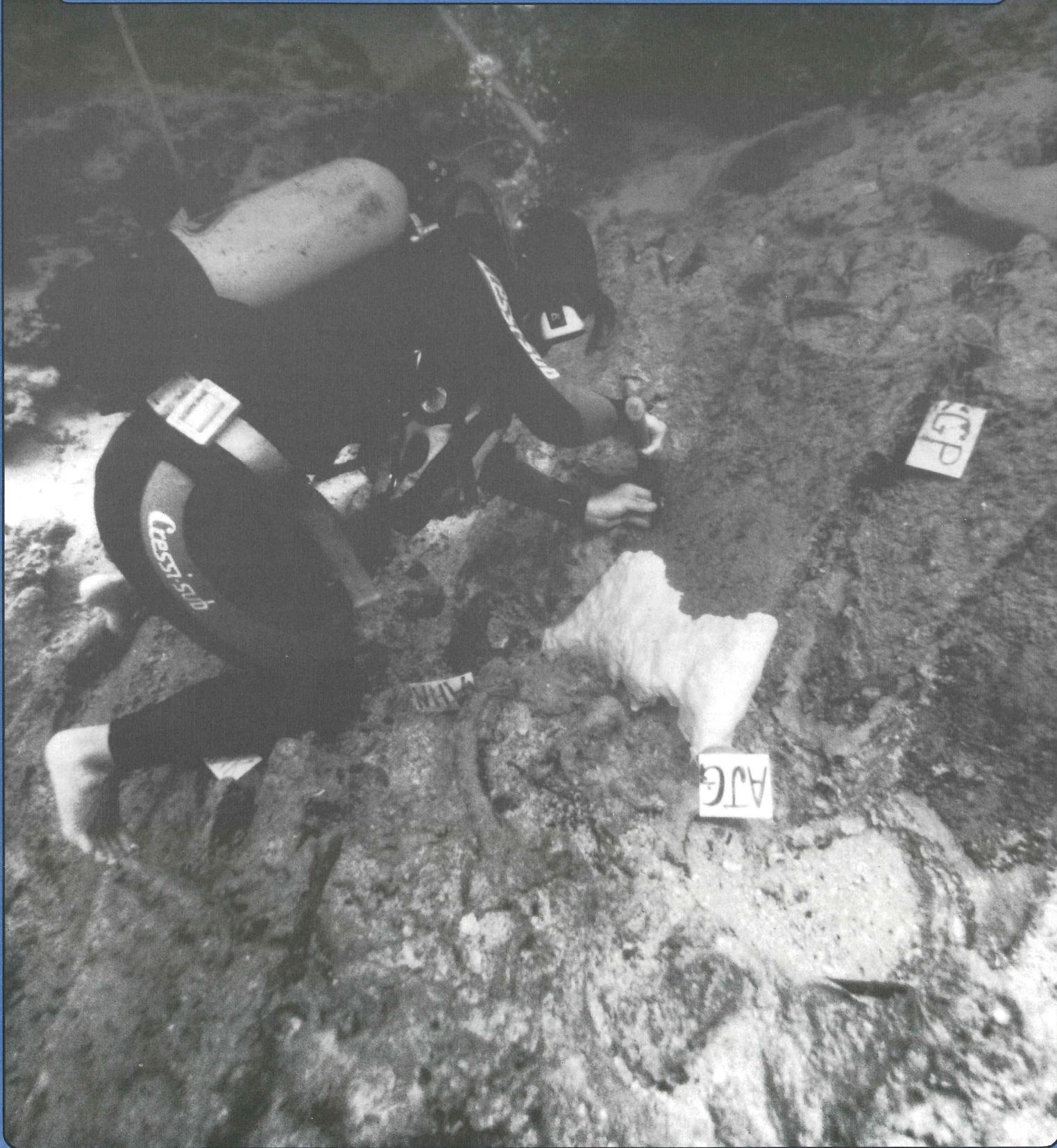


# IN A NEWSLETTER



Vol. 16 No. 4 Winter 1989



# INA NEWSLETTER



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## 1989: The Year In Review

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### Member Contributions Welcome!

We want to include you in future issues of the INA Newsletter.

Do you have an experience you would like to share with INA members? A trip? A photograph? A museum or site you've been to? A news item? A book you've read? A conference you've attended? A suggestion?

