

INA NEWSLETTER

VOL 10 NO 4



Winter 1984

INA'S 1983 SEASON



L to R: Ottoman Wreck hull remains; glass mending in Bodrum; sediment coring at St. Ann's Bay; fish basket in Port Royal.

In this issue, individual project directors and research personnel provide INA members with an overview of the work carried out by the Institute on various projects in 1983. Many of these activities will be the subject of major articles in forthcoming issues.

THE GLASS WRECK

Although the Glass Wreck excavation was completed in 1979, the mending of the thousands of broken glass vessels, the conservation and reconstruction of the hull remains, and the molding, drawing, and study of the artifacts is continuing.

Under the direction of Cemal Pulak, a Texas A&M University nautical archaeology graduate student, four local menders are tending the arduous task of piecing together thousands of fragments of broken glass to form complete or near complete vessels. Each month brings new excitement as George Bass opens the envelope containing Sema Pulak's drawings of the latest reconstructed glass vessels. Some months the envelope contains drawings of entirely new vessel types, adding to what is already the largest collection of medieval Islamic glass in existence.

Aside from broken glassware, work on Glass Wreck artifacts focuses on replica-

tion of iron objects, including anchors. It would now appear that at least half the eight anchors on board had been broken and hastily repaired—little wonder medieval ships carried so many spares. Joseph Schwarzer has begun the difficult task of replicating a large assemblage of objects within a wicker basket, an assemblage that includes a bronze steelyard with iron chain and balance pan, a padlock, a dozen chisels and drills, a wood rasp, a claw hammer, and spare nails. In the same envelope with the glass drawings, Netia Piercy sends her drawings of the iron, copper, and bronze implements from the wreck.



Joe Schwarzer works on Glass Wreck concretion.

The Turkish government has just completed the roof over the new museum building which will house the reconstructed remains of the ship's hull. The new building is located within the Crusader Castle, which houses the Bodrum Museum of Underwater Archaeology. The hull remains are expected out of chemical treatment in February or March when they have finished curing.

ANCIENT HULL RESEARCH

My 1983 field work began January 1 with a trip to Haifa, Israel, to work on the ancient warship ram found off the coast at Athlit. Two weeks were spent studying methods to extract the old warship's bow timbers from their highly decorative bronze ram; they had been securely locked together since the fourth century B.C. That trip resulted in enough information to permit the completion of laboratory research on the ram's timbers. An article on this work was published in *Mariner's Mirror* in August. The timbers were removed in July, and the ram is now undergoing conservation treatment preparatory to display in the Haifa Maritime Museum. Research on this important find continues in Israel and at INA's Ship Research Laboratory in College Station.

During an April conference on the study of ancient Greek warships at the National Maritime Museum in Greenwich (London), England, I presented a paper on ancient ship construction. Shortly thereafter, I began work in Herculaneum, Italy, on a Roman boat which was a victim of the eruption of Mt. Vesuvius in A.D. 79. This boat will be the subject of an elaborate study next year.

Then in June, I spent several days at Perama, Greece, where a sailing replica of the fourth-century B.C. Kyrenia ship is being built. Here the theories resulting from years of study of the excavated Kyrenia remains are being applied by an experienced team of shipbuilders, using the methods and materials found in the original hull. It is an exciting project. During the summer, I also visited INA headquarters in Bodrum, Turkey, to discuss plans for the new Serçe Liman ship museum with the architects. We expect to begin the reconstruction of the vessel next spring. Most of the year was spent over drafting boards and in libraries, however, and at the keyboard of my new word processor, tending to a vital aspect of archaeology: turning our findings into public knowledge.

J. R. Steffy

Photo: Don Frey



Van Doorninck holds amphora for Sheila Matthews to examine graffiti.

CONTINUING RESEARCH ON THE YASSI ADA BYZANTINE WRECK

Significant new information about the cargo, anchors, and galley of the seventh-century Yassi Ada ship has been acquired since the publication of the final report (*Yassi Ada: A Seventh-Century Byzantine Shipwreck*) just last year. Several ceramic vessels from the ship's galley, as well as over a dozen fragments from its tile roof, have been brought to light by the present excavation of the sixteenth-century Ottoman Wreck also at Yassi Ada, and a restudy of the cargo, amphoras, and anchors is being undertaken by Fred van Doorninck.

