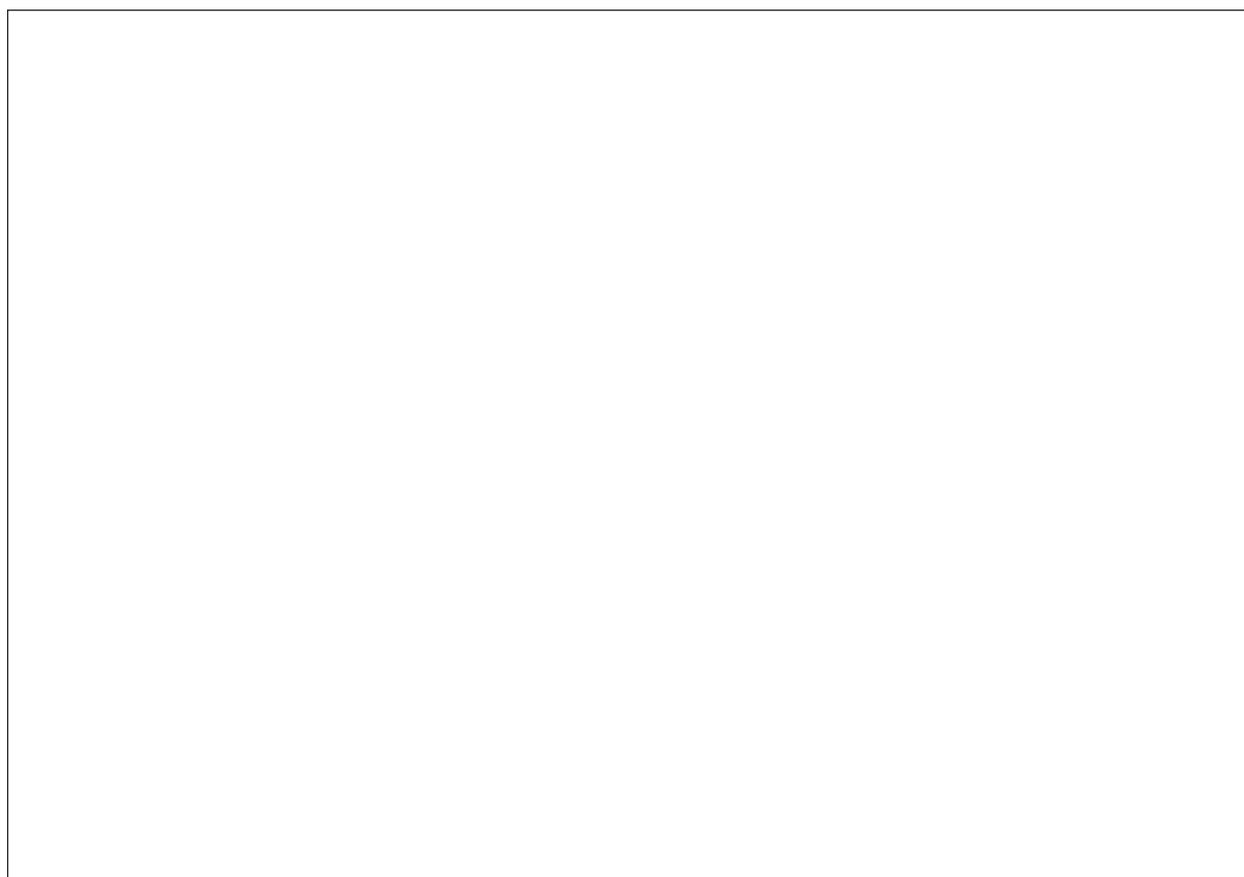


# THE INA QUARTERLY

Winter 1995

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- 
- 3 The Byzantine Shipwreck at Bozburun, Turkey  
The 1995 Field Season  
*Frederick M. Hocker*
- 9 Whitehall Project 1995:  
A Preliminary Report on the Excavation  
and Study of the U.S.N. Row Galley *Allen*  
*Eric B. Emery*
- 15 Nautical Archaeology in the Southern Baltic Sea  
*George Indruszewski*
- 19 INA Sonar Survey Locates Ancient Shipwreck  
*Brett A. Phaneuf & Donald Frey*
- 21 Review  
*Pottery for Spanish Shipwrecks 1500–1800*  
by Mitchell Marken  
*Reviewed by Brian Jordan*
- 22 *INA Quarterly* Submission Guidelines
- 23 News & Notes

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**On the cover: Amphoras from the Bozburun wreck prior to the beginning of conservation, shown still in the lifting basket with temporary identification tags. Photo by D. Frey.**

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# The Byzantine Shipwreck at Bozburun, Turkey

## The 1995 Field Season

by Frederick M. Hocker

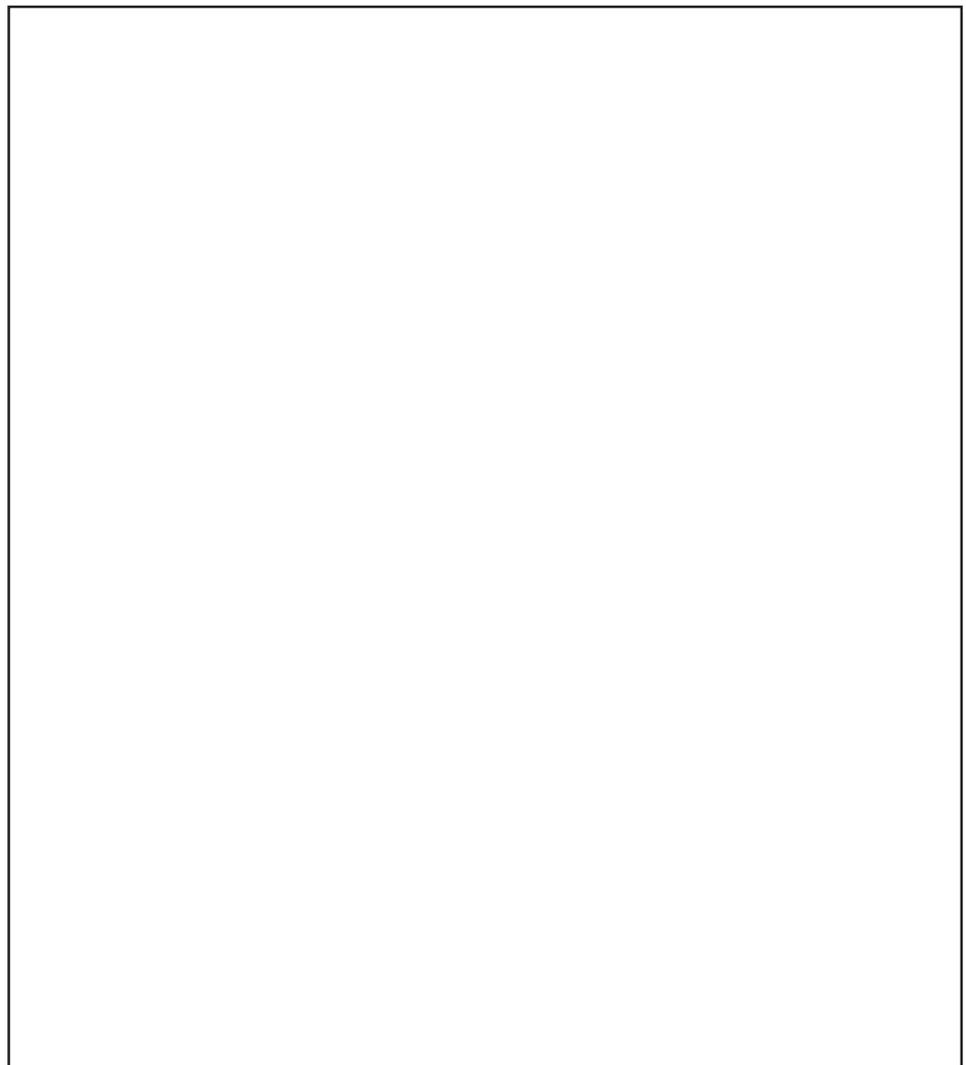
Sara W. & George O. Yamini Faculty Fellow

Thirty-six meters deep in the Aegean Sea, everything is blue and green. The amphoras in my excavation square vary from a dark, brownish blue with black sea cucumbers festooning the handles to a medium gray-green. The concreted anchor Robin Piercy has just uncovered in the square to the right is a pale bluish-green. Behind me, there is a mound of light blue sand, spoil hand-fanned out of my square and Robin's, that separates the lower end of the excavation from the featureless sandy slope that disappears down into indigo murk. Even in this dimly-lit world the shape of a medieval ship is clearly visible in the mound of amphoras running up the slope.

The site was one of several shipwrecks shown to George Bass and the first INA survey team in 1973 by Mehmet Askın (profiled in *Newsletter* 6.4), a sponge diver from the nearby town of Bozburun (Fig. 1). The wreck first appeared as a low mound of amphoras approximately 20 meters long and 8 meters wide in the sloping, sandy bottom at the base of the cliff called Küçüven Burnu, outside the entrance to the harbor of Selimiye, a small village near Bozburun (Fig. 2). The mound is oriented almost directly north-south, with the southern (upper) end lying at a depth of 26 meters, hard against the base of the cliff, and the northern (lower) end at 36 meters. In addition to the mound, a number of whole and fragmentary amphoras are scattered about the bottom either side of the mound and in the rocks of the cliff above. Some of the scatter is a result of the wreck, as the material is firmly concreted into the rocks in places, but some is doubtless the work of visitors to the site. A few other artifacts, including ceramics, several pieces of concreted iron, and one broken cruciform anchor, were initially visible in the wreckage and on the rocks.

The site has been the subject of regular monitoring by INA, and was surveyed in 1973, 1982, 1992, and briefly in 1994 in preparation for the excavation. In the course of the surveys, three amphoras were recovered and deposited in the Bodrum Museum of Underwater Archaeology. These amphoras provided a preliminary date for the wreck in the later ninth or early tenth century, and appeared to match jars found on kiln sites in the Crimea, Ukraine.

Work in 1995 began with the construction of an excavation camp and dive platform. Because the site lies very close to a lee shore (less than 5 meters from the face of the cliff) in the prevailing



Map: B. Jordan

Fig. 1. *The INA excavation camp site is located in a small harbor called Sig (Shallow) Bay. The shipwreck is reached by a short boat ride along the cliffs.*

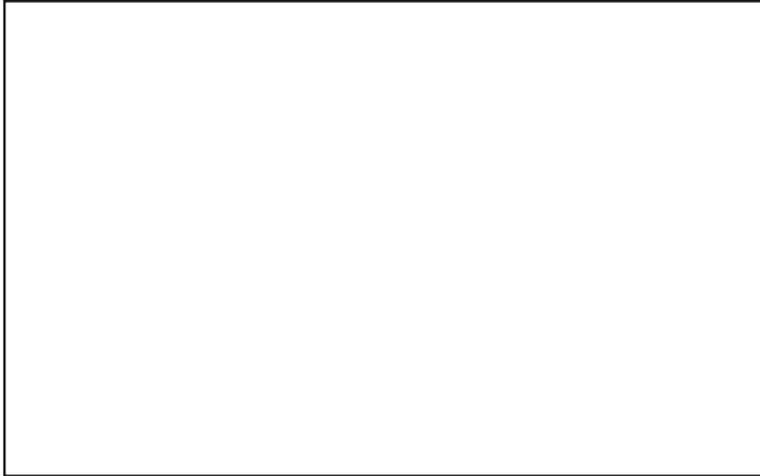


Photo: W. H. Charlton

Fig. 2 (above). The cliff at Küçüven Burnu before the erection of the dive platform.

Fig. 3 (below). The cliff and dive platform. To the right of the picture can be seen the boat landing, while to the left is the three-level changing and work area.

Photo: D. Frey



summer winds, it was considered unsafe to moor INA's research vessel *Virazon* over the wreck. A spur of rock projecting from the cliff offered a possible location for a fixed platform, but required extensive improvement. Project staff, wielding sledges, chisels, and pry bars, "terraformed" a series of more or less level platforms out of the rock and surfaced them with concrete. These platforms support a 45 kW diesel generator (one of a pair donated by INA Director Danielle J. Feeney) and compressors to power airlifts. Three levels of changing and work platforms, as well as a boat landing, were constructed of wood (Fig. 3).

