Artifacts From The Blue China Wreck: An Unknown Shipwreck Off The Coast of Jacksonville, Fla.

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Non-technical Summary

During its search for the wreck of the sidewheel steamer *Republic*, Odyssey Marine Exploration located the sunken remains of an unidentified sailing vessel. This ship had gone down carrying what had been a substantial cargo of ceramic wares. A small selection of artifacts from the site was recovered and the wreck arrested in court, thus granting ownership to Odyssey.

Some time after the discovery, the site was revisited by Odyssey as part of an inspection of wrecks discovered near the remains of *Republic*. At that time, it was decided that the site was undergoing destruction from the dragging of trawl nets across it—an ironic occurrence, since it was through an artifact picked up in a trawl net that the site was originally discovered. The decision was made to recover as many diagnostic artifacts as possible in an effort to identify and date the remains, and to recover as many intact ceramics as possible for study, exhibit, and potential sale before further destruction of the site took place.

This was not a true archaeological operation, although archaeological techniques were employed: a photomosaic was constructed and the relative positions of artifacts were recorded using software specially designed by Odyssey for the purpose. The work also served to fine-tune Odyssey's equipment and operational procedures on a wreck of relatively low significance (so classed due to the degree of extant destruction and disturbance).

Introduction

It all started with a jar. A glazed earthenware jar, unremarkable save for the fact that it had been brought to the surface of the Atlantic Ocean from more than 1,000 feet down, an unexpected addition to a

Florida trawlerman's catch. The story of the jar ultimately made its way to Odyssey Marine Exploration (Odyssey), and led to the designation of Site BA02, an anomaly to be further investigated.



Figure 1

Site BA02 is located 70 nautical miles East-Southeast of Jacksonville, Florida at a depth of 367 meters in the Atlantic Ocean's Gulf Stream current. The site was first surveyed by Odyssey as part of the search operations that ultimately led to the discovery of the side-wheel steamship Republic. Initial examination was conducted with acoustic imaging using an EdgeTech DF1000 towed sidescan sonar unit on 11 July 2002. The location was pinpointed and the wreck examined visually using an Ultimate remotely operated vehicle (ROV) on 29 January 2003. At that time, three artifacts were removed: a bowl, and a pitcher containing a glass tumbler. These were recovered for the dual purposes of arresting the site in court and for the attempted identification and dating of the vessel.

Subsequently, the shipwreck was named the "Blue China Wreck" from the presence of a large quantity of ceramics, a number of which featured blue decoration. Later research would reveal that this cargo consisted largely of earthenwares, with very few items actually being "china" (i.e., Chinese porcelain or bone china). By that time, however, the assigned name had become so firmly associated with the wreck that it was not changed.

On 28 April 2003 the wreck site was videotaped over the course of an eight-hour dive, again using the Ultimate ROV. At that time, three more artifacts were placed in a recovery basket that had been deployed at the north end of the wreck mound: a large stoneware jug and two ceramic vases bearing blue ornamental designs. It was hoped that additional diagnostic artifacts would aid in dating and identifying the wreck. On 29 April 2003, the Ultimate ROV made another dive on the site to shoot more videotape and retrieve the artifact recovery basket and its contents, making a total of six artifacts brought up from the wreck by Odyssey.

At that time it was observed that the site consisted of a large, low-lying mound, approximately 30 meters by 10 meters. There appeared to be a large quantity of wooden hull structure in various stages of deterioration, with more intact portions beneath a sand substrate. A large concentration of ceramics and bottles was present near the south end of the site, with two anchors present at the extreme south end. This led investigators to assume this to be the bow end of the wreck. A large number of encrusted iron masses were scattered about the area. Initial impressions were that the wreck represented the remains of a merchant ship, possibly a coastal trader (Laura Lionetti Barton, pers. comm., 10 July 2003; Notes on Arrest Data Needed to Complete Admiralty In Rem Complaint, Odyssey "Blue China Wreck" Files, n.d.).



rigure 2

Examination quickly confirmed that the site was not the sought-after wreck of *Republic*. In addition, displacement and damage to artifacts on the site reflected the impact wrought by modern fishing trawls (Lange Winckler, personal communication to William Sargent, 7 March 2003). Despite this, an admiralty arrest was filed to protect the site from incursion by others and establish Odyssey's ownership of the vessel should the company wish to engage in further investigations..

