

# INA NEWSLETTER

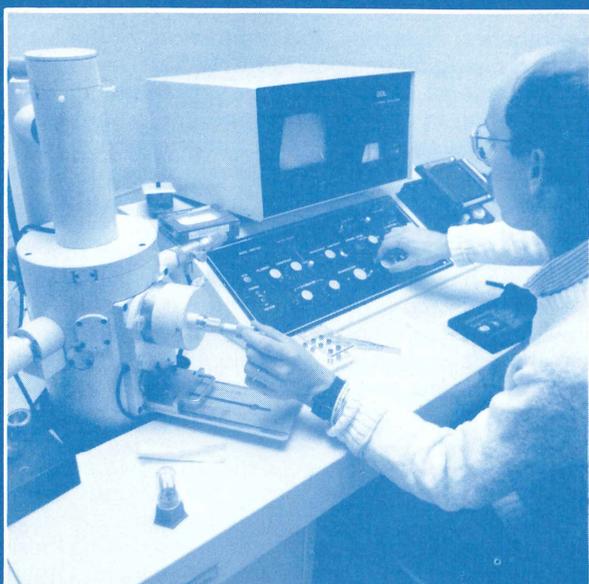
VOL 12 NO 3



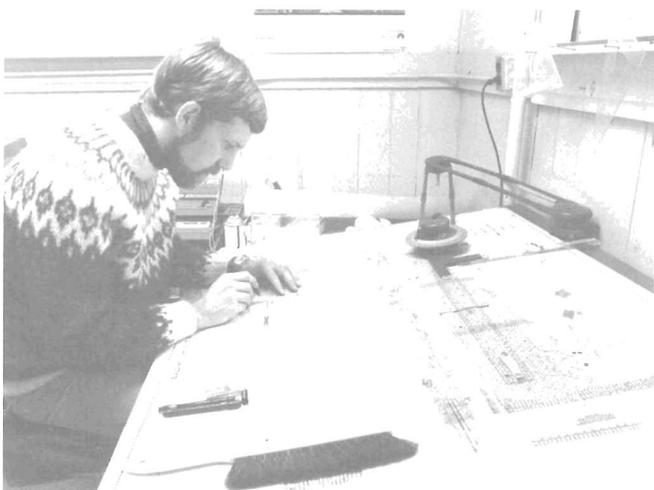
December 1985

## *Scholars In The Making*

A Look At The Trials And Successes  
Of Nautical Archaeology Students  
At Texas A&M University



# Of Grad Students And Hoops: Ever The Twain Shall Meet



Graduate students call it “the ultimate hoop”—the most important one they jump through to earn a master’s degree. Within their university experiences, it is their *raison d’être*, *pièce de résistance*, and *fin de la guerre* rolled into one. Among all semester-end projects, it alone gives new meaning to the thrill of victory and the agony of defeat.

What academic task commands such awe? The master’s thesis, of course: humble product of two to seven years of one’s lifetime, and the culmination of countless hours of intellectual assimilation, synthetics, dialectics, and production. At the least, its processes teach one to fill out loan forms; at best, they yield a professional and personal statement about the author that deserves scholarly citation in other publications.

In the baldest of terms, the thesis is but one among many reports a graduate student prepares to landmark stages of educational and research growth. Indeed, many university programs offer students a non-thesis option for graduation—albeit, coming up with other inquisitional assignments—which suggests that the document is not the only litmus test of scholarly capability and intent. However, among those programs where it is a ritual in a rite of passage, preparation of the document is a serious, formal event that demands dedication and creativity from curious individuals; that fosters unique relationships between students and faculty mentors; and that rewards a well-earned satisfaction to all parties involved.

The agony or ecstasy of the project depends in part on a student’s *modus operandi*. Some students enter the university knowing precisely what their research topic will be; they whiz through production in a business-like manner, shrewdly test-driving thesis chapters along the way by writing them for term papers. Others may spend ages snooping or stumbling through possible projects until a topic is discovered or suggested for them. Still others finish their coursework and depart the university in vehicles stuffed with research notes, 3x5 cards and first drafts, which they transport from place to place until allowable time finally forces them to set the paper albatross free. Parents and spouses, meanwhile, live in fear that their scholar will be ABT—All But Thesis—until age 35.

However the process unfolds, there is no way to underestimate the amount of work involved in pulling the final package together idealistically, substantially and graphically. It requires hours of research, and even more time simply spent thinking. Inevitably there is work to do in foreign languages and often in foreign countries. The cost in photographs, photocopying, and coffee can be astronomical, and theses *could not* be completed without the assistance of colleagues, family and friends; they are a true neighborhood effort.

The power pack for all this productivity is indefatigable curiosity. One does not have to be brilliant to write a meaningful thesis, but one does have to be analytical, philosophical, motivated, capable of being turned on and capable of putting out. And one does have to remember from time to time the basic

STUDENT PHOTOS. Page 1 (l to r): Bill Lamb, Fred Hocker, Aleydis van de Moortel, Jay Rosloff. Page 2: Nicolle Hirschfeld and Beth Garver, Harding Polk. Page 3: Jim Jobling, Ralph Pedersen and Miguel Paredes, Steve Vinson. (Photos: KC Smith)

purpose of the project, beyond potential job security, power and fame. A thesis is a contribution to human knowledge. Its value in that regard is inestimable.

During nine years in which the nautical archaeology specialization has been offered by the Department of Anthropology at Texas A&M, twenty-four students have fulfilled the final academic obligation for a master's degree by researching, writing and defending a thesis. About fifty other students are at various stages in the process, leaping fleetly through coursework, term papers and other projects on their way to the ultimate hoop. From start to finish, the academic process is demanding and competitive, yet it has attracted individuals from nearly ten different nations, with differing levels of experience and wisdom, emitting various intensities of glimmer from the stars in their eyes. The unifying attribute among them has been an interest in the history of seafaring.

Students mull over this subject in an academic format that is set by the University. To receive a master's degree in anthropology with nautical archaeology specialization, a student must complete thirty semester hours of credit—about ten courses, although most people exceed the requirement. Curricula are tailored according to individual interests from among courses in nautical archaeology, anthropology, and at least one other area. Several classes are required of all students, and up to twelve hours may be structured as individual study projects and thesis research. Students must be able to work in at least two languages; they learn to work with drafting, woodworking, and conservation tools; most learn to use a computer, although that is not a requirement; and they all learn to love their library cards.