We're interested in what you have to say and contribute. Send submissions and queries to:

*Editor*  
*INA Newsletter*  
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Written submissions should be limited to 1,000 words and are subject to approval and editing. **Please clearly mark everything with your name and address** so we can return it to you. We cannot be responsible for items lost by the postal system, so please do not send original illustrations or photographs. Detailed format information available upon request.

The INA Newsletter is published quarterly.  
Editor: Cheryl Haldane.  
Production: Richard Herron.  
Designed and produced by Diana Thornton.

*Cover: Claire Peachey applies epoxy resin to a four-handled copper ingot on the Ulu Burun shipwreck. (Photo: Don Frey)*

## A Letter From The President

Dear members, benefactors, supporters, life members, contributors, and students of all ages:

As you can read in this issue, INA's two field projects at Ulu Burun and Port Royal each have had safe and successful sixth and ninth seasons, respectively. I hope you share the excitement in the articles for the past seasons and join in the anticipation of those to come.

You may notice that there is no article on the search for the *Gallega*, which has been one of INA's past projects. Not only was there no season this fall, but also, for a variety of reasons, the Ships of Exploration and Discovery Research Project is no longer a part of INA. Because of INA's long-standing interest and activities in the New World, we have decided to restructure such programs in what we believe is a more comprehensive and preferable way.

We have re-organized our conservation facilities so that we no longer have separate laboratories for separate projects. The Conservation and Research Laboratory is a teaching and functioning laboratory for all INA projects, and is a far more cost-effective allocation of both human and financial resources.

We have brought forward our Columbus Caravels Project at St. Ann's Bay, Jamaica, where Columbus beached, lived on and then abandoned not just one, but two of his caravels. Plans are underway to start the season's survey in 1990. We are confident that this project will dovetail neatly with the work already underway in Jamaica at Port Royal. In addition, this project, like the other two, will have students as active participants. Read more about it in this issue.

The third major element in the restructuring will occur by adding a New World faculty member to our pre-existing faculty who are specialists in Classical Archaeology, Old World Archaeology, Ship Reconstruction, and Conservation. This new person will bring to INA his or her field projects, thus providing more opportunity for research and student training.

We believe that our relationship with students is a particular strength of what we do. Students gain

experience and training, and find subjects for their degrees. INA gains by having work done by qualified individuals and by having specialized research undertaken.

In Turkey, we are making major progress through the several bureaucratic stages that will finally transfer title to land to us. With this in hand, we can begin ground breaking for what will be a very spectacular Turkish headquarters.

I am most excited to announce that the National Endowment for the Humanities has awarded us a Challenge Grant to aid our endowment effort. Not only does this mean that for every \$3.00 raised we will receive \$1.00, but that this prestigious entity recognizes our significance.

