

The Jacksonville 'Blue China' Shipwreck (Site BA02): the Glass Assemblage

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Odyssey Marine Exploration's survey and excavation in 2005 of the Jacksonville 'Blue China' shipwreck identified two main forms of cargo at a depth of 370m, 70 nautical miles off Jacksonville, Florida. Unlike the British ceramic table, tea and toilet wares, a consignment of glassware proved to be of entirely American origin. Alongside rectangular glass window panes, the ship was transporting an eclectic mix of spirits, mineral water, condiments, colognes and medicinal products packaged in glass bottles of diverse shape and color. In addition to the bottle assemblage were limited glass lamp components and glass bar tumblers, as well as tableware typified by a singular salt cellar.

Of 261 glasswares recorded on the surface of Site BA02, a sample of 52 was recovered for analysis. This article examines the variety of types found on the wreck, their dimensions, origins, manufacture and use. As with the site's ceramic assemblage and clay tobacco pipes, the suggested internal dating evidence of September 1854 for this East Coast schooner's sinking provides a tightened chronological marker for these classes of artifact. The glass cargo reflects the wide range of affordable goods readily available to the average American middle class consumer and provides insights into the social, cultural and economic trends of the period.

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1. Introduction

Odyssey Marine Exploration's survey and rescue excavation of the Jacksonville 'Blue China' shipwreck in 2005 identified conspicuous spreads of glass cargo wares across the site, predominantly bottles in various shapes, colors and sizes, all without their cork stoppers and devoid of their original contents (Fig. 19). Less numerous products included lamp components, glass bar tumblers and tableware (Fig. 20). In stark contrast to the exclusive British origins of the ceramic assemblage (Gerth, 2011), the glasswares are all of American manufacture and were probably loaded onto the Site BA02 East Coast schooner at New York, the ship's proposed home port. The ship was also transporting a significant consignment of window glass panes, which are discussed elsewhere (Gerth *et al.*, 2011: 10, 41-44).

A total of 261 glasswares (excluding the window panes) from four classes of artifacts – bottles, bar wares, tableware, and lamps – were recorded on the surface of Site BA02, representing 27.0% of the total artifacts present:

- Black glass spirits/liquor bottles: 193.
- Tumblers: 44.
- Various bottles: 18.
- Lamp globes: 2.
- Lamp bases/fonts: 2.
- Salt cellar: 1.
- Inkstand: 1.

The most extensive concentration of bottles defines the northern, stern section of the wreck in Area B, where 115 Type 1 black glass liquor bottles cover an area of 5.7 x 3.9m

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Fig. 1. A consignment of Type 1 black glass liquor bottles in Area A on the Jacksonville 'Blue China' shipwreck.



Fig. 2. Overview of Area A showing a consignment of Type 1 black glass liquor bottles north of a large concentration of British ceramics.



Fig. 3. Detail of Type 1 black glass liquor bottles in Area A.

on both the eastern and western side of the keel (Figs. 6-10). Two Type 4 Sands's Sarsaparilla medicine bottles lie on the western edge of keg K1 and two glass oil lamp globes and two lamp fonts with bases were recorded 1.5m to its northwest.

The second most extensive concentration of glass bottles occurs in Area A, the starboard bow, immediately north of a dense cluster of British ceramic cargo wares (Figs. 1-4). Some 65 Type 1 black glass spirits/liquor bottles, three transparent glass tumblers and two Type 3 transparent long-necked sauce/utilitarian bottles cover an area of 2.0 x 1.9m. One Type 6 green glass cologne bottle is present on the southern flank of the main ceramics cluster.

Immediately north of the large keg K6 in Area E2 is a rich deposit of small finds, including a glass salt cellar (Fig. 18), a glass inkstand and two light aqua Type 3 sauce/utilitarian glass bottles on the northwestern side of keg K7. These wares are associated with part of a brass and glass sextant and a brass hinge, which may denote the position of the stern galley remains. An additional Type 8 cobalt blue 12-paneled cologne bottle juxtaposed with a lead ingot and a series of at least six degraded wooden kegs is present in Area D (Fig. 11).

Area G contains the scattered remains of cargo ceramics and glasswares within an area of 6.7 x 3.0m, which has seemingly been heavily impacted by fishing trawlers' bottom gear. A 7.2m-long and 0.7m-wide narrow band extending down the northwestern side of this zone, terminating at the northern end of Area A, contains 25 scattered glass tumblers (Figs. 15-16, 20). Area G merges with Area F on the eastern, port side of the wreck, where a further seven tumblers were recorded. Two more tumblers are present in Area A, one in Area B, four in Area D, four in Area E and one next to concretion CN1. The tumblers in Areas F and G are contextualized with a spread of glass window panes on either side of the keel covering a 1.8 x 1.3m section of wreckage in the northern end of Area D and parallel to a second 1.8 x 1.2m cluster in Area F (Figs. 12, 17, 19).

The glassware assemblage, from which a small sample of 52 artifacts was recovered for study (Table 1), seems to comprise remains of a larger cargo that no longer survives, having been severely impacted or dragged by bottom trawlers (select excavation encountered insufficient stratigraphy to conceal significant additional cargo). The glasswares are all American products indicative generally of production in the decades 1840-60, when glassmaking was becoming one of the largest and most important industries in the country. Having undergone severe fluctuations in successes and failures over the decades, by the latter part of the century America's glass production was identified as being the US's most highly developed industry (Henderson, 1893: 434).

Class	No. Recovered	Height (cm)	Date Range	Content
Type 1 bottle	6	26.5	c. 1850s to c. 1860	Spirits/liquor
Type 2 bottle	1	18.2	1820s to c. 1860	Mineral water
Type 3 bottle	2	21.4	1830s to c. 1860	Sauce/utilitarian
Type 4 bottle	4	15.3	1839 to c. 1860	'Sands's Sarsaparilla' medicine
Type 5 bottle	7	13.5	c. 1840-1860	Medicine
Type 6 bottle	2	19.1	c. 1830s-1860	Cologne
Type 7 bottle	1	13.0	1820s to 1860s	Cologne
Type 8 bottle	1	18.8	1830s to late 1850s	Cologne/ toilet water
Type 9A bottle	9	16.5	Late 1840s to c. 1860	Spices/condiments
Type 9B bottle	total	11.8		
Smooth-sided tumbler	5	8.9	c. 1845-75	----
Fluted tumbler	10	9.0	c. 1845-75	----
Oil lamp font & base	1	21.2	c. 1840-1870	----
Oil lamp globe (semi-opaque glass)	1	16.2	1850s to 1880s	----
Oil lamp globe (ruby red)	1	19.8	1850s to 1880	----
Salt cellar	1	5.0	c. 1835 and 1860	----

Table 1. Classes of glasswares recovered from the Jacksonville 'Blue China' shipwreck (Site BA02).

The small sample of glass bottles recovered during the rescue excavation of the Jacksonville 'Blue China' shipwreck comprised:

- Six Type 1 long-necked black glass spirits/liquor bottles (Figs. 29-31).
- One Type 2 dark olive green black glass mineral water bottle (Figs. 33-36).
- Two Type 3 long-necked aquamarine sauce/utilitarian bottles (Figs. 38-41).
- Four Type 4 rectangular aquamarine 'Sands's Sarsaparilla' patent medicine bottles (Figs. 42-47).
- Seven Type 5 cylindrical, tapered vial-like aquamarine medicine bottles (Figs. 49-53).
- Two Type 6 transparent olive green glass cologne bottles (Figs. 54-56).
- One Type 7 colorless glass figural cologne bottle (Figs. 57-62).
- One Type 8 12-paneled cobalt blue glass cologne/toilet water bottle (Figs. 63-66).
- Nine Type 9 rectangular aquamarine spice or condiment bottles (two different sizes/varieties) (Figs. 67-74).

None of their paper and/or foil labels has survived intact and only one bottle type has an embossment defining the company and product name. The wooden packing crates that would have typically carried the stenciled names of the company and bottled product, or possibly the

merchant consignee to whom the goods were being shipped, were also no longer preserved. In their absence, attributing the Jacksonville 'Blue China' glassware to particular glass factories is largely impossible, with the exception of a few pattern glass artifacts that exhibit distinctive features. As with Site BA02's ceramic wares, the glassware cargo was probably intended for delivery to a coastal port along the southeastern United States or perhaps in the Gulf of Mexico (such as New Orleans, from where some of these goods may have been shipped up the Mississippi to the Western frontier or south to Central and South America).

2. Mid-19th Century US Glassworks

The growth of the bottle industry throughout the 19th century hinged on a combination of factors. Urbanization and a rising standard of living increased the markets for products that had formerly been produced in the home, such as liquor and preserved food, and for other products like carbonated beverages and medicines that had previously been consumed in limited quantities. The greater demand for packaged goods boosted the use of sealed glass containers, guaranteeing consumers that the contents were untainted and sanitary. Packaging also permitted customers to bring home and store products for later use. Further developments in road and canal communications, as well as steamboats and railroads, necessitated the production of



Fig. 4. Detail of Type 1 black glass liquor bottles on the west flank of Area A.



Fig. 5. A Type 9A large glass condiment bottle alongside a Canton porcelain ginger jar northwest of Area A.



Fig. 6. Overview of a second consignment of Type 1 black glass liquor bottles in Area B, east and west of the keel.

more bottles and other glassware to protect and preserve goods during shipment. Customer confidence was also reassured by the application of brand names in the form of company labels and/or embossments (Busch, 2000: 176).

The diversity of the Jacksonville ‘Blue China’s glass cargo provides a unique window into America’s thriving glass industry *c.* 1854, the most likely date of the ship’s loss based on available data analyzed. By the mid-19th century, factories, firms, and workers were increasingly specializing in various branches of glassmaking, including the manufacture of flat glass (plate and window glass), tableware and bottles, the latter of which were particularly vital to US merchants and druggists, who relied on vast volumes to conduct their business – a burgeoning industry that just 50 years previously was still in its infancy, eclipsed by more expensive imported bottles (Busch, 2000: 175).

Whereas only a verified eight (and no more than 11 or 12) glassworks are known to have been operating across America in 1800 (Davis, 1949: 28; McKearin and Wilson, 1978: 68), within two decades at least 33 glasshouses were in existence. Of the 71 such factories operational by 1832, over half produced glass bottles as either their main output or as a sideline. The industry continued to grow and 50 years later 169 glasshouses were manufacturing annually over 70 times the number of bottles produced in 1820 (Busch, 2000: 176; McKearin and Wilson, 1978: 68-70). Virtually all of the US glassworks were located in three major geographical regions: New England, the Middle Atlantic States and the Midwest (McKearin and Wilson, 1978: 68-70).

Most of these opened in the wake of the 1824 protective tariff designed to safeguard American industry, including glass production and trade, from cheaper imported British commodities (Busch, 2000: 176; McKearin and Wilson, 1978: 69, 70). The US had recently witnessed a period of technological innovation in the bottle manufacturing industry that increased productivity. The adoption of full-size multi-section molds around 1810, for instance, facilitated uniformity and speed. The subsequent growth in manufacturing was naturally accompanied by a decrease in bottle prices. By the latter part of the 19th century, beer, soda and whiskey bottles were valued at \$3.75 per gross, which was roughly half their cost earlier in the century. This was still relatively expensive compared to other products, such as basic provisions like pork, which in 1853 sold in San Antonio, Texas, for 11 cents per pound and coffee from Rio for 12.5 cents per pound (*Southwestern Historical Quarterly*, October 1947: 170). The skilled labor required for blowing glass kept bottle prices high. Demand for bottles continued to grow, nevertheless, so much so that it still exceeded supply (Busch, 2000: 176-7).



Fig. 7. Mixed glass bottles to the southwest of Area B on either side of the keel: Type 1 liquor bottles in the background and a Type 4 Sands's Sarsaparilla bottle and a Type 5 tapered medicine bottle in the foreground.



Fig. 8. Type 1 black glass liquor bottles alongside keel K4 and the keel in Area B.



Fig. 9. Type 1 black glass liquor bottles and Type 5 cylindrical medicine bottles in Area B intermixed with clay tobacco pipes.



Fig. 10. Type 1 black glass liquor bottles and two Type 5 cylindrical medicine bottles in Area B intermixed with clay tobacco pipes.



Fig. 11. A Type 8 cobalt blue glass cologne bottle alongside small wooden kegs, glass window panes and a lead ingot in Area D.



Fig. 12. A Type 9B small glass condiment bottle in Area F, with glass window panes on either side of the keel. Mixed pottery is visible in the background.



Fig. 13. A Type 6 olive green glass cologne bottle on the southeastern edge of Area G.



Fig. 14. Type 3 glass sauce/utilitarian bottles scattered around concreted keg K7 in Area E3 in association with clay tobacco pipes.



Fig. 15. Fluted glass bar tumblers in situ in Area G.



Fig. 16. Fluted glass bar tumblers in situ in Area G.



Fig. 17. Glass tumblers in Area D2 in association with glass window panes.



Fig. 18. A glass salt cellar in situ next to keg K6 in Area E2.

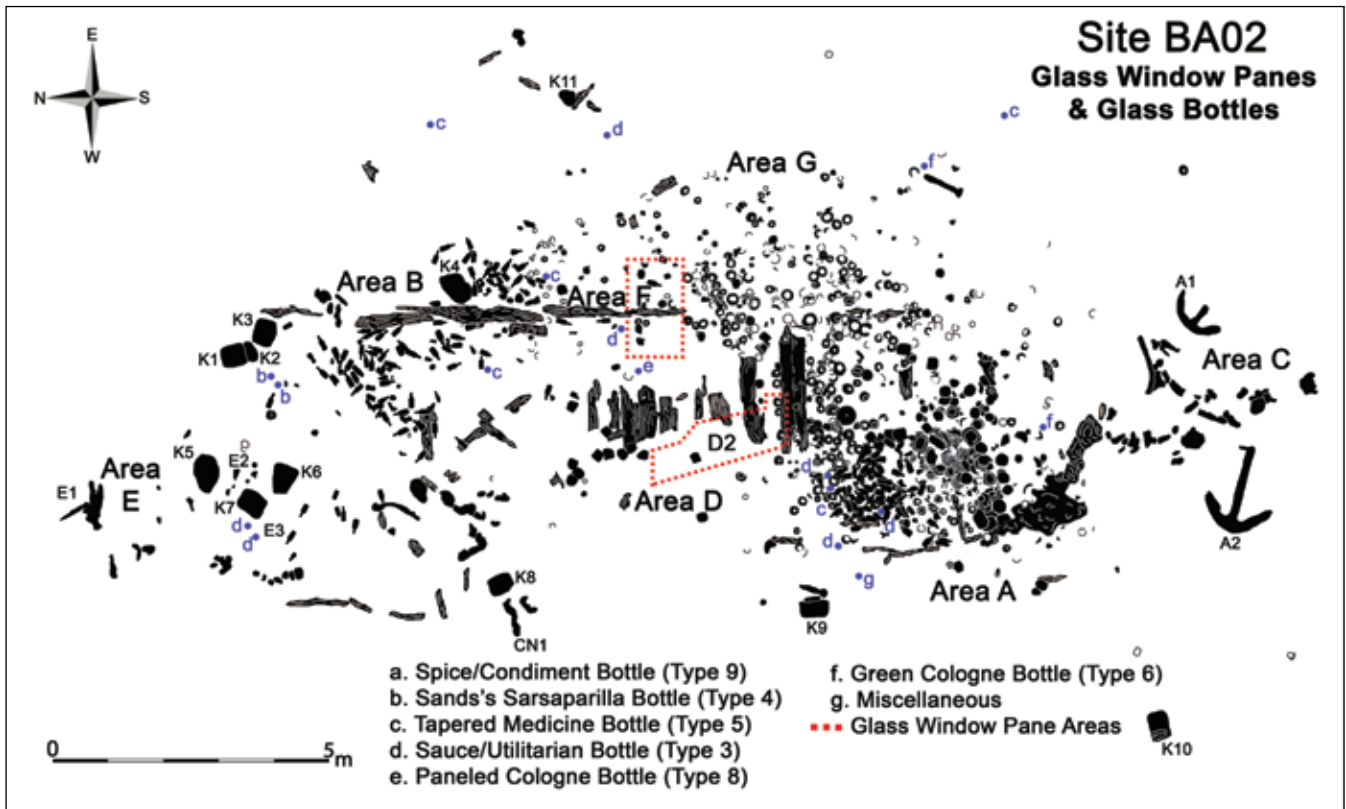


Fig. 19. The distribution of American Type 3-9 glass bottles and window panes on Site BA02.

