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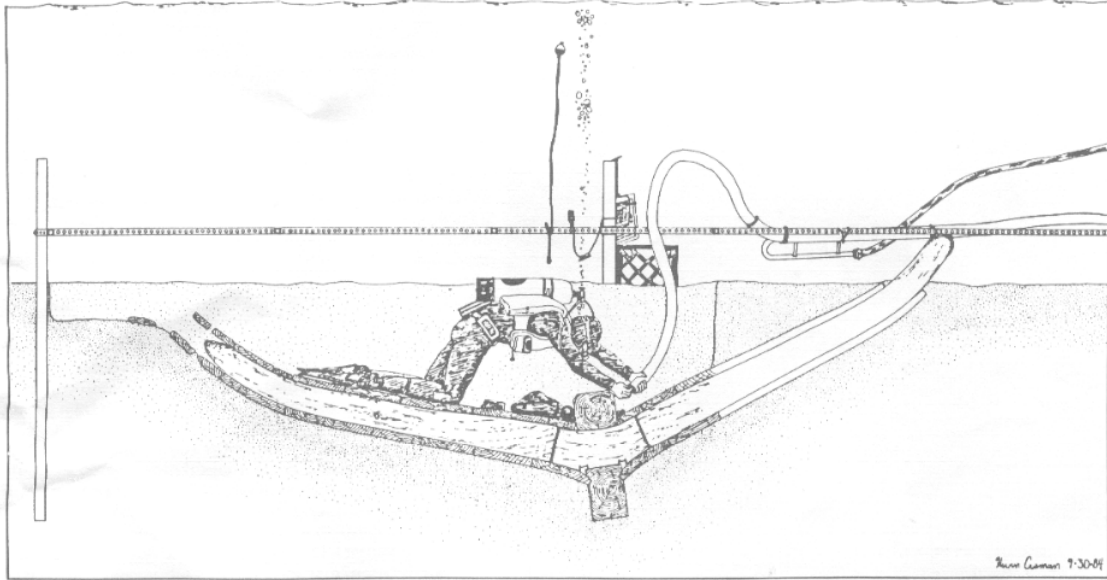
INA NEWSLETTER

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1984 THE YEAR IN REVIEW



IT WAS A VERY GOOD YEAR

By far the most exciting event for INA in 1984 was the point at which Dr. George Bass and the other archaeologists working on the **Bronze Age Shipwreck** at Kaş, Turkey, realized the extraordinary nature of the site they were studying. During a dramatic two-month field season, hull and artifactual remains of the 3,400-year-old ship—the oldest excavated under water—were found to be far more extensive than anyone had ever imagined. Although the vessel was only partially excavated last summer,

the material assemblage already is an unequalled collection of Bronze Age trade goods from the eastern Mediterranean; and hull remains portend a cache of information about shipbuilding technology in 1400 B.C. Bass speculates that the ship had sailed from Syria, had stopped in Cyprus, and was headed either to Greece or to western Turkey when it was driven upon the inhospitable rocks at Cape Ulu Burun on the southern coast.

The ship settled without capsizing on a slope that ranges between 145 and 170 feet deep. The depth is a mixed blessing: although it no doubt thwarted site salvage efforts after the craft sank, it now creates critical diving circumstances for the excavation. It was not, however, too deep to be noticed some years ago by a young Turkish sponge diver, who described the site in 1982 to INA President Don Frey. An initial survey was conducted, and the presence of oxhide-shaped ingots and particular amphorae suggested to Bass, a Bronze Age authority, that the site merited intensive study.

Discovery of the Kaş Wreck site was announced formally in December by Project Director Bass and Assistant Director Cemal Pulak at a press conference at the National Geographic Society, a primary sponsor. The *INA Newsletter* will present its own review of the excavation in the next issue, which will feature articles by Bass, Pulak, Frey and other participants.

While the excavation at Kaş was engrossing one INA contingent in Turkey, another under the direction of Dr. Fred van Doorninck worked in Bodrum on material and architectural reconstructions of the **11th-Century A.D. Vessel** from Serçe Liman. Among the continuing projects were replication of the vessel's eight anchors; study and assembly of the one million glass remains; and preparation of conserved hull members for reconstruction—a project that began in September, under the direction of Dick Steffy.

A number of students from the Texas A&M University nautical archaeology specialization participated in activities at both Kaş and Bodrum, and crews at both locations hosted members of the **INA Board of Directors** during their summer meeting, during which some directors dived on the site at Kaş. Summer activities were capped by the Institute's annual **Turkish Survey** to locate and to document shipwreck sites in coastal waters.

Before returning to Bodrum in the fall, Steffy spent summer months forwarding progress on his other projects in the Old World. These include reconstruction of the bronze **Warship Ram** from Athlit, Israel, dated tentatively to the 4th century B.C.; study of the **1st-Century A.D. Roman Vessel** at Herculaneum, Italy; and the full-scale replication of the **4th-Century B.C. Merchant Vessel** excavated at Kyrenia, Cyprus.

Under New World skies and waters, work continued on INA's several ongoing projects in the Caribbean. The fourth summer season of the **Field School at Port Royal**, directed by Dr. Donny Hamilton and sponsored jointly with Texas A&M University and the Government of Jamaica,



Archaeologists from the joint INA-Turkish team map the remains of the Bronze Age Shipwreck at Kaş, while the site is documented photographically. Ceramics and oxhide-shaped copper ingots visible on the seabed (foreground) await excavation until the position and distribution of all features have been recorded. (Photo: William Curtsinger, National Geographic Society)

Page 1 Illustrations: Drawing of the excavation of the Boscawen in Lake Champlain, Kevin Crisman; Archaeologist Roni Polk cleaning artifacts recovered from a test excavation at St. Ann's Bay, KC Smith; artifacts in situ at the Bronze Age Shipwreck at Kaş, William Curtsinger, National Geographic Society.

uncovered further mysteries within the six-room structure under excavation at the submerged, 17th-century English colonial town on the south coast of Jamaica. On the north coast of the island, crew of the **Columbus Caravels Project**, headed by Roger C. Smith, began test excavation of a promising site in its continuing search at St. Ann's Bay for the last two ships commanded by the famous admiral.

Elsewhere in the Caribbean, an early **16th-Century Shipwreck** at Bahia Mujeres on the coast of Quintana Roo was located and surveyed by a joint INA-Mexican government archaeological team. The site is one of six from the period under consideration in a major effort to identify and to study caravels and exploration *naos* that sank in the New World prior to about 1525. The objective is to assemble archaeological evidence of the vessels' construction and material contents, details of which to date are poorly substantiated and speculative, for Quincentennial activities in 1992.

Remains from another of the six early sites, excavated under the direction of Donald Keith in 1981-82, have been undergoing conservation and analysis in College Station during the last two years. The past summer months saw renovations and improvements installed under Keith's direction at the **Molasses Reef Wreck Conservation Laboratory** to expedite artifact processing. Eight tons of artifacts from the MRW site in the Turks and Caicos Islands slowly are being restored and reenvisioned to reveal cultural and technological truths about early Iberian seafaring in the Caribbean basin.

Additional information about the ships of discovery has come to light during research currently being conducted in Spanish and other European archives and museums by Denise Lakey and Joe Simmons. The two began their investigations in August as part of a joint project between INA and the Government of Spain that will culminate this spring in the **Bay of Cadiz Survey** for maritime cultural resources in Spanish waters. Lakey is co-director with a Spanish archaeologist on the project.

While the above-mentioned projects and programs represented the Institute's primary efforts in 1984, independent research on sites throughout the United States—in northern Texas, in the Great Lakes, and along the Eastern Seaboard—also was conducted by present and past INA associates and nautical archaeology students. Indeed, the academic and geographic distribution of studies in the past year was reflected at the Conference on Underwater Archaeology (CUA) in Boston in January when more than 20 papers were delivered relating to work pursued or directed by present and past INA associates.