Early planning for the excavation camp concentrated on Kameriye Island, to the west of the site, but this proved to be impractical. Tufan Turanlı, of INA's Bodrum staff, located a better camp site in Sig (Shallow) Bay, on the eastern side of Küçüven Burnu. An olive grove belonging to local farmer Dürmus offered access to the sea less than 1.5 kilometers from the dive platform. This camp site had municipal water and electricity, and a road connection to town. Tufan also found an unfinished house nearby that could be converted into a field laboratory and secure storage for artifacts. Project staff, from graduate students to physicians, dug water lines and septic tanks, built bamboo-roofed dormitories, mixed and poured cement, and even manufactured furniture. The finished product is a camp that will support the excavation for several years with minimal maintenance and maximum efficiency, and that will free the *Virazon* for extensive surveying during the summer.

Diving began on July 8. Using tables developed specifically for the excavation (based on similar tables developed for the deeper Uluburun excavation) by Dr. Richard Vann of the Diving Physiology Research Center at Duke University,

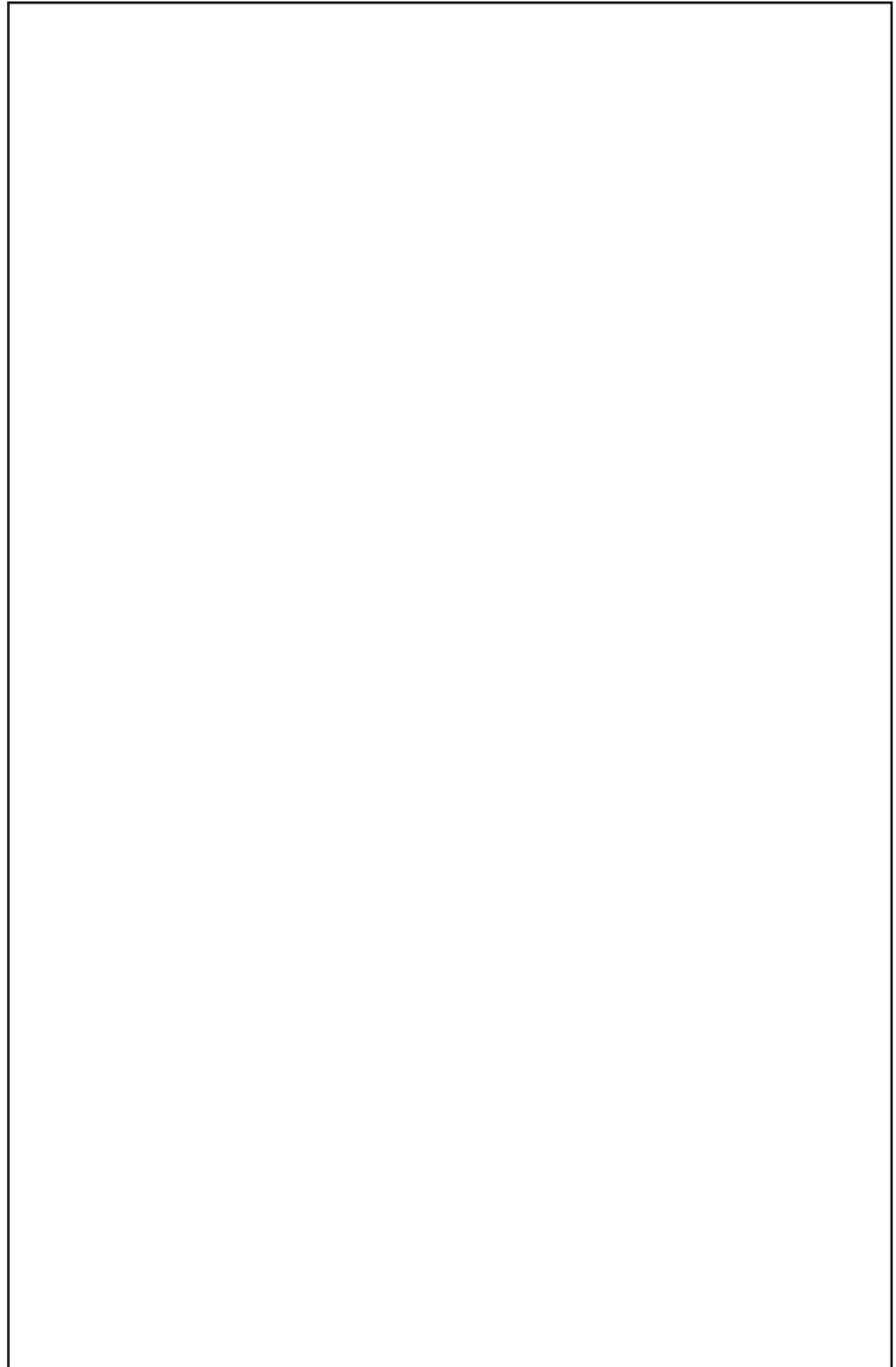
archaeologists dived in teams of four for up to 25 minutes each morning and 20 minutes in the afternoon. Once the tables have been validated by sufficient dives, dive times can be extended to 30 minutes morning and afternoon. Divers decompressed on pure oxygen at 6 meters, which greatly reduced the risk of decompression sickness. Many divers were involved in Project Dive Safety, a research effort by the Diving Physiology Research Center to collect data on repetitive dives so that more reliable dive tables can be constructed. These divers wore dive computers that recorded exact time and depth data that could be downloaded electronically for analysis. By the end of the season, 979 dives had been accomplished without any incidence of diving-related illness, although a four-person, double-lock recompression chamber was installed in camp (three minutes by boat from the platform) in case of emergencies.

Underwater work consisted initially of the creation of a safe working environment by placing a fixed safety station (INA's well-known "phone booth") at the upper end of the site and several sets of spare tanks of compressed air around the site perimeter. This was followed by the establishment of a network of datum points around the site. Thirteen points, consisting of iron pins, were driven into the rocks at the upper end of the site. Eleven points made of galvanized iron pipe with stabilizing fins were driven into the sandy bottom outside the limits of the site (as determined by probing), although one of these points was removed almost immediately, as it obstructed two of the others. These points provide sufficient coverage of the site to allow any artifact or feature within the mound or on the rocks

above to be located. We used Direct Survey Measurement (*Quarterly* 22.3), a mapping technique developed on the excavation of the Tudor warship *Mary Rose* and first used by INA in mapping the bottom topography at Uluburun in 1994 (*Quarterly* 21.4). Once the primary datum points were set and mapped (with an average error of less than 1 cm), an excavation grid of 2-meter squares was constructed of polypropylene line attached to galvanized pipe stakes driven into the bottom outside of the wreck perimeter (Fig. 4).

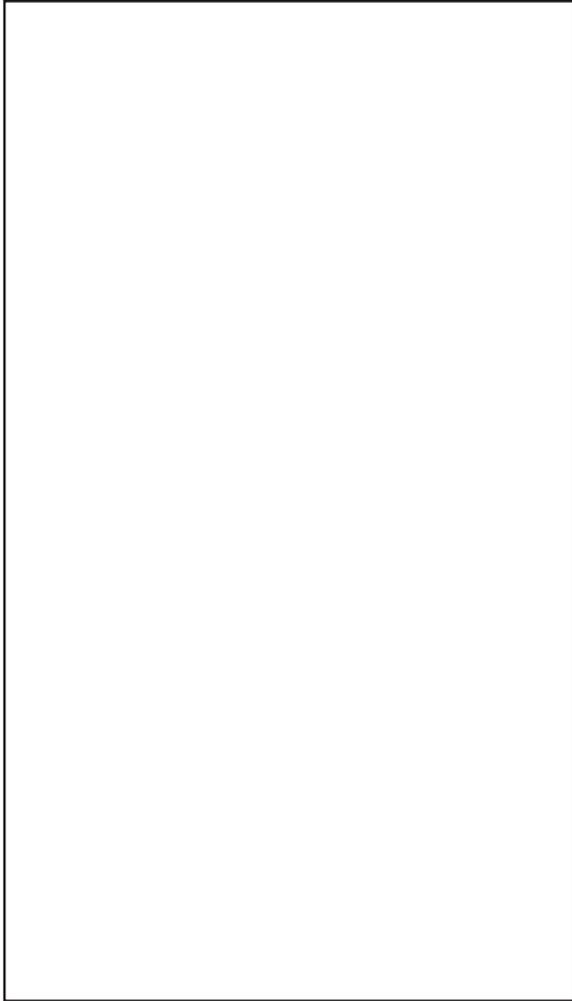
Each excavator was assigned a single square. The squares around the edges of the amphora mound were chosen for initial excavation, with more experienced staff assigned to two trenches across the mound. The upper trench, across row F, and the lower trench, across row M, were chosen to allow deeper probing of the mound at its upper and lower ends. It was expected that these two trenches would provide a better indication of which end of the wreck is the bow, and allow a more detailed evaluation of the range of material to be found and the degree of preservation to be expected. Excavation proceeded by hand fanning, with heavier spoil removed by airlift. All artifacts encountered were tagged, bagged, and removed to the surface for preliminary cataloguing. Sediment samples were taken for palynological and composition analysis on a regular basis and whenever unusual sediments were uncovered. For example, near the upper end of the site, in square E 12, a pocket of charcoal and dark sand that may be related to the ship's galley was encountered.

Artifacts were labelled by lot number based on provenience, with complete or nearly complete artifacts assigned individual inventory numbers beginning with the prefix BK (for **B**ozburun-**K**üçüven **B**urnu). All diagnostic artifacts, including individually inventoried objects and objects catalogued by lot number only, were stored in water until the end of the season, when they were taken to the Bodrum Museum of Underwater Archaeology for conservation and permanent storage. On-site conservators accomplished preliminary cleaning and stabilization of many objects before the end of the season, which should lighten the load on INA's Bodrum conservation staff and reduce the amount of storage space required. After cataloguing, a number of non-diagnostic plain ware sherds (almost all badly eroded amphora body fragments from disturbed areas at the upper end of the wreck) were redeposited on the site in a depot dug in square M9.



Drawing: F. M. Hocker

Fig. 4. Schematic plan showing the layout of the site and the major datum points.



Drawing: Selma Oguz

Fig. 5. *An example of a Class 1 Amphora (27.5% of original size).*

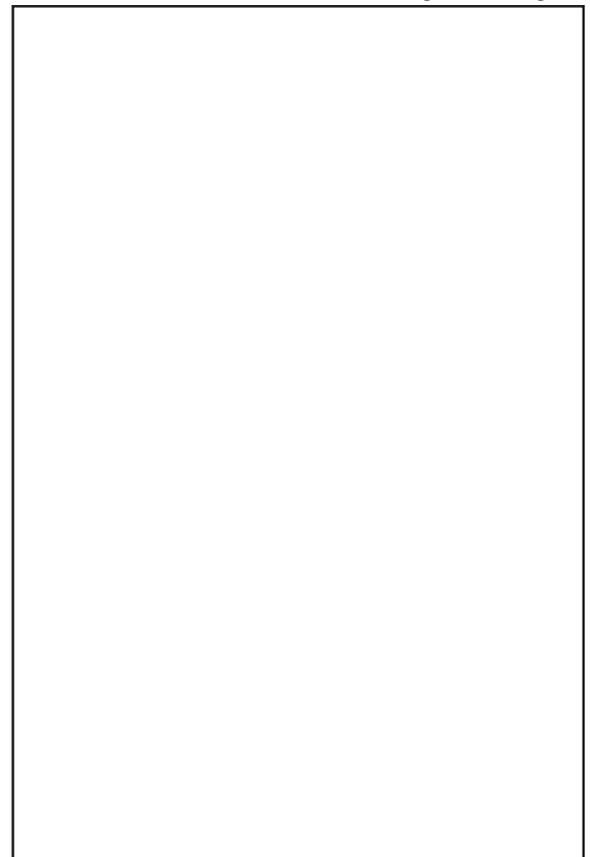
a fairly numerous group of dark brown jars made to a higher standard than the others, but there is surprisingly little variation in size. Preliminary measurements indicate that the average capacity is approximately 13 liters, which is relatively small as amphoras go. The best parallels for Class 1 amphoras are from kiln sites in the Crimea, dating to the later ninth and early tenth century, but similar jars have also been found in the Balkans and in Istanbul. Unfortunately, none of these sites are very closely dated, and a more precise dating of the Bozburun shipwreck will have to wait for either more easily datable artifacts, such as coins or coin weights, or dendrochronological analysis of the hull timbers. One of the problems facing researchers of Byzantine amphoras is that neither the dating nor the geographic origin of many types is very clear; we anticipate that close dating of the Bozburun wreck, combined with a large number of intact jars, will go a long way toward solving at least the dating problem.