However, as of the time of this writing, a full-scale archaeological investigation is not justified due to cost and logistic concerns, not the least of which is a cycle of increased hurricane activity from June through November.

In 2005, during a break from operations

on *Republic*, the company's research vessel *M/V Odyssey Explorer* was sent to reexamine and assess the condition of other wrecks previously located in the vicinity. This included the Blue China Wreck, which evidenced a noticeable amount of additional destruction—resulting from trawl nets being dragged over the site—in the intervening period.

Little of the original context remained undisturbed, and much of what remained of a substantial cargo of ceramics had been broken, smashed and scattered directly related to trawling activities.

This trip had been intended only to check the status of the site during an interval of relative quiet in the midst of that season's multiple hurricanes. Unfortunately, at that point it appeared that the site was in imminent danger of total destruction. As a result, the decision was made to use the brief window of fair weather to undertake what on land would be classed as a "salvage archaeology" operation—or more properly in this case, "rescue archaeology."

Odyssey's considerable store of deep water archaeological technologies was deployed for a triple purpose: first, to gather what knowledge could be gained from the wreck in the limited time available, including the recovery of diagnostic artifacts in an effort to identify the vessel; second, to use the site for testing and improving data logging software, and to improve photomosaic and other archaeological techniques, and; third, to recover as many intact ceramic artifacts as possible for study, display, and potential sale.

During its searches for specific targets, Odyssey encounters many wrecks, not necessarily of commercial value, but of potential archaeological value. In many ways, these sites are just as valuable to Odyssey as a high value cargo wreck. It is hoped that remote sensing technologies can be refined to the point that a site can literally be recorded in its entirety with a few passes of the research vessel over her final resting place, without disturbing the site or requiring excessive diversion of effort from the search for a primary target.

In this case, while a photomosaic of the wreck was constructed, no measured site plan was made due to the short window of fair weather. The provenience data that was obtained came from the use of the ship's onboard transponder.



Figure 3

Site Description

The "Blue China Wreck" lies at a depth of 367 meters below the surface of the Atlantic Ocean and within the flow of the Gulf Stream current. The rate of current at the sea bottom ranges from 0.5 to 1.0 knots, while surface currents vary and at times are considerably greater than those at depth. Water temperature and salinity vary according to weather and longer-term influences. The setting is a deep ocean environment populated sparsely by flora and fauna (Lange Winckler, personal communication to George Becker, 17 October 2003). Folklore among local fishermen suggests that surface currents in this region tend to trap disabled ships that might otherwise drift to shore or elsewhere, producing a concentration of wrecks.

The wreck is the only disruption of a relatively featureless bottom plain beneath the rolling Atlantic waters. The wreck mound is oval in shape, with the centerline running approximately northwestsoutheast, with the bow at the southeast end. Two iron anchors are visible there, one whole and one fragmentary. No wood is present beneath the anchors. The largest visible cluster of ceramics is near the bow end of the site. Modern trash is also present, including plastic garbage bags, a beer can, and what might be fragments of cloth. The bottom matrix consists of shallow deposits of sediment over hardpan, although the sediment (including what appear to be pulverized fragments of china) deepens as one moves north along the wreck. No stone or iron ballast is visible.

Despite scattering of the wreck components by trawl nets dragging across the site, some artifacts remain in relatively well-defined clusters. The following are visible as one transits from south to north along the site:

• anchor and broken anchor;

• cluster of concreted/encrusted iron artifacts of various shapes and sizes;

• large mound of mixed ceramics that occupies approximately 50% of the total site

area;

 \cdot a tight concentration of dark glass bottles within the ceramics;

• what appear to be the remains of small kegs of white lead from which the staves and hoops have disintegrated;

• a more dispersed cluster of bottles (these are taller and narrower than those in the first cluster);

 seven (7) larger concreted/encrusted iron artifacts that are of relatively uniform size, perhaps containers of smaller artifacts;

• a tripod-shaped iron encrustation that may represent a piece of steering gear, marking the extreme north end of the site. Also found in this area was a salt container, sextant sun shield, telescope, and whole and fragmentary clay pipes. The presence of the navigational instruments supports this end of the site being the remains of the stern of the vessel.