The Institute of Nautical Archaeology traditionally has contributed to the academic process by providing opportunities for students to participate in scholarly research projects. Not only do students practice field and laboratory techniques they have read about, but they also often identify aspects of the project that pique their intellectual curiosity and form the bases of their theses.

The Institute also assists scholars-in-the-making by providing employment during that tenuous period when students are ABT, after coursework has been negotiated but the thesis is still en route. After they graduate, some former students continue to work for INA as research associates, staff assistants, or summer volunteers. For some, the projects provide grist for Ph.D.'s; for others, they offer opportunities to work as professionals applying skills and knowledge previously acquired.

The efforts and accomplishments of nautical archaeology students form the thread of this *Newsletter* issue, and we present them from several perspectives. On the first three pages we introduce some of the students currently enrolled in the specialization in photographs that hopefully convey the nature and diversity of their academic environment. Two views from the other side then are presented in articles by nautical archaeology graduates whose research was allied to INA projects. Manuela Lloyd has written about a shipwreck survey she conducted in Turkey for her thesis topic; and Doug Haldane describes the anchor reconstruction he completed that directly benefitted from his previous thesis research.

A third article presents an abstract of each of the theses written by nautical archaeology students since the first such document was submitted to the anthropology department in May 1978. Several graduates—Randal Davis, Samuel Margolin, Richard Swete, and Sheli Smith—are not mentioned in the compendium because their studies were completed during early years of the program when a non-thesis option was offered, or because they were graduated by the Department of Geography. In the event that any other student's work has been overlooked or imprecisely summarized, please accept our apology.



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# The Shipwreck At Iskandil Burnu

An intriguing photograph, a professor's request, and dogged research led to an explanation of a Byzantine shipwreck in Turkey

By Manuela Lloyd

In the workhouse of the 1982 camp at Yassi Ada, someone had hung a photomosaic of a shipwreck at Iskandil Burnu, which had been located at the end of the previous year's Turkish coastal survey [see *Newsletter* 9:1]. Time after time I found myself staring at the mound of amphoras depicted in the photo, trying to fathom the site's secrets. My fingers could trace out the egg-shaped ceramic vessels neatly arranged in rows. Jugs and cooking ware dotted the upper half of the mosaic. Occasionally my eyes would fix on differently shaped amphoras.

When Dr. George Bass asked whether I would like to analyze this shipwreck as a master's thesis topic, I leapt at the opportunity. While I was excited about participating in the fall coastal survey, as a neophyte excavator I was nervous about the prospect of directing the part of the project that would deal with the wreck at Iskandil Burnu. How much time would I have to examine the site? Which aspects should be the focus of concentration? These were but two of the many questions that raced through my mind. As I later discovered, my apprehensions were for naught: experienced members of the survey team assisted and guided me at every point of indecision.

Iskandil Burnu, which means "sounding point," is located at the tip of the longest peninsula in southwestern Turkey. Jutting out as it does, the point posed a danger for any vessel traveling the coastal route, and our shipwreck was only one of several known in the area. Distributed down a slope of 20 to 30 degrees, the site ranged from about 25 to 35 meters in depth and 4 to 5 meters in width. In all respects, it presented ideal site conditions: a compact mound of amphoras, relatively undisturbed by humans, lying on a moderate slope in deep sand favorable to hull preservation.

Because it was not feasible at that time to fully excavate this wreck from the seabed, the challenge was to analyze it from data recovered during on-site study. Indeed, that had been the crux of Dr. Bass's proposal: to conduct an experiment to determine the amount of site information obtainable from an underwater survey prior to an excavation.

As it was developed into my thesis, the Iskandil Burnu study sought to interpret the wreck by answering three primary questions: What was the country of origin and exact date of the cargo? What could be learned about the size of the ship itself and the arrangement of the cargo? What could a study of this shipwreck contribute to our knowledge of the economic conditions and maritime commerce of the era? In addition to

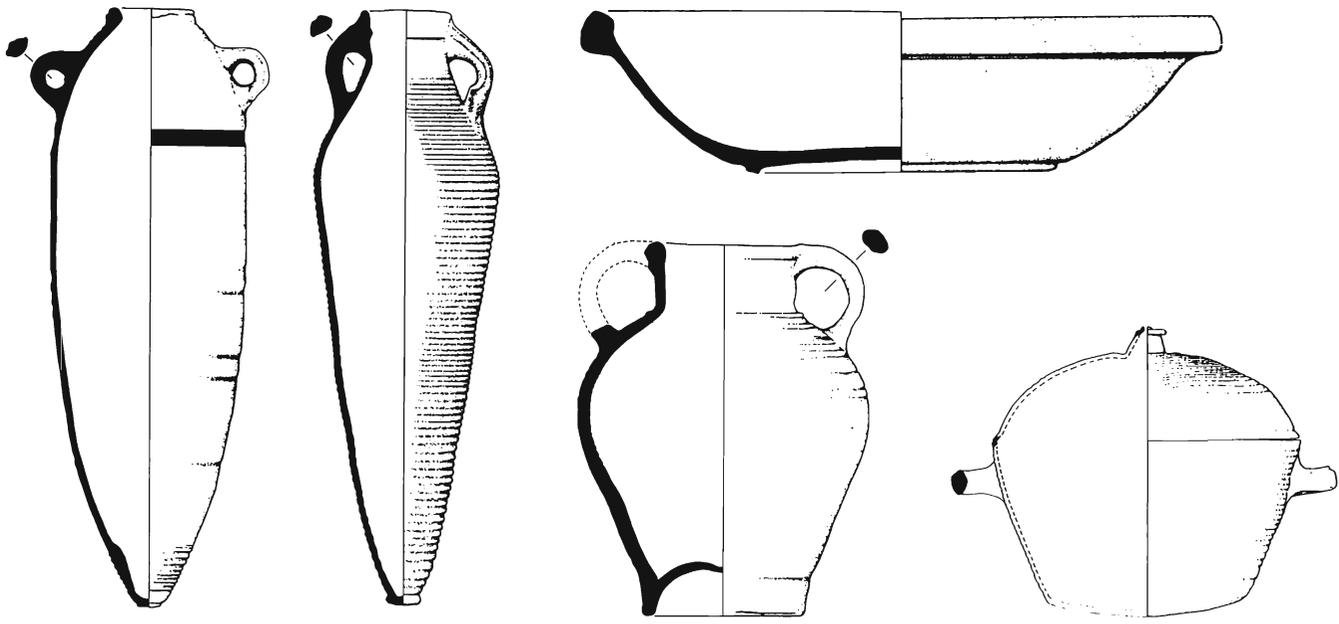
its contribution of new types and important details of Byzantine coarseware, a relatively understudied pottery type, the value of the project lay in its conclusion that a shipwreck can be interpreted to a significant degree by a complete survey and extensive research prior to excavation.

