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On the cover: Chinese export porcelain from the Saldana Island Shipwreck includes a variety of bowls, dishes, and cups from the late 17th century AD. The peony scroll dish, one of 140 excavated this year, measures 35 centimeters in diameter. Photo by N. Piercy.

The Institute of Nautical Archaeology is a non-profit scientific and educational organization, incorporated in 1972. Since 1976, INA has been affiliated with Texas A&M University where INA faculty teach in the Nautical Archaeology Program of the Department of Anthropology.

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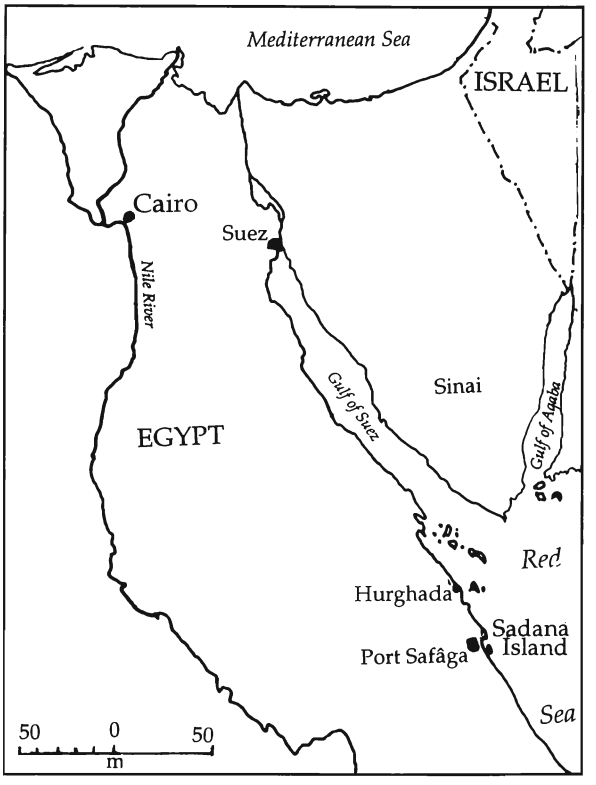
Sadana Island Shipwreck

Excavation 1995

by Cheryl W. Haldane, Ph. D., INA Research Associate

INA-Egypt's first excavation season on the Sadana Island Shipwreck logged just over 1,000 dives for a total of more than 260 hours on the seabed at depths of 22-42 meters. Our work focused on activities designed to protect the ship and its cargo from casual visitors, to prepare the site for further study, and to begin documenting its rich collection of Chinese porcelain and other ceramic artifacts (fig.1).

Our first visit to Sadana Island had been made during the 1994 Red Sea shipwreck survey (*INA Quarterly* 21.3), and we were excited to be returning for our first full-scale project this year. Our excavation team included Egyptian archaeologists, a representative of the Egyptian Navy, INA-Egypt staff, students in Texas A&M University's Nautical Archaeology Program, long-time INA illustrator Netia Piercy and a second-generation illustrator, Lara Piercy (fig.2). We camped on the beach opposite Sadana Island from 15 June until 28 August when a convoy of LandRovers and police cars began the 700-kilometer-long drive to Alexandria's Maritime Museum with the season's finds.



Map: C. Powell

Fig. 1. *Sadana Island, Egypt.*

Photo: C. Haldane

Fig. 2 (Above). *Two generations of INA artists at work—Netia and Lara Piercy examine some of their drawings of Sadana Island Chinese porcelain.*

Excavation

This season, we had four primary excavation goals: to prepare the site for future work, to evaluate mapping procedures for the *kullal* (juglet) field at one end of the site, to recover all visible porcelain objects, and to excavate test trenches for evaluating hull structure.

The size of the site (c. 50 x 25 m) made computer mapping the most accurate means of recording site features relative to each other. By measuring distances between fixed points, we were able to use the Web© for Windows™ computer mapping system to position objects accurately in three dimensions.

The ship lies along the base of a 27-meter-high coral reef. Stacked grapnel anchors more than 4 m long mark the bow, and layers of earthenware juglets and bottles cover the stern. Clusters of large storage and transport jars called *zilla* in Arabic received a great deal of attention as they obstructed our access to much of the central portion of the site (fig. 3).

Many dives were devoted to measuring and then moving approximately 30 zilla off the shipwreck and to the base of the reef. We suspect that most of these carried a liquid cargo or were empty when the ship sank. Some zilla, however, had been filled with objects by sport divers. They told us last year that they had done this to protect artifacts from theft by other sport divers. Objects recovered from zilla include copper wares, glazed bowls, a nearly complete glass "case" bottle, earthenware pipes, kullal, stacks of porcelain bowls concreted together, and a ceramic teapot (fig.4).

Using a procedure developed and tested on site for sketch mapping and measuring within the kullal field, we excavated more than 100 kullal of at least 20 different types although all are of a similar thin, gray/brown fabric. We believe we raised about 10% of the existing kullal—one small section of the area showed that there are at least five layers of juglets over a field approximately 7 x 6 m.

Teams working on measuring and excavating porcelain objects dealt with two different types of material: objects clearly in context, usually locked to other site features by coral growth or marine encrustation, and porcelain that had been recently broken and dumped in mixed piles by looters. The large number of shattered porcelain objects suggests that unscrupulous sport divers have been using hammers and chisels to try to break porcelain free of encrustations. Their discards remain for us to record and study, but we also noted several areas rich in porcelain that seem to be undisturbed.

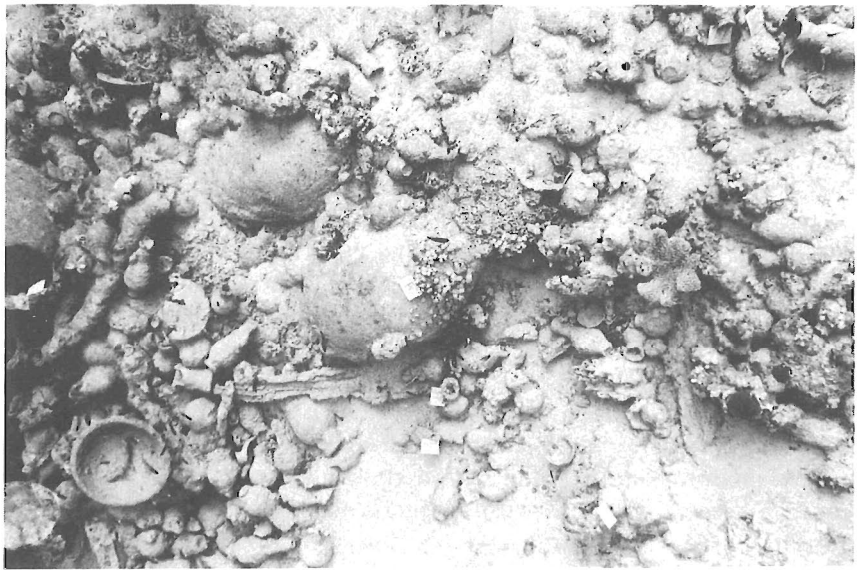


Photo: A. Flanigan

Fig. 3. *More than 120* kullal *and bottles provided us a glimpse of the complex associations of these small earthenware objects stacked more than five deep in one part of the hull. Meter-high* zilla *(storage jars) like those in the central area of the photograph make up a substantial portion of the cargo as well.*

Materials

Porcelain

The Sadana Island Shipwreck's porcelain cargo is unique among excavated or salvaged materials from other wreck sites, because it is a cargo intended for the Middle Eastern market. A number of Dutch and other European ships have been excavated in the Pacific Ocean, and the porcelain they carried includes shapes and designs specifically intended to appeal to a western market. For example, images of human figures are common on western-oriented wares. In contrast, all of the decorated pieces of porcelain from Sadana rely solely on floral motifs. No animal or human figures are present, and this is typical of styles intended for sale in India and the Middle East.

Photo: E. Khalil

Fig. 4. *Archaeologists worked hard to recover all visible objects to protect the site from further looting. Here D. Haldane raises a stack of 13 porcelain dishes encased in marine growth from the wreck.*

Tracing porcelain trade networks from Istanbul to China leads directly to Egypt and the Red Sea. Although the Ottoman Empire (which included Egypt) made a political withdrawal from the Indian Ocean in 1635, merchants and ship owners from Arabic-speaking parts of the Ottoman Empire continued to trade in the Red Sea and the Indian Ocean. Porcelain typically was carried from China to southern India, and transshipped at ports there. The trade routes between India and Arabic-speaking parts of the Ottoman Empire remained active.

The Sadana Island Shipwreck includes a great deal of the Chinese Imari wares, a polychrome imitation of Japanese-style porcelain decoration. When porcelain is manufactured, only the rich cobalt blue glazes are applied before firing (underglaze). Additional colors, including scarlet, green, yellow and gold, were applied separately as overglaze. Unfortunately, these are rarely preserved in marine environments. This means that the porcelain we recover from the ship has only part of its decoration preserved.

Sometimes we can get a glimpse of more complex original decoration when dry porcelain is held in raking light. Illustrator Netia Piercy first identified the "ghosting" where overglaze had preserved the porcelain surface, leaving a thin glossy tracery of the original designs. Recording the ghosting is slow and demanding work, and only one porcelain

object has had its "ghosting" recorded fairly thoroughly. We were pleased to find a virtually identical example of the type in the Topkapı Saray collections to compare to the Sadana bowl and to learn that the method we used to record the ghosting successfully reveals the original designs. This part of the study will require extensive work after the porcelain has been desalted, cleaned, and dried (fig. 5).

Nearly 300 different porcelain artifacts were recorded and raised in 1995. We noted about 20 different object types, some of which Dr. Rose Kerr, Curator of Chinese art at London's Victoria and Albert Museum, tells us date to the middle to late years of the 17th century. Curiously, we also have porcelain bowls almost identical to some in the Topkapı Saray collections of the Ottoman sultans in Istanbul that are dated about 50 years later by the individuals who have studied that material. Establishing the date for the porcelain cargo will be an exciting aspect of future research.

Photo: N. Piercy

Fig. 5. *Archaeologists spend hours each day cleaning and recording the more than 400 objects raised in 1995. Emad Khalil, INA-Egypt's deputy director, used pneumatic air scribes to remove coral growth and encrustation from this large clay bottle.*

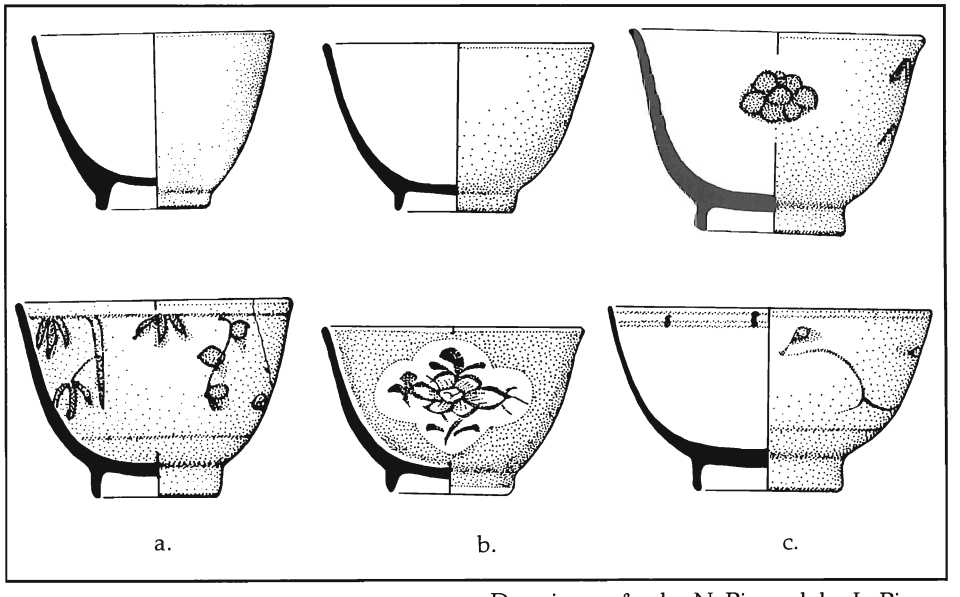
The primary porcelain cargo components excavated this year were two sizes of dishes decorated with a peony scroll on the interior and an unidentified motif on the exterior. The dishes measure 34.4 cm and 37.8 cm in diameter. More than 140 dishes of this type were excavated from the wreck in 1995. Many of them were in the lowest part of the hull, concreted together in coral-covered stacks of up to 20 dishes that weighed more than 100 pounds.

In addition to the peony scroll dishes, porcelain artifacts included a variety of plates, cups, small and large bowls, and a single triangular-sectioned bead (fig. 6).

Earthenware

Nearly 160 earthenware objects were excavated from the Sadana Island Shipwreck in 1995. Tobacco pipes, a kursi (charcoal holder for a water pipe) with bright red slip and elaborate decoration, glazed and unglazed bowls, spouted containers with small mouths, transport amphoras, bottles, pitchers, and kullal will provide an interesting corpus of material for study (fig. 7 and 8).