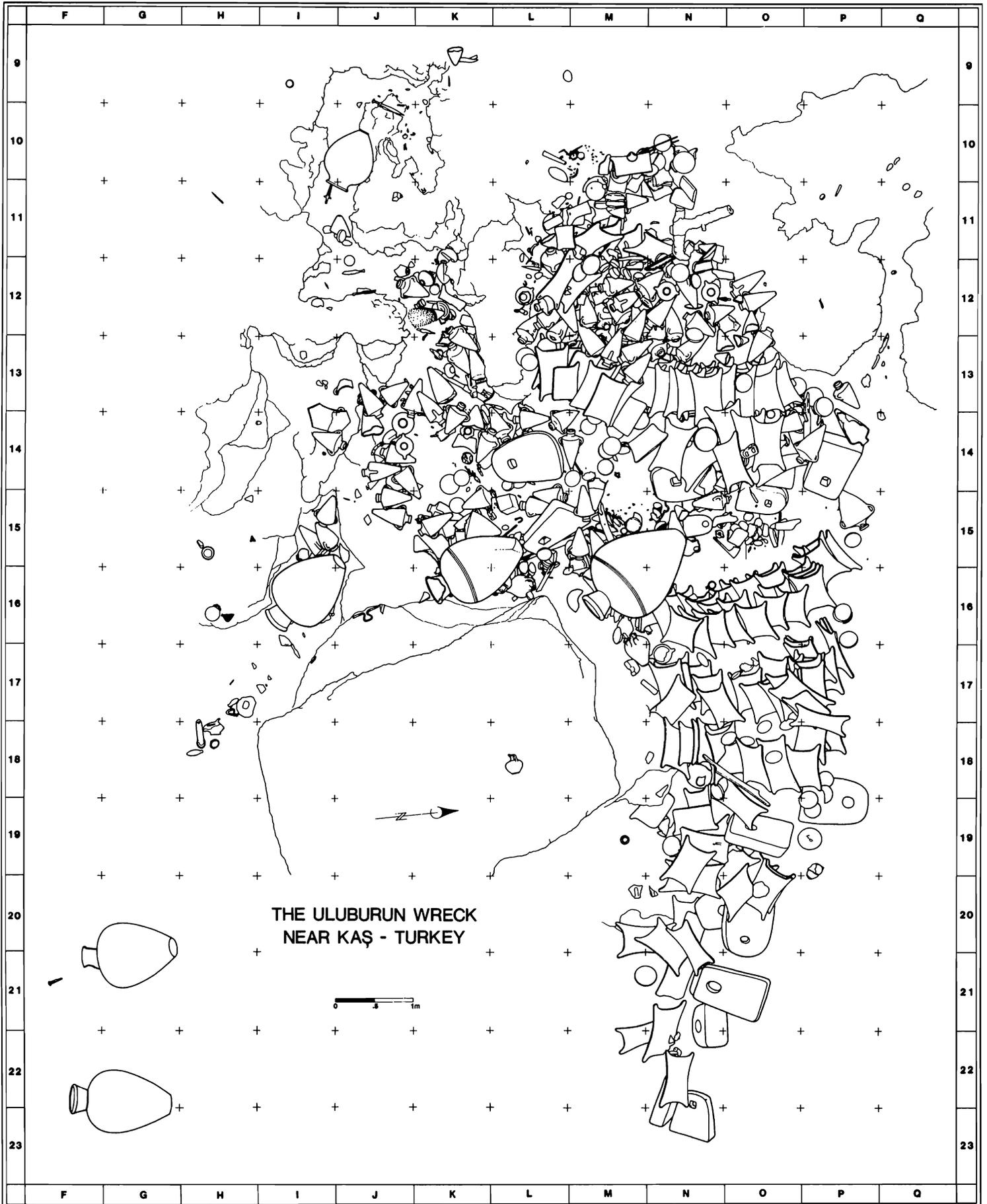
World-wide interest in our work continues and we have undertaken such activities as consultations with the government of Columbia and the Getty Conservation Institute, discussions with the Chinese about long-term collaboration and training (an agreement is now with them for signature), discussions with Egyptian scholars and officials, and plans to dive with the Russians in the Black Sea in the summer of 1990. Faculty and staff have given many lectures and presentations from New York to California to Turkey.

During this year we will be continuing with our aim of making available, based on our research, as quickly as possible as much information as possible to scholars, students and all readers and followers of Nautical Archaeology. As members, you are in the vanguard of this group, not only because you hear about our work first, but because your membership contribution helps us pursue this work.

Thanks to you for 1989 and I hope you will join me in wishing everyone in the membership best wishes for 1990.



Robert K. Vincent, Jr.  
President



# Ulu Burun: 1989 Excavation Campaign

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by Cemal Pulak

Between June 8 and September 7, the Institute of Nautical Archaeology completed its sixth excavation campaign on the Late Bronze Age shipwreck off the Ulu Burun, near Kas in southern Turkey. During the season, excavators made 2368 dives between 145 and 182 feet, totalling some 778 hours on the wreck.

As in previous campaigns, we concentrated primarily on excavating the site's upper slope (see site plan, opposite). This area, except where wooden hull members are preserved, has now been fully mapped and excavated. A massive encrustation beneath the row of copper ox-hide ingots removed in 1986 continued to resist our attempts to chisel it free. In addition to ceramic sherds, mostly of amphoras, and ballast stones, the concretion matrix contained two copper bun ingots and an amorphous tin ingot that had corroded into a powdery-mush consistency.