Clearly, we have not included in this *Newsletter* articles about all of INA's activities in the past year, but, rather, a cross section of year-end summaries by project directors and two articles of a different nature than our traditional reports. If we appear to favor New World enterprises this time, it is because our next two issues will direct attention not only to the Kaş site but also to other Old World projects.

KC Smith

Top: Involvement of nautical archaeology students in INA projects remained an important theme, such as the participation of Bill Lamb (left) and Larry Mott (right) in activities at the Molasses Reef Wreck conservation laboratory. With backgrounds in geology, they have been identifying ballast samples from the site, assisting lab staff member Mark Myers. Center: Staff Assistant Beth Braznell, a Texas A&M employee, works closely with INA personnel as she coordinates many administrative functions of the University's graduate specialization in nautical archaeology. Bottom: INA Ship Reconstructor J. Richard Steffy converts drawings of wood fragments into plans that will be used in the replication of the Kyrenia Wreck. (Photos: KC Smith)



Columbus Caravels Project

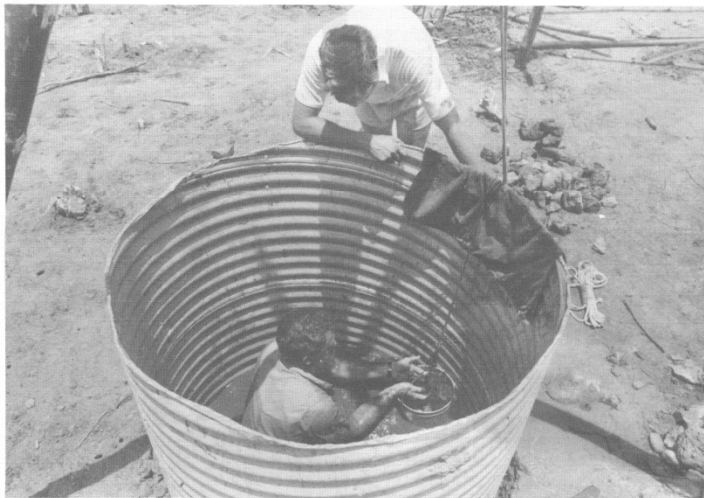
Caravels Test Site Yields Ballast, Artifacts And Clues

The search for Columbus's abandoned caravels on the north coast of Jamaica continued last summer into its third season. New members of the team included Harding and Roni Polk, archaeologists who recently moved from Virginia to College Station; Chris Peckham, a graduate of Sam Houston State University; and Dan Derby, an architecture student at Texas A&M University. The project also received a visit from INA Secretary/Treasurer Janet Urbina, who brought us some badly needed parts during her fact-finding visit to the island.

Having completed survey of a large expanse of the coastline and adjacent waters of St. Ann's Bay in the previous season, our objectives in 1984 were to begin a test excavation at the site of an old stone plantation wharf, to continue investigation of a peculiar offshore anomaly on a shallow sandbar, and to expand investigations into other parts of the lagoon. Since the field season was to be only six weeks long, we had our work cut out for us when we assembled our headquarters on the beach at Almond Cove in late June.

We had been finding buried shipwrecks and anchorage middens since the first season in 1982, including a small English vessel under almost two meters of mud and sand, and another vessel which still contained cargo eroding from the beach. Further investigation of the latter site led us to the conclusion that it may be the remains of the *Fly*, a Jamaica sloop which was driven ashore during a hurricane in 1791. This year, we found several additional wrecks: the hulk of the *Balfour*, a salt trader from the Turks and Caicos Islands; the wreck of a 19th-century sailing ship laden with sugar mill apparatus; and another site that was badly scattered on the reef. We also examined the remains of a small vessel called *Father Goose*, after the film starring Cary Grant and Leslie Caron in which it was destroyed by a Japanese patrol boat from Hollywood in 1965!

More important than investigation of modern wrecksites, however, was the continued examination of a mysterious magnetic anomaly under a shallow sandbar near the mouth of the Church River. Armed with a computer-generated contour map, produced from our field data



Above: Inside an aluminum culvert that serves as an excavation caisson, Project Director Roger C. Smith places mud, ballast and artifacts into a bucket for screening. As material is removed from the bottom—at this point, below the water table—the caisson is forced deeper into the ground. Smith is assisted by archaeologist Harding Polk. (Photo: KC Smith)

Below: Later in the test excavation adjacent to the wharf, the caisson is below ground level and the water table, requiring the use of scuba to dig. The bamboo tripod was used to raise buckets filled with excavation debris. Behind the inundated hole, a pile of rocks spilling away from the wharf represents ballast removed from the test. (Photo: KC Smith)



by James Baker of Texas A&M, we began pinpoint coring on the areas of highest intensity. A three-dimensional projection of the anomaly showed that its size and characteristics were tantalizingly similar to what we might expect from two buried caravels. The turbulence and turbidity of the water at this location had made visual examination difficult, but from the cores, we knew that the anomalous layer did not extend very deep into the sediments. Core samples contained fragments of brick, ceramic and ballast, but no wood.

We eventually found the cause of the sandbar anomaly after a period of stormy weather. Early one morning before the tradewinds started, the water was unusually calm and clear. As we swam over the anomaly, we noticed that it had been uncovered, revealing a small pile of rocks, bricks and modern trash, including metal objects that had been detected by our instruments. It looked like another anchorage midden, where small

boats had anchored over the years, discarding debris, ballast and trash overboard.

An innovative new remote sensing tool was added to our investigations last summer. Larry Green and Ken Burkhardt of Triangle Marine, Tucson, Arizona, arrived with a computer-enhanced color sonar instrument, which displayed the various densities of buried sediment layers on a monitor in multi-colored images. Although the system provided additional data to our efforts, it still needs refinement to be successfully applied for archaeological purposes.

The major objective of the season was to attempt to find out what might lie under the old English wharf. We suspected from its architecture, and from the results of nearby terrestrial excavations by a Spanish archaeological team, that the wharf may have been built on top of an earlier Spanish structure, which originally may have been constructed from

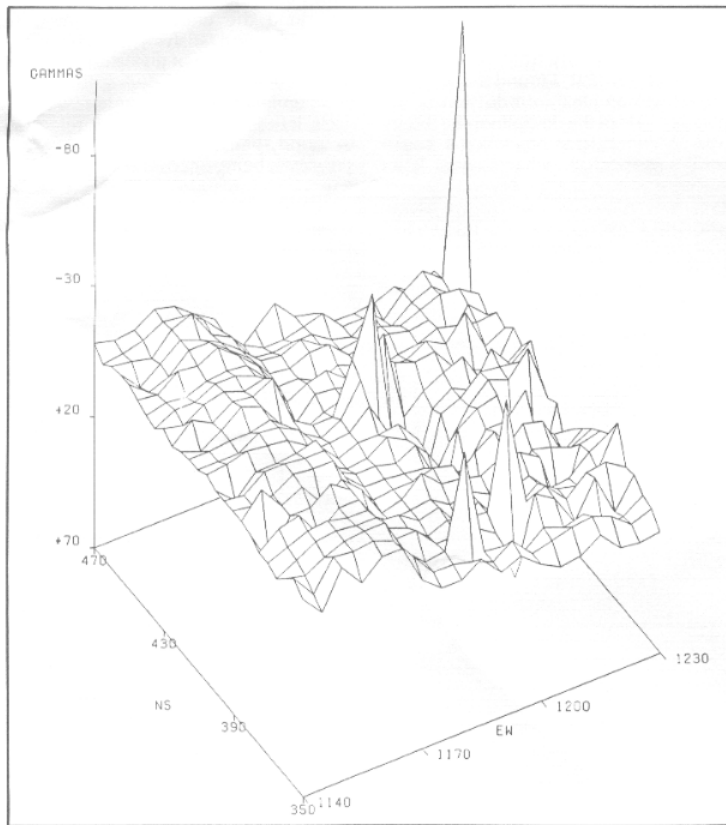
the ballast of the beached Columbus ships. Piers and wharves often were built on top of abandoned ships since their ballast represented a convenient accumulation of foundation rocks. In this case, the initial waterfront property chosen by Columbus may have been put to good use by later Spanish and English inhabitants.