Kullal are defined by the presence of a filter at the junction between neck and body and by the fine, thin brownish-gray fabric used in construction. There are 10 different shapes and decorative types of kullal excavated this year, three different bottle shapes, and two different pitchers with handles. Fabric types are similar, and most examples are decorated with bands of incised linear and punctate designs. Some also have applied plastic clay decoration in more and less elaborate arrangements. The kullal from Sadana Island bear strong similarities to those excavated more than 20 years ago from the Sharm el Sheikh shipwreck (see Raban, 1971).



Drawings a & c by N. Piercy, b by L. Piercy

Fig. 6. *Coffee drinking in porcelain cups had become an accepted part of daily life for many people in the 17th century as contemporary Ottoman miniature paintings illustrate. Celadon green, brown, and white cups with blue underglaze and colored underglaze are common on the Sadana Island wreck.*

Cupreous objects

Excavators recovered a number of objects made primarily of copper. These included cooking pots and lids, handles, dishes, a coffee pot, a kettle, ewers, a single tool, two hinged and linked loops, and two portable grills. In addition, a well preserved sheave that may be bronze and weighs at least 12 kilograms and a possible folding lantern were retrieved.

Copper objects from the surface of the wreck have suffered from exposure to the sea, and many are extremely fragile and broken. In some cases, we have identified recent damage from previous site visitors. A copper plate from the wreck that was returned to us by an anonymous donor includes an inscription in Arabic that may help to identify at least one member of the ship's complement on its last voyage.

Glass

Glass objects from the Sadana Island Shipwreck include three types of bottles. All but two examples fall into the category of case bottles. The exceptions are an 18-cm tall, turquoise neck and mouth of a large, round, glass bottle similar to examples from seventeenth-century Ottoman Turkey and a dark brown bottle base with a 10-cm diameter. Case bottles are known to be a European-style bottle intended for transporting liquor. Alcohol was an important part of seaborne trade in the Far East. In the Muslim world, wine drinking had been forbidden by Mohammed, but debates about whether alcohol should be considered forbidden also are well documented in written documents of this period.

The best preserved example of a case bottle (3-3) was retrieved from a zilla. About 85% of the 28.5-cm-tall body is present, but one-side is badly broken. Case bottles are green glass bottles with square bases, walls that angle slightly outward as they approach the rounded shoulders, and a well defined neck and rim. The walls are very thin, and thus fragile, a feature that resulted in tremendous breakage (probably much of it recent) on the bottom. At least 21 case bottle bases have been excavated so far; con-

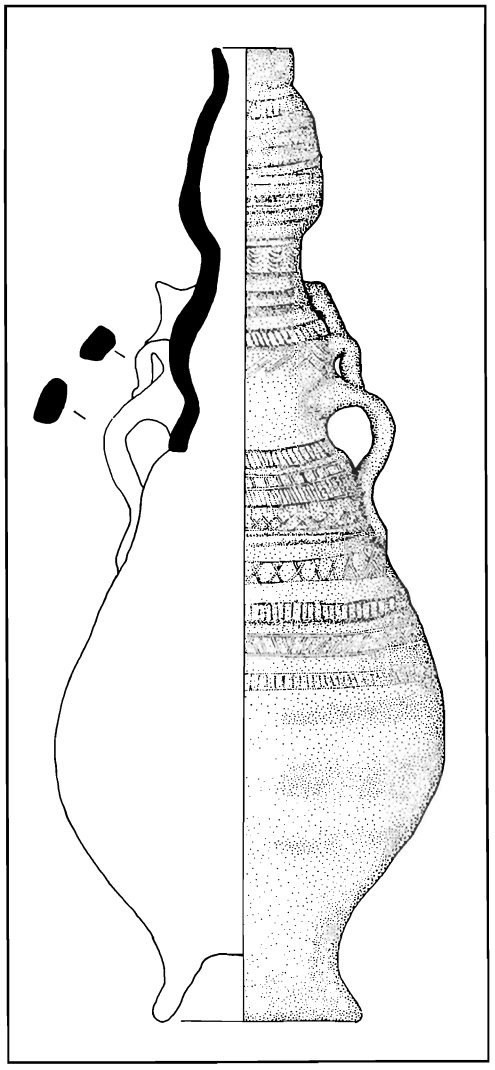
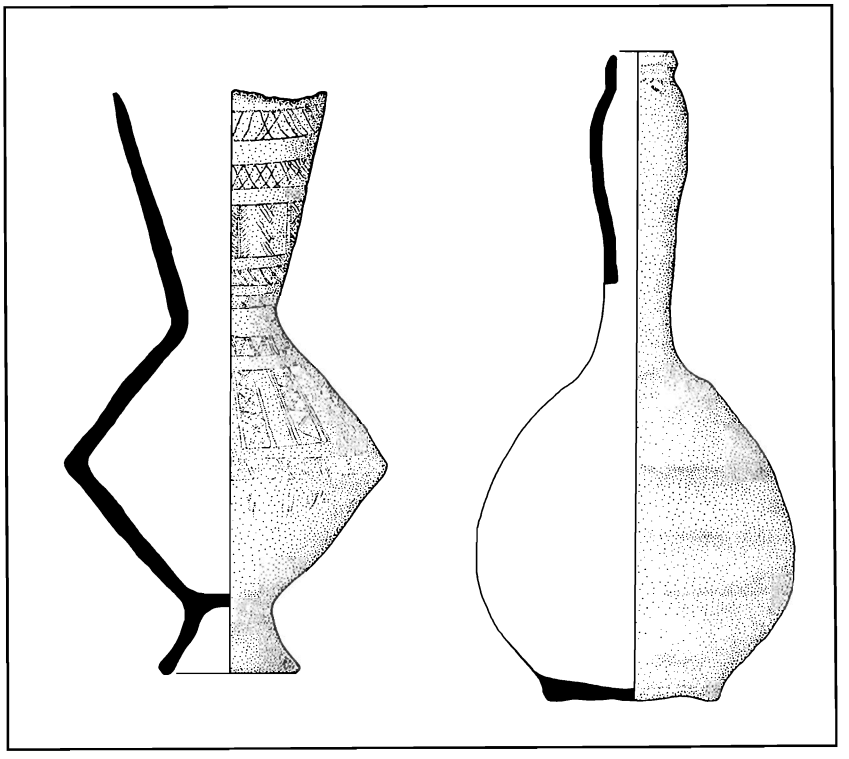


Fig.7 (Left). *A pitcher.*

We recovered about 20 different kinds of small-mouthed containers, probably for water, made of the same finely textured brownish-gray clay. This pitcher, kullal *(or juglet), and bottle are typical in shape and decoration of the more than 1,000 remaining on the bottom. Drawings by K. Burnett, 35% of original size.*

Fig. 8 (Below). *Kullal (left) and bottle (right).*



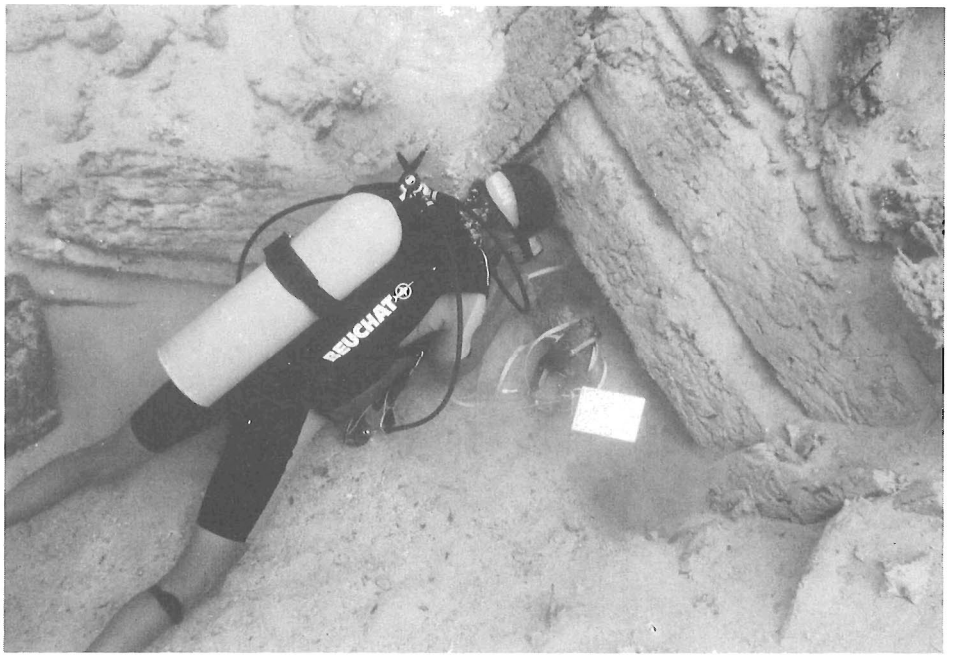


Photo: E. Khalil

Fig. 9. *Brief examination of hull construction methods during the 1994 Red Sea Shipwreck Survey had taught us that the Sadana Island wreck was built in a previously undocumented fashion. Two test trenches opened this year brought three very different parts of the ship to light, raising more questions than answers about the technology used to build the hull. Here, D. Haldane examines the hull.*

servation and study will probably allow us to join some of these to excavated body and shoulder sections.

Organic remains

The Sadana Island Shipwreck contains a rich variety of waterlogged organic remains that includes wooden jar and bottle stoppers as well as a substantial amount of wood charcoal. In addition to hand-picking larger samples, including rope, archaeologists recovered seeds and other plant fragments through bucket flotation of object contents.

Bucket flotation separates organic remains from sand and shells by disaggregating the sediments and causing the organic component to be suspended in water, then trapped in a sieve as the water is poured through it. Microscopic analysis of samples will teach us more about the crew's diet and the ship's cargo, but already we know that the ship carried coconuts, aromatic resin, pepper, coriander and coffee.

These products are among the most frequently cited spices in Ottoman archival documents, and they served not only as spices but also as medicines. During the sixteenth century, coffee had been introduced to the Arabian peninsula from Ethiopia, probably by Sufis who seem to have appreciated its stimulating qualities. The plant grew well in Yemen, and Yemen became the world's leading producer of coffee by the seventeenth century. Alexandria was the major port for re-export of Yemeni coffee in the late seventeenth and early eighteenth centuries, and coffee was a high value cargo. The coffee arrived in Alexandria after being shipped up the Red Sea, taken by caravan across the desert, then by river boat from Cairo.

Pepper's value as a spice remains high today. More than 4,000 years ago, pepper began to be traded westward from India. Price studies show that it has long been considered as the most precious of spices. In addition to its role in flavoring food, it is used as a preservative and was thought to be a stimulant and an aid to digestion; dockmen unloading pepper ships were forbidden to wear clothes with pockets in them for fear that they would steal a few peppercorns.

The aromatic resin carried on the Sadana Island shipwreck has a strong and rich odor. Chemical analysis by gas chromatography in order to define its chemical composition will allow a match to be made to known resin types. This is the only way to tell which of the many plants that produce aromatic gums and resins such as frankincense, myrrh and storax and are native to India, the Far East and the Red Sea shores is the source of the material on the Sadana Island wreck.

The Hull

Two trial trenches excavated in the central part of the ship and recording of the lowest portion of the hull provided basic details of ship construction (fig. 9). In addition to moving sand in this area by hand, archaeologists used induction dredges, large tubes that depend on water suction, to make their job quicker and more efficient. One trench measured about 1.5 x 1 m; the other is about 3 x 3 m.

The larger trench provided some interesting details of construction, including a coating of resinous material over the planking and an area that has had some of the heavier timbers removed. As this was uncovered in the last few days of excavation, we will be investigating this further next year and trying to understand whether the timbers were lost recently or at some time before the ship sank.

The methods used to build this ship are not previously recorded, and the ship itself as an artifact is there-

Photo: E. Khalil

Fig. 10. *C. Haldane examines a 4-meter-long grapnel anchor. This is one of at least eight anchors carried by the immense ship that wrecked against the reef near Sadana Island.*

fore extremely important. What we have so far observed shows us that the hull was not built according to standard European methods. Its frames, though large (c. 20 x 20 cm) and in some cases composite (built of two layers of wood), are spaced fairly far apart in comparison to Dutch or Portuguese hulls.

Also, some of the bottom components (either hull planking or perhaps a sister keel) measure 20 cm in thickness, which is much thicker than planking on comparable European hulls. It was also clear that frames do not fit the planking closely because many shims (thin wedges of wood) have been found already.

Major hull components were fastened with iron bolts and nails. As the iron has decayed, only the concretion surrounding the fasteners or, in some cases, the iron-impregnated wood is available for study. We did not clear enough of the hull for a coherent pattern of fastenings to be recorded.

The trial trenches did not provide conclusive evidence for construction methods, but study of all notes, measurements and descriptions of the areas, as well as future seasons of excavation, will add to our understanding of the hull's construction. In addition to large components such as stringers and frames, archaeologists recovered tiny chips of wood and bark that probably were left from the hull's construction. Identification of wood types used may provide a clue to the ship's origin.