Over a three-year period, the site was visited several times, and a total of 13 man-hours of study was logged. During this research, photomosaics of the entire wrecksite were compiled from overlapping black-and-white photographs, and pottery types were counted and measured *in situ* as time permitted. Nineteen pieces of diagnostic pottery and one glass goblet base were positioned on the site plan; these artifacts were recovered and taken to the Bodrum Museum of Underwater Archaeology for conservation, cataloging and storage. Ultimately, the analysis of the site was made from the artifactual assemblage, site photographs, and the observations of archaeologists working on the project.

The pottery that had intrigued me so in the original photomosaic proved to be diverse, including six types of amphoras, two types of cooking pots, jugs of various shapes, and plates. Research later revealed that the closest archaeological parallels for most of the ceramic items have been found in a late 6th-century A.D. stratum in southern Palestine.

The most intriguing piece was our mystery object until it finally was identified as a rare example of an uncut and sealed covered casserole. Usually, the potter made a casserole as one unit, with the lid separated from the pan by a knife before firing. However, sometimes the lid was delicately resealed to the pan before firing to ensure for the buyer that the vessel was unused and that the cover was tight-fitting. Later at home, the buyer would separate the lid from the pan by lightly tapping the join with a knife. One wonders whether this piece was a kosher cooking pot, or *'ilpas satum*, as mentioned in the Talmud, which could indicate the presence of a Jewish merchant on board the ship at the time of its demise.

The final route and destination of the ship can only be hypothesized. At some point late in the 6th century, the vessel left Gaza or Ashkelon or possibly even Caesarea—all of which were loading ports for the export of Palestinian wine during the Romano-Byzantine period—and headed northward. She was a small ship, about 20 meters long and 5 meters in breadth, roughly the same size as the 7th-century ship excavated at Yassi Ada. Her main cargo consisted of wines carried in two types of common transport amphoras. The number of smaller pottery



items indicates the possibility of at least two merchants on board, one of whom may have been Jewish, transporting small household containers.

The seasonal aspect of maritime commerce in the Mediterranean suggests that the voyage took place between March and November; possibly it occurred between May 27th and September 14th, as recommended by the Talmud. A south-to-north route during this period would have been against the prevailing north wind. The length of an uneventful trip between southern Palestine and Rhodes was about ten days; between southern Palestine and Constantinople, about twenty days.

We do not know where this coastal trader may have stopped, whether at Cyprus or the southern coast of Turkey,

Rhodes, or perhaps even Knidos, before she tried to tack against the wind around the Datça Peninsula and was driven back onto the point. Tragically for those concerned with the voyage but advantageously for archaeologists 1,400 years later, she gently settled to the bottom, becoming a closed deposit of pottery and information that only slowly is releasing her secrets.

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*Drawings of Byzantine coarseware recovered from the site, with scales noted, include from left: Amphora 3, 1:10; Amphora 6, 1:9.5; Amphora 8, 1:5.8; Misc. 2, a plate, 1:3.7; and Cook Ware 2, the covered casserole, 1:5.5 (Illustrations: Netia Piercy). Archaeologists examine the upper portion of the amphora mound at Iskandil Burnu (Photo: Don Frey).*

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# The 7th-C. Yassi Ada Ship Anchors

A twenty-year-old puzzle finally was reassembled with three-quarters of a ton of replicated pieces

By Douglas Haldane

"Listen, Fred, we can have these concretions clean by the end of the summer." I spoke with earnest to Dr. van Doorninck as I pointed to the enormous pile of anchor remains recovered two decades ago from the 7th-century A.D. wreck at Yassi Ada.

As his assistant during my first summer in Turkey in 1983, I had been cleaning iron oxide out of similar concretions from the Serçe Liman Glass Wreck. Having mastered that, I thought myself capable of anything—a real "concretionologist." Dr. van Doorninck, however, with more presence of mind than his overzealous student, and knowing what a formidable task the Yassi Ada Byzantine anchors presented, redirected my energies to cleaning out and casting nail concretions from the former site.

## A usable shell

Concretions are both a bane and a benefit to nautical archaeologists: they are devilish to deal with, but bountiful in the information they can provide. When we speak of concretions, we are referring to the amorphous conglomerate of calcium carbonate, metallic oxides, sand and shell that forms around a metal object as it oxidizes in seawater. An iron artifact continues to oxidize until it is either sealed off from oxygen or has completely decomposed. In the first case, some elements of the original material may survive, but in the latter, as occurred with most of the Yassi Ada anchors, the iron is reduced to a reddish-brown or black mush that turns to powder if allowed to dry.

That does not mean that the artifact is entirely lost. The concretion that had formed around it can be used to mold a replica of the former object. To cast a concretion, one breaks the shell apart, cleans out the oxide from the insides until a black layer that represents the object's original surface is reached, and then glues the pieces back together. Holes and cracks which inevitably result when the concretion is broken are filled with clay or plaster.

Liquid epoxy which then is poured into the concretion mold takes the place of the original metal and adheres to the object's original surface. When the epoxy hardens, the concretion is chipped away, leaving a replica of the artifact. The difference between a five-centimeter long nail concretion and a two-and-a-half-meter long anchor concretion basically is one of size.

Having completed my master's thesis on Greco-Roman anchors, I was slightly better qualified to undertake the replication of the Yassi Ada anchors when I returned to Bodrum the

following summer. Unfortunately, what with preparations for and excavation of the Bronze Age shipwreck at Kaş, Dr. van Doorninck and I had little time together to study the anchors. What I did know, however, was that I had been given the task of replicating eight out of the eleven anchors that had been on board the ship when she sank.

Seven anchors had been spares stacked on the deck near the bow. The other four had been bower anchors mounted on the bulwarks ready for use, two of them on either side of the pile of spares. One bower had been cast in polysulphide rubber in the early 1960s; another was cast in epoxy by INA staff member Sheila Matthews in the winter of 1983; and a third bower, only partially oxidized, is being cast by Dr. van Doorninck.