As in previous seasons, we used aluminum culverts donated to the project by Kaiser Bauxite of Jamaica, which also transports our equipment to and from the island free of charge. The cylinders make excellent excavation caissons, allowing us to dig a test pit without creating a major excavation or disturbing the surrounding sediments. A caisson was inserted next to the wharf, and excavation was carried out in arbitrary levels with artifacts sorted and bagged in lots according to depth. Gradually, the worm-eaten tops of two wooden pilings began to emerge from the sediments. Further down, a smaller and cruder piling, which appeared to be from the original construction, was unearthed. While large ballast stones hampered the caisson's penetration downward, we began to amass a curious collection of colonial artifacts.

English trade ceramics, fancy glass stemware, rum and wine bottles, sailors' buttons, culinary implements, slave-produced pottery, roof tile and brick fragments, and beef, pork and turtle bones all attested to the variety of commerce conducted across the plantation's wharf in the last three centuries. Oyster shells of a non-tropical variety reflected the North American colonial connection; and Pacific money cowries had found their way via Africa to the West Indian sugar plantations along with the slaves they had helped to purchase.

The work continues: at the end of the third season, the excavation had reached a 17th-century horizon—a period which is not well represented in the maritime historical picture of Jamaica. The test pit was backfilled with the caisson in place for further work. Already, the variety of sites and materials discovered at St. Ann's Bay is helping to fill in the chronology of maritime trade to the overseas plantations. In pursuit of Columbus's caravels, we have unearthed a cross section of nautical history, which hopefully will aid in the establishment of a planned national historic park and its interpretation to the public. But our main objective is to reach the buried 16th-century horizon, and to locate the site of the first European outpost in Jamaica—the last two ships commanded by Christopher Columbus.

Roger C. Smith



A three-dimensional computer image of the Sandbar Anomaly was produced from data gathered during a magnetometer survey in 1983. (Computer graphics: James G. Baker)

Port Royal Project

Field School Offers Opportunity To Gain Practical Experience

Our report on the 1984 Field School at Port Royal is of a slightly different nature than the other year-end summaries. At the time that Newsletter articles were requested, Dr. Hamilton was engrossed in the preparation of a major manuscript about the project for the World Book Encyclopedia annual science edition and gladly consented to the suggestion that we feature a report from a student's point of view. Thus, the following article was submitted by field school participant and nautical archaeology student Jim Jobling.

Many years ago, while still an undergraduate student, I was asked by a visiting professor to state the discipline in which I intended to specialize. I explained that, as I had always had a love for the sea, I wished to study nautical archaeology. Archaeologist Brian Fagan's reply was that wherever he went in the world, he was sure to find a dreamer!

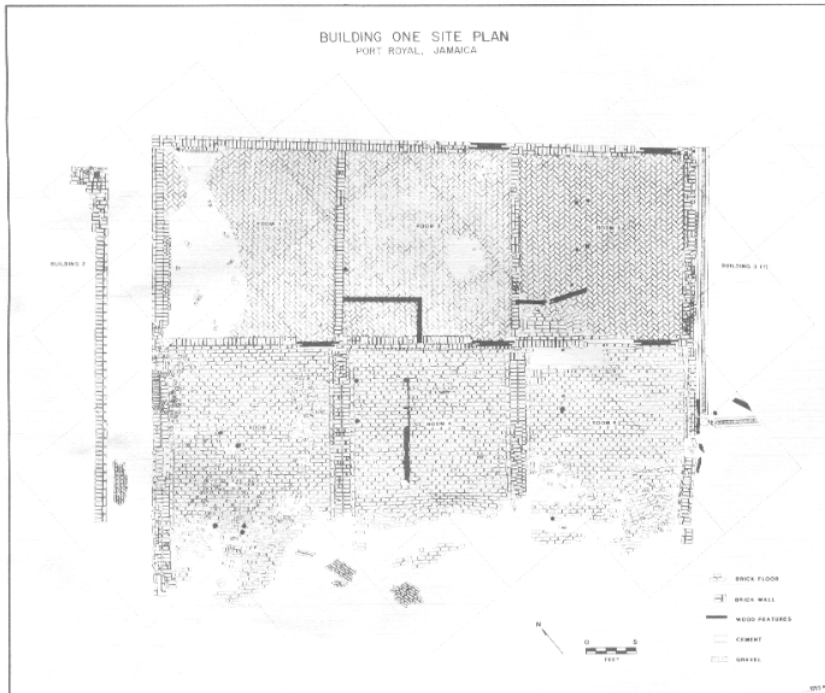
Having studied archaeology and being a certified scientific diver—and despite Dr. Fagan's skepticism—I knew there were opportunities to successfully combine these two interests. Diving on wrecks was second nature to me, but I had learned quickly that trying to do archaeological work alongside of salvage divers did not work out. In Africa where I lived, appropriate training or research facilities were not available, so I decided I would have to look elsewhere in the world to complete my education.

The 1984 Summer Field School at Port Royal, Jamaica, provided a unique opportunity to do so. Working under Dr. D. L. Hamilton on the underwater excavation of an English city that sank in an earthquake in 1692, I found that the field school was an ideal introduction to the practical side of the discipline; the theory was to follow later on, when I began studies in nautical archaeology at Texas

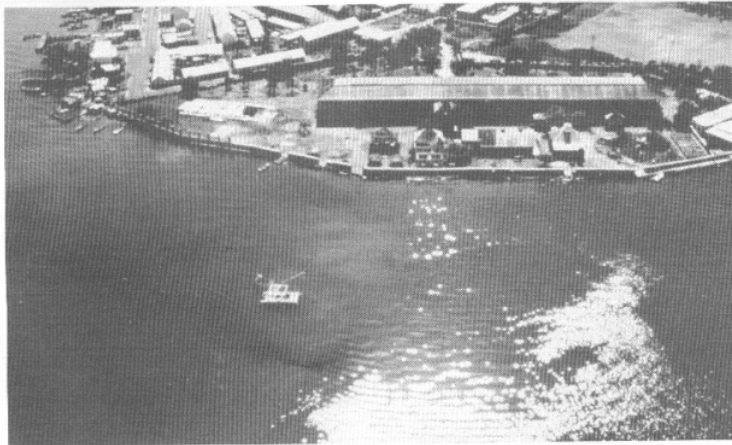
A&M University. The two are a perfect complement to one another, as I have discovered after experiencing the field school and two semesters at the University.

I went to Jamaica in May in the advance party, and that was a distinct advantage. Some of the students who arrived later when the work was getting underway were somewhat at a loss at first concerning the goals of the project. Combined with this were the varying levels of diving experience among the students, some of whom endured a period of disorientation as they began to work under water in the murky conditions of Kingston Harbor.

I found the underwater work both challenging and satisfying and never tired of the daily regime of diving on the same site. Finding artifacts during the three-hour underwater shift was a reward in itself. If there were only a few artifacts to be found, then the continuing view of the site slowly being uncovered was plenty to



The work of four field seasons, countless students, and six illustrators is seen in this site plan of Building One, being excavated at the sunken city of Port Royal, Jamaica, under the direction of Dr. D. L. Hamilton. The tiny squares represent the virtually intact pattern of bricks that formed the floors of the six-rooms. Wood features indicated by dark lines generally were doorjamb or internal partitions. Contributors to the production of the plan have included Cemal Pulak, Jody Simmons, Kevin Crisman, Bruce Thompson, Mark Myers and Shirley Gotelipe.