Reef survey

In addition to excavating the site, archaeologists also surveyed the coral reef nearby. Four additional anchors, probably from the same ship, were located (fig. 10). One team member spotted a single stack of eight complete and clean dishes decorated with peony scrolls at a depth of 26 meters, probably placed there by a sport diver planning to raise them at another time. Five other plates, all with recent breaks, were also found far from the shipwreck and also represent looting activities.

Origin of the Ship

The first question asked by archaeologists and other interested people concerns the ship's origin: Where is it from? We know that the porcelain originated in China and that the coffee undoubtedly came from Yemen, but these were cargoes that could have been loaded at any major emporium such as Jidda.

As we expected, no conclusive answer can be given this season. Personal items often provide clues to the nationality of the ship's crew, and thus to its possible origin. We found few objects this year that could be considered personal items: the inscribed copper plate, smoking paraphernalia and possibly incense burners, although these last might be cargo.

As we excavate more deeply into the hull, we expect to reach levels undisturbed by sport divers that will contain artifacts that can help us better address this question.

Future Plans

We are extremely concerned about the presence of looters at the site. The day we arrived, a dive boat also came and sent more than 10 divers into the water above it despite our repeated requests that they leave the site. We could not dive that day, so there was no possibility of being able to observe them except from the surface. We do not know if they took things from the site. Many people have told us that they know about the site and have visited it or know someone who has "many things" from the wreck in their home. The Egyptian Coast Guard will be patrolling the area periodically, but we have also left a warning sign on the sea floor (fig. 11).

The 1995 excavation season of the Sadana Island Shipwreck has been a success, with more than 400 objects raised and transported across the Egyptian desert and through the Delta to Alexandria's Maritime Museum where a new laboratory for wet objects is being prepared by INA-Egypt with the assistance of the Supreme Council for Antiquities and the Egyptian Antiquities Project. We plan to have a larger international crew in 1996, in order to work more effectively. It seems almost too long to wait to return to this exciting and beautiful site.

Acknowledgments. The Supreme Council of Antiquities and its director Dr. Abdel Halim Nur el Din provided a great deal of support for the excavation, including archaeologists Sameh Ramses, Mohammed el Sayed, Mohammed Mustafa, and Inspector Abdel Rigal. We also are grateful to the Egyptian Navy for allowing Lt. Tarek Abu el Elaa to join us for the entire season. The excavation also benefited from the talents of INA-Egypt staff Douglas Haldane and Emad Khalil, Illustrators Netia Piercy, Kendra Burnett, and Lara Piercy, American University in Cairo student Marston Morgan, and TAMU Nautical Archaeology Program students Elizabeth Greene, Alan Flanigan, Layne Hedrick, Peter Hitchcock, and Christopher Stephens.

Funding and in-kind support for the 1995 Sadana Island Excavation was generously provided by Billings K. Ruddock, The Amoco Foundation, The Brock Foundation, CitiBank - Egypt, CIB, Pepsi, Arab Contractors, British Gas, Egypt, Scuba Doo in Hurgada, and INA-Egypt members. The American Research Center in Egypt and its Cairo Director Mark Easton, Fran and Chip Vincent, and Richard and Bari Biennia also contributed their efforts to the success of the season. Our appreciation for your assistance is unbounded.

Suggested Reading

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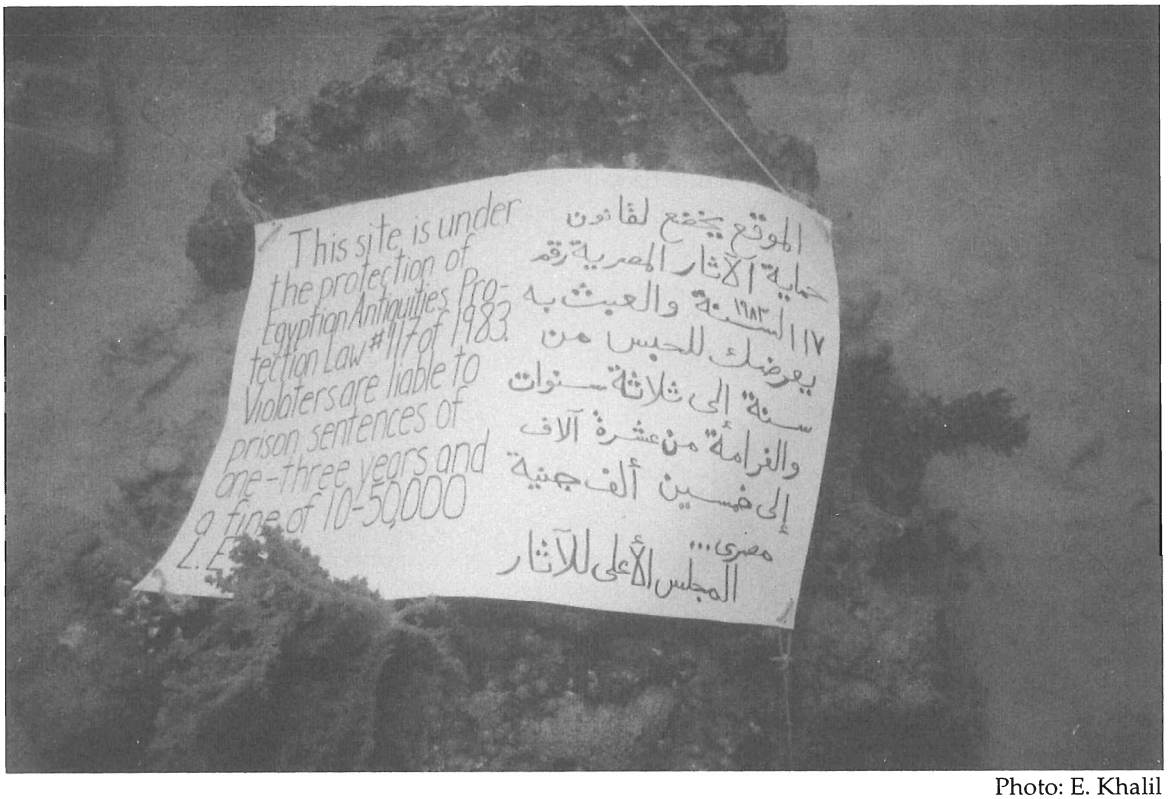


Photo: E. Khalil

Fig. 11. *Regrettably, the Sadana Island Shipwreck has been visited by too many divers unaware of the importance of taking only photographs with them when they leave the site. It is hoped that a blanket of sand and this sign will protect the site in the coming year.*

T.S.S. Zavala: The Texas Navy's Steamship-of-War

by Elizabeth R. Baldwin

In February of 1839 the fledgling Republic of Texas commissioned vessels for a new navy, a navy that would be of immense strategic importance in the ongoing conflict with Mexico (fig. 1). The most controversial vessel of the new navy was the sidewheel steamer *Zavala*. Originally the *Charleston*, the vessel had been built as a coastal packet and converted into a steamship-of-war for Texas.

Although much has been written about the Texas War of Independence from Mexico, surprisingly little is known about the actual design, construction, and armament of the ships, including *Zavala*. Because the financial resources of the young Republic of Texas were severely strained and the navy was in a rush to have the vessel ready for potential confrontations with Mexico, the navy's financial records for *Zavala* are incomplete and often contradictory. No plans of her exist, nor was her extensive refit to a warship documented in detail. Thus, there exists a significant gap in our knowledge of the Texas Navy, its capabilities and constraints in the hostilities with Mexico that followed the War for Independence.

The *Charleston* was built in Philadelphia in 1836 as a coastal steam packet for the Charleston and Philadelphia Steam Packet Company. The period from 1820 to 1840 was vital to the advancement and worldwide acceptance of steamship technology. It was during this period that steamships were able to correct and improve upon previous problems and inadequacies and present a serious commercial threat to sailing vessels. In response to that commercial threat, packet services, regularly scheduled sailings that carried passengers and a variety of available cargoes, were introduced. However, packet services proved to be a natural market for steam vessels, which did not need to rely on wind for motive power. The *Charleston* was built for the coastal trade. While early packet routes had typically run on sheltered waters, such as Long Island Sound or the Hudson River, the *Charleston* would traverse deeper, and often more treacherous ocean waters along the Atlantic coast between Philadelphia, Pennsylvania and Charleston, South Carolina.

The vessel's permanent enrollment documents state that her length was 201 feet 9/10ths, her breadth 24 feet 1/10th, and her depth 12 feet. She measured 569 15/95ths tons, and had a round stern, a flush deck and a scroll head (fig.3). These measurements yield a length to breadth ratio of 8.3 to 1, which appears to be the average ratio for paddle steamers of the period. She was intended to carry a maximum of 120 passengers, and had a complete complement of furniture, bedding and crockery to service those passengers in style.

The new vessel was fitted with a pair of beam engines built by Levi F. Morris of Philadelphia. This type of engine is also known as a "walking beam" engine, and was common on early steam vessels. It is a simple reciprocating engine, characterized by a heavy, diamond-shaped elevated lever that pivoted at its center and transmitted the drive force from a vertical piston rod to a connecting rod which in turn drove the paddlewheels. Originally developed in 1822, this type of engine was reliable, econom-

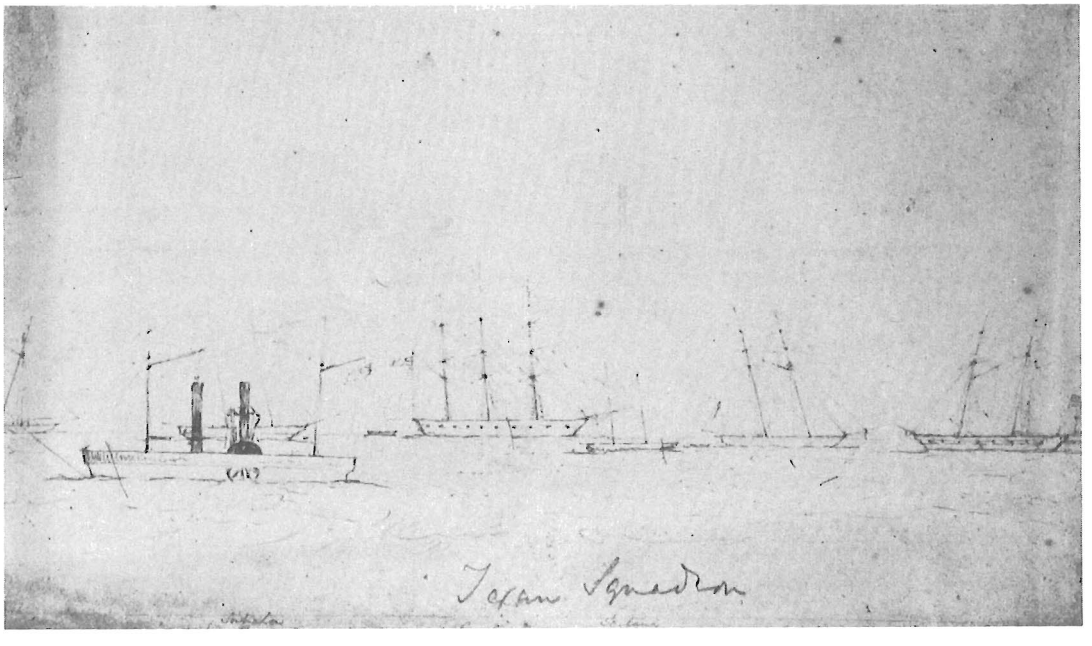


Fig. 1. *Sketch of the Texas Fleet at Galveston by William Bollaert.* Zavala, *the only steam vessel in the fleet, is pictured in the lower left. The configuration of one stack behind the other reflects a failed attempt at perspective on the part of the artist. (Courtesy of the Newberry Library, Chicago).*

ical and easy to maintain, and it became the universal engine of the eastern coastal packet steamers. The two boilers were most likely of copper, to prevent corrosion from seawater, and probably sheathed in iron for greater strength.

Unlike most packet steamers of her day, *Charleston* was very heavily constructed. Such heavy timbering was typically an attempt to strengthen the vessel to carry the weight of her twin engines and boilers and to prevent her from hogging. It may also have been in response to the tough ocean conditions that awaited on the coastal ocean route. Indeed, a punishing encounter with the elements occurred only months after she began her service.

The *Charleston* encountered a severe gale off Cape Hatteras in October of 1837. A passenger gave a vivid account of the storm:

> A little before two o'clock in the morning, a sea broke over the stern of the boat like an avalanche ... making an opening about one inch wide the whole length of the boat, through which the water poured ... every time she shipped a sea. ... At half past ten, A.M., a sea of immense volume and force, struck our forward hatch, towered over the upper deck, and swept off all that was on it. It engulfed the fire under the boiler of the engine on that side, and lifted the machinery so as to permit the escape of a volume of steam and smoke, that nearly suffocated us, and so shifted the main shaft of the engine that it no longer worked true, but tore away the wood work ... The big bell tolled with the shock, as though sounding the funeral knell of all on board.

The staunch *Charleston* rode out the storm and limped into Beaufort, South Carolina for repairs. Other vessels were not as fortunate. The storm destroyed the steam packet *Home* with the loss of about one hundred lives.