The restudy was prompted by the discovery that many of the Byzantine Wreck amphoras had graffiti scratched on them. Since only 110 out of some 800 amphoras were recovered during excavation of the wreck, it became clear that the remaining amphoras would have to be raised. Fully two-thirds of them are now in the Bodrum Museum where they underwent a preliminary cataloging this past summer; over a dozen amphora types other than those published in the final report were recorded—each of them represented by only a few examples. Graffiti, often scarcely legible even under optimum lighting, have now been found on 80 amphoras and are being drawn by B. J. van Doorninck. Those deciphered to date include the words *phakea* (lentils) and *rhoe* (juice) and the names Oly(m)pios and Georgios, the latter name scratched on the amphora after firing, perhaps indicating it had belonged to Georgios, the ship's captain. A study of the organic contents of these amphoras, continued this summer by Texas A&M University graduate student Cheryl Ward Haldane, now indicates that some 700 globular-shaped amphoras in the cargo may have contained wine which was flavored with umbelliferous (possibly anise) seeds. A rather frequent occurrence of one or two olive pits in these amphoras raises the possibility that many of these vessels were reused, having earlier held olive oil or other contents (such as lentils?).

Considerable work was done on the anchor concretions from the Byzantine Wreck with a view toward replicating one of the iron stocks and at least one of each of the three sizes of anchors the ship carried. The letter epsilon was found on one anchor, a discovery that prompted the au-

Continued on page 4.

PEOPLE AND PLACES

Tom Oertling, a Texas A&M nautical archaeology graduate student and INA project volunteer, spent this fall in Yorktown, Virginia, helping with the Virginia Research Center for Archaeology excavation of a Revolutionary War vessel. Earlier in the year he was on the site of a sunken Basque whaler in Red Bay, Labrador, helping with the Parks Canada excavation and taking wood samples from the hull. Tom will be returning to College Station to work on the hull remains from the Molasses Reef Wreck this spring. . . Ruby Lang, another A&M graduate student and INA volunteer, has recently moved from ship reconstructor to project director of the search for the *Mittie Stephens*, a steamboat lost in a fire on Lake Caddo (Texas/Louisiana border) in 1869. Aside from its importance to the history of the area, the steamboat is beginning to reveal an intriguing story, making the research all the more exciting. . . Also a Texas A&M graduate student/INA volunteer, Cathy Hoyt has been working on the conservation of a number of artifacts recovered from the *Sea Venture*, which wrecked in Bermuda in July 1609. The ship was one of seven bound for the infant colony of Jamestown when a hurricane drove her aground. While most of her survivors finally made it to Virginia, a few stayed behind and

formed the nucleus of a colony, thus claiming the island as British territory. The artifacts will be returned to Bermuda for display in the Bermuda Maritime Museum. . . Carol Olsen, an A&M staff member, graduate student, and former INA volunteer, has been invited to lecture at the Chrysler Fine Arts Museum in Norfolk, Virginia, on January 8. Her lecture will cover her extensive research on identifying ship's figureheads in the Mystic Seaport Museum and Mariners' Museum. Her work has led her to serve as a consultant for antique dealers wishing to authenticate their figureheads. In May she will be presenting her work at the prestigious Samuel Eliot Morison Lecture Series at the U.S.S. *Constitution* Museum, Boston, Massachusetts. . . INA Research Associate Roger Smith spent the fall as a Research Fellow at the John Carter Brown Library, Brown University, Providence, Rhode Island. He used the library's excellent collection for his research on the nautical technology of the period of discovery and exploration of the New World.

NIKONOS IIIs NEEDED BY INA

In recent years almost all our underwater photographs have been shot with a Nikonos III. When one is occasionally flooded, in-field first aid has been a thorough rinsing with fresh water followed by drying with alcohol or even cologne.

The Nikonos III is no longer in production and reconditioned models are difficult to find. We have tried the Nikonos IVa (actually a better camera for photographers who do not subject it to the grueling schedules of the archaeologist), but a dose of sea water on its advanced electronics requires more than a sloshing with cologne to make it right. Needless to say, we cannot put an excavation on hold while waiting for our cameras to be repaired.

In short, we need more Nikonos III camera bodies for our upcoming season's work and are prepared to pay for one in good shape or accept it as a tax deductible donation. If you can bear to part with your old camera or know of someone who wishes to trade up to the Nikonos IVa, please call us at 409/845-6694.