An aerial view of the Port Royal Project headquarters at the Old Naval Hospital—the very long building—also indicates the portion of the sunken city under excavation; the project barge is anchored just above the site. (Photo: Doug Kessling)

keep one's interest. Naturally, the work was not without its problems, but I found that none of these were insurmountable. For example, at times the inability to communicate under water was a nuisance. One either had to swim to the surface 15 to 20 feet above to converse, or write the conversation down so one's diving partner could read it and give a reply.

Port Royal is an ideal site for a field school in underwater archaeology. The diving conditions are exceptionally safe, even though the visibility is limited;

divers can easily get down to the site, and a large barge, which furnishes surface-supplied air, is anchored immediately above. In addition, the site is close to shore, from which divers merely swim out to begin their excavation shift. All of the operations are staged from the Old Naval Hospital, which now is a government-sponsored museum and archaeological research center. The collections of artifacts retrieved by previous excavators of the sunken city are housed there, and it was within the early 19th-century structures of the hospital that our

conservation and work facilities were located.

The excavation over the last few years has uncovered the remains of a six-room, multipurpose building that fronted on Lime Street in 17th-century Port Royal. The layout of the brick floor and foundations, with its superimposed layers of stratigraphy, is relatively straightforward. During the past season, we concentrated on three rooms which previously had not been excavated, in the process unearthing an abundant and interesting cross section of material culture from the period.

The diving was only a small part of the work we did; more time was spent on the surface writing our notes from each dive, and cleaning and processing the artifacts we had found. It was during these activities that I discovered the extent of the process involved in artifact conservation and documentation, and we all took a hand in the drawing, photography, cleaning and restoration tasks.

The experience of being in Jamaica was no less unique than the archaeological research. Time seems to be of little importance to the local inhabitants, and "Soon Come" was an expression that we all came to understand and appreciate. We had ample time ourselves to become acquainted with the people and culture of Port Royal, living as we did in a dormitory at the edge of town and walking each day to the Old Naval Hospital. The combination of culture, archaeology and research diving, for me, proved to be an ideal introduction I had long sought to pursue.

Jim Jobling

1985 Field School Applications Available

Applications for participation in the 1985 Field School in Underwater Archaeology at Port Royal, Jamaica, are now available, according to Dr. Donny Hamilton, project director.

Approximately sixteen students will be selected to attend the project, for which graduate-level course credit at Texas A&M University is earned. Corresponding to the University's two five-week summer sessions, the field school will begin June 4 and extend until August 12—a total of eleven weeks. About mid-way during the season, students will be given a one-week break during which they may visit other parts of the island.

In addition to completing excavation of the six-room structure on Lime Street, a good part of the summer operations, Hamilton says, will involve testing other areas of the thirteen acres of submerged city ruins. The object will be to determine

the extent of disturbance to the archaeological context—that is, how badly structures were destroyed during the earthquake and their subsequent subsidence into the sea.

Hamilton also hopes to determine whether another structure is located adjacent to the six-room building currently under study, along its northeast side. A building has been identified along the southwest margin, and it previously was hypothesized that the primary excavation site may have been situated on a corner lot in the late-17th-century city. Determining the presence of adjoining construction is of importance in identifying where on historic Lime Street the six-room building is located, based on period maps and city plans.

Students who participate in the Port Royal Project are taught a variety of skills. Not only do they learn underwater exca-

vation techniques, but they also are shown methods for underwater mapping, surveying and photodocumentation. In the laboratory, the procedures for documenting, conserving and analyzing material remains form a large part of the summer activities which students experience.

As participants, students are required to enroll for Anthropology 609 during the Texas A&M summer school sessions. A field school charge of \$500 covers the cost of room, board and laboratory fees; transportation to Jamaica must be provided by individual students.

For additional information or an application form, please contact Dr. Donny Hamilton, Department of Anthropology, Texas A&M University, College Station, TX 77843; telephone 409/845-6698.

Molasses Reef Wreck

Crew Seeks Clues In Many Ways

Researcher Searches For Signs Of Shipwreck Survivors' Camp

When it became apparent from our studies of the remains of the Molasses Reef Wreck that some or all of the ship's crew had survived the wrecking of their vessel, we began to suspect that they might have headed for West Caicos, the closest island downwind and downcurrent from Molasses Reef. This speculation was reinforced by the fortuitous discovery there in 1980 of a Spanish copper coin of the so-called "Santo Domingo type."

When we learned that the northern end of the island was going to be covered by spoil produced in the mining of aragonite, we decided to go to West Caicos to conduct a brief survey of areas that might have been attractive to shipwrecked sailors. Dennis Denton and I travelled to the island in June, accompanied by two local residents, Wayne Kafcsac, manager of Meridian Marine, and Mike Spillar, discoverer of the coin.

If survivors of the Molasses Reef Wreck had reached West Caicos, where would one look for traces of their passing? We could only speculate that they would have been attracted to sources of fresh water, high ground from which to signal passing ships, and sheltered coves in which they safely could keep their boats. Arawak Indian sites, if they could be located, also would be good places to look since it is highly likely that Indians eventually would come into possession—through trade or by force—of at least some of the artifacts brought to the island by the survivors.

Accordingly, our objectives were to make a metal-detector search of the place where Spillar had found the coin, to scrutinize rock carvings he had noted, to map the locations of water holes and springs, and to survey the tops of hills and ridges which likely would have lured shipwrecked sailors and Arawaks alike.



Searching with a metal detector, Don Keith sweeps the sandy bottom of a tidepool seeking buried clues that survivors did occupy the island after their ship was lost. (Photo: Dennis Denton)

Today the island is uninhabited, as it has been throughout most of the past. Some people say it is jinxed. Terry Richardson, resident of the nearby island of Providenciales, took us for a reconnaissance overflight, pointing out curious features visible from the air. From aloft we could see most of the island at a glance. An abandoned marina on the east coast had an eerie familiarity about it: Peter Benchley worked the place into the plot of his novel *Island*. The southern half of the island was dotted with water-filled sinkholes, the locations of which we marked on our map.

We landed on the west coast of the island and camped amid the ruins of "Yankee Town," a turn-of-the-century sisal plantation. During the next five days we clambered over iron-shore, hacked our way into the interior, explored caverns, and snorkeled the shallow waters offshore. Although we did not find evidence of occupation by early Spanish explorers, the survey was by no means an exhaustive one, and plans already are being laid for a more extensive project involving specialists in Arawak archaeology.

Donald H. Keith

MRW Conservation Facility Takes Lead From Florida Lab

It was clearly going to be a problem of mass production. There we were, confronted with eight tons of heavily encrusted, 16th-century material culture and faced with the certainty that somebody was going to have to *conserve* all those artifacts.

Faced with the certainty, actually, that we were the ones who were going to have to do it.

"We" work in the Molasses Reef Wreck Conservation Laboratory at the Texas A&M Research and Extension Center. The lab was established in 1982 to house and to conserve the artifacts being recovered from the Molasses Reef Wreck (MRW), an early 16th-century site in the Turks and Caicos Islands, BWI, which INA had begun to excavate under the direction of Donald Keith.

However, no one had anticipated the huge volume of material that three phases of fieldwork eventually would produce. To complicate matters further, most of those artifacts were of wrought iron, which is conserved by a safe but slow method known as electrolysis.

I'm talking slow. I'm talking two years' worth of treatment for each of our thirteen medium-sized cannons (swivel guns known as *versos*) and two small anchors, and longer for the two large cannons (*bombardettas*) and one large anchor. Not to mention a dozen eighty-pound breech blocks and over 1,000 small artifacts, which would need individual attention throughout their treatment. As time went on, it became clear that we would need a plan. But where to get one?

In terms of efficiency and production, probably no archaeological conservation laboratory surpasses the Florida State Conservation Facility in Tallahassee. There, Herb Bump and Jim Levy process the tons of artifacts that are legally recovered from Florida's coastal waters every year. As a result, their lab has been designed to handle large numbers of artifacts in a highly efficient manner.

After visiting the Tallahassee facility this summer, Don



Mark Myers in the MRW lab. (Photo: KC Smith)

Keith returned to College Station possessed by a vision that could only be described as "the light." Needing a term we could use around the office, however, we referred to this vision as the "master plan."