In addition to the artifacts described above, some 2,500 items were visible on the wreck site. The area between the ceramics and the second cluster of bottles is largely empty of artifacts, revealing elements of the hull structure. Also seen during ROV operations were fragments of what appeared to be window glass, which were not collected.

The wreck seems to be that of a mixedcargo merchant vessel, apparently of typical size for coastal and small-load trans-Atlantic shipping. Vessels used in the China trade usually were larger-burthen ships used to carry much larger cargoes. While this does not rule out a ship coming from China or Asia, it suggests the ship was on a route that might have included the Caribbean islands or the Atlantic coastal trade.

No iron or stone ballast is visible on the site. The planking found beneath the silt under the artifacts is probably that of the very lowest part of the ship—thus the recoverable items available from this wreck would be those described above, any additional items buried in the sediments on the wreck, and other items that might be buried on the surrounding sea floor. It appears unlikely there is another cargo hold, and there is no visible debris field surrounding the mound itself.

The various types of cargo seen on the wreck and recovered for study indicate this vessel was likely lost in the pre-Civil War era, probably the 1850s-1860. The few Chinese-made porcelain wares that have been recovered were mixed with large quantities of ceramics produced in English

potteries and exported to the American market. In addition, much of the glassware discovered was probably produced at American glass works in the mid-19th century.

The site exhibits both direct and indirect evidence of trawl damage. Direct evidence includes actual "trawl scars," i.e., drag marks in the matrix of the seabed, as well as smashed artifacts and ship's structure, post wreck event. Indirect evidence includes a lack of benthic organisms, which are slow to develop and spread, and the desert-like surroundings to the wreck (Tom Dettweiler, personal communication to Hawk Tolson, 15 February 2005). Because no photomosaic was constructed at the time of the discovery of the wreck, comparative analysis of the change in its condition due to this damage can only be based on the recollections of the crew. Admittedly, this is less than satisfactory for scientific purposes.

Aims and Objectives

Initially, the 2005 visit to the Blue China Wreck was intended to be for the purposes of observation and evaluation. The unexpected degree of destruction found on the wreck resulted in a decision to more thoroughly document the site and engage in more extensive artifact recovery to preserve material that appeared in imminent danger of complete destruction. Therefore, while on site, the following objectives were established by the project manager and project archaeologist:

1. Construct a photomosaic of the wreck site;

2. Recover a larger quantity of diagnostic artifacts;

3. Recover intact examples of all visible glass and ceramic artifacts;

4. Recover as many intact ceramic artifacts as possible for study, display, and potential sale;

5. Use the recovery process as an opportunity to conduct testing and improvement of data logging software and deep water archaeology techniques.

Methods

The best way for archaeologists to visualize and participate in the excavation of a deep water site is through the application of advanced digital video technology components on an ROV system. Such video technology has developed to the point that an archaeologist sitting on a research ship has a better view than a diver would have from the faceplate of a diving helmet or mask. An additional benefit is the provision for immediate collaboration and discussion between other archaeologists and scientists. The ROV is, in effect, the 'hands and eyes' of the deep water archaeologist.

Conducting archaeology in deep water requires the same standards as those employed in terrestrial and shallow water sites. The significant difference, however, is the requirement for specialized equipment. The basic elements required for deep water archaeology are as follows (*Figure 4*):



Figure 4

• A vessel with a Dynamic Positioning System (DPS) linked to a Global Positioning System (GPS);

• An ROV capable of both heavy and delicate work at depth, with required tooling, packages, and recovery systems;

• An accurate sub-sea survey and navigation system, data logging system, and capability for video and still photography;

· Ship-board conservation facilities.

Although not a necessity for sound archaeological practice, Odyssey's use of High Definition (HD) television cameras adapted to deep water use through multiple field modifications has demonstrated the value of exceptional quality in video resolution. As global conversion to High Density Television (HDTV) progresses, HDTV will eventually be the standard video format, and become more accessible in terms of cost and equipment design for marine archaeological use.

Hull Contents

Over 400 individual artifacts were recovered from the site, all of which were conserved in the Odyssey laboratory in keeping with current standards for best practice. Some have become part of interpretive exhibits, and the rest are in secure and climate-controlled storage at the Odyssey curatorial facility. All of them fall into one of three categories: 1) cargo, consisting of large quantities of identical or similar items, 2) ship's gear, consisting of specialized or unique items used in the operation of the ship, and 3) indeterminate, consisting of specialized or unique items not definitively attributable to either of the first two categories. Limitations in what can be concluded from the artifact assemblage are due to the fact that collection efforts concentrated on recovering as many intact examples of artifact types as possible, without using a systematic sampling procedure. Still, some reasonable assumptions can be made.

