lindsey (2007c). I identified manufacturing technology from complete or near-complete preserved vessels and lip portion of vessels from the Robber's Roost Site, and all glass shard specimens from the Grissom and Sorenson sites.
4. Identify whether there are embossed markings, such as a logo or seal, as well as identifying what and where any markings are found.
5. Measure the base diameter, finish sizes (lip diameter, bore diameter, lip length, and neck length) of the glass bottles using digital calipers to the nearest 0.01mm.
6. Try to refit some of these specimens for each site following these steps:
 - a. Try to refit all specimens within a bag (one catalog or field specimen number) of the same color, pattern, glass thickness, embossing, and portion (base and base, lip and lip, and rim and rim). This was done for the Grissom and Robber's Roost sites.

- b. Try to refit the same and/or similar color, pattern, glass thickness, embossing, and portion of specimens (base and base, lip and lip, and rim and rim) from different bags. This was done for the Grissom and Robber's Roost Sites.
7. Calculate the minimum number of vessels (MNV). The MNV estimation was made by tabulating the minimum number of each vessel portion (base, lip or rim) and taking as MNV the maximum value. Portion minimum number estimates take into account glass color, morphology (e.g., neck finish or base profile), size (e.g., bore diameter, lip length, base diameter, and thickness), and visual characteristics (e.g., embossed letters or patterns). For the Robber's Roost Site, MNV was calculated using portion minimum numbers only -- the most abundant portion is represented as that level's MNV (other characteristics were not used for MNV at this site). For the Grissom and Sorenson sites, I considered color, portion, and other traits in the MNV calculation. For example, if there are two blue color specimens, one a rim portion with a pattern on its body, and the other a body portion with no pattern, the MNV would be 2.

I created an arbitrary vessel numbering system. For the vessels from the Grissom Site the vessel number began with number 01, the vessels from the Robber's Roost Site began with 101, and the vessels from the Sorenson Site started with 5001. Consequently, no vessel or portion numbers were the same, and each vessel identified both its site and the vessel.

8. Identify the functional type of each vessel using terms, descriptions and pictures from IMACS (1992:19-26) and Lindsey (2007d; see Table 2.03). In assigning function, it is important to remember that the same type or style of bottle may have been used for distinctly different products, and they were reused many times for totally unrelated products (Lindsey 2007d).

9. Estimate the age or period of manufacture each vessel using six different methods for the age estimation, as follows:

a. Using vessel color according to Table 2.04.

b. Using glass manufacturing technique to according to characteristics and ages noted in Table 2.05.

c. Using lip manufacturing technology according to Table 2.06. Machine-made lips are recognized when

- (1) The side seam extends into, and through, the finish all the way to the top surface of the finish and rim;
- (2) a horizontal seam circles the neck immediately below the finish called a "neck ring seam;" and
- (3) another mold seam (often faint) at the very top of the finish which encircles the bore or opening (Jones and Sullivan 1989:35-39; Lindsey 2007c; see Figure 2.14).

With mold-blown technology, the neck seam presence distinguishes between applied finish and tooled finish. The tooled finish is identified by a side mold seam that distinctly ends or fades out on the neck below the bottom edge of the finish (Lindsey 2007a). The applied finish is identified by a side mold seam ends on just the bottom edge of the lip (Lindsey 2007a).

d. Using embossed symbols and lettering to identify the company and manufacturing period using definitions from Bethman (1991), Toulouse (1972), Whitten (2005a), and company websites (Figure 2.16; Table 2.07).

e. Using finish or lip profile shapes according to Table 2.08. Lip shape is useful for chronology because it reflects technological development of closures. For example, the crown finish was invented and patented by William Painter in 1892 (Jones and

Sullivan 1989:163-164, Lindsey 2007a) or 1891 (Munsey 1970:105). The crown finish became common by the early to mid 1910s and was used universally for carbonated beverages by 1912 with complete transition by 1920 (IMACS 1992:10-12; Lindsey 2007a)

f. Using other embossed notations. Bottles embossed with a volume capacity date to 1913 revised the Gould Amendment of the Pure Food and Drug Act in 1906. This amendment required all bottles to have such labeling and gradually the bottle makers accepted it (Lindsey 2007f). Bottles embossed with "Federal Law Forbids Sale or Reuse of This Bottle," are from between 1933 (or 1935) and the 1960s (IMACS 1992:8; Lindsey 2007f; see Table 2.09)

10. After completing glass analysis, I input all data into three Microsoft Access databases. A copy of each of these databases was provided to Dr. Lubinski for curation.

Archival research methods including collecting information about local stores, industries, and business people by going to 1) the Central Washington University (CWU) James Brooks Library, especially the Government Documents Department, and the University Archives Collection, 2) the Kittitas County Historical Museum (KCHM), 3) the Ellensburg Public Library (EPL), especially the Local History Collection, and 4) the library of the Department of Anthropology. At the CWU Brooks Library, I examined the Sanborn Fire Insurance maps of Ellensburg for the years 1888-1928 (Sanborn Map Company 1983-1990), US railroad maps (e.g., Rand McNally 1958), and consulted with the map librarian Brian Bach. I looked for pertinent newspaper accounts about Ellensburg residents related to historic bottles. At the University Archives Collection of the Brooks Library, I examined early writing about Kittitas County, as well as Ellensburg history and records about early residents, such as city directories (Polk 1890,

1913, 1923, 1929, 1931, 1948, 1949, 1957, 1961), special local historic collections and photographs. At the KCHM, I observed materials about life in Kittitas County and looked for displays (e.g., posters and maps) related to historic bottles and Ellensburg stores. At the EPL, I examined information about Ellensburg residents (e.g., genealogical files), photos, and Ellensburg and Kittitas County history and consulted with the librarian Milton Wagy. In the library of the Department Anthropology, I examined former students' independent reports and Honors theses, especially for Kittitas County history and archaeological site reports.

Chapter 3: The Grissom Site (45KT301)

Introduction to the Site and Background

The Grissom Site (45KT301) is a multi-component archaeological site located southeast of Colockum Pass, in the northeast corner of the Kittitas Valley and about 10 miles northeast of Ellensburg, Washington (McCombs 2003:1; see Figure 3.01).

The Grissom Site is located on Caribou Creek, near a location traditionally named “Che-lo-han,” about ten miles northeast of Ellensburg (Glauert and Kunz 1972:40; Kittitas County Centennial Committee [KCCC] 1989:3; Ray 1936:99-120,143-144, Schuster 1998:328). It was near some springs called Warm Springs, the great Council Ground, and a site for root digging, hunting and fishing campsites for Central Washington Indian tribes during the spring and summer season (Eitemiller *et al.* 1995; KCCC 1989:3). Alexander Ross was the first white man known to travel the Colockum Trail in 1812; in 1814 he returned to the Kittitas Valley and witnessed more than 3,000 Indians in the Kittitas Valley “covering more than six miles in every direction. Councils, root-gathering, hunting, horse-racing, foot-racing, gambling, singing, dancing, drumming, yelling, and thousand other thing,” (Ross 1855:21). The Colockum Trail connected the Kittitas valley to the Wenatchee country to the northwest, and was used before railroad transportation became possible (KCCC 1989:7-8; Smith 1976:37-58).

The Grissom Site was excavated during the 1967-1970 field schools at Central Washington State College, now Central Washington University (CWU), under the supervision of Dr. Clay Denman and Dr. William Smith of the CWU faculty (McCombs 2003:1). Some 90 units were excavated, of which the main block is indicated in Figure 3.02. The excavation had two systems for recording depth, cm in depth below the site datum point and level numbers (e.g., +1, +2 and +4), and also included several proveniences without levels or depths such as surface

and pit clean up. Unfortunately, the relationship between depths and levels was not recorded and remains unclear.

Thousands of artifacts were unearthed. Most of the materials derive from a prehistoric/protohistoric Native American campsite, but there are also historical artifacts, such as buttons and nails. Preliminary faunal analysis was done by students Kimber Baderscher, Michelle Lynch, Rita Sulkosky, and Chris Hehman, during the period of 2003 to 2005 under the mentorship of Dr. Lubinski. A lithic analysis was done by a student, Mary McCombs, in 2003 under the mentorship of Dr. McCutcheon. However, historic artifacts were not analyzed prior to this project.

The Historic Glass Sample

I chose to examine all historic glass from the site. To find the glass, I queried the Grissom database in winter quarter 2006 for all catalog numbers with historic glass in the material field. I then removed the glass bags from the inventory boxes which are organized by catalog numbers.

A total of 1,247 specimens from 436 bags was examined (Table 3.01). All specimens are glass shards. The glass specimens are unevenly distributed among units and depths. Specimens were derived from 51 different units, plus some bags without a known unit number. Their distribution is given in Table 3.01. They were distributed from 0 to 120cm below datum (Table 3.02). Light green color specimens were found in 19 units (Table 3.03). Light green specimens are bottles glass (30 specimens) and plate glass (135 specimens). Half of the plate glass specimens (78 of 135) came from units W3E (62), U3E (13), and V3E (3; see Table 3.04). The site was, probably, disturbed because prehistoric lithics and historic artifacts co-occur in the same unit and level (McCombs 2003:18-20).

The 1,247 specimens represent 65 separate vessel portions: two nearly complete vessels, 36 base portions, 18 lips, 6 bodies, 2 rims, and 1 lid (Tables 3.05-3.06). The 1,247 specimens and 65 portions represent a minimum of 40 separate vessels (2 nearly complete vessels, 31 base portions, 3 lip portions, 3 body portion, and 1 rim portion; see Table 3.07). Portion minimum number estimates take into account glass color, morphology (e.g., neck finish or base profile), size (e.g., bore diameter, lip length, base diameter, and thickness), and visual characteristics (e.g., embossed letters or patterns). For the Grissom Site, I considered color, portion, and other traits in the MNV calculation. Over half of the vessels (20 of 40) are colorless; five vessels are aqua, five are green, three are amethyst, two are brown and blue, and one white.

There were 6 profile variations among the base portions, with 12 out of 21 identified portions round (Table 3.08). Other bottle portion profiles were Blake, Monarchy/Eire, elixir/handy, French square, and polygon. Blake profile bottles were commonly used for medicine or patent drug bottles while the round-bottomed bottles were used for a variety of purposes (Lindsey 2007d). The lip portion had four variations (Table 3.09): prescription, ring/oil, flat/patent, and champagne; all in use from the 1830s to 1920s (Lindsey 2007a). Ring/oil, flat/patent, and prescription lip portions were commonly used by patent or proprietary medicine bottles (Lindsey 2007a; see also Table 2.08).

Thirty-one vessel portions (20 MNV and 1 lid) were identified by their functional types (Table 3.10), of which seven were medicine (druggist) bottles, five alcohol, soda, wine, or champagne bottles, three condiment bottles, two beverage bottles, one bowl, one cosmetic or ointment/cream jar, one unknown jar, and one jar lid. At least two of the condiment vessels contained “delicious flavoring extracts,” and one was a mustard bottle. The jar lid fragment was likely a Mason jar lid because of its shape and embossing of “MAS(O).” Also, there are 135

shards of panel glass (window glass) among the artifacts (Table 3.04). These artifacts are uniform in thickness (1.1 ~ 1.7mm) and flat, slightly green color, and transparent.

All of the bottles with identified manufacturing technology were made with mold blown technology, in use from the 1840s to the 1910s (IMACS 1992:11-12; Lindsey 2007c). Only nine vessels were identified by their manufacturing technologies (Table 3.11) because all of the specimens were in shards. Six vessels were made by cup bottom mold technology, in use from the 1850s to the 1910s; one was made by keyed mold technology, in use from the 1840s to the 1870s; one was made by post bottom mold technology, in use from the 1840s to the 1910s; and one was made by three-piece mold technology, in use from the 1870s to 1910s (Lindsey 2007c).

The lip manufacturing technologies were applied and tooled finish technology. Applied finish technology is divided into two technologies, one done with various tools - including a finishing or lipping tool –and the others, done by a controlled drip of glass and called a hand applied lip (IMACS 1992:5-6; Lindsey 2007a). Four vessels were made by applied finish technology, in use from the 1840s to the 1890s (IMACS 1992:12; see Table 3.12). Vessel portion # 28 (catalog number # 1191; see Figure 3.03) had a hand applied finish, a technology in use from the 1840s to the 1860s (IMACS 1992:2). Eleven of 15 lips were made by tooled finish technology, in use from the late 1870s to the 1920s, the end of the mold-blown technology period (Lindsey 2007a, 2007c).

Thirty-nine specimens were embossed on their side or bottom (Table 3.13). Two food containers with embossing (vessel portion # 08 [catalog # 3525] and vessel portion# 10 [catalog # 3527]) might be “Dr. Price’s Delicious Flavoring Extracts” because the fragmentary bottle specimens at Grissom are a perfect match for a complete specimen pictured in a book, *the Illustrated Guide to Collecting Bottles* (Munsey 1970:153; see Figure 3.04). Dr. V. Clarence

Price and Charles R. Steele began manufacturing flavoring extracts in 1874 in Chicago (Zumwalt 1980:340). One bottle portion (portion # 09) with fragments of a fan and text is a D. O.

Woodworth druggist bottle based on comparison with a complete bottle from the Sorenson Site. The full text of the bottle would read “D.O. Woodworth/Druggist/Ellensburgh, Wash.” One of the other embossed specimens was the product name Sarsaparilla. Another glass shard embossed with 1846 probably referred to a patent date or the founding date of the company.

The locations of four glass manufacturers were identified from the embossing (Table 3.14). They were all made in eastern states: Baltimore, Maryland; Millville, New Jersey; Chicago, Illinois; and Lowell, Massachusetts. Two glass manufacturing companies were identified which were the Maryland Glass Company, Maryland and the Whitall-Tatum Company, New Jersey (Toulouse 1972:339-341,544-547; Whitten 2005a). The Whitall-Tatum Company made the D. O. Woodworth druggist bottle of Ellensburg between 1889 and 1893 (see discussion in chapter 7).

The manufacturer of some specimens, those embossed with an H or Z, could not be found in the available records of embossed glass (Toulouse 1972; Whitten 2005a). An “H” embossing as a marker’s mark could include Hemingray Glass Company, Muncie, IN; H.J.Heinz Glass Company, Sharpsburg, PA (ca.1893-1946); Hagerty’s Glass Works, Brooklyn, NY, and probably others (Whitten 2005a). A “Z” or “N” embossing as a marker’s mark could not be found.

Discussion

Based on the glass analysis, the historic component of the Grissom Site dates from about 1840 to 1920. Mold-blown technology was only used from the 1840s to the 1910s. Vessel portion # 28, which had a hand-applied lip, was, probably, the oldest vessel in this site, because it was probably made between the 1840s and the 1860s. Another reason to assume that this vessel

was the oldest is because the vessel color was dark olive. Glass color is based on the glass ingredients. The majority of common bottle glass is primarily composed of silica, soda, and lime (Munsey 1970:7, Perry 1945:73-74). The silica (silicon dioxide) is primarily derived from sand and makes glass green or yellow (Munsey 1970:37). Very dark greenish-amber (black glass), pale green, or aqua glass was popular before the glass was decolorized by the addition of decolorizer agents, such as manganese and selenium in the middle of the 19th century (IMACS 1992:18; Lindsey 2007b; Munsey 1970:55). Usually olive green glass was a natural color and made before colorless glass technology was invented, ca. 1870s (IMACS 1992:18; Munsey 1970:37).

One bottle fragment was embossed with an “M” in a circle on the base was, probably, one of the newest vessels. This embossing mark has been used by the Maryland Glass Corporation, in Baltimore, Maryland, since 1916 (Toulouse 1972:339-341; Whitten 2005a).

The Grissom Site was, apparently, abandoned before the 1920s, and probably by about the 1900s because 1) no machine made bottle were found, 2) only varieties of lip portions manufactured between the 1830s (e.g., ring/oil) and the 1880s (e.g., champagne) were found -- no crown (invented by 1892) or straight brandy/wine (invented around the 1890s) were found, and 3) no volume capacity information embossing was found. The Pure Food and Drug Act of 1906 requested labeling information, but it did not require the inclusion of volume specification, such as 1 pint or 6oz (Lindsey 2007f; Munsey 1970:69). Glass manufacturing companies began to label volume information on their bottles when the Gould Amendment to the Federal law passed in 1913 (Lindsey 2007f). Therefore, this site was possibly abandoned prior to the 1900s, before the transition began from mold-blown glass technology to machine-made (IMACS 1992:6-7).

However, I worry about this Maryland Glass bottle. The only evidence for occupation after the 1920s is the bottle from the Maryland Glass Corporation, which dates from or after 1916 (Toulouse 1972:339-341). Consequently, based on the other evidence presented here, I argue this bottle is from near that 1916 initial date.

Full-automatic glass machinery was invented in 1904 by Michael Owens, and the semi-automatic machine was developed around the 1890s to the 1900s (IMACS 1992:6-7; Jones and Sullivan 1989:39; Lindsey 2007f; see Figure 3.05). The transitional period from mold-blown to machine-made glass is difficult to estimate. However, by 1917, 90-95% of bottles and jars produced in the U.S. had automatic or semi-automatic machine-made characteristics (Lindsey 2007f). Small runs of customized bottles, such as proprietary druggist and drug store bottles, were one of the last classes of bottles to convert to full machine production by the mid-1920s. This is because most druggists were small local businesses and still needed small orders of bottles (Lindsey 2007a).

Although the Maryland Glass Co. installed automatic equipment with two Owens machines in 1915 (Toulouse 1972:339), the Grissom vessel does not have a suction scar, which was an early Owens machine characteristic (Jones and Sullivan 1989:38; Lindsey 2007c); instead it was made by a cup bottle mold technology. However, many of the glass companies who acquired fully automatic bottle machines retained hand operations for smaller or specialty orders for quite some time (Lindsey 2007f). The Maryland Glass Corporation bottle was, perhaps, a medicine bottle because the base portion had Blake profile, a general characteristic of a medicine bottle, but the bottle finish is missing and this is one of the most distinguishing parts between medicine bottles and other bottles (Lindsey 2007d). To sum up, I presume that the site was, possibly, abandoned around the 1900s, and was, definitely, abandoned before the 1920s.

Chapter 4: the Robber's Roost Site (45KT800)

Introduction to the Site and Background

The Robber's Roost, or Bassett, Site (45KT800) is a historic archaeological site located between 3rd and 4th Avenue, and Main and Water Street in downtown Ellensburg, Washington (Figure 4.01). This site was where Andrew Jackson Splawn opened a trading post in 1870 (Splawn 1917:297), using a cabin built by William (Bud) Wilson in 1867 and moved to this location (Inter-State Publishing 1904:237; Luttrell *et al.* 1999:6.20). Splawn tried attracting the local Native peoples in hope to trade with them because there were only a few white settlers at that time (Glauert and Kuns 1976:53; Splawn 1917:297). The "Robber's Roost," named by John Gillispie, was used as a name for the settlement before the town was named Ellensburgh (Ellen's village) by John Shoudy in 1875 (Luttrell *et al.* 1999:6.20; Splawn 1917:302). Splawn described the early days of his business in his book, *Ka-mi-akin, The Last Hero of the Yakimas* (1917:297):

We bought a hewn log house, 14x18 feet, which stood a few miles away and contracted with Martin Daverin to haul it and put it up near our camp... John Gillispie, a young settler of the previous year and good friend of mine, rode up and asked how I was going to get inside to do business... He said that I needed a sign and volunteered to make me one. I accepted his offer. A few mornings later I read over my door, "Robbers' Roost." It staggered me for a moment, but, on second thought, I concluded that perhaps John knew more about the sign business than I did. Thought it did look very suggestive I decided to let it stay.

Robber's Roost soon became famous throughout the land. Settlers were very few and poor, so we could expect but little revenue from that source and must depend upon the Indian trade.

A few years after Splawn sold his business (Splawn 1917:302):

In the early summer of 1872 I sold my stock of goods to John A. Shoudy. Afterwards I made him a present of my squatter's right to the 160 acres of land comprising the present site of Ellensburg. Shoudy platted the townsite and named it after his good little wife. The settlers, however, for many years, still clung to the old name, Robber's Roost.

A. T. Mason, a settler from Cayuga County, New York, reminisced about the Robber's Roost in the late 1800s (The Ellensburg Dawn 1901). When Mason came to the Robber's Roost to buy something, he saw from 50 to 200 Natives lying around the store and a few white men (The Ellensburg Dawn 1901:50). Inside the store, there was a corner on one side and bench on the other. The Robber's Roost became a popular place because cattle herds were gathered here before beginning the drive to market in Seattle (KCCC 1989:7). The Kittitas Valley became "Cattle-man's Paradise" because of plenty water, bunchgrass on the hills for early grazing, and, also, it was closer to the markets than other beef producing areas (KCCC 1989:7; Lutrell 1999:6.2). In 1871, Mr. Splawn sold out to Mr. John Alder Shoudy who built a second log cabin in 1872, and later built the first frame store building in Ellensburg (Figure 4.02).

Collaboration among Kittitas County Youth Services (Director Stan Bassett), Central Washington Archaeological Survey (Dianne Semko, Debra Dove, James Chatters, and William H. Adams), the City of Ellensburg, Kittitas County Juvenile Court, the Kittitas County Historical Museum (Larry Nickel), and Small Towns Institute (Director Ken Munsell), sponsored an activity of archaeological excavation for youth volunteers this site in 1986 and 1988 (Adams *et al*, 1986-1988). In 1986, the project was small; four volunteer supervisors, including Dianne Semko, Debra Dove, and James Chatters, were involved in the excavation. They worked in teams supervising six to eight teenagers two hours per day, four days a week from June to October 1986 (Adams *et al*, 1986-1988). Young people were trained in archaeological excavation and laboratory analysis (Adams *et al*, 1986-1988). The plan was expanded in 1988. A total of 10 youth volunteers, two paid archeological professional supervisors (Semko and Dove), and one youth supervisor worked at 30 hours per week for 10 weeks from 22nd June to 28th August (Adams *et al*, 1986-1988). Professional archaeologists taught the volunteers

excavation techniques, recording, mapping, and preparation of cultural materials for laboratory analysis (Adams *et al.*, 1986-1988).

There were 61 excavation units in 1988 (Figure 4.03-4.04). According to the Robber's Roost excavation records (Adams *et al.* 1986-1988), this site had two different grid systems. In the 1986 excavation, there were 14 excavation units, and some units had two or three sets of grid numbers. For example, one unit was labeled as N.1/W.13, another unit was labeled as 00/W.2 and 00/W.3. I interpret these as units of different size, with those with single coordinate pairs (e.g., N.1/W.3) as 1 x 1m and those with multiple pairs larger. The excavation map of the Robber's Roost Site (see Figure 4.03) had small rectangular shaded areas among the 1988 units. I hypothesized these shaded areas were the units of the 1986 excavation. I tried to place the units of the 1986 excavation on the shaded areas using the 1986 coordinates. I presumed the letter N meant northing and the letter W meant westing, and so on. There were no 1986 excavation notes, but some 1988 excavation records described areas excavated in 1986. I placed the numbers from the 1986 excavation units on the 1988 excavation units following the excavation map (Table 4.01). Unfortunately, some 1986 excavation units, such as unit N9/W11, did not match the 1988 units and the map of the shaded areas. In these cases, examination of site records indicates the 1988 locations are correct, and the 1986 coordinates are simply incorrect. I used the 1988 locations in Table 4.01.

Also, the excavation of 1986 and 1988 used the different level systems. The 1986 excavation used the depth below the datum point, written as 10-20cm. The 1988 excavation used the depth below the surface written as level 1 and 2. I systematically placed from 0-10cm into level 1, from 10-20cm into level 2, and so on (Table 4.02-03). This 1986 and 1988 level correspondence seemed reasonable if units were dug in arbitrary 10cm levels, so this assumption

was made for my analysis. (Unfortunately, later examination of the 1988 field notes indicates to Dr. Lubinski that the 1988 excavation used stratigraphic “natural” levels, and so the 1986 and 1988 levels are not comparable. This discovery was made too late to be included in my analysis).

Thousands of historical artifacts were recovered (Adams *et al.* 1986-1988). The artifacts were separated into categories, such as bottles, metal, pottery, and bones (Adams *et al.* 1986-1988). In 1988, a sample of the historic glass, buttons, and ceramics were analyzed by students and recorded on 126 log sheets (historic glass [23], buttons [27], and ceramics [76]) in the records (Adams *et al.* 1986-1988). For the historic glass analysis, 136 glass artifacts were arbitrarily chosen and analyzed according to their width, length, height, weight, color, and other physical characteristics, such as glass morphology (base and neck portions), and embossing marks (Adams *et al.*, 1986-1988). The historic glass analysis included vessels from both the 1986 and 1988 excavations. Most analyzed bottles were completely preserved vessels. I do not know if these described vessels are in my sample or not. I did not include these observations in my results, but I mention a few interesting specimens here. FS # 2118 has a specimen embossed with “Crown Perfume Company LONDON” on its side. FS # 2154 has a specimen embossed with “Perry Drug Co. DISPENSING CHEMISTS Ellensburg, WASH,” below the lip and “PARIS,” on bottom.

The Historic Glass Sample

According to the Dean Hall box inventory compiled by Heather Hull in spring 2006, there are 104 Robber’s Roost inventory boxes. A total of 20 historical bottle glass inventory boxes were found. Sixteen inventory boxes have glass shards, and the other four boxes have completely preserved glass bottles and closures. I arbitrarily chose a 20% sample of field

specimen bags from each of the 16 shard inventory boxes and chose all (100% sample) of the completely preserved vessels and closures from four inventory boxes (Table 4.04). Out of 51 bags in shard sample, I examined only specimens with preserved base, lip, rim, and/or closure because many bags had hundreds of glass shard specimens. Most of the unexamined specimens are parts of vessel bodies, which are not identifiable as to bottle function or manufacturing technology or place except specimens with seams and embossing. Each shard specimen in each examined bag from the Robber's Roost Site inventory boxes was marked with a sub-sequence number (e.g., 1073-01, 1073-02, etc) to follow its original field specimen number. Each complete preserved vessel was marked with a sub-sequence number also, but this time, I added "0" following the last digit of the original field specimen number (e.g., FS # 2226 was marked as FS # 22260) to make a five-digit number instead of a four-digit number to distinguish complete preserved vessels from glass shard specimens.

A total of 982 specimens, 96 completely preserved vessels and 886 shard specimens, were examined. Over 50% (498 of 886) of glass shard specimens were base portions; and 32% (284 of 886) of the specimens were lip portions, either wide or small bore size (Table 4.05). Over 50% of the sample specimens were colorless, and nearly 20% of them were brown color (Table 4.06). Seventy-three specimens were not bottles but tableware glass, such as tumblers, dishes or plates because they were curving rims or shallow, wide, circular base portions (see Jones and Sullivan 1989:137-138). Some tableware specimens had decorative motifs (e.g., cutting or patterns) on their rim, body, heel, and/or base parts. Tumbler shape included cylindrical and tapered.

A total of 216 specimens have embossing on their base, heel, body, shoulder, or closure (Table 4.07). Many specimens are embossed with company marks or name, such as "SB&G

Co.,” and “MASON FRUIT JARS.” Another embossing is patent date (e.g., PAT.AUG 9, 1898), warning sign (e.g., REFILLING PROHIBITED), and bottle volume quantity (e.g., ONE PINT or 8 oz). Most of the embossing was not understandable because of fragmentation.

Before I counted the minimum number of vessels (MNV), I tried to fit some of these specimens back together. At first, I tried to refit the specimens which were in the same bag, focusing on the same portion (base and base, lip and lip, and rim and rim), similar colors (especially colorless and amethyst color because amethyst color specimens might have originally been colorless glass), and pattern. The next step was to try to refit the specimens which came from different units or levels based on their portion (base and base, lip and lip, and rim and rim), similar color, and pattern. I emphasized specimen visual appearance when selecting which pieces to try to fit together. When I distinguished between vessels having similar characteristics, I noted in the database why I decided to divide them. For example, vessel portions # 756 and 757 had similar rim portion. Vessel portion # 756 had a wave pattern on its lip; vessel portion # 757 had a twisted pattern on its lip. I noted that as “dist.(distinguish from)VN (Vessel Number) 757: motif” in the Access database. Some specimens did not fit together because of their physical characteristics. The most difficult to distinguish specimens were colorless and amethyst specimens. Once refitting was completed, there was a total of 751 different vessels or vessel portions (Table 4.08). Most of the specimens fitted together come from the same bag. A total of seven pairs of portion specimens were fitted together from different units or different levels (Table 4.09).

Using these refit methods, there is a minimum of 463 (96 complete vessels and the base of 367 separate vessels) separate vessels in the sample (Table 4.10). Also, there are 235 lip portions and 53 rim portions. Over 40% of vessels (202 of 463) were found above level 4;

nearly 25% (113 of 463) were found above level 2. Nearly 60% (274 of 463) of vessel color is colorless; other colors are brown (75), aqua (36), amethyst (28), and green (24) (Table 4.11).

I tried to figure the overall vessel shape for all specimens, but 655 vessel portions (367 base, 235 lip, and 53 rim portion) were glass shards and difficult to identify. A total of 463 vessels (96 complete preserved vessels and 367 glass shards) had a base portion, and 420 of these (90.7%) were assigned a base profile shape (Table 4.12). There were 17 variations. The most common base profiles were round (309), plain oval (18), and elixir/handy (17). A total of 331 vessels (96 complete preserved vessels and 235 glass shards) had a lip portion, and 329 of these (99.3%) were assigned a lip profile shape (Table 4.13). There were 19 variations. The most common lip profiles were flat/patent (74), crown (46), small mouth external thread (40), and bead (34).

Comparing the Robber's Roost and Grissom sites, four of the Grissom lip profiles are still used here (crown, champagne, small external thread, and wide mouth external thread). Five of the Grissom base profiles are still used here (round, Blake, Monarchy/Erie oval, Elixir/handy and French square).

The vessels of the sample had two different glass manufacturing technologies: mold-blown and machine-made. No free-blown bottles were found in the sample. Mold-blown technology at the Robber's Roost Site used at least three different molds: dip molds, cup bottom molds, and post bottom molds (see Table 2.04). Lip manufacturing technology at the Robber's Roost Site used at least three different techniques: applied and tooled lip technologies, and machine-made. To distinguish between mold-blown or machine-made technology I examined the sample of 331 vessels having lip portion (completely preserved bottles [96] and glass shard vessels having lip portions [235]). Based on this sample, 46 completely preserved vessels were

made with mold-blown technology: 42 were cup bottom mold made and 4 were made with post bottom mold technology (Table 4.14). Thirty-one vessels were made by machine. Of the 235 lip portions from shards, two vessel portions were made with applied lip technology, 111 by lipping tools, and 87 by machine. Overall 159 (47.1%) of these 331 vessels I examined were made with mold-blown technology and 118 vessels (34.9%) were made by machine. Fifty-four vessels (16.3%) were not able to be identified to their manufacturing technology. Excluding these, the vessels made by mold-blown technology (57.4%) outnumber the vessels made by machine (42.6%).

Below level 4, most vessels were made with mold-blown technology while above level 3, over two-third of the vessels were made by machine (Table 4.15). The glass manufacturing technology clearly shifted from mold-blown to machine-made between level 3 and 4 at the Robber's Roost Site. Comparing mold-blown and machine-made bottles, machine-made bottles were less variable in form. For example, the base profiles of 49 of 117 (41.9%) mold-blown bottles were round; 120 of 145 (82.8%) machine-made bottles were round. Mold-blown bottles have 14 base variations; machine-made bottles have 12 variations of lip profiles (see Tables 4.12, 4.13).

I estimated the glass function of all vessels which had base, lip, and/or rim portion. I examined 751 separate vessels or portions: 96 complete preserved vessels, 372 separate base portions, 235 separate lip portions, and 53 separate rim portions. A total of 438 of these 751 vessel portions were identified as to their function (Table 4.16). The vessel functions were alcohol, medicine, beverage, and condiment bottles, tableware (such as bowls, dishes, and tumblers), food storage bottles, unknown jars, and household bottles, such as toiletry and ink-bottles. Approximately 30% (118 of 438) of the identified bottle portions were alcohol bottles,

such as liquor, wine/champagne, and beer. Nearly 25% (110 of 457) of them were medicine bottles because of their embossing and bottle portion - relatively short neck compared to the body length (Lindsey 2007d). The lip profiles of flat/patent, bead, and prescription were commonly used by medicine or druggist bottles (Lindsey 2007a). These three lip profiles were found in 51.3% (81 of 158) of mold-blown vessels. Machine-made bottle lip profiles included crown and small and wide mouth external threads. Crown tops were commonly used for carbonated beverage, such as beer and soda (Lindsey 2007a; IMACS 1992:21). External thread lips were used on all types of bottles (Lindsey 200a). In sum of lip profiles from the sample of the Robber's Roost Site, the mold-blown vessels were used commonly for medicine bottles; machine-made vessels were used commonly for carbonated beverages.

The base portions of flasks have some variations depending on their manufacturing period. Distinguishable variations are shoo-fly & coffin flasks, picnic flask, eagle flasks, and Olympia & Washington style flasks (Lindsey 2007d). At the Robber's Roost Site, there were 30 flask vessels: picnic (15), eagle (13), shoo-fly (1), and Olympia flask (1). While picnic flask was popular from about 1890 to the mid 1910s, eagle flask was popular from the early 1900s until Prohibition (Lindsey 2007d). Vessel portion #142 (FS # 2101-03) is interpreted as an Olympia flask rather than a Washington flask, because its base profile is elixir/handy, and it was embossed "Pat. Aug. 9 1898" on its base. This flask bottle form was the proprietary product of the Illinois Glass Company of Alton, Illinois (Lindsey 2007d). Olympia flasks and Washington flasks have similar characteristics and the same patent date on their base or body. However, the Olympia flask base profile is elixir/handy while the Washington flask base profile is Buffalo/Philadelphia (Lindsey 2007d). Flasks were rarely made after the National Prohibition in 1920 (IMACS 1992:11; Lindsey 2007f).

Some other distinctive bottle forms were found. For example, the "export" style of beer bottles was in the sample of the Robber's Roost Site (Figure 4.05). This style bottle has a long history, dating back to at least the early 1870s; the name "export" is because these bottles were shipped - "exported" - to the Western states and territories (Lindsey 2007d). This type of beer bottle usually also has a distinct bulge to the neck and a relatively slim to moderate cylindrical diameter body (Lindsey 2007d). The lip profile is crown, ring/oil, or double oil/mineral (Lindsey 2007d). A total of seven export style vessels were in the Robber's Roost sample. Five vessels were lip portions having a crown lip profile: vessels # 343 (FS # 2266-03), 602 (FS # 2098-08), 613 (FS # 2225-03), 639 (FS # 2227-02), and 647 (FS # 2241-04). The other two vessels were complete vessel # 112 (FS # 22610-01) and lip portion # 159 (FS # 2148-18) having a ring/oil lip profile.

A total of eight stubby-style beer bottles were found (see Figure 4.06): seven vessels were found above Level 2, and one vessel was no level assigned. These eight lip portion vessels were # 580 (FS # 2019-04), 634 (FS # 2001-16), 635 (FS # 2001-17), 674 (FS # 1073-08), 675 (FS # 1073-09), 676 (FS # 1073-10), 725 (FS # 2001-14), and 756 (FS# 1996-06). These bottles were produced during a time when automatic bottle machines made virtually all utilitarian bottles; thus, they always have typical machine-made traits and most likely crown finishes dating from the 1930s to 1950s (Lindsey 2007d).

Four Lea & Perrins' Worcestershire sauce bottle closures and one probable bottle were found, dating back to about 1880. The closures are FS # 21890-04 and three unnumbered specimens. They are all embossed with "Lea & Perrins" on their tops. Vessel portion #332 (FS# 1017-10) is a probably Worcestershire sauce bottle because it is embossed with "WOR..ESTERS HIRE. SAUCE," on its shoulder (Figure 4.07). Also the bottle color is the similar color (light

green) as all four closures (light green). This type of closure, the glass and cork combination, is called the “club sauce type” stopper (Jones and Sullivan 1989:152-153). The embossing with Lea & Perrins is one of the most commonly found on the top of club sauce type stoppers and this product began importation into the US in 1849 (Lindsey 2007a). The company was founded in Worcester, England in 1839 (Lindsey 2007a).

The oldest vessel (portion #470, FS# 2192-12), a case gin bottle, was made by dip mold technology sometime before the early 1870s (Lindsey 2007c). This specimen does not have a lip, but is square with a distinct taper inwards from the shoulder to the base, it has no seam on base or body, and the glass thickness and heavy weight indicates the vessel was a case gin bottle (Lindsey 2007d).