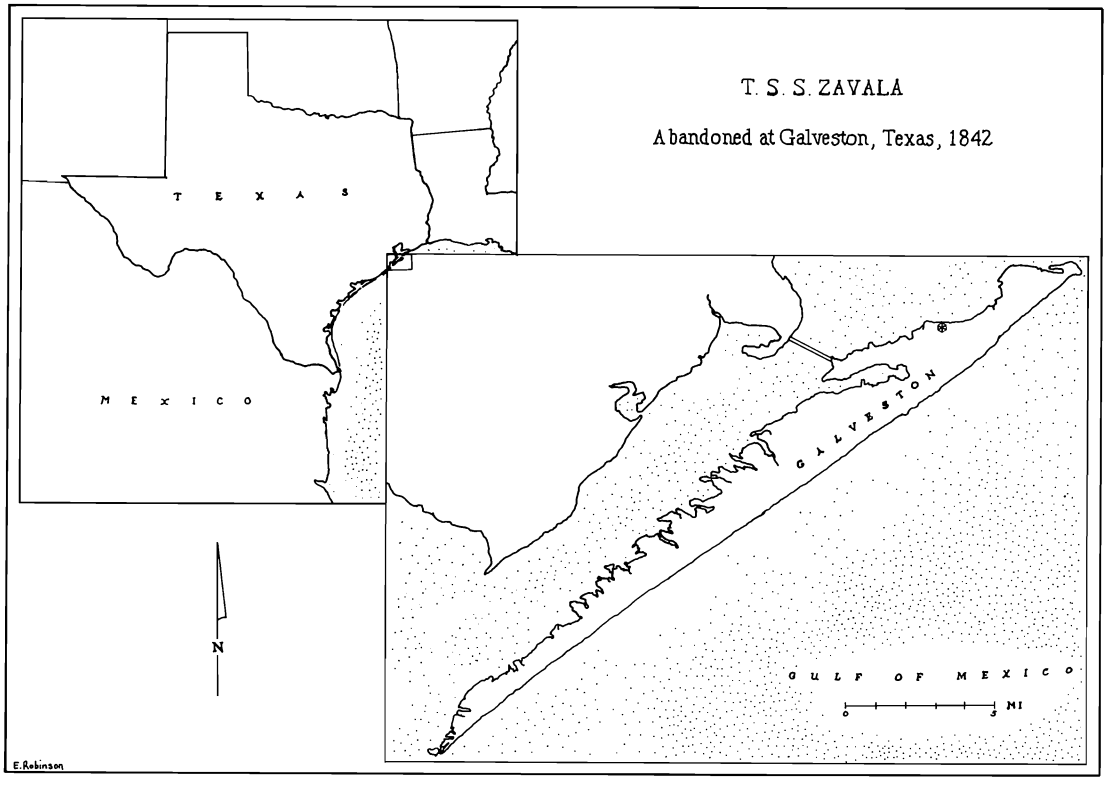
After these well-publicized wreckings, public confidence in the Charleston route steam packets seems to have been badly shaken, so much so that some of the lines became financially untenable. Although the *Charleston* fared relatively well in the gale, the Charleston and Philadelphia Steam Packet Company went bankrupt shortly thereafter. Whether the bankruptcy was due to the public lack of confidence in the coastal steam packets, or to the depressed economic climate of 1837 is uncertain. The company's bankruptcy, and the ongoing national depression, forced its trustees to sell the *Charleston* at a substantial loss.

The ship was purchased by agents for the naval commissioners for the Republic of Texas. The government of the Republic, concerned that Mexico had the ability to blockade Texas ports, had appropriated funds for the acquisition of a new fleet for the navy in November of 1837. Texas had maintained a fleet during its war of independence from Mexico, but those vessels were no longer useful. By December 1838 the newly elected President Lamar wrote in favor of the popular pro-navy position: "The protection of our maritime frontier ... is a public duty. ... This duty may effectively be accomplished by a naval force of small magnitude though under present conditions of our credit and finances not at a moderate expense." The commissioners promptly contracted for six sailing vessels. Yet, the Navy Department also thought it imperative to purchase a steamship, which would have an advantage over sailing ships by being able to maneuver in and out of harbors and rivers regardless of the wind. Unfortunately, the naval commissioners found themselves in strained circumstances: they had only bonds of the Republic of Texas with which to pay for a ship.

Financial considerations seem to have weighed heaviest in the decision to purchase the packet *Charleston* instead of a steam vessel that had been purpose-built as a warship. Steam warships had first been built for the U.S. Navy in 1814 to designs by Fulton. In England the British Navy had also taken to building steam warships, and between 1820 and 1840 about seventy steam vessels were added to the fleet. Although the Texans would have preferred a purpose-built warship, they were not prepared to pay the necessary price. In the *Charleston* the Texas Navy agents had found an ideal compromise. She had been built with extremely heavy timbers for a merchant vessel, she could be had for a bargain price, and Texas bonds could be used in the transaction. An interested, and politically motivated South Carolinian, James Hamilton, arranged a consortium to buy the vessel for cash in return for the Texas bonds.

After the sale of the steamer to the Republic of Texas the vessel was repaired and altered in New York City by Hamilton's consortium. The type of work reported in navy records in the Texas archives seem to indicate that *Charleston* was in dire need of major repair as a result of the extensive damaged suffered in the gale off Cape Hatteras. In fact, the high cost of repairing such heavy damage may have helped to push the Charleston and Philadelphia Steam Packet Company into bankruptcy.

The necessary repairs were made by a battery of different firms from New York City and environs, and included extensive repair to the hull, masts, repair to the engines and boilers and new copper sheathing. The vessel was also fitted with new equipment which included draperies, cushions and tassels for cabin decoration. Such decoration seems inappropriate for a warship, but it reflects Hamilton's assumptions about her future use. In a letter to the secretary of the Texas Navy, Hamilton stated, "She will be completely fitted out to answer the purposes both



Map: E. R. Baldwin

Fig. 2. *Map showing the location of Galveston, Texas and the site of the* Zavala.

of a marine frigate, and a mail and passenger boat ... [E]xcept as needed to transport troops, I should presume it would be deemed expedient to keep her as a government mail-boat between New Orleans and Galveston ... and at the same time keep your coast clear of all blockade and Mexican cruisers." Other administrative officers of the Texas Navy were of similar opinion regarding the vessel's suitability; that is, she should be made a government packet. Armament and equipment for the steamer were also to be provided by Hamilton's consortium. It was proposed to "mount upon her one long eighteen or twenty-four pound gun in the forecastle, and one long twelve or eighteen on the stern, and four or six waist guns, with muskets, pistols, pikes and sabres, powder and ball, and necessary munitions of war for a crew of one hundred men." The *Charleston* steamed out of New York on February 19, 1839 bound for Galveston, where she arrived sometime around March 18, 1839 (fig. 2). The steamship was the first ship commissioned into the new navy, not as a government packet, but as a steamship-of-war. She was renamed *Zavala*, in honor of Lorenzo de Zavala, the first Vice President of the Republic of Texas.

A. C. Hinton, a former junior officer in the U.S. Navy, was given command of the steamer. Hinton wrote the secretary of the navy, outlining alterations he thought necessary for *Zavala* to function well as a warship, along with a plan for carrying them out. He felt that as refitted the vessel needed further strengthening to bear the weight and recoil of the guns, and that the engines were exposed and vulnerable. By selling the unnecessary passenger furnishings for approximately $10,000.00, Hinton felt he could finance the alterations. Some preliminary maintenance work took place in Galveston where the paddlewheel arms and buckets were replaced, but no further work was authorized.

The new commodore of the Texas Navy, the energetic and dynamic Edwin Moore, arrived in Galveston to take command on October 4, 1839. He inspected the fleet and designated the alterations to be made. *Zavala* was ordered to New Orleans for fitting-out, and Hinton was allocated $9,000.00 for that purpose. He was not authorized to sell the furnishings to obtain additional funds. Financial difficulties arose immediately. New Orleans merchants, still smarting from the nationwide depression and rampant inflation, demanded payment in cash, refusing Texas notes. Hinton's frequent letters convey frustration, mostly because the list of needed repairs quickly outgrew the available cash. And something was clearly amiss. Along with a request to authorize expenditures for a new foremast and a new berth deck, he asked to replace the paddlewheel components. "I found that so decayed and shattered were the wheels, there was not a single arm that was fit to be used again." It is hardly possible that in the course of barely three months, most of which had been spent at anchor, *Zavala* would have completely worn out the sixty oak paddlewheel timbers ordered in Galveston in August. Nor does it seem possible that new masts would be needed only one year after they had been replaced during her refit in New York. Yet the repairs were made, and Hinton continued his increasingly frustrating correspondence with the secretary seeking necessary funds.

nal). Again on April 5, 1842, Moore wrote the secretary of the navy to no avail. "I feel it is my imperative duty to urge upon the Department the necessity of fitting out the steamer *Zavala* in order that we may keep the ascendancy by sea ..." Although funds were authorized by Congress for her further repair and return to service, Houston, now president, never made the appropriation.

Zavala subsequently sank further into disrepair, and in May 1842 she was run aground in Galveston to prevent her from sinking. The deteriorating hulk was eventually stripped and allowed to sink into the harbor's mud flats. She eventually became part of the harborscape. The story of *Zavala* began to fade from public memory.

That memory has been rekindled by archaeology. On November 14, 1986, the remains of the steamship of war *Zavala* were located and identified by the Underwater Archaeology Unit of the Texas Antiquities Committee, under the direction of J. Barto Arnold, and the National Underwater and Marine Agency (NUMA), a private organization under the direction of author Clive Cussler. By careful study of historical maps that showed both the placement of wharves and the pattern of infilling to enlarge the island, the team located *Zavala* 's remains beneath Pier 29 in Galveston (fig. 2). Coring and a test trench made by backhoe revealed various metal ship fittings and wooden hull remains, as well as a large riveted iron boiler measuring more than 15 feet in length. The archival background research and the vessel remains together indicated that the investigators had found *Zavala*. The survey confirmed that significant portions of the hull remain, despite damage to the hull incurred in her working life, and deterioration resulting from her intentional grounding and abandonment.

INA has proposed a limited eight week excavation of the hull remains to document the construction of *Zava-*

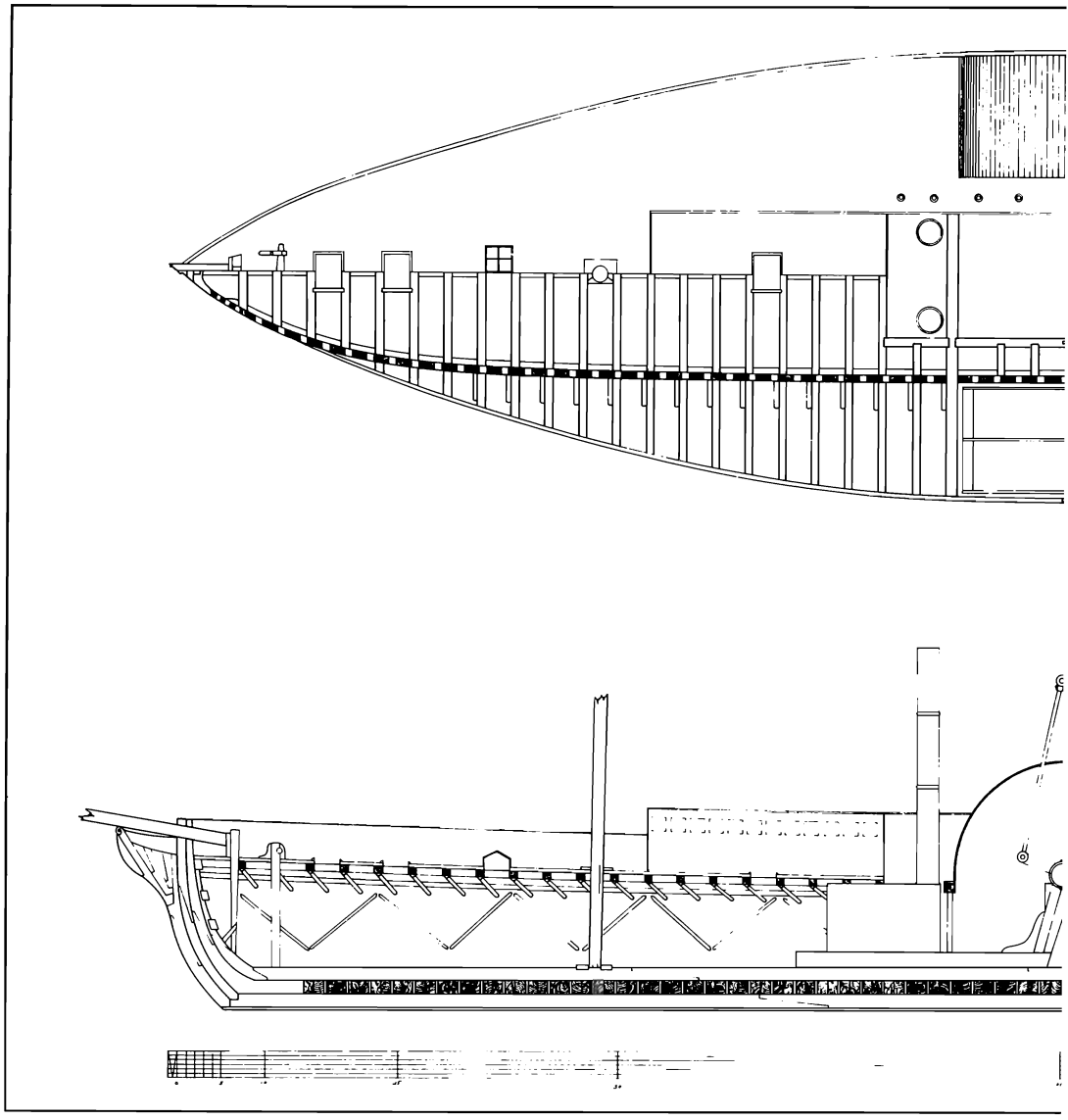


Fig. 4. *Conjectural reconstruction of the* Charleston, *before being refitted as a warship.*

la. Due to the paucity of data relating to the construction and service of *Zavala*, and similar coastal steamships of the period 1820 to 1840, this excavation will contribute significantly to our knowledge of 19th-century steamship construction and to our understanding of the role of the navy and naval policy in the Republic of Texas.