GLASSWARE

Multiple pieces of glassware were recovered from the site, including various types of bottles, bar tumblers, and other commercial wares. All of the glass artifacts date to the mid-19th century, suggesting that the pieces were produced in the Northern United States, where all of the major glassworks were located at that time.

The dating of the bottles is based largely on their shape, form and color, which indicate production between 1840 and 1857. It is important to note, however, that bottle-dating is not a precise science. The fact that many of the bottles appear to be pontiled further supports the timeframe; pontil scars became uncommon as the 1860s progressed and largely disappeared by the late 1860s or early 1870s as various "snap case" tools dominated the task of grasping the hot bottle for finishing the lip.

The Blue China bottle assemblage consists largely of aqua bottles with a light hue, suggesting a manufacture date in the 1850s. Medicines, sarsaparillas, utilitarian bottles, etc. produced during the period of 1830-1840 were typically a darker colored glass - ambers and greens - and aquacolored glass bottles of this period were usually a deeper shade.

Although few of the bottles bear embossing, most bottle types can be identified by their shape. The shape of an historic bottle is usually indicative of what the bottle contained (liquor, medicine, mineral water, etc.); products were closely identified with certain distinct bottle shapes rarely used for other contents (Fike 1987:13).

The bottles recovered from the Blue China wreck include the following (note: all remarks in the following text concerning neck finish and base shape are based on Fike, pages 8 (Figure 2, Neck Finishes) and 10 (Figure 3, Base Profiles):

• Spirits/Beer/Ale Bottles (qty:6): these have a height of 26.8 cm and base diameter of 7.6 cm.

Originally sealed with glass stoppers, all of the examples were recovered empty and represent only a small fraction of the many beer and ale bottles present on the site and were probably shipped as cargo. Made of thick green and "black glass," these bottles feature a "Mineral Water Lip" and



Figure 5

"Round" base without a pontil mark (note: in the collectors' arena, the "Mineral Water Lip" finish is also known as an Applied Rounded Collar, Long (or Short) Tapered Collar with Ring, Applied Taper Collar, Short Tapered Collar Lip, Applied Top, Glob Top, Gloppy Top and/or Whiskey Top).

In the early to mid-17th century, glass blowers in England began making black glass. American glassmakers soon learned the process and were producing such bottles in the 18th century. The term "black glass" refers to shades of dark green, dark amber, deep purple, or brown. Often the glass is so dense that the color appears black; the most common agent producing the dark color is iron oxide. The oxide not only darkens the glass, but strengthens it as well, reducing breakage. Beer and ale bottles in the mid-19th century were typically round in cross section (an inherently strong shape) and were made of thick glass to withstand the pressures of carbonation as well extensive post-bottling handling since they were typically reused many times.

· Mineral Water Bottle (qty:1): this

artifact has a height 19.0 cm and a diameter of 8.2 cm.

This heavy, dark green bottle exhibits a "Mineral Water Lip" and "Round" base with no pontil mark. Mineral water was bottled in a relatively diverse array of bottle shapes, including this example, which



Figure 6

was in use ca. 1840 to ca. 1890. Like beer and ale, the carbonated nature of many mineral waters required the bottles to be made of relatively heavy, thick glass in order to survive the high-pressure bottling process and post-bottling re-use. The dark color also helped reduce exposure to light to better preserve the contents.

Mineral water consisted of a combination of gases and dissolved salts and was frequently used for medicinal purposes (Fike 1987:17). In the years just preceding and following the Civil War, mineral waters were in their glory. And during the California Gold Rush, mineral water bottles were blown on the East Coast for San Francisco proprietors and transported 12,000 miles around Cape Horn to San Francisco via sailing ship. Whether this example was cargo or personal property of a crew member is unknown.