The bottom line of the master plan was, naturally, to complete the conservation process as soon as possible, which meant getting all of the large artifacts into electrolysis immediately. This logistic nightmare was eased by two serendipitous facts: for the first time since the project began in 1982, we had both the people and the money to do the job. Generous donations from private sources and through Texas A&M Uni-

versity made it possible for us to implement the master plan and to get every large artifact into electrolysis.

Also of major importance to the project was the fact that the lab had four full-time employees, as well as several volunteers. At the time, this included Keith, Lab Manager Tom Oertling, Bruce Thompson, and myself, although our group since has changed somewhat. This infusion of manpower and ideas created the momentum which carried the project through the hot College Station summer.

The answer to our small artifact problem seems to lie in hydrogen reduction. This is the process which cleared a ten-year backlog of artifacts in the Tallahassee facility. It entails heating the iron to a point just below melting in a reducing (hydrogen) environment. Basically, it does in four or five days what would take electrolysis six months to complete. Although the MRW lab does not own a hydrogen reduction oven, plans are being considered to transport one oven-load of artifacts to Florida for treatment.

Once we found out about this process, which requires that the artifacts be free of encrustation, we decided to concentrate our efforts on cleaning a single artifact class. Cannonballs, or shot, were easy to recognize inside their concretions, and we had enough to nearly fill the retort in the oven at Tallahassee. Although they were chosen strictly for convenience, they have yielded one of our biggest discoveries to date. Out of the approximately 180 shot that were uncovered this summer, about one dozen are hollow.

Why hollow shot? At present, we suspect that they were filled with gunpowder and employed as a sort of hand grenade. Used in boarding enemy ships, the bearer would light the fuse and toss it ahead of him. Undoubtedly, it also would have scared the bejabbers out of hostile Indians. More analysis is required before further conclusions can be drawn, but this is the earliest wreck in the New World upon which such "grenades" have been found.

We have hardly made a dent in the artifact collection. How many other discoveries lie ahead?

Mark Myers

Bahia Mujeres Wreck

Early 16th-Century Site Located

Last November, we returned to Quintana Roo to track an early 16th-century vessel that had eluded us the previous year. As part of INA's program to investigate ships of exploration and discovery, we were anxious to relocate and to examine what we believed was the earliest wrecksite in Mexican waters.

Discovered in 1958 by fishermen from nearby Isla Mujeres, the site was salvaged in 1960-61 by the Mexican diving club CEDAM, which removed cannons and anchors but otherwise left it intact. Twenty years later, we came across mention of the wreck in a book by CEDAM founder, Pablo Bush Romero. Photographs showed wrought-iron, breech-loading artillery similar to ordnance from the Molasses Reef and the Highborn Cay Wrecks we were studying. We concluded that the site might provide valuable comparative data in our research on late 15th- and early 16th-century ships of discovery, and in 1983 we went to Mexico to do a little detective work.

Working with Pilar Luna, director of the underwater department of the National Institute of Anthropology and History, and members of her staff, we located and recorded some of the original artifacts. Despite their deteriorated condition, the guns provided us with a broader understanding of the period weapons; and a small grapnel anchor was of a type we

had never seen. We had hoped to relocate the site itself, but a brief marine reconnaissance was unsuccessful.

Later, at Bush Romero's advice, Luna contacted Alfonso Arnold, CEDAM's chief diver for years, and invited his aid in finding the site during our second reconnaissance last fall. After only two days, Arnold relocated the remains—now almost invisible under years of coral growth. A low mound of concreted ballast stones running north-south nearly 20 meters lay on the edge of a patch reef near the bay entrance. We knew it was our sought-after site when Arnold found the encrusted chains he had used to anchor CEDAM's work barge during the salvage.

Preliminary recording included a field plan and photo-documentation. A metal detector signalled numerous "hits" around the ballast, but no excavation was attempted. Since only cannons and anchors were recovered previously, and since the site appears to be undisturbed otherwise, it no doubt contains much more than meets the eye. Further investigation of this early wreck is planned for 1985 or '86, and hopefully the excavation will add valuable comparative material to our growing knowledge of early ships of exploration.

Roger C. Smith
Donald H. Keith

Pulak: A Dedicated Young Scholar

No one who knows him would accuse Cemal Pulak of being undirected, uncertain, incapable, or insincere. Indeed, he is the antithesis: a bright, dedicated and driven student of nautical archaeology who has offered his skills and earnest interest to INA projects since 1975.

Pulak and the Institute discovered each other simultaneously a decade ago when Don Frey was attempting, for the first time, to engage local students in INA projects in Turkey, and Pulak, in high school, was ready for adventurous experience. All but packed for a climbing trip in Southeast Asia, he encountered one of Frey's posters on the campus in Bosphorus and replied with a lifetime of impressions from *National Geographic* about what was in store if he joined an underwater archaeological project. The intended site was near a place called Sheytan Deresi. Pulak was invited to come.

"I went down to Bodrum [INA headquarters] expecting to find everything in the highest possible order and condition, but, boy, was I surprised. Don Frey pulled out a compressor and said, 'Fix it,' and I spent the entire summer working on that compressor.

"At first, I was very disappointed, but later I appreciated this introduction to field work. It made me realize there are many important aspects to an excavation."

Archaeology was not unknown then to the 24-year-old student; in fact, it ranked third on his list of possible professions, after architecture and engineering, respectively. For many reasons, it was mechanical engineering that he targeted, and was on his way to a master's degree when George Bass asked whether he would come to Texas A&M to study nautical archaeology.

His interest notwithstanding, Pulak declined the offer in order to complete his schooling, and then was obliged to decline it for two more years while he served in his nation's navy. However, he continued to join summer field seasons, and even spent a month-long furlough from the service at the INA project at Serçe Liman. A civilian again when he returned the following summer, in 1979, he was accompanied by his new wife, Sema, who since has shared her superb skills as an artist on INA projects. Both now laugh when they admit that their honeymoon was spent doing archaeology on the "Glass Wreck."

Since entering Texas A&M in 1980 and

spending a summer at the first Port Royal field school in 1981, Pulak has become even more involved with INA's projects in the Old World. He has fortified his experience and his knowledge as director or assistant director of excavations on 4th-century A.D., Hellenistic, and Ottoman-era sites in Turkey, the latter having involved direction of a summer field school in 1983 which the Institute conducted for the Council of Europe. Reconstruction of this vessel's hull and material culture will be the topic of Pulak's second master's thesis. At the present, he also is involved with the Bronze Age ship excavation at Kaş as the project's assistant director.

Not unlike his colleagues in being highly preoccupied with his research,

Pulak does have one outside avocation for which he is renown among his friends. He has a collection of bugs and butterflies that numbers in the thousands, and one suspects he knows a little something about every member of the family—including those varieties sent from exotic project locations by sympathetic INA scouts. One of his enduring projects in life is to establish all species of bugs and butterflies in Turkey and to write a field manual about them.

Beyond these salient details of his life, perhaps the best way to introduce Pulak is through his own writing and research. In the following article, he discusses the 16th-century Ottoman shipwreck at Yassi Ada, that has become for him a subject of intense scrutiny.

16th-Century Ottoman Wreck: One Of Three Ships Trapped By Perilous Yassi Ada Coast

In 1967, in the process of excavating a late Roman or early Byzantine shipwreck at Yassi Ada, Turkey, expedition members from the University of Pennsylvania and the National Geographic Society made a remarkable discovery. Intermingled with the 4th-century A.D. vessel they were excavating, and a 7th-century Byzantine amphora-carrier that had been studied previously, was a third shipwreck. Its bow, at a depth of 42 meters, partially overlaid the stern of the older vessel, and its stern, in 36 meters of water, was adjacent to the 7th-century site. This curious ship—and perhaps the other two—had struck a reef 150 meters southwest of the small, uninhabited landform.