The vast majority of recovered artifacts were transport amphoras and amphora sherds—over 440 jars were counted on the surface of the mound before excavation began. Excavation has shown that at least two layers of jars survive, with the lower layer and parts of the upper layer still stacked as they were in the hold when the ship sank. Some of the upper layer has tumbled down slope, and an exploratory dive has revealed a few amphoras well down the slope, nearly 60 meters deep. At the upper end of the site, there is a lot of broken material, partly caused by visitors to the site in previous years, but the eroded nature of the sherds suggest that much of the breakage is ancient, probably a result of the ship bouncing down the face of the cliff and slamming into the bottom.

The amphoras are of two major classes. Class 1 jars (Fig. 5), of which over 40 intact or nearly intact examples were recovered, are fairly crudely made, of pyriform-ovoid shape, with a round, toeless base, conical neck, heavy rim, and heavy, elliptical-section handles attached below the rim and to the mid-shoulder. Amphoras of this class, which account for the overwhelming majority of jars visible on the site, are evenly distributed throughout the mound. A large number of the recovered jars are from squares D9, M10, and M11, but this reflects the faster pace of excavation in these squares rather than a bias in distribution. A number of types within this class are immediately apparent, including

Fig. 6. *An example of a Class 2 amphora (27.5% of original size).*

Drawing: Selma Oguz



Class 2 amphoras are shorter and broader, with a flat bottom, harder shoulder, and wider, flaring neck, but have similar handles to Class 1. Although only a few have been identified in the surface layer and only two examples were recovered (Fig. 6), these jars appear to be concentrated in the central portion of the mound. No very close parallels have yet been found for the Class 2 amphoras, but the shape is generally similar to a common type of middle Byzantine amphora known to have been made on the shores of the Sea of Marmara, among other places.

Although amphoras dominated the 1995 finds, small amounts of other material offered intriguing clues to what awaits us in 1996. In the upper part of the wreck, a number of artifacts associated with food storage and preparation were recovered. These included 12 square, stone tiles in squares E11, F10, and F11. The tiles are similar in shape and size to clay hearth tiles found on the seventh-century wreck at Yassı Ada, and were found approximately in line. Three tiles were recovered from this area (the rest remain partly buried, along with what looks like a building stone), and a third, similar tile was actually recovered from the wreck material scattered in the rocks above the site. A large, slightly crowned slate of unknown function was recovered near the tiles. A plain ware pitcher (Fig. 7) missing its handle was raised from square D9, where it was lodged between two amphoras. The base of another pitcher was recovered down slope, in square F10. Several fragmentary bowls were found in squares F9 and F10. Taken together, this material, along with the deposit of charcoal in square E12, suggests the presence of a permanent hearth and galley at one end of the ship.

Other catalogued artifacts found on the site were lead fishing weights, of both the folded sheet type and the solid, pyramidal type (Fig. 8). Both were found at the lower end of the site, in squares M9 and M10. It is possible that these are from fishing equipment used aboard the ship, as both were buried relatively deeply, but it is more likely

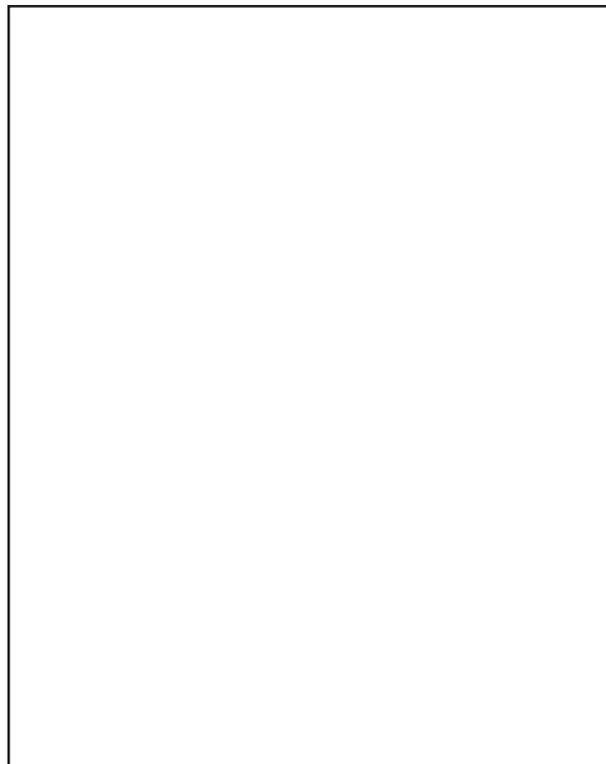
that they are intrusive, left by a fisherman who snagged a line on the wreckage (local fisherman still frequent the Küçüven Burnu cliffs).

In addition to the recovered objects, some interesting material was revealed but left *in situ*. Two anchors, of Byzantine cruciform type, were discovered at opposite ends of the site. One broken anchor, concreted onto the rocks above and to the east of the amphora mound, may be intrusive, but the anchor buried under several amphoras in square M9 is certainly one of the bowers, so called because it was kept ready for use on one side of the bow. A sounding next to this anchor revealed that it lies on sterile sand, and that the amphoras in this square and M11 are spillage from farther up slope.

In several of the squares of row D and column 12, wood fragments were found relatively high up in the deposit. These fragments include both hardwood (possibly elm) and softwood, and may be remnants of either collapsed deck or the upper portion of the starboard side. Although coherent hull remains were not revealed in any excavation unit, these fragments suggest that the well-preserved hull remains discovered in two soundings on the earlier surveys are probably well distributed over the site. The stiff, organic-rich sediment that lies under the loose, surface sand also promises good preservation below.

The 1996 season, which begins in late May, will concentrate on three major objectives. The first is to remove as much of the amphora cargo as is practical. The second is to investigate the sand pockets in the

rock ledges above the amphora mound—many of the small finds normally associated with the stern of Mediterranean ships, such as coins, tools, and weights, probably lie in these pockets. The third is to establish the extent of preservation of the hull. After three months of excavation, we should know much more about this medieval venture.



Drawing: Selma Oguz

Fig. 7. A plain ware pitcher with a missing handle may have been used by the crew of the vessel (40% of original size).



Photo: M.G. Pridemore

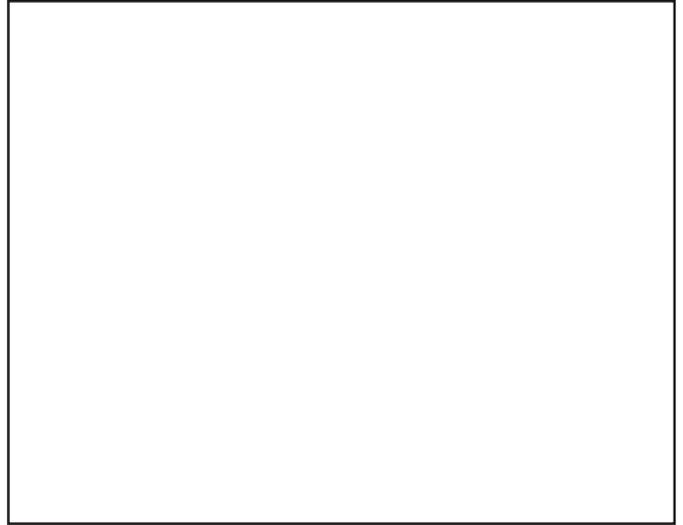


Photo: D. Frey

Fig. 8. Among the small artifacts recovered were lead fishing weights, the solid pyramidal type (left) and the folded sheet type (right).

*Acknowledgments:* Primary external funding for the excavation season was provided by grants from the National Endowment for the Humanities (NEH) and Mrs. Doris Smothers. MARES, manufacturer of superior dive equipment, provided in-kind support, and John Flynn, owner of Computer Access, Inc., offered assistance in obtaining computer hardware. Drs. David Perlman and Tom Love volunteered their medical services to mend cuts, bruises and dinged ears. Feyaz Subay, an old friend of INA in Turkey and proprietor of Fey Diving in Marmaris, provided invaluable help with compressor repairs and technical support.

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# Whitehall Project 1995

## A Preliminary Report on the Excavation and Study of the U.S.N. Row Galley *Allen*

by Eric B. Emery

The winter of 1813/14 in the Lake Champlain Valley was a season of strained vigilance for U.S. Navy Master Commandant Thomas Macdonough. On June 18, 1812, a fledgling United States government had declared war on Great Britain over the issues of free trade and the impressment of American sailors. By February, 1814, Macdonough's shipwrights at Vergennes, Vermont, were engaged in an arms race with the British at Isle-aux-Noix, Canada. The prize was control of Lake Champlain. This strategic waterway was the key to supplying American efforts to invade Canada, and to British plans for splitting New England from the rest of the United States. Over the course of their struggle, both sides adopted the use of a variety of small war-craft, including the row galley.

Numerous reports from Canada in January, 1814, told of British efforts to expand their gunboat flotilla. It was believed that the British intended to resume raiding in the Champlain Valley by early summer. This prompted U.S. Navy Secretary William Jones to grant Macdonough his request for a row galley squadron. The galleys were to be built according to the plans and specifications of the Chesapeake Bay row galleys designed by William Doughty, Chief Naval Constructor at the Washington D.C. shipyard (fig. 1). Jones described the Doughty galley as "the most perfect of [its] kind" measuring "75 feet long and 15 feet wide... carry[ing] a long 24 and a 42 pound carronade, row[ing] 40 oars, and draw[ing] but 22 inches water."

Row galleys boasted a number of advantages for service on Lake Champlain. They could be quickly built and were relatively inexpensive; they had a shallow draught which allowed them to travel almost anywhere on the lake. The galleys' low freeboard made them difficult to hit from a distance, and they were capable of being operated by sails or sweeps.

On February 14, 1814, the Navy Department contracted Noah Brown, one of New York's finest shipwrights, to build Macdonough's galley squadron. In less than two months, Brown constructed, armed, and launched a total of six of these vessels: *Allen*, *Borer*, *Burrows*, *Centipede*, *Nettle*, and *Viper*. *Allen* was launched onto Otter Creek below the falls at Vergennes in late April. It was immediately employed in protecting Fort Cassin, a makeshift battery at the river's outlet into Lake Champlain. *Allen* was manned by 40 officers and seamen under the command of Sailing Master William Robbins.

During the spring and fall of 1814, *Allen* cruised Lake Champlain looking for smugglers, and assisted Macdonough's fleet in its victory over the British at Plattsburgh Bay on September 11th. When the war ended in December of 1814, the Navy's squadron was put in ordinary at Whitehall, New York. Three years later, *Allen* was recommissioned for patrol duty on the lake under the provisions of the Rush-Bagot Agreement. When the Navy Department closed the Whitehall station in 1825/26, the vessel was sold. Situated out of the way in the Poultney River—about a



Source: U. S. Archives, Washington DC and College Park MD

Fig. 1. Plans for a U.S. Row Galley, Oct. 11, 1813, approved by William Doughty, Chief Naval Constructor, Washington, D.C.