· Condiment or spice bottles (qty:9):

these transparent light green or aqua bottles were recovered in at least two sizes. The smaller (qty:5) had heights ranging from 11.2 cm to 12.5 cm and the larger (qty:4) from 17.0 cm to 17.8 cm. This bottle exhibits a "Rolled Lip" finish, which describes the exact



Figure 7

type of manufacturing step involved. While hot, the sheared top was folded inward or outward to add strength and/or a more finished appearance. The base is a "Fluted Oblong (Variant 1)" with no pontil mark. All were recovered empty and had been sealed with corks. The quantity recovered suggests these were cargo items.

This bottle type is often called a "spice jar." Sauces and condiments such as pepper sauce and mustards were also sold in this type container. A number of embossed examples of this exact shaped bottle are featured in Betty Zumwalt's book, *Ketchup, Pickles, Sauces: 19th Century Food in Glass* (1980). As noted by Zumwalt, this bottle type is probably "the most common mustard or spice bottle found." The original shape and design is believed to have been produced by J.W. Hunnewell & Co. in the early part of the 19th century.

Seasonings and sauces were frequently

used in the 19th century to enhance the taste of foods and to mask unwanted flavors resulting from lack of refrigeration. Like all of the bottles recovered from the site, these samples are missing their original paper labels.

• Medicine Bottles (qty:7): these aqua bottles have a height of 12.3 cm and diameter of 3.6 cm. They feature a "Flat or Patent" neck finish and "Round" base with

a pontil mark. They were all recovered empty, having been originally sealed with cork stoppers, some of which were found nestled inside the bottles. The quantity recovered suggests these were a cargo item.

This cylindrical, tapered vessel or vial of English origin was used for a number of



Fig. 8

medicinal products, including Godfrey's Cordial as well as Dalby's Carminative. Both products, introduced in England in the 18th century, were sold as a remedy for various ailments afflicting infants and young children. By the early 19th century both products were available in the United States, listed among the countless patent medicines on the market containing opium or morphine.

The Blue China examples may have held either of these two remedies; however, by the middle of the 19th century and perhaps earlier, a number of patent medicines were sold in this shape bottle. Its narrow neck and mouth were especially useful for the pouring of liquid contents and limiting evaporation around the cork.

· Sand's Sarsaparilla medicine bottles

(qty:4): these aqua bottles have a height of 15.0 cm and an octagonal base 5.5 cm by 3.2 cm. The bottle has a "Double Collar Lip" and a "Blake (Variant 2)" style base with pontil mark and is embossed with the words "SAND'S SARSAPARILLA, NEW YORK." All the examples had been recovered empty and had been originally



Figure 9

sealed with corks (Fike 1987:220). The quantity recovered suggests these were cargo items. Bottle expert Bill Lindsay (author of the Society for Historical Archaeology *Historic Bottle Website*) puts the age of this bottle in the 1850's range, noting that there

Bottles and Extras

is a chance it dates to late 1840s and possibly even the Civil War era. Lindsay explains, "The problem with dating medicine bottles of the 1830s to early 1860s era is that they are all similar as to the manufacturing methods. If the product itself, like Sand's Sarsaparilla, was made during that period then it really is impossible to pin it [the date] down" (Bill Lindsay, personal communication, 21 August, 2007).

Abraham B. and David Sands established their business in New York City in 1835, becoming one of the city's largest drug wholesalers. By 1847, their inventory of proprietary medicine included Sand's (Fike;1987). Sarsaparilla Further documentation suggests that Sand's Sarsaparilla was first produced in 1840. According to the A. B. & D. Sands Family Recipe & Medical Almanac, published in 1853, the product "...has now borne the test of over fourteen years' experience." With several different retail and wholesale locations under different names, by 1863, the firms were all merged as A. B. Sands & Co. Various family members managed the business until it was sold to W. H. Schieffelin & Co. in March 1875 (Fike; 1987)



Figure 10

Sarsaparilla was a common 19th century medicinal administered as a remedy for blood related diseases and a host of other ailments, including syphilis. Its main ingredients were the roots from a plant species of the genus Smilax extracted with alcohol, and often mixed with other plant extracts of reputed medicinal value.

· Mold-blown cologne bottle (qty:1): with a height of 13.0 cm and base of 5.2 cm by 2.5 cm., this mold-blown, colorless "flint" glass bottle with long neck and flared lip has a "Wide Prescription" neck finish and a "Blake (Variant 1)" base. It is the only such bottle recovered from the site and was found empty. A commercial cologne bottle, it dates from about 1835-



Figure 11

1865. This example with its plume motif (McKearin 1978: 396-7) is typical of the designs seen on cologne bottles of this era. Like most commercial cologne bottles, it was originally sealed with a simple cork stopper. A fancy label may have once been attached to the top of the cork (McKearin 1978: 388). Ornamental perfume bottles typically featured the more decorative glass stopper.