## The concretions assembled

The concentration assemblage consisted of three large, unwieldy masses representing a major portion of the pile of spare anchors, and a multitude of smaller pieces that had become somewhat scattered around the castle during the course of two decades. A search for missing pieces included a major and fruitful excavation of the dirt floor of a storeroom and a precarious descent into an abandoned cistern that failed to confirm the rumor that some pieces mistakenly had been tossed there as rubbish!

When all pieces finally were located, I had on my hands three-quarters of a ton of concretions—about 85 to 90% of the total—ready for cleaning and casting. However, by the time I returned from Kaş, prepared to embark on this project, Dr. van Doorninck already had returned to Texas A&M. I stood with a copy of his chapter on the anchors from *Yassi Ada I: A Seventh-Century Byzantine Shipwreck* in my hand, stared at the gnarly mass of concretion, and wondered what I had gotten myself into.

Obviously, the only solution to this enormous and incomplete puzzle was to reconstruct larger pieces of concretion by joining smaller fragments together. When gaps occurred due to missing pieces, I bridged them with plaster, hoping against hope I would not later come across the missing bits in the "unidentified" box. Fortunately, I didn't. When the built-up pieces grew too heavy, I partially cast them and then removed as much concretion as possible. By May 1985, the major task remaining was to rejoin two extremely large masses of partially-cast concretion that represented five of the anchors in



Doug Haldane uses a pneumatic chisel to remove concretion from the anchor casts. (Photo: Don Frey)

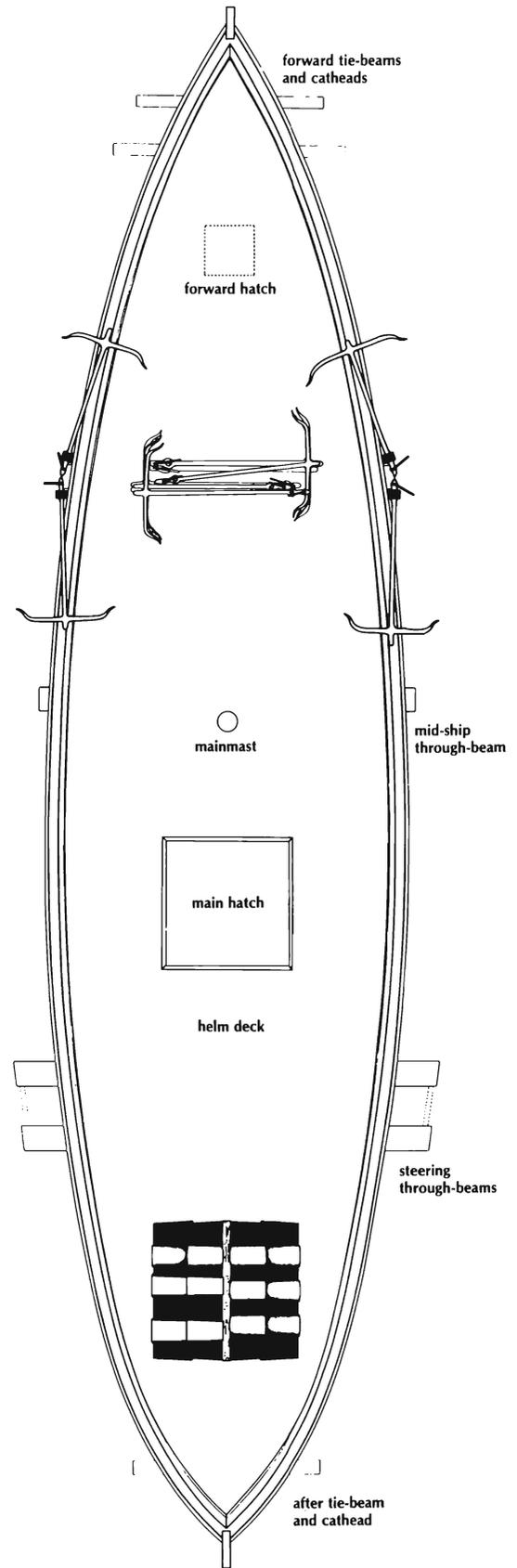
the pile of spares. I had come to a critical juncture: would the two masses join?

At first try they did not. Finally, some small pieces from the “unidentified” box provided a two-square-centimeter join, but otherwise, a gap of up to forty centimeters long remained. However, with the assistance of Dr. van Doorninck, who had returned for the summer season, I managed to bring all five anchor shanks, and thus the two masses, into proper alignment; I bridged the remaining gap with plaster, and our puzzle was completed.

### A worthwhile endeavor

The project has been well worth the effort. Considerable information about the design and use of the anchors which study of the anchor concretions alone did not reveal already has emerged. For example, we found anchor heads to be slightly twisted so that the stock would have been off perpendicular to the arms, allowing the anchors to cant more readily. One anchor clearly had seen long service; another had a fluke that had been broken and then filed down and reshaped. Yet another anchor had arms that were drawn down slightly out of the normal cruciform shape, and we wondered whether it was an early forerunner of later inverted-Y-shaped anchors such as were found on the 11th-century Glass Wreck. A particularly important discovery was a length of anchor cable found buried out of sight by concretion. It will give us a rare opportunity to study the strength and quality of the rope on which the ship had depended for its safety.

None of these discoveries could have come about without the efforts of several other INA associates: Robin Piercy had developed our mechanical resources considerably in recent years; Tufan Turanli located a local source of serviceable epoxy; and Don Frey acquired the funds needed to finance an undertaking of this magnitude. As is usually the case with INA projects, it was teamwork that made the difference between the possible and the impossible.



THE 7TH-CENTURY BYZANTINE MERCHANT SHIP AT YASSI ADA

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# Nautical Archaeology Theses: A Wealth Of Data From Students

By KC Smith

This compendium of abstracts from theses submitted by students in the nautical archaeology specialization at Texas A&M has been prepared for two reasons. The first is to show the diverse, interesting and creative range of subjects which students have researched in depth and reported formally—in most cases in secondary publications as well as in their theses. The second is to fulfill the *Newsletter's* role of sharing scholarly information.