Centuries later, analysis of her keel revealed the ill fate of the vessel: the concreted shell of a bolt that once had fastened deadwood to the keel was totally distorted, suggesting the force of the impact. (Splinters from the disintegrated keel could still be seen in the bolt concretion matrix.) The vessel had received at least one fatal blow in the bow near the point where the keel gently curves toward the stempost. Of the three excavated shipwrecks at Yassi Ada, the latest was the only one to show definite

evidence of a suspected catastrophe.

During excavation of the 4th-century ship, part of the overlying vessel was uncovered, and freshly exposed timbers were mapped. Few artifacts were encountered; however, among those raised were glazed bowls with pedestal bases and interiors decorated with incised concentric circles and stylized tulips in the center. Erroneously, these artifacts were dated to the 13th century A.D.

During a second campaign at the site in 1969, a silver coin belonging to the later wreck was recovered and mistakenly identified as dating from the time of Philip III of Spain. This and radiocarbon dates from hull samples led excavators to believe they were dealing with an early 17th-century ship. In the same season, a number of important rigging parts were excavated. The next and final visit to Yassi Ada occurred in 1974 and ended within a few days with the outbreak of hostilities on Cyprus.

In 1978, while excavating the 11th-century A.D. "Glass Wreck" at Serçe Liman, Turkey, I heard of the mystery vessel for the first time from George Bass, one evening over a meal. His vivid and exciting description of the well-



Trays of wooden hull remains behind a mound of amphora sherds are ready to be lifted to the surface during excavation of the 16th-century Ottoman Wreck at Yassi Ada, Turkey. (Photo: Ottoman Wreck Staff)

preserved timbers and various rigging remains painted the image in my mind of an almost complete ship resting on the seabed, just waiting to be excavated! This vision remained with me, and in 1982 it was decided that the ship is question ought to be excavated.

Meanwhile, the silver coin had been cleaned and was re-identified by the American Numismatic Society as being a 4-real piece from Sevilla, dated 1566-1589, during the reign of Philip II rather than Philip III. This now placed the wreck in the time of the last great sea Battle fought with oared ships—the Battle of Lepanto between Christians and Ottoman Turks. And indeed, the nature of the glazed bowls, the location of the wreck off the Turkish coast, and the absence of cargo suggested the vessel might be an Ottoman warship from the time of the famous naval encounter.

The occasion for revived interest in the Ottoman Wreck was a field school in underwater archaeology which INA was conducting for the Council of Europe. The site was chosen primarily for two reasons: its proximity to the Bodrum Museum, where field school lectures would be held; and the belief that excavation could be completed in one summer, based on previous summers' facile uncovering of timbers.

After construction of a camp that would house summer school participants, phase one of the excavation began when we moored our diving vessel *Virazon* over the site. The underwater work began by uncovering and then spanning

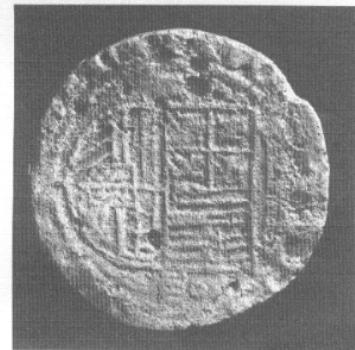
the excavation area with 2x4-meter, angle-iron grids subdivided into two 4-meter-square sections. We soon realized that the informative but hastily made map produced in 1967 was not up to the standards obtainable by more modern recording methods. Thus, a new plan was made with a stereophotogrammetric technique that had been devised earlier by Don Rosencrantz and subsequently refined for our field school use. The depth of the wreck permitted divers only 44 minutes of bottom time per day, thus demanding state-of-the-art measurement techniques. The second site plan surely is the most accurate yet made of a hull at such depths, and has been demonstrated to an accuracy of ± 3 cm.

As the wreck slowly revealed its secrets with each working day, the solid oak timbers at the bow—excavated during the previous seasons—proved to be the best-preserved portion of the ship. It did not take long for my long-harbored image of a perfectly preserved ship to crumble; or to realize that our excavation area was much larger than initially had been conjectured. Hence, our plan to simply sweep off and to map the hull was replaced by a painstakingly slow and careful excavation technique that would not damage fragile and disjointed wood fragments. Every piece was pinned to the seabed with bicycle spokes to prevent their disturbance before they could be recorded.

By the end of the 1982 season, most of the port side of the vessel had been excavated and mapped. In addition, to



A self-portrait by Cemal Pulak, as he cleans an encrusted artifact from the Ottoman Wreck.



The misdating of this 4-real piece initially led excavators to believe the site represented an early 17th-century vessel. (Photo: Ottoman Wreck Staff)

provide accurate data for the vessel's reconstruction, all of its frames, part of the keel, and about one-fourth of the preserved planking were raised and transported to Bodrum to be placed in freshwater storage tanks for further study. Some 150 retrieved concretions also were cast and recorded during the following winter study period. The most important and interesting of these was the pintel section of the rudder attachment.

The 1983 season involved two months of excavation, the goals of which were established through careful evaluation of the previous year's results. The primary objective was to excavate completely the starboard side of the ship, which seemed to possess large wooden members resembling wales. Unfortunately, the season fell short by about ten days of fully

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Lake Site Offers Abundant Remains

In the year 1759, a British army under the command of Lord Jeffery Amherst captured two French fortifications at the southern end of Lake Champlain and prepared to advance into the heart of Canada. To oppose this advance, the French had a small naval squadron on the lake, consisting of four sloops and a schooner. Amherst had brought with him an experienced naval officer, Captain Joshua Loring, a crew of shipwrights, and the ordnance and stores necessary to equip two warships. The shipwrights quickly constructed at Fort Ticonderoga the 155-ton brig *Duke of Cumberland* and the 115-ton sloop *Boscawen*. In early October of 1759, Loring and his warships cornered and captured three of the French sloops, clearing the way for the invasion and defeat of New France the following year.

Two-hundred and twenty-five years after Amherst's brief naval campaign on Lake Champlain, the remains of three French and Indian War warships have been discovered, sunk in seven feet of water below Fort Ticonderoga. The hulls have been identified as the British sloop *Boscawen*; one of the four 65-ton French sloops; and a small, flat-bottomed gunboat or batteau. The archaeological investigation of the vessels is being sponsored by the Champlain Maritime Society, the Fort Ticonderoga Association, and the State of New York.

The first season of excavation, directed by Arthur B. Cohn and myself, was conducted on the hull of the 70-foot-long *Boscawen*. Two 25-foot square grids, subdivided into 5-foot-square excavation units, were constructed and placed over the bow and stern of the sloop. The team of six divers excavated with water dredges, removing the overlying mud in 4-inch levels. In addition to each diver's notes and diagrams, the progress of the excavation was recorded by underwater still and video cameras.

A wide assortment of artifacts was recovered from the hull, including carpentry and foraging tools, lead and iron shot of different sizes, musket parts, and personal items such as buttons, pipes, coins, bottles, and wooden gaming pieces. Some of the more interesting finds included more than a dozen leather shoes and a pewter spoon with the owner's initials—HI—scratched on the back. Evidence of the crew's diet consist-

ed of deer, pig, and cattle bones, butternut shells, and squash seeds.