The maker is unknown, but a number of American glassworks produced a wide variety of fancy cologne bottles during this period. An advertisement in The New York Commercial Advertiser of July 2, 1832 offered: "Cologne Water - Put up in a variety of bottles comprising about 30 different designs, 30 different kinds ... " (McKearnin 1978: 386). It is unknown whether the Blue China example represents cargo, ship's stores, or personal property.

· Paneled cologne bottle (qty:1): this

cobalt blue, twelve-sided, sloped sloped shoulder bottle has a height of 18.0 cm. It originally contained cologne or toilet water and dates from 1840-1860. It has a "Flanged Lip" and a "Polygon" base with pontil mark. Originally sealed with a cork stopper, the bottle was recovered empty represent and may a personal possession (Digger O'Dell, personal communication, 3 November 2005).



Figure 12

The paneled cologne bottle, produced in a variety of colors, remained popular until late in the century. The Williamstown Glass Works advertised this bottle type from 1840-1854, offering a variety of sizes ranging from 3 to 18 ounces. Paneled bottles were produced in colors representing the full spectrum of the color wheel; from milk glass to black, pinks and greens, as well as purples and blues.

• Utilitarian Bottles (qty:2): these bottles

have heights of 20.7 cm and 21.6 cm, with diameters of 5.5 cm and 5.7 cm, respectively.

These are both identified as utilitarian bottles, and are a very light aqua. They exhibit a "Ring or Oil" neck finish and "Round" base with pontil mark. The indented base is called a "Kick-up" or "Pushup," a common feature of turn-mold bottles (the bottles



Figure 13

are turned in the mold to produce a seamless body). Originally sealed with cork stoppers, these samples were recovered empty. It is unknown whether they represent cargo or ship's stores.

Utilitarian containers make up the bulk of the bottles produced during the 19th and first half of the 20th centuries. They were often heavy duty bottles intended to be recycled and reused by the producer or distributor of the product. These two examples have shapes characteristic of bottles that were used for sauces, olive oil or Florida Water (cologne).

· Cologne Bottles (qty:2): these have an

intact length of 19.0 cm and diameter of 2.9 cm.

These transparent green bottles, with broken neck tops, feature "Round" bases with pontil marks, and uncommon upwardtapering sides. They appear to be almost identical to the artifact recovered from the wreck of the side-wheel steamer Central America



Figure 14

(ca. 1857), which was identified as a "wine-tester bottle" (Herdendorf 1995:172). However, most collectors today believe this bottle type was a French cologne bottle after a case was found with their fancy paper labels still intact.

The six cologne bottles and their case, featured in *Antique Glass Bottles* by Willy Van den Bossche (p. 220), exhibit the original company label of the French Perfumer, L.T. Piver. The Piver samples are identical in color and similar in shape to the bottles recovered from the Blue China Wreck, which probably represent cargo.

Development or Other Impact

As noted at the beginning of this report, examination of the Blue China Wreck during Odyssey1s return visit in 2005 revealed a disturbing amount of destruction resulting from trawl nets being dragged across the site. Little of the original context remained undisturbed and much of the substantial cargo of ceramics had been smashed and scattered. The remaining ship's structure is largely flattened, with only a few relatively deep crevices in the hull preserving some remnants of stratigraphy below the disturbance caused by trawling. Limited test excavations revealed that, for the most part, there was only the single layer of artifacts that was visible from the surface, atop some solid hull structure. It was apparent that what remained was in imminent danger.

While the goal of this report is to provide thorough documentation of the materials recovered from the Blue China shipwreck site, it also presents evidence of the damage that trawling can cause to deep wrecks. Such sites are also endangered by deep ocean oil exploration, dredging, the laying of cables, and modern-day pirates who have no concern for archaeology.