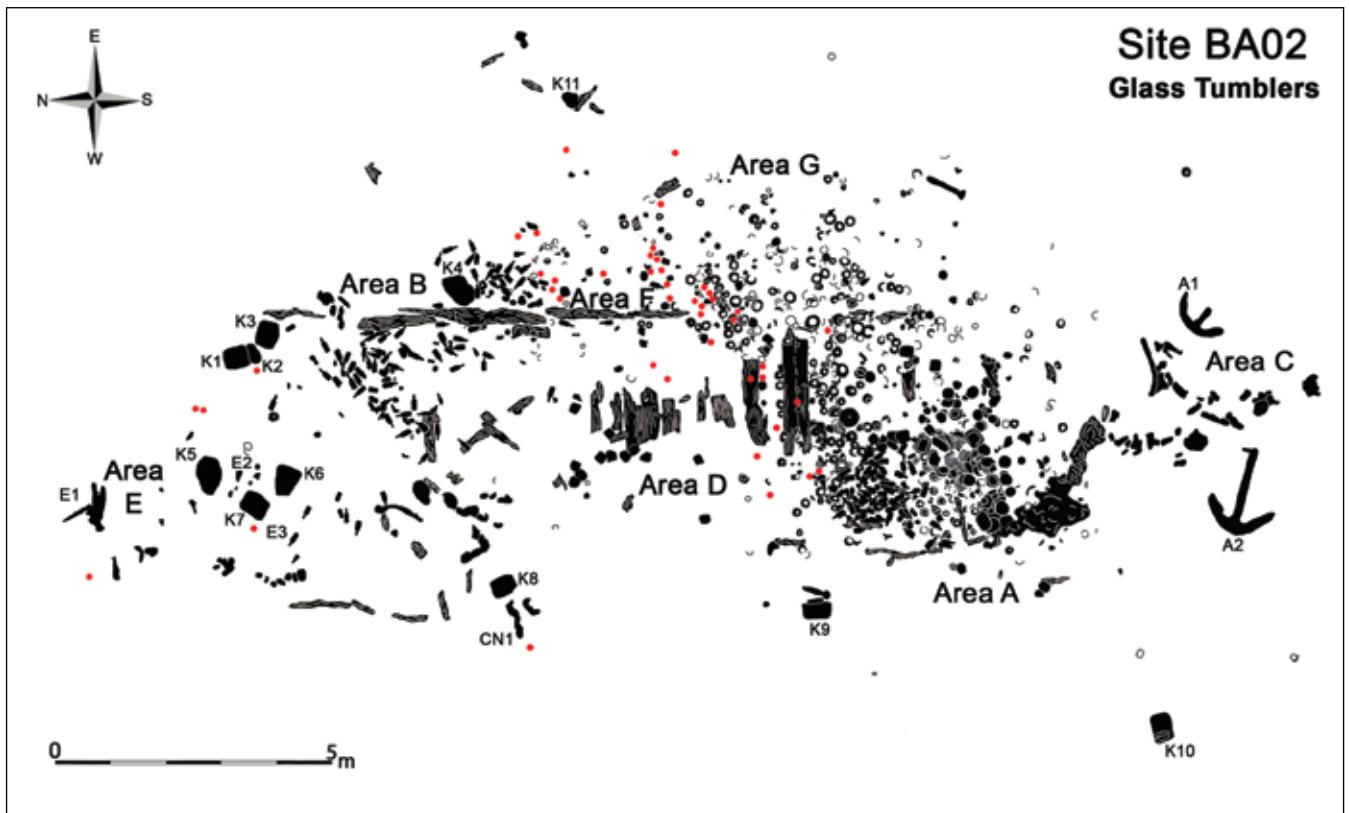


Fig. 20. The distribution of American glass tumblers on Site BA02.



Fig. 21. A trade card issued by the Liebig Company of New York for the European market featuring late 19th-century glassblowers at work next to a glass furnace. Photo: courtesy of SHA/BLM Historic Glass Bottle Identification & Information Website.



Fig. 22. A glass blower and mold boy in a glass factory at Grafton, Virginia, in October 1908. Photo: courtesy of the US Library of Congress.



Fig. 23. Workmen washing, filling and crowning mineral water bottles in November 1918 in a plant run by the New York State Conservation Commission in the New York State Reservation, now Saratoga Spa State Park, near Saratoga Springs. Photo: New York State Archives, 14297-87, SARA No.375.

While a comprehensive overview of the US glassworks operating in the mid-1800s is beyond the scope of this paper, this brief outline offers insights into some of the regional firms located within reasonable transportation distances from New York City, the suggested port of origin for the Jacksonville 'Blue China' vessel. These produced glasswares contemporary with the ship's lifespan and their output included the manufacture of bottles and vials. For most glasshouses in the region under discussion, as well as across the country, bottles were unmarked (not embossed with proprietary information relative to the glass maker or user of the bottle) (McKearin and Wilson, 1978: 89). This fact is confirmed by the anonymity of the recovered Site BA02 bottle assemblage.

Of particular relevance is the southern area of New

Jersey, which in the first three decades of the 19th century became a regional center of glass manufacture that continues today. Most of the factories were located in the flat, wooded part of southern New Jersey, where suitable sand for glass was abundant, as was wood for furnace firing, potash and building materials. Like most glassworks of this era, the majority of 'South Jersey' firms were built on or near waterways, railroads and turnpikes, providing easy access to city markets, and in particular, to Philadelphia, where companies had established agents and outlets (McKearin and Wilson, 1978: 89). While most were window glasshouses, a number of manufactories specialized in bottles.

One such example was Glassboro's Harmony Glass Works (1813), which, like many such companies, experienced multiple ownership changes, later becoming

Whitney Brothers (1839-87) and finally the Whitney Glass Works (1887-1918) (Toulouse, 1971: 519-24). This long-lived factory apparently turned out a large variety of vials, bottles and druggist wares of every description, as well as wines, porters (a dark colored beer similar to stout) and Dutch gin bottles “equal to the best in Europe”, as an 1857 circular recognized (McKearin and Wilson, 1978: 92). Other ‘South Jersey’ factories that may have contributed to the Site BA02 cargo included the Waterford Glass Works (1822-80), whose output regularly consisted of window glass, bottles and flasks; the Washington Glass Works (1839-1917; called the Williamston Glass Works by the 1850s) located in Williamstown, Camden County (McKearin and McKearin, 1941: 603); and the Millville Glass Works and its later manifestations (1844-1938) (McKearin and Wilson, 1978: 90-95).

Closer to New York City, Philadelphia’s Union Glass Works opened in 1826 and, following a fire in the 1840s, was reopened in 1847 by the firm of Hartell and Lancaster, primarily for the production of bottles. An 1858 advertisement for this company lists an assortment of bottles being sold, including druggist glass, wine, porter and mineral water bottles (McKearin and Wilson, 1978: 88-9). Another high probability Philadelphia bottle-producing company conducting significant business in the region was the Dyottville Glass Works, which underwent various ownerships and renaming from its founding about 1816 to its demise in 1923. This company produced “vast quantities of various kinds of bottles and flasks” during the mid-19th century (McKearin and Wilson, 1978: 79-88; Toulouse, 1971: 171).

Further west, the plethora of glass factories in the Pittsburgh area, as well as neighboring Ohio and West Virginia, could well have been a source of some of the Jacksonville ‘Blue China’ vessel’s bottle cargo given the efficiency and regional expansion of railroad transportation by the 1850s. Strong possibilities include the larger producers of bottles (known as ‘hollowware’), such as the Pittsburgh firms of Ihmsen & Sons (1836-68 onwards), Samuel McKee & Co. (1834-86), A. & D.H. Chambers (1841-88), Cunningham & Co. (1845-1930), William McCully & Co. (1841-86) and possibly other smaller concerns in Ravenna and Zanesville, Ohio. Additional firms included glasshouses in Wheeling and Wellsburg, West Virginia (McKearin and Wilson, 1978: 153-69).

Finally, New York State itself possessed a number of bottle-producing glasshouses operating in the 1850s, which could have contributed some of the bottles discovered on Site BA02. These included the upstate factories of the Lockport Glass Works (1843-80s) and the Mount

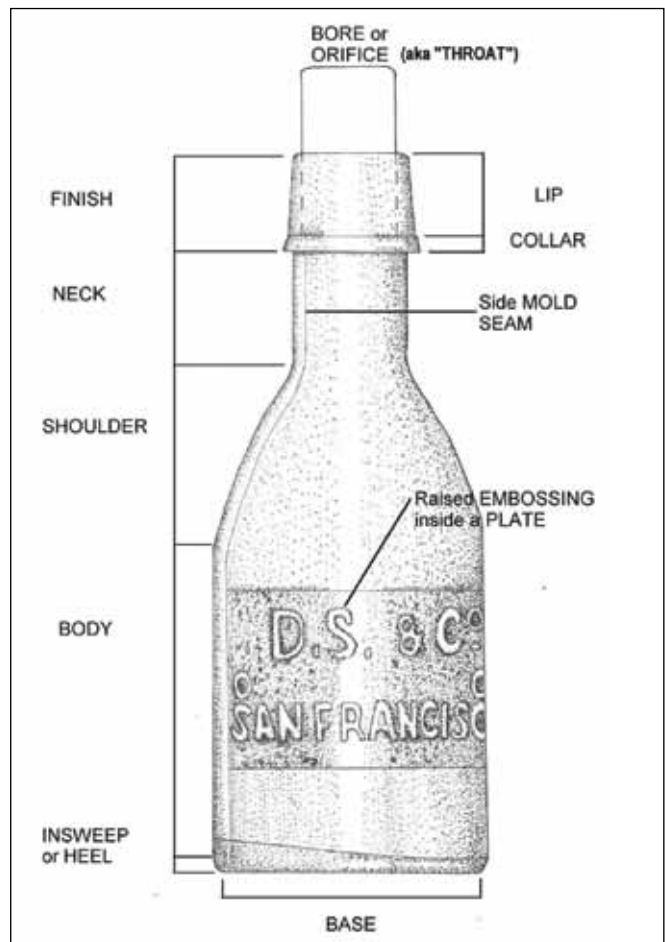


Fig. 24. A stylized 19th-century mineral water bottle with the standard morphological components located and named, as used in this paper for descriptive purposes. Drawing: Peggy Corson. Photo: courtesy SHA/BLM ‘Historic Glass Bottle Identification & Information’ website.

Vernon Glass Works in Mt. Pleasant (1844-90), both of which were known producers of the ‘Saratoga’ style of bottles corresponding to the Site BA02 Type 2 discussed below (McKearin and Wilson, 1978: 137-42, 234-35; Tucker, 1986: xii-xiii). In addition, as noted below in the discussion of the Type 1 spirits/liquor bottles, both the Brooklyn Glass Works (1831-76) and the Ellenville Glass Works (1836-96) northwest of New York City are viable candidates for the production of this bottle type in particular.

The assorted Site BA02 glass cargo reflects the manufacturing developments that characterized the United States during the seven decades following its independence, indicative of an emerging economy still reliant on British ceramic imports, but increasingly becoming self-sufficient through a booming domestic market in American glasswares. Significantly, this combined cargo exemplifies the

wide range of affordable goods readily available to the average American consumer and provides insights into the social, cultural and economic trends of the period.

3. 19th-Century Glass Bottles: Limits of Interpretation

The dating and classification of the Site BA02 glass bottles is based largely on their shape, mode of manufacture and to a lesser extent on their color, which together provide a general production timeframe of 1840-60. This is consistent with the independent dating of the Jacksonville 'Blue China' wreck to around 1854. The interpretation of the Site BA02 bottles also benefits from comparative analysis with examples recovered from contemporary marine and terrestrial sites, particularly well-preserved examples retaining their company labels and/or remains of contents.

Similar assemblages derived from far-flung historic sites also contribute to a better understanding of the extensive trade networks that developed in the mid-19th century and supplied American consumers east and west. The coastal schooner represented by the Jacksonville 'Blue China' wreck played a role in the country's early maritime commerce along the Eastern Seaboard and reflects the variety of products traded and transported from the crowded docks of New York at the time.

The majority of American bottles produced from the early 1820s until after the turn of the 20th century, which witnessed the development of semi-automatic and automatic bottle machines, were largely mouth-blown examples (blown by human lungs) manufactured in multi-section molds typically made of cast iron and brass, although ceramic and wooden molds were not uncommon. When forming the shape of the bottle, molds leave behind diagnostic physical features reflecting the manufacturing techniques used, which helps to determine not only production methods but is also a useful index of chronology.¹

Consistent with these production trends, the Site BA02 assemblage represents mostly mold-blown examples, with the exception of two bottle forms (Type 3 and Type 6) that appear to have been free-blown, possibly with the aid of a one-piece dip mold (a tool used to assist in free-blown production to gain uniformity and consistency in the shaping of the body and sometimes the base) (Griffenhagen and Bogard, 1999: 103; Lawrence, 2006: 372; McKearin and Wilson, 1978: 14; Walbridge, 1920: 67-9). Free-blown bottles were typically produced without a mold, instead being formed and shaped by the skills of the glassblower using manipulation of the blowpipe and various hand tools. Bottles formed without a mold will generally not be symmetrical in body, shoulder, neck or

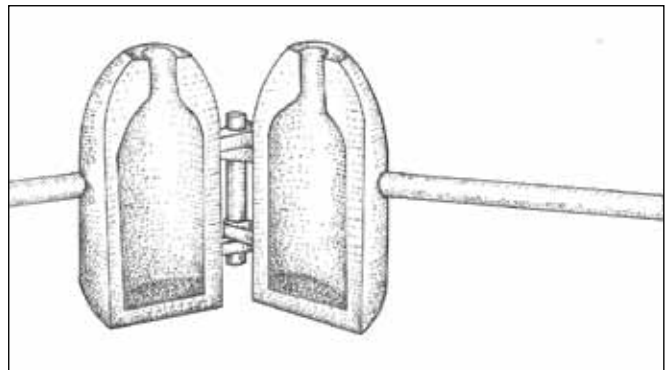


Fig. 25. A true two-piece, side-hinged bottle mold. Drawing: Peggy Corson. Photo: courtesy SHA/BLM 'Historic Glass Bottle Identification & Information' website.

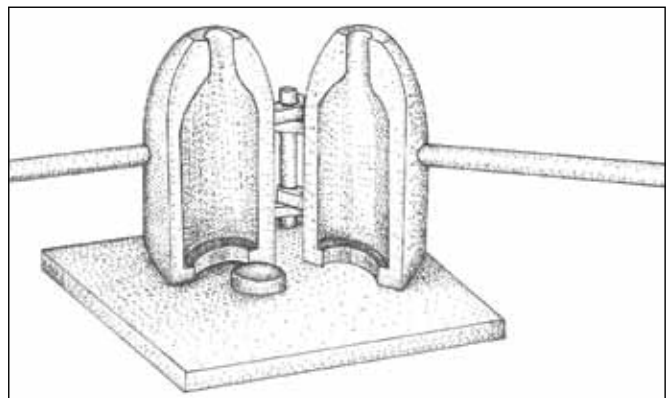


Fig. 26. A side-hinged, two-piece bottle mold with a separate post-style base plate ('post-bottom' or 'post-base' mold). Drawing: Peggy Corson. Photo: courtesy SHA/BLM 'Historic Glass Bottle Identification & Information' website.

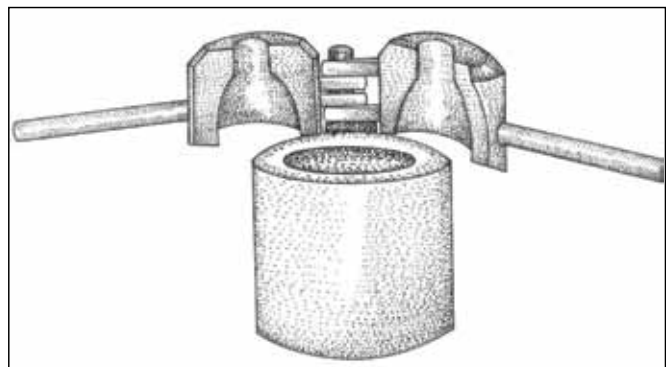


Fig. 27. A three-piece mold comprised of a one-piece body/base mold part ('dip mold') surmounted by a two-part, side-hinged shoulder/neck forming mold. Drawing: Peggy Corson. Photo: courtesy SHA/BLM 'Historic Glass Bottle Identification & Information' website.