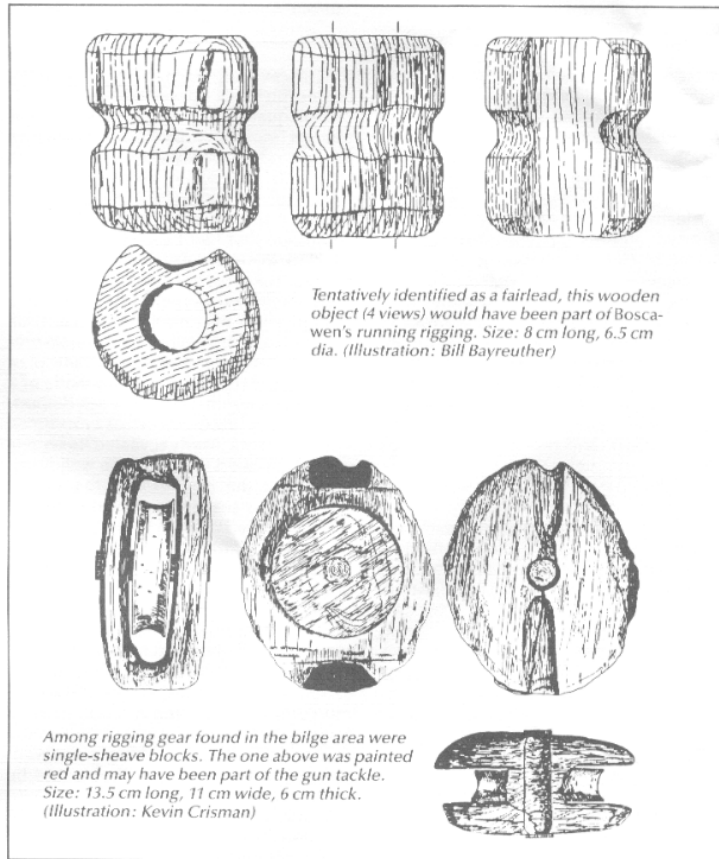
Rigging equipment was found in the bilges, and included single-sheave blocks (some painted red), deadeyes, parral beads, and rope. Ballast stones were lying on top of some of the rigging material, suggesting an attitude of carelessness among the crew regarding Crown property.

The hull, constructed almost entirely of oak, was about 40 percent complete. The frames and planking were of substantial dimensions, and they were fastened with both treenails and spikes; the *Boscawen* appeared to be over-built for the protect-

ed conditions on Lake Champlain.

About one-half of the *Boscawen* was excavated during the summer of 1984, and preparations are being made to complete fieldwork on the hull in 1985. The archaeological study of the three French and Indian War vessels at Fort Ticonderoga will provide a better understanding of colonial French and British methods of shipbuilding, and of life on Lake Champlain 225 years ago.

Kevin Crisman, a recent master's degree student in nautical archaeology, has directed a number of surveys and excavations around Lake Champlain.



Elissa Restoration

A Spirited Lady Is Brought To Life

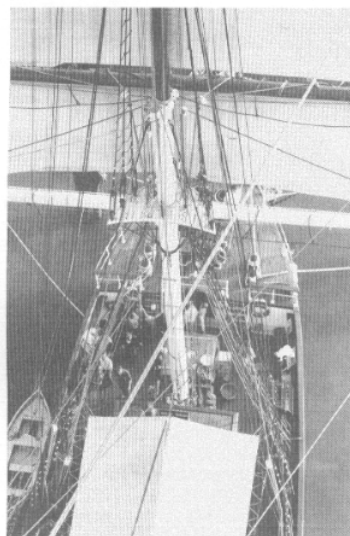
I grew up with a love of sailing ships. I remember at age seven being entranced as I watched my eldest brother work on the rigging of a model of the *Cutty Sark*. Like most young men of that age—of any age—I dreamed of what it would be like to sail a square-rigger like the *Cutty Sark*.

As a youth I sailed a variety of boats, and now, years later, I am a nautical archaeologist who studies ships, seafaring, and seamen of ages past. I was pleased and surprised to find that, under my nose in Galveston, the tall ship *Elissa* was being restored and actually was being sailed. Having completed my degree in May, I now had the time and the opportunity to fulfill my dream.

Elissa, an iron-hulled barque, was built in 1887 by Alexander Hall and Company in Aberdeen, Scotland, and was in continual merchant service for over 100 years. Some years ago she was discovered in a scrapper's yard and was saved from an ignoble demise by Peter Throckmorton, Karl Kortum, and a number of other dedicated men. Eventually she was brought to Galveston, a port she had visited twice in the late 1800s when commerce was still conducted by sea. *Elissa* became a part of the ongoing reconstruction and renovation of Galveston's historic Strand District, supervised by the Galveston Historical Foundation. Not just a museum devoted to the last years of the age of sail, *Elissa* is once again a proud, spirited sailing ship, just as she had been when she slipped down the ways in Aberdeen so long ago.

The success of *Elissa's* restoration in large part has been due to the untiring efforts of a team of volunteers who maintain and upkeep the ship, from scraping and painting to bending on sail. Most come from Galveston or Houston; they include doctors, nurses, businessmen, housewives and students, and from their number comes the crew who sails her each year. Among the most far-flung of the volunteers, I drove the 300-mile round trip from College Station nearly every weekend for five months. It was a long haul just for a dream.

When I first stood on her deck, I wondered whether I would ever have the courage to climb her 102-foot tall masts. It took some coaxing from some very understanding veterans, but once I realized that I was not going to fall as long as I was hanging on, that there were plenty of things to hang onto, and that



The figurehead of *Elissa* and a view of her decks from aloft were photographic images captured by the author during his work aboard the restored barque.

the masts were not going to fall of their own accord (yes, that thought passed through my mind more than once), I eventually did make it to the top—the royal yard. After a month of building my courage by going higher and higher, I began to feel more and more like a member of the crew.

I learned many things as a volunteer aboard *Elissa*: marlinespike seamanship, how to climb the rig, when and why to haul on which line, and exactly how heavy an anchor chain is. I learned how to lift her heavy spars and small boats using a few blocks, a stout line, the ship's capstan, and a few able bodies. I gained confidence in myself that I could do all these things and direct others in doing them as well. In a way, I learned how to think like a seaman; to do things in the simplest and safest possible way; to do things right the first time, paying attention to details. I came to respect those who were teaching me, who had the knowledge to bring back the beautiful *Elissa* from a neglected, rusting hull. They were keeping alive the knowledge and culture that I was trying to resurrect from old books and documents. My respect for the seamen of the past increased a hundred-fold because of what they had to know and to do, and what they went

through. In all cases, it was quite a lot.

I also had hoped that by sailing on *Elissa* I might "touch hands" with the seamen of long ago to see firsthand what the life of a mariner had been like. To some extent I think I did, although I did not realize it at the time. It wasn't the first day of the sail in October, on the t'gallant yard with the mast doing figure-eights across the sky (me along with it); nor was it two days later on the upper tops'l yard with the 30-plus mph wind flopping the sail up and back over the yard. Nor was it the night when we dragged anchor in a thunderstorm, with rain being blown horizontally and lightning flashing images from the darkness. I was scared, but only because I didn't know any better. An old salt would have taken it in stride.

I touched the old sailors while standing my two-hour anchor watch, the rain finding its way inside my foulweather gear. The feeling lingered later that night when, my watch completed, I went to the galley, warmed myself by the wood-burning stove, ate clam chowder, and talked with some of the crew as my shoes and socks dried over the cast-iron stove.

(For additional reading about *Elissa*, see *Sea History*, No. 15, fall 1979; and No. 26, winter 1982-83).

Tom Oertling

RESEARCH NEWS

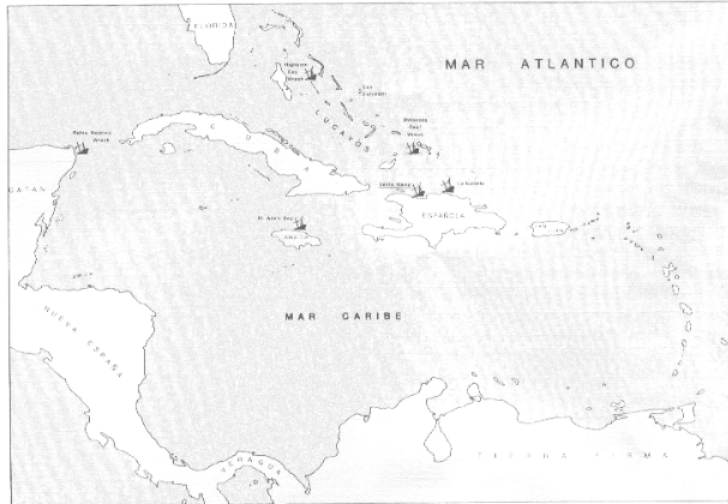
16th-Century NW Sites The Focus of Research; Findings Shared at CUA

Last spring, a group of College Station-based INA colleagues began to hold informal, weekly seminars on the topic of early 16th-century vessels of exploration and discovery. The meetings took place at the conservation lab for the Molasses Reef Wreck, a contemporaneous ship whose excavation under Don Keith's direction in part had inspired the need for the sessions, as had the dissertation topic of Roger Smith on these very vessels.