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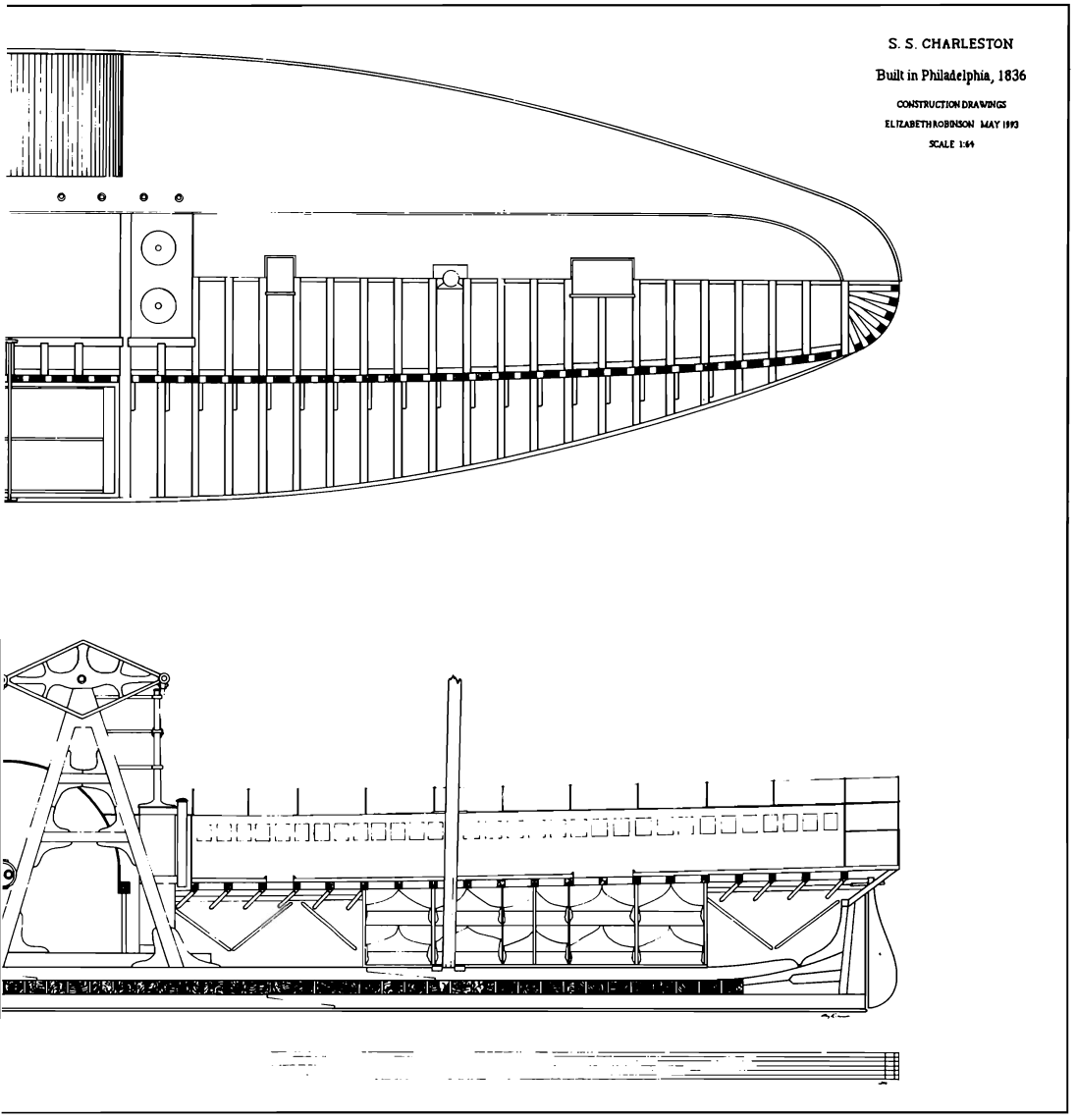

Drawing: E. R. Baldwin

Riding a New Wave:

Digital Technology and Underwater Archaeology.

By David A. Johnson & Michael P. Scafuri

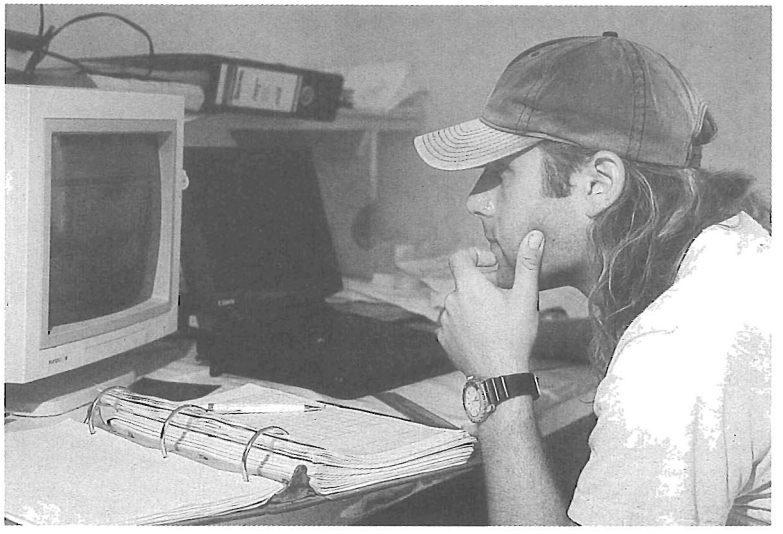

Photo: Don Frey

Fig. 1. *David Johnson using the technologies described in this article at the Bozburun site.*

There was an air of excitement in the sleepy little town of Selimiye during the summer months of 1995. INA was beginning its first new Turkish excavation in eleven years, the excavation of the Byzantine-period shipwreck at Kücüven Burnu near Bozburun. With this project, INA brought a new cast of characters to Turkey, many of whom had never been to INA's base in the Mediterranean before, and many of whom were working on their first underwater excavation. With these different faces came fresh insights and ideas of how to go about the business of performing archaeology in the field. The interaction of these individuals with the veteran staff of the Turkish arm of INA made for a project where innovation and experience mingled in a creative atmosphere of learning.

After over thirty years of pioneering research in the methods of archaeological excavation, INA and its founders have established it as a leader in the investigation of new technologies. It is continually building upon the innovations of the past to remain at the forefront of the science of archaeology. Most obviously, this has occurred in venturing into the hostile environment of the ocean floor to excavate through the use of SCUBA. Additionally, in experimenting with sonar, magnetometry, and acoustical technology for use in underwater survey and excavation, INA has pushed other technological envelopes since its inception.

With the digital age upon us, there has been much talk about the "information super highway" and the ever-growing importance of computer technology in our daily lives. The role of computers in archaeology has had an increasingly significant presence in recent years. From early on, INA has appreciated the usefulness and validity of the computer as a tool in managing the vast amounts of data produced during excavation and analysis of archaeological finds. The Port Royal Project made use of database and computer aided drafting programs when they were still in their relative infancy (see *INA Newsletter* 12.4:10), and now that the software and hardware is becoming increasingly more powerful and sophisticated, there are more innovative and exciting tasks being attempted with computers, such as the topography and mapping of the Bronze Age shipwreck site at Ulubu-run (see *INA Quarterly* 21.4:8-16).

From the earliest stages of planning the field campaign to excavate the medieval wreck at Bozburun, it was decided to rely more upon digital information management than any of INA's past excavations (fig. 1). This commitment set us on the path of conducting a project that uses computers as the primary tools in cataloguing and con-

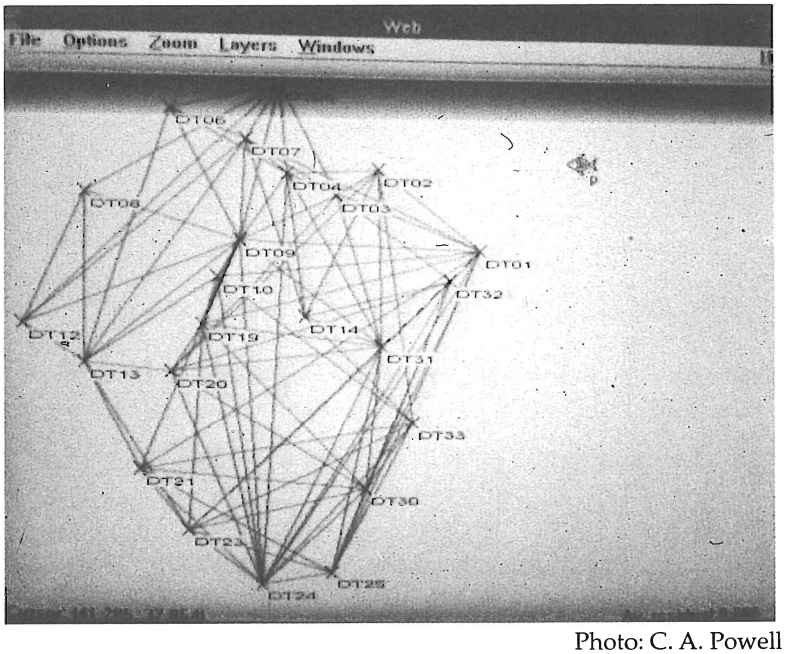

Photo: C. A. Powell

Fig. 2. *A picture of the final Web results for the primary datum points from the Bozburun site.*

trolling information both in the field and out. Computers will also be used as the medium for the wreck's final presentation. The intent of this commitment is to increase efficiency in the collection and analysis of archaeological data while still in the field. This should facilitate the faster communication of archaeological information to our peers. It will also serve to bring archaeology to more of the public through electronic media such as CD-ROM, the Internet, and the WorldWideWeb.

Web

The root of computer applications in the field at Bozburun lay in the use of a program, developed by Nick Rule for the *Mary Rose* Project in the 1980's, called Web©. This program allowed us to derive extremely accurate three-dimensional positional information for artifacts on the sea-floor using relatively simple tools. In essence, the program uses a best-fit algorithm to detect inconsistencies in measurement data that usually go undetected when using traditional methods of triangulation with a line and plumb-bob (fig 2).

Several methods of measurement data are accepted by Web, including offsets, bearings and slopes, but the simplest method, called Direct Survey Measurement (DSM) was selected for implementation during the 1995 field season. DSM makes the process of measuring underwater less complicated, using four direct lengths from known points, or datums, to find an unknown point in three-dimensional space (fig. 3, 4, and 5). Web manipulates the measurements to find the solution, the point where the measurements best agree. The program then reports the average error among the measurements.