There were 19 small diameter homeopathic vial vessels (Table 4.17). They had four variations among them (Figure 4.08). These homeopathic vials were once used as medical bottles, but are no longer used in the US (Roger Glaser, Downtown Pharmacy, Ellensburg, personal communication, 28 April 2007). According to the *Whitall-Tatum Drug, Perfume & Chemical Bottles Catalogue* of 1902, these bottles had two height variations: short style and long style (see Figure 4.09). Their sizes were described by the drachm (or dram) and sold by the gross in pasteboard boxes.

The manufacturers or distributors of 68 vessels were identified from the embossing on the glass (Table 4.18). Forty-five of these 68 vessels were manufactured in eastern states, such as Illinois, Pennsylvania, and New Jersey. At least 31 companies supplied the glass to Ellensburg: 23 were eastern state companies and 7 western state companies, such as Northwestern Glass Co., in Seattle, Washington (Table 4.19). Four Lea & Perrins closures were identified, but where they were made was uncertain. The major glass suppliers were the Owens-

Illinois Corporation (8 bottles in the samples from 1929 to 1954), the Owens-Illinois, Pacific Coast Company (7 bottles from 1932 to 1970), the Northwestern Glass Company (6 bottles from 1931 to 1973), the Streator Bottles & Glass Company (6 bottles from 1881 to 1905) and the Illinois Glass Company (5 bottles from 1873 to 1929) Twenty vessels in the sample were made by the Owens-Illinois Corporation (including the former the Illinois Glass Company and its Pacific Coast branches).

Five vessels were used in Ellensburg stores: one fragment (portion #354) from the D. O. Woodworth drug store, three fragments (portions # 116, 190, and 498) from the Harry S. Elwood drug store, and one bottle fragment (portion #360) from a soda pop company (the Sody-Licious Beverage Company). These stores were identified from embossing (see discussion in Chapter 7).

Discussion

Excavation Levels and Age Estimation

In order to investigate excavation level and age, I defined a sample of the Robber's Roost Site that appeared to be undisturbed. This area includes all units except units 5, 6, 7, 8, 55, 56, 57, and 58 because the sewer pipe runs through these units (see Figure 4.03), and there is evidence of mixed age vessels (e.g., portions # 236 [FS# 2098-02] dated from 1881 to 1905, and # 838 [FS# 1071-05] dated after 1962 were found in the same Level 5). The sewer system was installed in 1889 (Inter-State Publishing 1904:293).

The oldest vessel at the site (portion #470, FS# 2192-12), manufactured sometime before the 1870s, was found in Level 4. The oldest vessel found in Level 7 (portion # 524) was manufactured sometime after 1857. The newest vessels were found at Level 1 and date back to 1970.

There were 55 embossed vessel portions in the sample. The embossing included maker's marks, bottle volume capacity, and the phrase "Federal Law Prohibits Sale or Reuse of This Bottle." There were 41 makers' marked vessels (31 vessel portions and 10 complete vessels), nine volume marked vessels (7 vessel portions and two complete vessels), and five non-refill embossed vessels (all vessel portions). I marked each level with the time period for the vessels from that level. For example, in Level 6, six of seven vessels from that level were, perhaps, made between 1880 and 1905. One vessel (vessel portion # 450, FS# 2192-12) was a design made from 1884 to 1923. I decided this level's date was between 1880 and 1900 (Table 4.20).

Nine vessel portions with an embossed food label were found at the levels between 1 and 4 (Level 1: # 366, 369, 397; Level 2: # 440, 441, 443; Level 3: # 775; Level 4: # 481, 482). No such vessels were found below Level 4. The volume capacity requirement law, known as the Gould Amendment to the Pure Food and Drug Act, was passed on 3rd March, 1906, and bottles with an embossed (or paper labeled) specific capacity or volume information likely date from 1913 or later (Lindsey 2007f; Sutton and Arkush 2002:188). These are consistent with the age estimates in Table 4.20.

The non-refill embossed statement was required by the National Prohibition Law passed in late 1933 and enforced in 1935 (IMACS 1992:8; Lindsey 2007f). All liquor bottles were required to be embossed with "Federal Law Prohibits Sale or Reuse of This Bottle," and these bottles date from between 1933 and the 1960s (IMACS 1992:8,11) or between 1935 and the 1960s (Lindsey 2007f). Only five vessels with this embossing were found, all at Level 1 (portions # 301, 304, 305, 306, and 228). Since none were found below Level 1, this is consistent with the age estimation in Table 4.20.

The maker's mark estimates show correct stratigraphic order for Levels 1-7 except for one vessel (portion #268, FS # 2111-02 from Unit 21) which was found at Level 5 and its embossing dates to 1946. This vessel does not fit with the Level 5 estimated age, which is from around 1900 to 1910. It is difficult to explain why vessel # 268 was found at Level 5.

I, also, attempted the age estimation by examining the glass manufacturing technology. The glass vessels were divided into two categories: mold-blown and machine-made (see Table 4.14). Three different mold blown technologies were found in this site. They were dip molds, post bottom molds, and cup bottom molds (IMACS 1992:13-17; Lindsey 2007c; Sutton and Arkush 2002:184-187; see Table 2.05). Their technologies were used in different time periods. Dip bottom mold technology is the oldest mold technology and was used from 1790 to the 1870s (IMACS 1992:11-13; Lindsey 2007c; Sutton and Arkush 2002:182). Post bottom molds and cup bottom molds were no longer used by the 1910s (IMACS 1992:11-13; Lindsey 2007c). Glass manufacturing technology shifted from mold blown to machine-made, but the glass manufacturing changing period was unclear (Lindsey 2007c). A total of 193 separate vessels, 50 completely preserved vessels and 143 glass shard vessels with lip portions, were examined from the same "undisturbed" sample as for the embossing exercise (Table 4.21).

Major manufacturing technology changes were found between Levels 2 and 4. Level 3 was regarded as a transition period. Levels 1 and 2 were clearly dominated by machine-made vessels. The transition period of glass manufacturing technology from mold blown to machine-made is difficult to estimate, but by 1917, 90-95% of bottles and jars produced in the U.S. had automatic or semi-automatic machine-made characteristics (Lindsey 2007c). Therefore, the Level 2 date, perhaps, is around 1920 and later, while Level 3 is dated to around the 1920s. This is roughly consistent with the embossed age estimates (Table 4.20).

I concluded from two different age estimation methods, embossing and glass manufacturing technology, that the Robber's Roost Site stratification was, probably, not disturbed badly and was in relatively good stratigraphic order.

Excavation Level and Ellensburg History

I noticed a low in MNV for some levels and wondered if it could be related to economics, so I tried to use the information about glass function and MNV among the excavation levels (Table 4.22). I propose that the low alcohol vessel numbers in Levels 5 and 6 was due to economics in Ellensburg at the time. The age of Levels 5 and 6 were estimated to be between the 1880s and the 1900s. The alcohol beverage vessel ratio of Levels 5 and 6 was about 20% while Levels 1, 4, and 7 were nearly or over 30% alcohol beverage containers. I argue that people consumed less hard alcohol, such as liquor, and favored light alcohol content beverages or non-alcohol beverages at the time of Levels 5 and 6. Over 40% of the drinking vessels in the Levels 5 and 6 sample were soda/mineral water vessels while over 70% of the vessels in other levels except Level 3 were alcohol beverage containers (see Figure 4.10).

In this period, the United States itself suffered its serious depression well know as the Panic of 1893, lasting until 1897 (Huston 2001:472-473). The high unemployment rate and high prices hit the national economy severely (Huston 2001:473). In Kittitas County, two Ben E. Snipes & Co. banks in Ellensburg and Roslyn went bankrupt (Ellensburg Capital, 19 December 1906). Before the national depression, Ellensburg had bitter experiences with financial difficulty because of the business district fire in 1889 (Luttrell *et al.* 1999:6.20; Mohler 1945:300; Painter 1973:49; Smith 1976:259; see Figure 4.11). The damage was estimated at \$2,000,000 (Mohler 1945:301; Smith 1976:259-261). Smith (1976:256) quotes a contemporary article from the *Salem Statesman*:

The town of Ellensburg, W.T. was devastated by fire the night of the Fourth of July. Only two buildings of the business portion being left standing, the First National Bank and the Lynch Block. Altogether ten blocks were destroyed.

However, Ellensburg business recovered soon and interest in Ellensburg's business potentialities, seeming like the "Pittsburgh of the West," caused heavy investments in Ellensburg real estate and city development (Mohler 1945:303). After this boom of the Ellensburg economy ended in 1891 (Mohler 1945:307-308), the Ellensburg Dawn (1904:26) described this period:

A few years ago the boom dropped out at Ellensburg and the valley was one of the quietest in the state. The people had no money and everyone walked about looking forlornly along their noses. Scarcely seeing any one, so engrossed were they with their unhappy thoughts of shattered hope and evaporated fortune.

The US Census shows the Ellensburg population went from 2,768 in 1890 to 1,737 in 1900 (see Table 4.23). This time was the only time since becoming a city that Ellensburg went below the population criteria for a city (Painter 1973:54).

The connection between these historic glass deposits of alcohol vessels and the Ellensburg economic situation are ambiguous. One reason is that the sample size is small. The total number of drinking vessels sampled from each level was between 12 and 35. Alcohol consumption does not reflect only the single factor of economics. There are more complicated factors involved, such as social, demographic, and medical reasons. I concluded that the vessel numbers at each level, Ellensburg history, population, and general economic situation did not have a significant clear or consistent relation.

Chapter 5: the Sorenson Site

Introduction to the Site

A ground disturbing activity was made by the Sorenson Monitoring Project, conducted under a contract with the Kittitas County Conservation District (KCCD) and administrated the Central Washington Archaeological Society (CWAS) in October, 2004 (Woodard and Hehman 2004:1). This project was located on the Sorenson Property, adjacent to Little Wilson Creek, in Kittitas County, Washington (Woodard and Hehman 2004:1; see Figure 5.01). The Bonneville Power Administration (BPA) and the KCCD cooperated with Mr. Sorenson to install piping structures that drain a tributary into Little Wilson Creek (Woodard and Hehman 2004:1). During the construction, faunal remains, glass bottles, ceramics, and metal objects were collected (Woodard and Hehman 2004:6). All ceramic shards were vitrified white earthenware. Some ceramics were J. & G. Meakin, reportedly dated to no later than 1852, or Alfred Meakin, reportedly dated to no later than 1875 (Woodard and Hehman 2004:6). There were 88 individual specimens of faunal remains. These specimens represented three taxa: *Bos taurus* (cow), *Equus caballus* (horse), and *Ovis aries* (domestic sheep; Woodard and Hehman 2004:5-16). The minimum numbers of individuals were five cows, two horses, and two sheep (Woodard and Hehman 2004:16). It was concluded that this site was probably used during the late 19th or early 20th centuries (Woodard and Hehman 2004:6).

The Glass Sample

There are only 10 historic glass specimens from this site. I chose all of the specimens to examine. They have neither field specimen numbers nor catalog numbers. I arbitrarily made a specimen number for each glass specimen, from FS # 01 to FS # 10. The minimum number of

vessels for this site was nine (Table 5.01). Two glass manufacturing companies were identified from embossing.

The variation of glass function was limited because of the small sample size. Six vessels were identified by their functions: two condiment bottles, one medicine bottle, a carbonated beverage bottle, at least one tumbler, and one jar closure.

Vessel #5001 was apparently a druggist bottle because a drug store's name (D.O. Woodworth) was embossed on the body (Figure 5.02). This bottle was from the Whitall-Tatum Co., of Millville, N.J. and was made between 1889 and 1893 (Bethman 1991:79) or possibly 1880-1895 (Lockart *et al.* 2006) because the company mark "WT&CO," with a single letter underneath, was only used during this period. This company was existence between 1857 and 1938 (Toulouse 1972:544; Whitten 2005a) or between 1854 and 1938 (Bethman 1991:78).

Vessel #5002 was a part of a tumbler because the portion, tapering inwards from the rim to the base (Jones and Sullivan 1989:143; see Figure 5.03). This vessel does not have any seam. The bottom of this tumbler had a horseshoe and a star pattern embossed on its bottom. The motif of horseshoe and star logo is seen on the base of jelly glasses & tumblers, the majority of which were made from ca.1900-1930; sometimes the star is not present (Whitten 2005a). Glass manufacturers producing with this type of design on the base included Indiana Tumbler & Goblet Company, Greentown, Indiana (1894-1903); Ball Bros Glass Company, Muncie, Indiana (1888-1992); Fostoria Glass Company, Fostoria, Ohio (1887-1891) & Moundsville, West Virginia (1891-1986); Monongah Glass Company, Fairmont, West Virginia (1903-ca.1929); and Hazel-Atlas Glass Company, Washington, Pennsylvania and Wheeling, West Virginia, and other plant locations (1902-1964; Whitten 2005a). There are many possibilities; I could not figure out which company made this tumbler. However, this vessel is slightly pinkish, which means that

the vessel has some manganese in the glass and has become tinted by exposure to ultraviolet sunlight. Colorless glass was relatively uncommon prior to the 1870s; colorless glass became quite common after the mid to late 1910s (IMACS 1992:19; Lindsey 2007b). Manganese was used to make transparent glass from the 1880s to the 1920s (IMACS 1991:7; Lindsey 2007b). Also, this vessel has a uniform thickness and small bumps (like cleats) around the base edge, and a well developed regular portion and no air bubble in the glass; therefore, it was most likely made by a machine rather than by mold-blown technology. By 1920, machine-made bottles were improved in that the thickness of glass was made more uniform and bubbles were removed (IMACS 1992:7). These facts suggest this vessel was made later or more likely the beginning of the 20th century. This vessel is a tumbler, but I do not have enough information about tumblers to make further deductions.

Vessel #5003 and 5004 were described as condiment bottles because their necks are relatively longer than druggist bottles (Lindsey 2007d; see Figure 5.04). All of the side panels on the sides of the bottles have a convex portion and the neck length (38mm) and lip diameter (22mm) were relatively large compared to the body height (87mm). Medicine bottles, generally, have opposite characteristics, and a relatively short neck. The lip profile was flat/patent commonly, a sort used by extract and patent and proprietary medicine bottles (Lindsey 2007a). These vessels were, perhaps, condiment bottles. The bottle manufacturing technology was cup bottom molds, and the lip was made by tooled lip technology. Therefore, these two bottles were made between the 1870s and the 1910s (Lindsey 2007c).

Vessel portion # 5005 seemed to be a carbonated beverage bottle because the lip profile was for a crown top (Figure 5.05). Crown tops were commonly used on carbonated beverage bottles, such as beer and soda (IMACS 1992: 21; Jones and Sullivan 1989:163). This vessel

color was light green, a color with general and versatile uses (IMACS 1992:21). The bottle was, perhaps, a soda or mineral water bottle rather than a beer bottle, but it is difficult to conclude.

Vessel #5006 (Figure 5.06) was a liner jar closure (Jones and Sullivan 1989:140). This vessel was made by the Cohansey Glass Manufacturing Co., of Philadelphia, Pennsylvania, at its factory at Bridgeton, New Jersey, between 1870 and 1900 because of embossing on the back of the lid (Toulouse 1972:139-140). The Cohansey fruit jar, embossed as COHANSEY GLASS MANUF./CO. PHILADA PA/PAT.JULY 16.1872/PATENTED JANUARY 18 1876, was one of the most successful of the home-canning containers at that time (Pepper 1971:214). The advertisements of the Cohansey Company showed the jar and its lid connected with a single wire bail and no wrench required to open or to close (Figure 5.07). The company won awards for the cylinder window glass and bottles at the Centennial in 1876 (Pepper 1971:215; Toulouse 1972:139; see Figure 5.08). This glass liner was held in a place by a solid cap made of metal (Jones and Sullivan 1989: 60). A metal part was found at the Sorenson site and physically fits with vessel # 5006 (Figure 5.06). The purpose of this closure was to provide an airtight seal (Jones and Sullivan 1989:160). This type of closure was also found in the Grissom and Robber's Roost sites, in the form of Mason fruit jar lids, but its accessory of the metal ring was distinctive from Mason jar closure caps.

The shape of vessel portion # 5007 suggested that it was neither a bottle nor tableware. This yellow glass portion is similar to some of the shards of vessels found in the Grissom and the Robber's Roost sites. However, the function of this glass is unknown.

Vessel portion #5008 was a part of the body of a colorless or amethyst vessel with a curving shape, composed of two specimens (FS# 08 and 09) that fit together. The glass thickness was uniform, and it had a smooth surface with no pattern on it. The diameter of this

vessel was almost the same as the base size of vessel # 5002 (a tumbler). However, this vessel was in shards and lacked identifying information, so I could not make further conclusions.

Vessel portion # 5009 was a part of the body of a colorless bottle with seams on the body and on the heel. The portion of this vessel included one flat and one curving side. There were no air bubbles in the glass. This bottle might be made by cup bottom mold or machine-made technology (if so this was perhaps after the 1920s because of no air bubbles in the glass; Lindsey 2007c) because of a possibility of the seams. However, all I had of this vessel was a small fragment of glass. I could not conclude any more.

Discussion

The age of the site can be estimated from the glass and ceramic artifacts. Three ceramic plates in the dateable sample were embossed with “England” on their bottom (See Figure 5.09). This observation implied they were made after 1890 for J. & G. Meakin and after 1897 for Alfred Meakin (Birks 2002a, 2002b; Lage 2004:213). The Charles Meakin mark, which was imprinted with the Royal Coat of Arms and painted in England, was used at the Burslem works in Staffordshire, England between 1870 and 1882 (Birks 2002c). Another ceramic vessel with a pottery maker’s mark (see Figure 6.10) was, probably, the Steubenville Pottery Company (1879-1959) in Steubenville, Ohio (Herskovitz 1978:98-99). The initial analysis of the Sorenson Site (Woodard and Hehman 2004) did not mention this ceramic vessel. This vessel was unique because it was a dish with an imitation shell shape. It had many bumps on the surface like a scallop shell and a hinge on the edge. This ceramic vessel was presumably older than the others because the surface color had turned yellowish, and there were many small cracks on the surface. The mark looked similar to the mark of J. & G. Meakin, which used a lion and a unicorn, well

known as the Royal Coat of Arms (Birks 2003a), but this mark had two lions and was made in the U.S.

The glass artifacts in this sample with known dates of manufacture range from the 1870s to the 1920s. The ceramic artifacts with maker's marks were all manufactured after 1870, one between 1870 and 1882, but the others potentially later. All specimens from this site have no record of provenience and a lack of context. It is difficult to fully estimate age of this site. However, I concluded that the Sorenson Site dates from the 1870s to the 1920s.

Chapter 6: Discussion: Glass Manufacturing Companies and Transportation

Humans started to make glass by themselves probably around 1,500 B.C. (Munsey 1970:6; Sutton and Arkush 2002:175). Egyptian and Mesopotamian craftsmen produced glass artifacts such as beads and small, curved vessels (Perry 1945:12-17; Sutton and Arkush 2002:175). By the late 17th century, the three principle components of glass were silica (silicon dioxide); flux (alkali), either soda (sodium oxide) or potash (potassium oxide); and stabilizer (non-alkaline base), either lime (calcium oxide) or lead (lead oxide; Jones and Sullivan 1989:10). Today, glass ingredients consist of sand, soda, and lime, and sand (silica) comprises the major ingredient (Munsey 1970:7; Sutton and Arkush 2002:175). The soda is a flux added to promote fusion; lime is added because soda-silica glass is soluble in water, and the lime reduces this solubility (Munsey 1970:7; Perry 1945:74; Sutton and Arkush 2002:175). Soda-lime-silica glass, called lime glass, is the lowest-melting stable glass and the most economical; thus, in the US, most glass is lime glass (Perry 1945:75).

The history of glass making in the United States began in Jamestown in 1607 when eight Dutch and Polish glassblowers came from the European continent (Munsey 1970:22; Perry 1945:29). The first American glasshouse was established in 1739 by Caspar Wistar in Salem County, New Jersey (Munsey 1970:22; Perry 1945:29-30). During the 19th century, the amount and variety of American glassmakers increased and improved glass manufacturing techniques (Sutton and Arkush 2002:179). The railroad construction and expansion connected east and west coasts of the US. The new lines not only carried many immigrants to the western U.S., but also established new markets. Commodities made by industrial areas were distributed through mass transportation systems, such as intercontinental railroads (Hastings 1972:71; Sutton and Arkush 2002:179).

Glass Manufacturing Companies in the US

One of my goals was to try to understand commercial shipping to Ellensburg through the glass artifacts at these three sites. To investigate this, I looked at glass manufacturing locations from the site artifacts and compared these to the age of the artifacts. I hoped to see patterns in changing suppliers over time. I started this commercial shipping investigation because I noticed that bottles from the site I first examined (the Grissom Site) came from at least two eastern US manufacturing companies (the Whitall-Tatum & Co. of Millville, New Jersey, and the Maryland Glass Co. of Baltimore, Maryland) and at the second site, the Sorenson Site, the two identifiable glass makers were located in the eastern US (the Whitall-Tatum & Co. of Millville, New Jersey, and the Cohansey Glass Manufacturing Co. of Philadelphia, Pennsylvania). Was it by chance I only found glass made by eastern US manufactures, or – given the industry and trade networks of the time, was it almost inevitable? The time of these two sites is between the 1840s and the 1920s. In the Robber's Roost Site sample, there were also later deposits that might have a different pattern.

For the three Kittitas Valley excavation sites, a total of 34 glass manufacturing or distributor companies were identified from embossing (Table 6.01). There are 26 eastern US companies and 7 western US companies represented in the sample. Four Lea& Perrins Co. bottle closures were not identified their manufacturing place, either in the UK or in New Jersey. Twenty-one of these 34 companies actually made glass. Seventeen of these 21 manufacturing companies were located in the eastern US states while the other four companies were located in the western US (Table 6.02; Figure 6.01).

I chose the glass manufacturing companies represented in the Robber's Roost Site for examining shipping patterns because the sample size is the biggest among these three sites. I

used the company marks to identify these bottles' manufacturing age or period. I tried to use the information I had about glass manufacturing periods (Table 6.03) to figure out if shipping pattern played a role in explaining the distribution of glass manufacturers in the sample. I used only bottles from undisturbed units of the Robber's Roost Site because I wanted to specify the glass deposition period (by level) and changing glass bottle suppliers represented in the Robber's Roost Site. Thirty-three vessels, provided by 15 glass manufacturing companies, 12 eastern states and 3 western states, were examined (Table 6.03-6.04).

In the Robber's Roost Site sample, all bottles found below Level 3, except perhaps portion #341, came from eastern US glass manufacturing companies (Table 6.04), as identified from the embossing (e.g., the Streator Bottles & Glass Company of Streator, Illinois, and the Western Bottle Manufacturing Company of Chicago, Illinois). Portion # 341 was embossed with "KERR GLASS MFG CO/PORTLAND ORE," on its base. The Kerr Glass Manufacturing Company (KGMC) of Portland, Oregon, operated between 1904 and 1909 (Toulouse 1972:306-308; Whitten 2005a). According to Toulouse (1972:306-308) and Whitten (2005a) the KGMC did not actually make glass from 1904 to 1909, but its glass was made by other companies: the Illinois Pacific Glass Co. of San Francisco, California, between 1904 and 1906; the Hazel-Atlas Glass Co. of Grafton, West Virginia, between 1906 and 1909; and the Alexander H. Kerr & Company of Altoona, Kansas, between 1909 and 1912. The glass manufacturing location of this specimen is uncertain because there are three possible manufacturing locations.

In Levels 1, 2, and 7, the glass sample from the Robber's Roost Site came from both eastern and western US glass manufacturing companies. Western manufactures include the Owens-Illinois, Pacific Coast Company of San Francisco, California, since 1943 (Lockhart 2006; Toulouse 1972:406) and the Northwestern Glass Company of Seattle, Washington, between

1931 and 1973 (Lindsey 2007d; Toulouse 1972:390-391;Whitten 2005a;). Eastern manufacturers include the Owens-Illinois factory at Toledo, Ohio, and the Thatcher Glass Manufacturing Company. The Thatcher Glass Company mark, a T with a smaller angular M and C nestled underneath the cross bar to the left and right, was, according to Toulouse (1972:496) from 1900 on, or according to Lindsey (2007d) and Whitten (2005a) from 1949 to 1985. The newest bottles at the Robber's Roost Site were made in 1970 at the Owens-Illinois, Pacific Coast Company plant in Oakland, California (e.g., vessel portion # 301).

All of the pre-1930 bottles were made in the eastern US, including all of the custom-made bottles ordered by Ellensburg druggists. There were four custom-made druggist bottles in the sample: vessel portion # 354 (made by Whitall-Tatum & Co. of Millville, New Jersey); vessel portions # 237 and 319 (made by the Western Bottle Manufacturing Co. of Chicago, Illinois); and vessel portion # 116 (made by the Sheldon-Foster Co of Chicago, Illinois). Two drug stores ordered these custom-made bottles. The D.O. Woodworth drug store ordered its bottles from Whitall-Tatum & Co., ca 1889-1895 (Bethman 1991:147,466-467) and the Harry S. Elwood bottles from the Western Bottle Manufacturing Co., ca 1906-1908 (Bethman 1991:464) and, probably, from the Sheldon-Foster Co., ca 1900-1906 (Bethman 1991:78). The custom-made druggist bottles in the undisturbed Robber's Roost Site sample were, definitely, made by eastern glass manufacturing companies. Also, according to Bethman (1991:74,464) the Elwood drug store used other glass companies, Adelber M. Foster & Co. of Chicago, Illinois, ca. 1898-1900 and the Carr-Lowrey Glass Company of Baltimore, Maryland, ca.1917-1919.

The sample I chose for this examination included only vessels having identifiable embossing. The sample size was small; only 33 vessels and 15 manufacturing locations. But, I also saw many fragmentary specimens with unidentifiable embossing and many vessels without

embossing. The manufacturing companies or locations of these vessels could not be identified. More glass samples are needed for future studies in order to have more confidence about the manufacturing locations and commercial shipping activities of glass vessels in historic Ellensburg.

Glass Commercial Shipping and Transportation

Unlike prehistoric artifacts, historic artifacts were often made far away from the people who used these items. Usually historical artifacts were shipped by using mass transportation systems (Sutton and Arkush 2002:179). The glass artifacts from the Robber's Roost Site probably were shipped by using transcontinental railroads, such as the Northern Pacific Railroad and the Chicago, Milwaukee, St. Paul and Pacific Railroad (the common name was the Milwaukee Road) and maritime transportation to Seattle. These two transcontinental railroads connected the east and west coasts of the US via Ellensburg. The first railroad coming to Ellensburg was the Northern Pacific Railroad in March, 1886 (Armbruster 1999:244; KCCC 1989:8,48-49; Luttrell *et al.* 1991:7.3-7.5; Rand McNally 1958; Painter 1972:48; see Figure 6.02). The Milwaukee Road was built through Ellensburg and Cle Elum in 1909 (Armbruster 1999:242,247; KCCC 1989:49; Luttrell *et al.* 1999:7.22; Painter 1972:57; see Figure 6.03-6.04).

The opening of the Northern Pacific Railroad was regarded as the most important economic aspect of growth of the region (Inter-State Publishing 1904:250; KCCC 1989:48-49; Mohler 1945:291; Painter 1972: 48-49; Schwantes 1996:188-193). Records show that 257 cars of freight were shipped out of Ellensburg in 1898 (KCCC 1989:49). The Northern Pacific Railroad payroll in Ellensburg was \$27,000 per month by 1913 (Polk 1913:9). The arrival of the railroad was described as "Ellensburg had at last attained one of the great objects of her ambition, rail connection with the world" (Luttrell *et al.* 1999:7.3).

In the Robber's Roost Site, 15 glass manufacturing companies were located in 8 eastern US states. How did this glass get to Ellensburg? The Northern Pacific did not directly connect with these states, running from St. Paul, Minnesota, to Seattle, Washington (Rand McNally 1958:2-3). However, St. Paul was connected with several other railroads, such as the Pennsylvania and the Chicago and Northwestern railroads by the late 19th century (Rand McNally 1958:2-3; Hasting 1972:70; see Figure 6.04). The Milwaukee Road started from Chicago, Illinois, and connected to Seattle via St. Paul and Ellensburg (Rand McNally 1958:2-3). Thus, the eastern US glass probably arrived by train on the Northern Pacific Railroad or the Milwaukee Road.

The glass artifacts in the Robber's Roost sample were made not only by the eastern US glass companies, but also by western glass makers. Some of the glass probably was also transported by railroads. There was no direct railroad connection between California and Ellensburg. Thus, commodities must have changed railroads at least one time. The Southern Pacific Railway started from Los Angeles and the nearest terminal was in Portland, Oregon, completed in 1887 (Orsi 2005:23; see Figure 6.05). Many railroad companies shared the same line between Portland and Seattle, such as the Great Northern, the Northern Pacific, the Union Pacific, and the Milwaukee Road (Rand McNally 1958:45; Bach, personal communication, 24 April 2007). The route from Portland to Ellensburg used the Northern Pacific line via either Seattle or Tacoma (Rand McNally 1958:45). People and commodities usually changed trains in Auburn, Washington (Bach, personal communication, 24 April 2007). Another route was the Spokane, Portland and Seattle Railway which connected Portland to Pasco, Washington, and then Pasco to Ellensburg using the Northern Pacific line (Rand McNally 1958:45).

Another means of commercial shipping of glass from California to Ellensburg was by using maritime shipping from California to Seattle, Washington, and then using either the Northern Pacific line or the Milwaukee Road. Both the Northern Pacific Railroad and the Milwaukee Road had depots near the port of Seattle (Armbruster 1999:146, 213, 222, 227). Non-rail land transportation was not practical for commercial shipping before the 1930s (KCCC 1989:9). A toll road was established in 1884 from Taneum Creek to Ranger Prairie (North Bend), but water, ice, and snow made maintenance difficult, and the route lost importance when the Northern Pacific was completed in 1888 (KCCC 1989:9; Luttrell *et al.* 1999:5.5).

In sum, the glass from the Robber's Roost Site from eastern US glass manufacturing companies was almost certainly shipped by transcontinental railroads while western US glass makers' glass may have been shipped by using the railroads and/or marine transportation systems.

Chapter 7: Ellensburg Stores and Custom-Made Glass

A total of five bottles were found from three Ellensburg stores. They were the D. O. Woodworth and the Harry S. Elwood Ellensburg drug stores and, probably, the Sody-Licious Beverage Company. These bottles were identified in the sample from embossing because the store names and location (e.g., Elwood druggist Ellensburg Wash) were embossed on the front of the bottle panel.

D.O. Woodworth Druggist Store

One complete and two fragmentary bottles recovered from the Sorenson, Grissom, and Robber's Roost sites were produced for the D. O. Woodworth drug store in Ellensburg. These bottles include a complete bottle (vessel #5001) from Sorenson, and two fragments: vessel portion # 09 from Grissom and vessel portion #354 from Robber's Roost (Figure 5.02). As can be noted in Table 5.01, the complete bottle (#5001) is embossed with "D.O. Woodworth, Druggist, Ellensburgh, Wash." The Sorenson bottle has an embossing, "(W) T&CO," with a letter "P" on the bottom. The bottom embossed "WT& CO" with a single letter underneath was used only between 1889 and 1893 (Bethman 1991:79) or between 1857 and 1938 (Toulouse 1972:544) by the Whittall-Tatum & Company of Millville, New Jersey (Bethman 1991:79; Lockhart *et al.* 2006; Toulouse 1972:544). The bottle has a Blake (rectangular with flat chamfered) base portion. The Blake style was popular until 1900 (Bethman 1991:86). This druggist bottle probably was made before 1894 because, in 1894, the United States Post Office dropped the final "h," and the town became Ellensburg (Mohler 1945:289). Another reason was that the D.O. Woodworth drug store was operated in Ellensburg from 1889 to 1895 (Bethman 1991:148,467).

Whitall-Tatum & Company (WTC) operated from 1857 to 1938 (Toulouse 1972:544; Whitten 2005a,2005b) or from 1854 to 1938 (Bethman 1991:78; see Figure 7.01). This company made customized bottles for individual customers. Each customer chose his own bottle types from the company's catalog (Figure 7.02). The WTC sent its catalogue to customers ordering goods (WTC 1971[1880]:5). The catalogue had visual figures for various bottle heights, volume, bottle proportions (such as Black, Union Oval, French Square, or Philadelphia Oval), lip portions (e.g., Bead, Oil, Turlington, God-frey's, and Opo), colors (e.g., colorless, green, dark green, blue, and amber), stoppers, neck length, and bore size (WTC 1971 [1880]:5; see Figure 7.03) Also, customers could order engraving or lettering on the plate, including a symbol, but this was offered on the first order only (WTC 1971[1880]:8). This is perhaps a reason why the engraving of the D.O. Woodworth drug bottle did not change when D.O. Woodworth transferred the business to his brother Clarence Woodworth in March of 1892 (Bethman 1991:466). This custom bottle was typical of the period; beginning in the 1880s, the large glass manufacturing companies had bottle molds of standard portions into which they inserted the customer's personalized plate and then onto bottles (Lindsey 2007d; Munsey 1970:174).

The D.O. Woodworth bottle (#5001) had a Blake base and prescription lip portion; a symbol on the front of the bottle was a Chinese fan (Munsey 1970:176), and it held six ounce of liquid (Figure 7.04). In the 1880 and 1892 company catalogues of the WTC (WTC 1971 [1880], n.d. [1892]), there was not a Chinese fan symbol available for order. It appeared in the 1902 catalogue (WTC 1967[1902]:unpaginated; see Figure 7.04). I do not know if there were catalogs issued between 1880 and 1892 that could have included the Chinese fan when Woodworth ordered it ca. 1889 – 1890. The 1902 catalogue had other items, such as nursing bottles, with fittings, medicine spoons, jars, tooth powder bottles, glass ointment pots and boxes, perfume

bottles, xxx ware, oil, ether, and syrup bottles (WTC 1967 [1902]). The company had two offices; one was in Philadelphia, and the other in New York (WTC 1971 [1880]:3). Whitall-Tatum & Co. was a prolific producer of a druggist's glassware and related pharmacy glassware until the 1920s (Bethman 1991:78; see Figure 7.05).

The D.O. Woodworth drug store was established by Daniel (or David) Olin Woodworth (22 March, 1866 - 4 February, 1934) who was born in Fenner County, New York, and came to Ellensburg, with his brother, Clarence Douglas Woodworth (22 May, 1867-?) to establish a drug store (Ellensburg Public Library [EPL] 2007a, Hawthorne 1893: 671; Polk 1890:49). This druggist store, with the original name "Woodworth and Long," was opened in January 1889 by D.O. Woodworth and J. Long (Bethman 1991:148; Hawthorne 1893:671). Unfortunately, the store was destroyed by fire on July 4, 1889 (Bethman 1991:466). It was reopened in the State Register Building, next door to the Wilson's stables, at Third and Water Streets, and then moved into the Geddis Block at the southwest corner of 4th Avenue and Pearl Street from 1889 to 1895 (Bethman 1991:148,467; Polk 1890:49; see Figure 7.06). In March of 1892, D. O. Woodworth transferred the business to his brother C.D. Woodworth and moved to Albany, Oregon (Bethman 1991:466). His brother, C. D. Woodworth, continued the business until March of 1895, when he sold this store to the Perry Drug Co. of Ellensburg (Bethman 1991:467).

Harry S. Elwood Druggist Store

Three fragmentary bottles recovered from the Robber's Roost Site were produced for the Elwood drug store in Ellensburg. These bottles include three fragments (vessel portions # 116, 190, and 498). As can be noted in Table 4.07, vessel portion # 116 (FS # 2194-03) is embossed with "Elwood, Druggist, Wash," on the front panel and with "SHELDON" on its base (Figure 7.07); vessel portion # 190 (FS # 2268-03) is embossed with "Elwood, Druggist, rg, Wash," on

front and with “W.B.M. Co,” on its base (Figure 7.08); and vessel # 498 (FS # 20130-01) is embossed with “Harry S. Elwood, Druggist, Ellensburg, Wash,” on its front. Vessels# 116 and 498 had an excelsior base profile (rectangular with rounded corners), while vessel # 190 had a beveled ideal base profile (rectangular with flat chamfered corners, rounded corners). These bottles were used by the Elwood drug store because vessel # 116 fragmentary bottle is a close match for a complete specimen from 45KT808 (Figure 7.09), and vessels # 190 and 498 are a match for a bottle drawing from the *Pioneer Drug Store* (Bethman 1991:464, see Figure 7.10).