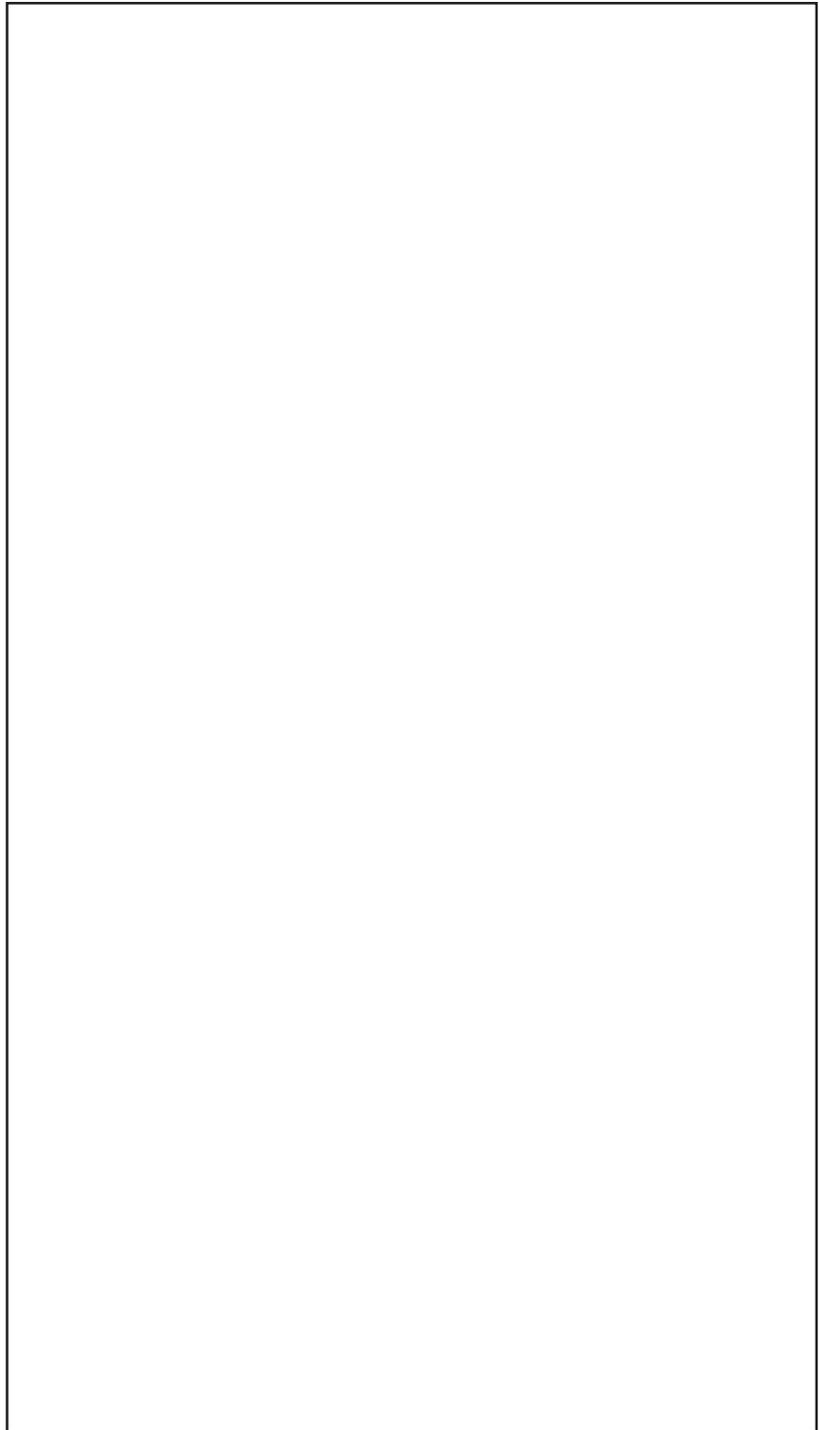
mile and a quarter northeast of Whitehall—the exposed portions of *Allen's* hull were removed by salvagers while the submerged portions remained well-preserved.

### The 1981-82 Survey and Investigation

The remains of a row galley—thought to be *Allen*—were discovered and first investigated by Kevin Crisman and Arthur Cohn (founder of the Lake Champlain Maritime Museum) in August of 1981. The wreck was situated on the New York side of the river (fig. 2), downstream from the remains of the U.S. brig *Eagle* and the British brig *Linnet*. Approximately fifty percent of the original hull was determined to be intact. This included the keel (roughly 70 feet [23 m] in length) and the keelson (67 feet [22.1 m] in length), portions of the stem and sternpost assemblies, and most of the starboard side. A full-scale investigation of the wreck promised to yield a considerable amount of new information on early naval life and the design and construction of War of 1812 vessels on Lake Champlain. It was further concluded that it would be possible to reconstruct, in the form of lines drawings and construction plans, the hull's shape and appearance from the existing remains.

An archaeological survey of the hull was carried out in 1982. The project was supported by various local organizations, including the New York State Education Department, the Vermont Division for Historic Preservation, and the Champlain Maritime Society. There was evidence at this time to suggest that this wreck was in fact the row galley *Allen*. First, the wreck was found in close proximity to the remainder of Macdonough's squadron in the Poultney River. Captain James T. Leonard—commander of the Whitehall Station on Lake Champlain after 1814—had the remaining vessels *Eagle*, *Ticonderoga*, and *Linnet* moved into the Poultney River where they would be less likely to obstruct boat traffic heading north from Whitehall. *Allen* was the only operating vessel from the 1814 squadron at this time. When the station closed in 1825/26, *Allen* was probably taken into the Poultney River and auctioned off to local salvagers.

Secondly, the collection of ballast found in the wreck's stern suggested that it was being used to counterbalance a large weight in the bow. This was unusual because ballast was typically placed on either side of the keelson along most of its length. This kept the vessel trim in the water and added stability to the hull. When *Allen* was patrolling Lake



Map: K. Crisman

Fig. 2. *The Champlain Valley was a center of activity for both the British and Americans during the War of 1812.*

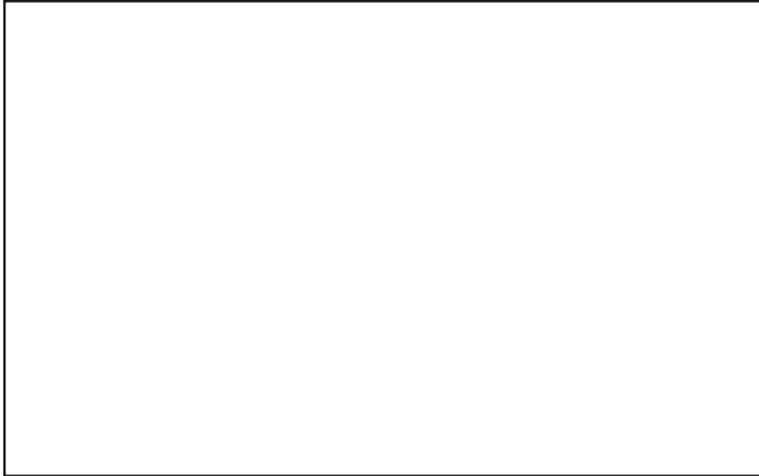


Photo: S. Butler

Fig. 3. Installation of the starboard side grid.

Champlain during the latter part of its career, it mounted a long 12 pounder on its bow. The weight of this gun would have required sufficient ballast in the galley's stern to float the vessel on an even keel.

Finally, a silver-plated uniform button from the U.S. Army's 13th Infantry Regiment was found between the vessel's keel and keelson during the 1982 survey (*INA Quarterly* 22.1). It was known through historical documentation that Macdonough had used American soldiers stationed at Plattsburgh and Burlington to man the oars of his row galleys. There were soldiers from the 13th Infantry on Lake Champlain during the Battle of Plattsburgh Bay on September 11, 1814. An American soldier may have lost this button from his uniform while bending oars for Plattsburgh aboard *Allen*.

### Whitehall Project 1995 - Project Objectives

The second and final phase of *Allen's* study was designed to gather the data needed to complete the analysis of the hull (thereby permitting its reconstruction). This needed to be done before the arrival of the Zebra Mussel in the Poultney River. The Zebra Mussel is a small mollusk that was introduced into the American Great Lakes roughly ten years ago (*INA Quarterly* 22.1). It is indigenous to freshwater lakes and streams in Europe. These creatures form colonies on both wooden and metal shipwrecks and obscure the details of their design and construction.

Five main objectives were defined for the 1995 project: (1) to gather sufficient information to develop a complete site plan; (2) to complete the documentation of the keel, keelson, and stem and sternpost assemblies; (3) to record the con-

struction and shape of frame sections at as many points as possible; (4) to conduct an intensive study of the vessel's starboard side including its ceiling planking; and (5) to map and record the vessel's ballast arrangement in the stern on both sides of the keelson and remove samples for conservation.

The 1995 fieldwork took place in the form of a joint field school between Texas A&M University and the University of Vermont from July 10th to July 29th. There were ten field school divers (in addition to the project directors, a local dive-master, and the author) to assist with the excavation and recording of the hull, removal and cataloguing of artifacts, and photography. Besides this full-time staff, local dive instructor Ron Plouff and Dr. Robert Neyland from the Navy Historical Center assisted with some of the dredging and recording at different stages in the project. The Lake

Champlain Maritime Museum provided logistical support, and also housed a conservation lab for the treatment of artifacts. The project additionally received INA support.

One of the primary objectives of the 1995 fieldwork was to excavate *Allen's* starboard ceiling and frames which were buried beneath the Poultney River's heavy clay banks. A grid was constructed during the first week of the project and placed over the wreck (fig. 3). This structure was twenty feet long by five feet wide (6.6 m x 1.6 m) and was divided into 5-foot-square excavation units. Transversely, the grid extended from the starboard edge of the keelson nearly to the top of the surviving starboard frames. The units within the grid were numbered consecutively from 1 to 4, with Unit 1 closest to the bow and Unit 4 to the stern. A second grid (10 feet [3.3 m] long) was installed, but left un-excavated.

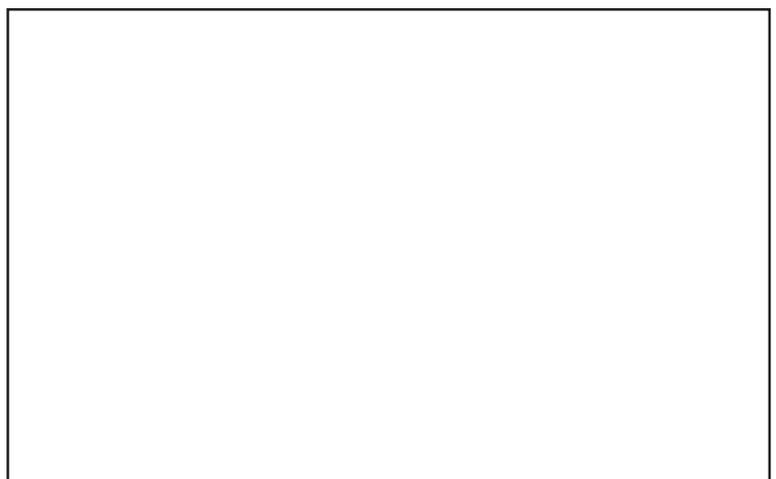


Photo: S. Butler

Fig. 4. Arthur Cohn tends a diver dredging on *Allen's* starboard side.

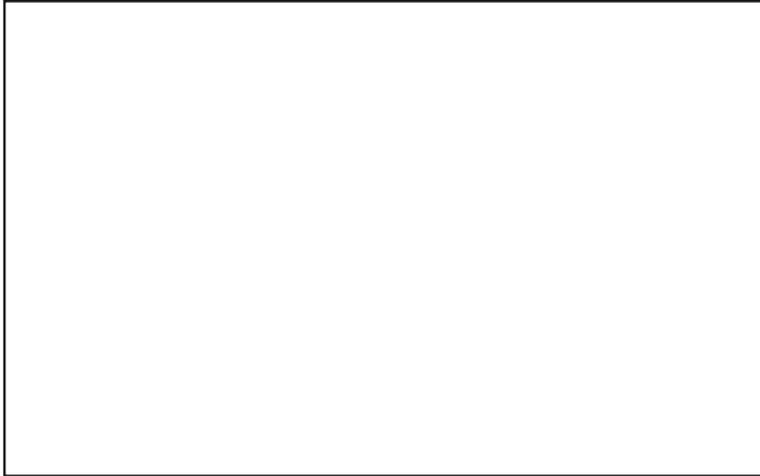


Photo: N. Power

Fig. 5. Arthur Cohn sifting through a dredge bag.

Dredge work began during the first week of excavation and continued until July 27th (fig. 4). The excavators started with Unit 1 and proceeded from stem to stern. Heavy clay (up to 8 inches [20.2 cm] deep in certain areas) was removed by systematically peeling off the sediments in 4-inch (10 cm) layers and hand-feeding them into the dredge system. Tight-meshed dredge bags were secured to the dredge exhaust and examined after each level was completed and between each frame (fig. 5). Many iron nails, wood chips and fragments, and pieces of pine ceiling were found mixed into the clay.