Over the course of the 1995 season, provenience for nearly one hundred individual artifacts were computed using Web, with an accepted margin of error of under 2 cm. Using this positional information, we were able to begin the computer drafting of a three-dimensional

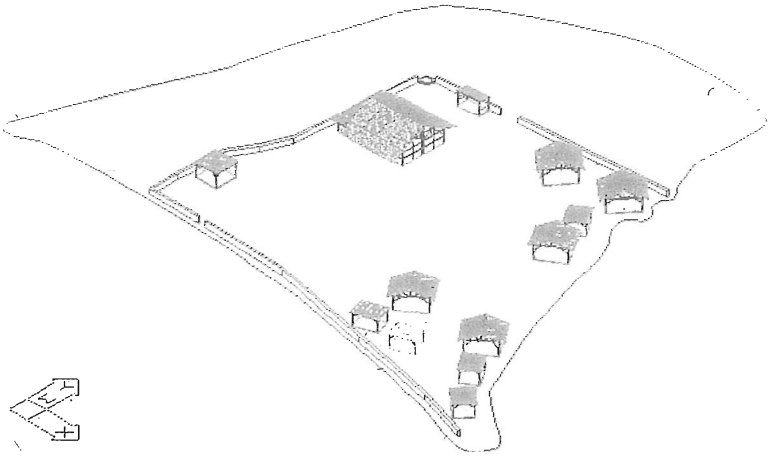

Photo: INA

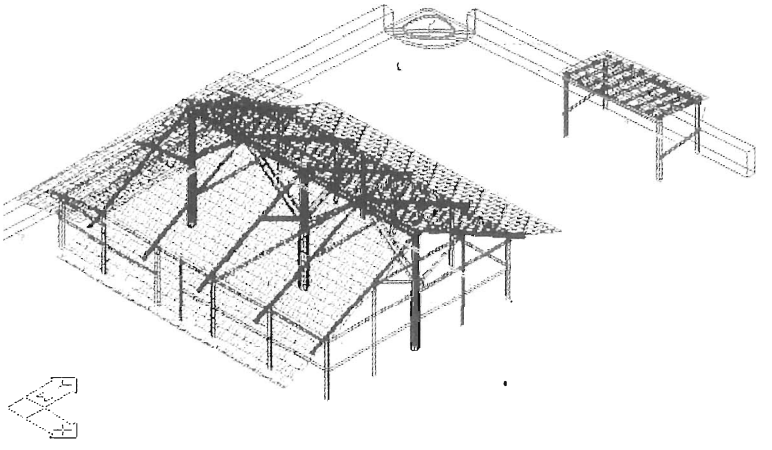

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Photo: D. Frey

Fig. 3 (Top). *AutoCAD drawing of the Bozborun camp. The structure locations were determined by taking tape measurements between the buildings and iterating them in the Web program.*

Fig. 4 (Middle). *A reconstruction of the Bozborun camp galley and tool shed in AutoCAD.*

Fig. 5 (Bottom). *Photograph of the Bozborun camp pictured above.*

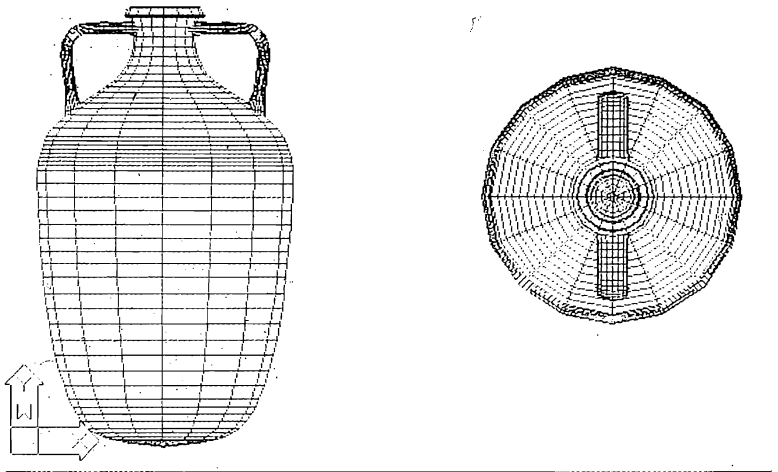

Photo: INA

Fig.6. *Three-dimensional preliminary model of a Bozborun amphora.*

model of the site in the field. This site plan represents one of the most exciting and innovative applications of computers in the Bozburun project.

CAD and Modeling

The primary environment that we selected for the construction of the three-dimensional plan was AutoCAD®. This drafting program was selected because of its high degree of accuracy and its compatibility with other database and design programs. It also enabled us to use an AutoCAD programming language called LISP, within which we could read the provenience data determined in Web as the basis for inserting three-dimensional models of artifacts into their appropriate locations. The modeling routines of the animation and rendering package 3D-Studio® were also used with great success to create realistic and accurate wireframe images of the artifacts.

Through the application of these programs, archaeologists will be able to see an actual three-dimensional representation of a submerged find while on the surface, rather than dealing with a conventionally drafted two-dimensional plan or photomosaic (fig. 6 and 7). While the usefulness of such a document for study and analysis has yet to be seen, the production of the plan has been an insightful exercise in data collection and field analysis. The plan is intended to provide a graphic interface into the databases that hold the more detailed information about the individual artifacts. This serves as a unique tool in studying the finds of the site in a convenient manner and helps to communicate detailed information about the spatial relationships of the artifacts more effectively than with conventional methods.

Database Management

The underlying concern in building the field database was to make the information management system as user-friendly as possible. The information had to conform to a format that would be conducive to the convenient entry of useful data and also to the effective extraction of necessary information. Concurrent with this goal was the need for expandability and easy file transfer.

FoxPro® for Windows™ was selected for use due to its programmability and processing speed, and also its convenient compatibility with a number of other pieces of software. FoxPro was programmed not only for more convenient data entry and extraction, but also to link to AutoCAD and Web in order to transfer information between programs. In designing a system to solve the problem of managing the data, it was thought that the software and hardware used should be powerful, yet not overly complicated or inaccessible to an archaeologist. FoxPro, as well as the other software packages used, offered a powerful PC-based solution that was relatively inexpensive and easy to implement with a moderate level of orientation.

A "multi-relational" database was constructed to handle the provenience, registration, and cataloguing of artifacts, using the system developed at Port Royal as its basis. As the artifacts are studied during the period between excavation seasons, specific databases that contain more detailed information will be constructed and related to the field catalogue database. By incorporating graphical information, such as photographs and dimensioned drawings, along with numerical and textual information in the databases, all of the information necessary to study the site from a number of perspectives will be at the user's fingertips.

Next Steps

System development before next season is geared towards refining the interaction between the database and the AutoCAD site plan. Current avenues being pursued for solutions include incorporating Web's algorithms within the database program and using a data transfer program such as structured query language (SQL) or direct data exchange (DDE) between the database and the plan. This would allow simultaneous interaction between the programs and the cross-transfer of data. Several geographic information system (GIS) packages are also being tested and considered for use in future seasons.

One of the major goals of the 1995 excavation season was to perform a detailed review of the wreck site to assess the size of the task at hand and formulate an appropriate plan for the most efficient and effective completion of the project. In conducting this review, some of our initially conceived systems and procedures, the digital information management system included, were tested and

their merits and faults were assessed. It has been determined that to complete the first phase of goals in integrating computers into the field, certain improvements in systems and hardware must be made. These improvements and upgrades will facilitate the excavation goals and help to increase the efficiency of our data handling.

The most immediate problem to solve is the excavation and cataloging of the large pile of amphoras that covers the hull remains. Certain tasks, such as excavation and conservation, act as limiting factors in plotting an efficiency curve for this problem, since both must proceed at a controlled pace which is determined by individual circumstance. Computers can be used to accelerate these and other time consuming processes in part by establishing provenience for artifacts and by reducing the time involved in recording and cataloging. While using digital technology to streamline these processes may involve an initial capital investment for the necessary equipment, more useful information will be produced in less time, giving a return on this investment that will be more than justified in the post-season.

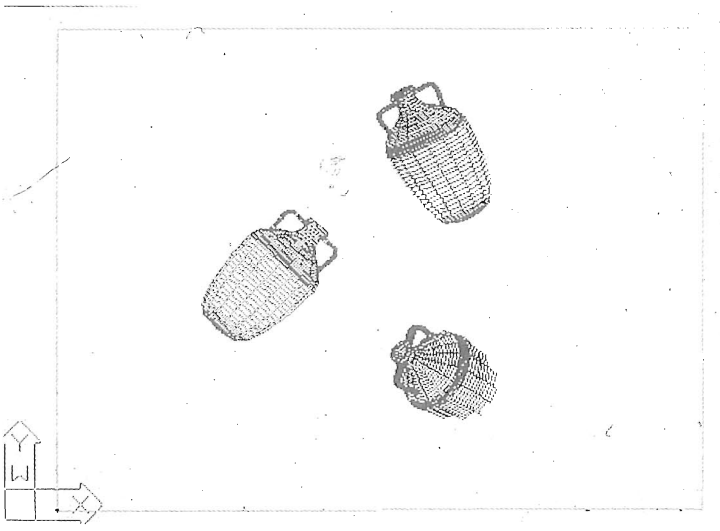

Photo: INA

Fig. 7. *Several Bozborun amphoras arranged in a hypothetical scatter pattern.*

INA staff are working in various ways to solve this task. To increase the efficiency of establishing provenience, the feasibility of implementing the SHARPS™ acoustical system, developed by INA board member Marty Wilcox, is being assessed. The speed of taking "points" with SHARPS, combined with the Web program, produces a fast and efficient system for measuring artifacts. Additionally, labeling artifacts in the field with bar codes would aid the registering, storing, and tracking of artifacts as they are processed and offer another type of access into the databases. Also being considered is a personal computer that is fully functional under water and is currently being developed by the Australian Institute of Marine Science.

In cataloguing artifacts, a search is being conducted for affordable and accurate scanning and digital imaging equipment which would provide three-dimensional surface meshes or drawings of artifacts with relatively little time and effort spent. While a field catalogue entry of an amphora last season would take 45 to 90 minutes to complete, performing the same task with a digital scanner would produce an accurate recording in a fraction of the time. In this way, every amphora taken off of the wreck could be recorded in detail by scanning and photography, and many could be redeposited on the seafloor at the conclusion of the field season. With a representative sample retained for more extensive analysis and these recordings, the data set of the amphoras from the Bozburun wreck would be quite complete.

Future Presentation

The use of computers to collect and store archaeological data more efficiently represents the first phase in this system. The second phase involves using computers to communicate the findings of archaeological research to a broad audience. Electronic publishing offers a medium for communication that has unlimited versatility. As an example, it should be possible to allow a scholar of Byzantine trade to examine fabric samples of the amphoras for intensive study while, at the same time, showing a curious fourth-grader what a ship from the Middle Ages would have looked like.

The final publication of the findings of the Bozburun shipwreck project is intended to be partly in electronic media. In partnership with the Visualization Laboratory in the College of Architecture at Texas A&M University, INA plans to make the information collected during this excavation available as a multi-media digital library or "data mine." Not only will hard data be available for interested scholars and students, but also the analysis and interpretation of finds, including presentations such as realistically rendered and animated reconstructions of the vessel and an interactive three-dimensional tour of the wreck site as it appeared on the sea floor (fig. 8 and 9). INA and the Nautical Archaeology Program at Texas A&M University are currently preparing home pages for the WorldWideWeb that will be continually updated with information concerning current and past projects as a first step towards this type of electronic publication.

Computers, as with any other piece of equipment, are tools to the nautical archaeologist that can be used in

the excavation, analysis, and interpretation of archaeological data. They are tools that are becoming increasingly more vital to the efficient and successful conduct of archaeological projects. In this regard, any stigma concerning their involvement and usefulness with archaeology surely must be abandoned. As INA begins to seek funding to equip itself for the digital age, these are considerations that must be kept in mind.

Acknowledgments. Special acknowledgment is due to Nick Rule and his wife, Carol, who joined the Bozburun excavation for two weeks during the 1995 field season. His views, assistance, and ideas continue be an integral part of applying computers to this project and nautical archaeology as a whole. We would also like to thank INA president and Bozburun excavation director Dr. Fred Hocker, who provided continual support and encouragement for our goals and sometimes grandiose ideas. Without his assistance and willingness to try a few new things, our system could never have gotten off the ground. Additional acknowledgments should be given to Professor Richard P. Skowronek of the Engineering Design Graphics Department at Texas A&M University, whose excellent instruction and advice over the past year with AutoCAD and 3D-Studio proved invaluable this summer. Lastly, we would like to thank John Flynn of Computer Access in College Station, who provided us with timely help, advice, and, more importantly, almost all of the hardware used in the 1995 field season.