We decided to expedite the recovery of artifacts from the concretion—cement-hard in most places—by cutting it into smaller, more manageable blocks that could be raised easily. After much chiselling, a large section of the encrustation was finally freed and raised to the surface. This section can now be slowly and carefully excavated under controlled conditions in our conservation facilities in the Bodrum Museum of Underwater Archaeology.

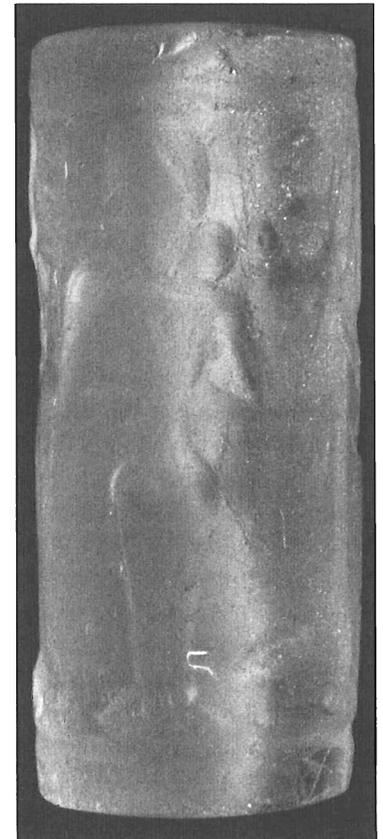
In a small sand pocket just upslope of the encrustation, archaeologists discovered several large beads of blue faience and rock crystal and an intricately-carved rock-crystal cylinder seal (fig. 2). These recent finds probably rolled down from adjacent areas upslope, where all three of the previous cylinder seals, including a 1986 find of a rock-crystal seal of similar style and workmanship, and all the rock-crystal beads were discovered.

The area just below the large encrustation acts as a natural trap for objects falling or rolling downslope from what we believe is the starboard stern quarter of the ship. In addition to many amphora fragments and some fine-ware sherds, excavators working around and partly under the row of stone anchors recovered ballast stones, bones, terebinth resin that undoubtedly spilled from amphoras, bits of wood, two bronze fishhooks, a hematite balance-pan weight with a lead plug in its lower surface,

a bronze double-bladed axe, and a bone or ivory finial (endpiece), one of five found in 1989.

A tortoise carapace (upper shell) element was also found here, bringing, with four additional pieces found this year, the total number of shell fragments to 42. At least five different tortoises are represented by the pieces, and because no lower shells, or plastrons, have been found, it is likely that they were removed before the tortoise shells were placed aboard the ship. Tortoise carapaces used as sound boxes for musical instruments, such as lutes and lyres, are well documented for both ancient and modern times. After careful removal of the plastron, a skin is stretched in its place over the carapace, thus forming the sounding board. Such musical instruments would not be out of place in the assemblage of the Ulu Burun ship which has already produced a pair of bronze cymbals and a whistle-like tin object.

Three substantial pieces of wood associated with many amphora sherds and two copper bun ingots were also uncovered in the catchment area and moved off the site. A log of Egyptian ebony (*Dalbergia melanoxylon*) was the first to be



**Figure 2** This rock-crystal cylinder seal, only 2.2 cm long, bears carvings of a seated deity or royal person flanked by standing figures. (Photo: Robert Neyland)

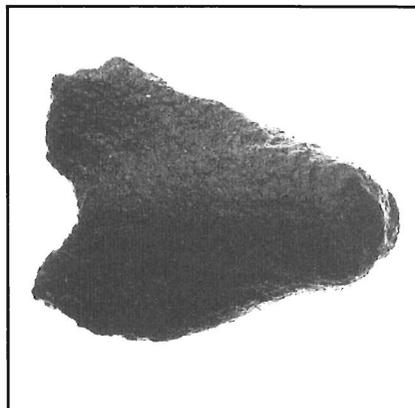


**Figure 3** Painted Mycenaean stirrup jars were often used to transport scented oils; this example was 11.5 cm high. (Photo: Robert Neyland)

revealed; it lay beside a heavy log more than a meter long that we believed since 1985 to be an element of the ship's hull. But we abandoned this tentative conclusion this past season despite the size of the piece and a gentle curve at one end that resembles typical hull curvatures. No tool marks or fastening holes have been detected, and the piece is rounded in section. It is possible that, if not cargo, this log might be a rough-hewn spare carried to repair or replace a damaged frame. Examining the construction of any preserved frames will help us to decide this question.