1984 IJNA, VOLUME 13

The 1984 subscription rate to the *International Journal of Nautical Archaeology* is \$41.00 US for INA members. This price represents a savings of approximately 50% off of the regular subscription price. A subscription to the journal is the best means of keeping abreast of research around the world in underwater archaeology.

To receive the INA discount, members should submit their orders, accompanied by a check or money order, to INA/PO Drawer AU/College Station, TX 77840.

PROFILE

would take the profession. With the dedication of a few scholars who believed underwater archaeology could make significant contributions to the understanding of man's past, and with the help of many supportive Board members like Jack, the Institute—and nautical archaeology—has indeed come a long way since its establishment in 1972.

Jack was one of the fifteen founding INA Board members and has served as Chairman of the Board. As an avid diver, Jack was involved in Caribbean wreck diving long before his association with George led him to the Mediterranean. For years, Jack has wanted to find an early Phoenician (Canaanite) shipwreck and has been a driving force behind INA's annual survey of the Turkish coast. Needless to say, when INA's Turkish associates investigated sponge divers' reports of an early shipwreck containing Bronze Age "oxhide" ingots and Canaanite amphoras, Jack was

as excited as anyone to learn that perhaps this site was an early Phoenician shipwreck.

Jack spent time this fall with the INA survey team diving on this Bronze Age wreck site located near Kaş. From Don Frey's stereophotographs, Jack produced a site plan of the wreck, pictured on page 4. This fall is not the only time Jack has been to Turkey to help with the underwater work; he is sometimes accompanied by his wife, Jean, who has also assisted INA as a working diver on the Serçe Liman Glass Wreck. Jack is also an accomplished underwater cinematographer; readers who saw the *Odyssey* program, "The Ancient Mariners," have seen some of his excellent underwater footage.

A Texan by birth, Jack received his degree in architecture from Cornell University. He now resides in Tulsa where he is an oil producer. He and Jean have two daughters, Karen and Jenny.

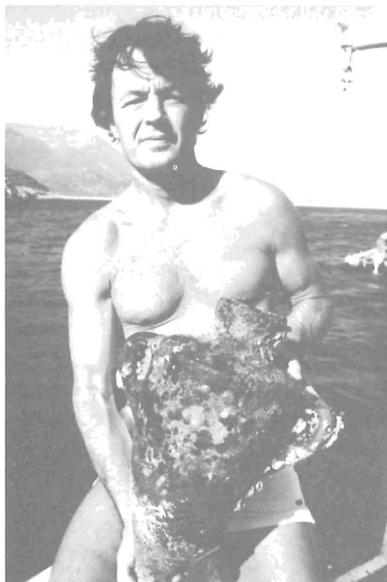


Photo: Don Frey

Jack Kelley holds Canaanite amphora from Kaş Wreck.

When Jack Kelley and George Bass were first introduced while George was still at the University of Pennsylvania, no one could have foreseen how far the founding of an institute of nautical archaeology

Continued from page 2.

thor to investigate the anchors of the eleventh-century Glass Wreck and find that at least one was stamped with Arabic letters. These seventh- and eleventh-century anchors now become the first reported examples of stamped anchors from the medieval Mediterranean world.

F. H. van Doorninck

TURKISH COASTAL SURVEY

In 1980 INA began its annual survey for shipwrecks along the western coast of Turkey. The primary purpose of this survey is to develop an extensive selection of sites from which to choose when INA is ready to begin a new excavation in Turkey. However, by sampling the sites that do not warrant excavation themselves, INA hopes to learn more about trade routes in antiquity.

The 1983 survey went south of Bodrum to the area of Fehtiye, Kalkan, and Kaş. Four of the dozen-odd shipwrecks investigated this year had cargoes which remained intact enough to warrant further study. One of these, the Kalkan Wreck, about which we had heard much over the last decade because of the "huge mound of amphoras lying close together," had been badly looted despite harsh Turkish penalties for removing antiquities. Not a single unbroken amphora remained.