The Elwood druggist bottles from the sample of the Robber’s Roost Site were made by at least two different glass manufacturing companies, the Western Bottle Manufacturing Company (WBMC) and, probably, the Sheldon-Foster Glass Company, both located in Chicago, Illinois (Bethman 1991:78,464; Whitten 2005a). Vessel # 190 is embossed with “W.B.M. CO.” on its bottom. The WBMC began operation in Chicago in 1901 and continued until about 1930 (Bethman 1991:78; Whitten 2005a). The company was used by many Washington druggists at that time (Bethman 1991:78). Vessel # 116 was embossed with “SHELDON” on its bottom. The Sheldon-Foster Glass Company operated between 1895 and 1913 in Chicago (Whitten 2005a). Bethman does not mention this bottle in his 1991 book. The Sheldon-Foster Glass Company mark was sometimes embossed as “SHELDON” (Bethman 1991:78; Whitten 2005a). This mark is evidently less common than the "S-F G CO" mark which was usually used by this company and appeared on the most of prescription/pharmacy bottles (Whitten 2005a). The embossing “SHELDON” was used from about 1900 to 1906 (Bethman 1991:78). This company was, apparently, a partnership between bottle makers Thomas Sheldon and Adelbert M. Foster (Bethman 1991:78).

The Harry S. Elwood druggist store, owned by Harry S. Elwood, was located at 401 N. Pearl Street, between 1899 and 1939 (Bethman 1991:147,463; Polk 1913:38; see Figures 7.11-7.12). The Elwood druggist store was in the Cadwell Block, built by E.P. Cadwell in 1889 (Daily Record 2002). The offices of Dr. Christian Brumm (osteopath physician), Dr. Clement L. Hoeffler (physician and surgeon), and Dr. Emanuel S. Kreidel (dentist) were located on the second floor in the same building (Daily Record 2002).

Harry S. Elwood was born on April 4, 1938 in Leesburg Highland, Ohio, took a regular course in pharmacy at Cincinnati, and came to Ellensburg in 1887 (Bethman 1991:463; EPL 2007b; Inter-State Publishing 1904:803; see Figure 7.13). He worked in some Ellensburg drug firms, including G. B. Henton, and purchased the interest of W.S. Newland in the firm of Newland & Stephens in 1893 (Bethman 1991:463; Inter-State Publishing 1904:803). In 1899, Elwood purchased the interest of Stephens and opened his own druggist store located at 4th and Pearl Street and became quite successful (Bethman 1991:463; Inter-State Publishing 1904:803). Elwood bought the Raven Drug Company in Seattle in 1908 (Bethman 1991:659). Elwood served as president and treasurer of the Raven Drug Company and finally sold it to the Bartell Drug Company of Seattle in 1911 (Bethman 1991:463,659). Elwood owned his drug store in Ellensburg until he encountered financial difficulties and sold it to the Ostrander's Drug store in 1939. He left Ellensburg in 1942 and worked for several different Bartell Drug stores before he retired (Bethman 1991:463).

Harry S. Elwood married Florence A. Kinzer, a native of Ohio, in 1888 or 1889. Mrs. Elwood passed away in 1892 and then married Elvira Margruis, born in Pulaski, Pennsylvania (Publishing 1904:803). Elvira was an instructor of the department of literature in the State Normal School at Ellensburg, now CWU (Inter-State Publishing 1904:803). He was one of three

charter members of the Elks Lodge and was a Mason (EPL 2007b). He died at a nursing home in Oakland, California, at the age of 93 (EPL 2007b).

Sody-Licious Beverage Company (Ellensburg Coca-Cola Bottling Company)

One fragmentary bottle (vessel portion # 360, FS# 2087-21) recovered from the Robber's Roost Site was, probably, produced for the Sody-Licious Beverage Company in Ellensburg. As can be noted in Table 4.07, the bottle is embossed with "Coca Col TRADE MARK REGISTER BOTTLE PAT. D-105529 al GSTED 6-FL.OZS," on its body and "ELLENSBURG WAS" on its base (Figure 7.14). The bottle base portion is round, the bottle shape is usually called the "hobble-skirt," and the bottle color is light green. This vessel is broken above the shoulder.

This bottle was, probably, made by the Owens-Illinois Company in 1943. This is because this bottle has an embossing, "48 (letter "I" in an oval and diamond mark) 43" on its upper heel. This company mark, letter "I" in an oval and diamond, was used the Owens-Illinois Glass Company between 1929 and 1954 or 1956 (Lockhart 2006; Toulouse 1972:403) or 1929 and 1958 (Whitten 2005a). Following standard Owens-Illinois labeling, 48 is the factory number and 43 is the year of manufacture (Lockhart 2006; Toulouse 1972:403; see Figure 2.13). I presume that the fragmentary bottle (vessel # 360) was made in 1943 because it was embossed with "Coca-Cola trade mark register" and due to its: bottle shape (the hobble-skirt), patent number (PAT.D-105529), company mark (letter "I" in an oval and a diamond mark), company mark embossed position (the upper heel), and lack of Applied Color Labeling.

The Cola-Cola Company, one of the largest soft drink companies in the world, was founded by Asa Griggs Chandler in 1888 (Munsey 1972:12). Coca-Cola became the company's first registered trademark on January 31, 1893 (Munsey 1992:32). Until 1916, Coca-Cola bottle forms were each individual bottle producers' choice (Munsey 1972:56). Beginning in 1913, the

Coca-Cola Company asked the bottle makers to design a unique, recognizable, Coca-Cola bottle (Munsey 1972:57). A dozen designs were submitted, and in 1916 the committee chose the Earl R. Dean's design from the Root Glass Company (operated from 1901 to 1932) of Terre Haute, Indiana (Munsey 1972:57; see Figure 7.15). The Root Glass Company became the only firm allowed to manufacture the new bottles (Lockhart 2006; Munsey 1972). This classic contoured design bottle (called "Mae West" or "hobble-skirt") was patented on November 16, 1915 (Munsey 1972:62) and became used almost universally throughout the Coca-Cola bottling industry (Munsey 1972:58; Toulouse 1972:446; see Figure 7.16). Vessel # 360 is embossed with "PAT.D-105529." This patent number implies that this bottle was made after 1937 and was the third version design of the contoured bottle used by Coca Cola (Munsey 1972:63; see Figure 7.17). The Coca-Cola bottle color, well known as Georgia-green, was accidentally made (Munsey 1972:60; Toulouse 1972:446). The Root Glass Company used its local sand which had a quantity of iron in it (Toulouse 1972:446). The Root Glass Company was purchased by the Owens-Illinois Glass Company (OIGC) in 1932 (Toulouse 1972:446).

Another reason I presume the bottle was made in 1943 was the company mark embossing position. Until 1934, the bottles made by the OIGC maintained the standard Owens- Illinois marking system, located on the heel (Lockhart 2006). This consisted of a two-digit date code (to the right) all embossed on the narrowest constriction of the lower half of the bottle (Lockhart 2006). In 1951, two changes happened: the date code migrated to the left, and the manufacturer's mark moved to the base of the bottle (Lockhart 2006). This bottle was embossed with the company code mark on upper heel, so the bottle was made before 1951.

This bottle used embossing, not Applied Color Labeling (ACL). The Coca-Cola Company decided to use the label "Coca-Cola" in white ACL instead of embossing in 1957

(Munsey 1972:59,63; see Figure 7.18). The ACL is a type of permanent labeling done by applying a mixture of borosilicate glass, mineral or organic pigments, and other substances (Lindsey 2007f). This style of marking bottles was most commonly found on soda, milk, and beer bottles made from 1934 (Lindsey 2007f).

I have some questions about this bottle. I presumed that vessel #360 was, probably, made somewhere in an OIGC plant. However, I could not find a record of a plant that has or had the number 48. Another question is why vessel # 360 was embossed with “ELLENSBURG WAS” on bottom. No Coca-Cola franchise was listed for Ellensburg on the nationwide Coca-Cola franchises list provided by Munsey (1972:311). I do not know the age range of Munsey’s list; the newest listed franchise was the Sitka Bottling Company in Alaska in 1958 (Munsey 1972:297). Since 1920, the Cola-Cola Company has been involved in more than four hundred cases to protect its trade marks (Munsey 1972:33).

According to *Washington Sodas* (Fowler 1986), a “Coca-Cola Bottling Company – Ellensburg” was listed for Washington soft drink bottlers, but it says “see SODY-LICIOUS BEVERAGE COMPANY – Ellensburg,” (56). The Sody-Licious Company was incorporated in 1957 with the Ellensburg Coca-Cola Bottling Company started in 1949, but the company still used the Sody-Licious Beverage Company name (Fowler 1986:275). It is confusing which company actually used this bottle and whether the names were used interchangeably (see Figure 7.19).

The Sody-Licious Beverage Company (SLBC), probably, used this bottle to sell its beverage (see Figure 7.20). At that time, bottles were usually reusable. Customers returned the empty bottles to retail stores, and then the beverage company refilled them and sold them again.

Bottle reuse was widely practiced in the 19th and early 20th centuries when bottles were relatively much more expensive to produce than today (Lindsey 2007d).

The Sody-Licious Beverage Company was originally named the Ellensburg Soda Works, which was founded by Robert Baskins and William Freyburger in May 1885 when Washington was still a territory (Kittitas County Historical Museum [KCHM] 2007a; Polk 1890:20; see Figure 7.21). This company received \$300 worth of fire damage in the July 4, 1889 Ellensburg business district fire, and insurance did not cover it (Fowler 1986:108). The Ellensburg Soda Works beverage bottles were filled by a Crown Cork machine, made in Baltimore, Maryland, in 1896, and purchased by the Ellensburg Soda Works in 1905 (KCHM 2007e). Frank Schuller Jr. described the early days of the company:

In 1910 I was 18 and working at the Ellensburg Soda Works. It was started in May, on May 28, 1885 and was one of the oldest businesses in town even then.

Wholesale cost of a case of 24 bottles was 80 cents. Everything was sold to the saloons – there were 23 to 26 in town – and people bought pop at the saloons for five cents a bottle.

I bought the business in 1916 and began delivering soda pop by the case to private homes. The Gilmour's grocery said they would handle it if I stopped home delivery, and people began buying it with their groceries, which were usually delivered.

We didn't bottle any orange or grape in 1910. It just strawberry, cream soda, rootbeer, lemon, and sarsaparilla iron.

1910 was the year the high school football team (and I was on it) played the college football team on a frozen field (boy was it cold!) where Hebel school now stands. The score was 0 to 0 (McGiffin 1980:37).

Frank Schuller Jr., working at the Ellensburg Soda Works, purchased the company in 1916 (KCHM 2007a), and changed its name to Sody-Licious Beverage Company between 1924 and 1931, based on the Ellensburg directories for those years (Polk 1923:62,156, 1931:180). The Ellensburg directories listed the bottle company as the Ellensburg Soda Works until 1923, but the directories between the years of 1924 and 1928 are missing. In the Ellensburg directory for

1929, the Ellensburg Soda Works, the SLBC, and Frank Schuller Jr. were not listed (Polk 1929). Frank Schuller Jr. was listed under SLBC in 1931 (Polk 1931:89).

The SLBC was located at 202 N. Anderson Street, the same place where the Ellensburg Soda Works was located, until 1949 (Polk 1931:180; 1948:236). The company became the Ellensburg Coca-Cola Bottling Company in 1949 (Fowler 1986:87-88; KCHM 2007a, 2007c; Polk 1949:166). Frank Schuller Jr. sold his business to four of his employees in 1957, and one of the four, Jerry Varnum, later became the sole owner (KCHM 2007c, 2007d; Polk 1957:67). In June 1967, the company was sold to Cascade-Columbia Beverage Inc. of Yakima, which was a similar business (KCHM 2007c, 2007d). The new owner maintained the same building as a warehouse and distribution point (KCHM 2007d). Jerry Varnum continued to operate a soft drink and snack vending service until he retired in 1974 (Fowler 1986:275; KCHM 2007d).

Robert F. Baskins was one of two founders of the Ellensburg Soda Works in 1885 (EPL 2007c). He was born in Bremer, Iowa in 1863. After he passed away on July 2, 1931, his attorney, John T. Honeycutt, submitted a petition on his behalf because Baskins did not have any relatives left, even though he was one of seven siblings. Baskins' real and personal property was donated to Kittitas County and used to hold his funeral service. He was interred in the I.O.O.F. cemetery near the city of Ellensburg. His total properties were worth \$1,550.45, and his funeral expenditure was a total \$417.18 including the fee for a cemetery lot, \$44.00. The balance was \$1133.27.

William Freyburger was the one the co-founders of Ellensburg Soda Works (EPL 2007d). W. Freyburger was born in Shelbyville, Illinois, August 7, 1857, and came to Ellensburg on April 20, 1885. After he arrived in Ellensburg, he founded the Ellensburg Soda Works with Robert Baskins. Freyburger "served as chief of the volunteer fire department from 1895 to 1898

and was a member of the department when it was called upon to fight the great fire that swept the town on July 4, 1889,” (EPL 2007d). Also he served as city marshal, chief of police, and a member of the city council. He was a charter member of the local Knights of Pythias lodge, helped to institute the lodge at Yakima, and was a continuous member for 50 years (EPL 2007d). Freyburger married Jane H. Bears on October 27, 1919. He passed away when he was 83 years old following a long illness (EPL 2007d).

Frank L. Schuller, Jr. was the owner of the SLBC and the ECBC in Ellensburg from 1916 until 1957 (EPL 2007e; see Figure 7.22). Schuller, Jr. was born on August 19, 1892 in Ellensburg. His father, Frank L. Schuller Sr., was a Kittitas valley pioneer who migrated from Luxemburg in 1871 when he was the age of 16 (EPL 2007e; Fowler 1986:88). Schuller Sr. came to Ellensburg in 1884 and became a US citizen on January 10, 1891 (EPL 2007e). Frank Jr. served two terms on the Ellensburg City Council and was a president of the Chamber of Commerce (EPL 2007e). He married Marie Teissiere, the first instructor of French and Spanish at Central Washington State College, now CWU, on October 22, 1925 (EPL 2007e). He passed away at Kittitas Valley Community Hospital in November, 1977 (EPL 2007e).

Henry J. “Jake” Schuller was a bottler at the Ellensburg Soda Works between 1921 and 1922 (Fowler 1986:88). Frank Jr. and Henry were twin sons of Frank Schuller Sr. (EPL 2007e; see Figure 7.23). Henry received a degree in mechanical engineering at the Washington State College in 1917 (Fowler 1986:88). He became a business person in Port Angeles, Washington (EPL 2007e) or co-owned the Harris & Schuller Sheet Metal Works with Orville L. Harris in Bremerton, Washington, between 1923 and 1950 (Fowler 1986:88).

Additional information about the Ellensburg Soda Works and the SLBC are provided by Fowler (1986:87-88,108, 274-275).

Chapter 8: Conclusions

Since fall quarter 2005, I have examined and described over 2,000 glass specimens. The glass specimens themselves do not tell anything; I must interpret what they mean. Glass artifacts cannot change or interbreed, but people's behavior changes glass making technology and production. For example, there have been many changes since the Whitall-Tatum & Company catalogue of 1880 which shows some of the many items at that time that were of glass. Many items, such as homeopathic vials, are no longer used, and these items are difficult to identify and determine how they were used.

My methods were based on lab observation combined with archival research, including internet research. The most difficult part of my archival research was how to contact an appropriate person who had special knowledge about my research questions.

I examined three different sites in the Kittitas Valley. I have learned about the early pioneer period of Kittitas County and Ellensburg history throughout my research, especially the Robber's Roost Site, the Ellensburg local drug stores, and the beverage industry.

I recognize that archaeology is not only doing excavation, but more important is the interpretation of raw data from the excavation. The data do not themselves notify anything; I create meaningful data to answer my research questions. I had to acquire a broad general knowledge and good communication skills for fields other than archeology. This is another applied knowledge I learned from my research.

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Table 2.01: Closure Category

Category	Description
1) Stopper	A plug which is inserted into the neck of a vessel to effect a seal from within the vessel.
a) Cork	Made of the bark of the cork oak tree.
b) Glass Stopper	Consist of a shank, which is the plug, and a finish, the portion by which the stopper is grasped for removal, and the neck, which is the transition point between the shank and finial. These two parts (shank and finish) may be jointed by a neck (Figure 2.05).
(1) Club Sauce	A circular top, horizontally oriented; the shank is cylindrical for a distance, indicating the area which could be wrapped in shell cork; and the lower potion of the shank is tapered (Figure 2.06).
2) Lid	The cover for a container, usually a jar, pot, or box.
3) Liner	To shield the food in fruit jars from the metallic taste imparted by direct contact with a metal cap. The glass liner, sandwiched between a metal cap and a rubber ring, was held in place by a screw band or solid cap made of metal.
a) Mason's Patent Fruit Jar Caps & related	Patented in 1858. The lip was ground, without interfering with threads, and the jar seal affected externally, at the shoulder. Original mason's jar was intended to take a zinc metal cap, a closure that completely covered and sealed the mouth (Figure 2.07).
4) Patent Closures	
a) Huntington Spring Stopper	Patented in 1879 in the US, consists of a loop of heavy wire attached to a rubber gasket. The device sits inside the bottle neck with the top of the wire loop protruding from the mouth (Figure 2.08).
b) Crown Finish and Cap	Patented in 1892 in the US, consists of a simple metal cap with a corrugated skirt or flange and a compressible liner (originally cork [earliest days to mid-20th century] or sometimes linoleum soaked disks [1909-1915] and now plastic) inside the top (Figure 2.09).
c) Codd's Ball Stopper	First patented in England in 1870. Internal ball closure was self-sealing via a rubber gasket mounted inside the bore of the bottle against which the marble was pushed firmly by the carbonated contents. The contents were accessed by pushing down on the marble to release the pressure after which the marble dropped to the lower part of the neck. The contents of the bottle had to be a carbonated beverage to hold the marble stopper in place (Figure 2.10).
d) Lightning-Type Closure	Patented in the US in 1975. A stopper of rubber or porcelain is attached to a wire bail which pivots on either side of the neck under the finish. The level wire, which hooks into loops in a neck tie-wire used to keep the closure on the bottle, moves up and down to loosen or tighten the pivoting wire bail (Figure 2.11).

Source: Jones and Sullivan 1979:149-167; Lindsey 2007a

Table 2.02: Summary of Bottle Seams from Toulouse (1969b:587-589)

Line #	Observation
01	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.
02	A seam disappearing at the shoulder means a bottle blown in a shoulder height hinged mold.
03	Seams disappearing in the neck area may be blown in any mold, but the seam rubbed out with a hand held finished tool.
04	If a seam crosses the bottom the mold was a two piece, hinged bottom type.
05	A horizontal seam around the widest point, with two side seams going upward means a three part mold based on a dip mold bottom.
06	Three or more side seams from heel to finish means a three part (or more) mold for decorative designs.
07	Circular seam symmetrical with bottom, joining two or more side seams means a post bottom mold.
08	Irregular, feathery, non-symmetrical bottom seams usually mean a machine made bottle from suction

	machine equipment.
09	Small diameter, indented into surface rather than extending, non-symmetrical, on the bottom, usually is the valve mark of a 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 plate 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" means come from the use of a separate blank mold-hence indicate machine manufacture.

Table 2.03: Glass Functional Category

Functional Type (IMACS 1992)	Structures and Names (Lindsey 2007d)
<p>Liquor/Sprits (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 whisky bottles are aqua, clear, amber and pale green," (p.19)</p>	<p>Cylinders Square/ rectangular Case gin bottles/Tall square short-necked spirits bottles/Tall square long-necked spirits bottles/Short squatty spirits bottles/Rectangular spirits bottles</p> <p>Flasks Union Oval flasks/Shoo-fly & Coffin flasks/Picnic flasks/Eagle flasks/Olympia & Washington style flasks</p>
<p>Wine/Champagne "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," (p.19).</p>	<p>"Bordeaux" shape "Burgundy" shape "Hock" or "Rhine" shape</p>
<p>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 the cork and twisted around beneath a ring of glass on the neck. Beginning in about 1870, the western 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," (p.19).</p>	<p>Export style Champagne style</p> <p>Others Malt extract/malt tonic styles/Weiss beer styles/Soda/mineral water styles/"Stubby" & "Steinie" styles</p>
<p>Soda& Mineral Water "The varieties of these bottles consist of the three basic types stressed thus, far, i.e., blob-top, Huntington type, and crown-cork bottles. However, these are several variations, involving pointed, or torpedo-shaped as it is frequently called, and the round bottoms were mostly imports from Europe, notably England. These vessels contained ginger ale primarily," (p.21) "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</p>	<p>Early soda/mineral water styles Saratoga mineral water styles Blob soda/mineral water styles Internal stopper soda/ mineral water style Huntington Spring Stopper style (See Figure 2-08; Table 2.01) Crown top/finish soda styles (see Figure 2-09;Table 2.01)</p>

<p>mineral water bottles are pints and quarts but they are also discovered occasionally in other sizes,” (p.21).</p>	<p>Early Crown Top sodas Later Crown Top (ACL) sodas</p>
<p>Medicine/Chemical/Druggist “There are essentially two major groups of drugs: ethical and proprietary. There are two types of prescription bottles: plain and embossed. The plain bottles usually featured sunken panels into which paper labels were glued. 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. Labeled and glass-stoppered bottles that were reused by pharmacists were usually several inches to ten inches in height,” (p.22).</p> <p>Prescription “All types. Shapes were mostly cylindrical or square, and prescription bottles were mostly oblong,” (p.22).</p>	<p>Patent/Proprietary medicinal bottles Bitters/Tonics/Sarsaparillas/Cures, Remedies & Related /products/Others</p> <p>Druggist/Prescription bottles Round/Square/Rectangular/Oval</p> <p>Poison & Chemical</p> <p>Others Citrate Magnesia</p>
<p>Food Bottles Pepper sauce/ club-source “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 to cylindrical and sometimes employed the Gothic arch embossing similar to the pickle bottles,” (p.24). Gothic or cathedral styles/Round styles/Square/ rectangular styles/Other styles/types</p>	<p>Sauce & Condiments Ketchup (catsup) style/ “Club” sauce style/Barrel (and other shape) Mustards/Other sauce/condiment styles – Horse Radish</p> <p>Catsup Food containers included a wide variety of sizes, shapes and colors</p>
<p>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 form as ‘Mason Jars,’ ” (p.24).</p> <p>Pickles & Preserved foods “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,’ ” (p.24).</p>	<p>Canning Jars Mason’s Patent closure jars/“Lighting” type jars/Thumbscrew & stopper lid type jars/“Economy” (cap & spring clip) type jars Others jar styles or types</p>
<p>Milk bottles “These were introduced in the latter part of the 19th century and the first recorded patent was in 1880. There were usually cylindrical, wide mouthed, made of clear glass and embossed,” (p.24).</p>	<p>Round styles/Square styles/types</p>
<p>Household bottles Ink “Ink bottles were made in a variety of shapes and colors. The most common shapes are ‘cone shapes’ with wide base tapering up to a narrow neck. A variation of the cone shape was called the ‘umbrella shape’ which had greater heights,” (p.26).</p>	<p>Ink bottles/Mucilage/Blacking/shoe Polish/ Nursing bottles/Toiletries (e.g., perfume, cologne & cosmetics, hair products, tooth powder)/Snuff</p>

Table 2.04: Glass Color and Manufacturing Periods

Color and Added Compounds	IMACS (1992:18-19)	Lindsey (2007b)
Aqua	ca.1800-ca.1910	Date prior to the 1920s back at least to the early 19th century (1800-1920 or 40s [Western US company.]) except Coca-Cola bottles. Jar - by about 1930
Brown (or Amber) adding copper, selenium, gold, carbon, or nickel	1860-present	1890-
Colorless	1875-present	the 1870s but became quite common after the wide spread use of automatic bottle machines in the mid to late 1910s
Amethyst (purple) de-colored with manganese or nickel		1880s-1930 (majority: 1890-1920)
Tint color (slightly grey), de-colored with selenium or arsenic		A machine-made bottle made: 1912 to 1915 no later than the 1950s mouth-blown bottles: later ones 1900-1920.
Green, adding chromium, copper, or iron	ca.1860-present	
White (or Milk glass), adding tin or zinc	1890-1960	Ointment/cream: 1890s-mid-20 th C. Fragment 1870s-
Blue or Cobalt, adding copper or cobalt	1890-1960	Medical cobalt: 1895-1910
Olive		1890s-. brighter Olive: 1920s-

Table 2.05: Manufacturing Technology and Age

Mold Type	Date	Definition and Comments
Non-Shoulder Molds		
Dip Mold	1790s-1870s	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 types of mold produces a uniform body shape up to the shoulder, and the finish may be handmade. no potil mark or scares.
Pattern mold	mid-1700s 1800s	Early pattern molds have perpendicular ridges or grooves, and there may be an irregularity in the glass at the shoulder, or a wrinkle at the neck.
Hinged shoulder-height mold	late 1700s-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.
Full-Height Molds		
Bottom-hinged mold	ca.1810-ca.1880	The mold seams on bottles manufactured by this method have seams the sides and across the base. The seams across the bottom come in two varieties: (1) straight across the bottom; and (2) curved 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.
Keyed Mold	1840s-1870s	Base seam is not straight but like post bottom's base seam.
Three-part dip mold	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; however, this was not usually done. It did not provide for embossing on the lower half of the bottle.

Three-Part Leaf mold	1830s (or 1821) -1910s	Circle seam on base and three seams on body.
Post-bottom mold	1840s-1910s	The seams from this type of mold run down the sides and to a circle around the bottom.
Cup-bottom mold	Late 1850s-1910s	The seams from this type of mold run down the sides to the heel and around the outside of the base. 1860s: only druggist bottles. Generally used 1880s or 1890s.
Blow-back mold	Mid-1800s	This type of mold leaves a rough and ragged edge around the top of the finish, this rough area is ground down so that the 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.
Turn mold	mid-1860s –early 1920s	No embossing on base & body, perfectly horizontal though faint striation, no pontil scarred, European origin.
Automatic bottle machine	1904 to present	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.
others		
Embossing	1850s -	A plate mold was used to embossing lettering or designs on the body of bottles, the palate mold, or slug plate, as it was known, helped in the standardization of many bottle shapes.
Owens auto-machine scar	1904 -	Produced irregular circular marks, known as cutoff scars (not seams) on the base (see Figure 2.14).
Machine made valve mark	1930-1940	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 tooled	ca 1850 (America). ca. 1830 (England)	often erased seams on the finish. In this process, which shaped the top of the bottle, or rod was inserted into the bore while he associated clamp on the outside developed the finish as it was rotated. Seams were obliterated by the rotation of the lipping tooled; but if the tool was pressed only, seams were produced to the top of the bottles.
flared or fired lip	Early 19 th century	The finish was made by cutting the bottle from the glassblower's rod and reheating the lip or sealing surface to smooth it.
Snap-case	during the 1850s - mid-1860s	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. The automatic bottle machine did away with the snap scar.
Applied Color Labeling	Since 1934	Commonly found on soda, milk, and beer bottles.

Source: IMACS 1992:5-7,11-13; Lindsey 2007c, 2007f; Munsey 1970:50; Sutton and Arkush 2002:184-186

Table 2.06: Lip Manufacturing Technology and Age Estimation

Technology	Manufacturing Period	Comments
Sheared lip	1810 - 1840	Closed Mold
Hand applied lip	1840 - 1860s	Open mold
Applied lip	1840 - 1890	Using lipping tools
Tooled lip	Late 1870s-1920s	The end of the mold technology period Medicine bottles were earlier than others
Machine-made lip	1904 – present	Semi and full automatic machine-made wide mouth bottles and jars
	1910/1912 - present	Narrow mouth bottles

Source: IMACS 1992:12; Lindsey 2007a

Table 2.07: Owens-Illinois Glass Co., Plant Numbers and Dates of Operation
(Lockhart 2004: Table 1).

Plant Number	Plant Location	Dates of Operation	Plant Number	Plant Location	Dates of Operation
1	Toledo, Ohio	1930-1937	15**	Waco, Texas	1938-present †
2	Fairmont, West Virginia	1930-present †	20**	Oakland, California	1946-present †
3	Huntington, West Virginia	1930-present †	23	Los Angeles, California	1949-present †
4	Clarksburg, West Virginia	1930-1944	10**	Atlanta, Georgia	1960-present †
6	Charleston, West Virginia	1930-1963	21	Portland, Oregon	1960-present †
7	Alton, Illinois	1930-present †	4**	Rockport, New York	1962-present †
8	Glassboro, New Jersey	1930-1939	8**	New Orleans, Louisiana	1962-present †
9	Streator, Illinois	1930-present †	22	Tracy, California	1962-present †
10	Newark, Ohio	1930-1939	11**	North Bergen, New Jersey	1963-present †
11	Evansville, Indiana	1930-1940	5	Charlotte, Michigan	1963-present †
12	Gas City, Indiana	1930-present †	16**	Lakeland, Florida	1967-present †
13	Chicago Heights, Illinois	1930-1940			
14	Brigeton, New Jersey	1930-present †			
15	Okmulgee, Oklahoma	1930-1940			
16	Cincinnati, Ohio	1930-1932			
17	Clarion, Pennsylvania	1932-present †			
18	Columbus, Ohio	1932-1948			
20	Backinridge, Pennsylvania	1932-1940			
25	Terre Haute, Indiana	1934-1950			
26	Muncie, Indiana	1936-1949			

* All dates are approximate; Toulouse used a graph that was not precise.
 ** Plant numbers with two asterisks are ones where the number was reassigned after the original plant ceased operations.
 † Present = 1971, the date of Toulouse's book *Bottle Makers and Their Marks*

Table 2.08: Finish Profile Shapes and Manufacturing Period

Finish Profile Shape (IMACS #)	Age	Comments
Bead (#3)	no dating	primarily medicinal bottles, occasionally liquor to pepper sauce, foods, and condiments
Benedictine	the 1870s to well into the 20th century	
Blob (#20)	1840s –end of the mold era (1920)	soda and mineral water bottles
	1870s – the 1910s	beer bottles
Brandy or Wine (#12)	1860s – 1920s	liquor bottles and flasks, many types of medicinal bottles (particularly larger sizes),
Capseat or “common Sense”	1889-1960s	patented by the Thatcher Manufacturing Company in September 1889, milk bottle.

Champagne (#18) 1) Sloped top 2) Flat top	1885-90 (before);	applied finish
	1885-90 to 1920	Tooled finish
	1915-20 to date about 1890 and 1920 pre-1890	Machine-made
		medicinal and bitters bottles (the last half of the 19 th c.) some liquor bottles and flasks (1850 to early 20 th c.) figured flasks (1845-1870), some earlier mineral/soda water and beer/ale bottles (1850-1870).
		rarely ink bottles or narrow and wide mouth food bottles. the secure wiring down of a cork for a highly carbonated product like champagne.
Collared ring (#24) "double" collared ring finish	1910-1920, possibly 1925 between 1913 and 1915	early 20th century druggist or prescription bottles. druggist or prescription bottles.
Club Sauce	the 1850s until the 1930s	The finish could be called the <i>Lea & Perrins® finish</i> . rarely found on medicinal, inks, wine, and liquor bottles.
Cracked-off	the 1890s to 1920s	figured flasks, a variety of other liquor bottles, early patent & proprietary medicines and hair treatment bottles, ink & mucilage (paste) bottles, cologne/perfume bottles, food and condiment bottles, and occasional wine bottles.
Crown (#19)	mid-1890s - 1915 (mold)	most commonly found on soda, mineral water, and beer bottles.
	1910-1912 – (machine-made)	
Double oil/mineral (#2)	1840 - 1880s uncommon late 1880s	earlier soda, mineral water, and ale/porter bottles (1850s - 1870s), patent or proprietary medicine bottles (1840s - 1870s), wine and liquor bottles of the same era, and occasionally bulk ink bottles.
Double ring (#1) (Perry Davis type by Jones)	1840 - 1920s (1850 – 1910)	patent/proprietary medicines, liquor flasks, sauce or narrow necked food bottles, flasks, and occasional ink bottles. rarely soda, mineral water, or wine/champagne bottles; never found on wide mouth bottles or fruit jars.
English ring, deep lip/parker (#8)	the mid-19th c.-the early machine-made (i.e., the 1920s)	liquid or semi-liquid products.
Flare ring (#22)	19 th - 20 th centuries	
Flare or Trumpet (#14)	1800 – early 1870s (1825 – 1865)	liquor flasks and small ink bottles.
	early 19 th – early 20 th C.	snuff bottles or jars, occasionally patent or proprietary medicine bottles, some food bottles, liquor decanters, and some early fruit or food storage jars.
Flat/patent (#7)	about 1850- 1940s	extract and patent & proprietary medicine bottles. less commonly on liquor bottles of all sizes, hair tonics, inks, rarely mineral waters.
Grovel flare (#13)	the first half of the 19th century	Figured flask.
Grooved Ring (#21)	1860 – 1890	liquor or ale bottles.
Ground	1858 and about 1915	the extreme upper surface is flat, slightly rough to the touch differing closures including various jars, liquor flasks.
Inside threads	the late 1880s and National Prohibition in 1920	the most common on mouth-blown tooled finish liquor bottles. some soda/mineral waters (mostly foreign made), chemical and/or ammonia bottles, perfumes and colognes, and some ink bottles.

Pouring	the 1830s and 1840s to at least 1930	the bulk sale of ink - a type of liquid that one generally wanted to pour in a slow, controlled manner.
Prescription (#9)	mid-1870s–the end of mold era early 1920s	most common finish on druggist, drug store.
Priof	the 1920s and 1930s	the "PRIOF" embossing; in fact, the embossing is on the outside face of the ledge, Citrate of Magnesia bottles and some other use as a beverage finish/closure
Reinforced Extract (#10)	1890s – the end of mouth-blown bottle era – 1910s to early 1920s	uncommon on mouth-blown bottles. medicine and druggist bottles. liquor flasks from the early 1900s.
Ring/oil (#11)	1830s – 1920s (1850 – 1920)	commonly proprietary and patent medicines (bitters, tonics, cures, balsams, etc.), some liquid/sauce type food bottles, large ("bulk") ink bottles, occasional liquor & figured flasks.
Rolled or folded	between about 1815 and the 1860s 1830s to about 1870	figured flasks. medicinal and "hair" treatment bottles.
Sheared/blow over (#15)	1800 – the early 1870s	many figured flasks, a variety of other liquor bottles & flasks, early patent/proprietary medicines and hair treatment bottles, ink & mucilage (paste) bottles, cologne/perfume bottles, food and condiment bottles, and occasional wine bottles. The straight finish is rarely if ever found on soda, mineral water, or beer/ale bottles, canning jars, and bottles produced after the 1870s with a few exceptions.
Sheared Ring	1880 Whitall, Tatum & Co. catalog	generally used on Castor Oils.
Stacked ring (#23)	Late 19 th to early 20 th centuries	most likely probably manufactured in Europe.
Stove pipe (#4)	Late 19 th century	uncommon.
Small Mouth External Thread (#16)	the mid-1870s	some mouth-blown liquor flasks and perfume/toiletry bottles.
	the early 1890s	liquor flasks, some perfume/toiletry bottles.
	dominated the around 1930	Machine made: any type or style of machine-made bottle except carbonated beverage bottles (beer and soda) which almost exclusively used the crown cap.
1) Interrupted (non-continuous)	the early 1920s – or early as 1911	
Stacked Ring (#6)		In general, the stacked ring is a somewhat uncommonly used finish on American made bottles.
Straight Brandy or Wine (#25)	1890s to National Prohibition (1920)	liquor bottles and flasks, many types of medicinal bottles (particularly larger sizes). rarely if ever seen on ink or perfume/cologne bottles, wide mouth food bottles, beer bottles, and druggist and drugstore bottles. most commonly utilized on large (fifth to quart size) round, square, and rectangular mouth-blown liquor bottles.
	after repeal of Prohibition in 1933	machine-made liquor bottles during ("medicinal use only") and for a time.
String rim	1700 - 1730	wine or spirits bottle.
Tapered down	1830-1850	mineral water or ale bottles.
Wax seal	1840s-1910s	Canning jar.