The third piece of wood was revealed after team members removed a heavy stone anchor that partly lay across

**Figure 4**  
The smallest zoomorphic pan-balance weight found on the wreck so far, this fly-shaped weight measures 1.8 cm from wing-tip to forehead. (Photo: Robert Neyland)

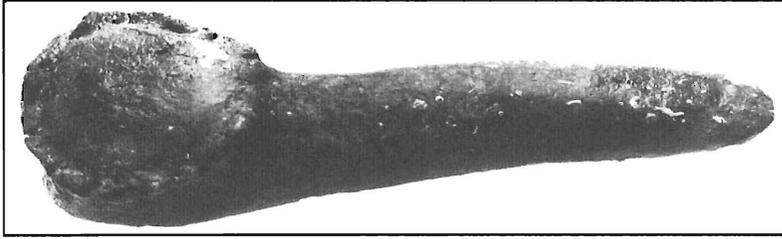


the ebony and large log. As with the larger piece, the function of this smaller log—which bore branch or root stubs—remains a mystery. Donna J. Christensen of the U.S. Forest Products Laboratory, Center for Wood Anatomy research, has come to our aid once again, as she has on many previous occasions, and identified these logs as either spruce (*Picea*) or larch (*Larix*).

The area of the wreck directly upslope of the large rock outcrop continued to produce many artifacts as in seasons past. Fragments of the ship's hull and other bits of wood that came to light in this area slowed the pace of the excavation considerably. A fairly large piece of wood about 70 centimeters long, and on which many small beads and other objects were found, might be the first evidence of ceiling planking on the Ulu Burun ship. This and other hull pieces have been covered again with sand for later excavation and subsequent evaluation after all the heavy cargo is excavated. Finds near and on the plank included many more faience and agate beads, several rings made from seashells, a knucklebone (possibly for playing the game of knucklebones, similar to dice, or perhaps for divination), tin ingots, fragments of glass ingots, a fine-ware stirrup-jar (fig. 3) and several other ceramic vessels, a hippopotamus tooth (incisor), many lead fish-net weights, and a bronze zoomorphic weight in the form and size of a fly—the smallest balance-pan weight yet found on the wreck (fig. 4). A sharpening kit of medium- and fine-grade abrasive stones and an antler tine (fig. 5) for honing bronze blades was probably stored in a leather bag.

Nearby, and wedged against a copper ox-hide ingot, were three copper or bronze bowls (fig. 6) of progressively increasing sizes. Nested one inside the other for compact storage, these extremely fine bowls suffered badly over the years. The innermost bowl was raised intact, even though a ballast stone had fallen inside, cracking and removing small sections of the bowl. Most of the base and a large section of the rim of the middle bowl had survived, while the outermost bowl was represented only by a section of its rim. The three bowls were apparently stored in a caldron, but only a single strap for the attachment of its handle and the impression of the caldron's walls on an ox-hide ingot survive.

Excavation on the southern side of the rock outcrop (the vicinity of the spill of stacked Base-ring II bowls excavated in 1988) also was completed and the source of a large patch of stained sand farther downslope was investigated. Most of the assemblage of Base-ring II bowls and other Cypriot pottery that had been found here in 1987 and 1988 excavation rested on a plateau of bedrock; the area of the White Shaved juglets lay to one



**Figure 5**  
*This antler tine, 15.7 cm long, and medium- and fine-grade abrasive stones were stored together and probably used to sharpen bronze blades. (Photo: Robert Neyland)*

side of the plateau's base. This year, an additional intact White Shaved juglet, fragments of others and sherds of Base-ring II bowls were found here. While the disposition of Cypriot pottery in this area does not permit us to establish its source positively, evidence suggests that the assemblage originated from a large storage jar, or pithos, which rolled farther downslope and left behind a trail of Cypriot wares. When the remaining pithoi in deeper parts of the wreck are fully excavated, we should be able to determine precisely which pithos contained Cypriot wares for export in addition to the one excavated in 1984.