## SURVEYS

**Elizabeth Shuey**, *Underwater Survey and Excavation at the Ancient Port of Gravisca, Italy* (May 1978). In search of the ancient Etruscan port of Tarquinia and the Roman port of Gravisca, Shuey directed the first extensive survey and excavation of underwater remains in the harbor now called Porto Clementino during summer 1977. Nearby terrestrial finds and reports of a breakwater in the bay had renewed debate concerning the location of these ancient maritime depots. Shuey's study not only determined the whereabouts, design and engineering details of the harborworks, which proved to be of early Roman construction dating at least to the 1st c. A.D., but she also was able to suggest the antiquity and duration of seafaring activities in the harbor through pottery finds that dated from the 6th c. B.C. to the 14th c. A.D. With additional documentation, she concluded that both the Etruscan and the Roman ports almost certainly had been located at Porto Clementino. Shuey's was the first master's thesis completed through the nautical archaeology specialization at Texas A&M.

**Roger C. Smith**, *The Maritime Heritage of the Cayman Islands: Contributions in Nautical Archaeology* (8/81). Based on findings from two seasons of field survey and archival research, Smith's study focused on the unrecognized contributions of the Cayman Islands to the establishment of European hegemony in the West Indies, and on the relationship between an isolated, insular environment and the cultivation of a distinct maritime culture. Elements of anthropology, archaeology, history and geography were forged to create a cultural perspective of the Islands' seafaring heritage from the mid-1600s to modern times, in particular dealing with the turtling trade: the men who fished, their vessels and methods, and how this industry fit into West Indian growth and history. Smith's field research, initiated at the request of the Government of the Cayman Islands, represented INA's first formal project in the Caribbean.

**Dorothy Slane**, *The History of the Anchorage at Serçe Liman, Turkey* (5/82). During INA's excavation of the 11th-c. shipwreck at Serçe Liman, unrelated pottery fragments from varied periods and cultures were found near to and beneath the vessel remains. Working with the hypothesis that examination of the disparate material might yield an archaeological record of the harbor's use, Slane directed the survey of a 56x70-meter area of the seabed in summer 1979, during which

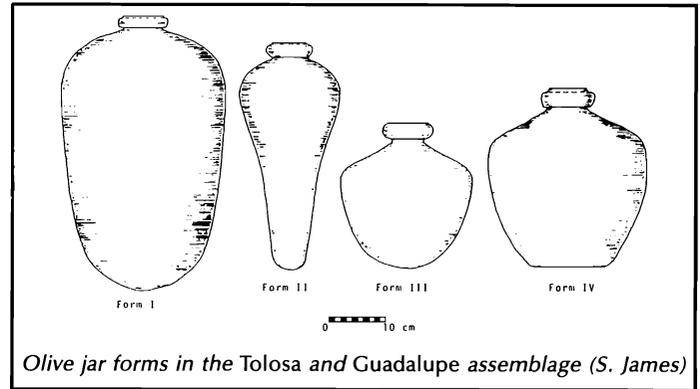
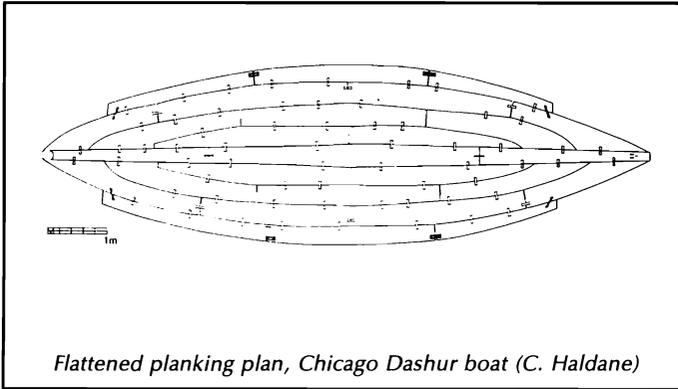
approximately 300 artifacts were recovered. From their analysis, Slane reconstructed the 4,300-year history of the anchorage between 3000 B.C. and the 13th c. A.D. In addition to a catalog of artifacts and discussion of periods of maritime use, her thesis also presents her survey strategy, by which she confirmed the site's unrestricted use through time and validated the hypothesis that surface survey can yield a true history of harbor use.

**James Baker**, *Computers and Nautical Archaeology: Characterization of the C.S.S. Georgia Wreck Site* (12/82). As an underlying theme, Baker's thesis reports the results of a Texas A&M survey to investigate, characterize and make recommendations concerning the Civil War ironclad C.S.S. *Georgia*. Because the wrecksite presented dangerous and impossible data retrieval conditions for divers, a series of remote-sensing surveys with side-scan sonar, magnetometry and bathymetry were conducted of the shipwreck and the surrounding area. Among other responsibilities, Baker was asked to develop computer programs and graphics techniques to interpret the thousands of remote-sensing readings. In addition to presenting a history of the vessel and recommendations for its mitigation, Baker's thesis deals at length with his application of computers to this problem and their applicability to other underwater archaeology projects.

**Manuela Lloyd**, *A Byzantine Shipwreck at Iskandil Burnu, Turkey: Preliminary Report* (8/84). A late 6th- or early 7th-c. A.D. shipwreck that was potentially insightful but not feasible to excavate at the time was surveyed under Lloyd's direction during three field seasons. Working with the hypothesis that a complete seabed survey could provide sufficient data to interpret a shipwreck, Lloyd analyzed the 1,400-year-old site on the basis of pottery remains, photomosaics, archaeologists' observations and documentary research. Her findings are reported in a lengthy article on pages 4-5 of this newsletter.

## SPECIFIC VESSELS

**Paul Hundley**, *The Construction of the Griffon Cove Wreck* (12/80). Hundley's study in 1978 of shipwreck timbers and materials raised in 1955 from Lake Huron, Canada, and his examination of the original recovery site, sought to determine whether the remains were, as claimed, from the ship of René Robert Cavalier de la Salle. Proof of the claim would provide precise details of the earliest ship constructed on the upper Great Lakes (1679) and of 17th-c. trade and technology; disproof would set the disputed question to rest, yet still add knowledge to Great Lakes maritime history. To reassemble the vessel's construction, Hundley produced a series of models and lines drawings based on his field recordings of the timbers. Augmented by his analysis of historic artifacts and documents, he determined that the Griffon Cove Wreck was not La Salle's *Griffon*, but rather a smaller, local variation of a Mackinaw boat that had been abandoned in the mid-1800s.