Wide Prescription or Flared (#17)	1800 - 1870	medicinal and druggist type bottles and vials.
	early to mid-19th C	liquor decanters, utilitarian, ink, and cologne bottles.
Wide Mouth External Thread 1) Interrupted (non-continuous) 2) mouth-blown jar 3) machine-made jar	the Mason fruit jar in 1858	canning jars and other food storage jars.
	the early 1920s – or early as 1911	Jars made during the transition period from hand-made to machine-made production (approximately 1900-1915).
	pre-1910	a ground rim (i.e., top surface to the finish).
	after 1900 and almost always after 1915	a smooth, non-ground top rim.
Wide prescription (#5)	N/A	N/A

Source: IMACS 1992:3; Lindsey 2007a

Table 2.09: Other Dating Methods

Observation	Date	Comments
More and larger bubbles (~1/8" and larger)	1905 to 1910-the 1920s	Machine-made bottles
Smaller bubbles	Early 1930s and later	Machine-made bottles
Absence of bubbles or a very few small "seed" bubbles or narrow "V" shaped bubbles	After the 1930s	Machine-made bottles
The external screw cap	The mid-1920s to the 1930s	Machine-made bottles
Applied Color Label (ACL)	After 1934	Machine-made bottles
Narrow mouth bottles	from 1910 to 1912	Machine-made bottles
Embossed (or labeled) specific capacity or volume information	From 1913	Machine-made and mold blown bottles
Embossed with "Federal Law Forbids Sale or Reuse of This Bottle."	From 1933 (or 1935) to the 1960s	Liquor machine-made bottles
A valve mark (1/2" inch (12-14 mm) in diameter, a bit smaller (10-12 mm), or larger (up to at least 24 mm).	From the early 1910s.	Machine-made bottles

Source: Lindsey 2007d

Table 3.01: Grissom Site Unit and Number of Bags and Specimens

Unit	# of Bags	# of Specimens	Unit	# of Bags	# of Specimens
H0E	5	7	R3E	13	16
H5E	1	1	R4E	11	14
I0E	1	1	R5E	7	9
I2W	6	6	S1W	1	1
J0E	9	10	S3E	45	179
J1W	1	4	S4E	9	17
J2W	7	7	S5E	21	83
J5E	1	1	S6E	1	1
L0E	2	3	T0E	2	4
L4E	1	1	T1W	3	5
L5E	3	4	T3E	10	25
M0E	22	122	T4E	10	17
M0W	4	4	T5E	19	22
M1E	1	29	U0E	6	40
M1W	2	4	U1W	4	12
N/A	15	37	U2W	1	1
N0E	2	10	U3E	40	66
No Unit	1	1	U4E	2	4
O0E	1	1	U5E	4	4
P0E	2	26	V0E	50	156
P3E	7	25	V1W	3	3
Q0E	3	10	V2W	3	6
Q1W	1	9	V3E	3	12
Q3E	20	37	W3E	13	112
Q4E	6	18	X0E	7	19
R0E	14	25	X1E	8	12
R1W	2	4	Total	436	1,247

Table 3.02: Grissom Site Specimens' Find Depth (Lower Coordinate). Level = centimeter below the datum

Unit	Number of Specimens	Level									
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	> 81	Other*
H0E	7	0	2	0	3	0	2	0	0	0	0
H5E	1	0	0	0	0	0	0	0	0	0	1
I0E	1	0	0	0	0	0	0	0	0	0	1
I2W	6	3	0	1	0	2	0	0	0	0	0
J0E	10	0	8	0	2	0	0	0	0	0	0
J1W	4	4	0	0	0	0	0	0	0	0	0
J2W	7	0	0	0	0	1	2	1	0	0	3
J5E	1	0	0	0	0	0	0	0	0	0	1
L0E	3	0	1	0	2	0	0	0	0	0	0
L4E	1	0	0	0	0	0	0	0	0	0	1
L5E	4	0	0	0	0	0	0	0	0	0	4
M0E	122	0	19	1	17	3	2	1	0	0	79
M0W	4	0	3	0	0	1	0	0	0	0	0
M1E	29	0	29	0	0	0	0	0	0	0	0
M1W	4	0	4	0	0	0	0	0	0	0	0
N/A	37	0	3	4	7	3	0	0	0	0	20
N0E	10	0	0	0	10	0	0	0	0	0	0
No Unit	1	0	0	0	0	0	0	0	0	0	1
O0E	1	0	0	0	0	0	1	0	0	0	0
P0E	26	0	23	0	3	0	0	0	0	0	0
P3E	25	0	0	0	0	9	2	1	0	0	13
Q0E	10	0	8	0	2	0	0	0	0	0	0
Q1W	9	0	0	0	0	9	0	0	0	0	0
Q3E	37	0	0	1	17	1	15	3	0	0	0
Q4E	18	0	0	7	3	6	0	0	0	0	2
R0E	25	0	3	10	2	0	9	1	0	0	0
R1W	4	0	0	0	0	4	0	0	0	0	0
R3E	16	0	0	3	12	0	0	0	0	0	1
R4E	14	0	0	2	3	2	4	1	1	0	1
R5E	9	0	0	0	3	3	2	0	0	0	1
S1W	1	0	0	0	0	1	0	0	0	0	0
S3E	179	1	0	74	26	30	46	0	0	0	2
S4E	17	0	0	0	10	3	2	0	2	0	0
S5E	83	0	59	0	2	0	2	1	10	0	9
S6E	1	0	0	0	0	0	0	0	0	0	1
T0E	4	0	4	0	0	0	0	0	0	0	0
T1W	5	0	1	0	0	4	0	0	0	0	0
T3E	25	0	14	0	0	0	3	2	0	0	6
T4E	17	0	0	0	0	1	2	14	0	0	0
T5E	22	0	0	5	4	2	3	6	1	0	1
U0E	40	0	32	2	0	3	2	0	0	1	0
U1W	12	0	0	0	0	12	0	0	0	0	0
U2W	1	0	0	0	1	0	0	0	0	0	0
U3E	66	0	0	0	0	0	9	32	13	0	12
U4E	4	0	0	0	0	0	3	1	0	0	0
U5E	4	0	0	0	3	0	0	0	0	0	1
V0E	156	0	105	0	44	0	0	0	0	0	7
V1W	3	0	0	1	0	0	0	0	0	0	2
V2W	6	0	0	1	0	5	0	0	0	0	0
V3E	12	0	0	0	0	0	0	0	7	5	0
W3E	112	0	0	0	0	0	0	50	21	40	1
X0E	19	0	5	0	4	0	10	0	0	0	0
X1E	12	0	0	0	1	0	5	0	1	0	5
Total	1247	8	323	112	181	105	126	114	56	46	176

Other* includes no level, level 1, 2, 4, +1, +2, and +3, surface, clean up, and pit clean up.

Table 3.03: Grissom Site, Specimens Color Distribution.

Unit	Aqua	Amethyst	Brown	Blue	Colorless	D. Olive	Green	L. Green	White	Total
H0E	0	0	1	0	4	0	0	2	0	7
H5E	0	1	0	0	0	0	0	0	0	1
I0E	0	0	0	0	1	0	0	0	0	1
I2W	0	1	1	0	3	0	0	1	0	6
J0E	0	1	0	0	7	0	0	2	0	10
J1W	0	0	1	0	3	0	0	0	0	4
J2W	0	4	0	0	3	0	0	0	0	7
J5E	0	0	1	0	0	0	0	0	0	1
L0E	0	1	0	0	0	0	1	1	0	3
L4E	0	0	0	0	0	0	0	1	0	1
L5E	0	0	2	0	0	0	0	2	0	4
M0E	1	1	109	0	7	1	3	0	0	122
M0W	0	2	0	0	2	0	0	0	0	4
M1E	0	0	1	1	10	0	2	15	0	29
M1W	0	0	3	0	1	0	0	0	0	4
N/A	5	1	8	0	9	2	4	8	0	37
N0E	1	0	4	0	5	0	0	0	0	10
N. Unit	0	0	0	0	1	0	0	0	0	1
O0E	0	0	0	0	1	0	0	0	0	1
P0E	0	6	1	1	1	0	2	15	0	26
P3E	0	0	0	0	13	12	0	0	0	25
Q0E	0	3	0	0	4	0	0	2	1	10
Q1W	0	7	1	0	0	0	1	0	0	9
Q3E	0	8	2	0	25	0	0	2	0	37
Q4E	0	3	0	0	13	0	1	0	1	18
R0E	0	1	0	0	16	0	3	3	2	25
R1W	0	1	0	0	3	0	0	0	0	4
R3E	0	0	1	0	13	0	0	1	0	15
R4E	4	1	0	0	7	0	2	0	0	14
R5E	2	0	0	0	6	0	1	0	0	9
S1W	0	1	0	0	0	0	0	0	0	1
S3E	117	0	1	0	59	0	1	1	0	179
S4E	6	0	0	0	8	0	1	2	0	17
S5E	33	0	16	0	30	0	1	3	0	83
S6E	0	0	0	0	1	0	0	0	0	1
T0E	0	0	1	0	2	0	0	1	0	4
T1W	0	0	1	0	2	0	2	0	0	5
T3E	1	0	1	0	15	1	2	6	0	26
T4E	3	0	2	0	10	1	1	0	0	17
T5E	7	0	1	0	8	0	1	5	0	22
U0E	3	0	0	0	21	0	9	7	0	40
U1W	0	1	0	1	8	0	1	0	1	12
U2W	0	0	0	0	1	0	0	0	0	1
U3E	0	0	12	0	33	5	2	13	1	66
U4E	0	0	1	0	1	1	0	0	1	4
U5E	2	0	1	0	1	0	0	0	0	4
V0E	10	0	0	1	140	0	0	5	0	156
V1W	0	1	0	0	2	0	0	0	0	3
V2W	1	0	0	0	3	0	0	2	0	6
V3E	0	1	0	0	8	0	0	3	0	12
W3E	2	0	5	0	42	0	1	62	0	112
X0E	3	2	2	0	6	0	6	0	0	19
X1E	0	2	1	1	6	0	2	0	0	12
Total	201	50	181	5	565	23	50	165	7	1,247

N. Unit = No Unit, Color Code: D. Olive= Dark Olive, L. Green = Light Green

Table 3.04: Grissom Site, Plate Glass Specimens with Units.

Unit	H0E	J0E	L5E	M1E	P0E	Q0E	R3E	R4E	S3E	S4E
# of Specimens	2	2	1	15	13	1	1	2	1	1
Unit	S5E	T4E	U0E	U3E	V0E	V2W	V3E	W3E	N/A	Total
# of Specimens	2	4	1	5	6	2	3	67	6	135

Table 3.05: Grissom Site, Vessel Portion Numbers (Portion # and Specimen # including Catalog #)

01	3723		09	3526		23	9282-3		39	1767-4
02	3617		10	3527		23	9282-4		39	1767-5
02	9263-1		11	3528		23	9282-5		40	3702
02	9263-2		12	15004-31		23	9282-6		41	9143-1
02	9263-21		12	3529		23	9282-9		42	9281-4
02	9263-26		13	3551		23	9321-4		43	15032-1
02	9263-3		14	9282-17		23	9321-5		43	9321-2
02	9263-35		14	9321-8		24	3622		44	9836-18
02	9263-42		14	9378-1		24	3663		45	9836-21
02	9263-43		14	9378-2		25	3664-1		46	3639
02	9263-5		15	15004-10		25	3664-2		46	3714
02	9263-7		15	15004-13		26	3490		47	2534
02	9843-1		15	15004-14		27	9032-1		47	3721
02	9843-2		15	15004-3		27	9251-1		48	1359
02	9843-3		15	15004-39		28	1191		49	3730
02	9843-4		15	15004-43		28	14277-10		50	9035-6
02	9843-5		15	15004-78		28	14277-2		51	15004-2
02	9843-6		16	15004-17		28	14277-4		52	15004-1
03	9281-1		16	15004-6		28	14277-7		53	15004-4
03	9292		16	3530		28	14277-8		54	15004-5
04	9261		16	3550		28	14277-9		55	3738
05	14827		16	3553		29	3717		56	3687
05	14894-1		16	3560		29	9222-1		57	295
05	3732		17	15004-7		30	3685		58	3697
05	9110-1		18	15004-8		31	9273-1		59	478-1
05	9272-1		19	15004-11		32	15163-3		59	478-2
05	9272-10		19	15004-9		33	1494		59	478-6
05	9272-6		20	15004-32		34	9274-1		60	14341
05	9443-1		21	15004-34		35	9207		61	9836-19
06	14831-1		22	3744		36	3567		62	3691
07	3521		23	1908-1		37	8749		63	75
08	3525		23	1908-2		37	9620		63	9836-20
09	15004-12		23	1908-3		38	3532		64	9132-1
09	15004-26		23	9209-6		38	3554-1		65	9005-1
09	15004-29		23	9282-1		39	1767-1		65	9605-1
09	15005		23	9282-10		39	1767-2			
09	15006		23	9282-2		39	1767-3			

Table 3.06: The Grissom Site, Vessel Portions

PN	Cat. #	Excavation		Co.	Portion	Base Profile by IMACS	Finish Profile by IMACS	Glass Function	Embossing
		Unit	Level						
01	3723	M0E	20-40	C	base	Round		C	
02	9843-1	M0E	0-20	B	base	Round		B	
03	9281-1, 9292	N0E M0E	0-40 50-60	B	base	Round		B	
04	9261	M0E	50-60	G	base	Round		W	
05	3732	S3E	40-50	C	base	Blake (variant 1)		Md	
06	14831-1	S3E	50-60	C	lip		N/A		
07	3521	V0E	20-40	C	base	Round		BE	
08	3525	V0E	20-40	C	body			C	“Dr. Price’s Delicious Flavoring Extracts”
09	3526, 15005, 15006	V0E	20-40 N/A	C	base	Blake (variant 1)		Md	“D.O. WOODWORTH/ DRUGGIST/ELLENS BURGH, WASH” & “(W)T&Co”
10	3527	V0E	20-40	C	body			C	“Dr. Price’s Delicious Flavoring Extracts”
11	3528	V0E	20-40	A	lip		Flat/patent		
12	3529	V0E	20-40	C	base	Monarch/ Erie oval		M	
13	3551	V0E	20-40	C	base	N/A			
14	9378	V0E	N/A	A	(body)			M	“LOWELL/ MASS U.S.A.”
15	15004-2, 10, 13, 14	V0E	0-20	C	Base-lip	Blake (variant 1)	Flat/patent	C	Refit either vessel 08 or 10
16	15004-6	V0E	0-20	C	base	Elixir/handy		L	
17	15004-7	V0E	0-20	C	base	N/A			
18	15004-8	V0E	0-20	C	base	N/A			
19	15004-9, 11	V0E	0-20	C	base	French square			“H”
20	15004-32	V0E	0-20	A	body				
21	15004-34	V0E	0-20	BL	rim			BO	
22	3744	U0E	0-20	C	base	Round			
23	1908-1	R0E	20-30	C	Heel-lip	Round	Flat/patent	M	
24	3662, 3663	X0E	0-20	AM	base	Polygon			
25	3664-1, 2	X0E	0-20	G	base	Round		BE	“Z”
26	3490	T4E	57-61	C	base	N/A			
27	9251, 9032-1	T5E	?-40 30-40	G	base	Round		W	
28	1191	P3E	40-50	D.O	lip		Ring/oil		
29	3717, 9222-1	U1W	0-60 50-60	W	base	N/A		O	
30	3685	Q0E	20-40	W	lid			Ld	
31	9273-1	Q3E	50-60	AM	base	N/A			
32	15163-3	S5E	N/A	C	base	N/A			
33	1494	T3E	60-70	C	base	N/A			
34	9274-1	P0E	0-20	BL	body				
35	9207	I0E	N/A	C	base	N/A			
36	3567	V0E	20-40	C	base	N/A			
37	9620	M0W	10-20	AM	base	N/A			

38	3532, 3554	V0E	20-40	C	base	Round			
39	1767-1, 5	P3E	40-50	C	base	Blake (variant 1)		M	“M “ in a circle
40	3702	T5E	40-50	A	base	N/A			“1846”
41	9143-1	X0E	21-40	A	base	N/A			
42	9281-4	N0E	0-40	A	base	N/A			
43	9321-2, 15032-1	X0E	41-60 40-50	A	base	Round			
44	9836-18	M1E	10	C	base	Blake (variant 1)		M	
45	9836-21	M1E	10	C	base	N/A			
46	3714, 3639	R1W	0-50 70-80	AM	body				
47	2534, 3721	P3E	40-50 28-40	AM	lip		Prescription		
48	1359	P3E	0-50	G	base	Round			
49	3730	J2W	50-60	AM	base	N/A			
50	1043	W3E	60-70	C	base	N/A			
51	15004-2	V0E	0-20	C	lip		Prescription	M	
52	15004-1	V0E	0-20	C	lip		(Flat/patent)		
53	15004-4	V0E	0-20	C	lip		Ring/oil	M	
54	15004-5	V0E	0-20	C	lip		Prescription	M	
55	3738	X1E	40-60	C	rim				
56	3687	S3E	20-40	C	lip		Prescription	M	
57	295	R0E	60-70	AM	lip		Champagne	W	
58	3697	V2W	25-50	C	lip		N/A		
59	478-1, 2, 6	S5E	0-20	A	lip		Ring/oil		
60	14341	R4E	30-40	C	lip		prescription	M	
61	9836-19	M1E	10	A	lip		Ring/oil		
62	3691	S1W	0-50	AM	lip		prescription		
63	9836, 75	M1E, T1W	10 20	G	lip		champagne	W	
64	9132	T3E	Surface	G	lip		N/A	J	
65	9005-1, 9605-1	Q1W, T4E	0-50, 60-70	B	lip		N/A	B	

PN = Vessel Portion Number, Co., = Color, A = Aqua, AM = Amethyst, B = Brown, BL = Blue, C = Colorless, D.O. = Dark olive, G = Green, LG = light green, W = White, Vessel Function Symbols: B = Beer, BE = Beverage bottle, BO = Bowl, C = Condiment, F = Food container, J = unknown Jar, L: s-f = Liquor bottle, shoo-fly shape, Ld = Lid, M = medicine bottle, Md = Medicine druggist bottle, O = Ointment/cream, W = Wine

Table 3.07: Grissom Site Minimum Number of Vessels (MNV) and Reasons

# of Vessel	PN	Cat. #	Color	Portion	Function of vessels	Reasons
01	01	3723	C	base	C	base profile
02	02	9843-1	B	base	B	almost complete base, color, size
03	03	9281-1, 9292	B	base	B	color, thickness, size
04	04	9261	G	base	W	color, thickness
05	05	3732	C	base	M	complete base
06	07	3521	C	base	BE	complete base, thickness, size
07	09	3526, 15005, 15006	C	Base	M	almost complete base, embossing
08	10	3527	C	body	C	embossing
09	12	3529	C	base	M	almost complete base
10	13	3551	C	base	N/A	size, thickness
11	14	9378	A	body	M	size, color, thickness
12	15	15004-2, 10, 13, 14	C	Base-lip	C	almost complete base to lip (refit either PN 08 or 10)
13	16	15004-6	C	base	L	complete base, thickness
14	17	15004-7	C	base	N/A	size, thickness, basal profile
15	18	15004-8	C	base	N/A	thickness, base profile
16	19	15004-9, 11	C	base	N/A	almost complete base, size, thickness
17	21	15004-34	BL	rim	BL	color, portion
18	22	3744	C	base	N/A	complete base, thickness
19	23	1908-1	C	body-lip	M	almost complete except base
20	24	3662, 3663	AM	base	N/A	base profile, thickness, pattern
21	25	3664-1, 2	G	base	BE	color
22	26	3490	C	base	N/A	base profile, heel portion, thickness
23	27	9251, 9032-1	G	Base	W	color, thickness
24	28	1191	D.O	lip	N/A	color, technology, lip profile
25	29	3717, 9222-1	W	base	O	color, pattern
26	31	9273-1	AM	base	N/A	color, base profile, thickness
27	34	9274-1	BL	body	N/A	color, thickness
28	36	3567	C	base	N/A	base profile, thickness
29	37	9620	AM	base	N/A	size, base profile
30	38	3532, 3554	C	base	N/A	size, thickness, base profile
31	39	1767-1, 5	C	base	M	almost complete base, base profile, thickness
32	40	3702	A	base	N/A	color, base profile
33	41	9143-1	A	base	N/A	color, basal profile, thickness
34	42	9281-4	A	base	N/A	size, heel profile
35	43	9321-2, 15032-1	A	base	N/A	size, thickness
36	44	9836-18	C	base	M	almost complete base
37	48	1359	G	base	N/A	color, size,
38	49	3730	AM	base	N/A	base profile, size
39	50	1043	C	Base	N/A	base profile, thickness
40	64	9132	G	lip	J	color, lip profile

The same abbreviations as above (Table 3.06).

Table 3.08: Grissom Site Variation in the Vessel Base Profiles

Vessel Base Profile by IMACS	Vessel Portion Number	Total
Round	1, 2, 3, 4, 7, 22, 23, 25, 27, 38, 43, 48	12
Blake (variant 1)	5, 9, 15, 39, 44	5
Monarchy/Erie Oval	12	1
Elixir/handy	16	1
French square	19	1
Polygon	24	1
Total		21

Table 3.09: Grissom Site Variation of the Vessel Lip Profiles

Vessel Lip Profile By IMACS	Age Estimation	Vessel Portion Number	Total
Prescription	m-1870s-e-1920s	47, 51, 54, 56, 60, 62	6
Ring/oil	1830s-1920s	28, 53, 59, 61	4
Flat/patent	1850s-1940s	11, 15, 23,	3
Champagne (Tooled)	1885-90 to 1920	57, 63	2
Total			15

Table 3.10: Grissom Site Glass Function by Vessel Portions

Glass Function	Nearly complete bottle	Base Portion Number	Body, Lip , Rim, or Closure Portion #	# of Bottles or Closures
Medicine	23	05, 09, 12, 14, 39, 44	51, 53, 54, 56, 60, 62	7
Liquor	0	16	0	1
Beer/Ale	0	02, 03	65	2
Wine/Champagne	0	04, 27	57, 63	2
Beverage (non-carbonated)	0	07, 25	0	2
Condiments	15	01	08, 10	3
Food Containers	0	0	0	0
Bowl	0	0	21	1
Ointment/cream	0	29	0	1
Unknown Jar	0	0	64	1
lid	0	0	30	1
Total	2	15	14	21

Table 3.11: Grissom Site Glass Manufacturing Technology

Glass Manufacturing technology	Portion Numbers	Use Period	Total
Cup bottom mold	05, 07, 09, 15, 19, 39	Late 1850s-1910s	6
Keyed mold	12	1840s-1870s	1
Post bottom mold	02	1840s-1910s	1
Three part dip mold	23	1870-1910	1
			9

Table 3.12: Grissom Site Lip Manufacturing Technology

Lip manufacturing technology	Portion Number	Use Period	Total
Applied finishes	11, 15, 56	1840 - 1890	3
Hand-applied finishes	28	1840 - 1860s	1
Tooled finishes	23, 47, 51, 52, 53, 54, 57, 58, 59, 60, 61	Late 1870s-1920s	11
			15

Table 3.13: Grissom Site Embossing

Line #	Cat #	Unit	PN.	Color	Comments, Embossing
01	9378-1	V0E	14	A	On side with "LOWELL / MASS U.S.(A)"
02	9378-2	V0E	14	A	On side with "(A)"
03	9124	T5E	N.A	C	On side with "3 (?)"
04	3688	N.U.*	N.A	C	On side with "(MAM)" unclear
05	1767-1	P3E	39	C	On bottom with "M" with a circle
06	3664-1	X0E	25	G	On bottom with "Z(?)"
07	3737	S3E	N.A	A	On side with ? (unclear)
08	15077-1	S5E	N.A	A	On side with "WE"
09	1882-1	S5E	(14)	A	On side with "LERO"
10	9377	V0E	(14)	A	On side with "PARILLA"
11	9375	V0E	(14)	A	On side with "SA"
12	9376	V0E	(14)	A	On side with "RS"
13	3694	S5E	N.A	A	On side with "D. J(A)/ E"
14	3840	T5E	(14)	A	On side with "(&) C(o)"
15	3650	Q3E	N.A	A	On side with "C"
16	3750	H0E	N.A	C	On side with "T"
17	9202	R5E	N.A	A	On side with "RIA"
18	9272-5	S3E	N.A	A	On side with "H(?)"
19	3737	S3E	N.A	A	On side with "(L)A(?)"
20	9054-4	S3E	N.A	A	On side with "(R)CE. (M)"
21	9054-6	S3E	N.A	A	On side with "R (P)"
22	14381-37	W3E	N.A	C	On side with "PA/ D"
23	3525	V0E	08	C	On side with "DR. P/ DEL/ (F)LAVOR(L)"
24	3527	V0E	10	C	On side with "R.P/ DEL/ (A)VORIN"
25	3526	V0E	09	C	On side with "DW/ GGIS/ (U)RG (I or H)"
26	15005	V0E	09	C	On side with "RTH/ T/ H, WASH" On bottom with "(W)T &CO/ I"
27	15004-10	V0E	15	C	On side with "S"
28	15004-39	V0E	15	C	On side with "ACT"
29	15004-11	V0E	19	C	On bottom with "H"
30	3685	Q0E	30	W	On top of lid "MAS(O)"
31	3702	T5E	40	A	On bottom with "1846"
32	15004-82	V0E	N.A	C	On side with "(O)/ (N)?" unclear
33	3695	S5E	N.A	A	On side with "PON(D)"
34	15084-3	S3E	N.A	A	On side with "D"
35	3732	S3E	N.A	C	On bottom with "H"
36	3736	S3E	N.A	A	On side with "FAL"
37	3745	S3E	N.A	A	On side with "AL"
38	3746	S3E	N.A	C	On side with "O"
39	3629	S3E	N.A	A	On side with "(F)"

Cat # = Catalog Number. PN = Portion Number, U.N.* = No Unit, Color code: A = Aqua, C = Colorless, G = Green, W = White.

Table 3.14: Grissom Site Glass Manufacturing Company

Company name or Production	Manufacturing Place	Vessel Portion Number
Maryland Glass Co.	Baltimore, MD.	39
Whitall-Tatum Co.	Millville, NJ.	09
Dr. Price's Delicious Flavoring Extracts	Chicago, IL.	08, 10
(Lowell MASS U.S.A.)	Lowell, MA.	14

Table 4.01: Robber's Roost, 1986 Unit Location Reconstruction

Unit Number of 1986	Location within 1988 Unit	Sample of FS Bag Number(s)
N.1/W.13	SW ¼ of 10	0
00/W.7	NW ¼ of 58	FS 1017, 1019, 1021
00/W.5&S.1/W.5	W ½ of 7	FS 1027
00/W.2&00/W.3	N ½ of 56	0
00/W.1	NW ¼ of 55	FS 1051
N.2/E.1	NE ¼ of 63	FS 1062, 1067
N.1/W.1&N.2/00&N.2/W.1	W ½ + NE ¼ of 62	FS 1073
N.1/W.2	SE ¼ of 61	0
N.1/W.5&N.2/W.5	W ½ of 60	FS 1102
N.6/W.6*	NE ¼ of 69	0
N.7/W.6&N.8/W.6*	E ½ of 78	0
W.11/N.9**	SW ¼ of 26	0
N.7.8/W.5	W ½ of 77	FS 1996
N.6.8/W.5	NW ¼ of 70 + NW ¼ of 77	FS 1997
No Provenience	N/A	0

N.6/W.6* = no shade area on 1988 map, W.11/N.9** = miss matching shade area on 1988 map

Table 4.02: Robber's Roost 1986 Level Reassignment

Level of 1986	Reassigned to Level in 1988 System	FS bags Numbers of 1986
0-10 cm.	Level 1	FS 1073
10-20 cm.	Level 2	0
20-30 cm.	Level 3	FS 1027, 1051, 1063
30-40 cm.	Level 4	0
40-50 cm.	Level 5	FS 1017
50-60 cm.	Level 6	FS 1102
60-70 cm.	Level 7	FS 1019, 1067
70-80 cm.	Level 8	0
80-90 cm.	Level 9	FS 1021
90-100 cm	Level 10	0
100-110 cm.	Level 11	0
110-120 cm.	Level 12	0
No Level	N/A	FS 1996, 1997

Table 4.03: The Robber's Roost Site, Location of 1986 FS Bags

Field specimen's number in 1986	Assigned Location in 1988 system unit/level
1017	58/5
1019	58/7
1021	58/9
1027	57/3
1015	55/3
1063	63/3
1067	63/7
1073	62/1
1102	60/6
1996	77/no level
1997	70, 77/ no level

Table 4.04: Robber's Roost Glass Inventory Boxes and Sample Bag Numbers

Inventory #	# of bags and vessels	# chosen	FS Numbers I choose
169	24	5	1017, 1019, 1021, 1027, 1051
246	17	3	1063, 1067, 1073
272	17	3	1102, 1996, 1997
173	17	4	2001, 2009, 2011, 2013 (3 of 3)
217	12	3	2016, 2018, 2019
172	17	3	2087, 2098, 2099
251	25	5	2101, 2104, 2109, 2111, 2113
295	20	4	2136, 2139, 2144, 2148
286	14	3	2155, 2156, 2172
197	13	3	2174, 2177, 2189 (2 of 2)
252	14	3	2192, 2194, 2208
291	15	3	2225, 2226, 2227
245	08	2	2228, 2234 (2 of 2)
290	11	2	2241, 2248
296	11	2	2253, 2256
293	15	3	2266, 2268, 2274
183	28 vessels	All (28 vessels)	1027-01, 1101-01, 1063-01, 1079-01, 1102-01, 1102-02, 1997-01, 2013-01, 2019-01, 2027-01, 2027-02, 2029-01, 2029-02, 2031-01, 2032-01, 2034-01, 2062-01, 2069-01, 2076-01, 2076-02, 2081-01, 2081-02, 2086-02, 2088-01, 2093-01, 2093-02, 2099-01, 11??-01,
184	30 vessels	All (30 vessels)	2103-01, 2103-02, 2103-03, 2104-01, 2114-01, 2114-03, 2122-01, 2129-01, 2134-01, 2136-01, 2139-01, 2142-01, 2148-01, 2148-02, 2148-03, 2148-04, 2148-05, 2148-06, 2148-07, 2148-08, 2151-01, 2154-01, 2155-01, 2155-02, 2155-03, 2156-01, 2156-02, 2156-03, 2156-04, 2156-05,
174	24 vessels	All (24 vessels)	2166-01, 2174-01, 2183-01, 2183-02, 2189-01, 2189-02, 2192-01, 2194-01, 2194-02, 2194-03, 2194-04, 2199-01, 2203-01, 2217-01, 2232-01, 2240-01, 2241-01, 2241-02, 2241-03, 2241-04, 2241-05, 2241-06, RR21-01, RR99-01
242	14 vessels	All (14 vessels)	2242-01, 2242-02, 2246, 2247-01, 2247-02, 2248, 2250, 2253, 2256, 2261-01, 2261-02, 2264, 2274, 224?
Total	250bags & 96 vessels	51 bags & 96 vessels	

Table 4.05: The Robber's Roost Site, Sample Specimen Portion and Level

Level	Complete	Base	Lip	Rim	Closure	Total Specimens
1	3	82	43	6	0	134
2	16	49	38	4	2	109
3	10	60	43	14	2	128
4	18	25	16	2	7	67
5	11	41	32	7	1	93
6	9	56	28	6	1	100
7	19	96	54	20	12	202
8	1	7	2	2	1	13
9	2	18	2	2	0	24
10	0	23	10	2	0	35
N/A	7	41	16	8	5	77
Total	96	498	284	73	31	982

Table 4.06: The Robber's Roost Site, Sample of Specimen Color and Portions

Color	Complete	Base	Lip	Rim	Closure	Sum
Aqua	11	35	30	0	1	77
Amethyst	6	31	22	2	1	62
Brown	6	110	56	2	11	185
Colorless	61	281	142	64	5	553
Green	5	23	10	1	0	39
Light Green	6	9	10	1	5	32
White	1	6	11	3	8	29
Other	0	3	3	0	0	6
Total	96	498	284	73	31	982

Table 4.07: Robber's Roost Site, Specimens with Embossing

Line #	FS* Number	Embossing	Where	Comments
01	1017-01	CHESE/NEW-Y	Side	Made in New York?
02	1017-06	22 'I'	Base	Company mark
03	1017-06	"WOR..ESTER SIRE. SAUSE "	shoulder	
04	1019-02	26(or 92) 0-4463 "HA"	Base	Company mark
05	1019-03	PAT JULY/18	Base	
06	1021-01	CH/YORK	Side	
07	1027-09	WOOD	Base	
08	1051-01	S	Side	
09	1063-01	PAT NOV26 67 (inside 406)	Base	Patented date
10	1063-06	F	Base	Company mark ?
11	1063-07	F	Base	Company mark ?
12	1067-02	& Col	base	
13	1067-07	-41?PATER/SOR	Base	
		R-174	Side	
14	1067-09	X	Base	
15	1073-01	PP11-21 (cm**) 70 15419-GB	Base	Company mark
16	1073-02	7?546-GB 4 88	Base	
17	1073-03	>5/8 or 3	Base	
18	1073-04	461-6	Base	
19	1073-05	JSIT BO	Side	
20	1073-06	E	Side	
21	1073-13	UPAN	Base	
		ONE PINT	Side	Liquid quantity
22	1073-14	AM	Base	
		ONE PINT	Side	Liquid quantity
23	1073-15	AMERICAN/ 21(cm**)67/NE GROWERS	Base	Company mark
		ONE PINT	Side	Liquid quantity
24	1073-16	J-I 65/ (cm)	Base	Company mark
25	1073-17	2/L-96	Base	
26	1073-18	(cm**)MXNOT TO	Base	Company mark (?)
27	1073-19	ALHA/SELA	Base	
28	1073-20	LEDX/X13	Base	
29	1073-21	(Unclear)	Base	
30	1073-22	NE	Base	Company mark
31	1073-23	D-8/72(cm**) 5	Base	
32	1073-24	(Unclear)	Base	

33	1073-25	(Unclear)	Base	
34	1102-01	SB&Go/4	Base	Company: SB&G Co.
35	1102-03	19	Base	
36	1996-07	140/PAT FEB10 03	Base	Patented date
37	1996-08	8oz./(cm) 8/S.A.	Base	Liquid quantity, company mark
38	1996-09	..MBR/21	Base	
39	1997-02	ST.JO	Side	
40	1997-03	RECYCLABLE	Side	sign
41	1997-04	(cm**)	Base	Company mark
		RE	Side	
42	1997-05	UTTLE	Base	
43	1997-10	C Co/154	Base	
44	1997-12	528(cm**)	Side	
45	1997-24	W?&S/M/MIL	Base	Company: WF&S
46	1997-25	(Unclear)	Base	
47	2001-03	20545-SB20 (cm) 70 918?NOT TO BE REFILLED	Base	Company mark, Warning sign
48	2001-04	70	Base	Production date?
49	2001-05	O/B	Base	
50	2001-06	AL	Base	
51	2001-07	53	Base	
		TC	Side	
52	2001-08	31A	Base	
		NO DA	Side	
53	2001-22	UNITED VINTNERS INC./REFILLING PROHIBITED/5072/69 9/C (cm**)	Base	Company: United Vintners Inc. warning sign, company mark
		ART 4/5 ART 4/9 ART	Side	
54	2001-23	UNITED VINTNERS INC./REFILLING PROHIBITED/5072/69 4C(cm**)	Base	Company: United Vintners Inc. warning sign, company mark
		4/5QUARTER/5Q	Side	Liquid quantity
55	2001-24	UNITED VINTNERS INC./REFILLING PROHIBITED/5072/69 12C(cm**)	Base	Company: United Vintners Inc. warning sign, company mark
		ART QUN	Side	
56	2001-25	WINE N	Base	
57	2001-26	D/87	Base	
58	2001-27	NE PINT	Side	
59	2001-28	NW	Base	Company mark
60	2009-01	53 (cm**) 60	Base	Company mark
		NOT TO BE REFILLED	Side	Warning sign
61	2009-02	TY	Base	
62	2011-01	O?	Side	
63	2011-04	?98/H	Base	
64	2011-05	26	Side	
65	2011-10	6 or9/6 or 9	Base	
66	2011-11	/500	Side	
67	2013-01	W	Base	
68	2013-05	SGIA/P WINEL/L	Base	
69	2013-06	WASHINGTON/20 (cm**) 55/NE COUNC	Base	Washington D.C. or Washington State? Company mark
70	2013-07	?NL	Base	
71	2013-08	621	Base	
72	2013-09	66/COUNO	Base	
73	2013-22	X-/3 (cm**)/5.A	Base	Company mark
74	2016-01	L?	Base	