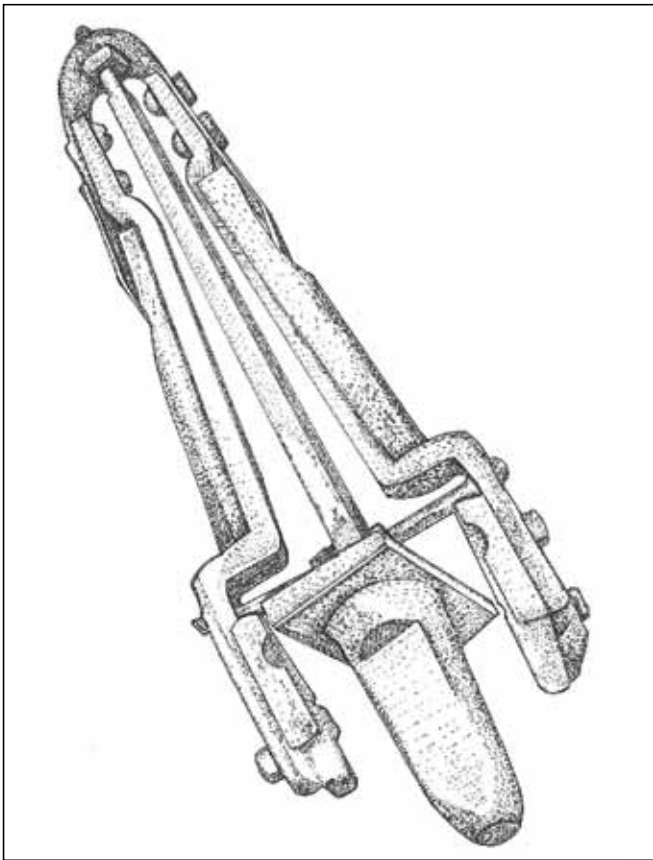


Fig. 28. A finishing or lipping tool used to form ("finish") the conformation of a bottle lip (the "finish"). The tool's central plug fitted inside the bottle bore, so that when the tool was rotated the opposing pads on the caliper ends formed the outside of the finish while the glass was still hot and pliable. Drawing: Peggy Corson. Photo: courtesy SHA/BLM 'Historic Glass Bottle Identification & Information' website.

base shape and will not incorporate mold seams, embossing or molded decoration. Although less common, bottles produced by free-blown manufacture were still available up until about the American Civil War of 1861-65.

The bases of early to mid 19th-century bottles – both free-blown and mold-blown – usually feature some type of pontil mark or scar derived from the long iron pontil rod usually fixed to the base of the bottle with a small glob of glass to enable a worker to hold the bottle to complete the 'finishing' of the mouth and lip (cf. Fig. 24 for bottle terms used in this paper). Typically a ring or strip of hot glass was added to the neck of the bottle at the point where the blowpipe was removed and was subsequently shaped to form a smooth rim that took a cork stopper. The finish was formed while the bottle was rotated by another glass-worker holding it by the base with the pontil rod. When the bottle was finished, the rod was snapped off, frequently leaving a patch of roughened glass or a pontil scar on the base (Jones, 2000: 156; Lawrence, 2006: 372). The

different empointing techniques included the plain glass-tipped pontil, the sand glass-tipped pontil, the blowpipe as pontil and the bare iron pontil, each of which left a characteristic mark or scar (Jones, 2000: 156). The Site BA02 bottles exhibit evidence of the sand, glass-tipped or blowpipe pontil scars. No bare iron pontil marks were apparent.

In the 1840s, a new method of holding bottles during finishing was developed, which is a useful chronological marker, whereby a 'snap case' or an iron cradle held the post-mold hot bottle by the base and/or body while the finish was being completed. The snap case gradually replaced the various types of pontil rods and empointing techniques and was one of the most significant inventions that facilitated more efficient production during the mid-19th century. Unlike the pontil rod, the snap case left little, if any, marks or other physical evidence on the bottle (Lawrence, 2006: 372; McKearin and Wilson, 1978: 14). Examples with pontil scars largely disappeared by the late 1860s as various 'snap case' tools replaced the use of the pontil rod to grasp the hot bottle for finishing the lip. Significantly for our understanding of the transition between these techniques, this 'new' technology is absent from the Site BA02 glass bottle assemblage, which clearly looks back rather than forward in time in terms of tradition.

In effect, the presence or absence of pontil marks or scars, and the specific type of mark derived from different empointing techniques, is a very useful tool for dating 19th-century bottles. The presence of distinctive pontil scars on all of the Site BA02 bottles establishes a general end date of 1860 for their production. However, the transition from the use of the pontil rod to the snap case occurred over a period of many years and at different times and contexts dependent on the adoption of the newer technology by a specific factory and its craftsmen.

Only one bottle type amongst the Jacksonville 'Blue China' assemblage features an embossed company name useful in dating and identifying the bottled product (the Type 4 Sands's Sarsaparilla medicine bottle, see Section 7 below). The other bottle types, however, can largely be identified and dated by shapes closely associated with distinct products, such as liquor, medicine, mineral water, condiments and cologne/perfume (Fike, 1987: 13), although this is far from an exact science.

It is important to bear in mind that bottle reuse was common in the 19th century and even earlier, when supply in America could not meet the growing demand. Archaeological excavations have demonstrated that bottles could be retained for decades and reused multiple times before being discarded. For example, wine bottles excavated from the John Curtis house in Williamsburg, Virginia, were at

least 20 years old when they were deposited. Other 18th-century sites present a similar scenario (Busch, 2000: 176).

Customers habitually returned their empty bottles directly to merchants and druggists in return for cash (McKearin and Wilson, 1978: 229-30) or took their own bottles to druggists to be refilled. Thus, even medicine bottles might contain a different product to what they originally held (Busch, 2000: 177). Old bottles had both trade and property value. It was not unusual to offer customers three shillings or more a dozen for returns. Entrepreneurs, including brewers, snuff manufacturers and druggists, who needed bottles to market their products, offered cash or goods for both new and old bottles. Merchants strove to sustain supplies by offering reduced prices for returns. For example, in May 1774 a New York brewer sold a dozen new bottles of beer for 10 shillings, but for seven shillings if the bottles were returns (Busch, 2000: 175). In a similar vein, a dealer from Hartford, Connecticut, offered a dozen bottles of porter for 16 shillings, two pence or at the discounted price of 12 shillings if the bottles were returns (McKearin and Wilson, 1978: 230).

Bottle reuse was also customary in bars and saloons, where whisky was purchased in barrels and then served to customers in bottles. Each morning bartenders refilled empties from the night before. Firms devoted entirely to the trade in used bottles emerged as big business, with middlemen facilitating their transfer between manufacturers, merchants and consumers. The first such company allegedly opened in New York City in the late 1840s. By the end of the century the second-hand bottle business was thriving throughout America's cities (Busch, 2000: 177).

Although color is generally of limited use in classifying a bottle's age or content type, it offers some insights into chronology. The Jacksonville 'Blue China' assemblage consists largely of pale or light aquamarine examples, which are indicative of production in the 1850s and later. Medicine, sarsaparilla and utilitarian bottles made during the period 1830-40 were typically a darker colored glass – ambers, greens and deeper shades of aquamarine.

Analysis of the recovered bottles from Site BA02, based largely on the above factors of production, has permitted the following descriptive identifications and dating to be proposed. This study includes an overview of the bottles in both an historical and archaeological context in light of the social, economic and cultural trends prevalent in mid-19th century America.

4. Type 1 Spirits/Liquor Bottles

As with all of the bottles recovered from Site BA02, the six Type 1 spirits/liquor bottles were found empty (Figs. 1-4,

6-10, 29-31). They would have been sealed originally with cork stoppers, which either imploded during the schooner's sinking as a result of pressure or degraded over the decades within the corrosive marine environment. The half dozen liquor bottles retrieved represent a small fraction of the 193 cargo bottles of this type recorded on the wreck.

Type 1 spirits/liquor bottles are tall, moderate width cylinder 'fifth' capacity containers (approximately one-fifth of a gallon) with a combined body and shoulder height that is greater than 1.5 times (but less than 1.8 times) the combined height of the straight-sided neck and finish. The base is composed of a flat exterior ring with a moderately domed bell-shaped center plate, which exhibits a sand pontil scar typical of the period. The base diameter is slightly less than one-third the height of the entire bottle. The applied finish is of the 'mineral' style that was common on pre-Civil War American liquor bottles in many forms (plus many other bottles). Type 1 exhibits a horizontal mold seam at the base of the gently rounded shoulder and two opposite and perpendicular (to the shoulder seam) vertical shoulder/neck seams typical of bottles produced in a three-piece mold (known as a Ricketts' patent mold style in the 19th century; Fig. 27).

The Type 1 bottles display the following dimensions: H. 26.5cm; W. mid-body 8.1cm; max. W. of shoulder 8.2cm; neck H. 7.2cm; total finish H. 1.8cm; collar H. 0.6cm; collar W. 3.0cm; lip H. 1.2cm; neck W. 4.0cm; bore Diam. 1.8cm; rim Th. 0.3cm; body H. 14.8cm; shoulder H. 2.8cm; base Diam. 7.9cm; weight: 583gr.

Liquor of all types – bourbon, rye, gin, cognac and scotch – was bottled in a wide variety of shapes and sizes in mid-19th century America, ranging from small flasks holding a few ounces to larger bulk containers, such as demijohns and carboys that stored gallons. Although the diversity of 19th-century liquor bottles is enormous, distinct forms and shapes permit specific examples to be correlated to particular contents.

The Jacksonville 'Blue China' wreck examples are representative of a common spirits/liquor bottle type with bodies that are moderately slender in cross-section with a long, tapering narrow neck, a form that evolved from the wider and squatter late 17th/early 18th-century English cylindrical 'onion' bottle made of dark green glass and typifying some of the earliest types found in North America. Like its predecessor, the Type 1 bottles are typically associated with any number of liquors from rum to whiskey and brandy and frequently even contained wine. This popular three-piece molded cylinder bottle, commonly referred to as a 'patent style cylindrical fifth' (one-fifth of a gallon), was manufactured by numerous eastern American glasshouses from 1844 until about 1880, with production



Fig. 29. Type 1 black glass spirits/liquor bottle BC-05-00002-BE, H. 26.5cm.

concentrated in the decades between the 1850s and 1870s (Jones, 1986: 29; McKearin and Wilson, 1978: 207, 219).

Although the Site BA02 Type 1 examples are all unmarked – not uncommon for the time – similar bottles of the period are embossed on their bases with the names of the major, largely East Coast, glassworks active during the height of this bottle types' popularity. Identified embossments include the Dyottsville Glass Works of Philadelphia, Pennsylvania, a company that was in business from 1833 to 1923; Weeks & Gilson of South Stoddard, New Hampshire (1853-73); Whitney Glass Works (Harmony Glass Works until 1835) of Glassboro, New Jersey

(1813-1918) (Griffenhagen and Bogard, 1999: 105); Willington Glass Works of West Willington, Connecticut (1814/5-72); Ellenville Glass Works of Ellenville, New York (1836-96); Bushwick Glass Works of Brooklyn, New York (1865-90s); Cunningham & Ihmsen of Pittsburgh, Pennsylvania (1857-78) and W. McCully & Co., also of Pittsburgh, Pennsylvania (1841 to late 1860s), amongst others (McKearin and Wilson, 1978: 220-21).

The three-piece molds relied on to make cylinder liquor bottles, as exemplified by the Site BA02 Type 1 bottles, were often referred to as a Ricketts mold, one of the United States' earliest multi-section mold types (Fig. 27). This technology utilized one large body piece from base to shoulder and two shoulder sections that folded out to allow the bottle to be removed after blowing. It also permitted the name of the glassworks or company and the address to be molded onto the outer rim of the base. First used in England c. 1814, the mold was later patented in 1821 or 1822 by Henry Ricketts of Bristol, England, and then adopted by many US glassworks by the 1830s, making its presence in archaeological contexts a good index of chronology (Jones, 2000: 154; McKearin and Wilson, 1978: 216; Sutton and Arkush, 1996: 177).

The Ricketts mold standardized the size of most categories of spirits (and wine bottles) in the first half of the 19th century. It also enabled an interchangeable 'slug' plate to be added to the bottom of the mold, which could be used to emboss a company name. Production in a three-piece mold leaves a diagnostic horizontal mold seam around the bottle at the junction of the body and shoulder. The Jacksonville 'Blue China' Type 1 examples are indicative of the classic three-piece Ricketts mold type spirits bottle of American manufacture (unlike the true Ricketts' bottles that were of English manufacture).

The Site BA02 'cylindrical fifths' feature an applied 'mineral' finish, a common lip form seen on this bottle type. A sand pontil scar present on the base of the bottle is of a form that was popular on English dark green glass wine bottles from the 18th century onwards and similar American-made bottles of the first half of the 19th century (Jones, 2000: 156). This particular mark derives from a common method of emponitilling a bottle so that it could be securely held for finishing. The pontil scar was formed when the hot glass on the ball-shaped tip of an iron pontil rod was dipped in sand (or small glass chips) prior to application to the bottle base. The sand or glass chips were apparently intended to keep the pontil rod from adhering too closely to the bottle, facilitating easier removal. This form of sand pontil conformed better than other pontil types to molded base shapes without causing distortion (Jones, 2000: 156; Van den Bosche, 2001: 64).

The Type 1 bottles' round bodies, an inherently strong shape, were made of thick glass to survive extensive post-bottling handling, which was essential because this bottle type was typically reused many times. These liquor bottles are of a dark olive green glass often referred to as 'black glass': it is typically so dense that the color appears visually to be black. Other much less common 'black glass' colors include dark ambers, deep reddish purple and other more rare hues. The dark color was produced by combining many proportions of substances and impurities, most usually high concentrations of iron, but also carbon derived from ashes or copper with iron and magnesia. These raw materials produced a strong and resilient glass whose dense color best protected the contents from the effects of sunlight, thus preventing spoilage (McKearin and Wilson, 1978: 9-10).

The process for making black glass, one of the oldest bottle colors, was commonly employed by glass blowers in Britain in the 17th century, although the term apparently was not adopted until the following century, when advertisements in American newspapers of the 1740s offered for sale 'black-glass-bottles' (Jones, 1986: 11; McKearin, 1978: 10). By this time it would appear that the production of black glass was known to glass makers in the 'colonies', where it was being produced in some quantity. Most black glass bottles were intended to contain liquor, wine and ale for which protection against light was an important quality. Between the 1840s and 1880s, in particular, they were mass-produced as a cheap container in a thousand shapes and sizes. Black glass bottles and fragments are ubiquitous on historic sites pre-dating the last quarter of the 19th century.

Of particular interest for the period under discussion and the Jacksonville 'Blue China' Type 1 wares are the comparable black glass liquor bottles recovered from the Hoff Store site, which collapsed into San Francisco Bay during the 'Fifth Great Fire' that ravaged the city on 3-4 May 1851. Situated along the south side of Howison's Pier, hundreds of W.C. Hoff's bottles containing preserved foods, medicines, toiletries, alcoholic beverages and various other contents for retail purchase were deposited into the muddy waters and many were excavated with their sealed contents intact (McDougall, 1990: 58).

The largest class of bottles represented by the Hoff Store assemblage was alcoholic beverages (49.5% of the total) of which two types were recovered: black glass, many of which are seemingly identical to the Jacksonville 'Blue China' liquor bottles, and other bottles reserved for wine and champagne. Black glass bottles blown from both dark olive green and amber glass predominate, totaling 258 examples (64.6% of the alcoholic beverage class). Some



Figs. 30-31. Detail of the finish and base of Type 1 black glass spirits/liquor bottle BC-05-00002-BE.

80 bottles exhibit morphological characteristics that are thought to reflect contents of brandy (cylindrical liquor bottles similar to the Site BA02 examples), with four intact examples retaining their liquor content. Some of the Hoff Store bottles exhibit embossed bases advertising an original content of ale (McDougall, 1990: 58-61). By the time they were lost, many of the examples may have been recycled and used for other products, which, of course, cannot be discounted for the Site BA02 cargo. The wreck's Type 1



Fig. 32. 'Patent' style bottles from the wreck of the SS Republic (1865), similar in shape to and the descendants of Site BA02 Type 1. There was extensive overlap in the making of these two forms concurrently in the 1850s and 1860s.

glass bottles very likely contained any number of liquid substances within the broad category of liquors or wine.

All but two of the Hoff store bottles were formed within molds, and 77% of the mold-blown bottles (198 bottles) exhibit sand pontil scars similar to those on the Jacksonville 'Blue China' examples. Unlike the shipwreck's 'cylindrical fifths', however, a handful of the San Francisco bottles are embossed with company names – both proprietors and glass makers – including a Baltimore, Maryland, retail and wholesale grocer and a glass manufactory in Bristol, England (McDougall, 1990: 59-60). Until the 1860s there were no glass companies producing bottles on the West Coast, so all of the Hoff store bottles were either of Eastern US origin or possibly imported.

The Hoff store liquor bottles and others within the assemblage reflect the global nature of the city's maritime trade network. Around the mid-19th century, the port of San Francisco functioned as the primary commercial emporium and depot of the Gold Rush and relied on shipborne consumer goods from eastern US cities, as well as British and other imports, many of which were competing with American manufacturers, including apparently some of the Hoff Store liquor bottles (Delgado, 2009: 130-31).