**Warren Riess**, *The History of, and Search for, the Seventeenth Century Bristol Merchantman Angel Gabriel* (12/80). Prior to this study, little was known about the Bristol merchantman carrying New World settlers and supplies that wrecked in 1635 near Pemaquid, Maine. Riess's thesis presents his reconstruction of her identity and history, and attempts to tie her ill-fated presence to local colonial enterprises. He also describes the field surveys he directed in 1977-78 to locate the vessel's remains—the detailed study of which could contribute to knowledge of early Stuart period ship construction. Although the ship was not located, information valuable to future search efforts was collected and analyzed.

**Cheryl Ward Haldane**, *The Dashur Boats* (8/84). Studying the largest available collection of contemporaneous ancient watercraft, Haldane focused on the boatbuilding techniques expressed in the 4,000-year-old funerary vessels found at Dashur, Egypt in 1894. Since the 1894 and 1901 excavations of and reports about four of the six known hulls, no detailed examination had been published of the boats, which provide the most ancient examples of deep mortise-and-tenon joints used in hull construction. Haldane's thesis presents a history of the vessels, discussion of their usage, and an analysis of their hull construction, which was based on her personal recording of two hulls in museums in Chicago and Pittsburgh and on printed descriptions of two housed in Cairo.

**Kevin Crisman**, *The Eagle: An American Brig on Lake Champlain during the War of 1812* (12/84). Crisman's lengthy thesis concerns the US Navy vessel built in nineteen days in 1814 as a final addition to the squadron of Commodore Thomas Macdonough. After helping to defeat the British at the Battle of Plattsburgh Bay, the *Eagle* was maintained for several years, then abandoned in 1825. Rediscovered in 1981 in the Poltney River near Whitehall, New York, the shipwreck was the subject of a two-year archaeological study co-directed by Crisman, during which the hull timbers were recorded extensively. Based on the measurements, wreck plans were made and the technique of hull construction examined; augmented by archival research—in particular, contemporary shipbuilding information—the original appearance of the brig was reconstructed and graphically depicted by Crisman in the form of hull lines and construction and rigging plans. Crisman's thesis describes the history of the vessel, her archaeological and archival reconnaissance, her visual reconstruction, and her comparison with other War of 1812 ships, concluding that the *Eagle* had been specially designed for accelerated construction and a limited career in shallow, protected waters.

### SHIP CONSTRUCTION AND EQUIPMENT

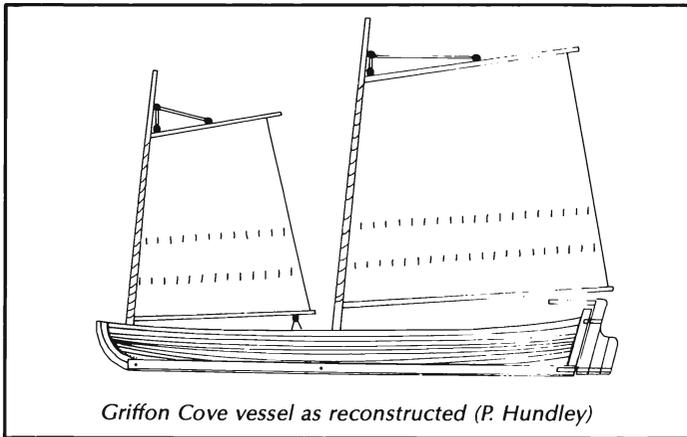
**Sheila Matthews**, *The Rig of the Eleventh-Century Ship at Serçe Liman, Turkey* (5/83). Anticipating reconstruction of the medieval shipwreck excavated by INA at Serçe Liman, Matthews undertook to study the rigging elements recovered from

the wrecksite and the hydrostatic features of the ship's hull to determine the nature of the ship's rig. Based on her analysis of hull and rigging remains, she was able to suggest the amount of sail area that would have been needed to propel the vessel efficiently, and the mast system necessary to support it. Comparing her hypothesis to illustrations of contemporaneous vessels, Matthews concluded that the small merchant ship probably carried a double-masted lateen rig to maximize maneuverability, speed and safety. In her discussion of the ship—the earliest known lateen-rigged vessel with sailing qualities that profitably can be assessed—Matthews also presents its history, on- and off-site recording, preliminary hull reconstruction, a catalog of rigging elements, and an illustrative compendium of other medieval rigs.

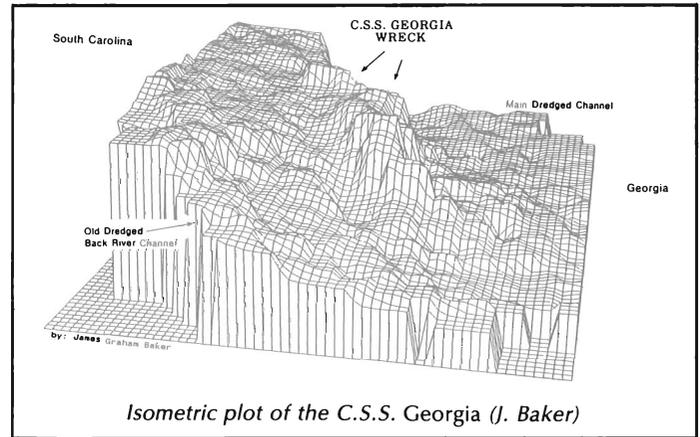
**Mark Geannette**, *Mast Step and Keelson: The Early Development of a Shipbuilding Technology* (12/83). Geannette's evolutionary and comparative study of the ship's mast step and keelson focuses on their delicate architectural relationship and the process through which they merged naturally into a single longitudinal member because of their similar locations. Noting three distinct, early European traditions differentiated by geography, time and utility—the style of the Classical Greek, Roman and Byzantine eras; and the Middle European (aka "Gallo-Roman" or "Celtic") and northern Scandinavian styles—his thesis primarily addresses the Mediterranean tradition. Geannette cites comparative distinctions of mast step and keelson designs with the other two traditions based on the analysis of evidence from approximately twenty shipwrecks dating from the 6th c. B.C. to the 11th c. A.D. He also ties their evolutionary relationship to the major technical change in shipbuilding from shell-first to skeletal construction.