75	2016-03	/5 QUA	Side	Quart?
76	2016-04	QUAR	Side	Quart?
77	2016-05	21	Base	
78	2016-09	P-893-b/S7/(cm**)	Base	Company mark
79	2016-10	521 WINE	Base	
		ONE PIN/2	Side	Quantity-pint?
80	2018-05	12(cm**)	Base	Company mark
81	2018-06	DISTILLING CORP/12(cm**) 90133/4D 18/EIPHIA, PA	Base	Company name: Distilling corp./? in Philadelphia, PA
82	2018-07	IF? NALLIST GOOD	Base	Company name?
83	2018-14	6G	Base	
84	2019-01	(cm**) 1/2/33-GB	Base	Company mark
85	2019-02	20 (cm**)	Base	Company mark (?)
86	2019-03	48	Base	
87	2019-05	?INE NW	Base	WINE NW? Company: NW?
88	2019-06	21 W	Base	
89	2019-07	E NT	Base	
90	2087-02	SB&G Co/1	Base	Company: SB&G Co.
91	2087-07	WASHINGTON	Base	Washington D.C?
92	2087-08	M/N 619	Base	
93	2087-09	N/N 4	Base	
94	2087-10	WI?	Base	
95	2087-11	BGIL	Base	
96	2087-12	O/WASH	Base	Washington State?
97	2087-13	WINEL	Base	
98	2087-14	LT/SCO	Base	
99	2087-21	ELLENSBURG.WASH	Base	Ellensburg, Washington
		"Coca Col/TRADE MARK REGISTER/ BOTTLE PAT. D-105529/?al/GSTED/6- FL.OZS." "48 a dot in a circle and diamond 43"	Side	Coca Cola Co, Patent, liquid quantity by ounces Like a company mark
100	2098-02	SB&G Co. 9	Base	Company: SB&G Co.,
101	2098-03	W.G.CO/1	Base	Company: W.G. Co.
102	2098-21	6R	Base	
103	2099-01	1	Base	
104	2102-02	U5	Base	
104	2101-03	PATENTED/PAT.AUG9, 1898	Base	Patented date
105	2104-05	WT.	Base	
106	2109-01	T	Base	
107	2109-10	(Unclear)	base	
108	2111-02	D-128/8(cm) 49? MADE IN U.S.A./PAT. D 95464	Base	Company mark Patent number? Made in USA
109	2113-03	621 WINE NW	Base	Company: NW
110	2113-04	6 or 9	Base	
111	2113-05	DWRA...293/Gracias	Side	
112	2113-11	(Diamond mark)	Lid	Company mark (?)
113	2136-06	PORCELAIN LINED CAP/FOR MASON FRUIT JARS	Top of lid	Mason®
		57	Back	Production date (?)
114	2139-03	N	Base	
		GSYRUP CO/CISCO CAL	Side	Company name, Made in San Francisco, CA?
115	2139-04	OF FIGS	Side	figs?
116	2139-05	BUFFALO	Side	

		Dr. P	Front	
		CA/..REMEDY'S	Other side	
117	2139-06	PIERCE/..R	Front	
118	2139-07	..WORTH/..ST/..ASH	Front	Woodworth druggist, Ellensburg, Washington?
		WT&C/C or G	Base	Company: WT&C?
119	2139-08	(cm**)	Base	Company mark
119	2148-05	W.ABBOTT&CO/PE/(A circle and diamond)	Base	W. Abbott Co, PE Company mark (?)
120	2148-18	CY/NO/HSRE	Base	Printing, unclear
121	2156-01	P	Base	
122	2156-02	4	Base	
123	2156-11	ROS	base	
124	2172-01	613	Base	
125	2172-12	F	Base	Company mark: F?
126	2172-13	F	Base	Company mark: F?
127	2172-14	J. HUNGERFORD SMT	Base	Company name: J. Hunger ford SMT
128	2174-01	C/18	Base	
129	2174-02	HILOH'S. SUMPTION/CURE	Front	
		VFLLS	Side	
130	2174-03	MOND CO/SHAMMOND/IND	Base	Shammond, IND(?)
131	2177-01	(cm**)	Base	Company mark
132	2177-02	1923W/WINE/20/(cm**)	base	Since 1923? Or production date?
133	2177-03	ONE PIN	Base	Liquid quantity?
134	2177-04	(cm**)	Side	Company mark(?)
135	2189-02	KERR GLASS MFG CO/PATENTED/ CHICAGO ILL	Base	A glass co. in Chicago, Ill
		TRADE MARK	Base	
136	2189-03	F	Base	Company mark: F
137	2192-01	1032	Base	
138	2192-03	S.G.10/9	Base	
139	2194-04	AB/35	Base	
140	2192-05	55R	Base	
141	2192-07	PATENTED/JUN. 9. '03/ JUNE 23, 03	Side	Patent date: 1903?
142	2192-13	F or T	base	
143	2194-03	Elwood/Druggist/Wash?	Front	A druggist store in Ellensburg?
		SHELDON	Base	Made in Sheldon Co?
144	2226-01	N(?)N.Y	Base	
145	2226-04	5	Base	
146	2226-05	C/ R/FIRE	Base	
147	2226-18	1	Base	
148	2227-08	PAT D SEPT.20 TH , 1898	Inside of lid	Patented date
149	2228-10	SB&G Co/9	Base	Company: SB&G Co.
150	2228-11	Co	Base	
151	2228-26	ATU	Base	
152	2228-27	ADE/MARK	Base	
153	2228-28	MENTHO/RE/TR	Side	
154	2241-05	2128-L	Base	
155	2241-06	W.B.M.CO	Base	Company: W. B. M. Co.
156	2241-09	One	Body	
157	2241-10	MINERAL WATER/NICA	Shoulder	Mineral water bottle?
158	2253-04	77	Base	

159	2253-08	THE TA../RVECO- /CINCINNAHI.O.?(cm**)	Base	Cincinnati, Ohio? Company mark
160	2256-03	SB&G Co/13	Base	Company: SB&G Co.
161	2256-04	SB&G Co/10	Base	Company: SB&G Co.
162	2256-06	20/G	Base	
163	2256-07	6R	Base	
164	2266-04	KERR GLASS MGF CO/PORTLAND.ORE	Side	A glass company in Portland, OR.
165	2266-06	SAUCE/ RS...E	Shoulder	Ingredient is sauce?
166	2268-03	W.B.M.CO	Base	Company: W.B.M.Co
		Elwood/Druggist/..rg Wash	Front	A druggist company in Ellensburg, WA
167	2268-04	1/PAT FEB 10.03	Front	Patent date 1903?
168	2268-05	2655	Base	
169	2268-14	L	Base	
170	2268-20	KD/ORK	Base	
171	2268-21	T/D	Base	
172	2268-29	R	Base	
173	2268-35	R	Base	
174	11020-01	SB7G Co13	Base	Company mark
175	11??0-01	WASHINGTON/21 56/WINE COUNCIL 4B	Base	Made in Washington State? Wine, year if 56?
176	19970-01	"6" or "9"	Base	
177	20130-01	MURINE EYE REMEDY/CHICAGO, U.S.A.	Side	Eye remedy, company name is the Murine ®, made in Chicago. IL.
178	20190-01	3/6/3	Base	
179	20290-02	Welch's	Body	Welch ®
180	20310-01	Harry S. Elwood/ Druggist/ Ellensburg Wash	Front	A druggist company in Ellensburg, WA
181	2-340-01	SANFORD'S /9	Base	Sanford ®
182	20620-01	HA/5	Base	Company mark?
183	20810-01	152	Base	
184	20810-02	S3	Base	Company logo?
		THREE IN ONE	Side	
185	20880-01	6R	Heel	
186	20990-01	BALTIMORE	Base	C.W.Abbott company in Baltimore, Maryland
		C. W. ABBOTT & Co	Side	
187	21030-01	JL &678	Base	
188	21030-02	H.J.HEINZE Co/152/pat b	Base	Heinz Company
189	21040-01	DIAMOND INK Co./MADE IN U.S.A.	Base	Diamond ®, ink bottle
190	21140-03	MADE IN U.S.A.	Side	
191	21220-01	218	Base	
192	21480-01	ECONOMY/TRADE MARK	Body	Kerr glass MFG, Portland Oregon
		KERR GLASS MFG CO/PORTLAND, ORE	Base	
193	21480-06	PHOSPHIC-CAFFEIN COMP/ ARLINGTON CHEMICAL CO/ YONKERS.N.Y	Front	Company name and location Yonkers, NY
194	21560-01	SANFORD'S/8	Base	Company name
195	21830-01	F	Base	Company mark
196	21890-01	NET CONTENTS 6OZ	Side	Volume quantity
197	21890-02	12	Side	
198	21920-01	SANFORD'S /27	Base	Company name
199	22030-01	C45/o	Base	

200	22470-01	(cm**)	Bottom	Company mark
201	22410-02	3ii	Shoulder	Volume quantity?
202	22410-03	CITATE OF MAGNESIA	Body	Magnesia
203	22410-05	SANFORD/18/39	Bottom	Different from "Sanford's"
204	22410-06	Buckeye Extract Co, OLYMPIA, WASH	Front	Company name and location of Olympia, WA.
205	22420-01	6	Front	
206	22420-02	6	Base	
207	22470-01	X.A.	Base	
208	22470-02	X.A.	Side	
209	22480-01	EL&CO	Side	Company: EL&CO
210	22530-01	CARTEPIS/95/MADE IN/U.S.A.	Base	
211	22560-01	+	Base	Mark or seam?
212	RR21-01	851	Bottom	
213	RR99-01	4 (cm**) 8/LYRIG	Bottom	Company mark and LYRIG®?
214	NO1	Lea & Perrins	Closure	Company name
215	NO2	Lea & Perrins	Closure	Company name
216	NO3	Lea & Perrins	Closure	Company name

FS* = Field Specimen Number, (cm**) = Company Mark

Table 4.08: Robber's Roost Portion Numbers (Portion # and Specimen # including FS#)

101	22480-01	135	2018-14	168	2148-03	196	2268-04	225	2155-08	253	2274-02
102	22460-01	136	2018-16	169	2019-05	197	2268-23	225	2155-06	253	2274-01
103	22470-01	137	2018-02	169	2019-06	198	2268-35	225	2155-04	254	2274-07
104	22470-02	138	2018-03	170	2019-07	199	2268-15	226	2155-05	255	2274-06
105	22500-01	139	2018-01	171	2019-17	200	2268-26	226	2155-09	256	2274-08
106	22420-01	140	2018-12	172	2019-16	201	2268-14	227	2009-03	257	2274-03
107	22420-02	140	2018-13	173	2019-03	202	2268-20	228	2009-01	258	2274-09
108	22740-01	141	2018-10	173	2019-02	202	2268-21	229	2009-05	258	2274-10
109	22530-01	142	2101-03	173	2019-01	203	2268-28	230	2009-02	258	2274-11
110	22640-01	143	2101-02	174	2019-08	204	2268-01	231	2009-06	258	2274-12
111	22560-01	144	2101-04	175	2099-27	205	2268-34	232	2009-10	259	2234-02
112	22610-01	145	2148-05	176	2099-01	206	2268-02	233	2009-09	260	2234-04
113	22610-02	146	2148-43	177	2099-03	207	2144-01	234	2009-08	261	2234-09
114	22470-01	147	2148-15	178	2099-05	208	2144-02	235	2098-04	262	2234-11
115	2194-02	148	2148-16	179	2099-04	209	2144-03	236	2098-02	263	2234-10
116	2194-03	149	2148-19	180	2099-13	210	2144-12	236	2098-05	264	2234-15
117	2194-08	150	2148-17	180	2099-09	211	2144-04	237	2098-03	265	2234-16
117	2194-05	150	2148-22	180	2099-14	212	2144-05	238	2098-11	266	2234-19
118	2194-04	151	2148-18	181	2099-06	213	2144-06	239	2098-01	267	2111-01
119	2194-07	152	2148-20	182	2099-07	214	2144-11	240	2098-13	268	2111-02
120	2194-06	153	2148-14	183	2099-10	215	2155-01	240	2098-12	269	2111-03
121	2194-10	154	2148-21	184	2099-11	216	2156-01	241	2098-14	270	2111-04
122	2248-04	155	2148-23	185	2099-16	216	2156-02	242	2098-20	271	2225-01
123	2248-03	156	2148-24	186	2099-26	216	2156-03	243	2098-21	272	2109-10
124	2248-05	157	2148-07	187	2099-22	217	2156-04	244	2098-22	272	2109-12
125	2248-06	158	2148-09	189	2268-19	218	2156-07	245	2208-04	273	2109-01
126	2248-07	159	2148-08	190	2268-03	219	2156-09	245	2208-03	274	2109-02
127	2248-01	160	2148-01	191	2268-30	220	2156-10	245	2208-02	275	2109-15
128	2248-12	161	2148-42	192	2268-22	221	2156-11	246	2208-06	276	2109-09
129	2248-17	162	2148-31	193	2268-25	222	2156-05	247	2208-08	277	2226-07
130	2018-07	163	2148-39	193	2268-24	222	2156-06	248	2208-07	277	2234-03
131	2018-06	164	2148-02	194	2268-07	222	2156-08	249	2208-09	278	2226-06
132	2018-08	165	2148-13	194	2268-06	223	2155-02	250	2208-01	278	2226-08
133	2018-05	166	2148-12	195	2268-05	223	2155-07	251	2208-05	279	2226-19
134	2018-15	167	2148-11	196	2256-02	224	2155-03	252	2274-04	280	2226-18

281	2226-04	327	1027-04	377	1063-10	428	2104-09	483	RR21-01	545	21480-08
282	2226-01	328	1027-14	378	1063-11	429	2104-03	484	20270-02	546	20930-01
283	2226-05	329	1021-01	379	1063-15	429	2104-02	485	20880-01	547	21560-03
283	2226-11	329	1017-03	380	2172-01	430	2013-10	486	11020-01	548	21560-04
284	2226-10	329	1017-01	380	2172-02	431	2013-04	487	20340-01	549	20930-02
285	2226-21	330	1017-06	381	2172-06	432	2013-06	488	20290-02	550	21940-01
285	2226-22	331	1017-08	382	2172-07	433	2013-05	489	RR99-01	551	10270-01
285	2226-23	332	1017-10	383	2172-13	434	2013-07	490	20760-01	552	21550-01
286	2226-20	333	1019-02	384	2172-14	435	2013-11	491	20620-01	553	21940-02
287	2226-34	334	1019-03	385	2172-12	436	2013-22	492	11020-02	554	21550-02
288	2266-06	335	1019-09	386	2172-26	437	2013-09	493	20810-02	555	21560-05
289	2226-12	336	1019-04	387	2172-15	438	2013-08	494	10790-01	556	21940-03
289	2228-12	337	1019-08	388	2172-18	439	2016-02	495	20690-01	557	20860-02
290	2228-10	338	1019-10	389	2174-01	440	2016-03	496	20760-02	558	2248-02
291	2228-15	339	1019-05	390	2174-07	441	2016-04	497	11770-01	559	2248-11
292	2228-03	340	2266-01	391	2174-14	442	2016-09	498	20310-01	559	2248-10
293	2228-05	340	2266-02	391	2174-13	443	2016-10	499	11010-01	560	2248-09
293	2228-04	341	2266-04	392	2174-02	444	2016-12	500	10630-01	561	2248-14
294	2228-13	342	2266-05	393	2174-03	445	2016-21	501	20810-01	562	2018-09
295	2228-11	343	2266-03	394	1067-01	447	2253-05	502	19970-01	563	2018-11
296	2228-28	344	1021-02	395	1067-02	448	2253-09	503	20130-01	564	2018-04
296	2228-26	345	1021-07	396	1067-03	449	2253-10	504	20190-01	565	2194-01
296	2228-27	346	1102-02	397	1067-14	450	2253-08	505	20990-01	566	2194-12
297	2228-17	346	1102-01	397	1067-15	451	2253-04	506	20290-01	567	2194-09
298	2228-06	346	1102-03	397	1067-13	452	2253-11	507	20270-01	568	2101-01
299	2228-21	347	2136-04	397	1067-12	453	1996-05	508	20320-01	569	2101-05
300	2001-01	348	2136-05	398	1067-08	454	1996-07	509	21420-01	570	2148-44
301	2001-03	349	2136-01	399	1067-10	455	1996-08	510	21510-01	571	2148-04
302	2001-07	350	2139-01	400	1067-09	456	1996-09	511	21480-03	572	2148-27
302	2001-06	351	2139-03	401	1067-22	457	1996-11	512	21030-02	573	2148-25
302	2001-04	352	2139-04	401	1067-23	458	1996-02	513	21480-01	574	2148-26
303	2001-05	353	2139-05	402	1067-26	459	2113-02	514	21140-03	575	2148-29
304	2001-22	354	2139-07	403	1067-20	460	2113-03	515	21030-03	576	2148-30
305	2001-23	355	2139-06	404	2256-01	461	2113-05	516	21030-01	577	2019-09
306	2001-24	356	2139-11	406	2256-06	462	2113-04	517	21830-01	578	2019-10
307	2001-25	357	2139-13	407	2256-07	463	2177-01	518	21540-01	579	2019-12
308	2001-28	358	2087-08	408	2256-04	463	2177-09	519	21480-02	579	2019-13
309	2001-29	358	2087-13	409	2256-03	463	2177-10	520	21940-04	580	2019-04
310	2001-08	358	2087-09	410	2256-05	464	2177-04	521	21740-01	581	2019-14
311	2001-20	358	2087-07	411	2256-10	465	2177-02	522	22030-01	582	2099-02
312	2001-26	358	2087-11	412	1997-14	466	2177-05	523	22410-02	583	2099-19
313	2001-02	359	2087-12	413	1997-02	467	2189-02	524	22170-01	584	2099-20
314	2001-39	360	2087-21	414	1997-05	468	2189-03	525	21830-02	585	2099-21
314	2001-36	361	1073-01	414	1997-03	469	2192-01	526	21480-05	586	2099-24
315	2001-37	362	1073-02	415	1997-10	470	2192-12	527	21920-01	587	2099-23
316	2228-09	363	1073-03	416	1997-13	471	2192-03	528	21560-01	588	2268-16
317	2227-04	364	1073-15	417	1997-25	472	2192-04	529	22410-04	589	2268-32
318	2241-03	365	1073-21	417	1997-24	473	2192-05	530	22410-05	590	2268-12
318	2241-02	365	1073-17	418	1997-12	473	2192-06	531	21220-01	591	2268-10
319	2241-06	365	1073-16	419	1997-17	474	2192-11	532	21390-01	591	2268-09
320	2241-05	366	1073-14	420	2011-06	474	2192-09	533	21480-06	592	2268-31
321	2241-10	367	1073-13	420	2011-04	474	2192-08	534	21480-04	593	2268-11
322	1051-03	368	1073-23	421	2011-03	474	2192-07	535	21290-01	594	2268-17
323	1051-01	369	1073-24	422	2011-19	474	2192-10	536	21040-01	595	2268-18
324	1027-10	370	1073-18	422	2011-13	475	1017-07	537	21360-01	596	2155-10
325	1027-13	371	1073-11	423	2011-10	476	22400-01	538	21140-01	597	2144-08
325	1027-12	372	1063-01	424	2011-12	477	22410-01	539	21340-01	598	2144-07
326	1027-11	373	1063-03	424	2013-12	478	21900-01	540	22410-06	599	2144-09
327	1027-06	374	1063-06	425	2011-15	479	22320-01	541	21560-02	600	2009-07
327	1027-01	375	1063-07	426	2011-17	480	22410-03	542	21480-07	601	2098-07
327	1027-02	375	1063-13	426	2011-18	481	21890-02	543	21550-03	602	2098-08
327	1027-03	376	1063-14	427	2104-07	482	21890-01	544	21660-01	603	2098-09

604	2098-10	647	2241-04	690	1063-05	732	2013-20	772	2174-15	816	2011-16
605	2098-16	648	2241-13	691	1063-23	733	2013-21	774	2155-11	817	2011-11
606	2098-17	649	2241-14	692	1063-24	734	2013-23	774	2155-12	818	2136-02
607	2098-23	650	2241-16	693	1063-26	735	2016-08	775	2177-03	819	2172-09
608	2234-01	650	2241-15	694	2172-08	736	2016-13	776	2113-01	820	2172-27
609	2234-05	651	2241-18	695	2172-10	737	2016-15	777	2099-15	821	2172-16
610	2234-13	652	2241-19	695	2172-11	738	2016-16	778	2099-17	822	1073-39
611	2234-14	653	2241-20	696	2172-05	739	2016-17	779	2099-12	823	1073-19
612	2234-18	654	2241-21	697	2172-19	740	2016-18	780	2099-25	824	1073-12
613	2225-03	655	2241-22	698	2172-20	741	2016-19	781	2001-38	825	1063-27
614	2225-04	656	1051-04	699	2172-21	742	2016-20	782	2001-12	826	1063-09
615	2109-14	657	1027-19	700	2172-22	743	2253-01	783	2104-08	827	1997-04
616	2226-02	658	1027-20	701	2172-24	744	2253-02	784	2104-05	828	1019-06
617	2226-03	659	1027-21	702	2172-25	745	2253-03	785	2104-06	829	1019-07
618	2226-14	660	1027-07	703	2172-28	746	2253-07	786	2013-01	830	1067-07
619	2226-15	661	1027-22	704	2172-29	747	2253-13	787	2013-15	831	1067-04
620	2226-16	662	1027-24	705	2174-04	748	2253-14	788	2013-17	832	1067-27
621	2226-24	663	1019-01	706	2174-10	749	2253-15	789	2013-16	833	1027-15
622	2226-25	664	1021-08	707	2174-11	750	2253-16	790	2087-02	834	1027-18
623	2226-28	665	1021-09	708	1067-05	751	2253-17	791	2087-18	835	1051-02
624	2226-31	666	2136-03	709	1067-06	752	2253-18	792	2087-14	836	1017-02
625	2226-33	667	2109-13	710	1067-11	753	1996-01	793	2148-33	837	1017-04
626	2228-01	668	2087-01	711	1067-18	754	1996-03	794	2148-35	838	1017-05
627	2228-02	669	2087-03	712	1067-16	756	1996-06	795	2148-36	839	1017-09
628	2228-08	670	2087-04	713	1067-17	756	1996-12	796	2148-41	840	1021-03
629	2228-18	671	2087-05	714	1067-19	757	1996-13	797	2087-15	840	1021-04
630	2228-19	672	2087-06	715	1067-24	758	1996-14	798	2139-02	840	1021-05
631	2228-20	673	2087-20	716	1997-01	759	2113-07	799	2139-10	841	1021-10
632	2228-22	674	1073-08	717	1997-09	760	2113-08	800	2139-12	842	2248-16
633	2001-15	675	1073-09	718	1997-18	761	2113-09	801	2139-08	843	2241-01
634	2001-16	676	1073-10	719	1997-19	762	2113-10	802	2016-01	844	2241-07
635	2001-17	677	1073-28	720	1997-20	763	2177-07	803	2016-05	845	2241-08
636	2001-18	678	1073-29	721	1997-21	763	2177-06	804	2016-06	846	2274-05
636	2011-08	679	1073-30	722	1997-22	763	2177-08	805	2016-11	847	2234-17
637	2001-30	680	1073-31	723	2011-07	764	2189-01	806	2109-03	848	2227-05
638	2001-31	681	1073-32	724	2011-09	765	2192-02	807	2109-11	849	2227-01
639	2227-02	682	1073-33	725	2001-14	766	2174-17	808	2109-16	850	2208-10
640	2227-03	683	1073-34	725	2011-14	766	2174-16	809	2098-06	851	2225-05
641	2227-06	684	1073-36	726	2011-20	767	2174-06	810	2098-15	852	2256-08
642	2227-07	685	1073-38	727	2104-01	768	2174-08	811	2098-18	852	2256-09
643	2227-09	686	1063-18	728	2013-02	769	2174-09	812	2098-19	853	2268-33
644	2241-09	687	1063-19	729	2013-03	770	2174-05	813	2011-01	854	2248-15
645	2241-11	688	1063-20	730	2013-18	771	2174-12	814	2011-02	855	1027-16
646	2241-12	689	1063-22	731	2013-19	772	2174-18	815	2011-05		

Note: There are 751 vessels or vessel portions; the numbers 188, 405, 446, and 773 were not used (855 - 4 - 100 [the number starts from 101] = 751)

Table 4.09: Robber's Roost Site: Vessels Refit from Different Units and/or Levels

Vessel #	FS #	Unit /level	FS #	unit/level	Differences	Combined Provenience
196	2256-02	70/06	2268-04	70/10	levels	70/04
277	2234-03	19/07	2226-07	22/07	units	19/07
289	2228-12	22/no level	2226-12	22/07	N/A (or level)	22/07
329	1017-01, 03	58/05	2021-01	58/09	levels	58/05
424	2011-12	71/01	2013-12	76/01	units	71/01
636	2001-18	23/01	2011-08	07/01	units	07/01
725	2004-14	23/01	2011-14	71/01	units	23/01

Note: Combined Provenience is the provenience assigned to the refit vessel for further analysis.

Table 4.10: Robber's Roost MNV, Level and Portion Distribution

Level	Complete	Base	Lip	Rim	MNV
1	3	64	38	4	67
2	16	28	26	4	46
3	9	42	34	9	52
4	17	20	13	1	37
5	12	39	23	6	51
6	9	47	24	6	56
7	20	72	49	12	92
8	1	5	2	1	6
9	2	10	2	2	12
10	0	17	8	1	17
N/A	7	23	16	7	30
Total	96	367	235	53	463*

* Total MNV for the site is 463 (96 complete preserved vessels + 367 base portions). If one added all level MNV values, the site MNV would be 466, but this is not done, in order to avoid the aggregation effects noted by Grayson (1984).

Table 4.11: Robber's Roost Color and Portion Distribution

Level	Complete	Base	Lip	Rim	MNV
Aqua	11	25	23	0	36
Amethyst	6	20	20	2	28
Brown	6	69	52	1	75
Colorless	61	213	114	45	274
Green	5	19	9	1	24
Light Green	6	8	10	1	17
White	1	4	4	3	8
Other	0	3	3	0	3
Total	96	367	235	53	463**

** the same notes as above (Table 4.10).

Table 4.12: Robber's Roost Base Profile Variation (by MNV)

Line #	Vessel Base Profile Type by IMACS (1992)	Mold	Machine	N/A	Total
01	Beveled ideal	1	0	0	1
02	Blake (variant 1)	10	1	1	12
03	Buffalo/Philadelphia oval	6	3	2	11
04	Concave	1	1	0	2
05	Elixir/handy	7	5	5	17
	Elixir/handy or Buffalo/Philadelphia oval	0	0	1	1
	Elixir/handy or slender handy	3	0	0	3
	Elixir/handy/ Excelsior, Windsor oval	0	0	1	1
06	Excelsior, Windsor oval/round cornered Blake	6	0	0	6
07	French square	7	0	1	8
	French square or Blake (variant 1)	2	1	0	3
08	Hopkins square	2	1	0	3
	Hopkins square or excelsior/Windsor oval/round cornered Blake	2	0	0	2
09	Hub/golden gate oval	2	2	0	4
	Hun/golden gate oval or Buffalo/Philadelphia oval	1	0	0	1
10	Monarch/ Erie oval	1	1	0	2
11	Oval	2	0	1	3
12	Plain oval	11	4	3	18
	Plain oval or elixir/handy	0	0	1	1
	Plain oval or Buffalo/Philadelphia oval	0	0	1	1
13	Polygon	0	1	0	1
14	Round	49	120	140	309
15	Salamander oval	0	1	0	1
	Salamander oval or plain oval	0	1	0	1
16	Slender handy	4	0	0	4
17	Square concave	0	3	1	4
	Total	117	145	158	420

Mold and Machine are manufacturing technologies, N/A = manufacturing method unknown.

Table 4.13: The Robber's Roost Lip Profile Variation (by MNV)

Line #	Vessel Lip Profile Type by IMACS (1992) and Lindsey 2007a	Mold	Machine	N/A	Total
01	Bead	24	6	4	34
02	Blob	1	1	0	2
03	Brandy/wine	10	3	0	13
04	Champagne	6	8	2	16
05	Crown	10	33	3	46
06	Double oil	1	0	0	1
07	Double ring	10	7	1	18
08	English ring/deep ring	6	0	1	7
09	Flare/trumpet	0	0	1	1
10	Flared ring	1	1	0	2
11	Flat/patent	40	7	27	74
12	Grooved ring	2	0	0	2
13	Prescription	17	1	1	19
14	Ring/oil	18	0	0	18
15	Sheared/blow over	3	4	5	12
16	Small mouth external thread	3	35	2	40
17	Stacked ring	2	1	0	3
18	Straight brandy/wine	3	1	1	5
19	Wide mouth external thread	1	13	2	16
	Total	158	121	50	329

Mold and Machine are manufacturing technologies, N/A = manufacturing method unknown.

Table 4.14: The Robber's Roost Site, Manufacturing Technology

Level	Complete Vessels Manufacturing Technology								Lip Frag. Manufacturing Technology					
	cup:a	cup:t	po:a	po:t	sum	mach.	N/A	Total	app.	tool.	sum	mach.	N/A	Total
1	0	3	0	0	3	0	0	3	0	8	8	27	4	39
2	0	6	0	0	6	8	2	16	0	4	4	15	7	26
3	0	1	0	0	1	7	1	9	0	11	11	17	6	34
4	0	8	0	1	9	3	5	17	0	11	11	0	2	13
5	0	5	0	0	5	5	2	12	1	11	12	6	4	22
6	0	6	0	2	8	1	0	9	0	15	15	5	4	24
7	1	7	0	1	9	2	9	20	1	34	35	7	7	49
8	0	1	0	0	1	0	0	1	0	1	1	1	0	2
9	0	2	0	0	2	0	0	2	0	1	1	1	0	2
10	0	0	0	0	0	0	0	0	0	5	5	2	0	7
N/A	0	2	0	0	2	5	0	7	0	10	10	6	1	17
Total	1	41	0	4	46	31	19	96	2	111	113	87	35	235

cup: a = cup bottom mold + applied lip, cup:t = cup bottom mold + tooled lip, po:a = post bottom mold + applied lip, po:t = post bottom mold + tooled lip, mach. = machine made, app. = applied lip, tool. = tooled lip, Lip Frag = Fragment. Manufacturing technology refers to Sutton and Arkush 2002: 189; Lindsey 2007a

Table 4.15: The Robber's Roost Site, Mold Blown vs. Machine-Made Distribution

Level	Mold Blown			Machine			Total	% of Mold Blown Glass
	Comp. ¹⁾	Lip Frag. ²⁾	Sum	Comp. ¹⁾	Lip Frag. ²⁾	Sum		
1	3	8	11	0	27	27	38	28.9
2	6	4	10	8	15	23	33	30.3
3	1	11	12	7	17	24	36	33.3
4	9	11	20	3	0	3	23	87.0
5	5	12	17	5	6	11	28	60.7
6	8	15	23	1	5	6	29	79.3
7	9	35	44	2	7	9	53	83.0
8	1	1	2	0	1	1	3	66.7
9	2	1	3	0	1	1	4	75.0
10	0	5	5	0	2	2	7	71.2
N/A	2	10	12	5	6	11	23	52.2
Total	46	113	159	31	87	118	277	57.4

Comp. ¹⁾ = Complete preserved vessels. Lip Frag. ²⁾ = Lip portion of vessels.

Table 4.16: Robber's Roost Glass Function by Vessel Portion

Function/Drinking	Total	Level					
		01,02	03,04	05, 06	07,08	09,10	N/A
Liquor (flask)	49(30)	11(2)	11(8)	5(4)	15(12)	1	6(4)
Wine/champagne	22	13	1	3	4	0	1
Beer/ale	47	18	5	10	5	2	7
Alcohol Sub-Total	118	42	17	18	24	3	14
Soda/mineral	47	8	10	8	2	4	5
Carbo.beverage*	12	5	2	5	0	0	0
Non carob. Beverage**	2	0	1	0	1	0	0
Sub-Total	51	13	13	13	3	4	5
Sub-Total	169	55	30	31	27	7	19
Containers							
Condiments	13	2	2	4	4	1	0
Food containers	3	1	1	1	0	0	0
Unknown Jar	44	14	9	10	7	3	1
Sub-Total	60	17	12	15	11	4	1
Tableware							
Bowls	12	2	3	3	3	1	0
Plates	10	4	1	3	2	0	0
Tumblers	66	11	7	17	23	5	3
Mugs	4	2	0	0	2	0	0
Stem-ware	2	0	0	1	1	0	0
Pitchers	2	0	0	1	1	0	0
Sub-Total	96	12	11	25	32	6	3
Medicine Bottles	110	20	28	22	26	6	8
Household bottles							
Lubrication oil	1	1	0	0	0	0	0
Vaseline	2	0	0	1	0	1	0
Perfume/toiletry	3	1	0	0	1	1	0
Glue	1	0	1	0	0	0	0
Cosmetic/ointment	4	0	1	2	0	0	1
Ink	11	3	4	3	1	0	0
Sub-Total	22	5	6	6	2	7	1
Total	457	116	87	99	89	25	32

Carbo.beverage* = carbonated beverage, Non-carbo. Beverage** = non-carbonated beverage

Table 4.17: Robber's Roost Site, Homeopathic Vials

Line #	Vessel Portion #	FS #	Height (millimeter)	Diameter (millimeter)	Drams (8 drams = 1 ounce)
01	115	2194-02	78.3	12.9	1.5
02	187	2099-22	44.7	14.3	1
03	541	21560-02	75.9	14.2	1.5
04	542	21480-07	83.3	13.7	2
05	543	21550-03	75.6	13.8	1.5
06	544	21660-01	77.1	13.0	1.5
07	545	21480-08	78.2	12.5	1.5
08	546	20930-01	76.6	12.6	1.5
09	547	21560-03	82.8	13.1	2
10	548	21560-04	75.3	13.3	1.5

11	549	20930-02	77.0	13.1	1.5
12	550	21940-01	78.3	12.6	1.5
13	551	10270-01	78.3	12.7	1.5
14	552	21550-01	82.5	13.3	2
15	553	21940-02	77.7	12.7	1.5
16	554	21550-02	75.4	14.2	1.5
17	555	21560-05	82.3	13.4	2
18	556	21940-03	47.5 (+)	13.0	N/A
19	557	20860-02	57.4	18.8	2

(+) = glass shard

Table 4.18: Robber's Roost Glass Manufacturing Companies and Distributors

Line#	Glass Company Name	Location	Business Period	Comments (Vessel #)	Sum
01	A.H. Heisey Glass Co.	Newark, OH	ca. 1900-1958	463	1
02	Buckeye Extract Co.	Olympia, WA	1903-	540	1
03	California Fig Syrup Co.	San Francisco, CA	1897-	351	1
04	Chesebrough Mfg Co.	New York, NY	1908-1911	329	1
05	C. W. Abbott & Co.	Baltimore, MD	?	145, 505	2
06	C. W. Cole Co.	Asbury Park, NJ	1894-1904	493	1
07	Diamond Ink Co.	Milwaukee, WI	?	536	1
08	Foster-Forbes Glass Co.	Marion, IN	1929-	228	1
09	Hazel-Atlas Glass Co.	Wheeling, WV.	1920-1964	333, 491	2
10	H.J. Heinz Co.	Sharpsburg, PA	c.1888	512	1
11	Illinois' Glass Co.	Alton, IL	1873-1929	114, 142, 484, 489, 535	5
12	Kerr Glass Manufacturing Co.	Chicago, IL	1909-1912	467	1
13	Kerr Glass Manufacturing Co.	Portland, OR	1904-1909	341, 513	2
14	Lea & Perrins Co.	Worcester, UK or NJ, US	1839-	N/A (closures not vessels)	(4)
15	Murine Eye Remedy Co.	Chicago, IL	1890s-	503	1
16	Nalley's Co.	Tacoma, WA	1918-	130	1
17	Northwestern Glass Co.	Seattle, WA	1931-1973	169, 170, 307, 308, 358, 460	6
18	Owen-Illinois Co. (Inc)	Toledo, OH	1929-	133, 359, 360, 365, 436, 442, 504, 827	8
19	Owens-Illinois, Pacific Coast Co.	San Francisco, CA	1943-	173, 301, 330, 361, 364, 370, 838,	7
20	Phospho-Caffein Comp. Arlington Chemical Co.	Yonkers, N.Y	Late 1800s or 1913	533	1
21	Sanford Co.	Chicago, IL or Bellwood, IL	1857 (or 1866)	272, 487, 527, 528, 530	5
22	Sheldon-Foster Glass Co.	Chicago, IL	1895-1913	116	1
23	Streator Bottles & Glass Co.	Streator, IL	1881-1905	236, 290, 346, 408, 409, 486	6
24	William Franzen & Son	Milwaukee, WI	1900-1929	417	1
25	T.A. Snider reserve Co.	Cincinnati, OH	1884-1923	450	1
26	Thatcher Glass Manufacturing Co.	Elmira, NY	1900-1985	268, 304, 305, 306	4
27	Welch's Co.	Vineland, N.J	1869-	488	1
28	Western Bottle & Glass Co.	Chicago, IL	1901-1930	190, 319	2
29	Whitall – Tatum & Co.	Millville, NJ	1857-1901	354	1
30	W. J. Latchford Glass Co or Latchford Glass Co.	Los Angeles, CA	1925-1938 1957	201	1
31	Wightman Glass Co.	Parker's Landing, PA	1900-1930	237	1
	Total				68

Table 4.19: Glass Manufacturing Company or Distributor Locations

Line #	State (# of companies)	Company name (number of vessels)	Sum of vessels
01	CA (3)	California Fig Syrup Co.(1) Owens-Illinois, Pacific Coast Co. (7) W.J. Latchford Glass Co. or Latchford Glass Co. (1)	9
02	IL (7)	Illinois Glass Co. (5) Kerr Glass Manufacturing Co. (1) Murine Eye Remedy Co. (1) Sanford Co. (5) Sheldon-Foster Glass Co. (1) Streator Bottles & Glass Co. (6) Western Bottle & Glass Co. (2)	21
03	IN (1)	Foster-Forbes Glass Co. (1)	1
04	MD (1)	C.W. Abbot t& Co. (2)	2
05	NJ (3)	C.W. Cole Co. (1) Welch's Co. (1) Whitall-Tatum Co. (1)	3
06	NY (3)	Chesebrough Mfg Co. (1) Phospho-Caffein Co., Arlington Chemical Co. (1) Thatcher Glass Manufacturing Co. (4)	6
07	OH (3)	A. H. Heisey Glass Co. (1) Owens-Illinois Co., or Inc. (8) T.A. Snider Reserve Co. (1)	10
08	OR (1)	Kerr Glass Manufacturing Co.(2)	2
09	PA (2)	H.J.Heinz Co. (1) Wightman Glass Co. (1)	2
10	WA (3)	Buckeye Extract Co. (1) Nalley's Co. (1) Northwestern Glass Co. (6)	8
11	WI (2)	Diamond Ink Co. (1) William Franzen & Son (1)	2
12	WV (1)	Hazel-Atlas Glass Co. (2)	2
	Total	Western US = 7 companiles, Eastern US = 23 companies	68

Table 4.20: Robber's Roost Site Excavation Level Age Estimation From Company Marks from the "Undisturbed" Sample

Level	Age Estimation	Manufacturing period (Vessel portion numbers)
01	1940-1970	1929- (228), 1931-1973 (307,308, 358), 1954 - (365, 436), 1970 (301, 361, 370), 1967 (364), 1890- (503), 1900 or 1946 – 1985 (304, 305, 306), 1929 - 1954 (359) 1937- (360)
02	1920-1940	1857 - (530), 1869 - (488), 1903 - (540), 1901 – 1930 (319), 1931 – 1973 (460), 1954- (442)
03	1910-1920	1857 - (487), 1900 – 1958 (463)
04	1900-1920	1857 - (527), 1899 – 1936 (116), 1909 – 1912 (467)
05	1880-1900	1881 – 1905 (236), 1900 – 1930 (237), 1869 - (512), 1946 – 1985 (268), 1857-(272)
06	1880-1900	1900 - 1905 (346), 1884 – 1923 (450), 1889 – 1893 (354), 1881 – 1905 (408, 409, 486), 1889- (351)
07	1868-1900	1857 - (528), 1904-1909 (341)
08		0
09		0
10		0

() = Vessel portion #, the "Undisturbed" sample = all excavation units, except units 5-8 and 55-58.