By the 1850s, spirit bottles similar to the Site BA02 Type 1 examples, both embossed and unembossed, were evidently still imported from Britain to some degree. However, with the growth of American glass companies, dozens of US glassworks were now manufacturing this product

style and selling it to various liquor companies to such an extent that imports were diminishing. This development is confirmed, in part, by the other distinctly American bottles recovered from the Jacksonville 'Blue China' wreck, as well as by similar bottles excavated from other contemporary sites (discussed below).

Excavations of other mid-19th century American shipwrecks have yielded similar black glass cylindrical liquor bottles shipped as cargo, further attesting to their mass production, distribution and appeal. The form was present on the 1865 wreck of the SS *Republic*, located 150km off the coast of Georgia at a depth of 500m, not far from Site BA02 and within a similar shipping lane (Fig. 32). En route from New York to New Orleans, the steamship sank in a ferocious hurricane transporting an enormous cargo of goods. Amongst the 8,429 glass and stoneware bottles recovered by Odyssey Marine Exploration in 2003-2005 (Cunningham Dobson and Gerth, 2010: 43) were two dozen black glass 'cylindrical fifths', largely dark amber in color. The majority of the recovered spirits/liquor bottles, like the Jacksonville 'Blue China' examples, are unembossed, except for a few bearing the names of New York glassworks, including the Ellenville Glass Works established in 1836 (McDougall, 1990: 65) and the Brooklyn Glass Bottle Works operative from 1831 to 1876 (McKearin and Wilson, 1978: 134). With dozens of contemporary glassworks producing similar bottles, determining the manufacturer of the Site BA02 Type 1 'cylindrical fifths' is virtually impossible. However, given the proposed New York point of departure for the Site BA02 vessel, a glass company such as the Brooklyn firm or the Ellenville glasshouse in Ulster County, 90 miles northwest of New York City, seems a viable candidate.

The excavation of the steamboat *Bertrand*, lost in the Missouri River in April 1865 – just six months prior to sinking of the *Republic* – yielded a similarly voluminous cargo of bottled goods well preserved in deep mud and silt (Corbin, 2002a: 14; 2002b: 201; Cunningham Dobson and Gerth, 2010: 65; Switzer, 1974: 1). Of more than 6,000 bottles retrieved from the *Bertrand*, most still packed in their original wooden shipping crates and with their paper labels intact, two cases yielded 12 bottles each of 25% alcohol bourbon whiskey. These 25 and 21.5-ounce amber and dark green bottles, all made from three-piece molds, bear the embossed name of a few American companies, including the Ellenville Glass Works of New York (Switzer, 1974: vii, 29, 31). The recovery of these cylindrical liquor bottles, and their surviving packing crates bearing the names of company consignees receiving the goods, provides direct evidence of the packing methods that are likely to have been used on the Jacksonville 'Blue China' ship.

As a cost-effective measure, Type 1 spirits/liquor bottles were rarely embossed with the liquor or wine company names that ordered them (as was the case for most bottles). Embossing was not a common practice until the mid-19th century, and even then most companies chose not to do so (Fike, 1987: 4). Most firms selling their beverages did not want to incur the expensive cost of the production of private or proprietary molds, which were cost prohibitive for the majority of businesses. Thus, the far more affordably manufactured non-embossed bottles prevailed and companies found it more cost effective to simply apply their own paper label to glass containers.

According to one reliable source, in 1890 at least 60% of bottles were not embossed and prior to this date there were even fewer (Fike, 1987: 4). While plate molds (with interchangeable embossing plates) made the production of proprietary bottles cheaper, companies nonetheless still had to incur the cost of the plate and its engraving. This was still substantially less than the cost of producing a complete mold for their bottles (McKearin and Wilson, 1978: 89).

To summarize, by the mid-19th century the Type 1 spirits/liquor bottle was a generic shape, but one that is readily identifiable and associated with certain products, largely a wide variety of high-percentage alcohol liquors, including bourbon, rye, gin, cognac, scotch and even wine. As today, the consumption of such libations was enjoyed by a broad cross-section of society. The allure of numerous straight liquors was enhanced by the belief that they possessed therapeutic value. They were thus often touted as remedies for various ailments: gin for the kidneys, rum for bronchitis, and 'Rock and Rye' for the symptoms of the common cold (Powers, 1998: 77, 86-7). Whiskey was even often labeled "For Medicinal Purposes Only" (Wilson and Wilson, 1968: 67, 84, 115, 121), while Duffy's Malt Whiskey was proclaimed by the company to be "a medicine for all mankind." Advertisements and testimonials of the 1880s cited the efficacy of Duffy's Pure Malt Whiskey in curing a host of ailments including pneumonia, dyspepsia and heart trouble (Hoolihan, 2008: 209-10).

Without a company embossment the origins of the Site BA02 liquor bottles cannot be definitively identified. Comparable embossed examples recovered from mid-19th century coastal contexts, including San Francisco's Hoff Store site and the 1865 wreck of the SS *Republic*, as well as the riverine steamboat *Bertrand*, suggest that the Jacksonville 'Blue China' examples were East Coast products, quite plausibly manufactured by a New York glassworks. This hypothesis is supported by additional artifactual evidence pointing to New York as the final port of departure for the Site BA02 vessel's southbound voyage.

5. Type 2 Mineral Water Bottles

One dark olive green mineral water bottle was recovered from the Jacksonville 'Blue China' wreck, which, as with the other forms, almost certainly comprised part of a once larger cargo (Figs. 33-36). The bottle's relatively heavy and squat body (characterized by a far shorter neck than in the Type 1 wares) typifies mineral water bottles designed to survive the rigors of the high-pressure bottling process as well as extensive post-bottling handling and multiple reuse. The Type 2 bottle, as in the case of the majority of mineral water bottles, is round in cross-section because a cylindrical bottle is inherently stronger than other shapes and thus able to withstand the gaseous pressure of the product itself. Bottles made to endure internal carbonation pressure were known as 'pressure ware' in the bottle making industry.

The Type 2 mineral water bottle has a relatively short and squat body with a short neck. The body and shoulder height is about 3.5 times the combined height of the neck and finish. The base is largely flat with a slight central indentation and the presence of a sand pontil scar. The base diameter is about half the height of the body and shoulder length combined, lending the overall design a 'squat'



Fig. 33. Type 2 black glass mineral water bottle BC-05-00194-BE, H. 18.2cm.



Figs. 34-36. Detail of the finish and base of Type 2 black glass mineral water bottle BC-05-00194-BE.

appearance. The applied finish is of the 'mineral' style, which typified such bottles produced between the 1830s and the 1890s. The bottle was produced in a two-piece mold (two side mold halves) with a separate base plate (Fig. 26).

The Type 2 bottle displays the following dimensions: H. 18.2cm; W. mid-body 8.2cm; max. W. of shoulder 7.8cm; neck H. 2.2cm; total finish H. 2.4cm; collar H. 0.8cm; collar W. 3.0cm; lip H. 1.6cm; neck W. 3.4cm; bore Diam. 1.8cm; rim Th. 0.4cm; body H. 10.8cm; shoulder H. 2.8cm; base Diam. 8.4cm; weight 1,188gr.

As in the case of the Type 1 cylinder liquor wares, the Site BA02 Type 2 bottle is also made of 'black glass,' which was especially functional in reducing exposure to heat and light to better preserve contents. The bottle is characterized by particularly thick glass, again similar to that of the Type 1 bottles, a feature intended to reduce breakage and increase safety during shipping (Gerth, 2006: 59; McKearin and Wilson, 1978: 9).

The Type 2 glass bottle form was blown in a post-base mold, a typically three-part mold where the middle part of the base was formed by a separate small plate or post, while the neck, shoulder, body, heel and outside edges of the base were formed by two-part mold sections of equal size and conformation (Fig. 27). The date or origin of this mold style is unknown, although it was in use in the US at least as early as the 1820s. Like the Site BA02 Type 1 'cylindrical fifths', this bottle form similarly exhibits a sand pontil scar on its base and a 'mineral' or 'double oil' finish, also known by a variety of other names, including a double long tapered collar, tapered collar with ring, long tapered collar with ring and short brandy with ring (Fike, 1987: 8).

Often referred to as a 'Saratoga' bottle, this distinctive style was used by hundreds of different 19th-century companies to bottle mineral water, including a large number operating out of Saratoga Springs, New York. The demand for this bottle type led to an especially profitable line produced in several glassworks in various parts of the country. It continued in use from the earliest products made in the 1820s and 1830s until the end of the 19th century (McKearin, 1978: 238). This possible source contributes to the plausible conclusion that the Jacksonville 'Blue China' ship was based in New York (cf. Gerth *et al.*, 2011).

Saratoga was renowned for its therapeutic mineral waters present in 122 natural springs and was a major source of bottled water during the 19th century (LaMoreaux, 2001: 135). While these mineral waters were the first to be bottled and marketed in the US, and are believed to represent the source of the majority of mid-19th century spring-water bottles, Saratoga's mineral waters were so popular that they inspired many 'knock-off'

bottles and contents. Other US springs thus also served the industry, including waters in Pennsylvania, Connecticut, Vermont, Virginia, Maine and Missouri. Even the far western state of California produced a product named after Saratoga's famous 'Congress Spring' (McKearin and Wilson, 1987: 235-36).

By the mid-19th century, the bottling of mineral water had become such an established American industry that these contents not only provided water for table use, but were also used for medicinal purposes because the combination of gases and dissolved salts was widely regarded to have curative qualities (Fike, 1987: 17; LaMoreaux, 2000: 135). Several springs, in reality long known to the Native American Indians to contain medicinal properties, were 'discovered' in the 18th century, including one in Boston "recommended by the most Eminent Physicians for their efficacy in a great Variety of Disorders" (McKearin and Wilson, 1978: 233).

As early as the 1830s the popular consumption of mineral water, and flavored soda waters derived from mixing syrups of various flavors with mineral waters, seems to have been so great that it even challenged sales of hard liquor. Advertisements of the period refer to establishments in Boston offering a combination liquor bar and soda stand. The passion for these non-alcoholic beverages increased further as the burgeoning 19th-century Temperance Movement became more effective (McKearin and Wilson, 1978: 238).

Although primarily an eastern American bottle style, similar mineral water bottles have been found widely across the US from the south to the far west. The 'Saratoga' style was produced in two distinctive sizes, universally referred to as a pint and a quart. Like so many bottles of the day, these varieties were 'scant' sizes in that they did not hold the full measure capacity of the actual bottle size. The pint typically held at least 12 ounces and the quart around 25-30 ounces. 'Saratoga' bottle colors were shades of aquamarine, green and blue, as well as dark glass (olive ambers and olive greens), the latter of which is represented by the Site BA02 example.

While some 'Saratoga' bottles feature the name of the user and/or bottlers in an attempt to encourage as many as possible of these expensive products to be returned to the original manufacturer or merchant for reuse (McKearin and Wilson, 1978: 240-41), unembossed examples are common on historic American sites, making it virtually impossible to identify makers or users of these bottles. Well over half of the bottles produced in the mid and latter part of the 19th century lacked an embossment identifying the company and product (Fike, 1987: 4). Non-embossed 'Saratoga' mineral water bottles were common amongst consumers of all socio-economic classes.



Fig. 37. A mineral water bottle from the wreck of the SS Republic (1865) of the same style as Site BA02 Type 2, but embossed with 'Clarke & White' and 'New York' of Saratoga Springs.

Although dated later than Site BA02 to 1865, two bottles recovered from the wreck of the SS Republic bear the embossed name of Saratoga's 'Clarke & White' of 'New York' (Fig. 37). These bottles are very similar typologically to the Jacksonville 'Blue China' unembossed example. The 'Clarke & White' bottles are the most common Saratoga products found today. Originally owned by Lynch & Clarke, Dr. John Clarke purchased the 'spring farm' on which the Columbia and Congress Springs were located and commenced bottling Congress Waters for export and sale. Following Clarke's death in 1846, his heir formed Clarke & Company. Around 1852, William White acquired an interest in the company and the firm became Clarke & White (McKearin and Wilson, 1978: 234; Pollard, 1871: 280).

As in the case of the Clarke & White firm, a number of glasshouses producing mineral water bottles were based in Saratoga Springs, but also elsewhere at the time when the Jacksonville 'Blue China' vessel sailed. The South Stoddard Glass Works of New Hampshire opened in 1850 and was particularly renowned as a producer of spring water bottles for Saratoga's Star Spring Company and High Rock

Congress (McKearin and Wilson, 1978: 235). The upstate New York Lockport Glass Works (1843-80s) and the Mount Vernon Glass Works in Mt. Pleasant, New York (1844-90), were also both known producers of the 'Saratoga' style bottle (McKearin and Wilson, 1978: 137-42, 234-35; Tucker, 1986: xii-xiii). Without a company embossment, any number of the bustling mid-19th century glasshouses striving to meet the consumer demands of this especially profitable product line could have produced the 'Saratoga' style bottle recovered from the wreck site.

6. Type 3 Sauce/ Utilitarian Bottles

Two Type 3 sauce or condiment bottles, light aquamarine in color, were recovered from Site BA02 in two slightly different sizes (Figs. 14, 19, 38-41). This bottle is also often referred to as a utilitarian bottle because it was frequently used for varied products, particularly patent medicines. Utilitarian containers make up the bulk of bottles produced during the 19th and first half of the 20th centuries. Like Site BA02's Type 1 and 2 bottles, these too were reused during the pre-Civil War era. As free-blown examples, they were of a much lighter and less durable glass than the former and thus were not subject to extensive reuse as were the thicker and heavier black glass bottles.

Without embossments or paper labels, identifying the contents is again virtually impossible. However, long-necked, narrow-mouthed bottles are commonly associated with liquid food products, including oils, sauces and other non-solid condiments manufactured by a host of mid-19th century companies (Zumwalt, 1980: 247, 252). The form's shape facilitated the efficient pouring of fluid contents and minimized spillage. The long neck and narrow mouth bore were also useful in retaining seasoning and flavor.

The Type 3 sauce or utility bottles have a relatively tall and narrow profile, with the neck and finish in combination equaling about two-thirds of the total height of the body and shoulder. The base features a distinctive push-up formed by the application and pushing of the blowpipe type pontil rod against the hot, pliable base glass, which also resulted in a distinctly circular blowpipe type of pontil scar. The base diameter is just over one-third the height of the body and shoulder combined. The applied finish is of the common 'oil' style. The bottle appears to have been produced by either free-blowing or more likely given the symmetrical conformation of the bottle in a simple dip mold.

The Type 3 bottles display the following dimensions: H. 21.4cm; W. mid-body 6cm; max. W. of shoulder 6.0cm; neck H. 6.5cm; total finish H. 1.4cm; lip W. 2.2cm; lip



Fig. 38. Type 3 sauce/utilitarian glass bottle
BC-05-00003-BE, H. 21.4cm.

H. 1.4cm; neck W. 2.7cm; bore Diam. 1.4cm; rim Th. 0.2cm; body H. 11.7cm; shoulder H. 1.6cm; base Diam. 5.1cm; heel H. 0.3cm; weight 156gr.

The free-blown (or dip molded) form with a blowpipe pontil scar present on the Jacksonville 'Blue China' Type 3 bottles is found on examples dating from as early as the 17th century. The steep rise or pushed-up section of the base enhanced bottle strength and stability because the process helped form an even base so that the bottle could sit upright without wobbling. The steep heel indentation also reduced the interior volume of the bottle and may have been useful in trapping content sedimentation in the groove around the outside edge of the base. This may have allowed the liquid content to be poured with minimal sediment delivery (Jones, 2000: 150; Van den Bossche, 2001: 395). Modern home brewing activities confirm that sediment trapping occurs within bottles featuring steep 'push-ups' such as the Type 3 examples.

The Type 3 bottles feature an 'oil' or 'ring' finish, one of the most commonly used finishes encountered on a wide



Figs. 39-41. Detail of the finish and base of Type 3 sauce/utilitarian glass bottle BC-05-00003-BE.

array of bottle forms dated between the 1830s and 1920s. This finish is frequently seen on all types of proprietary and patent medicines, such as bitters, tonics, cures and balsams, as well as a number of liquid sauce food bottle types (Fike, 1987: 8). The finish was used on many different bottle types and is related to a single function: it is a simple, but stout finish for securely corking and has sufficient lower rim space to wire down the cork securely or to seat a capsule-type foil seal.

Prior to 20th-century advances in preservation and cold storage, food was often excessively bland, of dubious freshness and frequently tainted due to a lack of refrigeration, all of which necessitated the use of table sauces and condiments to mask or improve unpleasant tastes (Gerth, 2006: 65-70). Condiments had been available to Americans since Colonial times to enhance or alter unsatisfying foods. The various products available to the 19th-century consumer included mustard, Worcestershire Sauce, pepper sauces and even ketchup, the latter of which was bottled in relatively small quantities until after the Civil War in 1865, when commercial production rapidly increased (Allen and Albala, 2007: 93-4).