While INA still relies extensively upon the reports of Turkish sponge divers, some of this year's best finds were a result of the survey crew's own experience and intuition. In Kekova, a very large natural harbor where sponge diving is forbidden because of the number of ancient sites nearby, the *Virazon's* captain, Tufan Turanlı, pointed out that a dangerous reef at the mouth of the harbor was just in line for ships traveling to the ancient city of Myra on the far side of the harbor. A snorkeling reconnaissance of the tip of the reef turned up the remains of a very large cargo, the strap-type handles indicating they were from large, Iron Age jars. The large jars and other selections of pottery found *in situ* may provide valuable parallels for dating similar artifacts found on land. Two days later, just before completing our investigation of the reef, we stumbled upon a sandy ravine filled with some thirty intact amphoras. Because this site apparently has not been looted and is contained within a small area, raising the cargo to look for galley wares and other remains of shipboard life would make a valuable project.

However, the most exciting activity of the survey season was the preliminary examination of the Bronze Age Wreck, discussed below.

D. A. Frey

Drawing: Jack Kelley



THE BRONZE AGE WRECK AT KAŞ

This summer INA's survey team made the two-day trip from Bodrum to Kaş to spend almost a week exploring and documenting a Bronze Age wreck which had been reported to the Bodrum Museum of Underwater Archaeology by Turkish sponge divers the previous year. Our two Turkish commissioners, Askin Canbazoglu and Yasar Yildiz, had already raised a copper "oxhide" ingot (like those excavated at Cape Gelidonya in 1960) and described the site to us, so it was with great excitement that we made our first dive. Chosen for INA's major 1984 excavation, the wreck lies 150 to 170 feet deep, the deepest we have ever attempted to work.

Our objective was to learn as much as possible without disturbing the site in order to prepare for the upcoming excavation and to anticipate our material and personnel needs. The photomosaic and subsequent plan of the site enabled us to obtain a more reliable count (83) of the oxhide ingots, more than twice the number recovered from the Cape Gelidonya wreck. The six very large storage jars indicate the vessel is much larger than that at Gelidonya. Initial testing leaves Cemal

Pulak hopeful that hull remains lie under the cargo. Moreover, the discovery of eight Canaanite (early Phoenician) amphoras reinforces George Bass' theory that shipping in the Late Bronze Age lay as much in the hands of the Phoenicians as it did in those of the Mycenaean Greeks.

D. A. Frey

THE SIXTEENTH-CENTURY OTTOMAN WRECK

The sixteenth-century Ottoman Wreck was discovered by chance in 1967 during excavation of the fourth-century Roman/Byzantine wreck at Yassi Ada. Because its bow overlay the stern of the earlier wreck, it was partially excavated in 1967. Not until the Council of Europe Field School in 1982 was real interest in continuing the excavation of this relatively "new" wreck rekindled.

By the end of the 1982 season almost all of the port side had been mapped, a large section of the fore part of the vessel raised for study, and some 150 concretions raised and cast, the most interesting being the gudgeon (rudder hardware).

After detailed evaluations of the previous year's results, we chose as our primary objective for the 1983 season the excavation of the starboard side of the ship, where soundings had revealed large curious wooden members resembling wales from the upper part of the hull. Although poorly preserved, parts from the upper sections of the hull were recovered and will greatly aid in the study scheduled for spring 1984. A secondary objective of recovering the gudgeon's mating pintle was unsuccessful.



Lifting wales (at right and left) and other timbers from Ottoman Wreck.

Photo: Tufan Turanlı

Analysis of the keel revealed a totally distorted bolt concretion containing fragments and splinters of what had once been part of the ship's keel: she had received her fatal blow as the bow struck the reef. Of the three shipwrecks excavated at Yassi Ada, only the Ottoman Wreck reveals definitive evidence for the suspected catastrophe. Peculiarly lacking in artifacts, this wreck demonstrates clearly that sinking ships do not have to be driven into the sandy sea bed by heavy cannons or a cargo of amphoras in order for their wooden hull members to be preserved.

Much work still remains to be done before conclusions about the ship's nationality, purpose, and structure can be made. However, according to preliminary estimations, we may say that the vessel had an overall length of 21-23 meters and a breadth of approximately 7 meters. Hopefully, ongoing study and a third excavation season will yield definitive information about this relatively well-preserved ship. Certainly any new information will supplement our still meager knowledge of sixteenth-century ship construction technology.

C. M. Pulak

PORT ROYAL

Excavation of the seventeenth-century sunken city of Port Royal continued for a third season as a joint INA/Texas A&M University field school.

The focus of the excavation has been a brick building (Building #1) containing three sets of paired rooms, each pair connected by a doorway, for a total of six ground rooms with the probability that there was at least one upper story to the structure. The three northern rooms each have a doorway onto what was once Lime Street, one of the major streets along the harbor front in 1692.