Table 4.21: Glass Manufacturing Technology from the “Undisturbed” Sample

Level	Mold Blown			Machine			Total	% of Mold Blown Glass
	Comp.	Lip Frag.	Sum	Comp.	Lip Frag.	Sum		
01	2	8	10	1	27	28	38	26.3
02	4	4	8	6	11	17	25	32.0
03	2	7	9	5	11	16	25	36.0
04	8	11	19	3	0	3	22	86.4
05	5	9	14	3	6	9	23	60.9
06	5	11	16	1	5	6	22	72.7
07	1	26	27	2	4	6	33	81.8
08	0	1	1	0	1	1	2	50.0
09	2	1	3	0	0	0	3	100
10	0	0	0	0	0	0	0	N/A
Total	29	78	107	21	65	86	193	55.4

Comp. = Complete preserved vessels, Lip Frag. = Lip portion of vessels. the “Undisturbed” sample = all excavation units, except units 5-8 and 55-58.

Table 4.22: Robber’s Roost Site, Vessel Function from the “Undisturbed” Sample by Portion

Function/Drinking	Total	Level										
		01	02	03	04	05	06	07	08	09	10	N/A
Liquor	38	7	2	3	6	2	1	10	0	1	0	6
Wine/champagne	19	8	3	1	0	1	2	3	0	0	0	1
Beer/ale	41	12	5	0	3	5	5	3	0	1	0	7
Alcohol	98	27	10	4	9	8	8	16	0	2	0	14
Sub-Total (%)	(27.7)	(43.5)	(24.3)	(13.3)	(29.0)	(19.0)	(19.5)	(30.2)	(0)	(28.8)	(0)	(43.8)
Soda/mineral	44	8	3	8	3	7	5	2	0	1	2	5
Sub-Total	142	35	13	12	12	15	13	18	0	3	2	19
Eating												
Condiments	10	0	2	0	1	2	1	2	1	1	0	0
Food containers	1	0	0	0	0	0	1	0	0	0	0	0
Unknown Jar	35	7	6	4	2	6	3	4	1	0	1	1
Sub-Total (%)	46	7	8	4	3	8	5	6	2	1	1	1
Tableware												
Bowls	9	1	0	1	1	1	2	3	0	0	0	0
Plates	9	2	2	0	0	2	1	1	1	0	0	0
Tumblers	47	8	3	3	2	2	13	9	1	1	2	3
others	7	1	1	0	0	0	1	2	2	0	0	0
Sub-Total (%)	72	12	6	4	3	5	17	15	4	1	2	3
Medicine Bottles	76	7	11	6	12	10	5	12	1	1	3	8
Household Bottles												
others	8	0	1	2	0	2	0	1	0	1	0	1
Ink	10	1	2	2	1	2	1	1	0	0	0	0
	18	1	3	4	1	4	1	2	0	1	0	1
Total	354	62	41	30	31	42	41	53	7	7	8	32
Age Estimation		1940-1970	1920-1940	1910-1920	1900-1920	1880-1900	1880-1900	1868-1900				

“Undisturbed” sample = all excavation units, except units 5-8 and 55-58.

Table 4.23: Robber's Roost Site, Kittitas County and Ellensburg Population

Date	Estimated Population				
	Washington	Kittitas County	Ellensburg	Cle Elum	Roslyn
1890	357,232	8,777	2,768	-	1,484
1900	518,103	9,704	1,737	-	2,786
1910	1,141,990	18,561	4,269	2,749	3,126
1920	1,356,621	17,737	3,967	2,661	2,673
1930	1,563,396	18,154	4,621	2,638	2,063
1940	1,736,191	20,230	5,944	2,230	1,743
1950	2,378,963	22,235	8,430	2,206	1,537
1960	2,853,214	20,467	8,625	1,816	1,283
1970	3,409,169	25,037	13,568	1,725	1,031

Compiled from Painter (1973:25,72).

Table 5-01: The Sorenson Site Glass Specimens

FS #	Color*	Part**	Base Profile (IMACS)	Finish Profile (IMACS)	Technology Base	Technology finish	Vessel #	Glass Function	Comments
01	C	C	Blake (variant1)	prescription	Cup bottom mold	Tooled	5001	Medicine	A cork inside, mark with a Chinese fun
02	AM	C(a)	Round	(rim)	N/A	N/A	5002	Tumbler	Pattern horseshoe with a star on bottom, inward shape, uniformed thickness
03	C	C	Blake (variant1)	Flat/patent	Cup bottom mold	Tooled	5003	Condiment bottle	All panes were convex, large neck, a ring on neck
04	C	C(a)	Blake (variant1)	Flat/patent	Cup bottom mold	Tooled	5004	Condiment bottle	three panes were convex, large neck, a ring on neck
05	LG	L	N/A	Crown	N/A	Tooled	5005	Carbonated beverage	Neck shape is bulged, small bubbles,
06	A	Ld	N/A	N/A	N/A	N/A	5006	Lid (liner type)	Sealed with a metal, diameter = 76.2mm
07	Y	N/A	N/A	N/A	N/A	N/A	5007	N/A	Pattern, round shape? Not bottle or lid.
08	C	B	N/A	N/A	N/A	N/A	5008	N/A	Curving shape, refit with FS09,
09	C	B	N/A	N/A	N/A	N/A	5008	N/A	Curving shape, refit with FS08,
10	C	B	N/A	N/A	N/A	N/A	5009	N/A	Flat front and side is curving shape, thin and fine uniform.

Color* A = Aqua, AM = Amethyst, C= Colorless, LG = Light Green, Y = Yellow.

Part** C = complete preserved vessel, C (a) = almost complete preserved vessel, L = lip portion, Ld = lid, B = body portion.

Table 6.01: Glass Manufacturing Companies and Distributors from All Three Sites

Line#	Glass Company Name	Location	Business Period	Comments (Vessel #)	Sum
01	A.H. Heisey Glass Co.	Newark, OH	ca. 1900-1958	463	1
02	Buckeye Extract Co.	Olympia, WA	1903-	540	1
03	California Fig Syrup Co.	San Francisco, CA	1897-	351	1
04	Chesebrough Mfg Co.	New York, NY	1908-1911	329	1
05	Cohansey Glass Manufacturing Co.	Philadelphia, PA	1870-1900	5006	1
06	C. W. Abbott & Co.	Baltimore, MD	?	145, 505	2
07	C. W. Cole Co.	Asbury Park, NJ	1894-1904	493	1
08	Diamond Ink Co.	Milwaukee, WI	?	536	1
09	Dr. Price's Delicious Flavoring Extracts	Chicago, IL	1875-	08, 10	2
10	Foster-Forbes Glass Co.	Marion, IN	1929-	228	1
11	Hazel-Atlas Glass Co.	Wheeling, WV	1920-1964	333, 491	2
12	H.J. Heinz Co.	Sharpsburg, PA	1888-	512	1
13	Illinois' Glass Co.	Alton, IL	1873-1929	114, 142, 484, 489, 535	5
14	Kerr Glass Manufacturing Co.	Chicago, IL	1909-1912	467	1
15	Kerr Glass Manufacturing Co.	Portland, OR	1904-1909	341, 513	2
16	Lea & Perrins Co.	Worcester, UK or NJ, US	1839-	N/A (closures not vessels)	4
17	Maryland Glass Co.	Baltimore, MD	1916-	39	1
18	Murine Eye Remedy Co.	Chicago, IL	1890s-	503	1
19	Nalley's Co.	Tacoma, WA	1918-	130	1
20	Northwestern Glass Co.	Seattle, WA	1931-1973	169, 170, 307, 308, 358, 460	6
21	Owen-Illinois Co. (Inc)	Toledo, OH	1929-	133, 359, 360, 365, 436, 442, 504, 827	8
22	Owens-Illinois, Pacific Coast Co.	San Francisco, CA	1943-	173, 301, 330, 361, 364, 370, 838,	7
23	Phospho-Caffein Co. Arlington Chemical Co.	Yonkers, NY	Late 1800s or 1913	533	1
24	Sanford Co.	Chicago, IL or Bellwood, IL	1857 (or 1866)	272, 487, 527, 528, 530	5
25	Sheldon-Foster Glass Co.	Chicago, IL	1895-1913	116	1
26	Streator Bottles & Glass Co.	Streator, IL	1881-1905	236, 290, 346, 408, 409, 486	6
27	William Franzen & Son	Milwaukee, WI	1900-1929	417	1
28	T.A. Snider Reserve Co.	Cincinnati, OH	1884-1923	450	1
29	Thatcher Glass Manufacturing Co.	Elmira, NY	1900-1985	268, 304, 305, 306	4
30	Welch's Co.	Vineland, NJ	1869-	488	1
31	Western Bottle & Glass Co.	Chicago, IL	1901-1930	190, 319	2
32	Whitall - Tatum & Co.	Millville, NJ	1857-1901	09, 354, 5001	3
33	W. J. Latchford Glass Co or Latchford Glass Co.	Los Angeles, CA	1925-1938 1957-	201	1
34	Wightman Glass Co.	Parker's Landing, PA	1900-1930	237	1
	Total				78

Sources for name, place, and business period: Bethman 1991, Fike 1987, Lea & Perrins n.d., Lindsey 2007d, Munsey 1970, Nalley's n.d., Newell 1975, Ring 1980, Sanford Company n.d., Toulouse 1972, WD 40 Company n.d., Whitten 2005a, Zumwalt 1980. Note that vessel or portion # indicates site (<100 = Grissom; 101-1,000 = Robber's Roost; > 5000 = Sorenson Site).

Table 6.02: Glass Manufacturing Location from All Three Sites

State	E or W state	Company name (Count MNV)	Sum of vessels
CA	W	Owens-Illinois, Pacific Coast Co. (7) W.J. Latchford Glass Co. or Latchford Glass Co. (1)	8
IL	E	Streator Bottles & Glass Co. (6) Western Bottle & Glass Co. (2) Kerr Glass Manufacturing Co. (1) Illinois Glass Co. (5) Sheldon-Foster Glass Co. (1)	15
MD	E	Maryland Glass Co. (1)	1
IN	E	Foster-Forbes Glass Co. (1)	1
NJ	E	Whitall-Tatum Co. (3)	3
NY	E	Thatcher Glass Manufacturing Co. (4)	4
OH	E	A. H. Heisey Glass Co. (1) Owens-Illinois Co., or Inc. (8) T.A. Snider Reserve Co. (1)	10
OR	W	Kerr Glass Manufacturing Co.(2)	2
PA	E	Cohansey Glass Manufacturing Co.(1) H.J.Heinz Co. (1) Wightman Glass Co. (1)	3
WA	W	Northwestern Glass Co. (6)	6
WI	E	William Franzen & Son (1)	1
WV	E	Hazel-Atlas Glass Co. (2)	2
Total		Western US = 4 companies, Eastern US = 17 companies	56

Table 6.03: Glass Manufacturing Companies from the Undisturbed Units only at the Robber's Roost Site

Line #	Glass Manufacture Name (Vessel portion #)	Location	Operation Period
01	A. H. Heisey Glass Co. (463)	OH	ca. 1900-1958
02	Foster-Forbes Glass Co. (228)	IN	1929-
03	H.J.Heinz Co. (512)	PA	1869- (1888-)
04	Kerr Glass Manufacturing Co. (467)	IL	1909-1912
05	Kerr Glass Manufacturing Co. (341)	OR	1904-1090
06	Northwestern Glass Co. (169, 170, 307, 308, 358, 460)	WA	1931-1973
07	Owens-Illinois Co., or Inc. (359, 365, 436, 442)	OH	1929-
08	Owens-Illinois, Pacific Coast Co. (301, 361, 364, 370)	CA	1943-
09	Sheldon-Foster Glass Co. (116)	IL	1895-1913
10	Streator Bottles & Glass Co. (236, 346, 408, 409, 486)	IL	1881-1905
11	T.A. Snider Reserve Co. (450)	IL	1884-1923
12	Thatcher Glass Manufacturing Co. (268, 304, 305, 306)	NY	1900 (or 1949)-1985
13	Western Bottle & Glass Co. (319)	IL	1901-1930
14	Whitall-Tatum Co.(354)	NJ	1857-1938
15	Wightman Glass Co. (237)	PA	1900-1930
	3 western Companies, 12 eastern companies, sample size = 33		

Table 6.04: the Robber's Roost Site Undisturbed Units and Glass Manufacturing Companies

Level	Vessel #	Company Name from Western State	Manufacturing date	Company Name from Eastern State	Manufacturing date
01	228			Foster-Forbes Glass Co., Marion, IN	1929-
	301	Owens-Illinois, Pacific Coast Co., San Francisco, CA	1970		
	304			Thatcher Glass manufacturing Co., Elmira, NY	1900 or 1949-1985
	305			Thatcher Glass manufacturing Co., Elmira, NY	1900 or 1949-1985
	306			Thatcher Glass manufacturing Co., Elmira, NY	1900 or 1949-1985
	307	Northwestern Glass Co., Seattle, WA	1931-1973		
	308	Northwestern Glass Co., Seattle, WA	1931-1973		
	359			Owens-Illinois Glass Co., Toledo, OH	1929-1954
	361	Owens-Illinois, Pacific Coast Co., San Francisco, CA	1970		
	364	Owens-Illinois, Pacific Coast Co., San Francisco, CA	1967		
	365			Owens-Illinois Glass Co., Toledo, OH	1954-
	370	Owens-Illinois, Pacific Coast Co., San Francisco, CA	1970		
	436			Owens Illinois Glass Co., Toledo, OH	1954-
02	169	Northwestern Glass Co., Seattle, WA	1931-1973		
	170	Northwestern Glass Co., Seattle, WA	1931-1973		
	319			Western Bottle Manufacturing Co., Chicago, IL	1901-1930
	358	Northwestern Glass Co., Seattle, WA	1931-1973		
	442			Owens-Illinois Glass Co., Toledo, OH	1954-
	460	Northwestern Glass Co., Seattle, WA	1931-1973		
03	463			A.H. Heisey Glass Co., Oakwood Ave., Newark OH	1900-1958
04	116			Sheldon Foster Co., Chicago, IL	1895-1913
	467			Kerr Glass Manufacturing Co., Chicago IL	1909-1912
05	236			Streator Bottle & Glass Co., Streator, IL	1881-1905
	237			Wightman Glass Co., Parker's Landing, PA	1900-1930
	268			Streator Bottle & Glass Co., Streator, IL	1881-1905
	512			H.J.Heinz Co., Sharpsburg, PA	1888-
06	346			Streator Bottle & Glass Co., Streator, IL	1881-1905
	354			Whiteall-Tatum Co., Millville, NJ	1857-1938
	408			Streator Bottle & Glass Co., Streator, IL	1881-1905
	409			Streator Bottle & Glass Co., Streator, IL	1881-1905
	450			T.A. Snider Preserve Co., Cincinnati, OH., 1884-?; Chicago, IL ?-1923	1884-1923
	486			Streator Bottle & Glass Co., Streator, IL	1881-1905
07	341	Kerr Glass Manufacturing Co., Portland, OR ¹	1904-1909		
08	N/A				
09	N/A				
10	N/A				
Total		11 vessels, 3 companies		22 vessels, 12 companies	

Sources for name, place, and period: Bethman 1991; Lindsey 2007d; Toulouse 1972; Whitten 2005a.

¹ The company headquarters was in Portland, but the factory could have been in the eastern or western U.S. See text.

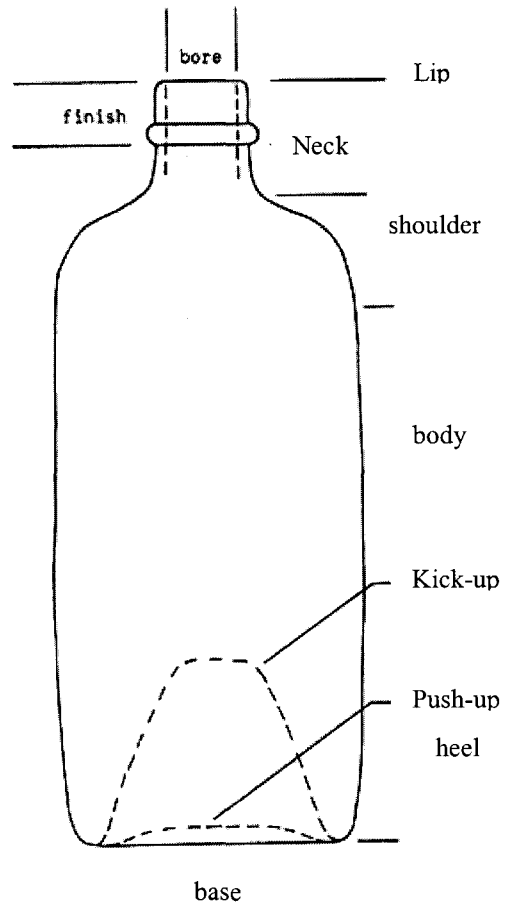


Figure 2.01: Bottle Morphology. Modified from IMACS (1992:2)

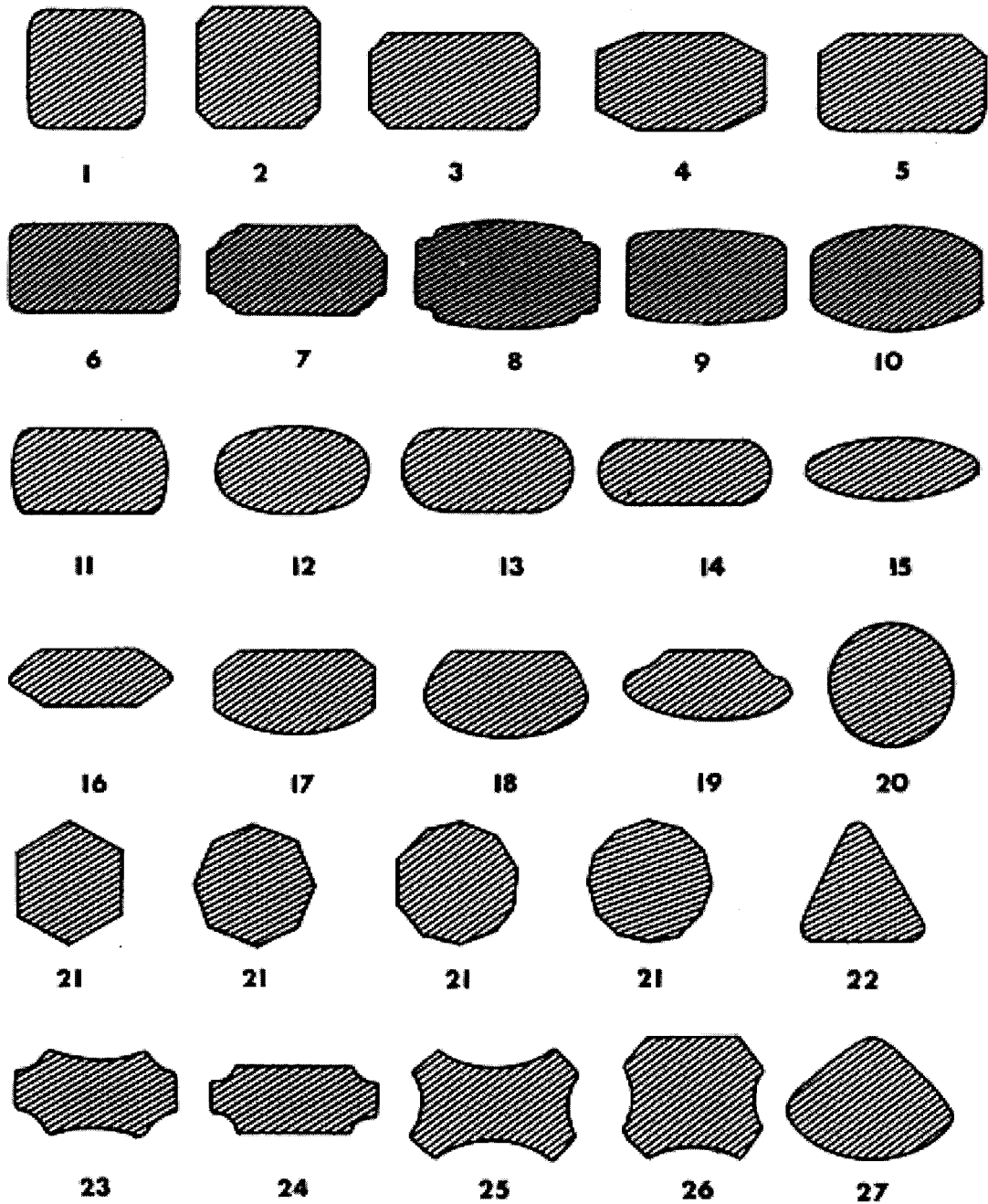


Figure 2.02: Base Profiles (IMACS 1992:4).

Key: 1. Hopkins square 2. French square 3. Blake (variant 1) 4. Blake (Variant 2) 5. Beveled ideal 6. Excelsior, Windsor oval or round cornered Blake 7. Oblong prescription: 8. Union oval 9. Crown 10. Salamander oval 11. Monarch or Erie oval 12. Plain oval 13. Elixir or handy 14. Slender handy 15. Oval 16. Irregular polygon 17. Hub or golden gate oval 18. Buffalo or Philadelphia oval 19. Clamshell 20. Round 21. Polygon 22. Triangle 23. Fluted oblong (Variant 1) 24. Fluted oblong (variant 2) 25. Concave 26. Fluted square 27. Spherical triangle

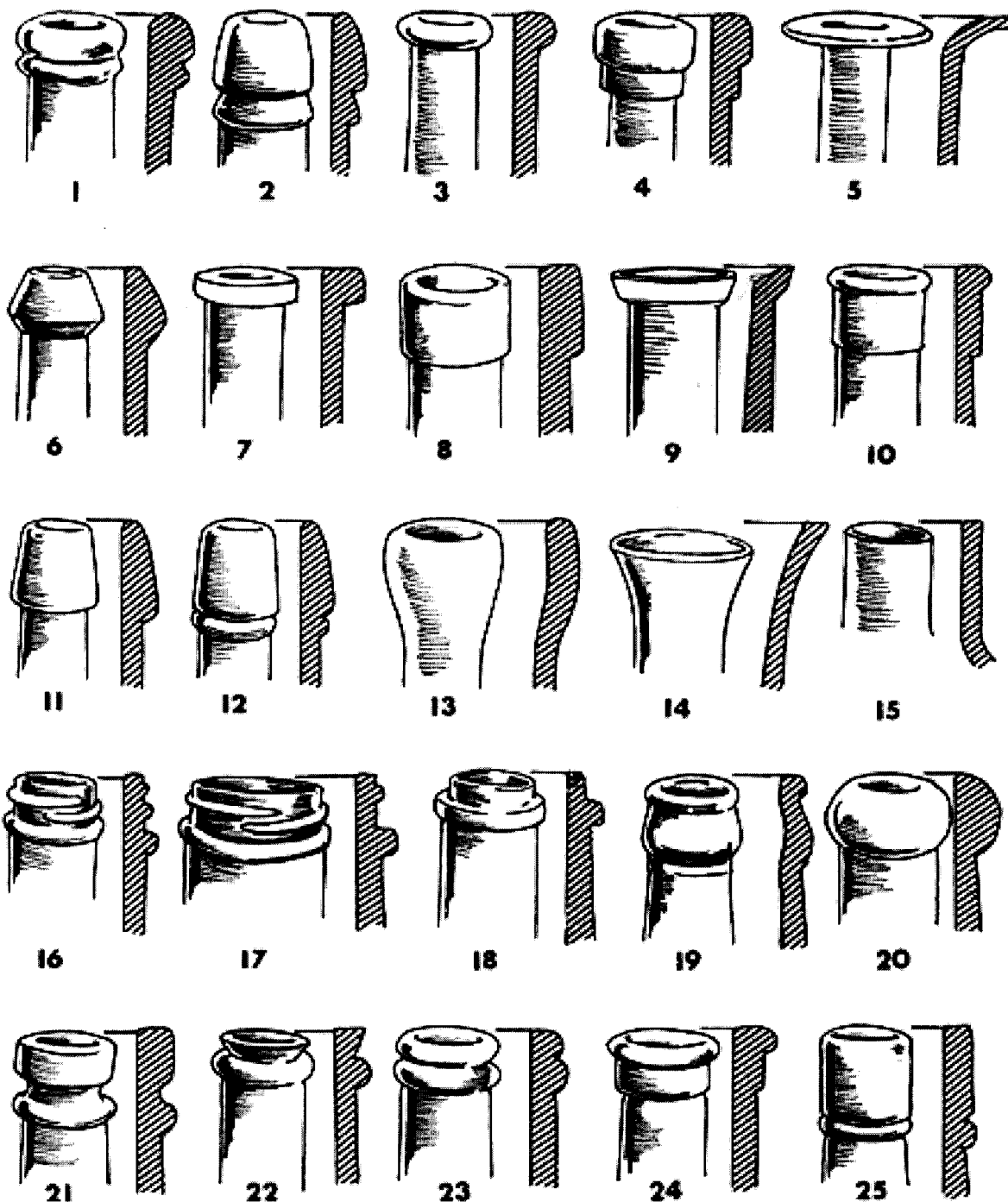


Figure 2.03: Bottle Neck Finish Profiles (IMACS 1992:3).

Key: 1. Double ring 2. Double oil or mineral 3. Bead 4. Stove pipe 5. Wide prescription 6. Sheared ring (occasionally ground) 7. Flat or patent 8. English ring, deep lip or packer 9. Prescription 10. reinforced extract 11. ring or oil 12. Wince or brandy 13. Global flare 14. Flare or trumpet 15. sheared or blow over (usually ground) 16. Small mouth external thread 17. Wide mouth external thread 18. Champagne 19. Crown 20. Blob 21. Grooved ring 22. Flared ring 23. stacked ring 24. collared ring 25. Straight brandy or wine

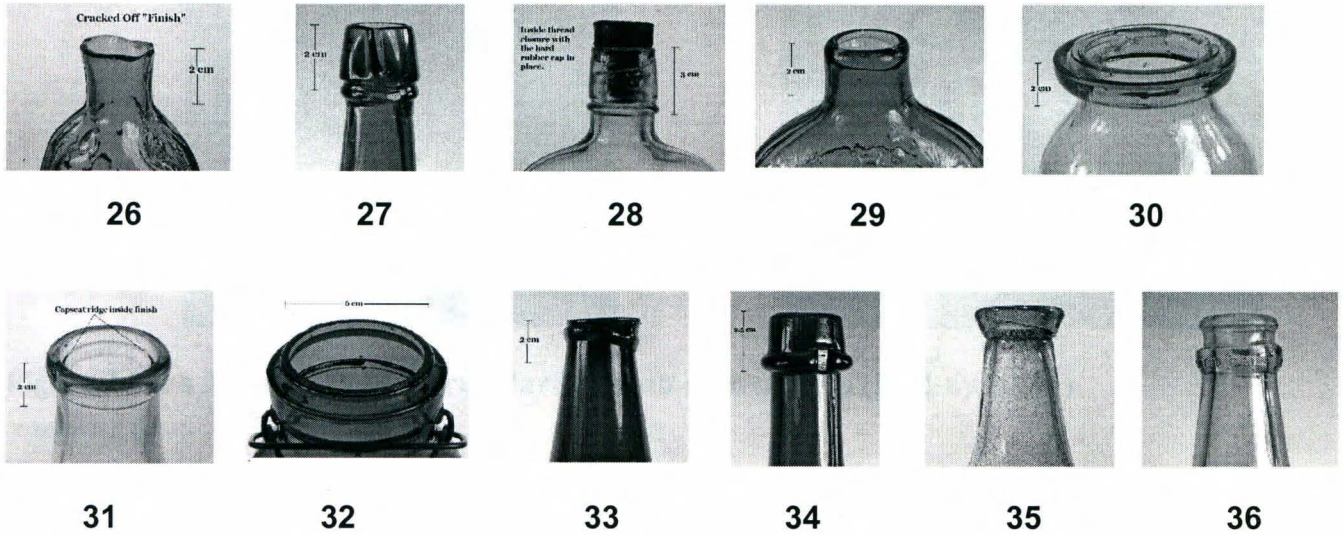


Figure 2.04: Bottle Neck Finish Profiles (continued) from Lindsey (2007a).
 Key: 26. Cracked-off 27. Pouring 28. Inside threads 29. Rolled or folded 30. Wax seal 31. Capseat or "Common Sense" 32. Ground 33. String rim 34. Benedictine 35. Tapered down 36. "Priof"

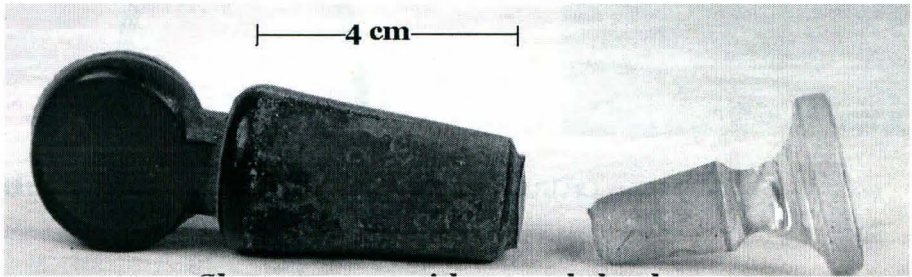


Figure 2.05: Glass Stoppers (Lindsey 2007a).

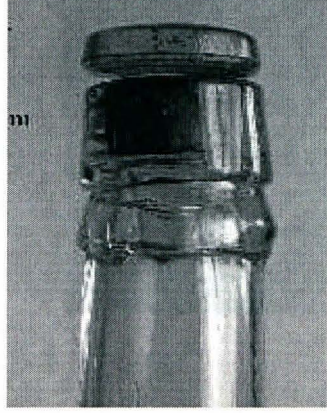
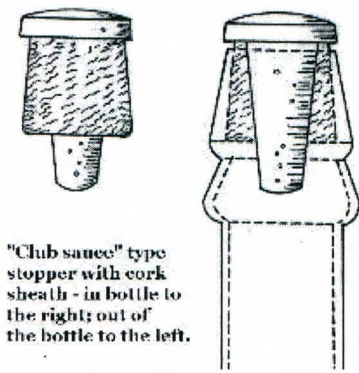


Figure 2.06: Stopper, Club Sauce Types (Lindsey 2007a).

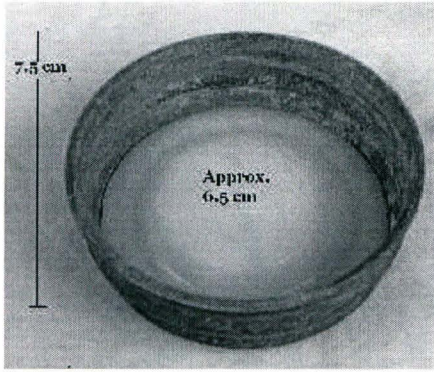


Figure 2.07: a Mason's Patent Fruit Jar Lid with a Metal Cap (Lindsey 2007a).

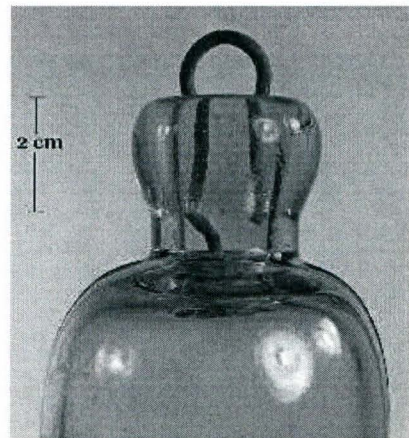
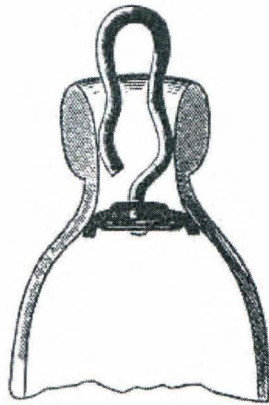


Figure 2.08: Huntington Spring Stopper (Lindsey 2007a).

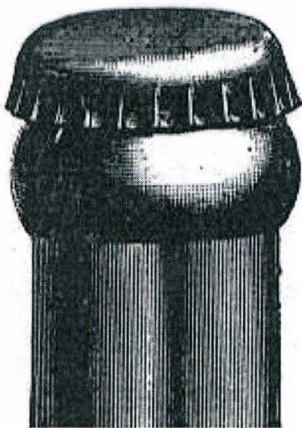


Figure 2.09: Crown Finish and a Cap (Lindsey 2007a).

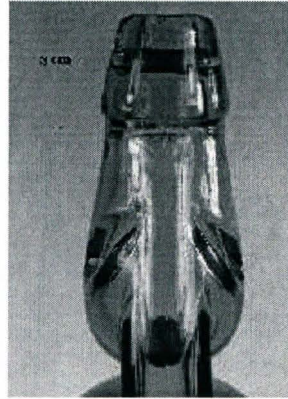
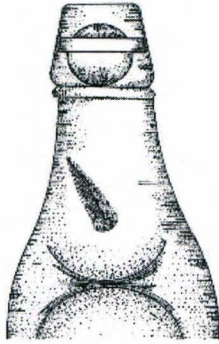


Figure 2.10: Codd's Ball Stopper (Lindsey 2007a).