Given the importance of sauces, oils and condiments to 19th-century America, bottles associated with these products are very common on historical sites of the period, epitomized by the prevalence of Lea & Perrins Worcestershire Sauce, which was recovered in large quantities from the wrecks of the *Republic* and *Bertrand*, both lost in 1865 while transporting a huge cargo of essential bottled foods to American consumers (Cunningham Dobson and Gerth, 2010: 42, 65). The Type 3 bottle may have also once contained some zesty condiment or sauce designed to spice up consumers' plates or possibly olive oil essential for cooking.

7. Type 4 Sands's Sarsaparilla Medicine Bottles

Four rectangular, aquamarine-colored patent medicine bottles embossed with the company and product name 'SANDS'S SARSAPARILLA NEW YORK' were recovered from amongst the Jacksonville 'Blue China' cargo (Figs. 42-47). These wares are significant representations of the probable earliest variant of the Sands's Sarsaparilla bottle, which first came onto the US market in the 1840s. Illustrations depicted in advertisements of 1848 and later feature a slightly modified version with embossed lettering that reads 'SANDS'S SARSAPARILLA // GENUINE // NEW YORK' (Fike, 198: 220; *Gazette of the Union*, 1849: 83). Both embossed variants were possibly manufactured simultaneously and overlapped for a period of time.



Fig. 42. Type 4 Sands's Sarsaparilla glass medicine bottle BC-05-00191-BE, H. 15.3cm.

The Type 4 bottles are typical of many patent medicine bottles of the era and characterized by their basically rectangular cross-section with widely beveled corners, making the bottle essentially eight sided with two wider flat sides. The front wide and flat side bears the embossed lettering 'SARSAPARILLA' and the two adjacent narrow sides feature separately the embossment 'NEW YORK' and 'SANDS'S'. The body/shoulder combination is almost three times the height of the neck/finish height. The base is mildly indented from the pushing action of the pontil rod on the hot, pliable glass (pushing inwards was done in an attempt to ensure that the residual blowpipe pontil scar did not inhibit the bottle from standing upright). The applied finish is a variation of the 'oil' finish seen in the Type 3 bottle. The bottle was blown in a true two-piece mold with no separate base plate (Fig. 25).

The Type 4 bottle displays the following dimensions: H. 15.3cm; W. mid-body 5.4cm; maximum W. of shoulder 5.2cm; neck H. 2.5cm; total finish H. 1.0cm; lip W. 2.1cm; lip H. 1.0cm; neck W. 2.1cm; bore Diam. 1.3cm; rim Th. 0.3cm; embossed lettering frame 8.6 x 0.9cm; body H. 10.3cm; shoulder H. 1.5cm; base Diam. 5.4cm; insweep range 0.3-0.9cm; weight 184gr.

The Type 4 bottle blowpipe pontil scar, also called a ring pontil, was formed when a hollow blowpipe was used as the pontil rod (Jones, 2000: 156-8), probably employed to cut costs by limiting the number of tools used by the glass blower and to save time. The 'oil' finish was a popular style on a number of different bottle types, particularly between 1850 and 1910, and was most common on a wide array of patent medicines, sauce bottles and other narrow-necked food bottles. Its popularity was most probably the result of a combination of factors, including corking strength, relative ease of manufacturing and perhaps even aesthetics to capture the consumer's attention.

Sands's Sarsaparilla was one of the many 19th-century products known as 'patent medicines' sold during an era when snake oil, worm pills, invigorators and elixirs emerged on the market as 'sure' cures for any and all afflictions. The 'Patent Medicine Era' – often referred to as 'the Age of Quackery' – was represented by a host of products, many laced with harmful narcotics and readily available to the consumer without revealing their contents or requiring a prescription. They were especially popular at a time when most people relied on home cures for medical problems and when a doctor was only called upon when death was feared. Shrewd entrepreneurs such as A.B. & D. Sands were among the many bold 19th-century businessmen who amassed large fortunes from their wholesale drug business, including enormous earnings from the sale of their prized Sarsaparilla (Fike, 1987: 3-4; Cunningham Dobson and Gerth, 2010: 39-41; Gerth, 2006: 23; Shimko, 1969: 153-55; Wood, 1904: 41).

Abraham B. and David Sands established their business in New York City in 1836 (Holcombe, 1979: 450). An 1842 advertisement listed their retail and wholesale druggist operation as based at several locations under a number of family names: A.B. & D. Sands Druggists, David Sands & Co., and A.B. Sands & Co. The first two companies apparently served as retail outlets, the latter for the company's wholesale/retail and export business. By 1863, the separate companies had merged as A.B. Sands & Co. before the business was sold to W.H. Schieffelin & Co. in March 1875 (Fike, 1987: 179; Odell, 2000: 211).

The Sands's Sarsaparilla product was first produced around 1839, as documented in the *Sands Family Recipe & Medical Almanac* published in 1853, which stated that the product "has now borne the test of over fourteen years' experience" (Fike, 1987: 220). Early advertisements dating to 1844 touted the many virtues of the product, which claimed to cure "All diseases arising from an impure state of the blood or habit of the system." The compound was alleged to differ "entirely in its character from the various preparations of sarsaparilla... offered to the public."



Fig. 43-44. Detail of the 'SANDS'S SARSAPARILLA NEW YORK' embossment on glass medicine bottle BC-05-00191-BE.



Figs. 45-47. Detail of the finish and base of Type 4 Sands's Sarsaparilla bottle BC-05-00191-BE.

Also touted was its “powerful healing effect”, which Sands described as “entirely harmless so that it cannot injure the most delicate constitution” (*Sheldon & Co.'s Business or Advertising Directory*, 1845: 55).

The Sands's were one of the US's most ambitious glass bottle promoters and advertisements for their sarsaparilla ran continuously in newspapers throughout the country (Odell, 2000: 212). As was the case amongst other patent medicine men of the era, their advertising ploys often relied on testimonials from respected members of the community advocating the use of a particular product that miraculously cured them. One grateful user of Sands's Sarsaparilla, formerly suffering from breast cancer, claimed the product cured her when nothing else could. Following years of enduring untreatable leg sores, a Justice of the Peace too found no relief until he reached for Sands's famous product (*Sheldon & Co.'s Business or Advertising Directory*, 1845: 55).

In addition to selling its sarsaparilla, Sands offered an eclectic assortment of ‘Druggist and Manufacturers Articles’, ranging in diversity from East Indian, Mediterranean and European drugs to perfumery, fancy soaps and surgical equipment. They also sold patent medicines of every description, paints, oils and even ‘Saratoga’ mineral waters (*Sheldon & Co.'s Business and Advertising Directory*, 1845: 55). The one ‘Sarsaparilla’ bottle recovered from the Jacksonville ‘Blue China’ wreck may have originated from a larger cargo originally shipped aboard the vessel.

While the mid-19th century was touted the ‘sarsaparilla era’ due to the host of sarsaparilla products flooding the US markets in the 1830s and 1840s, its popularity for medicinal use began to wane in the latter part of the century. At this time, however, the consumption of sarsaparilla-based beverages increased, very likely enhanced by its earlier remedial application (Shimko, 1969: 11; *Transactions for the Illinois State Historical Society*, 1906: 240).

8. Type 5 Cylindrical, Tapered Patent Medicine Bottles

The Site BA02 glassware cargo includes seven Type 5 cylindrical, tapered vial-like bottles, aquamarine in color (Figs. 7, 9-10, 19, 49-53). Each exhibits a ‘rolled’ lip finish and a blowpipe pontil scar similar to a number of the other bottles recovered from the wreck. Again, they were retrieved empty, having been originally sealed with cork stoppers, some of which were found preserved inside the bottles (Fig. 51).

The Type 5 bottles are small cylindrical and conical shaped medicine vials distinctly narrower at the shoulder than the base. The base incorporates a blowpipe pontil scar

A. B. SANDS & CO.,
WHOLESALE DRUGGISTS.
IMPORTERS AND DEALERS IN
ENGLISH, FRENCH AND GERMAN DRUGS,
CHEMICALS, CORKS, SPONGES,
AMERICAN AND FOREIGN ESSENTIAL OILS, ETC.
141 WILLIAM ST., cor. FULTON, New York.

☞ All orders intrusted to our care will be carefully and promptly filled at the lowest market rates.

SANDS' SARSAPARILLA.
The great American Remedy!

It is recommended by the leading medical authorities, and is highly approved by all who have tried it. *Delicate ladies find it a perfect restorative*; and persons who lead a sedentary life will find their nervous and general system strengthened and improved by its use.

IT IS HIGHLY ESTEEMED AND UNIVERSALLY USED.

Because—It produces the combined effects of a tonic, alterative and stimulative medicine.

Because—It purifies the blood and expels the poisonous virus which engenders all ulcerous and eruptive diseases.

Because—It acts powerfully upon the excretions of the body, and at once removes all impurities.

Because—It does not reduce the system, but invigorates it—thus requiring no detention from business or pleasure.

Price \$1 00 per bottle, or six bottles for \$5 00.

ROMAN EYE BALSAM,
FOR INFLAMED EYELIDS,

And for the cure of Scrofulous Humors and soreness surrounding or near the eye. In all diseases of this character it is almost a certain cure. The following extract from a letter just received, refers to one of the many similar cases constantly reported:

MESSRS. A. B. & D. SANDS: *Jersey City, Oct. 29, 1859.*

Dear Sirs—I have for a number of years been troubled with sore and inflamed eyelids, which, though they never caused me much pain, were very annoying on other accounts. I have tried a number of medicines at different times without the slightest success. Seeing an advertisement of your Roman Eye Balsam, in spite of my skepticism, I resolved to get some, and at least try it. I am now writing this in the fullest gratitude to inform you (I could almost send you a fifty dollar bill) that a few, and only a few, applications have resulted in a complete cure.

Respectfully yours,
L. ZABRISKIE.

Price 25 cents per jar.—Will be sent free per Mail to any part of the United States upon receipt of 80 cents in postage stamps.

CLOVE ANODYNE TOOTHACHE DROPS.
COMPLAIN NO MORE OF ACHING TEETH.

These Drops have been extensively used by thousands whose experience has proved that the Anodyne will give immediate and permanent relief after the failure of every other remedy. It is pleasant to the taste and smell, and a few applications will entirely remove the pain and soreness from a decayed tooth, so that it may be filled and rendered as useful as ever.

Price 25 cents per vial.—Will be sent free per Mail to any part of the United States upon receipt of 80 cents in postage stamps.

THE ABOVE REMEDIES PREPARED AND SOLD BY
A. B. & D. SANDS, DRUGGISTS,
Sold also by Druggists generally. 100 Fulton Street, New York.

Fig. 48. 'The Great American Remedy!' touts an advertisement for Sands's Sarsaparilla published in an 1860 issue of the New York Daily Tribune. Photo: courtesy SHA/BLM Historic Glass Bottle Identification & Information Website.



Fig. 49. Type 5 cylindrical and tapered glass medicine bottle BC-05-00350-BE, H. 13.5cm.

with some minor indenting caused by the action of the pontil rod. The base diameter is between one-quarter and one-fifth the height of the bottle to the cursory shoulder. The short neck is topped with a 'rolled' finish – an early and indistinct style that essentially involved just rolling the hot glass back on itself to form a narrow, slightly bulging finish or lip. This bottle was produced in a true two-piece mold, which lacked a base plate, with the lower sides of the two-mold halves forming the two halves of the base (Fig. 25).

The Type 5 bottle displays the following dimensions: H. 13.5cm; W. mid-body 2.9cm; max. W. of shoulder 2.0cm; neck H. 1.0cm; total finish H. 0.3cm; lip W. 1.9cm; lip H. 0.3cm; neck W. 1.6cm; bore Diam. 1.2cm; rim Th. 0.3cm; body H. 11.7cm; shoulder H. 0.4cm; base Diam. 3.7cm; insweep range 0.2-0.5cm; weight 57gr.

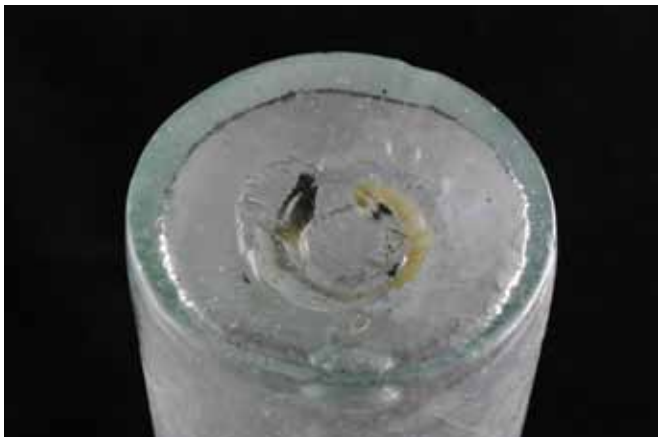
The distinctive Type 5 bottle shape with its narrow neck and mouth was ideal for the pouring of liquid contents and was possibly an American 'knock-off' imitation of the enormously popular 'Dalby's Carminative' and 'Godfrey's Cordial'. While both were of British origins, the latter were never embossed and the product was eventually also bottled in American-manufactured vessels. First advertised in 1721, 'Godfrey's Cordial' was still available over 200 years



Figs. 50-51. Detail of the finish of Type 5 cylindrical and tapered glass medicine bottle BC-05-00350-BE, with remains of its cork stopper preserved.

later in 1931 (Fike, 1987: 14). These soothing syrups were touted as remedies for various ailments afflicting infants and young children. By the mid 19th-century the products of both Dalby and Godfrey and their many imitators, including those discovered on the Jacksonville 'Blue China' wreck, were readily available in the US, where they were listed among the countless patent medicines that actually contained harmful opiates.

The children's market was especially profitable at a time when limited health care and high infant mortality were



Figs. 52-53. Detail of the base of Type 5 cylindrical glass medicine bottle BC-05-00350-BE.

pervasive and hope for a suffering child frequently lay solely in the purchase of a small bottle containing “syrup of poppies” (Beck, 1864: 16; Gerth, 2006: 26; Jordan, 1987: 95). As history has sadly demonstrated, such products sometimes proved fatal because they were typically offered without prescription, a common practice of the era. In one documented case, “forty drops of Dalby’s Carminative destroyed an infant” (Beck, 1864: 16). In reality, doses as small as even half a teaspoon could also be lethal.

Nonetheless, the production of such dangerous nostrums did not cease. A survey of 10,000 prescriptions filled by 35 Boston drugstores in 1888 revealed that 1,481 contained opiates. Among prescriptions refilled three or more times, 78% contained opiates. Such dangerous ‘medicine’ was not restricted to the US. In 19th-century Coventry in Britain, ten gallons of Godfrey’s Cordial (a happy mixture of opium, molasses and saffras instilled

for flavoring), enough for 12,000 doses, was sold weekly and was administered to 3,000 infants under two years old.²

By the turn of the 19th century, and perhaps earlier, glass factories such as the Illinois Glass Company advertised in their company catalog generic patent medicine vials sold as ‘Godfrey’s Cordial’, confirming that these distinctively shaped, tapered cylindrical bottles had in fact become a common medicine bottle style (*Illinois Glass Company Catalog*, 1908: 102-3). An 1822-23 catalog for the Obear-Nester Glass Company, featuring the ‘Godfrey’s Cordial’ vial among other patent medicine bottle types, attests to the ongoing use of this century-old medicinal bottle style (*Obear-Nester Glass Company Catalog*, 1922-3: 32). At the time when the Jacksonville ‘Blue China’ ship was lost around 1854, its cargo of small aquamarine vials was clearly in its heyday amongst a host of opiate-laced patent medicines catering to a hugely receptive market.

9. Type 6 Cologne Bottles

Two Type 6 transparent green unembossed bottles with their neck tops broken off were recovered from the Jacksonville ‘Blue China’ wreck (Figs. 13, 19, 54-56). Both were seemingly free-blown, with possibly some dip molding to rough out the basic body shape. The bottles feature a glass-tipped pontil scar, which was formed by the use of a solid iron rod dipped in molten glass and then applied and fused to the base of the bottle. When the rod was broken free of the bottle, a generally round but fragmented scar was left behind on the base (Jones, 2000: 155).

The Type 6 bottles are distinctively very narrow and tall, resulting in a form that is almost impossible to stand upright. The neck and finish (as known from intact examples elsewhere) are very narrow and typically about one-half the height of the body/shoulder. The base is slightly indented with a glass-tipped pontil scar, a distinct but formless ‘rough area’ covering most of the base. The finish on intact examples consists of a simple cracked-off or sheared opening, often flared slightly to make corking easier. These bottles are free-blown or possibly partly body formed in a dip mold.