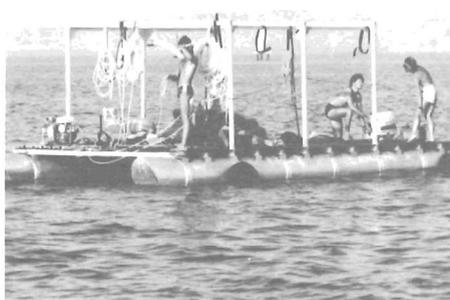
By 1983, the excavation of Rooms 3 and 4 (two of the three southern rooms) was completed. A rather interesting find was a large wicker fish basket found near the southwest corner of Room 3. I feel confident in calling it a fish basket, for on one of my trips to a side street of Kingston, I happened onto some fish mongers whose fish were displayed in baskets identical in every detail to that found in Room 3. Judging from the associated artifacts, Room 3 was probably a meat and possibly a leather processing shop. Room 4 is believed to have been a tavern.

Room 5 is extremely interesting. The outer wall of the building fell across the floor of the room preserving a large

amount of architectural detail and an immense amount of artifactual material. From the thousands of fragments of unsmoked pipes of several varieties found scattered across the floor, it seems obvious that Room 5 was a pipe shop. In addition to the pipes, there were over a hundred liquor bottles, two brass candlesticks, and several pewter objects—two plates, a charger (large platter), a unique tankard, and a baluster (for liquid measurements).

In 1983 the entire excavation operation was improved thanks to the generosity of AL-CAN of Jamaica and their international office in Ottawa, Canada. AL-CAN completely designed, constructed, and donated an aluminum pontoon barge with a 12-by-24-foot working platform. A diesel driven air compressor mounted on the barge replaced the two-year-old gasoline-powered compressors that had become very unreliable.

Photo: Dennis Denton



Working from barge at Port Royal.

Also this year, the Government of Jamaica completely renovated one of the former British Naval Officers' Quarters (constructed in 1898) to comfortably house our entire crew of approximately 20 people, and for the first time meals were cooked and eaten at our place of residence. We are extremely grateful to the Government of Jamaica and Prime Minister Seaga for their continued support. It is with enthusiastic optimism that the 1984 project is being planned with the goal of completing the excavation of the remaining three rooms of Building #1, the first of many buildings to be excavated in this important seventeenth-century British site.

D. L. Hamilton

THE PEDRO BANK SURVEY

The primary goal for the Pedro Bank Survey of 1983 was to conduct an intensive magnetometer search of areas of the bank which were only visually surveyed

during the last two summers. The Littlemore Scientific Company (ELSEC) magnetometer purchased by INA during the spring was the major tool of the survey.

This summer's survey was limited to a ten-day excursion during the latter half of May. Once again, the Jamaica Defense Force Coast Guard provided patrol boats, the *Fort Charles* (P7) and the *Discovery Bay* (P4), to act as support vessels. Both weather and sea remained abnormally calm during the period of the survey, allowing the crew to work virtually on top of normally dangerous reefs.

The only wreck found this summer which had not been located previously was that of a fishing trawler which came to grief on the reef sometime last winter. Although no new historically important sites were located, the results of the survey were nevertheless gratifying: all of the wrecks located over the last two summers were relocated, indicating that previous surveys were quite thorough in spite of the usually hazardous sea conditions. Plans for the upcoming season are now being developed based on the data gathered over the last three seasons. A manuscript on the previous work, including site descriptions and analyses, was recently accepted for publication by the *International Journal of Nautical Archaeology*.

S. D. Hoyt

THE COLUMBUS CARAVELS PROJECT

INA's attempt to locate and identify the site of Columbus's abandoned caravels began in 1981 with collection of primary historical accounts of his fourth voyage, documents pertaining to the subsequent founding of the town near the site, and early maps of St. Ann's Bay, Jamaica.

The first season of field work began in 1982 with the use of a magnetometer and sub-bottom penetrating sonar in a systematic survey control grid. Targets were located, tested, and identified, but no evidence of Spanish materials was encountered during the first survey season.