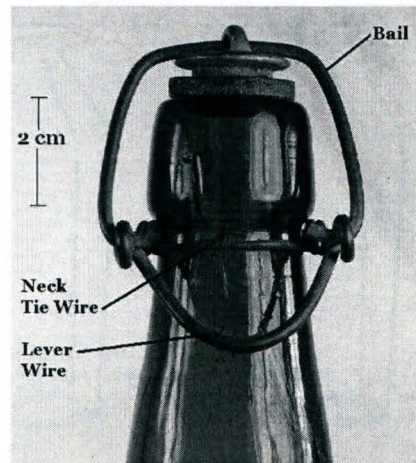
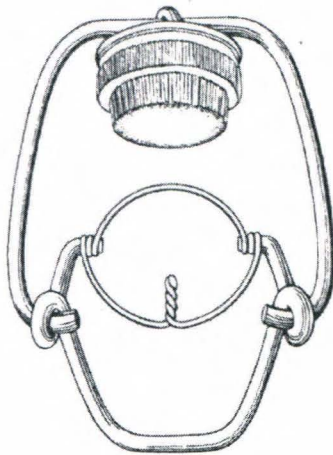


Figure 2.11: Lightning-Type Closure (Lindsey 2007a).

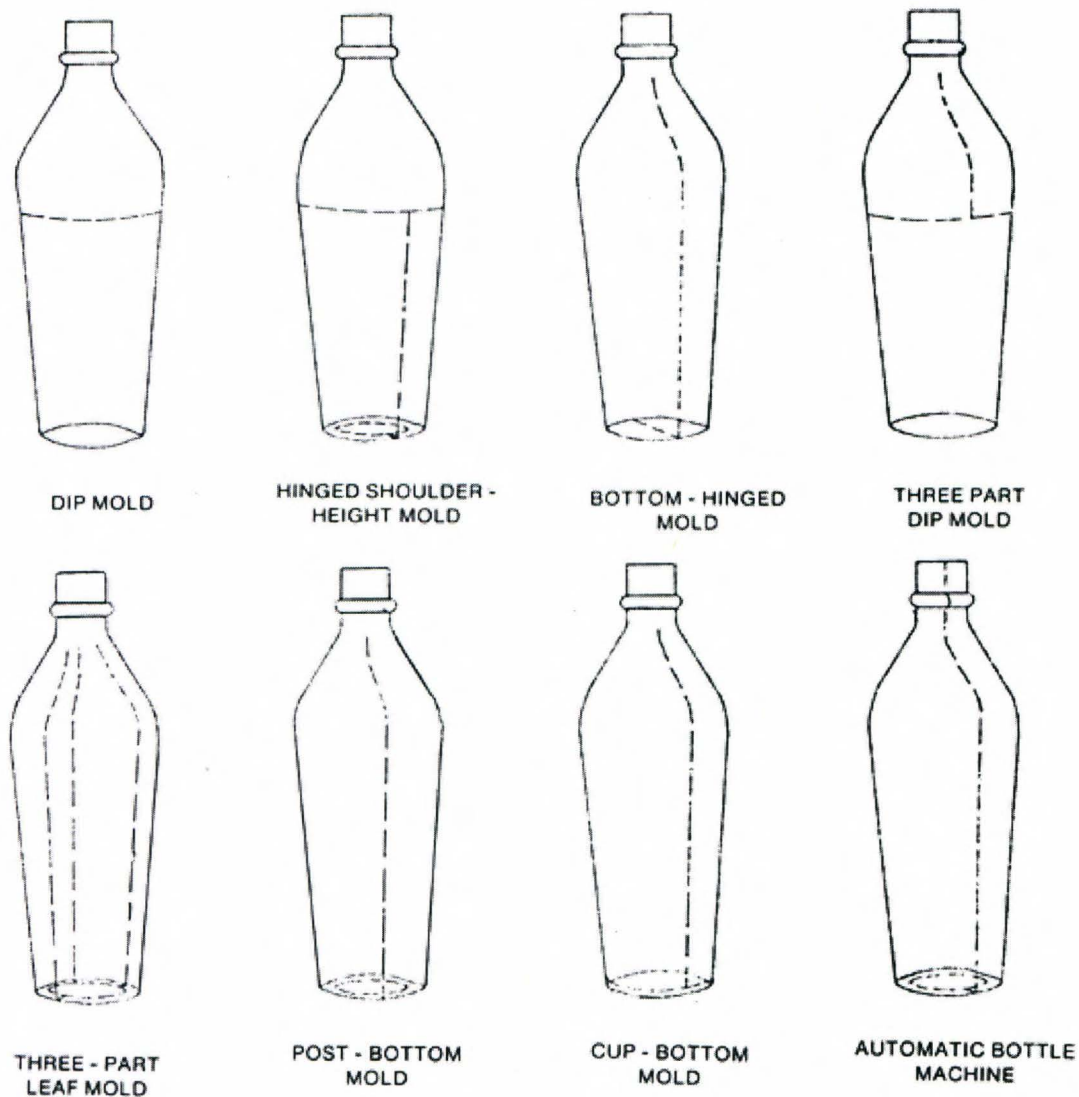


Figure 2.12: Types of Bottle Seams and Technology (IMACS 1992:17).

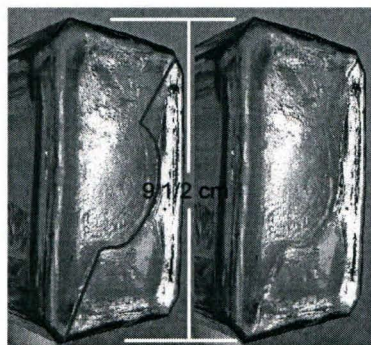


Figure 2.13: Keyed Mold (Lindsey 2007a). A base is depicted with a black line tracing the mold seam.

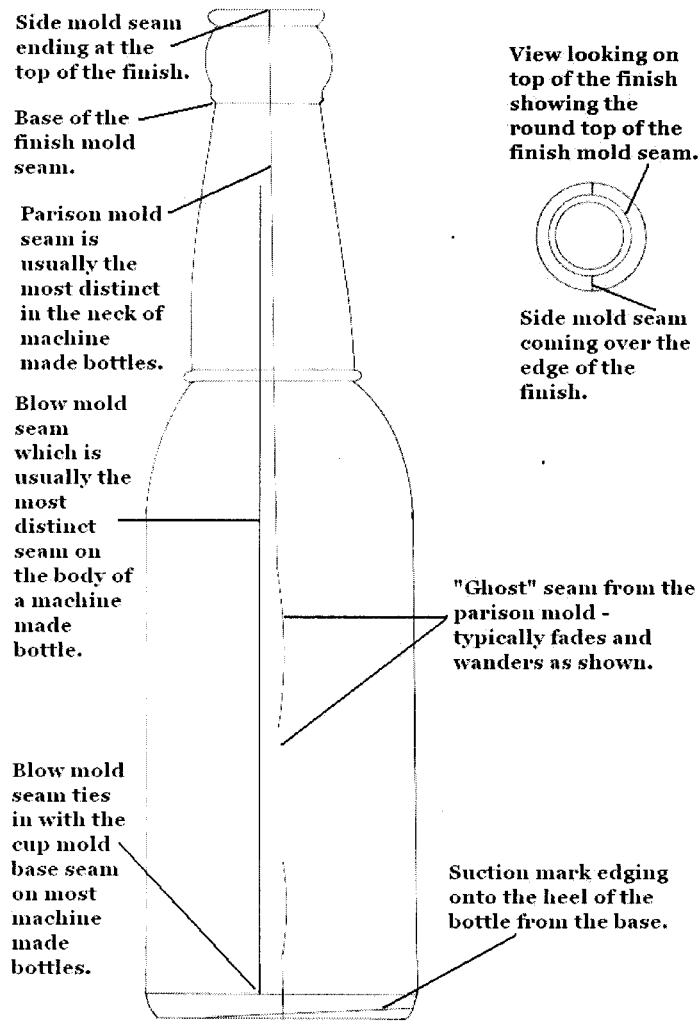


Figure 2.14: Machine-Made Bottle Characteristics (Lindsey 2007e).

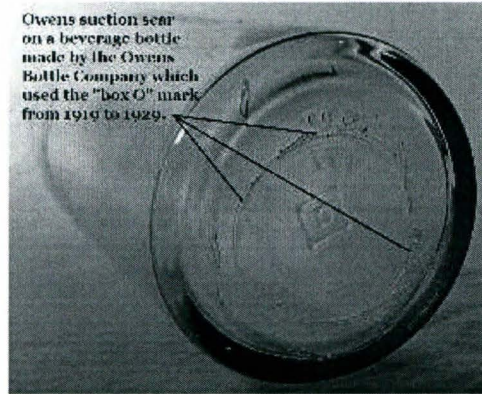


Figure 2.15: An Example of a Suction Scar Made by the Owens Bottle Manufacturing Machine (Lindsey 2007f).

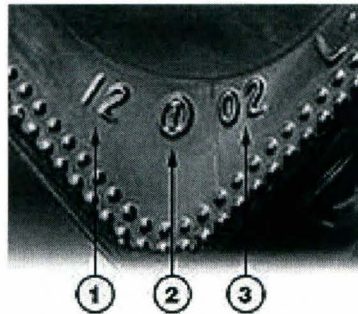


Figure 2.16: Owens-Illinois Corporation Code System.

The Owens-Illinois bottle identification marks. (1) Plant of manufacture, (2) Owens-Illinois Incorporated mark, (3) Year of manufacture. This bottle was made in the Gas City, Indiana plant, in 2002 (Owens-Illinois Incorporated n.d.).

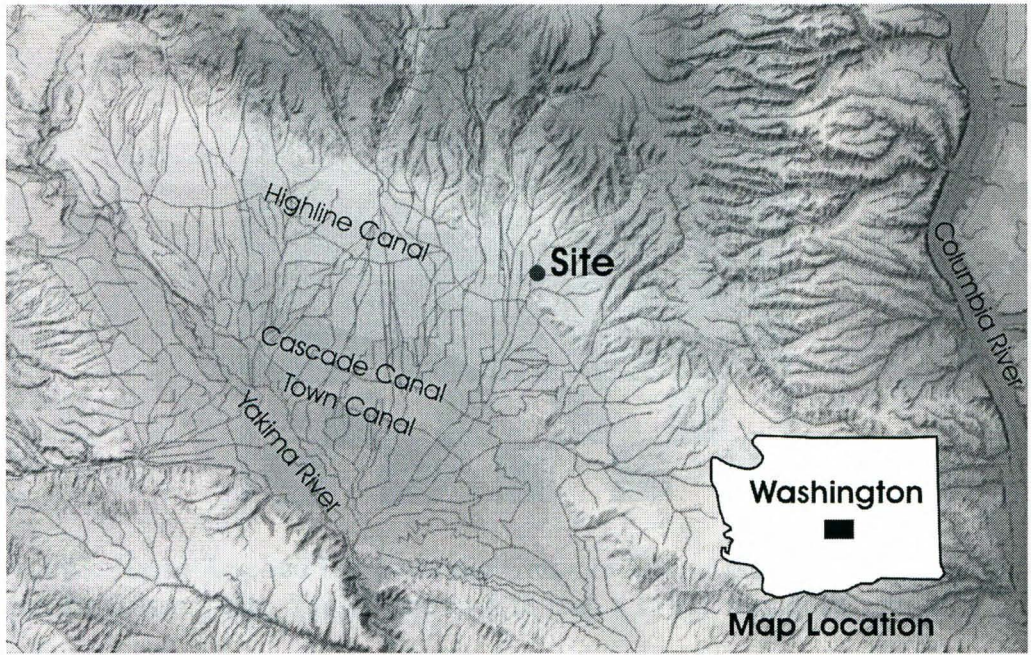


Figure 3.01: Grissom Site Location Map. Map by Dr. Lubinski, used with permission

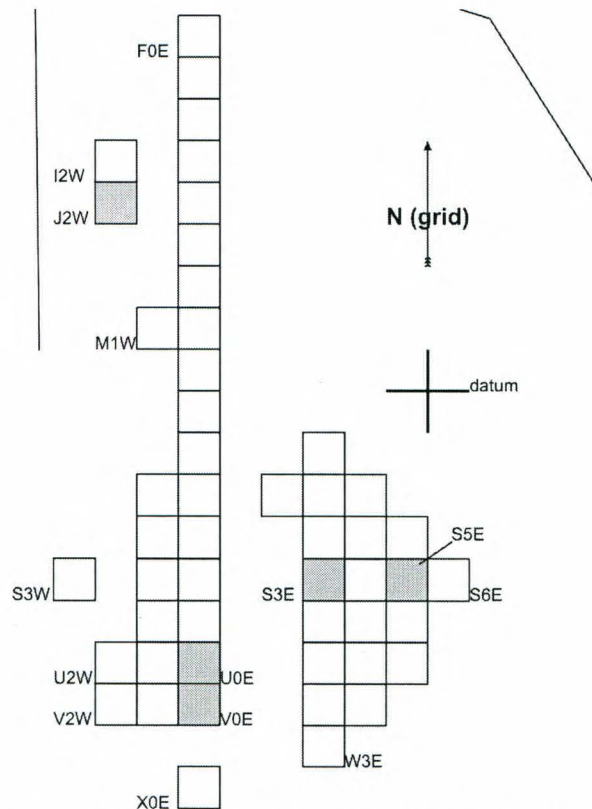


Figure 3.02: The Grissom Excavation Units. Map by Dr. Lubinski, used with permission.



Figure 3.03: Hand-Applied Lip from the Grissom Site. Assumed to be the oldest vessel at the Grissom Site. Vessel portion # 28 (cat. # 1191), ring /oil lip profile.



Figure 3.04: "Dr. Price's Delicious Flavoring Extracts." Height 10 inches ca. 1890 – 1910 (Munsey 1970:153).

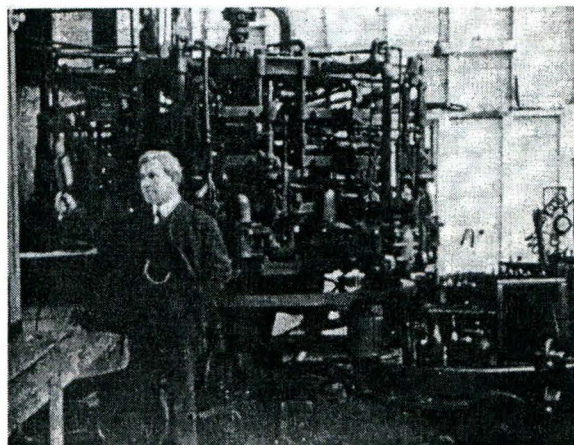


Figure 3.05: Mike (Michael) Owens with machine number five, called "A." Date is unknown (Skrabec 2007:209).



Figure 4.01: Robber's Roost Site Location. ● = The Robber's Roost Site. Base map from Kloster (2002).

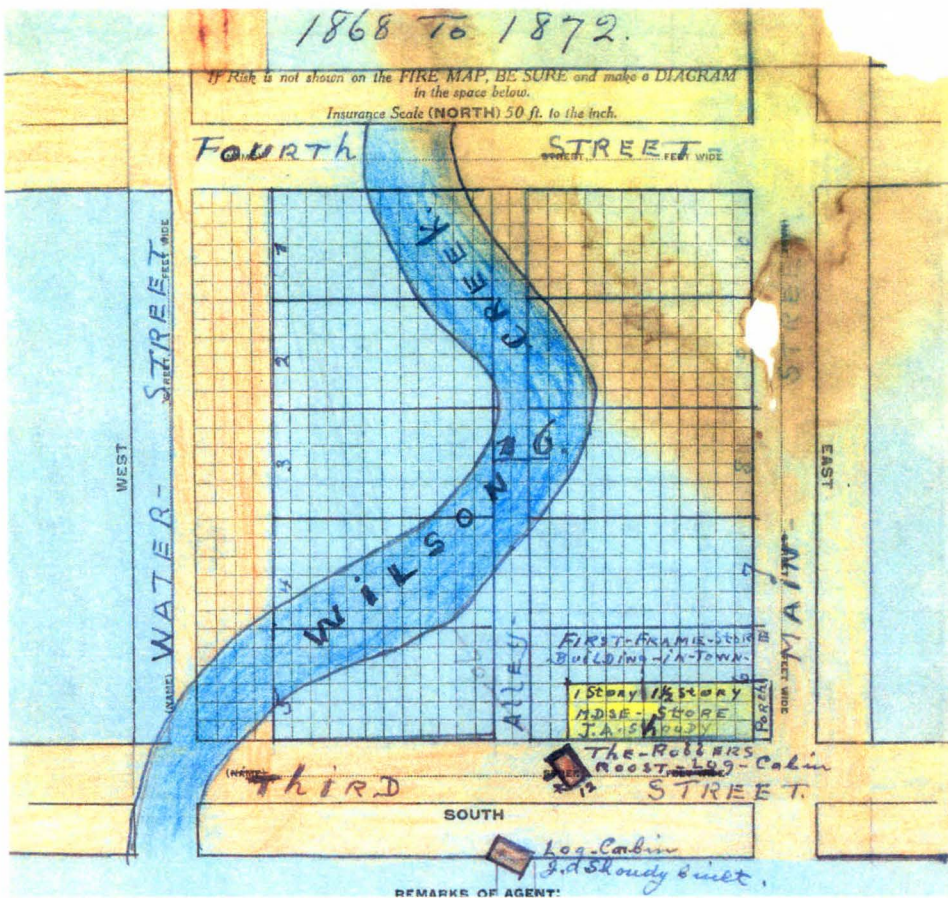


Figure 4.02: Robber's Roost Hand-Drawn Map Depicting Ellensburg ca. 1882. Drawn by Gerrit d'Ablaring (1862-1940), in Ellensburg Public Library Local History Collection.

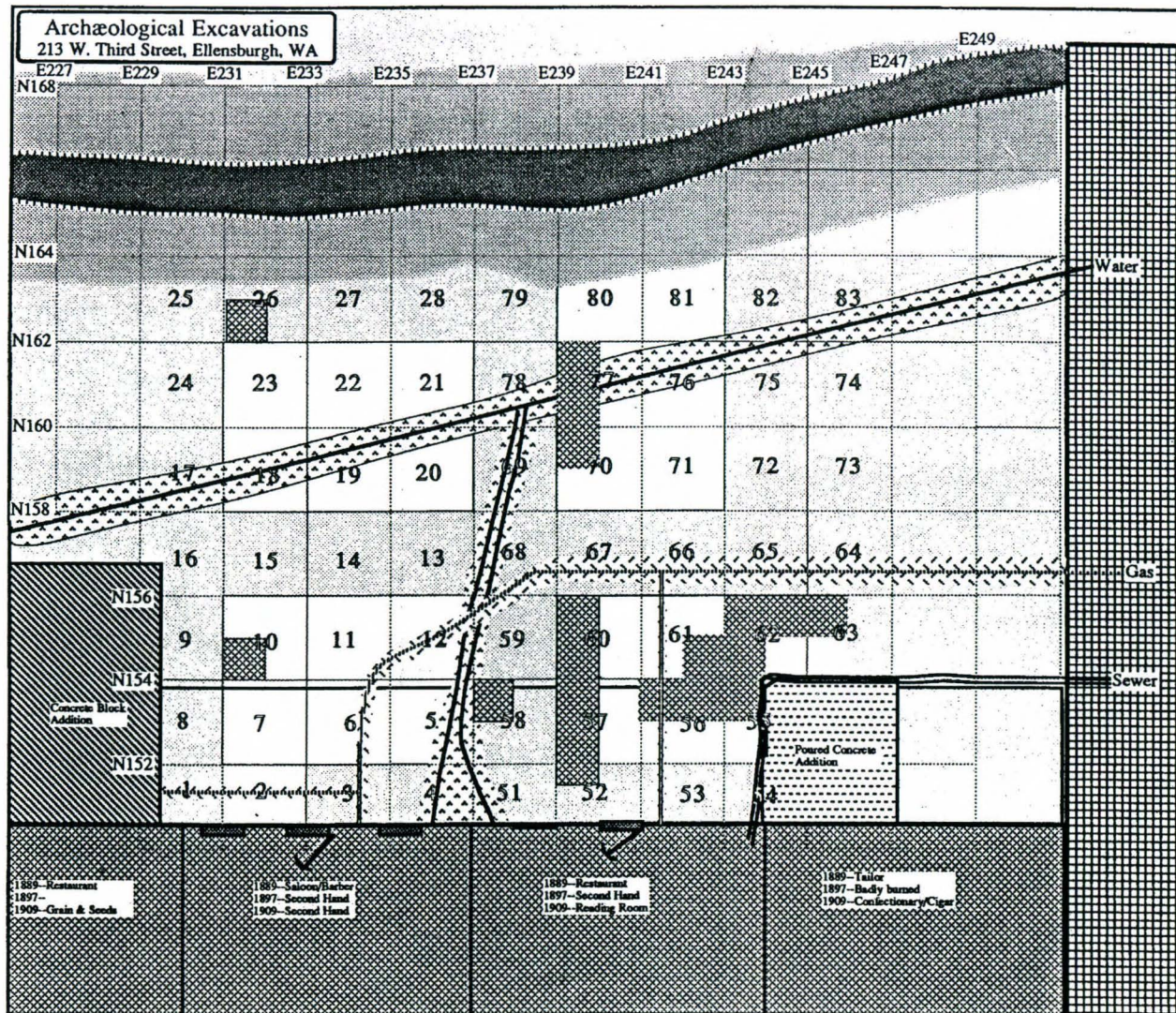


Figure 4.03: Robber's Roost Excavation Map (Adams *et al.* 1986-1988). The numbered units are 1988 units. The cross hatched squares within numbered units are 1986 units, while the cross hatched area at the bottom indicates buildings. The meandering line near the top is Wilson Creek.

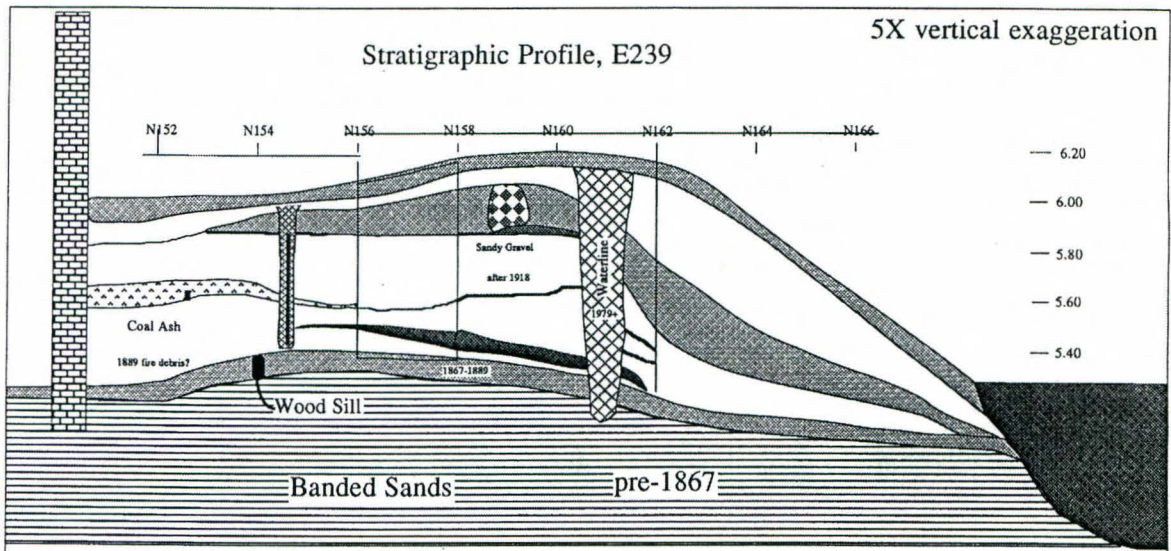


Figure 4.04: Robber's Roost Stratigraphy (Adams *et al* 1986-1988). Wilson Creek is shown at right.



Figure 4.05: The Robber's Roost Site, Export Style Bottle. Vessel #112 (FS #22610-01) Lip has ring/oil lip profile



Figure 4.06: Robber's Roost Site, Example Stubby-Style Beer Lips. Portion #580 (FS#2019-04) left, portion #138 (FS#2018-03) right. They have different crown portions of lip.



Figure 4.07: Robber's Roost Site, Example Worcestershire Sauce Bottle and its Club Sauce Type Closure. Left: front of view "WOR..ESTERS HIRE. SAUCE" (Worcestershire sauce), portion # 332 (FS#1017-10): right: club-sauce type closure "Lea & Perrins" on top, FS# 21980-03.



Figure 4.08: Robber's Roost Site, Homeopathic Vial Variants. Left to right: vessel # 552 (FS# 21550-01) 2 drams, vessel #544 (FS# 21660-01) 1½ drams, vessel # 557 (FS# 20860-02) 2 drams, vessel # 189 (FS# 2268-19) 1 dram.

HOMEOPATHIC VIALS.

ONE GROSS IN PASTEBOARD BOX.

SHORT STYLE.

S. 4 drachm. S. 3 drachm. S. 2 drachm. S. 1 1/2 drachm. S. 1 drachm. S. 3/4 drachm.

These vials possess the following advantages:
WEIGHT.—Extra weight and thickness.
MOUTHS.—Mouths formed by "Patent Tools," uniform in diameter, and always round.
LIPS.—Thick, well-shaped, regular and strong.
ANNEALING.—Carefully annealed, and thus not liable to break from sudden changes in temperature.

In ordering, please state the style desired, whether long or short.

For Capped Homeopathic Vials, see page 154.

FLINT HOMEOPATHIC VIALS.

SHORT OR LONG.

	Per gross.	Per gross.	
1, 1/4 and 1/2 drachm	\$1.12	3 drachm \$2.00	
1 drachm	1.25	4 drachm	3.00
1 1/2 drachm	1.50	6 drachm	4.00
2 drachm	1.50	8 drachm	5.00

BLUE OR AMBER HOMEOPATHIC VIALS.

SHORT STYLE.

	Per gross.	Per gross.	
1 drachm	\$1.75	2 drachm	\$2.00

HOMEOPATHIC VIALS.

LONG STYLE.

L. 1/2 dr. L. 3/4 dr. L. 1 dr. L. 1 1/4 dr. L. 1 1/2 dr. L. 2 dr. L. 3 dr. L. 4 dr. L. 6 dr.

SPECIAL VIALS.

Special sizes of Homeopathic Vials, Case Vials, Shell Vials, etc., can be made to order in lots of one gross of a size or upward. Metric specifications will be accepted.

Shell Vial. Case Vial.

SCALE OF MILLIMETERS.

Figure 4.09: Robber's Roost Site Whitall-Tatum Catalogue of Homeopathic Vials. (Whitall-Tatum Company 1967 [1902]:unpaginated).

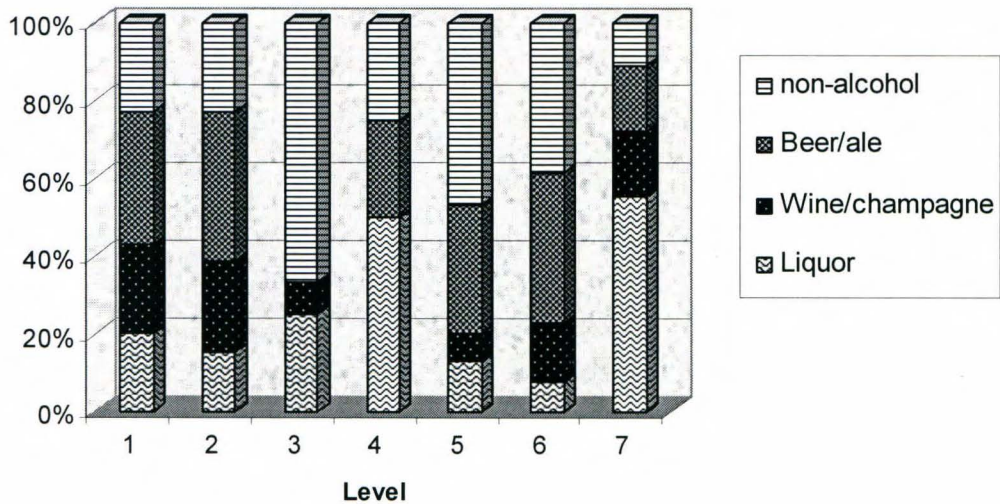


Figure 4.10: Robber's Roost, Drinking Container Ratio. Data from Table 4.22.



Figure 4.11: Ellensburg Fire on 4 July, 1889. Looking north on Main Street after the 1889 fire. Photo from the Daily Record (1999:111).

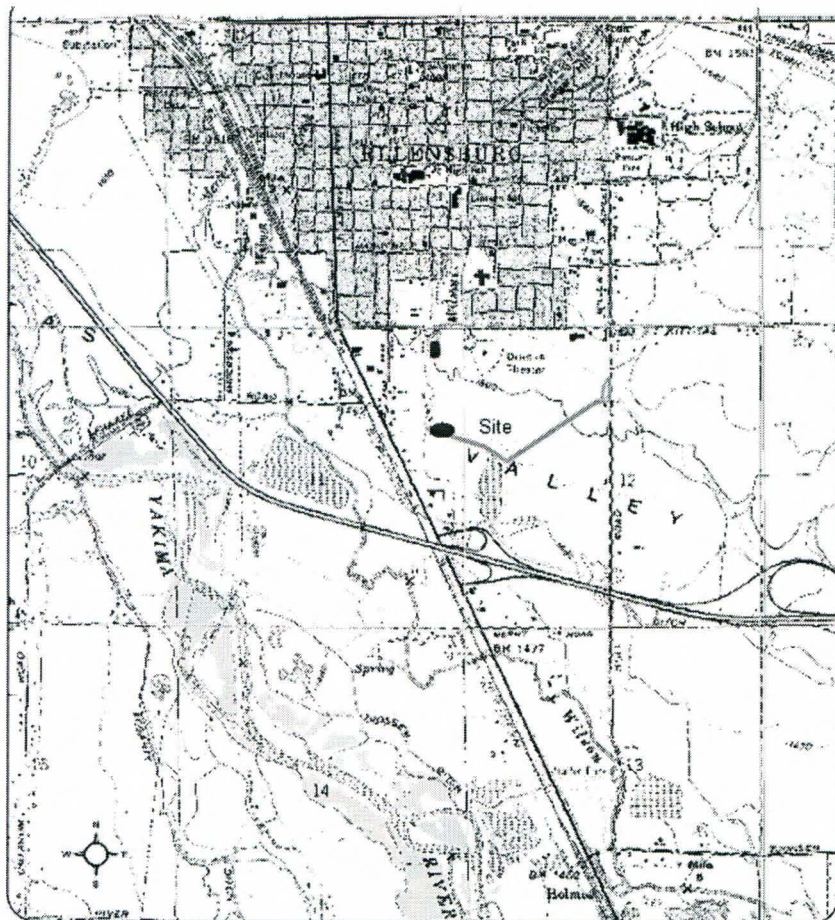


Figure 5.01: Sorenson Site Map (Woodard and Hehman 2004:5).

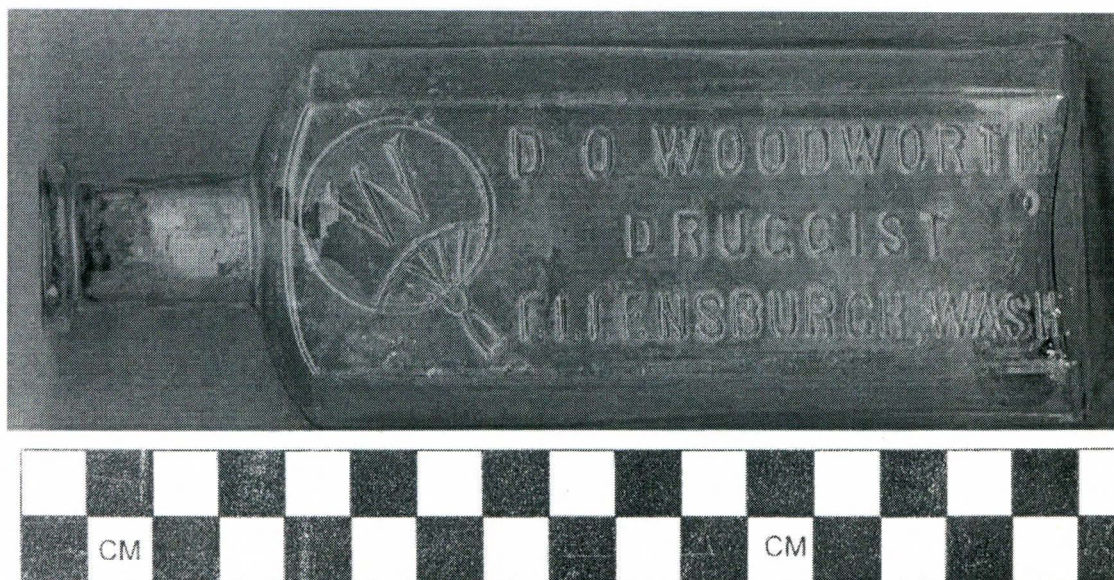


Figure 5.02: The Sorenson Site, D. O. Woodworth Bottle. Front view “D.O. Woodworth Druggist Ellensburg, Wash.” Vessel # 5001 (FS# 01).

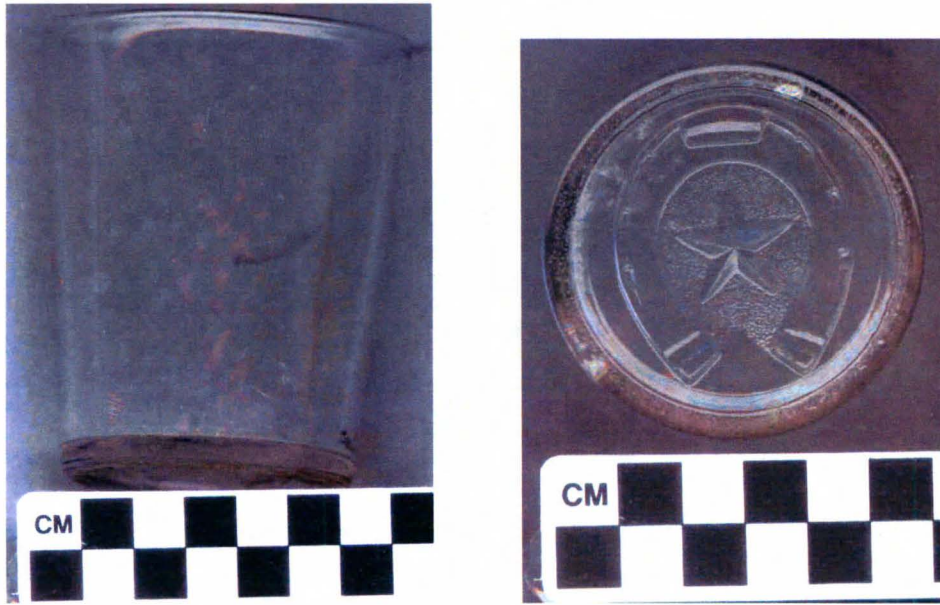


Figure 5.03: The Sorenson Site, Vessel# 5002. Left: front view. Right: the same tumbler in base view



Figure 5.04: The Sorenson Site, vessel # 5003 (Left), vessel# 5004 (Right).

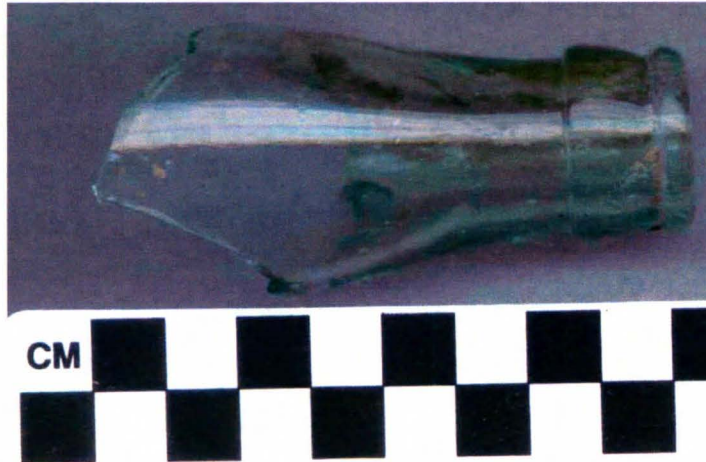


Figure 5.05: The Sorenson Site, Vessel# 5005. A crown portion of lip made by tooled lip technology.