A patch of black-stained sand, covering an area of about two square meters, was well-defined both horizontally and vertically. Almost all of the finds from the stained area came from the upper three or four centimeters, indicating the original surface upon which the wreck spilled, while the stain itself reaches to a depth of about 45 centimeters. Despite the volume of the stain, only small quantities of organic substances such as olive pits, terebinth resin, and cloth fibers were found here. It seems unlikely, therefore, that these organic materials and the ballast stones, pottery sherds, and a scrap gold pen-

dant (an incised figure on its surface appears to be that of a standing male) from the area are specifically associated with whatever caused the stain. It is tempting, on the other hand, to associate this stain with the pithos that lay directly upslope, its mouth pointing down in the direction of the stain and coinciding almost precisely with the uppermost limit of the stain. When this pithos was excavated in 1986 and its contents sieved, no artifacts or specific class of organic remains were prevalent. Sieving samples from the stained area revealed surprisingly few organic remains, mostly fig seeds, and nothing that could definitely account for the dark stain. The clear, sharp borders of the stain and its deep, vertical penetration suggest a liquid spill. Additional samples of sand have been set aside for chemical examinations that might reveal the composition of the stain.

Work farther downslope by several excavation members focused on exposing the two remaining intact pithoi and clearing the area around them down to bedrock. One jar was moved off the site and will be raised in 1990. A large body fragment from a seventh pithos, discovered in 1986 and thought to be the storage jar from which most of



**Figure 6**  
*A nested set of three bronze bowls was stored inside a cauldron. The smallest and best preserved (15.5 cm maximum diameter) was raised virtually intact. (Photo: Robert Neyland)*

the scattered Cypriot pottery found on the slope originated, was also fully exposed. Because the jar lay at a depth of 182 feet, dives had to be reduced from the usual 20 minutes to 15 minutes for safety reasons. Consequently, excavation of the jar and the area around it progressed slowly. We believe that spillage from the wreck extends to even deeper areas that will have to be investigated in future campaigns.

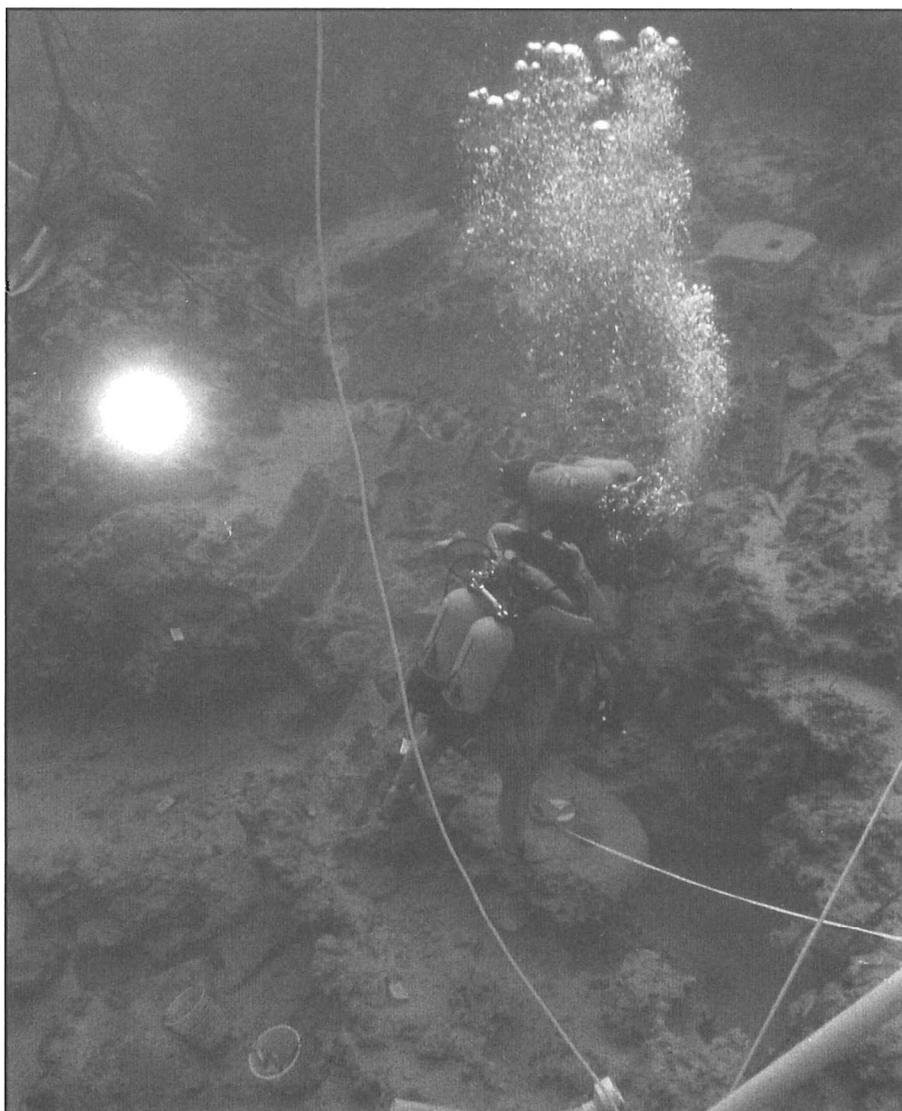
The area directly downslope (east) of the large rock outcrop also continued to yield Cypriot pottery. The assemblage here is similar to that recovered in areas just upslope of the large rock, which suggests a common source for both. In addition to Cypriot pottery, we found