### Keel

*Allen's* keel was estimated to be between 68 ft. and 70 ft. in length (22.4–23.1 m) and probably consisted of two timbers flat-scarfed together. Analysis of the keel was restricted to a five-foot

section exposed in the bow, a three-foot section in the stern, and measurements of its top surface taken at fifteen frame positions. Samples of wood from the keel could only be obtained forward of amidships. The samples revealed that the forward keel timber was fashioned from white oak.

A rabbet was cut along the top of the keel to fit the outer planking. Its two grooves were at 40 degree angles and were roughly 1 to 1 1/2 inches (2.5–4 cm) deep. They ran from stem to stern approximately 1/2 inch (1.5 cm) down from the top of the keel. The rabbet started just forward of the after-end of the apron and could be recorded up to the point where it was difficult to discern due to the outer planking.

### Stem and Stern Assemblies

The stem was flat-scarfed to the keel. This timber measured 2 feet, 7 1/2 inches (83.5 cm) in length, and extended up from the horizontal plane of the keel at approximately a 58 degree angle. The keel extended about 10 inches (25.5 cm) forward of the stem's base. The lower edge of the stem was considerably worn and deteriorated. This suggested that the space was not intended to hold an outer timber. Instead, the stem's original dimensions would have filled that space. However, the wood samples taken during the excavation disagree with this theory. They show the existence of three different wood types: the section of the stem closest to the forwardmost end of the keel was fashioned from red oak. The timber fastened between this outer stem, or "false stem," and the apron was of American elm; and the apron was of white ash. Two plugs, or "stopwaters," were found in the scarf table where the stem and keel were attached. The apron was fastened to the top of the stem with four 3/4 inch (2 cm) diameter iron through bolts.

William Doughty's row galley plan of 1813—from which *Allen* was believed to have been built—showed a double-ended vessel with its rudder hung from a curved sternpost. *Allen's* stern bore little resemblance to that of Doughty's plan. There was a straight sternpost which was fastened to the top of the keel by a long flat scarf and secured to the keelson and a frame by means of two 3/4 inch (2 cm) diameter iron drift bolts. An iron eye bolt with a 1-1/2 inch (3.6 cm) diameter hole was driven into the after end of the sternpost. This makeshift gudgeon was a fast and easy way to hold the lower rudder pintle.

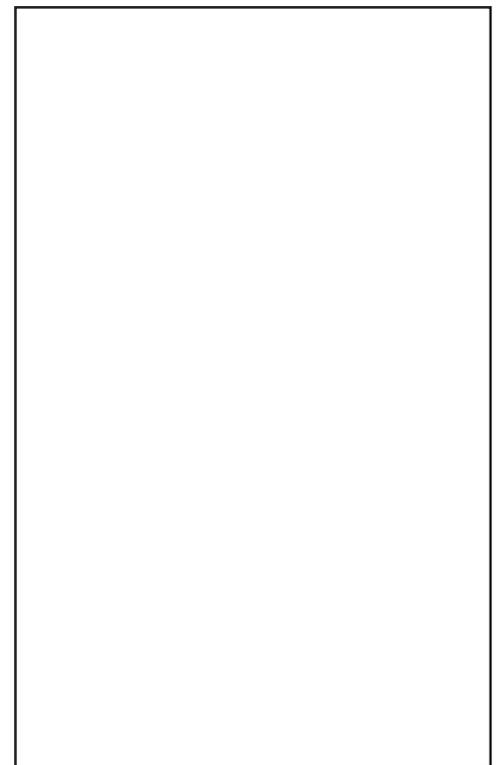


Photo: K. Crisman

Fig. 6. Dr. Robert Neyland records a starboard ceiling plank.

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## Keelson

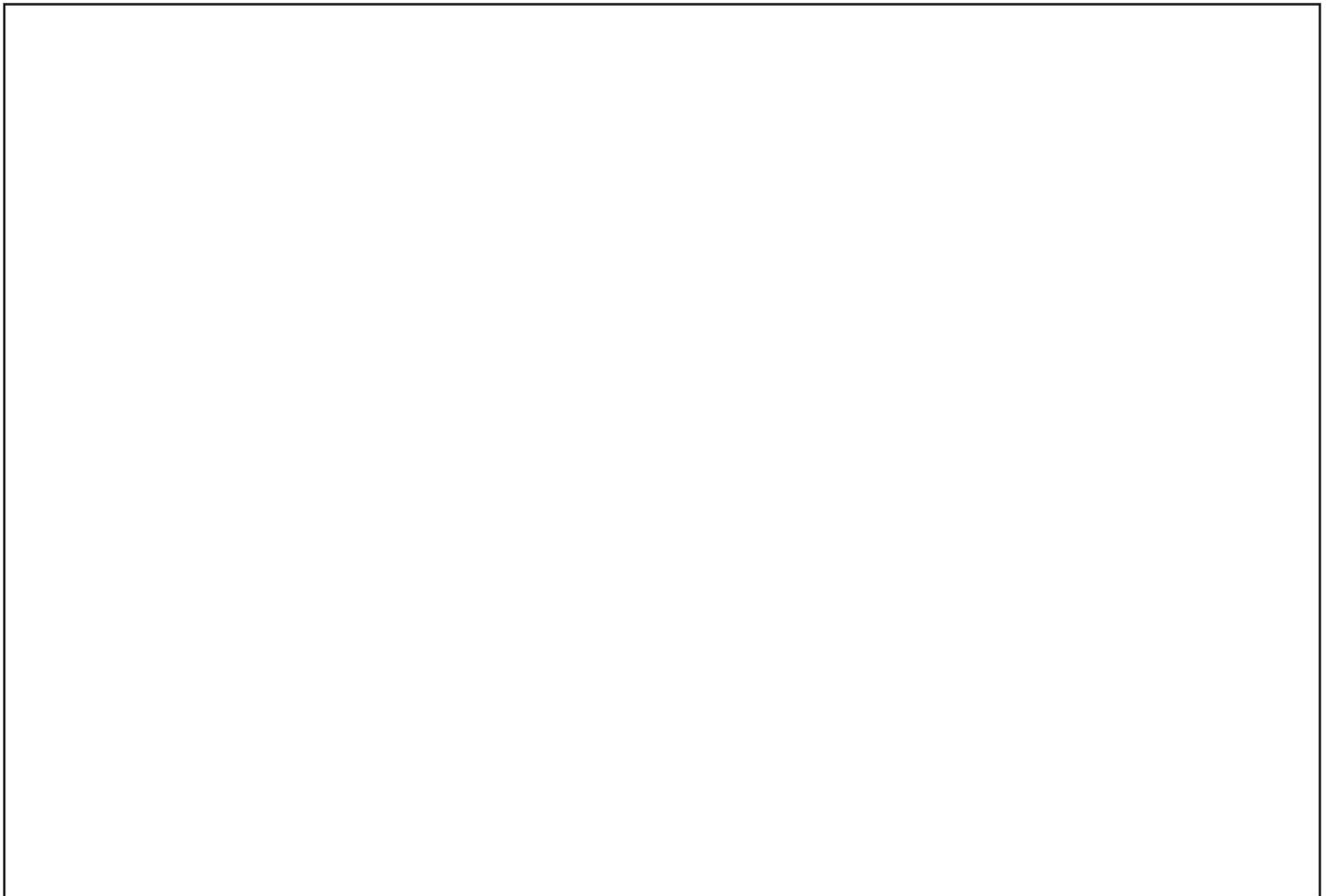
The galley's keelson was nearly intact. It consisted of two timbers flat-scarfed together 24 feet (7.92 m) abaft the stem. The overall length of the keelson was 67 feet, 3 inches (22.3 m) and was accessible for documentation at all points. The forwardmost end was considerably deteriorated. The top surface had stanchion mortises as well as two mast steps.

At 51 feet (16.8 m) abaft the stem a series of planks extended transversely across the top of the keelson. This transverse decking, or planking, was above the level of the ceiling, and was perhaps intended to provide seamen with a surface to walk on that was not cluttered with ballast.

An interesting bolt pattern along the keelson provided evidence that may help confirm the existence of two keel timbers. At the stem, amidships, and the stern were a series of three 3/4 inch (2 cm) diameter bolts that had been driven through the keelson and keel within a foot of each other. This provided additional rigidity to *Allen's* backbone at these potential weak sites. Similar drift bolt patterns were found 20 feet, 4 inches (6.2 m) from the stem and 30 feet, 10 inches (9.1 m). One of these locations coincided with the keelson scarf, and the bolts clearly were intended to secure the scarf. The second grouping of bolts may define the location of the keel scarf.

## Starboard Ceiling and Frames

The ceiling on the starboard side of *Allen* was generally well-preserved (fig. 6). Some strakes reached more than 14 feet (4.6 m). Their widths ranged between 7 inches (17.7 cm) and 15 inches (38 cm), and thicknesses between 3/4 inch (2 cm) and 1 inch (2.5 cm). Some of the notable features found on the ceiling included small wooden battens extending



Drawing: E. B. Emery

Fig. 7. *Midship Section of the Allen showing the more pronounced deadrise than originally specified in Doughty's plan.*

laterally from the starboard edge of the keelson toward the bulwarks. It is possible that these battens were designed to fix bulkheads in the hull's storage areas. Samples of both ceiling and battens were removed for documentation on shore. This also enabled divers to record the frames underneath.

Irregularities existed in *Allen's* frame construction and composition. The frames appeared to have been assembled with little regard for size and spacing. *Allen's* shipwrights were building in a hurry in 1814, and may have allowed considerable leeway for error. For example, one starboard first-futtock was attached to the wrong side of the floor (it did not follow the pattern of the other frames forward of amidships), drift bolts missed frames and simply passed through the keel and keelson, there were no limber holes cut into the underside of the frames, and some of the frames may have been produced from unseasoned wood. One frame in particular was abnormally large and soft. It was the largest frame in the entire vessel and was fashioned from white pine, an unusually weak wood to choose for a floor timber.

### Preliminary Reconstruction

Reconstruction of *Allen* required close examination of the archaeological data from the summer of 1995 and educated conjecture. The vessel's starboard side was best preserved and thus yielded the most information. The missing portions of the hull were put together based on comparisons with other contemporary vessels of a similar class and information obtained from historical documents.

Brown mass-produced *Allen* and its sister galleys, and it appeared as though he used Doughty's plan only as a reference point during his work. The 1995 data revealed a variety of deviations from Doughty's original design. By looking at what construction details Brown chose to omit, we can begin to understand the problems he faced while building *Allen*, as well as his solutions.

*Allen's* hull shape was considerably different from Doughty's plan. Doughty showed a series of sections with a full turn of the bilge. *Allen* had a more pronounced deadrise (fig. 7). Macdonough needed his galleys to be sail-worthy. The sharper angle of *Allen's* hull would have allowed it to cut through the water more easily and provided better lateral resistance. Doughty's galley was more barge-like. It would readily have supported its guns, but would not have been easy to handle under sail.

### Conclusion

Archaeological study of the ship during the 1995 Whitehall Project yielded a wealth of information about

row galley construction on Lake Champlain during the War of 1812. Once the hull analysis and artifact documentation have been completed, we will have a better understanding of life aboard a Lake Champlain galley, and the ability to identify the construction details unique to Noah Brown-built vessels. *Allen* is the only known craft built by this important 19th-century shipwright that is available for study. Brown built simple, strong, and serviceable hulls capable of satisfying the U.S. Navy's needs. *Allen* is a testimony to the skills—and compromises—necessary to construct and outfit an inland flotilla within a period of less than two months.

*Acknowledgments.* The 1995 Whitehall Project was supported by a Legacy Grant administered by the U.S. Navy Historical Center, the Lake Champlain Maritime Museum, the Institute of Nautical Archaeology at Texas A&M University, INA Director Harlan Crow. Additional support was provided by the New York State Education Department and the Vermont Division for Historic Preservation. The knowledge and leadership of Dr. Kevin Crisman and Arthur Cohn brought the project into being and kept it organized, informative, and safe. Special thanks to Dr. Robert Neyland from the U.S. Navy Historical Center, and students Steve Bilicki, Steve Butler, Erich Heinold, Pierre Larocque, Scott McLaughlin, Scott Padeni, Cheryl Quinn, Erika Washburn, and Rob Wilczynski.