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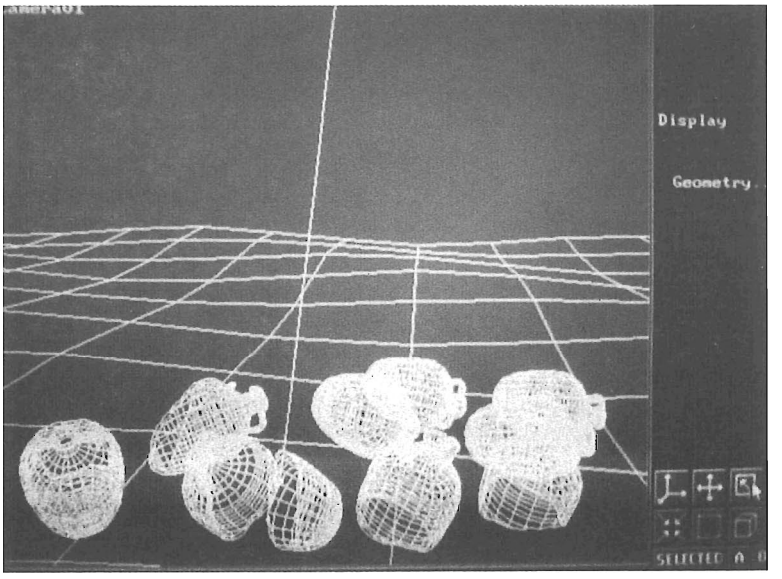


Photo: C.A. Powell

Fig. 8. *Complete and broken amphora models embedded in a hypothetical mesh surface in 3-D Studio.*

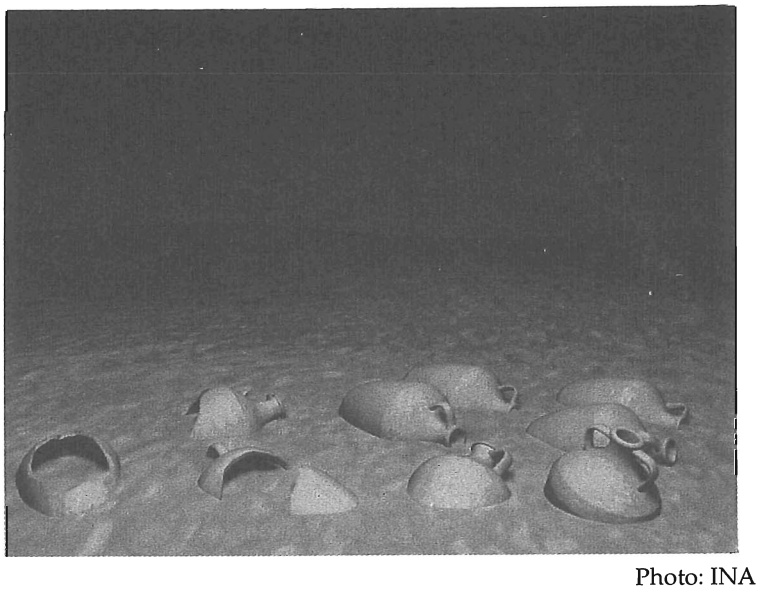


Photo: INA

Fig. 9. *A fully rendered image of the amphoras in figure 8 with textures and materials applied to their surfaces.*

To Dive for the Meaning of Words

by George F. Bass

George T. & Gladys H. Abell Professor of Nautical Archaeology/Yamini Family Professor of Liberal Arts

When I learned to dive in 1960, while a doctoral candidate at the University of Pennsylvania, it was to enable me to raise artifacts—tangible evidence of the past—from a Late Bronze Age shipwreck located off Cape Gelidonya, Turkey. I had no idea that the new field of underwater archaeology might also aid philologists by clarifying the meaning of words in ancient texts.

The excavation at Cape Gelidonya revealed mostly the cargo of a modest merchant vessel that had sunk around 1200 BC, approximately the time about which Homer wrote. Thirty-four ingots of Cypriot copper, the residue of tin ingots, and baskets filled with scrap bronze weighed about a ton in all. Between this metal cargo and the fragmentary remains of the ship's hull was a layer of twigs with their bark still preserved.

Someone on the excavation staff had brought an English translation of the *Odyssey*, so, looking for an explanation of the twigs, I eagerly turned to the passage in which Homer describes Odysseus building a wooden vessel in order to leave Calypso's island. After completing his hull, the translation said. Odysseus constructed a wicker fence to keep out the waves, and then backed up this fence with brushwood. There was my answer: the twigs were backing for a wicker fence, similar to the canvas spray-shield on the Turkish sponge boat from which we dived.

On my return to the University of Pennsylvania at the end of the excavation, I was asked to deliver a report on the excavation to members of the University Museum. Just before going to the auditorium, I thought I should refresh my memory by checking that passage in the *Odyssey*, and took another English translation from my shelf. It did not say the same thing. So I opened a German translation, and was surprised by a different reading. One said that Odysseus, after constructing the wicker fence, had made a bed of brushwood for himself, and the other said, instead, that Odysseus had thrown in a lot of wooden ballast!

Although I was studying ancient Greek, I had far more faith in professional classicists than in myself as a translator, but at last I turned to Homer's own words in *Od.* 5.257:

πολλὴν δ᾽ἐπεξεύατο ὕλην

Nothing about a backing for the fence, or wooden ballast, or a bed of brushwood. What Homer said was that Odysseus spread out a lot of brushwood. That's all. The Cape Gelidonya excavation showed that the ὕλη, the brushwood, was simply dunnage, the cushion which mariners use to keep cargo from damaging a ship's hull, and possibly to keep it out of bilge water. Homer should have been translated verbatim.

On a ship that probably sank in the late 14th century BC off Uluburun, the next great cape to the west of Gelidonya, my student and colleague Cemal Pulak has now found an even better preserved layer of dunnage, this time consisting of thorny burnet, a prickly bush that grows wild throughout the eastern Mediterranean area. In this case, he may also have found remains of the ship's wickerwork fence, a type of spray shield that appears in 15th- and 14th-century Egyptian tomb-paintings of Syrian ships as well as in the *Odyssey*.

The Uluburun wreck has also helped clarify words in a number of Near Eastern languages. In a paper delivered in 1972, the late Leo Oppenheim suggested that two words found on cuneiform tablets of the 14th century BC—*mêku* and *eblipakku*—meant raw glass. If he was right, there was written evidence that the major Syrian port of Ugarit exported glass, that Ashkelon, Acco, and Lachish sent glass ingots to Egypt, and that the pharaoh, in turn, sent glass ingots to Babylon. There was, however, no archaeological evidence to support Oppenheim's theory until excavators from the Institute of Nautical Archaeology discovered at Uluburun approximately 200 disk-shaped ingots of glass, the first glass ingots known from the Bronze Age.

Most of the Uluburun ingots are cobalt blue, but some are turquoise, and one is lavender. And this distinction throws light on Egyptian hieroglyphic inscriptions. In a relief of Tuthmosis III, Syrians are shown bringing baskets of blue and green cakes as tribute to the pharaoh. The blue cakes are identified in Egyptian as "lapis lazuli" and "genuine lapis lazuli," and the green cakes as "turquoise" and "genuine turquoise." The Uluburun ingots now allow Egyptologists to identify the blue and green cakes as blue and green glass ingots, unless they are specified as being "genuine" in the inscriptions. This distinction was already known from Akkadian, which describes lapis lazuli as being either genuine (literally "from the mountain") or artificial (literally "from the kiln").

The Uluburun excavation may have allowed the correct translation of another Egyptian word, one on which Victor Loret published an entire book. Loret believed that *sonter* (written *sntr*) was terebinth resin. If he was correct, he could translate Egyptian texts to show the importation of tons of this substance from the Syro-Palestinian coast into Egypt, where it was burned as incense in religious rites. Because only two possible samples of terebinth resin had ever been found archaeologically, and neither of them identified with certainty, Loret's thesis did not gain general acceptance.

The Uluburun ship carried more than a hundred Canaanite jars filled with a resin chemically identified as coming from the *Pistacia terebinthus* tree and weighing

about a ton. The reason that such resin had not been found on land in such quantities is that shipments of resin that did reach their destinations presumably were quickly burned. When I looked at a storeroom scene from the tomb of Rekh-mi-rê' in Egyptian Thebes and recognized the word *sntr* written in hieroglyphs on a Canaanite jar similar to those from Uluburun, my two years of struggling through Egyptian as an M.A. student at the Johns Hopkins University suddenly seemed worthwhile—especially as the jar was stored with copper ingots, of which the Uluburun ship carried ten tons.

The jars of resin at Uluburun also allow a new interpretation of Linear B *ki-ta-no* as terebinth resin. *Ki-ta-no* had earlier been translated by one scholar as being nuts from the pistachio tree, but the vast quantities in which they were used in Bronze Age Greece did not make sense. Perhaps we have a new insight into Mycenaean religion.

Perhaps my greatest thrill on an underwater excavation did not have to do with a new translation, but it did have to do with the history of literacy. It came with the 1986 discovery at Uluburun of a wooden diptych with ivory hinge. In all of Homer there is only one mention of writing. In the *Iliad* (VI.169) such a wooden diptych is mentioned, but it has been considered anachronistic by scholars, for the earliest such writing tablet known previously came from an 8th-century B.C. find at Nimrud. Unfortunately, the wax writing faces of the Uluburun tablet had disappeared, so we not only do not know the message it carried, but what language it was written in!

Applicants to our Nautical Archaeology Program at Texas A & M University often detail their diving experiences. How much better if they tell us what ancient languages they have studied. A healthy linguist, after all, can usually learn to dive in a week or two.

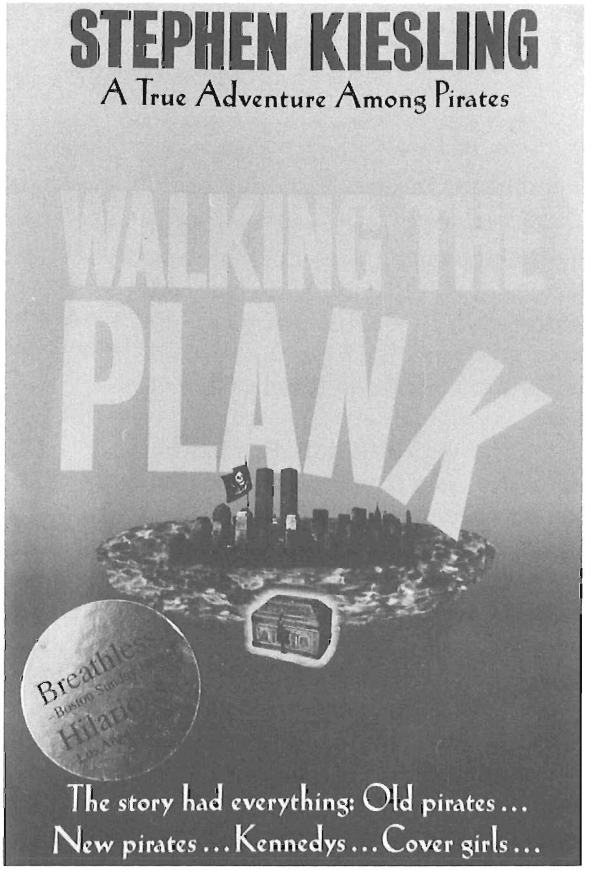
Dr. Bass's article is reprinted with permission from *Texas Classics in Action* (Winter 1994), the publication of the Texas Classical Association. TCA can be contacted at 2535 Turkey Oak, San Antonio TX 78232.

Old World Excavation Directors Visit New Bozburun Site

Photo: C. A. Powell

INA Old World Excavation Directors assembled for a historic meeting this summer at the new excavation site at Bozburun, Turkey. Pictured from left to right are: Frederick M. Hocker (director at Bozborun), Cemal M. Pulak (Uluburun), George F. Bass (Cape Gelidonya to present), Michael L. Katzev (Kyrenia), Cheryl W. Haldane (Sadana Island), and Robin C. M. Peircy (Mombasa). Only Donald Frey (Secca di Capistello) and Shelley Wachsmann (Tantura Lagoon) were not present.

Review



Nautical Shenanigans
by Ricardo J. Elia

Walking the Plank: A True Adventure Among Pirates
by Stephen Kiesling.
259 pages, Ashland, Oregon: Nordic Knight Press, 1994.

To be a successful underwater treasure hunter you must follow a basic business strategy. First, you need a shipwreck that may have contained treasure. You don't necessarily have to find the wreck, at least at first; just claiming to find it will work for a while. Next, you should invite a celebrity to join your search, preferably one with political connections. That will help you get publicity, which is not difficult since the media are attracted to treasure hunters like sharks to blood. The publicity will bring in investors, which is the critical part of the whole enterprise—getting other people to spend their money on your adventure.

No treasure hunter has applied this formula more successfully in the past decade than Barry Clifford, the discoverer of the pirate ship *Whydah*, which sank off Cape Cod in 1717. Clifford scored early with the media by inviting John F. Kennedy, Jr., to dive with him in 1983; that year *People* magazine ran a feature article on Kennedy and Clifford's "zany crew' of "golddiggers." The next year, Clifford found the wreck, which he claimed was worth $400 million. In 1985 *Parade* magazine ran a cover story that described Clifford as "the man who discovered a $400 million pirate treasure," a misleading description since, even after ten years of digging, the value of the recovered artifacts is estimated at less than $10 million.

In 1987 a limited partnership took control of the project and raised some $6 million through the sale of shares to investors eager to "own a piece of history." The salvage operation has been conducted under a federal permit, which imposed some degree of archaeological involvement on the project, including a conservation program for treating the artifacts.

To entice investors to put up the millions of dollars necessary to finance the project, the partners appealed to Walter Cronkite, who featured the *Whydah* salvage in a 1987 television segment produced by CBS News. They also wanted to publish a book about the *Whydah* project, to be titled *The Pirate Prince*. The book was to tell the story of Black Sam Bellamy, the *Whydah's* captain, with a swashbuckling Clifford cast as a modern version of the eighteenth-century pirate.

In 1989 freelance journalist Stephen Kiesling was hired to write the *Whydah* book. He went to Cape Cod and spent time with Clifford and members of his team, including divers, collaborating archaeologists, a historian, and business associates. As he conducted interviews and researched the projects, Kiesling became disenchanted with Clifford and the *Whydah* salvage and suspected that the project was not at all what was being portrayed to the public.