Even so, the alternatives for saving the Blue China Wreck and other similar sites are extremely limited, if not nonexistent. The site is neither archaeologically nor financially significant; the likelihood of returning to conduct a full archaeological excavation is slight, especially given the high cost of deep water work and the great distance of the site from shore. For the same reason, stabilization efforts through burial or synthetic coverings to encourage marine growth and sand deposition are equally unlikely. The site is in international waters, so legal protection is not available (barring passage of some hotlydebated United Nations regulations). Marking the site on charts would be more likely to attract attention than encourage avoidance, especially from fishermen, who actively seek out such sites as good fishing grounds. Aquatic wildlife are quick to colonize such artificial reefs on an otherwise

barren seafloor, and the lifestyle of commercial fishing is a treasure no less valuable than the shipwrecks on the ocean floor. Odyssey has no desire to add to the many regulations that already cripple this endangered industry—especially since the company obtains many leads to shipwrecks from its practitioners.

Conclusions

The Blue China wreck served primarily as a proving ground for Odyssey's hardware and software, and an opportunity to refine its deep-sea archaeological methods. Despite the fact that the project was more artifact recovery than archaeology, a number of conclusions about the wreck can be drawn from the information that was obtained.

The ship Odyssey has designated the Blue China Wreck was a wooden-hulled and wooden-framed sailing vessel of 100 tons or less. Whether it carried a square or fore-andaft rig is unknown but, if the premise of her having been a coastal trader is accepted, a fore-and-aft rig is the more likely configuration. The absence of wire rigging is indicative of a pre-Civil War time frame. The wreck can be solidly dated to the mid-19th century within a 10-year period of 1850-1860 based on the ceramics and glassware. The lack of cannon and the presence of a large cargo of ceramics indicate a merchant rather than a military vessel.

The cargo included an assortment of ceramic wares and glass bottles; the diverse quality and types of items found suggest a modest coastal trader—likely an American merchant's vessel—carrying goods on established routes to fill customer orders along the Atlantic Coast of the United States and perhaps in the Caribbean. The ceramic wares recovered from the site, largely Britishmade, would have first been shipped to major American ports such as New York and Boston before being loaded on this vessel.

Ownership and nationality of the vessel are unknown and may remain so in the absence of more diagnostic materials. However, as a coastal trader, she probably originated from a port on the Northern Atlantic Seaboard. In the absence of any other evidence, it can reasonably be assumed that the ship was overcome by conditions of wind and wave, resulting in loss by foundering.

That said, the examination of the Blue China Wreck has led to additional conclusions about the science of deep water archaeology in general. For a long time, vocal academic archaeologists without the means to access deep ocean shipwrecks have argued that they should be left untouched in some sort of suspended animation supposedly provided by the benthic environment. Now, however, the deteriorating condition of the Blue China site as discovered by Odyssey shows that such benign neglect is not viable as a management strategy.

The subject of human impact on deep ocean shipwreck sites, especially through trawling, is worthy of a paper in its own right. Unfortunately, empirical evidence that would have aided in making a strong case for the presence of trawl damage on this particular wreck was not recorded—only the general observations of the crew who noted it. Nevertheless, this particular case has encouraged Odyssey to record such damage on other wrecks it has located, documenting it through photography and side scan imaging. This is now part of the standard shipwreck evaluation process employed during field operations.

A "rescue archaeology" operation was conducted at the Blue China Wreck for the purpose of preserving as many intact artifacts as possible for potential study, display, and sale. On an equal note, advantage was also taken of a site not deemed to be archaeologically significant (due to extensive destruction and relatively modern nature of the wreck) to test hardware, software, and techniques that will be applied to more significant wrecks.

As a result, Odyssey has adopted the philosophy that with the discovery of deep ocean shipwrecks comes the responsibility to archaeologically investigate them, and to share with the public—not just the scientific community—the knowledge and cultural material recovered. The most frequent alternative may be the loss of such sites to natural and human impacts—along with the information they can provide.

The mission to recover artifacts from the Blue China Wreck and its substantial cargo of pottery resulted in a newly discovered source of largely utilitarian wares that are not well preserved in the terrestrial archaeological record. While the recovered ceramics do not provide new information about the manufacturing and dating of these wares, they do serve as a springboard for further research into their marketing, transportation and distribution. In the final analysis, these deep ocean finds contribute to the historical record, furthering our understanding of the extent to which these cultural goods were transported and disseminated on a global basis.

Select "Blue China" shipwreck artifacts, are available for purchase via Odyssey's website: www.shipwreck.net.