Canaanite amphoras, faience rhyton fragments, lumps of tin from corroded tin ingots, a bronze spearhead, a bronze pin, an ivory or bone finial, glass beads, an ostrich eggshell fragment, tortoise carapace fragments, and a bone of an unidentified mammal. Of interest is the large number of lead fish-net-weights, 266 in all. Because the weights came from an isolated and compact deposit, they probably represent weights from a single net. These particular weights are all small weights (larger weights are twice the size) and might be from a casting-net.

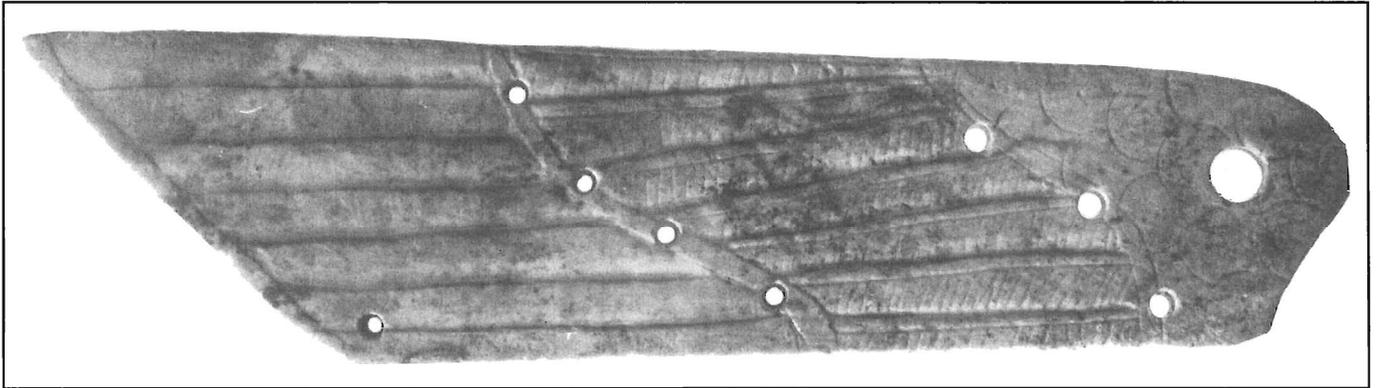
Work in the "ingot gully" to the north of the large rock outcrop progressed on several fronts (fig. 7). In 1987, we stopped raising ingots when we discovered that some

were too poorly preserved to be recovered without substantial damage to their surfaces. For two years, Texas A&M University graduate student Claire Peachey searched and tested for an acceptable method to lift such damaged ingots. We successfully used a technique to bond an epoxy to wet surfaces to consolidate and replicate missing sections of ingots under water, and eighteen copper ox-hide ingots were raised safely. Of these, nearly half had to be patched with epoxy before they could be chiselled free. First, areas of ingots where corrosion had consumed the metal entirely, leaving behind a "skin" of encrustation that formed a mold, were filled with epoxy. A coating of gypsum plaster and a layer of epoxy added on top of that, when needed, provided rigidity (see cover). Ingots thus protected could be chiselled free and lifted easily.