In the end, Kiesling could not bring himself to write the hagiography that was expected of him. He was sued for breach of contract, countersued, and eventually settled the case. Kiesling ended up writing not *The Pirate Prince*, but *Walking the Plank*, a scathing exposé of the *Whydah* project. (A novelist was later hired to write *The Pirate Prince* with Barry Clifford; their book was published in 1993.)

Walking the Plank may be ordered from the publisher, Nordic Knight Press, 160 Scenic Drive, Ashland, OR 97520 [telephone (503) 482–2012] for $12.95, plus $3.00 shipping and handling.

In the Field

The 1995 INA/CMS Joint Expedition to Tantura Lagoon, Israel

This fall, INA will join with Haifa University's Center of Maritime Studies (CMS) to conduct the second season of study of a ship that sank with its cargo during the Byzantine period in Tantura Lagoon on Israel's Carmel coast.

The expedition is directed by Meadows Assistant Professor of Biblical Archaeology Shelley Wachsmann, who discovered the shipwreck in 1983. INA excavation veterans Michael Halpern (Assistant Director) and Patricia Sibella (Ceramicist) will assist. Students from Texas A&M University who will be participating in the excavation include Steven Butler, Jaynie Cox, and Jeff Royal. They will be joined by Stephen Breitstein, Yaakov Kahanov, and Ezra Marcus from the CMS, as well as students from Haifa University's Department of Maritime Civilizations and volunteers.

This year, the expedition will focus on completing the *in situ* study of the section of hull discovered in 1994, as well as locating and recording additional sections of the hull and its cargo, while also being aware of other possible finds. Professor Emeritus Richard Steffy will be visiting the excavation to assist in trying to understand this enigmatic shipwreck.

Wilcox Gift Aids Turkish Coastal Survey

At the outset of October, Texas A&M student Brett Phaneuf will be joining Don Frey in Turkey to begin a sonar survey. They will be using INA's latest piece of equipment, a gift of Marty Wilcox, INA Director and inventor of the device. The Marine Sonic Technology, Ltd. side-scanning sonar is "state of the art," with the highest resolution for a commercially available unit.

It is hoped that the sonar unit will assist surveyors to locate more shipwrecks in less time. It will allow determination of what is exposed on the bottom before sending divers to investigate. This new sonar device will accurately display amphoras or other cargo, in addition to any hull structure available. It will also allow the determination of the extent of the wreckage. The computer which controls the sonar can give length, width, height above sea floor, and area of any object on the bottom.

Marty Wilcox joined the Texas Historical Commission team for a weekend in July to conduct a side-scan sonar survey of the *La Belle* shipwreck site. The sonar images assisted the archaeological recording process by providing divers with a picture of the sea floor in Matagorda Bay, where visibility rarely exceeds one foot.

Canary Island Survey

The Canary Islands Shipwreck Survey is currently on hold due to political circumstances in the region. Progress has been made, however. Ties between INA and La Universidad are growing. They are exchanging information and looking forward to launching a joint-research project next season. In the meantime, Brett Phaneuf, Peter Hitchcock and archaeologists from the Canary Islands will discuss the next season. They will also be conducting research concerning Phoenician and Roman expansion into the Western Mediterranean and the Atlantic coast of Morocco.

In mid-November, Phaneuf and Hitchcock will travel to Morocco to conduct correlating research. Once there they will be joined by Prof. Elizabeth Lyding Will of Amherst College. Mr. Thor Kuniholm (Director) has generously put the library and research facilities of the Tangier American Legation Museum at their disposal. Phaneuf and Hitchcock will be visiting ancient Phoenician and Roman sites along the coast, e.g. Lixus, the oldest Atlantic settlement (8th BC) and Kuoass, a major garum production site. Amphoras produced there are found throughout the Mediterranean.

Photo: S. Breitstein

Fig. 1. *Archaeologists clean and study a large portion of the shipwreck which was discovered during the 1994 season of exploration at Tantura Lagoon.*

Phaneuf and Hitchcock will be returning to College Station in December to begin planning the upcoming season in the Canary Islands and further research in Morocco.

INA Research in Albania Continues

In August, INA Research Associate Peter van Alfen made a brief visit to Albania to meet with Dr. Namik Bodinaku, the director of the Albanian Institute of Archaeology. The two planned a survey of the Albanian coastline to begin in June 1996. While van Alfen was in Albania, he and Albanian archaeologist Rezart Spahia continued their reconnaissance, begun in January, of the southern coastline between Butrint and Vlore. The 1996 survey will focus on this region.

With funding from a Fulbright grant, INA Research Associate Elizabeth Greene will spend the upcoming year in Albania. Greene will continue research on known shipwrecks and make preparations in Albania for the survey.

17th Century Shipwreck, *La Belle*, Discovered in Matagorda Bay, Texas

by Barto Arnold and Brett Phaneuf

Throughout June and July of this past year the Texas Historical Commission, led by Barto Arnold (Texas State Marine Archaeologist), conducted an archaeological survey of Matagorda Bay. This survey was a continuation of a 1978 magnetometer survey conducted by Arnold, searching for a range of wrecks. The most important of these was the 17th century shipwreck, *La Belle*. This piece of history had eluded treasure hunters for centuries, and Arnold himself for almost two decades. At the end of June the survey team, comprising students from Texas A&M University, University of Texas at Austin, and Florida State University, had located a variety of sites to be explored in the coming month. On the first exploratory dive in July, the shipwreck *La Belle* was discovered.

La Belle was a small French *fragatta* given to the explorer Réné La Salle (1643–1687) by Louis XIV and was part of a convoy of ships sent to colonize and explore the Mississippi River. La Salle missed the mouth of the Mississippi and instead arrived in Matagorda Bay, Texas. He established a settlement, Fort Saint Louis, near modern-day Port Lavaca. This enabled the French to claim Texas. Unfortunately, La Salle's colony suffered severe hardships, augmented by the loss of the colony's supplies and ships. The settlement succumbed to disease and Indian attacks before the Spanish could locate and destroy the colony themselves.

In 1685, *La Belle* was driven across Matagorda Bay in a violent storm and run aground on the Matagorda Peninsula. A year later, Spanish explorers salvaged her guns and part of the cargo. The account of this provides the only clues about the size and type of the ship. *La Belle* is the oldest known French shipwreck in the New World. It will provide information about trade and exploration in the Gulf of Mexico, as well as naval architecture and ship construction in the late 17th century.

Artifacts recovered from the shipwreck include a bronze cannon, brass pins, an abundance of pottery, pewter plates, rope, hawk's bells, beads, and an exceptionally well preserved portion of the hull. The Museum of Science and History and Don Keith of Ships of Discovery in Corpus Christi, Texas, along with the Conservation Research Laboratory at Texas A&M University, are conserving the artifacts recovered during this past summer. Work will resume at the wreck site in May of 1996 under the aegis of the Texas Historical Commission, and will be directed by Barto Arnold. More information about the site and its historical background can be found on the World-WideWeb at *http://129.109.57.188/index.htm.*

Suggested Readings

Boudriot, Jean
1993 *History of the French Frigate 1650–1850.* Rottersfield.

Weddle, Robert S.
1987 *La Salle, the Mississippi, and the Gulf: Three Primary Documents.* College Station: Texas A&M University Press.

Texas Historical Commission
1995 *La Salle Shipwreck.* Special Issue of *The Medallion.*

News &Notes

INA dedicates new headquarters in Bodrum

On July 7, INA Directors and staff formally dedicated the new headquarters facility in Bodrum. Over one hundred guests, including representatives from the Turkish Ministry of Culture, the Mŭgla Provincial Governor's Office, the Municipal Authority of Bodrum, the Bodrum Museum of Underwater Archaeology, and the American Embassy, along with over a third of the INA Board of Directors, were on hand. The gala celebration featured traditional Turkish music and folk dancing. Although the complex has been in use in an unfinished state for over a year, recent donations from INA Directors and friends, along with a concerted push this spring and summer, directed by Robin Piercy, Tufan Turanlı, Cemal Pulak and George Bass, has allowed the completion, including furnishing, of the main administrative building and both dormitory wings.

Directors and friends making the trip to Turkey enjoyed a week of festivities, beginning in Istanbul, where Director Ayhan Sicimoğlu hosted a reception with members of the Turkish business community. The group continued on to Bodrum for the gala , as well as a moonlight dinner s. This was served at the castle by staff in in Ottoman costume (thanks to Museum Director Oguz Alpözen) and ending in Selimiye, where guests dived on the Bozburun shipwreck and enjoyed some hearty camp cooking.

Photo: INA

INA Director Danielle J. Feeney cuts the ribbon at the opening of the new INA facilities in Bodrum, Turkey, as Archaeological Director George Bass looks on.

INA Scholarships Granted

The Institute of Nautical Archaeology is pleased to support the education of several Texas A&M Nautical Archaeology students annually. Ben an Liu, Tommi Mäkelä and Christine A. Powell were awarded INA Scholarships this year. Glenn Grieco and Brian A. Jordan were named as Mr. and Mrs. J. Brown Cook Graduate Fellows.

Charlton Gives Presentations

Bill Charlton, a graduate student in the Nautical Archaeology Program and INA's Divemaster, spoke to the Northwest Friends of INA in Portland, Oregon, on the 26 and 27 September 1995. Hosted by Mary and Dick Rosenberg and Dr. David Perlman, Charlton gave a talk and slide presentation about this past summer's activities at the first field season on the Institute of Nautical Archaeology's excavation of a ninth-century Byzantine merchant vessel found in the northern Aegean Sea near Bozburun, Turkey.

Charlton then traveled to the Wrigley Marine Science Center on Catalina Island, California, where he attended a Nitrox diving course conducted by the American Academy of Underwater Sçiences (AAUS). He will soon be certified as a Nitrox diving instructor by the International Association of Nitrox and Technical Divers (IANTD). Lastly, he attended the annual AAUS symposium at Scripps Institute of Oceanography in San Diego, California where he was co-author of a paper presented on the implementation of a new set of dive tables at Bozburun, Turkey, this past summer.

Norwregian Maritime Archaeologists Visit Texas A&M University

Marek Jasinski, Fredrik Søreide and Bjørn Sortland of the University of Trondheim, Norway visited the faculty, students, and staff of the Nautical Archaeological Program at Texas A&M University on the 5th of October 1995. An informal presentation about underwater technologies as applied to research in maritime archaeology in Norway was given. Professor Marek Jasinski is known for his work on Svalbard as well as with the concept of the maritime cultural landscape. Fredrik Søreide is currently writing his dissertation on underwater technology for maritime archaeology and Bjørn Sortland is a specialist in underwater operations.

Jordan Fellow Gives Lecture

David Johnson, who was awarded a Leyland T. Jordan Fellowship, gave a well-attended presentation entitled "Ships and Slaves of Colonial Jamaica" on September 20, 1995, at Texas A&M University. The lecture was intended to encourage awareness on the University campus of the work of the Nautical Archaeology Program and INA. The Jordan Fellowships are awarded by the Jordan Institute for International Awareness at A&M.

Article Published

Texas A&M Nautical Archaeology Program student Matthew G. Pridemore has published an article in Issue 24.2 of the *International Journal of Nautical Archaeology*, "A re-examination of a ship on an ivory plaque from Sparta." Mr. Pridemore discovered the presence of a secondary ram on the ship portrayed on the Greek plaque while conducting his thesis research on naval rams in antiquity.

Elizabeth Greene Receives Fulbright

Nautical Archaeology Program student Elizabeth Greene is the recipient of a 1995 Fulbright Fellowship, which will help to fund her research in Albania.

Visiting Scholars

The Nautical Archaeology Program at Texas A&M University is playing host to two international Visiting Scholars for the 1995–96 academic year.

Jan Bill arrived in September. He has been involved with the work of the Center for Maritime Archaeology of the Danish National Museum in Roskilde.

In October, INA welcomed Albanian archaeologist Rezart Spahia, who hopes to become his country's first nautical specialist.

"Hurricane Havoc" Exhibit

There is an exhibit of material from the *Nuevo Constante* wreck from October 8 to December 1, 1995, at the Museum of the Gulf Coast, in Port Arthur, Texas. The *Nuevo Constante* was a Spanish plate vessel sunk in 1766 just off Cameron, Louisiana, carrying New World goods to the Old World. For more information, call the Museum at 1-409-982-7000.

DAN Medical Guide now Available

DAN's Dive and Travel Medical Guide is ready for fall release. With an updated emphasis on dive travel and safety, and extensive coverage of dive safety and health issues, the new DAN Dive and Travel Medical Guide is an essential tool for prevention, identification and treatment of scuba diving injuries. The guide will be available for purchase in November 1995. For information, contact DAN Membership Services at (800) 446-2671.

Three Flags Over Turkey

Photo: S.W. Katzev

The flags of Turkey, INA, and Texas A&M University fly proudly over the new excavation site at Bozburun. 1995 marked the first season of excavation at this ninth-century Byzantine wreck near the town of Selimiye. This was the first new Turkish project for INA in eleven years. A varied contingent of INA staff, A&M students, Turkish archaeologists and students, and others conducted the season from May to August.

INSTITUTE OF NAUTICAL ARCHAEOLOGY