### Suggested Reading

- Chapelle, Howard  
1949 *History of the American Sailing Navy*. New York.
- Crisman, Kevin  
1987 *The Eagle: An American Brig on Lake Champlain during the War of 1812*, Annapolis: The Naval Institute Press.
- Dudley, William (ed.)  
1985 *Naval Documents of the War of 1812*. 2 Vols. Washington, D.C.
- Naval Records Collection of the Office of Naval Records and Library, Record Group 45  
1813 Entry 149, *Secretary of the Navy to Captains*, "Sec. Navy William Jones to Capt. Thomas Macdonough, December 7, 1813," Microfilm Roll 11, Part 2, Letter number 163.

# Nautical Archaeology in the Southern Baltic Sea

By George Indruszewski

With the changing face of Europe, Western nautical archaeologists have gained access to hitherto unknown territories. The collapse of the Warsaw Pact has created the opportunity for outside researchers to observe and work in areas that were formerly ruled off-limits by the state security apparatus. Perhaps even more important is a wider awareness of the scholarly work that has been going on for decades behind the former Iron Curtain. Poland and the southern Baltic region (Fig. 1) host important centers which have done, and are doing, crucial work on the history of seafaring. A 1995 visit to Poland by a delegation from the Institute of Nautical Archaeology offered insights into this continuing scholarship. I was privileged to be a member of this delegation.

The Baltic maritime tradition deserves more attention. In the medieval period, much of the land was covered by thick forests, which separated the settlements of the Western Slavs. These settlements were mentioned in the second half of the 9th century by an anonymous "Bavarian Geographer" who recorded a list of people and "cities" situated north of the Middle Danube. His account, together with other historical sources, tells us about the existence of numerous tribes who took or gave their name to the region they inhabited. The Slavs took advantage of the highly developed river and lagoon network, so characteristic of the territory between the Elba and the Vistula basins, and established a network of forts and strongholds connected and protected by bodies of water. This natural situation made watercraft the only practical choice for long distance transport and communication. According to historical sources, vessels built on the south-

ern shore of the Baltic seem to have reached a level of performance and seaworthiness comparable with that of Scandinavian vessels. The archaeological evidence provides important testimony about the intense seafaring activities which once connected an entire network of trading centers along the Baltic southern coast from the Schlei in the west to the Vistula lagoon in the east.

In the 13th century, however, the indigenous southern Baltic maritime tradition apparently entered a period of irreversible decline. The Hanseatic presence brought not only a drastic change in maritime trade but also new thinking in shipbuilding. Nevertheless, the method of construction characteristic of the southern Baltic coast in the early medieval period seems to have survived the test of time. Ethnographic studies point to constructional details of small craft used mainly for fishing and local transport. These show similarities with the medieval craft of Poland and Mecklemburg. The study of Baltic shipbuilding traditions has emerged from a period dominated by political and nationalistic considerations into an era of genuine scientific work.

## Torun—the Institute of Archaeology and Ethnography

The visit by the INA delegation started in Torun, home of the Nicolaus Copernicus University and of the Institute of Archaeology and Ethnography. The Institute remains today the only academic institution in Poland—and throughout Central and Eastern Europe—which offers a Master of Arts degree in underwater archaeology and artifact conservation. The director of the Institute, Prof. Dr. Andrzej Kola,

received the delegation with characteristic Polish hospitality and declared at the end of our stay in Torun that the Institute of Archaeology and Ethnography is willing to cooperate with our Institute on the basis of mutual respect and collaboration. Professor Kola specified that the work of his Institute is concentrated mostly on inland underwater archaeology, specifically on the study of medieval stationary structures in Poland and abroad. The Institute is currently engaged in cooperative research programs with the Ukrainian Institute of Archaeology and with the Institute for Ancient and Early History from Christian Albrecht University in Kiel, Germany.



Map: C. A. Powell

Fig. 1. Poland and the Southern Baltic Sea area, showing the sites mentioned in the text.

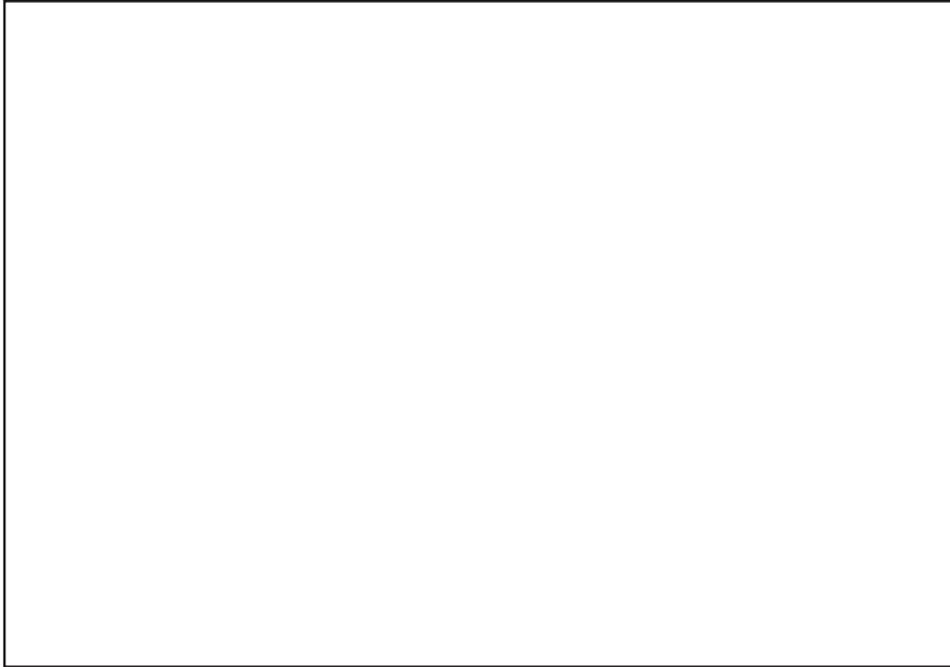


Fig. 2 (left). Built in 1442–4, this crane was used to lift weights of up to 4 tons. It now forms part of the Central Maritime Museum in Gdansk.

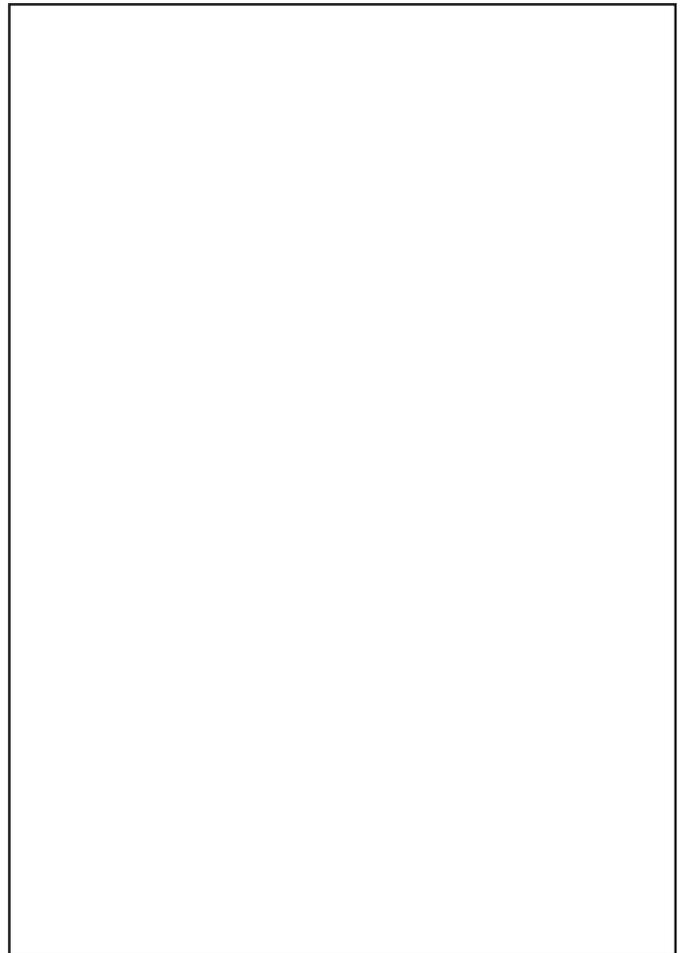
Fig. 3 (below). Malbork Castle was the headquarters of the Teutonic Knights in the late Middle Ages. This suspended bridge connects the upper castle with the middle castle.

Photographs: G. Indruszewski

### Szczecin—the National Museum

The next place visited by the INA delegation was Szczecin, a major port on the Odra/Oder river and home of the National Museum. Through the work of its research staff the museum has grown from an unknown regional institution into a center of Polish and world history. A major contribution to this rapid development was brought by the present director, Prof. Dr. Wladyslaw Filipowiak. He directed massive excavations not only in Poland but also in Mali and Ghana. The major work of Professor Filipowiak concentrated on the medieval town of Wolin, situated on the island with the same name, where in the course of almost twenty-five years of excavations a large collection of ship parts and ship-related fragments were found. The site yielded fragments of five ships dated to the early medieval period, as well as remains of an early medieval trading center.

Professor Filipowiak's work did not consist of land excavations only. He was among the first Polish archaeologists who learned to use a "hard-hat" diving suit to investigate underwater sites. As a result of a long-time interest in the maritime aspects of Pomeranian history, the National Museum is today in possession of a unique collection of early medieval vessels. Two other vessels are undergoing conservation treatment in the Museum's Conservation Laboratory. During my second visit to Szczecin he cordially invited me to participate in the investigation of a 15th–16th century merchantman sunk at Trzebiez in the Zalew Szczecinski (Szczecin lagoon).



## Gdansk—the Central Maritime Museum

A visit to Gdansk offered the INA delegation an opportunity to contact officials from the Central Maritime Museum. The delegation was also able to admire the historical splendors of the town, rebuilt from its ashes at the end of the Second World War. Founded in 1960 by Przemyslaw Smolarek, the Central Maritime Museum has grown in importance over the years thanks to the work of its dedicated staff. The excavation of the “Copper Wreck,” a merchantman sunk at the beginning of the 15th century with a heavy load of copper and iron ingots, and the investigation of the Swedish warship *Solen*, sunk in the battle of Oliwa in 1627, ought to be accounted among its most notable achievements. Today, the Museum’s collections comprise rare items ranging from hull remains and cargo items to unique marine paintings and navigation instruments. In addition to this, the Museum has custody of two notable vessels: *Soldek*, the first steamship built in post-war Poland, and *Dar Pomorza*, the former training frigate of the Polish merchant fleet. An integral part of the Museum’s buildings, the Old Crane, was another point of attraction for us, the 15th century building being one of the best preserved medieval port installations in Northern Europe (Fig. 2).

The delegation’s hosts took every care to ensure not only a pleasant stay in the Museum’s guest rooms but also a busy travel schedule. Thus, the delegation visited Malbork (Marienburg) castle, which was the seat of the pow-

erful state of the Teutonic knights (Fig. 3). The next visit took the delegation to the Hel Fishery Museum where Mr. Mirosław Kuklik made a brief but eloquent presentation of the artifacts exhibited in the collection. We next walked toward the tip of the peninsula. Amid pine thickets and rusted gun emplacements aiming nowhere, Mr. Kuklik pointed out to the delegation that they might be the first foreigners to walk through what used to be one of the most important military bases of the defunct Warsaw Pact. He mentioned that the area seems to be a blessing for a marine archaeologist, since numerous ship parts are swept periodically onto the shore by the powerful currents which encircle the tip of the Hel peninsula (Fig. 4). Some of this precious material is collected for fuel by local inhabitants (Fig. 5), but some reaches the hands of Museum personnel.

The delegation’s next visit was to Tczew, where we visited the Vistula river museum where Dr. Dirka, the head of the Conservation Laboratory, informed us of the techniques used in the conservation of the excavated ship remains. Here, we had the occasion to see the artifacts undergoing conservation treatment. Some of them, such as a 17 meter long oak keel, were quite impressive.