The other scholars who joined the seminars also had interest in 16th-century ships or New World nautical archaeology. Among them were Mark Myers, Tom Oertling, Denise Lakey, Joe Simmons, and Cemal Pulak. Week after week a different aspect of caravels and exploration *naos* was discussed—their construction, rigging, material evidence, armaments, and so on; after a semester's worth of sessions, group members had discussed and debated nearly all of what is known about the "Mercury spacecraft" of the era of exploration. They also had come to realize that a great deal remains to be known—some of the most important details—and thus was established a challenge that has grown into a major research effort.

Focusing on six known or potential sites in the Caribbean, a seven-person team has combined their various professional perspectives of nautical archaeology, conservation, archival study, and naval architecture and ordnance to continue examining the larger research question. The sites under study include the Bahia Mujeres Wreck off the coast of Yucatan, Mexico; the Highborn Cay Wreck in the Bahamas; the Molasses Reef Wreck excavated in the Turks and Caicos Islands; the elusive Columbian shipwreck sites at St. Ann's Bay, Jamaica, and on the north coast of Haiti; and suspected sites in the harbor at La Isabela, Dominican Republic.

Since 1980, when the first tentacles of interest in this period of seafaring were stretching out toward a cohesive plan of research, INA associates have searched for or studied five of the six target sites. In three cases—the Bahamas, the Turks and Caicos, and the Mexico wrecks—research has involved interaction with previous site salvors in an attempt to reclaim information and to examine ar-



Black dots on this map of the Caribbean indicate sites which have or perhaps will yield evidence of early 16th-century vessels of exploration and discovery. (Illustration: Mark Myers)

tifacts gleaned during the vessels' earlier salvages. If not facts, then questions and hypotheses have emerged during the conservation and analysis of the Molasses Reef materials in College Station. Archival research currently is being conducted in Spain by Lakey, and Simmons is embarked on a data-gathering mission in museums and repositories elsewhere in Europe that is focusing on early 16th-century ordnance.

Results of the study to date were synthesized and presented by six INA panelists in January during a two-hour symposium at the Conference on Underwater Archaeology. Panel moderator Smith introduced the topic and described the research regime. Myers discussed what is known about the construction of caravels and exploration *naos*, and Keith related the work that has been done on the five primary sites. Lakey described problems and offered tips concerning archival investigations on historic-period ships, and Bruce Thompson presented the current evidence for systems of material culture that has been excavated from 16th-century shipwrecks. After a concluding discussion by KC Smith on the need for interdisciplinary study in such research programs, a lively exchange of questions and comments was conducted among panelists and symposium attendees.

What was clear from the speakers'

presentations were their objectives in the scholarly effort: they are seeking to assemble a body of data, through myriad means and from various perspectives, about an important but poorly understood class of historic ships. Of equal import will be the availability of their information for impending Quincentennial Anniversary projects and celebrations, in particular, the replication of Columbus's three vessels of discovery.

An Editorial Note . . .

Please don't be shy about sending material for inclusion in future issues of the *Newsletter*. We welcome articles of two types—major project reports or news briefs—and the more illustrations accompanying these articles, the better. We are equally interested in printing requests for information, publication reviews, news of field schools and upcoming conferences, details about employment opportunities, and letters to the editor.

A few guidelines should be remembered. Major pieces should be about 500 words; items for the Research News section, about 200 words. If possible, please send double-space-typed manuscripts. Our months of publication are March, June, September and December, with deadlines for articles the 10th day of the preceding month.

Ottoman Wreck

Continued From Page 11

completing this time-consuming excavation. Although hull remnants in the region were poorly preserved and fragmentary, parts from the upper sections of the ship were recovered, and these members will greatly aid our illustrated reconstruction. Almost all of the wood fragments from the starboard side have been mapped and raised. In addition, two 1.5-meter pieces and the 7-meter stern section of the keel also were recovered, although the latter element, because of its size, had to be cut into two sections under water to be raised.

Our secondary objective of recovering the mating gudgeon for the pintel found in 1982 was unsuccessful. Lack of time also prevented subsidiary tasks such as raising the port side stern planking, which might have revealed the pattern of the long-lost frames in the stern.

To date, approximately 200 square meters of the wreck—about 90% of the total area—have been excavated, and much work remains to be done before certain conclusions about the ship can be made. Nonetheless, according to preliminary

estimations, we believe the vessel had an overall length of 21 to 23 meters and a breadth of approximately 7 meters. The function of the vessel remains a mystery, although stone and cast iron cannonballs recovered suggest it may have been a naval ship. Additional pedestal-base, glazed bowls were recovered in various sizes, bringing their total number to twelve. The largest is decorated with a crude five-pointed star instead of incised tulips, and the smallest is plain. A whetstone, a glazed cooking pot, an amphora glazed on its inner surface, bits of broken glass, a broad axe, and a stone dressing hammer (perhaps to shape stone cannonballs) also were among the items recovered.

It is hoped that ongoing work, perhaps coupled with a third season at the site in the future, will yield definitive clues to the nationality, purpose and structure of this relatively well-preserved vessel. Any new information will be a welcomed supplement to our meager knowledge concerning 16th-century ship construction technology.

Cemal Pulak



With the aid of an air-filled lifting bag, an archaeologist gently guides a tray of fragile wood fragments from the Ottoman Wreck to the surface. The remains are destined for freshwater storage and study at the Bodrum Museum. (Photo: Ottoman Wreck Staff)

WOULD YOU LIKE TO JOIN AN ORGANIZATION WHOSE WORK SPANS FOUR CONTINENTS, 3,400 YEARS, THE DEPTHS OF THE WORLD'S SEAS, AND THE LIMITS OF THE EARTH'S KNOWLEDGE?

It's easy to do: contact Raenell Silcox, membership coordinator for the Institute of Nautical Archaeology. Send her your name, address, phone number, and a check for \$15.00—the annual membership fee. That's all that is required to join the world's most intriguing organization.

What is INA?

The Institute of Nautical Archaeology is a non-profit scientific and educational organization which fosters and promotes study of the history of seafaring and human maritime endeavors. Based at Texas A&M University, College Station, Texas, INA enjoys a strong affiliation with the academic community and with the graduate specialization in nautical archaeology offered through the Department of Anthropology.

Since 1973, Institute associates have undertaken archaeological research in the Mediterranean, Africa, the Far East, the Caribbean, and the United States. The objects of their study have included all manner of vessel, from Bronze Age merchantmen to 20th-century turtling boats, as well as port facilities, seafaring hardware, ships' models

and other material evidence of people who lived and died at sea. The research requires field work and book work, work in laboratories and museums. It requires input from many disciplines, and it requires dedication and patience to extend the current limits of our knowledge about humankind's seafaring heritage.

Are there benefits of membership?

Most certainly! Open to the public, membership in INA has several benefits including receipt of the quarterly INA *Newsletter*. Often, this is accompanied by offprints of journal and magazine articles by Institute associates. Members also receive a reduced subscription rate to the *International Journal of Nautical Archaeology*, and a reduced purchase price for books and slide series about INA projects.

What am I waiting for?

What ARE you waiting for? Join today! If you already are a member, share this information with a friend. We look forward to hearing from you.



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