Before the second season, important data about shoreline changes since Columbus's time were obtained from the geological cores and tests conducted earlier. Gradual accretion of beach sediments over the years suggested that the caravels could lie beneath an area now overgrown with mangroves. It was decided to expand the survey network into this area during the 1983 season. The resulting data are currently being compiled by a computer to produce a contour map of the surveyed

areas. Although two additional wreck sites were located, neither was of Spanish origin.

In the process of searching for the lost caravels, the project has accumulated an enormous amount of electronic, archaeological, and geological data about St. Ann's Bay. Although the site of Columbus's ships has not yet been positively identified, sites of other historic shipwrecks have been located and studied. Radiocarbon dating of stratified sediment samples has already considerably narrowed the search area vertically, and computer enhanced analysis of magnetic information will further limit the search area horizontally. A third season of field work will commence in the summer of 1984. While the hunt for these historic ships is perhaps the most difficult survey project that INA has yet attempted, patient and systematic archaeology eventually will produce conclusive evidence of the caravels' whereabouts, if they are meant to be found during this quincentennial decade.

R. C. Smith

THE INA/MORNING WATCH RESEARCH EXPEDITION

In order to answer certain questions about maritime culture and technology during the early years of exploration and discovery in the New World, INA is presently making a study of shipwreck and harbor sites of the fifteenth and sixteenth centuries. One aspect of this study has been a series of field reconnaissance visits to known sixteenth-century sites throughout the Caribbean from Mexico to the Turks and Caicos Islands. On April 22, 1983, an INA survey and excavation team left Miami aboard director Sumner Gerard's research vessel, Morning Watch, for a three-month expedition during which three separate projects were undertaken. Primary mission of the team was the completion of the Molasses Reef Wreck excavation, but two other "mini-projects" were undertaken as well.

HYBURN CAY RECONNAISSANCE

Crossing the Straits of Florida, *Morning Watch* first stopped in Nassau for us to arrange with the government of the Bahamas to survey a possible sixteenth-century shipwreck site in their territorial waters. Having secured this permission, we sailed to Hyburn Cay in the northern

Exumas to begin a reconnaissance of the site. The Hyburn Cay Wreck was originally discovered in 1966 and extensively salvaged in 1967. From the brief reports that resulted, we realized that the wreck had been remarkably similar to the one at Molasses Reef; hence, we wanted to have a first-hand look at it to determine the present condition of the site and to evaluate its archaeological potential. Bad weather and problems with the anchor winch on the *Morning Watch* limited the reconnaissance to about 14 diving hours, but we learned enough to convince us that the lower portion of the ship's hull lies preserved, trapped beneath the ballast, and constitutes the most complete structure of a sixteenth-century ship known to us in the Caribbean.

D. H. Keith

Photo: Dennis Denton



Diver examines loose timber from Hyburn Cay Wreck; edge of ballast pile is at left.

ISABELA HARBOR SURVEY

Leaving Hyburn Cay, we proceeded to the north coast of Hispaniola to survey the harbor of the first permanent European settlement in the New World—La Isabela. Established by Columbus, Isabela was struck by a hurricane—the first ever experienced by Europeans—in 1493, and several ships were lost. These fifteenth-century vessels were our targets. After securing proper authority from the government, we began an intense, controlled remote sensing survey of the east side of the harbor. A Lietz theodolite and electronic distance meter (EDM) enabled us to pinpoint the location of any targets discovered during the course of the survey. Chief surveyor Bruce Thompson managed to sur-

vey in the visible land ruins as well, thus producing the first precise instrument survey of the oldest surviving town in the New World!

We were joined by Gordon Watts and Wes Hall, two colleagues from the History Department of East Carolina University and specialists in the fine art of magnetometric divination. Almost immediately they identified several good targets with their instrument. We dived and discovered the bottom of the harbor was composed of fine sediments which went into suspension at the slightest provocation, rendering the visibility virtually zero. Having localized the target as best we could using the magnetometer, we began to excavate. Twelve feet below the surface of the seabed we were still digging when the sides of our pits began caving in, forcing us to abandon excavation.

We completed the magnetometer survey ahead of schedule. Now realizing that the bottom sediments were too thick to permit test excavation, we decided sub-bottom sonar held the most promise for probing the potential shipwreck sites. Harold Edgerton at MIT arranged to lend us an EG&G Electronics instrument as well as to provide one of his students, Peter Mui, as operator and read-out interpreter.