The Type 6 bottle displays the following dimensions: H. 19.1cm; W. mid-body 3.0cm; max. W. of shoulder 3.4cm; surviving neck H. 1.6cm; neck W. 1.9cm; bore Diam. 0.1cm; rim Th. 0.2cm; body H. 16.5cm; shoulder H. 0.7cm; base Diam. 2.3cm; insweep/heel H. range 0.4-0.8cm; weight: 83gr.

Type 6 bottles are identical to examples discovered in a foundation trench in New Orleans’ French Quarter, whose material culture dates between 1830 and 1850 (as identified by Bill Lindsey). A much later molded example



Fig. 54. Type 6 green glass cologne bottle
BC-05-00188-GL, H. 19.1cm.

(1880s-90s), acquired from a collector in New Orleans, bears the embossed name 'Lundborg', who was a prominent 19th-century American perfumer with an establishment on Barclay Street in New York City (*The Cosmopolitan*, February 1887; *Current Literature*, September 1890: 179; *Illustrated New York*, 1888: 177). An 1886 advertisement claimed that Lundborg's perfume bottles were "very tastefully put up in little boxes, and are suitable offerings to give to any lady" (*The Brooklyn Magazine*, April 1886: xix).

A similarly-shaped bottle, with a wider, flared mouth, was recovered from the 1857 wreck of the sidewheel steamer *Central America*, which sank 2,200m off Cape Fear, North Carolina, en route to New York from the California gold fields. This wreck's bottle has probably been incorrectly identified as a "wine-tester bottle" (Herdendorf, 1995: 172), which has openings at both ends and thus is not a bottle in the true sense. However, the similarity of the Jacksonville 'Blue China' wreck Type 6

bottles to the New Orleans finds strongly suggests that they too probably contained cologne. This theory is supported by six intact and virtually pristine bottles dating to approximately 1840, which still survive today and represent products marketed by the French Perfumer L.T. Piver of Paris. These wares remain packaged in their original box with fancy labels identifying the product as 'EXTRAIT D'EAU COLOGNE de Jean Maria Farina – Fournisseur de plusieurs Cours à COLOGNE s/R' (Van den Bossche, 2001: 220, 362).

Jean Maria Farina was a descendant of Giovanni Maria Farina (1685-1766), an Italian perfume maker whose cologne formula derived from the recipe of his uncle, Gian Paolo Feminis. In 1709, Feminis traveled to Germany to market his distilled herbal 'water', which had been in use among Italian families for centuries (Stamelman, 2006: 53). The scent, which Feminis later enhanced, was so well received that he called upon his nephew, Giovanni Maria Farina, to join him in Cologne. In 1732, the younger partner took over the business and, 25 years later during the Seven Years War, French troops stationed in the city carried the scent back to France, where it was named after the city where it was first discovered. In 1809 Farina's grandson, Jean-Marie, moved to Paris to open a shop at 331 rue Saint-Honore, which catered to distinguished patrons, including Emperor Napoleon (Stamelman, 2006: 54). This product proved so successful that it prompted countless other businessmen to sell their own fragrances under the same name, many claiming to be descendants of Feminis.

In 1819, the official gazette of Cologne reported the existence of 60 manufactories of Eau de Cologne, most flatteringly, but inaccurately, launched under the Farina name. Only three were linked to the original founding family and the vast majority was apparently fraudulent (*The Ladies' Companion and Monthly Magazine*, 1856: 324). Farina, in fact, took to court a host of imposters, passionately defending his family's legal claim to the scent. To reassure his faithful customers that they were purchasing the genuine cologne, Farina had his signature, accompanied by an image of an imperial eagle and the coats of arms of the French and German courts, stamped in green wax on the cases of his products. Nevertheless, by 1865 well over 30 establishments are said to have still falsely carried the name Farina, deemed to be the "scent sensation of the age" (Stamelman, 2006: 54).

The popular knock-off cologne also found favor across Europe and America (McKearin, 1978: 383). Quite possibly even L.T. Piver, a prominent French perfumer in his own right, with company branches around the world, also pirated the Farina name. Piver's beauty products were readily available in the US by at least the mid-1860s and most



Figs. 55-56. Detail of the lower neck and base of Type 6 green glass cologne bottle BC-05-00188-GL.

likely earlier, as indicated by the shipment of Piver cosmetic pots and perfume bottles recovered from the 1865 wreck of the *SS Republic* (Cunningham Dobson and Gerth, 2010: 43, 48). American publications of the 19th century advertised L.T. Piver's perfumes and toilet articles as "demanded by a large class of select consumers" and obtained from jobbers or direct from the sole agent for the United States located in New York City (Parsons, 1896: 729). If a Piver product, the Type 6 perfume bottles recovered from Site BA02 may have originated from the company's factory in New York City.

The attractiveness of Eau de Cologne is perhaps best understood in the context of changing Western trends. Historically, European perfumes were common for both men and women and identical fragrances were used by both genders. During the 19th century, however, when cleansing became more habitual, men started to use little or no perfume, turning instead to toilet soap, scented oils for the hair and lighter fragrances such as Eau de Cologne (Jones, 2000: 24). Use of genuine Jean Marie Farina, applied to the "temples, wrists and behind one's ears", even spread in

Victorian America to the Western frontier, where a shortage of bathing water apparently demanded large quantities of Farina's Eau de Cologne (Sala, 1886: 423).

While it would be reasonable to assume that the Jacksonville 'Blue China' wreck's Type 6 bottles once contained a fashionable cologne, perhaps even Farina's original famous French fragrance or a similar version sold by L.T. Piver, this bottle was apparently also used for less celebrated products, including balsam, oil, medicines and liqueur such as the Italian Rosolio (Van den Bossche, 2001: 220). Thus, its original contents remain a matter of speculation.

10. Type 7 Figured Cologne Bottle with Plume Pattern

The Jacksonville 'Blue China' wreck's cologne bottles included one mold-blown, colorless glass example, possibly made from a higher quality flint (lead) glass (McKearin and Wilson, 1987: 388; pers. comm. Dorothy Hogan-Schofield, 11 February 2011). The bottle's long neck exhibits a 'wide prescription' finish, also termed a 'flared', 'flat top' or 'flanged' finish (Figs. 57-62). It features an especially thin version of this particular style, which is commonly found on medicinal and druggist types of bottles and vials dating between 1800 and 1870. This finish is also observed on early to mid-19th century liquor decanters and utilitarian ink bottles.

The Type 7 cologne bottle is rectangular in cross-section with heavily embossed, molded sides exhibiting a central bold plume-like decorative composition on the front side and similar, but narrower, plumes on the two narrow sides. The reverse features elements of the plume design running along its periphery. The neck of the bottle is relatively long (about three-quarters the height of the body), with a pronounced medial, bulging rib (known as a 'ball neck') and an early flared tooled finish. The base exhibits a typical blowpipe pontil scar with some indentation deliberately crafted to enable the bottle to stand upright. The bottle was produced in a true two-piece mold, as evidenced by the seam dissecting the base (Fig. 25).

The Type 7 bottle displays the following dimensions: H. 13.0cm; W. mid-body 5.3cm; max. W. of shoulder 5.1cm; neck H. 4.1cm; total finish H. 0.3cm; ring H. 1.0cm; ring W. 2.8cm; lip W. 2.7cm; lip H. 0.3cm; neck W. 3.0cm; bore Diam. 1.4cm; rim Th. 0.2cm; body H. 8.0cm; shoulder H. 0.3cm; base Diam. 5.2cm; insweep range 0.1-0.6cm; weight 120gr.

The Jacksonville 'Blue China' wreck's Type 7 bottle's central plume motif is typical of figured cologne bottles dating from the 1830s to 1860s, examples of which were also produced in blues and aquamarine (McKearin and



Figs. 57-59. Type 7 figured glass cologne bottle BC-05-00147-BE, H. 13.0cm.



Figs. 60-62. Detail of the finish and base of Type 7 figured glass cologne bottle BC-05-00147-BE.

Wilson, 1978: 396-7, 400-401). Like most commercial cologne products, this bottle originally would have been sealed with a simple cork stopper. A fancy label may have been adhered to the top of the cork. Some ornamental perfume bottles featured a decorative glass stopper.

As noted above, Eau de Cologne was first manufactured commercially in the early 18th century and soon became a major success. By the following century, it had become such an important staple of daily life that no perfumer and very few apothecaries did not attempt to reproduce it. This was especially true in the United States, where each manufacturer strove to improve upon the original formula, creating in effect a diversity of sweet-smelling toilet waters for the American consumer, all generically called 'cologne' (*Appleton's Journal of Literature, Science and Art*, 24 February 1872: 210).

A number of American glass firms manufactured and sold a wide variety of fancy cologne bottles during this period, exemplified by an advertisement published in the 2 July 1832 issue of *The New York Commercial Advertiser* that stated, "Cologne Water – Put up in a variety of bottles comprising about 30 different designs, 30 different kinds..." (McKearin and Wilson, 1978: 386). The growing popularity of cologne, perfume and sweet water of all types is apparent from the increasing number of advertisements offering these products, especially in the second quarter of the mid-19th century, supported by a host of glass US companies devoted to the manufacture of fancy cologne bottles catering to ladies' tastes (McKearin and Wilson, 1978: 383, 389).

By the 1840s and especially after 1850, decorative bottles were frequently produced of finer quality flint glass by numerous firms specializing in perfume and cologne containers. One well-known firm was the Brooklyn Flint Glass Works located in Brooklyn, New York, between Atlantic and State Streets, near the Atlantic Ferry. An 1851 advertisement in the *Brooklyn Evening Star* announced that "Every description of staple and fancy Flint Glass Ware is made in this establishment" (McKearin and Wilson, 1978: 388).

The manufacturer of the single Site BA02 example recovered is unknown, but research suggests that the bottle may have been produced in South Boston by one of three glasshouses: the Suffolk Glass Company (1850-59), Perry, Wynn & Company established in 1851, and the American Glass Company (1847-57). The Jacksonville 'Blue China' wreck bottle style is especially similar to decorated commercial cologne bottle fragments retrieved from the site of the latter company (pers. comm. Dorothy Hogan-Schofield, 9 February 2011; Kaiser, 2009: 190).

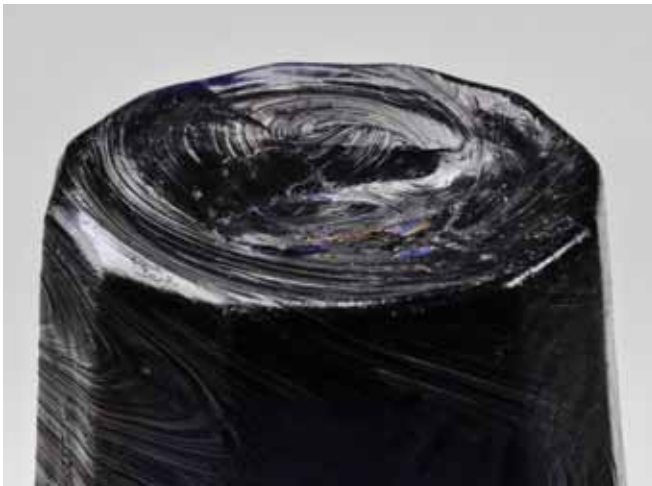
11. Type 8 Paneled Cologne Bottle

A stunning 12-paneled blue cobalt glass bottle of a style typically associated again with cologne or toilet water was recovered from Area D on the Jacksonville 'Blue China' shipwreck (Figs. 11, 19, 63-66). The form was in circulation between approximately the 1830s and the late 1850s, a date range confirmed by the pontiled base. Like the Type 7 cologne ware, the bottle also features a flanged or flared lip finish produced using a simple tool to manipulate the hot glass at the end of the neck, creating a relatively thin finish that projects away from the top of the bottle mouth or bore at an angle of about 90° (McKearin and Wilson, 1978: 518-19). Originally sealed with a cork stopper, the bottle was recovered empty and may have represented a small collection of select cologne containers carried on the Site BA02 schooner.

The Type 8 bottle features a long and somewhat cylindrical body, a rounded sloping shoulder and a long



Fig. 63. Type 8 12-paneled cobalt blue glass cologne/ toilet water bottle BC-05-00018-BE, H. 18.8cm.



Figs. 64-66. Detail of the finish and base of Type 8 12-paneled cobalt blue glass cologne/toilet water bottle BC-05-00018-BE.

cylindrical neck with a narrow 'bead' finish with an abrupt lower edge. This crude 'bead' finish was formed by the same process used to produce a 'rolled' finish and is considered one of the more simple methods used for finishing bottle lips. While the bottle was held on the pontil rod, the blowpipe was cracked off and the rough end re-heated. The flap of the glass was then folded back on itself with a simple tool such as an iron nail. Decorative or speciality bottles such as the Type 8 example were typically finished with more refinement than usual. Consequently, the craftsman finishing the bottle spent more time flaring the finish out slightly to add more structure to it and to make it more aesthetically pleasing, rather than simply and crudely rolling the flap of glass back onto the upper neck, which would have been the case for more cheaply produced bottles.

The base exhibits a glass-tipped pontil scar with some deliberate indenting from the pontil rod to facilitate standing upright. It appears to have been blown in a true two-piece mold (Fig. 25), although some examples were made with a three-piece leaf mold that would have formed three vertical seams on the bottle's neck (a feature that is often difficult to recognize).

The Type 8 bottle displays the following dimensions: H. 18.8cm; W. mid-body 5.7cm; max. W. of shoulder 6.3cm; neck H. 5.7cm; total finish H. 0.8cm; lip W. 3.0cm; lip H. 0.8cm; neck W. 2.9cm; bore Diam. 1.7cm; rim Th. 0.4cm; body H. 9.0cm; shoulder H. 3.2cm; base Diam. 5.0cm; weight 237gr.

While the wearing of perfume, cologne, rosewater and other scented concoctions played a major role amongst both ladies and gentlemen of the era, their use was seemingly not restricted to the more cosmopolitan middle and upper classes. As noted above, by the mid-19th century widespread advertisements for cologne and sweet waters of all kinds had increased dramatically, often published in small-town local gazettes as well as in larger urban newspapers. The sale of colognes and other scented waters targeted the general public in its broadest definition (McKearin and Wilson, 1978: 382-84).

By the last quarter of the 18th century a number of perfumery manufactories had been established in America, with small quantities of fragrant waters and colognes frequently put into square or long, flat bottles. These relatively simple vessels were soon joined by fancier cologne bottles, which had become very popular in America and abroad, especially in France, by the late 1820s (Griffenhagen and Bogard, 1999: 60; McKearin and Wilson, 1978: 382). One of the earlier advertisements offering for sale "Cologne Water; in rich fancy bottles, of various qualities", available at N. Prentiss' Perfume Manufactory,

was published in the *New York Commercial Advertiser* of August 1829. An advertisement for cologne water in “panell bottles” appeared in the same newspaper as early as 1832 (McKearin and Wilson, 1978: 386).

‘Panelled’ bottles, as they were descriptively called even in the 19th century, were in vogue from the early 1830s and remained popular until late in the century (McKearin and Wilson, 1978: 406). They were produced in a variety of colors representing virtually the full spectrum of the palette from milk glass to black, pinks and greens, as well as purples and blues. Bottles of this type are usually attributed to the Boston & Sandwich Glass Company, although a number of glass factories produced paneled colognes, and many companies used them for their products, including the New York wholesale perfumer and importers Snyder & Company, which advertised a diversity of styles in 1832. The Williamstown Glass Works (1840-54) also offered these distinctive paneled bottles in a variety of sizes ranging from 3-18 ounces, with corresponding prices from \$0.50 to \$1.50 a dozen. As an agent for the company, New York City wholesale druggist William Burger, published an 1851 price list featuring a host of fancy perfume bottles, including the ‘panelled’ type (Griffenhagen and Bogard, 1999: 60).

12. Type 9 Spice or Condiment Bottles

The Jacksonville ‘Blue China’ wreck contained a number of aquamarine glass bottles in two different sizes. The five large Type 9A (Figs. 5, 67-70) and four small Type 9B examples (Figs. 12, 71-74) recovered represent the dominant style used for various spices as well as other condiments in the mid to late 19th century. This unusual eight-sided bottle appears to have originated in the 1850s or possibly late 1840s. The original design that was subsequently copied is believed to have been the work of the J.L. Hunnewell Co. of Boston, Massachusetts (Zumwalt, 1980: 253). Mid-19th century Boston directories list the druggists as located at 8 Commercial Wharf (*The Boston Directory*, 1848: 161; 1852: 135). By 1856, and perhaps earlier, the firm had changed its name to J.W. Hunnewell & Co. (*Boston Board of Trade* 1856: 163). In addition to medicinal products, its line apparently included the manufacture of paints, oils and condiments, such as mustard and relish packaged in bottles similar to the larger Jacksonville ‘Blue China’ wreck Type 9A examples (Zumwalt, 1980: 253). By 1905, the company was still in existence and its primary product line was apparently paint (*The Era Druggists Directory*, 1905: 252).