## Gdansk—the Archaeological Museum

At the end of my stay I had the opportunity to meet with Dr. Henryk Paner, the director of the Archaeological Museum in Gdansk, and with Mr. Zbigniew Borcowski.

On this occasion Dr. Paner informed me of the Museum’s research activity, which ranges from the preservation of the Old Town historical heritage in Gdansk to land excavations in more remote corners of the province. Of special interest seems to be the excavation started in 1991 on Granary Island, which is an integral part of the Old Town. Following in the footsteps of his predecessors, K. Jazdzewski and J. L. Luka, Dr. Paner declared his openness to mutually advantageous terms of collaboration and joint research between our institutions. I left Poland with the feeling that there is great potential for research into the complexities of North-European seafaring history.



Fig.4. Hel peninsula—looking for ship parts on the beach.

Photo: G. Indruszewski

*Acknowledgments.* Our gratitude is offered to all who helped make this visit a reality: in Poland—A. Kola, W. Filipowiak, A. Zbierski, J. Litwin, P. Rutecki, Y. Pomian, H. Paner, Z. Borcowski, P. Swiderska, P. Agnieszka P., M. Kuklik, the CMM chief administrator, P. Dirka, the skipper of *Kaszubski Brzeg*, NM-Szczecin library and Museum personnel, CMM-Gdansk personnel, Archaeological Museum personnel, Czeslawa and Kazimierz Kusnierek, Slawomira and Karol Pawlak, and many others whose names momentarily escape our memory; in the USA—the directors of the Institute of Nautical Archaeology, G. F. Bass, B. Holloway, and T. Mäkela.

### Suggested Reading

- Filipowiak, W.  
1994 "Shipbuilding at the mouth of the River Odra (Oder)," *Crossroads in Ancient Shipbuilding—Proceedings of Archaeology, Roskilde 1991 6/40* 83-96.
- Kola, A.  
1983 "Problems and perspectives of archaeological underwater research in inland waters of Poland," *Acta Universitatis Nicolai Copernici IX/1*: 39-47.
- Litwin, J.  
1995 "The Puck Bay wrecks - an opportunity for a Polish Skuldelev," *Shipshape—Essays for Ole Crumlin-Pedersen on the occasion of his 60th anniversary—February 24th 1995*, Roskilde: 136-150.
- Paner, H.  
1993 "The industrial heritage of Granary Island, Gdansk," *Preservation of the Industrial Heritage—Gdansk Outlook—Proceedings*: 125-133.
- Smolarek, P.  
1983 "The Genesis, Present State and Prospects of Polish Underwater Archaeological Investigations in the Baltic." *Acta Universitatis Nicolai Copernici IX/1*: 5-38.
- Zbierski, A.  
1985 "The Development of the Gdansk area from the Ninth to the Thirteen century," *British Archaeological Review* 255(i): 289-334.

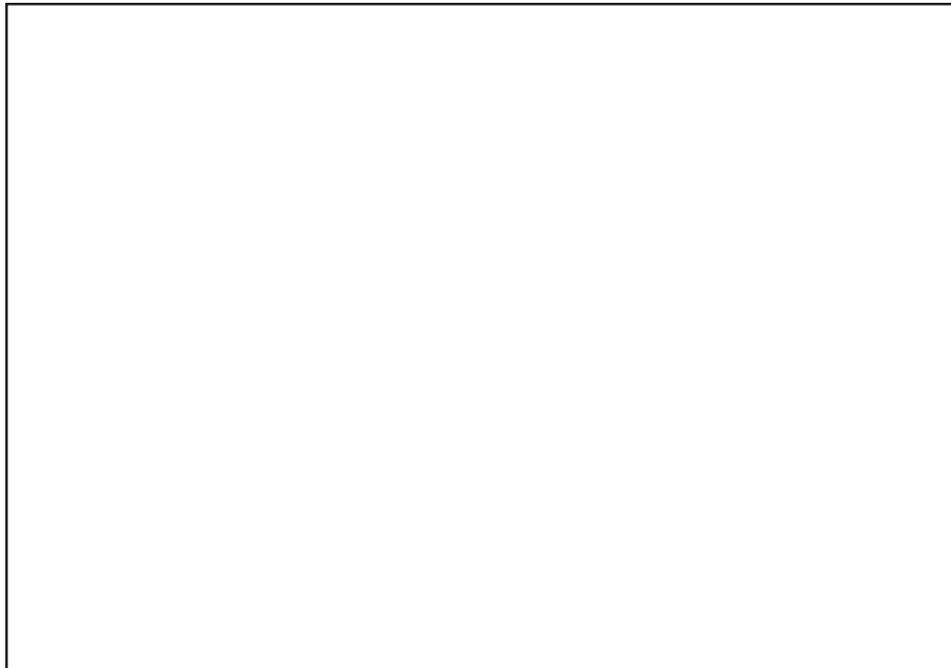


Photo: G. Indruszewski

Fig. 5. Ship parts stacked for fuel in the backyard of Hel Peninsula houses.

# INA Sonar Survey Locates Ancient Shipwreck

by

Brett A. Phaneuf & Donald Frey

INA and the Nautical Archaeology Program at Texas A&M University are developing computer systems to document sonar surveys for underwater archaeology sites. The sonar equipment, provided by INA Director Martin Wilcox, gathers data from the 20 to 100 meter-deep bottom, converts them into graphic images, and sends them to a Epson 880C ActionNote notebook computer. The operator can then view the information, pinpoint areas of interest, and save the valuable data to a Geographic Information System (GIS) database. This information can be used to identify sites that merit a physical survey by divers as a prelude to full-scale excavation.

In October 1995, Don Frey, Brett Phaneuf, and Murat Tilev conducted a side scan sonar survey along the southern coast of the Bodrum Peninsula (Fig. 1). Sponge divers had reported shipwrecks in the areas targeted for the survey, but a diver survey was deemed too dangerous or expensive. Instead, sonar was used to determine if the sponge fishermen's reports were accurate and to locate the exact positions of poten-

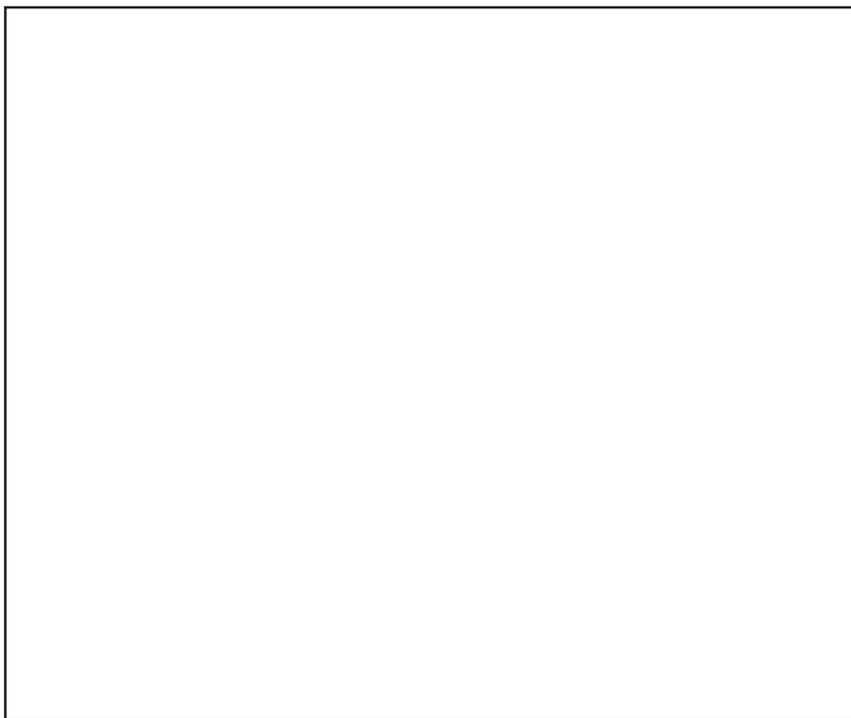


Fig. 1. *Bodrum and surrounding area, including Aspat Bay.*

Map: C. A. Powell

tial sites. The Marine Sonic Technology, Ltd., Sea Scan PC-150 KHz sonar system provided by Wilcox was coupled with a Trimble NT200D DGPS positioning system.

Much of the survey was spent scanning the seafloor of Aspat Bay, half an hour west of Bodrum (Fig. 2). Several divers, including our boat captain's father, had reported seeing a large mound of amphoras approximately 2 km offshore. Although this amphora mound was not found, an ancient wreck laden with roofing tiles was located just outside the survey area, at a depth of about 43 meters. The shipwreck was difficult to identify at first because of its extremely low profile (13 cm in height) and the disposition of the individual tiles, laying one on top of another nearly parallel to the bottom. The shipwreck reflected enough sound to produce a sonar image only when passed on a very specific course (Fig. 3).

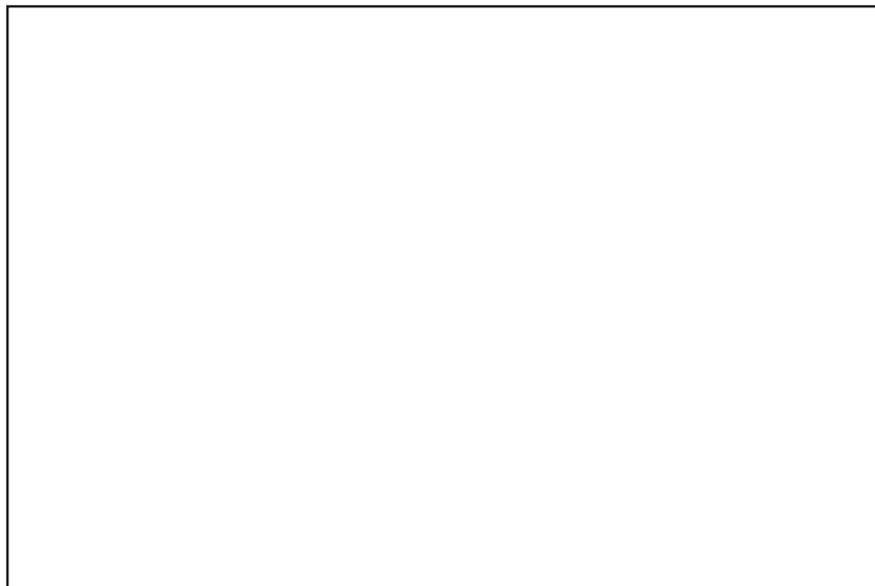


Photo: B. Phaneuf

Fig. 2. *Don Frey examines incoming sonar data in Aspat Bay. The Marine Sonic Technology, Ltd. Sonar system is fully PC and GPS integrated.*

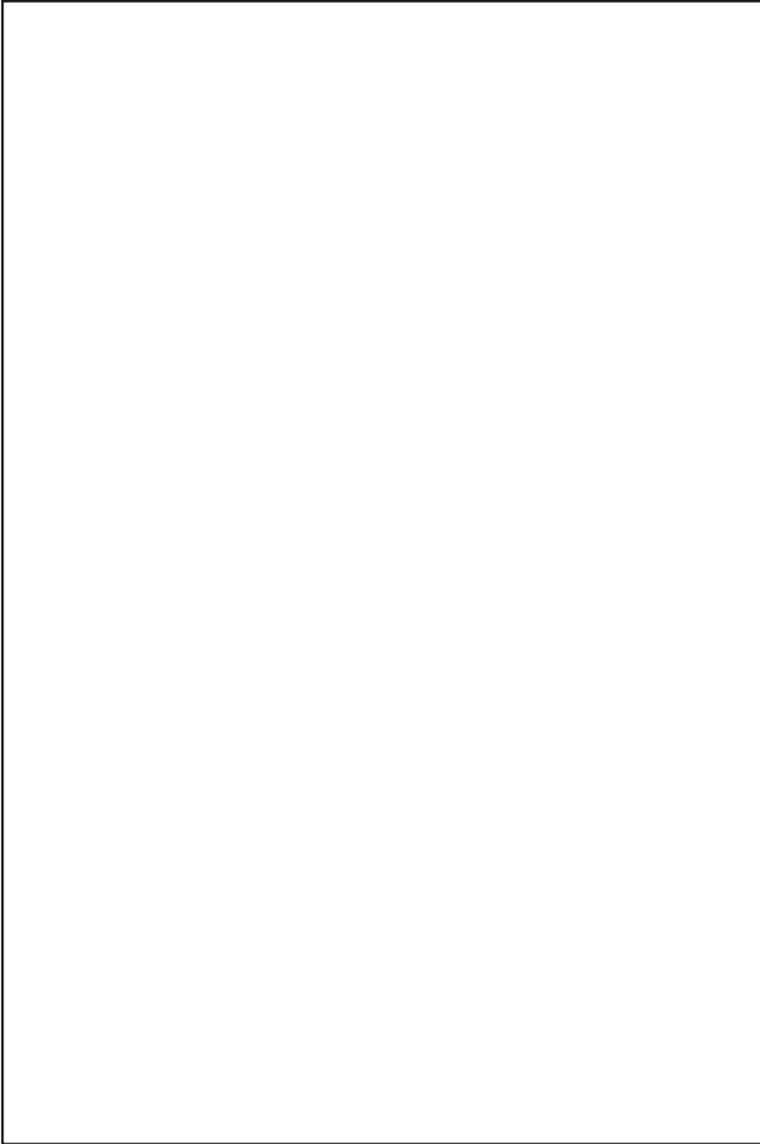


Photo: B. Phaneuf

Fig 3. For the first time Murat Tilev sees the ancient tile wreck in Aspat Bay, sunk more than a millennium ago.