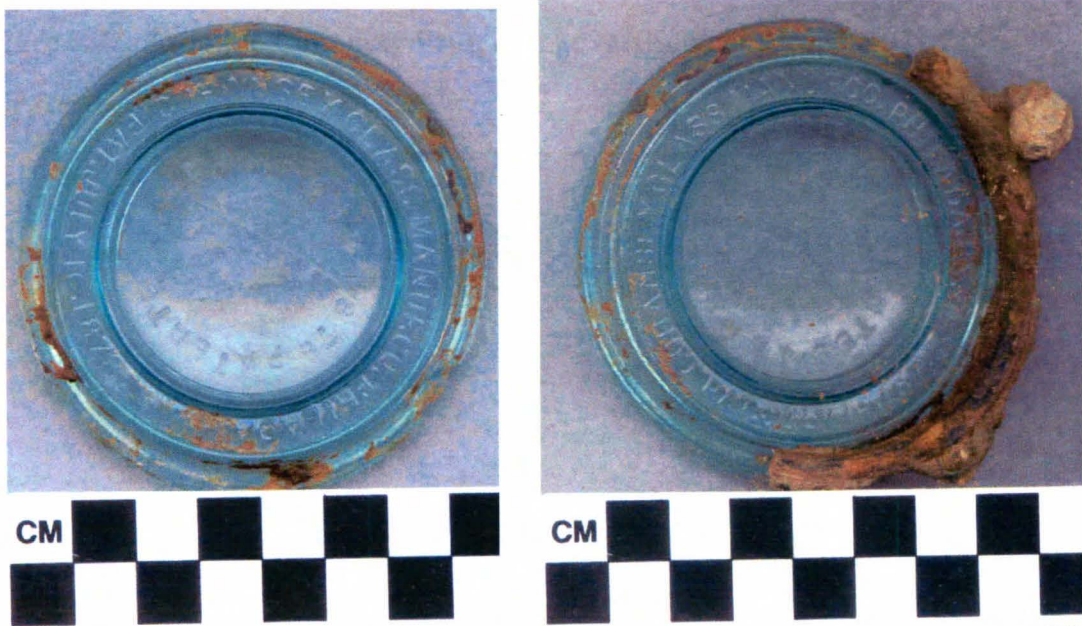


Figure 5.06: The Sorenson Site, Cohansey Liner Jar Closure. Vessel # 5006 (Left). Bottom view "COHANSEY GLASS MANUF. CO./PHILADA PA/PAT.JULY 16.1872/PATENTED JANUARY 18 1876." The liner closure fits with a metal ring, also found at the Sorénson Site. At right, the glass closure is shown with the partial metal ring attached.

Glass Only in Contact With Fruit.
No Separate Parts to be Misaid---Cover in One Piece.
No Wrench Required to Open or Close.

New Cohansey Fruit Jars.

Glass Cover in One Piece.

Anti-Rust Lined Metal Top.



Elastic Pressure by Spring Clamps on Shoulder Joint.

The Clamp can be turned back after fruit is cool, and PROVE the Air-tight Joint Perfect.

Every Jar being inspected, there is no trouble in using.

Inquire of nearest Wholesale Dealer or write for samples and prices.

Our PROTECTOR JARS, with Anti-Rust Lined Metal Tops, long and favorably known, have the same principles and advantages and are cheaper in price.



Cohansey Glass Manufacturing Comp'ny,
Manufacturers of Window Glass, Bottles & Fruit Jars,
N. W. Cor. Third & Arch streets, PHILADELPHIA

Figure 5.07: Example Cohansey Fruit Jar Advertisement (Pepper 1971:215).

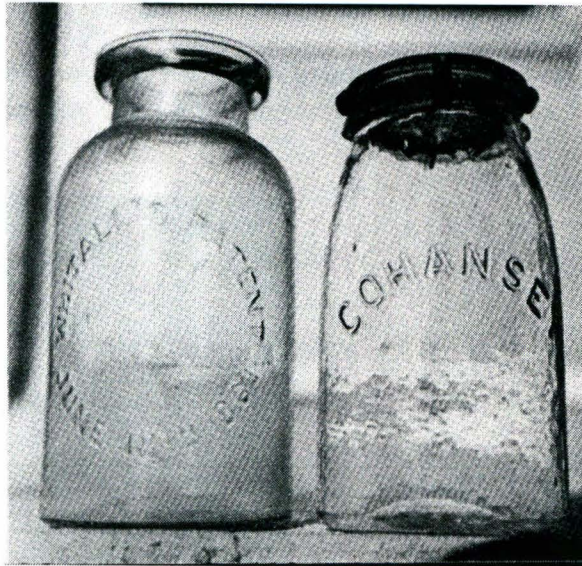


Figure 5-08: Examples of a Whitall-Tatum Jar of Millville (Left) and a Cohansey Fruit Jar of Bridgeton (Right) from Pepper (1971:226). Fruit jars from the era when competition was desperate for food preservation.



Figure 5.09: The Sorenson Site, English Ceramics. Left above: J & G Meakin. Right above: Alfred Meakin. Bottom: Charles Meakin.

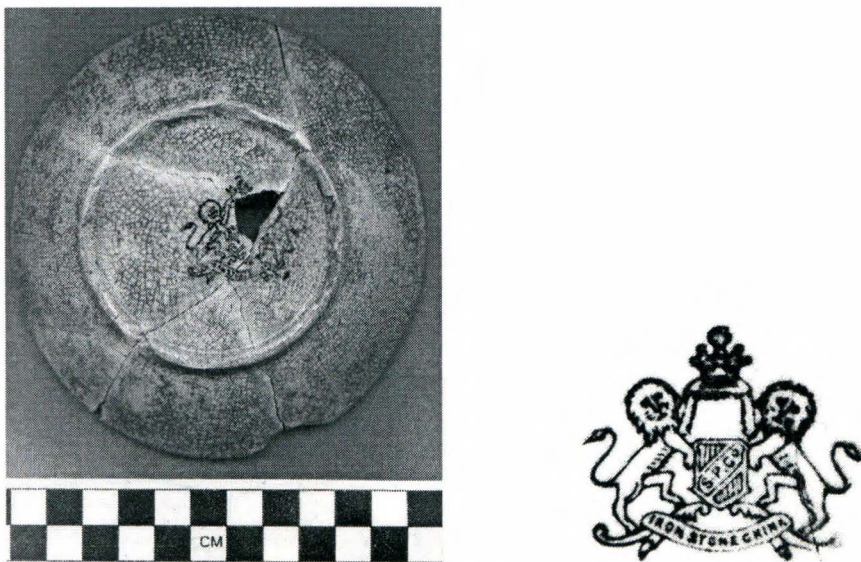


Figure 5.10: The Sorenson Site, Steubenville Pottery Company. Left: a ceramic plate from the Sorenson Site. Right: the company hallmark from Herskovitz (1978:98).

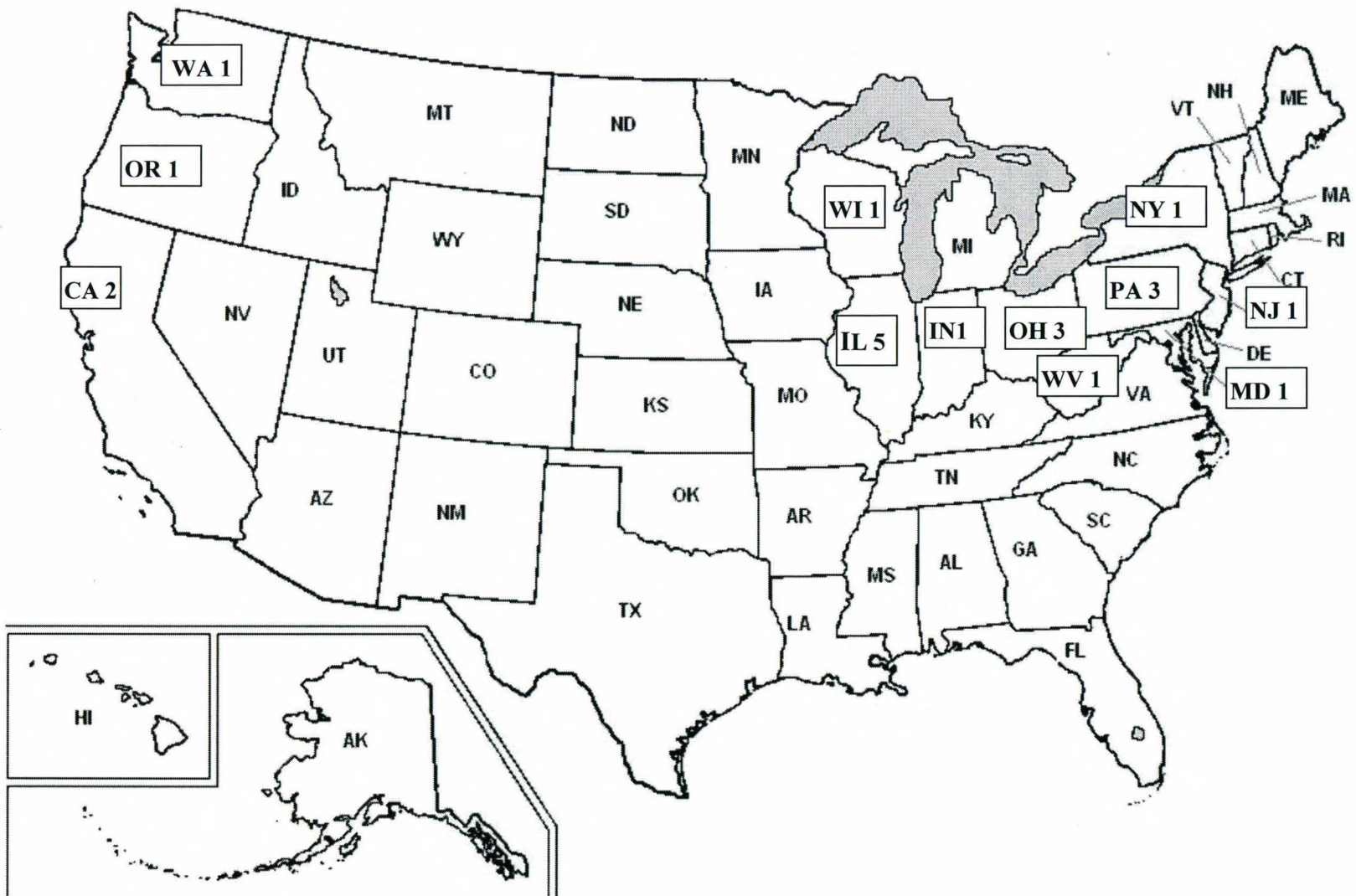


Figure 6.01: Bottle Manufacturing Company Locations from All Three Sites. The numbers in the boxes indicate the number of the glass companies each state. Data from Table 6.02. Base map from Family Life (2006).



Figure 6.02: Northern Pacific Railroad Depot in Ellensburg. Left: Third Street at train depot, ca. 1900 from Ellensburg Pubic Library Local History Collection Photographs. Right: undated photo from KCCC (1989:9).



Figure 6.03: Chicago, Milwaukee & St. Paul Railroad Depot in South Cle Elum ca.1912. From Ellensburg Pubic Library Local History Collection Photographs.

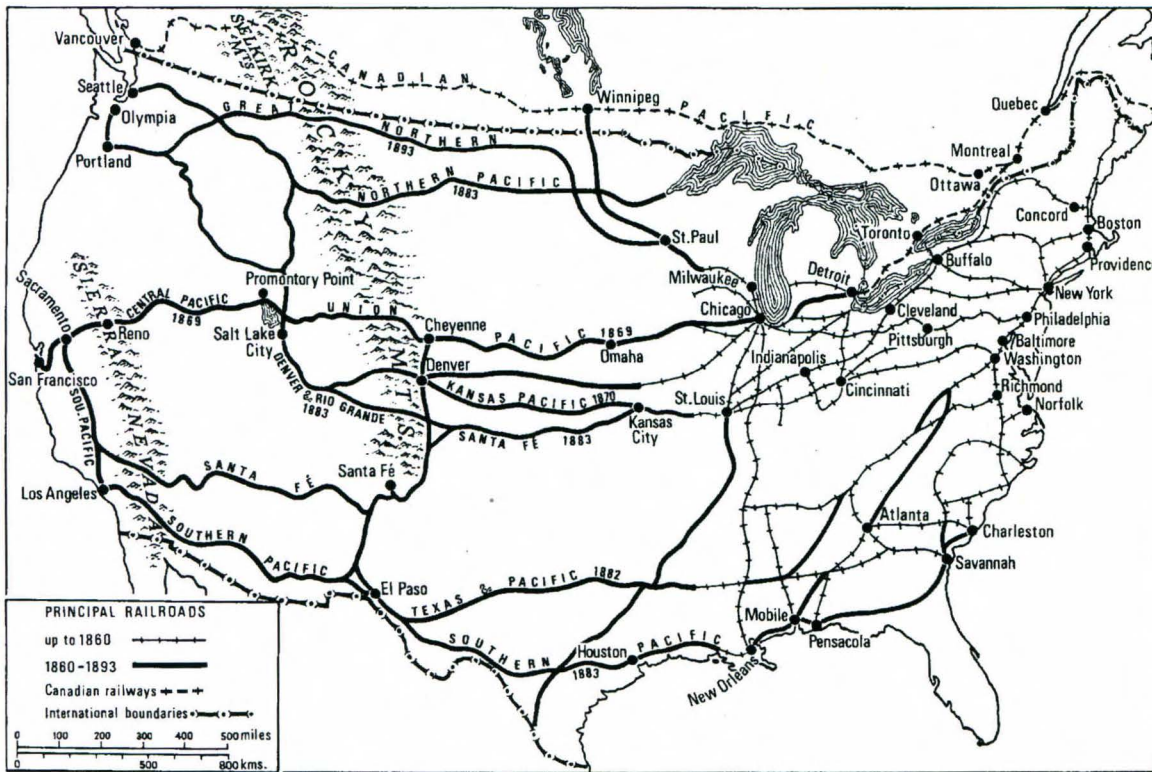


Figure 6.04: Map of American Railroads 1860-1893 (Hasting 1972:70).

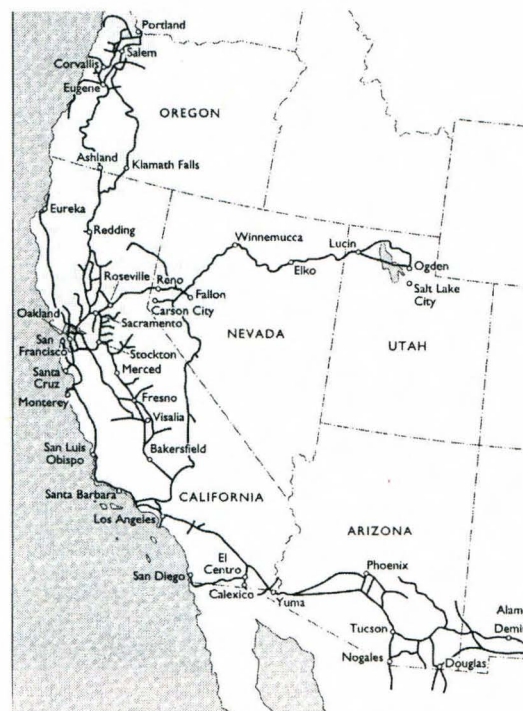
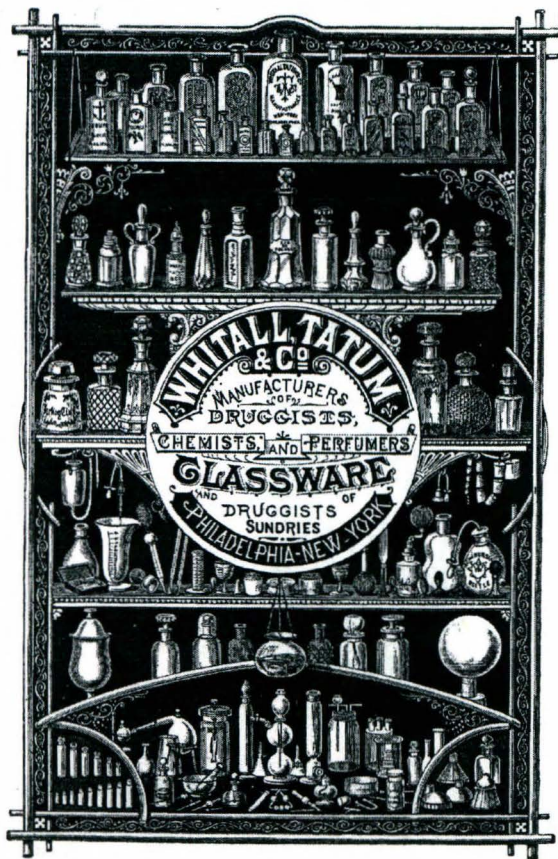


Figure 6.05: Southern Pacific Railroad Map (Oris 2005:2).



Figure 7.01: The Millville plant of Whitall-Tatum & Company in 1890 (Pepper 1971:220).



1880.

WHITALL, TATUM & CO.
GLASS MANUFACTURERS

Druggists', Chemists' and Perfumers'
 GLASSWARE.

DRUGGISTS' SUNDRIES.

No. 410 Race Street, P. O. Box 2712, PHILADELPHIA.	46 & 48 Barclay Street, P. O. Box 3814, NEW YORK.
--	---

1880.

Figure 7.02: The Whitall-Tatum Catalog Front Page (Whitall-Tatum Company 1971[1880]).



MOULDS FOR INSERTION OF LETTERED PLATES.

The Charge is for Engraving Lettering on our Plates, and it will be made on the first order only.

We have the following sets of moulds prepared for the insertion of names without the expense of making a new mould for each new name to be inserted. Special pencil designs, with devices, monograms, &c., will be sent for selection or approval without charge. We can make a rectangular, oval or globe Panel, on the inner side of the French Square or on the flat side of the Philadelphia Oval and Millville Round. (See page 15.) The effect of the Panel is to reduce the content to vary nearly the same. Thus, we make the 4 ounce French Square Prescription to hold say 64 ounces to the bottom of the neck, but with one side a panel it would hold only 4 ounces.

- PHILADELPHIA OVAL.
- MILLVILLE ROUND.
- FRENCH SQUARES.
- FRANCE SQUARES, WIDE MOUTH.
- BLAKES AND TALL ENGLISH BLAKES.

The same Plates fit into each of the sizes from above Prescription or Metric, and when from the same engraved plate can be ordered of either of these shapes or bottles.

PRICE ONE DOLLAR AND FIFTY CENTS TO SIX DOLLARS EACH FOR ENGRAVING.
Moulds fitted for Plates are prepared for the following shapes and sizes:

PHILADELPHIA OVAL.	MILLVILLE ROUND.	TALL FRENCH SQUARE.	FRENCH SQUARE, WIDE MOUTH.	BLAKE.	TALL BLAKE.
1/2 ounce.	1/2 ounce.	1 drachm.	1/2 ounce.	1/2 drachm.	
1 ounce.	1 ounce.	2 drachm.	1 ounce.	1 ounce.	1 ounce.
		3 drachm.	1 oz. & B. 1 oz.	1 ounce.	
		4 & B. 4 oz.	High 1 ounce.		
		5 ounce.	1 1/2 ounce.		
1 1/2 ounce.		6 ounce.	High 2 ounce.		
2 ounce.	2 ounce.	8 ounce.	2 oz. & B. 2 oz.	2 ounce.	2 ounce.
3 ounce.	3 ounce.	10 ounce.	3 ounce.	3 ounce.	3 ounce.
4 oz. also 2	4 ounce.	12 ounce.	4 oz. & B. 4 oz.	4 ounce.	4 ounce.
5ai plates.		14 ounce.	5 ounce.	6 ounce.	6 ounce.
6 ounce.	6 ounce.	16 ounce.	6 ounce.	7 ounce.	
8 ounce.	8 ounce.	18 ounce.	8 ounce.	8 ounce.	8 ounce.
10 ounce.	10 ounce.	20 ounce.	10 ounce.	10 ounce.	10 ounce.
12 ounce.	12 ounce.		12 ounce.	12 ounce.	
16 ounce.	16 ounce.		14 ounce.	16 ounce.	
			16 ounce.	20 ounce.	
			20 ounce.		
			22 ounce.		
			32 ounce.		

For Lettered Plates of the Metric Measure Philadelphia Ovals, see Page 15.



Figure 7.03: Example Whitall-Tatum Catalog Pages. Each customer chose bottle and lip shape, size, neck length, symbol, and glass type. Source: Whitall-Tatum Company (1971 [1880]:8 (left), 10 (right)).



Figure 7.04: D.O. Woodworth's Druggist Bottle Style. Bottle was Blake style, prescription lip, and the plate symbol was a Chinese Fan. Details from Whitall-Tatum & Company (1967 [1902] unpaginated).

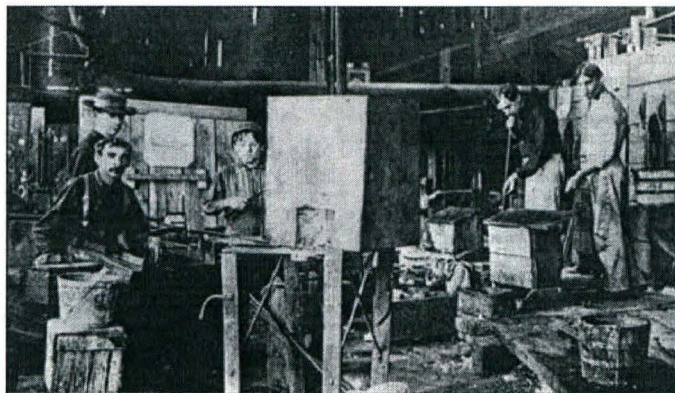


Figure 7.05: Whitall-Tatum Shop with Workers Blowing Glass ca. 1900 (Sebold and Leach 1995: Figure 64).



Figure 7.06: The Geddis Block, before Ellensburg Fire on 13 June 1888. From Ellensburg Public Library Local History Collection Photographs.



Figure 7.07: Harry S. Elwood Druggist Bottle from the Robber's Roost Site. Vessel# 116, FS# 2194-03. Left: front view "Elwood/.Druggist/ Wa" Right: base view of the same bottle "SHELDON"(Sheldon-Foster Company).

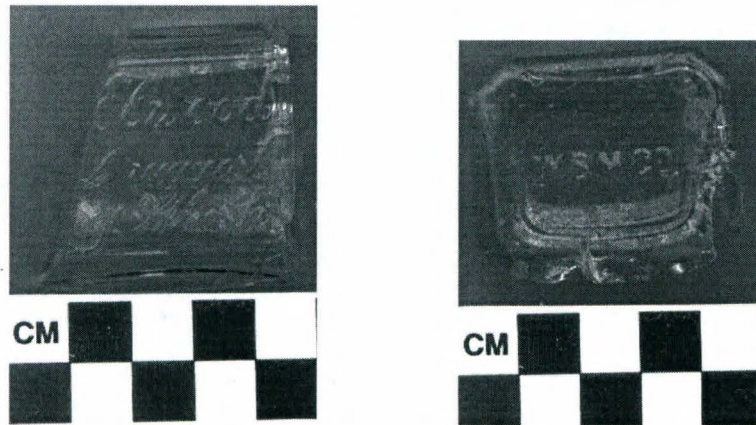


Figure 7.08 Harry S. Elwood Bottle from the Robber's Roost Site. Vessel # 190: FS# 2268-03. Left: front view "Elwood/Druggist/rg,Wash." Right: base view of the same bottle "W.B.M.CO" (Western Bottle Manufacturing Company).

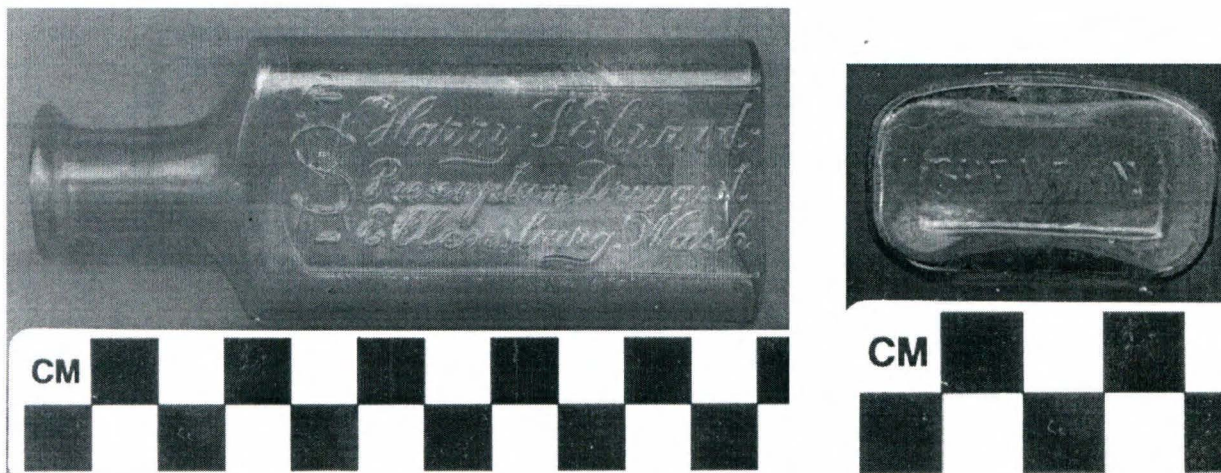


Figure 7.09: Harry S. Elwood Druggist Bottle from 45KT808 (City Block 24). Left: front view "Harry S. Elwood/ Prescription Druggist/ Ellensburg, Wash." Right: base view of the same bottle "SHELDON" (Sheldon-Foster Company).

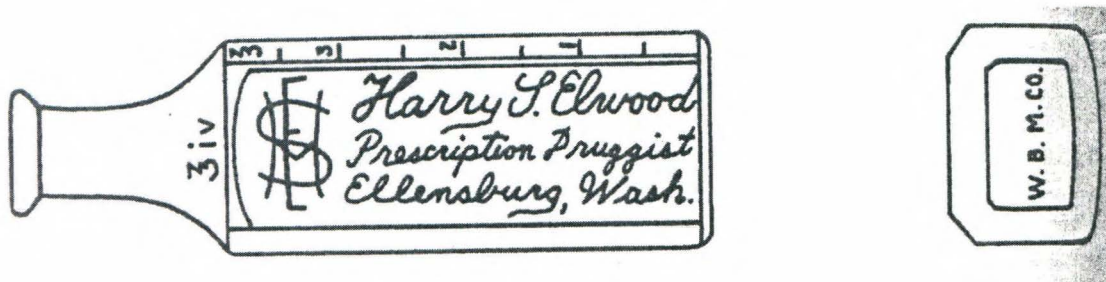


Figure 7.10: Harry S Elwood Bottle Drawing. The same base shape as vessel# 190 (bottle type: beveled ideal). Source: Bethman (1991:464).



Figure 7.11: Harry S. Elwood Store in Ellensburg in 1906. Shown in the intersection of Pearl Street and Forth Avenue, historical photo reprinted in *the Daily Record*, 11 May 2002.

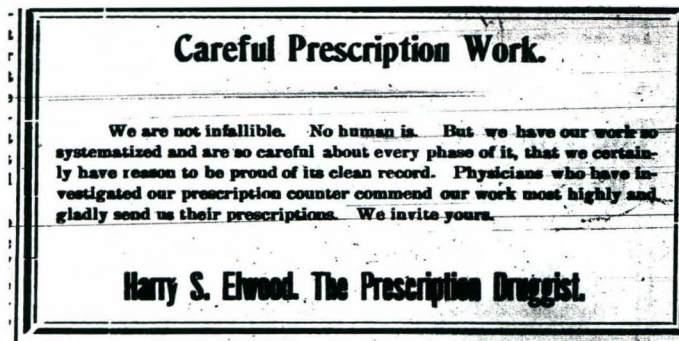
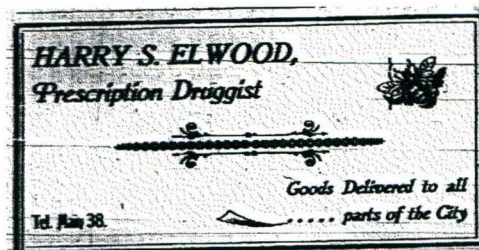
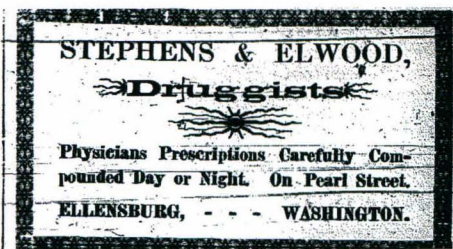


Figure 7.12: Harry S. Elwood Store Ads. Upper Left: 27 May 1898. Upper Right: 8 November 1902 Below 6 May 1909. From *The Ellensburg Dawn* (1894-1913).



Figure 7.13: Harry S. Elwood (Left). Undated photo from Ellensburg Public Library Local History Collection (EPL 2007b).



Figure 7.14: Coca-Cola Bottle of the Sody-Licious Beverage Company in Ellensburg. Vessel# 360: FS# 2087-21. Left: front view “Coca-Cola.” Right: base view of the same bottle “ELLENBURG/ WAS.” Made by the Owens-Illinois Company ca. 1943.

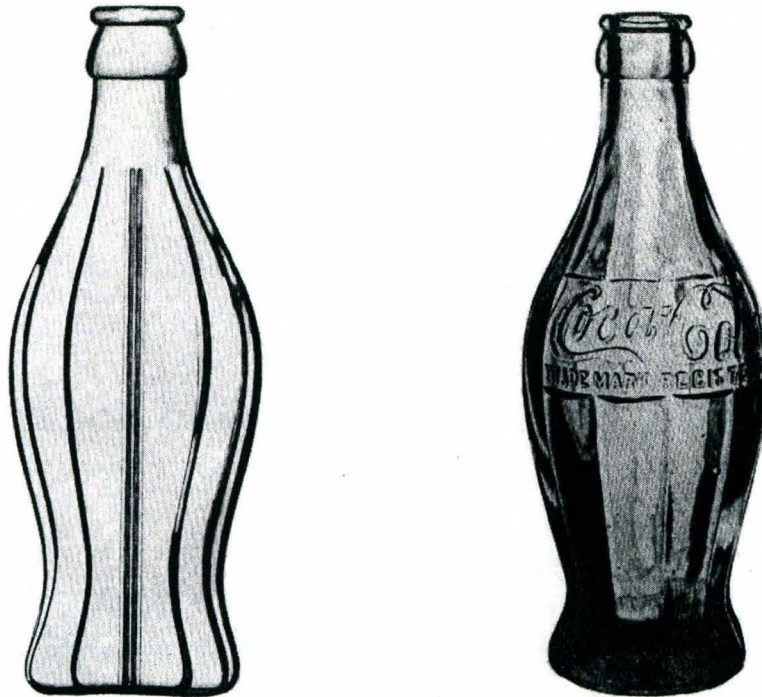


Figure 7.15: The Root Glass Company Bottle Original Design for Coca-Cola Bottle. Left: this design was submitted by Earl R. Dean, of the Root Glass Company in Terre Haute, Indiana. The Design was made in the summer of 1913, but it was not accepted by The Coca-Cola Company until 1916. Right: the original Earl Dean design. There were a small number of bottles made because it was too large around the shoulder to fit existing bottling machinery (Munsey 1972:71).

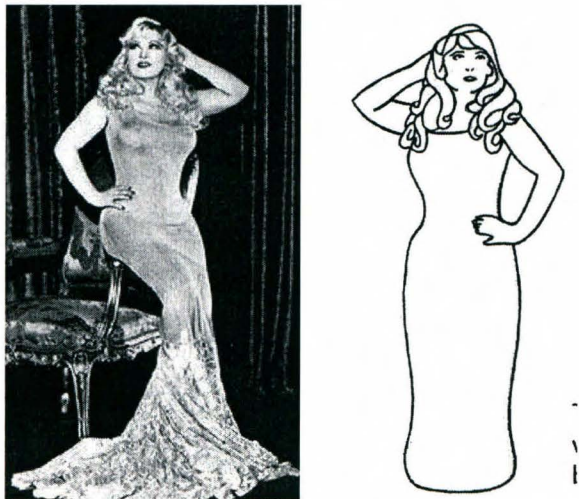


Figure 7.16: First Coca-Cola Contour Bottle called “Mae West” or “hobble-skirt.” Left: Mae West (James Randi Educational Foundation n.d.). Right: Hobble Skirt (Munsey 1972:71).

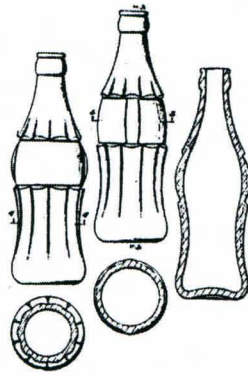


Figure 7.17: Third Coca-Cola Contour Bottle. Patented in 1937 with patent number 105,529 (Munsey 1972:71).

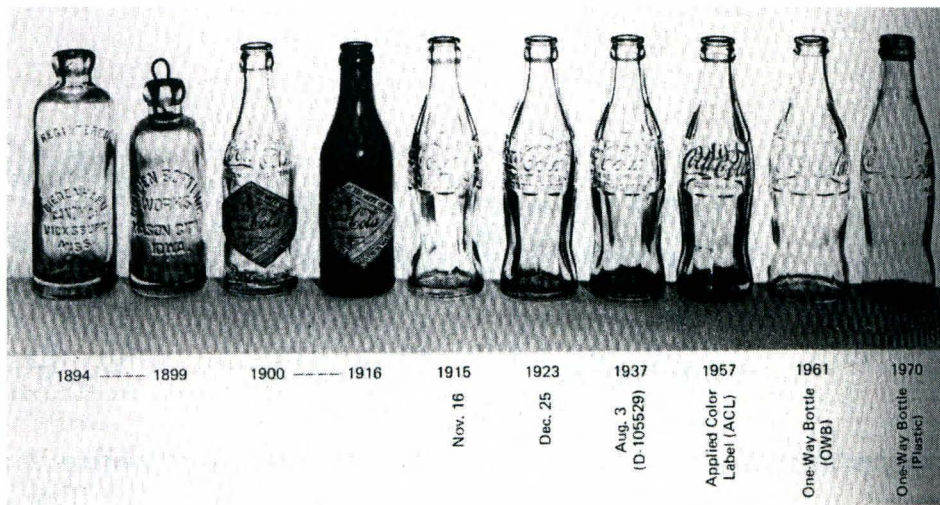
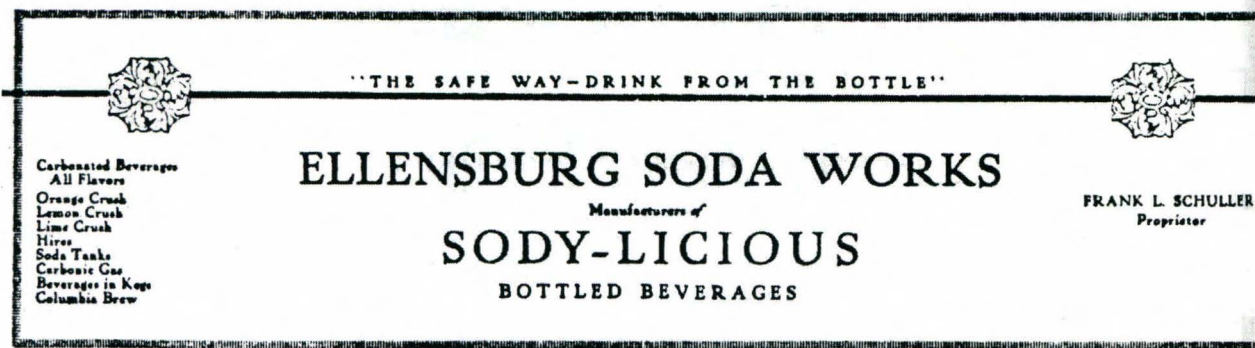


Figure 7.18: An Array of Bottles Illustrating General Shape of Coca-Cola Bottle used throughout the years (Munsey 1972:64).



ELLENSBURG, WASHINGTON.

Figure 7.19: Ellensburg Soda Works and the Sody-Licious Bottle Beverage Company Letter Head (Fowler 1986:88).



Figure 7.20: Examples of Sody-Licious Beverage Company ACL bottle Designs. Dates unknown. From Fowler (1986: 274).



Figure 7.21: An Example of Ellensburg Soda Works Advertisement (Fowler 1986:108). Original from the Oregon - Washington - Idaho Gazeteer (sic) 1889 - 1890.



Figure 7.22: Frank L. Schuller, Jr. From undated newspaper article on display in the Kittitas County Historic Museum (KCHM 2007a).



Figure 7.23: Twin Schuller Brothers: Frank left and Henry right. Photography from undated newspaper clipping (EPL 2007e).