Fig. 67. Type 9A large spice/condiment glass bottle BC-05-00182-BE, H. 16.5cm.

The Type 9A and B spice bottles feature wide, concave front and back panels with flat narrow side panels bound together by relatively wide, concavely beveled corners. They exhibit blowpipe pontil scars on the bases with enough pontil rod push-up on the Type 9B variants to limit pontil scar protrusion, so that the bottle could stand upright. Bottle Type 9A was molded to include an indentation to eliminate pontil scar protrusion. The Type 9A finish is a typical ‘rolled’ finish utilizing no applied glass and only minimal tooling. The Type 9B finish is a short applied ‘oil’ finish, with its lip formed from applied glass from molten material taken from near the blowpipe removal point, along with a little reheating to make the glass more pliable. Both bottles were produced in true two-piece molds, which did not include a separate base plate (Fig. 25).

The large Type 9A bottle form displays the following dimensions: H. 16.5cm; W. mid-body 6.9cm; max. W. of shoulder 6.8cm; neck H. 0.9cm; total finish H. 0.5cm; lip W. 3.6cm; lip H. 0.5cm; neck W. 3.4cm; bore Diam. 2.4cm; rim Th. 0.3cm; body H. 10.2cm; shoulder H. 4.7cm; base Diam. 6.1cm; insweep/heel H. range 0.1-0.8cm; weight 236gr. The small Type 9B bottle form displays the following dimensions: H. 11.8cm;



Figs. 68-70. Detail of the finish and base of Type 9A large spice/condiment glass bottle BC-05-00182-BE.

W. mid-body 4.8cm; max. W. of shoulder 4.8cm; neck H. 1.7cm; total finish H. 0.8cm; lip W. 2.1cm; lip H. 0.8cm; neck W. 2.1cm; bore Diam. 1.4cm; rim Th. 0.2cm; body H. 8.0cm; shoulder H. 0.9cm; base Diam. 4.2cm; insweep/heel H. range 0.1-0.7cm; weight 55gr.

The bottle type's moderately wide mouth or bore allowed for easier access during packing in crates and for extraction by the consumer. As was the case with all of the bottles recovered from Site BA02, these wares' original paper labels are not preserved, making identification of their contents particularly difficult, in this case especially so given the diversity of spices and condiments distributed in this bottle style.

Both the larger and smaller varieties feature a blowpipe pontil, often produced from the same blowpipe used to blow the bottle. In this case the glass blower used the residual glass left after the bottle was cracked off the blowpipe. To detach and then finish the bottle, it had to be laid on a marver (a metal or wooden table or slab) or on a cradle, which permitted the blower to move to the other end of the bottle to finish the lip (Jones, 2000: 155-7). The larger bottles' 'rolled' lip finish provides strong dating criteria because it was not significantly used after about 1870. To form the lip, while hot the sheared top was folded inward or outward (the latter method in the case of the Site BA02 Type 9 bottles). This lip finish added strength and/or gave a more refined and smooth appearance.

Various shades of aquamarine, often referred to as blue aqua, green or greenish aqua or pale blue aqua, are very common for all types of bottles, including culinary/food bottles such as the Type 9 style, and were particularly common between the 1850s and 1880s. Natural aqua glass derives from sand that is relatively low in concentrations of iron. High levels of iron produce darker greens, black glass and even amber. Sand deposits with very low iron content were highly valued commodities and although good quality sand was plentiful in the eastern United States, some was still imported from Belgium as late as the 1940s for Western American glass factories. By the early 20th century, aqua bottles were largely replaced by colorless glass, preferred by bottle users wishing their product to be more visible to the buyer.

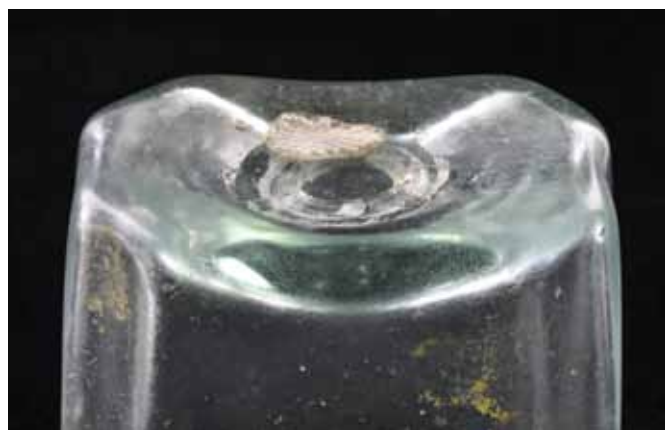
Some condiment/spice bottles virtually identical to the Site BA02 Type 9 examples feature labels identifying the diversity of different spices these bottles contained, including pepper, thyme, cloves, cinnamon, marjoram, as well as mustard condiment. San Francisco's Hoff Store site assemblage is again useful in interpreting the Jacksonville 'Blue China' wreck wares. The most numerous type of culinary container found was a minimum of 122 similar condiment bottles (46.6% of the total assemblage) like the Site BA02



Fig. 71. Type 9B small spice/condiment glass bottle BC-05-00004-BE, H. 11.8cm.

assemblage recovered in two different sizes. All examples exhibit pontil scarred bases, with the majority displaying the same kind of blowpipe pontil scar present on the Site BA02 examples. One of the Hoff Store site bottles retained black pepper, a decisive discovery in determining these specific bottles' function (McDougall, 1990: 63), which is arguably relevant to the contents of the Jacksonville 'Blue China' wreck examples. In addition to salt, black pepper was the most common condiment in 19th-century America and was largely imported into cities across the United States by small traders like the Jacksonville 'Blue China' schooner (cf. Allen and Albala, 2007: 94).

A number of the Hoff Store condiment bottles preserved a lead foil cap covering the cork, collar and uppermost section of the neck, illustrating the method of sealing that was probably originally used for the Site BA02 wares. The proprietors identified by these lead foil caps are 'WELLS, MILLER & PROVOST 217/Front/ST/NEW YORK' (McDougall, 1990: 63). During the mid-19th century, John B. Wells, Ebenezer Miller and Stephen H. Provost, located on New York's Front Street from 1844 to 1852, were one of the leading manufacturers and wholesale distributors of preserved foods and condiments (McDougall, 1990: 64; Zumwalt, 1980: 428,



Figs. 72-74. Detail of the finish and base of Type 9B small spice/condiment glass bottle BC-05-00004-BE.

431). An 1850 advertisement listing the wide assortment of goods offered at the company warehouse noted that the products were either manufactured by the proprietors themselves or imported direct from responsible houses (Tremayne, 1850: 28). Miller soon left the partnership and the Wells & Provost firm relocated to 215 Front Street in 1861 (Wilson, 1861: 904). Having later moved again to Yonkers, New York, they became one of the most successful bottlers of the era (Smith, 1996: 39). The Site BA02 Type 9 bottles may quite plausibly have held comparable black pepper attributable to this same New York company, providing further evidence pointing to New York as the vessel's final port of departure.

Well-preserved examples of this distinctive bottle type were retrieved from the wreck of the Steamship *Bertrand* that sank down the Missouri River in April 1865. The original intact labels and packing crates indicate that the *Bertrand* bottles, significantly like those from the Hoff Store site, contained both ground pepper and other spices that the company made and probably also stored in this same bottle style, such as cinnamon, mace and white pepper (Switzer, 1974: 60-1). The excavation of the 1865 shipwreck of the sidewheel steamer *Republic*, which sank six months after the *Bertrand*, produced over 90 examples of this common eight-sided condiment/spice bottle – unembossed and devoid of paper labels – from a collection of over 1,500 food/culinary bottles.



Fig. 75. Fluted glass bar tumbler BC-05-00358-GL, H. 9.0cm.

13. Glass Tumblers

The additional glassware recovered from the Jacksonville 'Blue China' wreck (excluding the window panes: cf. Gerth *et al.*, 2011: 41-4) included pressed glass tableware, pressed and mold-blown (and possibly free-blown) bar wares and individual lamp parts. Two types of short glass bar tumbler are represented among the recovered cargo: ten colorless fluted/paneled examples and five smooth-sided, pale green forms (Figs. 15-17, 20, 75-77).

The sample of short, colorless fluted/paneled bar tumblers represents the more common pressed glasswares produced in great quantities in the 19th century and is almost identical visually to today's common 'rock' glass.



Figs. 76-77. Pale green, smooth-sided glass bar tumbler BC-05-00158-GL, H. 8.9cm, and detail of its base.

The fluted or paneled pattern was produced in a number of varied styles, which correspond to different factory designations, such as French flute, reverse flute, gill flute, pillar flute, column and edge flute (Chipman, 1932: 155). The Site BA02 examples are relatively squat and taper gradually outward from the base of the glass towards the top. These fluted bar tumblers display the following dimensions: H. 9.0cm; external Diam. of mouth 8.4cm; rim Th. 0.3cm; base Diam. 6.9cm; weight 326gr.

The Jacksonville 'Blue China' wreck fluted/paneled glass tumblers considerably post-date 1827, when Deming Jarves, using an iron mold, allegedly produced the first pressed glass water tumbler at the Boston & Sandwich Glass Company in Massachusetts, which he founded in 1826 (*The Glass Industry*, 1917: 16). The process of pressing molten glass by mechanical means was perfected in the United States between 1825 and 1826. However, as Jarves acknowledged, the introduction and development of glass manufacture by pressing, although once alleged to have been an American innovation, actually originated in Europe. Metallic molds for crudely pressing candlesticks and other glasswares were in use in both Holland and England by 1815 and perhaps earlier (Davis, 1949: 82). Around 1827, the full-size press machine requiring two men to operate was invented and the Boston & Sandwich Glass Company in Massachusetts was quick to exploit its potential. The company's founder would later receive several patents for improvements in pressing techniques and mold designs (Davis, 1949: 83).³

Soon, pressed glass was being manufactured by other glass factories, including many centered in Pittsburgh, Pennsylvania. From 1830-45 the pressed glass industry made slow progress, marked by experimentation and competition between both domestic and foreign blown glassware (Davis, 1949: 83). By the mid-19th century, however, American glass companies were profiting as never before as pressed glass wares threatened to take control of the market away from the more costly cut and engraved wares. Many of the new designs imitated English and Irish cut glass patterns, but were more easily made and required less skilled labor. Efficiency created products that were cheaper and more readily accessible to the modest American consumer. For the first time, the average household could afford glassware to grace the family table.⁴

Site BA02's five smooth-sided, pale green bar tumblers were probably either free-blown or mold-blown because they exhibit a blowpipe pontil mark on their bases, indicating not only differences in manufacture from the pressed glass fluted/paneled examples, but quite possibly production at different glassworks. Both free-blown and mold-blown examples represent a technique involving

blowing by human lungs, the latter blown directly into a mold, the former without a mold. Their production date overlaps with the wreck's fluted bar tumblers, even though by the mid-1850s pressing glass into a mold was more common than mold-blown glassware. The smooth-sided, pale green bar tumblers display the following dimensions: H. 8.9cm; external Diam. of mouth 7.9cm; rim Th. 0.1cm; base Diam. 6.7cm; weight 122gr.

Site BA02's particular style of glass tumbler broadly dates from 1845-75 and could have been manufactured in any number of American glass factories producing bar and table wares. Especially likely candidates are one of the New England glass factories, quite possibly the Boston & Sandwich Glass Company or its competitor, the New England Glass Company (Spillman, 2006: 16). A handful of identical glass fluted tumblers was recovered from the later dated 1865 shipwreck of the *SS Republic*, testament to the longevity of this paneled pattern form.

The identification of the Site BA02 glass tumblers as cargo is based on their significant volume, widespread distribution and the discovery of five paneled examples inside five British dipped whiteware ceramic jugs into which they seem to have been packed to maximize space efficiency during shipping (Tolson *et al.*, 2008: 172). Further fragments of two green glass tumblers were found inside a sixth dipped whiteware ceramic jug. This nested stowage method may suggest that at least some of the ceramics and glasswares were being delivered to a single consignee.

14. Oil Lamp Fonts

The excavation of Site BA02 identified four parts of oil lamps in the northeastern, stern section of the wreck: two globes and two fonts with bases, with the exception of one base all of which were recovered. These wares were located 1.5m to the northwest of keg K1 to the north of Area B. Although the schooner's stern would have contained the crew's galley structure, these lighting devices probably did not illuminate the cabin because a shipboard lamp would have been gimballed and rigidly mounted. In addition, no burners or chimneys were found on the site and lamp stems and brass joint connectors were conspicuously absent. This leads to the conclusion that the ship was transporting separate glass lamp components as cargo, a common trend at a time when factories specialized in the production of individual glass parts (globes, fonts and bases) for the lamp industry (Barlow and Kaiser, 1989: 155; Gerth *et al.*, 2011: 41).

The heavy colorless glass lamp font and base from Site BA02 (BC-05-00024-GL; Fig. 78) is pressed in the 'Circle and Ellipse' pattern, with a hexagonal base and dates



Fig. 78. Oil lamp font BC-05-00024-GL pressed in the 'Circle and Ellipse' pattern, with a hexagonal base, H. 21.2cm.

generically to 1840-70 (Barlow and Kaiser, 1989: 43). Its distinctive design is also seen on vases produced in the eastern United States (McKearin and McKearin, 1941: 388, 392; Wilson, 1994: 457). An identical second font and base was recorded alongside the former and left *in situ*.

The top section of the lamp is an oval-shaped font comprised of six panels, each of which feature a repeating pattern consisting of a circle on top and an elongated oval form on the bottom. The top of the font ends in a relatively small opening with a narrow rim, which would have held the lamp burner. Below the font is a small, thick wafer of glass, which connects into a hexagonal base with a flared foot. The BC-05-00024-GL oil lamp font displays the following dimensions: H. 21.2cm; H. of body (from bottom of lowest flange above base to top of artifact) 14.6cm; Diam. of bore 2.7cm; max. Diam. of upper body 8.0cm; H. of base (up to first flange) 6.4cm; base Diam. (up to first flange) 13.5cm; weight 884grs.

Lamp fonts of this style were manufactured by the Boston & Sandwich Glass Company and the McKee and Brother Glass Works of Pittsburgh, Pennsylvania. The latter featured the lamp in its 1859-60 catalog, which stated that a dozen could be purchased with a whale oil

burner for \$4.00 and with a fluid burner at \$4.66 per dozen (Barlow and Kaiser, 1989: 90). A number of other companies specialized in similar patterned glass lamps.

The advent of the pressing machine in the late 1820s revolutionized the manufacture of glassware and facilitated the production of vast quantities of pressed glass in hundreds of different patterns. While mold-blown glass necessitated the muscle and lung technique of glass blowers, by contrast pressed glass consisted of molten glass mechanically pressed into a mold by a metal plunger affixed to a long lever-like handle (Berry, 2001: 47, 48). This new technique permitted the mass production of glassware, lowered manufacturing costs and consequently retail prices (McKearin and McKearin, 1948: 332, 377-8). Once thousands of identical items could be readily produced, glassware was no longer a luxury for the wealthy, but rather a commodity that could be afforded by all, and demand soared accordingly.

By the 1840s, companies such as the Boston & Sandwich Glass Company realized that in order to remain competitive, they needed to introduce major stylistic changes to their products. They invested heavily in the purchase of molds to make glass fonts in the knowledge that it required far less time to teach a glassworker how much glass to drop into a pressing mold than it did to train a glassblower to make free-blown fonts or blow the correct size bubble into a patterned mold (Barlow and Kaiser, 1989: 43). Pressing glass transformed the glass industry from one that relied almost exclusively on artisans to one that was augmented by molds. Deming Jarves, founder of the Boston & Sandwich Glass Company, estimated that by the mid-1850s glass companies were spending more than \$2 million dollars on pressing machinery and molds alone (Berry, 2001: 47, 48; Davis, 1949: 83).

The Jacksonville 'Blue China' wreck lamp font does not appear to be a companion to either of the glass lamp globes recovered from the site because the opening at the bottom of the globes are too large to fit the smaller lamp stem. The lamp font and base appear to have been pressed in a multi-section metal mold of either brass or iron. Such lamps produced at the Boston & Sandwich Glass Company were pressed in two-part molds. The pressed 'Circle and Ellipse' patterned font was attached to the pressed base using a wafer construction, whereby a circular glass merese inserted between the two pieces interconnected them while the glass was still extremely hot. The Site BA02 lamp font and base was seemingly produced by this same process. However, if it was pressed in one piece, then it could have been manufactured by the New England Glass Company of Massachusetts.