**Douglas Haldane**, *The Wooden Anchor* (5/84). In combination with ancient works and depictions, the recovery of wooden anchor elements and, infrequently, the entire anchor provided abundant information that had not been fully synthesized. Consequently, a developmental view of this ship's equipment, apparently introduced in the late 7th c. B.C., remained obscure. Believing that an analytical review of available material would be more useful than the generation of new information, Haldane organized extant data into a framework from which further investigation could proceed. His thesis discusses the history and chronology of wooden anchors, various stock types and reasons for their evolution and demise, constructional evidence, comments about anchor use aboard vessels, and associated hardware. Haldane concluded that, while knowledge about these items has increased considerably in recent years, much more will be learned with the recognition that wooden anchors are not merely pedestrian finds on a shipwreck but additional pieces to a larger puzzle.

**Thomas Oertling**, *The History and Development of Ships' Bilge Pumps, 1500-1840* (5/84). Because all wooden ships leaked to some extent, the bilge pump was the onboard device that



Griffon Cove vessel as reconstructed (P. Hundley)



Isometric plot of the C.S.S. Georgia (J. Baker)

assured the safety of the ship and its inhabitants. Indeed, Oertling states that this mundane tool was the most important piece of ship's equipment, even more so than an anchor or rudder, because the pump maintained the buoyancy of the hull by eliminating excess water. In his thesis, he presents a thorough discussion of the three primary types of pumps in use between the 16th and 19th c.—the burr pump, the suction or common pump, and the chain pump—and describes their appearance in time and changes in their design, the materials used in their construction, geographic variations, and their operation and secondary functions onboard vessels.

**Carol Olsen**, *Nineteenth and Twentieth Century Figureheads from the Mystic Seaport Museum Collection* (5/84). For more than 5,000 years, shipbuilders have decorated the bows of vessels as reflections of social, political, economic and artistic sentiments of their era. Despite the long tradition, the history of ship decoration scarcely had been examined prior to Olsen's lengthy study. Her thesis examines stylistic variations from around the world, dating from the 3rd millennium B.C. to modern times, with particular emphasis on twenty figureheads housed in the Mystic Seaport collection. Her work with the latter led to identification of some of the carvings and also improved documentation of the Museum's entire collection. In addition to discussing her research methods, Olsen shares details about the 19th-c. shipcarvers' trade including training, work environment, types and uses of materials, preparations and emplacement of figureheads, and payments and contracts involved in shipcarving.

**Michael Halpern**, *The Origins of the Carolinian Sidereal Compass* (5/85). The sidereal compass of the Caroline Islanders is a conceptual tool that organizes navigational knowledge and permits accurate, long-distance voyaging without instrumentation. Evidence of similar systems exists throughout the Pacific, and likenesses also are found in old Arab nautical texts. Halpern's thesis summarizes tropical sidereal navigation in general and the current state of knowledge, and presents a theoretical framework and criteria for evaluating whether geographically disparate models were developed independently or by virtue of diffusion. Data for the model are added in the form of analyses of Carolinian and Arab compasses from a temporo-astronomical standpoint to reveal past conjunctions, and as reconstructions of human movement in the Indo-Pacific region to compare cultural similarities, differences and possibilities of contact. Halpern concluded that Arab navigators probably were influenced by Austronesian seafarers in the Indian Ocean, though not directly by Carolinians, after the former had begun to elaborate an incipient sidereal compass.

**Robert Adams**, *The Construction and Qualitative Analysis of a Sewn Boat of the Western Indian Ocean* (8/85). Adams investigated the *mtepe*, one of the last of the large sewn

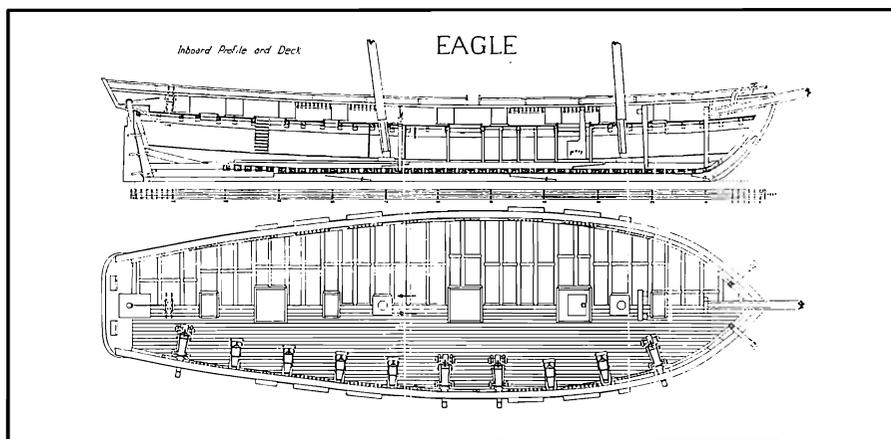
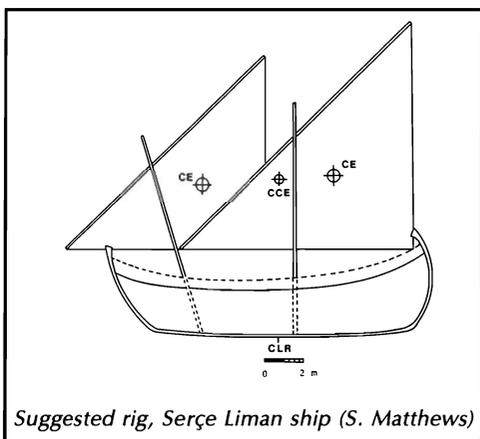
vessels of the East African littoral before this shipbuilding tradition fell out of use in the early 20th c. Sewn boat technology, which involved carvel, shell-first construction with only cordage for fastenings, was a western Indian Ocean tradition for millennia before the coming of the Portuguese in the 15th c.; after their arrival, sewn-boat techniques yielded to western shipbuilding methods. Although surviving details about sewn-boat construction are scant, Adams located several models and archival photographs of the *mtepe* that enabled a comparative study to be undertaken. His thesis thus defines the individual constructional features and presents a qualitative analysis of the components and the boat as a system. Results of the latter show that in contrast to rigidly constructed vessels of the western tradition, the sewn hull was designed to be flexible.