By the end of the survey we had selected three areas which demonstrated remote sensing "signatures" characteristic of shipwrecks, but all lie too deeply buried to be explored with the equipment we had on hand. If the wrecks of Columbus's 1493 ships are there in Isabela harbor, they are going to be difficult to find and even harder to excavate.

D. H. Keith

MOLASSES REEF WRECK EXCAVATION

After a month in the Dominican Republic, we raised anchor and headed for the Turks and Caicos Islands where we were joined by Sam Forbes, the government's representative. Our plan was to spend two months on Molasses Reef, where we hoped to 1) conduct a magnetometer search for the ships's missing anchors, 2) finish excavation and recovery of all artifacts associated with the site, 3) map accurately the entire site and portion of the reef on which it lies, 4) core several coral heads at the site and elsewhere on the reef to test the potential application of sclerochronology (coral ring dating) to nautical archaeology, and 5) recover the

wooden hull remains from storage on Pine Cay for further study at our conservation facilities at Texas A&M.

Although we did not manage to finish excavation of the site or discover the missing anchors, we did map in and recover more than 250 concretions. Among the most interesting artifacts recovered were two crossbows, a pair of leg irons, a clear glass bead, and a medallion or seal composed of two different metals. The crossbows in particular hint at an early date for the site.

Our theodolite and EDM saw hazardous duty on Molasses Reef. Since the nearest dry land is more than eight miles away, we installed a "Survey Instrument Tower" (SIT) in the shallows directly behind the site. From there, the SIT operator could measure simultaneously angles and distances to points on the site or to survey boats more than a mile away.

Photo: Dennis Denton



Coral head coring at Molasses Reef.

CAYO NUEVO, MEXICO

During November 1983, INA again sent representatives (Joe J. Simmons and Dennis D. Denton) to aid Pilar Luna, director of the Subaquatic Archaeology Department of the Instituto Nacional de Antropología e Historia, in the ongoing investigation of the possibly late sixteenth-century shipwreck located at Cayo Nuevo in the Mexican Bay of Campeche.

The team spent a total of nine days diving at this isolated reef, supported once again by a Mexican naval vessel. This time our work revealed a sparse scatter of ballast stones connecting two distinct areas of artifactual evidence, areas which are separated by almost 250 meters. In addition, the detailed structure of the reef in the immediate area of the most concentrated remains was determined. We also discovered another cast-iron cannon, making a total of five at this site, which may prove to contain some of the earliest cast-iron cannons in the Western Hemisphere.

J. J. Simmons

THESES ACCEPTED

When INA affiliated with Texas A&M University in 1976, the number of students enrolled in the graduate program was a mere handful. Since that time, their number has grown considerably, and recently several theses have been accepted.

Among the latest successful candidates are Jim Baker, "Computers and Nautical Archaeology: Characterization of the C.S.S. *Georgia* Wreck Site;" Mark Geanette, "Mast Step and Keelson: The Early Development of a Shipbuilding Technology;" Sheila Matthews, "The Rig of the Eleventh-Century Ship at Serçe Liman, Turkey;" Margaret Morden, "The Glass Lamps from the Eleventh-Century Shipwreck at Serçe Liman, Turkey;" James Parrent, "The Conservation of Waterlogged Wood Using Sucrose;" Dory Slane, "The History of the Anchorage at Serçe Liman, Turkey;" and Roger Smith, "The Maritime Heritage of the Cayman Islands: Contributions in Nautical Archaeology." Longtime *Newsletter* readers will recognize the titles of many of the theses as pertaining to INA projects.

D. H. Keith

Coral geologist Dick Dodge and a coring technician were brought to the site to core selected coral heads in an attempt to date the site using schlerochronology. Unfortunately this study was interrupted when the *Morning Watch* developed electrical problems which forced the expedition to retire prematurely from the reef; consequently, the potential which schlerochronology may offer to nautical archaeologists remains to be determined.

On the way back to Miami, we stopped at Pine Cay and recovered the hull remains which had been in storage in crates of wet sand for almost a year. We were pleased to discover that the simple expedient of covering the wood with wet sand preserved it quite well; no visible deterioration had taken place.

In the interest of refining our identification of the site, we will be concentrating all our 1984 efforts and resources on cleaning, conserving, and analyzing the artifacts already recovered, and will return to Molasses Reef to finish the remaining excavation objectives in 1985.



Bruce Thompson perched atop SIT station.

Photo: Dennis Denton



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