The American Flint Glass Company of South Boston, Massachusetts, also manufactured such mold-blown lamps (pers. comm. Dorothy Hogan-Schofield, 8 February 2010).

The Site BA02 lamp font – one of two on the wreck – is likely to have been part of a small cargo because, as mentioned above, a shipboard lamp would have been gimballed and rigidly mounted. The recovery of two other non-related glass lamp globes suggests that the ship was carrying a minor consignment of lamp parts. Lamp components were frequently produced separately and their varied glass and brass pieces often derived from different manufacturers that were later assembled by employees of the lamp industry (pers. comm. Jane Spillman, 2006; Barlow and Kaiser, 1989: 155).

15. Oil Lamp Globes

Two spherical lamp globes recovered from the northeast flank of Site BA02, corresponding to the ship's stern, typify mid-19th century products. Both globes were apparently mold blown. Despite the introduction of the more cost-effective pressing machine, the earlier mold-blown technology remained the preferred method of production for larger glasswares, such as lamp globes. If pressed, the center of the globe would be cylindrical with very thick sides, thus allowing the plunger to enter and escape. The end product would have been too heavy and thick for a lamp globe intended to shed light. Period lamp globes produced by the Boston & Sandwich Glass Company were virtually all mold blown, further confirmed by examples featured in the Company's catalogs of the 1860s to 1880s (pers. comm. Dorothy Hogan-Schofield, 3 and 4 February 2011).

By the mid-1800s the number of glass companies in the US had increased substantially compared to the turn of the century, and by 1867 most glass factories in the United States were involved in the manufacture of glass lighting devices (Berry, 2001: 47). The business had become so immense that many glasshouses were entirely devoted to pressing lamp globes, while others concentrated solely on lamp shades and yet more only produced chimneys (pers. comm. Dorothy Hogan-Schofield, 8 February 2010; Barlow and Kaiser, 1989: 153-54, 156).

Lamps produced in the mid-1850s used whale oil, burning fluid and newly introduced kerosene. When the price of whale oil began climbing precipitously, 'burning fluid' became especially popular throughout North America. First patented in 1830, its use spread quickly in the following decade. Derived from high-proof alcohol and redistilled turpentine, it was cheap and produced a white, smokeless flame. Further, the lamps that burned it were relatively simple to make and operate. Nevertheless, it was



Fig. 79. Semi-opaque oil lamp globe
BC-05-00021-GL, H. 16.2cm.



Fig. 80. Ruby red oil lamp globe
SC-04-00006-GL, H. 19.8cm.

still one of the most dangerous fuels ever to gain widespread use. By 1857, over a million gallons of 'burning fluid' were manufactured in Philadelphia alone and sold for about 60 cents a gallon (Russell, 1968: 93-4).

Kerosene burning fuel was also readily available in the United States by the 1850s, when companies such as the Boston & Sandwich Glass Company started kerosene lamp manufacture. The introduction of this liquid is credited to the Canadian geologist Abraham Gesner, who in 1846 discovered how to produce crude lamp oil from coal. The product (later known as kerosene) was first introduced into the English lighting industry by James Young of Glasgow, Scotland (Barlow and Kaiser, 1989: 43), through a patent he obtained in 1850. His United States patent was issued in 1852 and two years later 8,000 gallons of kerosene were being sold weekly across the country under Young's patent by the Kerosene Oil Company of Long Island, New York. Safe to use in glass lamps, kerosene had become a household word (Barlow and Kaiser, 1989: 153). Given the purported 1854 date for Site BA02, it is quite plausible that the Jacksonville 'Blue China' lamp globes were intended for kerosene lighting.

The wreck's two glass globes, one semi-opaque (BC-05-00021-GL; Fig. 79) and the other ruby red (BC-04-00006-GL; Fig. 80), were sufficiently common to have been intended for use in relatively modest homes of the period. They could have been crafted by any number of glasshouses that specialized in lighting accessories, including the Boston & Sandwich Glass Company, which by 1844 had constructed a furnace specifically for the manufacture of colored glass, which facilitated the increased production of lamps and other glassware in a variety of beautiful colors (Barlow and Kaiser, 1898: 43).

Both of the Site BA02's lamp globes are undecorated and spherical in shape, but slightly dissimilar in style. The ruby red example is rounder and squatter than the semi-opaque globe. Both feature a circular opening at each end of the globe, the semi-opaque one being smaller in diameter than the ruby red example. The semi-opaque globe features a rim around the opening that is relatively thin and tapers slightly outward, while the rim around the opening of the ruby red example is thicker, rounded and slightly curved. The semi-opaque lamp has a small chip on the rim of the lower opening and exhibits what appears to be iron oxide staining.

The BC-05-00021-GL semi-opaque glass oil lamp globe displays the following dimensions: H. 16.2cm; max. body W. 16.0cm; external Diam. of top opening 9.8cm; external Diam. of lower opening 9.9cm; rim Th. of top opening 0.4cm; rim Th. of bottom opening 0.4cm; weight 1.708kg. The BC-04-00006-GL ruby red oil lamp globe displays the

following dimensions: H. 19.8cm; max. body W. 14.5cm; external Diam. of top opening 12.3cm; external Diam. of lower opening 11.4cm; rim Th. of top opening 0.6cm; rim Th. of bottom opening 0.7cm; weight 7.1kg.

16. Pressed Salt Cellar

A single opalescent pale blue pressed glass salt cellar in the 'Bee Hive' pattern (BC-05-00007-GL; Fig. 81) was recovered from the Jacksonville 'Blue China' shipwreck, some 2.9m northeast of the large keg K6 in Area E2. Its context included a glass inkstand, part of a brass and glass sextant and a brass hinge. Although found in the original general area of the ship's stern cabin, it is hard to envisage practical sailors taking the time to 'pass the salt' during meals at sea. Instead, this was possibly another part of a small-scale bespoke consignment of glasswares.

The salt cellar is rectangular in shape, with sides tapering outwards from the base to the top of the vessel. The base consists of a series of five projecting curves or ridges that form an uneven exterior. The exterior perimeter of the container is comprised of alternating projecting curved rows. The top rim of the vessel again is uneven, consisting of alternating small ridges. The interior of the vessel is relatively shallow. The appearance of the glass varies from a milky pale blue semi-opaque color to an almost transparent colorless glass. The BC-05-00007-GL glass salt cellar displays the following dimensions: H. 5.0cm; max. Diam. 7.8cm x 5.3cm; rim Th. 0.8cm; top flange W. 7.8cm; lower flange W. 6.8cm; base Diam. 5.3cm x 3.0cm; weight 287gr.

This particular style of salt cellar style was in circulation between *c.* 1835 and 1860 and is attributed to the Boston & Sandwich Glass Company, where identical fragments have been unearthed from the former factory site. Also called a 'salt' by the Sandwich glassworks, this is one of the earliest forms pressed by the company, the original mold pattern having been designed in the 1820s. Its heavy horizontal ribs and curved rim typify the forms of blown molded salt cellars and sugar bowls of the period. Its early use is highlighted by the ten dozen 'Bee Hive' salts shipped to New Orleans in 1827 (pers. comm. Dorothy Hogan-Schofield, 8 February 2010; Barlow and Kaiser, 1985: 278; Wilson, 1994: 455).

While the New England Glass Company also produced a similar salt cellar patterned form, the Boston & Sandwich Glass Company is believed to have been an important – if not the leading – manufacturer of the 'Bee Hive' pressed salt cellar (Barlow and Kaiser, 1985: 278; Spillman, 1981: 242). Salt cellars of various design and decoration were produced in many other establishments equipped to work with molten glass and iron molds, including factories



Fig. 81. Glass salt cellar BC-05-00007-GL, H. 5.0cm.

that copied their competitors' popular designs. Typically unmarked, it is impossible to state categorically just which exact American glass factory manufactured this small table piece.

Salt making is believed to have been a very early American industry. In 1620, the colonists at Jamestown, Virginia, established salt works at Cape Charles and in 1633 began to send salt to the Massachusetts Puritans (Greeley, 1872: 124). By 1689, salt was being made in South Carolina. Early American settlers, however, imported most of their salt, but the British blockade imposed during the Revolutionary War made the receipt of imports virtually impossible and unaffordable due to high tariffs (Barlow and Kaiser, 1985: 275). The American market so long dependent on foreign manufacturers was compelled to rely on its own resources.

In the late 18th century, commercial salt works were established in coastal communities along the Atlantic coast, where salt was especially needed for curing fish. The leading manufactories were located in Virginia, Delaware, New Jersey, Massachusetts and Maine (Greeley, 1872: 124) and could produce one bushel of salt from 350 gallons of water. By the late 1830s, coastal towns such as Cape Cod, Massachusetts, were supporting a thriving salt industry. The town of Dennis boasted 114 salt works in 1837. Even Deming Jarves, the founder of Sandwich's glass company, outlined a plan to build a salt-making facility on

the grounds of the Sandwich factory in 1838. The operation relied on iron pipes to convey the heat beneath trays filled with salt water and reportedly produced ten bushels of salt per day, which at the time brought \$6 to \$8 per bushel (Barlow and Kaiser, 1985: 275).

Further inland, the Kentucky salt springs were in use before 1790. The first salt manufacture began in Ohio in 1798 and in Pennsylvania in 1812. More important sources existed in New York, West Virginia and Ohio, with New York ultimately generating more than half of the entire domestic supply of America. The state's leading salt works were situated in Syracuse, where the Onondaga Salt Springs was a major producer (Greeley, 1872: 125).⁵ Systematic production began in 1797, when state legislature designated a one mile-wide strip of land around the southern half of the lake as the Onondaga Salt Springs Reservation. Laws regulating the method of production (boiling or solar evaporation), as well as the storage and sale of salt, were implemented along with a collection duty for every bushel of salt produced on the Reservation. The rapid development of the salt industry in the 18th and 19th century led to Syracuse becoming known as 'The Salt City'. Between 1797 and 1917, the Reservation produced more than 11.5 million tons of salt. The expansion of the United States into areas that had natural salt brines and rock salt mines resulted in the decline of coastal salt evaporating facilities (Barlow and Kaiser, 1985: 275).

Whether derived from land or sea, coarsely milled salt frequently absorbed moisture and had a tendency to lump and, as a result, salt was placed on the table in an open container. Although the glass container held only a limited supply of salt, the term cellar was in common use at the time and meant a place of storage. The popular use of such glassware was supported in large part by a population that consumed an enormous amount of salt, which was delivered to the table in an open salt cellar throughout the 19th century (Barlow and Kaiser, 1985: 275-6).

17. Conclusion

Despite numerous trials and errors, the War of 1812 and British competition, American glass production increased steadily throughout the 1800s to become a booming industry in the second half of the century. A number of factors influenced this trend, including urbanization driven by developing industrialization. At the start of this period, only 5% of America's population lived in urban areas, whereas by 1850 the figure had increased to nearly 20% (Machor, 1987: 121), a growth that in large part was triggered by a flood of foreign immigrants and economic expansion (Selcer, 2006: 272). Initially only five cities

exceeded 5,000 residents. However, by the middle of the century over 60 cities could boast this population size and six cities catered to populations in excess of 100,000. The Northeast experienced the most substantial growth, with its four leading cities, Baltimore, Boston, Philadelphia and New York (including Brooklyn) sustaining a combined 1.3 million inhabitants (Machor, 1987: 120-21). During the three decades from 1830 onwards, these four major Atlantic seaports grew at a rate of 25% or more per decade (Selcer, 2006: 272). All of these cities were home to the burgeoning glass industry.

With increased urbanization, the development of better roads, canals, steamboats and railroads and a rising standard of living, America's population became increasingly reliant on glass containers to package products that had formerly been manufactured and consumed domestically. Bulk packaging in ceramic and wooden containers was the norm during the 18th century, glass bottles being relatively expensive to manufacture and domestic production being hampered by shortages of capital, competent labor and adequate transportation. Most bottles at this time were imported, and supply could not meet the growing demand (Busch, 2000: 175). Hand in hand with the phenomenon of expanding US cities were technological innovations, an infusion of skilled craftsmen and an increased consumer population, which, amongst other factors, by 1850 supported a thriving domestic glass industry. The industry, in turn, fed into a host of merchants, druggists and shopkeepers, whose retail and wholesale businesses depended on providing bottled goods and household glassware to customers across the country.

While many glass companies produced finer wares catering to a wealthier clientele, the Site BA02 glassware cargo confirms that US glassworks mass-produced a diversity of affordable items intended for the modest American consumer, including glass lamps, table and bar wares, as well as various bottle forms essential to the merchant trade and domestic life in the mid-19th century United States. Most of the US glassworks were built on or near waterways, railroads and turnpikes, providing efficient access to city markets and consumers. Improved transportation systems naturally facilitated increased trade networks. Ships typified by the Jacksonville 'Blue China' schooner, very likely based in and having departed from New York City on its final voyage, played a central role in the distribution of glasswares and bottled goods well beyond the major industrial centers.

The Site BA02 bottle assemblage is not unusual for the mid-1800s. Except for the more decorative cologne bottles (Type 7 and Type 8), the representative glass bottles recovered from the shipwreck typify 1850s US domestic refuse

assemblages often found broken in privies and dumps. The Jacksonville 'Blue China' bottle assemblage provides a clear snapshot of the diversity of bottled products (medicines, liquor, mineral water, condiments and cologne) present in mid-19th century households and stores and relied on by the American consumer.

All of the bottles from Site BA02 are seemingly of domestic American production. Given the relatively firm dating of the wreck to the mid-1850s, the bottle assemblage confirms and conforms to several previously established trends in US bottle manufacturing. First and most significantly, the use of pontil rods was at this time still by far the dominant method of holding the bottle for the final finishing (forming of the lip). All of the bottle types featured in the Jacksonville 'Blue China' assemblage exhibit pontil scars evocative of a method of manufacture that had largely ended by the late 1850s, replaced by the use of the snap case that left no mark on the bottom of the bottle. However, as is the case with most technological innovations, the new snap case device was adopted at varying rates by different factories over a period of time. Bottles exhibiting pontil scars indicative of the older technology continued in use until the end of the American Civil War of 1861-65.

Secondly, the Site BA02 bottles reveal that the finishing techniques of the 1850s were dominated by crudely applied finishes formed by the prevalence of the earlier, more basic tools. Thin 'flared' and 'rolled' finishes, formed without the use of a specifically designed finishing tool, were still a common method of forming the lip of the bottle at this time.

Thirdly, in light of the prevailing study of glass bottle production technology, the various methods applied in the production of the Site BA02 bottles clearly reflect the period of technological flux in American glass-making that occurred during the 1850s, whereby some of the methods employed reflected much older methods and others represented newer Industrial Age innovations. The bottle forming methods represented amongst the Jacksonville 'Blue China' assemblage range from the traditional age-old method of free-blowing and/or dip molding (Types 3 and 6) to the period-typical true two-piece molds with no separate base plate (Type 4, 5, 7 and possibly 8 and 9A). Also evident is the use of the Ricketts' style three-piece mold relied on to produce the Type 1 bottle and earlier versions of the relatively modern (for the period) post-base molds seen in the Type 2 and 9B examples. This latter mold type would subsequently become a dominant form for at least another three decades.

The non-bottle glass forms recovered from Site BA02 represent a sample of the modestly priced American

products readily accessible to the average mid-19th century US consumer. While the prevalence of these wares was not uncommon, a number of the glass cargo items uniquely reflect the technological trends and transitions that characterized the glass industry in the 1850s. The two different bar tumblers – the pale green example and the colorless fluted variety – exhibit co-existent production methods. While the fluted tumblers were pressed in a mold, the pale green samples were likely free-blown or mold-blown because they exhibit a blowpipe pontil mark on their bases. In the final analysis, as a microcosm of the early Victorian United States, the Jacksonville ‘Blue China’ shipwreck’s glass cargo and the recovered sample symbolize the success of the country’s industrial and mercantile revolution and, in particular, its burgeoning glassware industry, which proved resistant to failure and would help propel the country into the future.

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Notes

1. The bottle identifications, technology, and history presented in this paper rely heavily on data published in the Historic Glass Bottle Identification and Information website (US Department of the Interior Bureau of Land Management/Society for Historical Archaeology): <http://www.sha.org/bottle/typing.htm>.
2. See Brecher, *The Consumers Union Report on Licit and Illicit Drugs* (1972): <http://www.druglibrary.org/schaffer/Library/studies/cu/cumenu.htm>.
3. See: http://www.sandwichglassmuseum.org/about_us/history.
4. See Note 3 above.
5. Section 16 draws extensively on *Salt Production in Syracuse. ‘The Salt City’ and the Hydrogeology of the Onondage Creek Valley*: <http://ny.water.usgs.gov/pubs/fs/fs13900/FS139-00.pdf>.

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