**Carol Franklin**, *Caulking Techniques in Northern and Central European Ships and Boats: 1500 B.C.-A.D. 1940* (12/85). Caulking is the means by which a wooden vessel's seams are closed to prevent leakage. Franklin addressed this understudied aspect of ship and boat archaeology with a regional survey spanning 3,500 years of the caulking techniques used in all vessel types, from small riverine craft to massive oceangoing ships of the 18th c. Her thesis groups the material into three sections: using archaeological evidence, she describes waterproofing methods in very early watercraft; she then discusses the relationship between the later construction of larger, oceangoing vessels and a regularization of caulking techniques; and finally, Franklin examines the methods used in smaller native craft confined to riverine and coastal areas until their virtual obsolescence in the early 20th c.

**Joe Simmons**, *The Development of External Sanitary Facilities Aboard Ships of the Fifteenth to Nineteenth Centuries* (12/85). Simmons's scholarly yet often tongue-in-cheek thesis examines the appearance in European vessels, and the development over 500 years, of onboard hygienic accommodations designed to facilitate the disposal of human waste. While study of the subject largely has been ignored for various reasons, the reality of the situation was not overlooked by the men or in the vessels that took to sea. Drawing on historic depictions, models, and descriptions, Simmons charts the evolution of such shipboard structures as seats-of-ease, roundhouses, pissdales, and quarter galleries, citing the changes in European hull design and construction which made possible the various waste-disposal features.

## ARTIFACTS

**Margaret Morden**, *The Glass Lamps from the 11th-Century Shipwreck at Serçe Liman, Turkey* (5/82). Among the artifact assemblage excavated from the medieval-era Glass Wreck were 235 examples of broken glass lamps of three distinct types; Morden took on the task of analyzing these remains as



part of the larger study of glassware recovered from the site. Of necessity, her thesis begins with a history of glass in the Near East and the development of lamp forms and their usages based on literary, artistic and archaeological evidence. Next is provided an illustrated catalog of the artifacts grouped according to type: suspended lamps, standing lamps, and a single example of a mosque lamp, all of which were found amidst the vessel's cargo aft of midships and toward the stern. Morden's analysis of the ancient light sources, which she adjudged probably came from the Syro-Palestinian coast or inland to the Caspian Sea, notes for future researchers such realities as color change in the fabric due to marine exposure, the usefulness of literary and artistic sources and archaeological evidence, and the difficulty of determining how the shipment was assembled.

**Stephen James**, *The Analysis of the Conde de Tolosa and the Nuestra Señora de Guadalupe Olive Jar Assemblage* (5/85). Sunk in 1724 in a hurricane off the Dominican Republic, the *Tolosa* and the *Guadalupe* were salvaged 253 years later, and among the excavated artifact assemblage were 600 completely intact olive jars. A primary shipping container during the period of Spanish colonialism in the Indies, these ceramic vessels in various forms are useful as temporal indicators on a shipwreck site, although archaeologists have been working for many years with a typology assembled from a more limited data base than that provided by the current shipwreck collection. James's analysis of the largest complement of whole olive jars in the New World not only reveals a previously unreported jar shape, but also suggests needed changes in the present chronological and typological framework of the olive jar, and answers previous hypotheses concerning vessel sizes, capacities, contents, rim attributes, and glazing frequencies employed as temporal indicators.

**Gianmarco Brenni**, *The Dolia and the Sea-Borne Commerce of Imperial Rome* (8/85). After helping to excavate a Roman shipwreck from the latter 1st c. A.D. near Diano Marina, Liguria, Italy, Brenni asked to study a group of fourteen huge ceramic vessels called *dolia* recovered from the site. Like the *amphora*, the *dolium* was an important shipping container in antiquity, although its relation to trade in the western Mediterranean and many of its developmental aspects were not well understood. Augmenting his analyses of the jars with archival and archaeological evidence from elsewhere, Brenni undertook comparative study of body forms in relation to the *dolium's* chronological evolution, geographical distribution, and various uses. He also gathered information about the makers of the vessels, the *figulini*, and their methods. To understand how the ceramic containers were stowed aboard ships, Brenni sought ancient representations and also evaluated the location of his vessels on the shipwreck site. His thesis

includes a catalog of published Roman shipwrecks from the 1st c. B.C. to the 5th c. A.D.; data from these sites were used to trace the evolution of various *amphora* types and their relation to the appearance and disappearance of *dolia* in sea trade.

**Kenneth Cassavoy**, *The Gaming Pieces from the Glass Wreck at Serçe Liman, Turkey* (8/85). Unidentifiable at first, a handful of medieval Islamic chessmen found on this shipwreck were the basis of Cassavoy's research of the Glass Wreck gaming pieces, which also included a backgammon tableman and a bronze object resembling a die. Seeking cultural interpretations for their presence as well as clarification of their origin, manufacture, attributes and date, he studied the location of the pieces on the shipwreck to assess implications about shipboard status, occupation and leisure. With literary evidence, he examined differences in attitude among Islamic sects about games in general; social distinctions between chess, backgammon and dicing; and symbolism in the gaming piece forms and shapes. Descriptive and comparative analysis of the individual pieces is included in an artifact catalog in Cassavoy's thesis.

**Cathryn Wadley**, *Historical Analysis of Pewter Spoons Recovered from the Sunken City of Port Royal, Jamaica* (12/85). In 1692, Jamaica suffered an earthquake that caused about three-quarters of the city of Port Royal, located at the end of a sand spit, to sink into the harbor. Excavations over the last three decades, including the field school initiated in 1981 by INA and Texas A&M, has produced abundant data and artifacts, the latter including an assemblage of whole and partial pewter spoons. Wadley's analysis of this collection and research of literary sources provided information on the type, date and origin of many of the items, and the data have been compiled into a preliminary key for identifying and dating the same utensils from other 17th- and 18th-c. sites. In addition, the thesis discusses pewter spoon manufacturing, including alloy composites, mould construction and casting techniques. An illustrated catalog of the Port Royal collection also is provided.

## CONSERVATION

**James Parrent**, *The Conservation of Waterlogged Wood Using Sucrose* (12/83). Parrent conducted experiments using wood remains excavated from the sunken city of Port Royal and modern, chemically decomposed white birch samples to evaluate the use of sucrose to stabilize waterlogged wood. Seeking a low-cost conservation technique that avoids the use of chemicals, he tested four techniques and studied sucrose penetration into and fortification of wood microstructure. The most successful method resulted in an overall antishrink factor of 87% and rendered conserved artifacts that were aesthetically pleasing in appearance.



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