Many other targets that may be shipwrecks were recorded as well. The authors are now reviewing their records to select the most promising candidates for further inspection. The MSTL Sea Scan sonar makes it possible to find the length, width, height and area of a site without diving, making survey much more efficient in areas with sand bottoms. It also allows manipulation of the scanned images, both while collecting data in the field and while reviewing it on land.

The MSTL side scan sonar has proved its immense value and utility in archaeological survey. Therefore, we hope to use it as the principal instrument in future surveys. As the INA sonar survey crew becomes more accustomed to identifying targets as shipwrecks, we are confident that our research will become ever more productive. Future plans include incorporating a video camera in the sonar fish so that objects can be identified without sending divers to inspect a potential site. It should also be noted that in addition to validating the usefulness of side scan sonar in archaeological research, we also reconfirmed a basic law of the universe, namely Murphy's Law: "Generators will run out of gas at precisely the moment a potential wreck appears in the record."

The Smithsonian Institution has selected this Nautical Archaeology Excavation Project for inclusion in its permanent research collection. The Smithsonian's collection consists of descriptions of the use and impact of information technology across all areas of endeavor, including archaeology. This is a major honor, as only a few dozen descriptions are added annually in each category. The description will also be accessible to millions as an on-line information resource through a WorldWideWeb site on the Internet, sponsored by Novell. The Home Page address on the Web for The Innovation Network is <http://innovate.si.edu>. In addition, INA's application will be submitted to

the Computerworld Smithsonian Awards Program in the science category. Each year five applicants are selected that epitomize the ability of science to advance knowledge and benefit society.

*Acknowledgments.* The authors wish to thank INA Director Martin Wilcox for his generosity in providing a sonar system for the survey this past fall. Trimble Navigation provided the use of a differential global positioning system. This enabled us to effectively plan and navigate survey routes, as well as to return to our survey area with extreme accuracy. Thanks also to Epson America for providing laptop computing resources to review sonar records and process data. Epson, a previous winner of a Computerworld Smithsonian Award, has nominated INA to receive this honor.

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# Review

*Pottery for Spanish Shipwrecks: 1500–1800*  
by Mitchell W. Marken  
264 pages, Gainesville: University Press of Florida,  
1994.

Reviewed by Brian Jordan  
Mr. And Mrs. J. Brown Cook Graduate Fellow

Dr. Mitchell Marken's *Pottery for Spanish Shipwrecks: 1500–1800* is a substantial new reference tool for archaeologists interested in the Spanish colonial period. The focus of his study is common ceramic types associated with securely dated Spanish shipwrecks of the American colonial period. Marken has been able to refine and create topologies for both olive jars and Columbian Plain wares that make up the majority of ceramic finds on shipwreck and land sites. The quality of his research over the course of five years is evident in the detailed and precise recording process and in the number of ceramic assemblages studied.

Using body shape and rim styles, Marken has developed a fairly precise chronology for olive jars and Columbian Plain wares. The sections on each ceramic type are filled with meticulous descriptions and numerous illustrations that are invaluable for dating of unassociated finds on land and in the sea. Marken takes the reader through a detailed analysis of the ceramic assemblages of 17 shipwrecks from around the world. Each group of artifacts is first discussed chronologically, and then grouped according to type for easier referencing. Also included are chapters on manufacturing techniques, markings, contents, coverings, stowage, and volume relationships. By combining the attributes of olive jars with the attributes of Columbian Plain, this book provides an excellent resource in which collections can be dated with confidence.

Marken discusses the delicate issue of "legally salvaged" wrecks with aplomb. This matter is of some importance because the majority of the ceramic assemblages come from such excavations. "Unfortunately, until laws forbid the private salvage for monetary profit of important historical sites, our role as students of the colonization periods will remain a confusing one. In the meantime, should we sit back and ignore new information?" In this book, the answer is a very definite "No!" Marken in no way condones the practices of treasure hunters or their techniques. He fully recognizes that the pillage of underwater sites in the Caribbean has resulted in the loss of untold quantities of irreplaceable knowledge. Marken cautions against using the numbers and volumes of the jars found on these wrecks as "gauges of economic processes," because of the unsystematic recovery and lack of provenience data. Reliable information regarding the stowage of cargo aboard Spanish ships from this period is also unattainable, because treasure hunters have scrambled the remains. Still, Marken is unwilling to let what remains of the archaeological data go to waste. He concludes that studying salvaged material is the lesser of two evils. Significant insights can still be gained from the systematic study of artifacts from salvaged wrecks, despite the inexcusable loss of so much other information.

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Archaeologists and historians will benefit from Marken's work for many years to come. His systematic and detailed study of olive jars and common wares from 1500-1800 provides researchers with a standard typology from which to launch their own studies. Marken sums up these views best in his conclusion,

"By combining traditional archaeological approaches to accurately dated shipwrecks with refined techniques of fabric analysis, scholars will have the opportunity to bring order and confidence to problems previously obscured by uncertainty and confusion. It is hoped that legislation and education will help to curtail the salvage of historic vessels and that adequate funding will become available to study archaeologically the valuable resource represented by shipwrecks. As we learn to deal with the large quantity of ceramic material involved ... the prospect for future study in this field is almost unlimited."

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### *INA Quarterly* Submission Guidelines

The Editor invites all readers of the *INA Quarterly* to consider submitting material for possible publication. Preference will be given to articles closely related to the work of the Institute of Nautical Archaeology or the Nautical Archaeology Program at Texas A&M University. Please remember that the *Quarterly* has both professional and general readers. Neither excessively popular nor highly technical treatments are appropriate for this journal. Articles should comply with the following guidelines, and will be edited to meet style and length requirements.

Authors are required to submit a completed typed or printed manuscript, together with illustrations, well in advance of the publication date. Preliminary drafts should not be submitted, as it may not be possible to incorporate later revisions. Whenever possible, articles should also be submitted in electronic form, as a formatted file from a common Macintosh, DOS, or Windows word-processing program on a 3.25 inch diskette. Disks and original artwork will be returned to the author after publication.

Spelling should conform with a standard American dictionary. Foreign words, ship names, and book titles should be *italicized* (or underlined, if using a typewriter). Measurements should be metric, when possible. However, items built or recorded in feet and inches may be given in that fashion, with a metric conversion in parentheses following. Drawings, tables, and other graphic means of presenting information are preferable to long lists of measurements in the text.

Footnotes and formal in-text citations should be avoided, except when essential. Any necessary citations should follow the form of the *American Journal of Archaeology*. A suggested reading list of at least three works (including all those quoted in the article) may be included at the end.

*Quarterly* articles customarily include an "Acknowledgments" section at the end, above the reading list. This should include all those who assisted the author with researching or writing the article. Persons or organizations that helped finance the research with grants or in-kind assistance should be given particular credit.

Original illustrations should be submitted, together with a caption list. Mark all illustrations on the back with the figure number in pencil so it will be possible to match them to the captions. The illustrations should be of the highest possible quality, as there is unavoidable degradation during each step of the reproduction process. For example, blurred photocopies cannot be used. Bear in mind that most illustrations will be reduced to meet space requirements, so line thickness and lettering should be large enough to remain legible after reduction. Either photographs or slides are acceptable, but should be of good quality.

It is essential that proper acknowledgment be given to the works of other authors. The source of all illustrations must be provided. Where copyrighted material is used, permission from the publishers must be obtained. Any necessary endorsement by your project director must be granted prior to submission.

If you have any questions, suggestions, or comments, feel free to contact the Editor.

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# News & Notes

## *Library Donations*

INA wishes to thank Director Donald G. Geddes, III, who has very generously donated to the Institute his extensive collection of books, journals, charts, photographs, and manuscripts related to New World seafaring, as well as a selection of excavation equipment and cameras. Mr. Geddes's library is a welcome and much-needed addition to the research collections now held by INA. It will see frequent use by a number of scholars now in residence in College Station, as well as by scholars in the future.

The Institute is also extremely grateful to Director Claude Duthuit, who has donated two films he co-produced in the early 1960s. *Pecheurs d'éponges* follows the work of Bodrum sponge divers, and *Chantiers sous le mer* chronicles the excavation of the Byzantine ship at Yassıada. These two films, along with footage produced by Director Jack Kelley on several INA projects in the 1980s and 1990s, will form the core of a new *cinemateque*, a research collection of films concerning nautical archaeology.

## *Recent A&M Graduates*

The *INA Quarterly* congratulates the following recent graduates from the Nautical Archaeology Program at Texas A&M University who received Master of Arts degrees: Gail Ernestine Erwin (Fall 1994); Carmen

Marquez, Claire Peachey, Mark Smith (Spring 1995); Brinnen Carter (Summer 1995); and Peter van Alfen (Fall 1995). Michael Fitzgerald received a Doctor of Philosophy degree in Spring, 1995.

## *Flower Gardens Mapping*

This spring, the Institute of Nautical Archaeology at Texas A&M University will be compiling a sonar map for the United States National Oceanic and Atmospheric Administration (NOAA) at the Flower Gardens Marine Sanctuary, the northernmost active tropical coral reef in the Western Hemisphere. The team will be using a Marine Sonic Technology, Ltd., 300 Khz sonar system, provided by INA Director Martin Wilcox, to gather the data for the study. This is yet another exciting application of high technology to the study of the seas.

## *Cincinnati Meeting of SHA*

A strong contingent of scholars associated with the Nautical Archaeology Program at Texas A&M University and the Institute of Nautical Archaeology participated in the recent meeting of the Society for Historical Archaeology. The Conference on Historical and Underwater Archaeology was held in Cincinnati, Ohio, January 3-7, 1996. Papers on INA-sponsored projects were given by Elizabeth Bald-

win, Arthur Cohn, Joe Cozzi, Kevin Crisman, Eric Emery, Frederick Hocker, Stephen Paris, Erika Washburn, and Rich Wills.

## *INA Technical Lectures*

INA began its first season of technical lectures this spring, designed to stimulate interest in developing remote sensing technology and alternative career opportunities for students and professional nautical archaeologists. These lectures are scheduled bi-weekly and are open to all members of the INA and University communities, and to the general public. Write to Brett Phaneuf, Research Associate, at P.O. Drawer HG, College Station, TX 77841-5137 for further information or a schedule.

## *DAN on Web*

DAN (Divers Alert Network) now has a presence on the World Wide Web. Enter <http://www.dan.ycg.org> to find DAN's Web site on the Internet. Presently, the home page links to areas describing DAN's benefits and services; mission statement; contact information; and DAN's Medical Line, answers to frequently asked diving safety and medical questions published in *Alert Diver* magazine. If you have questions or comments about the DAN Web site, contact Barry Shuster at [shust001@mc.duke.edu](mailto:shust001@mc.duke.edu).

### **Nautical Archaeology now on the WorldWideWeb**

You can now contact the Home Page of the Texas A&M University Nautical Archaeology Program on the WorldWideWeb segment of the Internet. Enter <http://nautarch.tamu.edu>

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