Limited excavation under the ox-hide ingots that were raised and in peripheral areas of the ingot stacks revealed more Canaanite amphoras, the upper half of a Mycenaean jug, many more glass ingots (most were poorly preserved), a hematite balance-pan weight, a bronze adze blade, tortoise carapace fragments, and an intricately carved ivory wing (fig. 8). The wing, probably a cover for a cosmetic container, almost certainly pivoted on a peg placed



**Figure 7** Much of the season's work concentrated on strengthening copper ingots from the "ingot gully" to the north of the large rock outcrop. (Photo: Robert Neyland)



**Figure 8** Duck-shaped cosmetic containers of ivory are well known from the Syro-Palestinian coast. This example of an ivory wing, 13.5 cm long, probably belonged to a similar box. (Photo: Robert Neyland)

through the large hole at its base. Cosmetic boxes shaped like ducks are well known from the Syro-Palestinian coast.

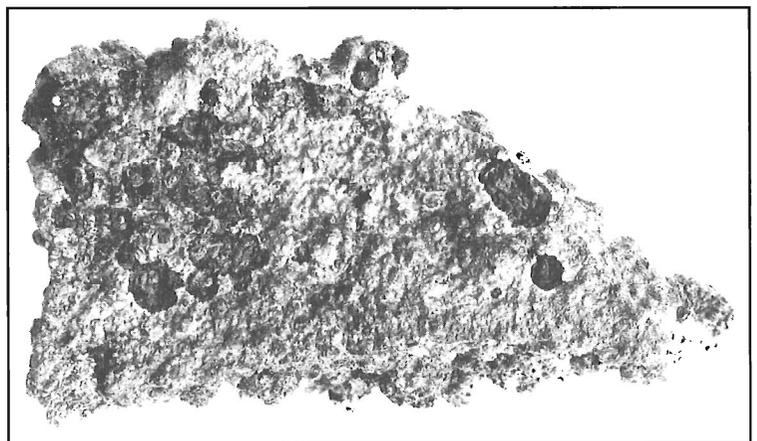
Three unusual wedge-shaped tin ingots (fig. 9) were found under one of the stone weight-anchors. They were probably cut from a single, large, disc-shaped ingot to facilitate its handling—a reconstructed ingot of eight such wedges would weigh about 50 kg (more than 100 lbs). Evidence for cutting or for the method by which these ingots were manufactured will probably become apparent once their surface encrustation and “warts” of corroded metal are removed.

Two archaeologists spent appreciable time completing several cross sections of the site in both north-south and east-west directions. Sectional profiles of all ingot rows were also begun, and elevation measurements of each ingot corner were taken before ingots left the sea bed. This practice had already rewarded us in 1986 when, to our surprise, the plotting of elevation measurements revealed the curvature of the ship’s hull at a point where not a trace of the actual hull itself had survived.

Archaeologists working at a depth of about 175 feet expanded the lower boundary of wreck spillage considerably by investigating along the sand ledge just below the two stone anchors furthest downslope. At first only a few ballast stones were uncovered. Excavation farther downslope exposed many more ballast stones and eventually led to the discovery of yet another stone weight anchor that lay deeply buried in sand. With the discovery of two additional anchors under copper ingots higher upslope, the total anchor count has reached 23. Excavation around the latest anchor discovered revealed a number of finds, most notably

a faience cylinder seal, a pilgrim flask neck, a complete glass ingot and half of another ingot, a number of glass beads and a pithos body sherd. Future work might reveal whether this pithos sherd is part of a previously documented pithos originally located farther up the slope or a fragment of a yet undiscovered pithos lying in deeper water. It is now clear that spillage from the wreck extends into much deeper water than had been previously surmised, and we can no longer depend on completing the excavation by 1991.

A computerized acoustic distance measuring device (Sonic High Accuracy Ranging and Positioning System—SHARPS) invented by INA board member Mary Wilcox and partly evaluated in the field in 1988 proved to be an indispensable tool for taking accurate and efficient meas-



**Figure 9** A unique wedge-shaped tin ingot, 24.3 cm long, was found beneath one of the stone weight-anchors. At least four types of tin ingots were carried aboard the Ulu Burun vessel. (Photo: Robert Neyland)

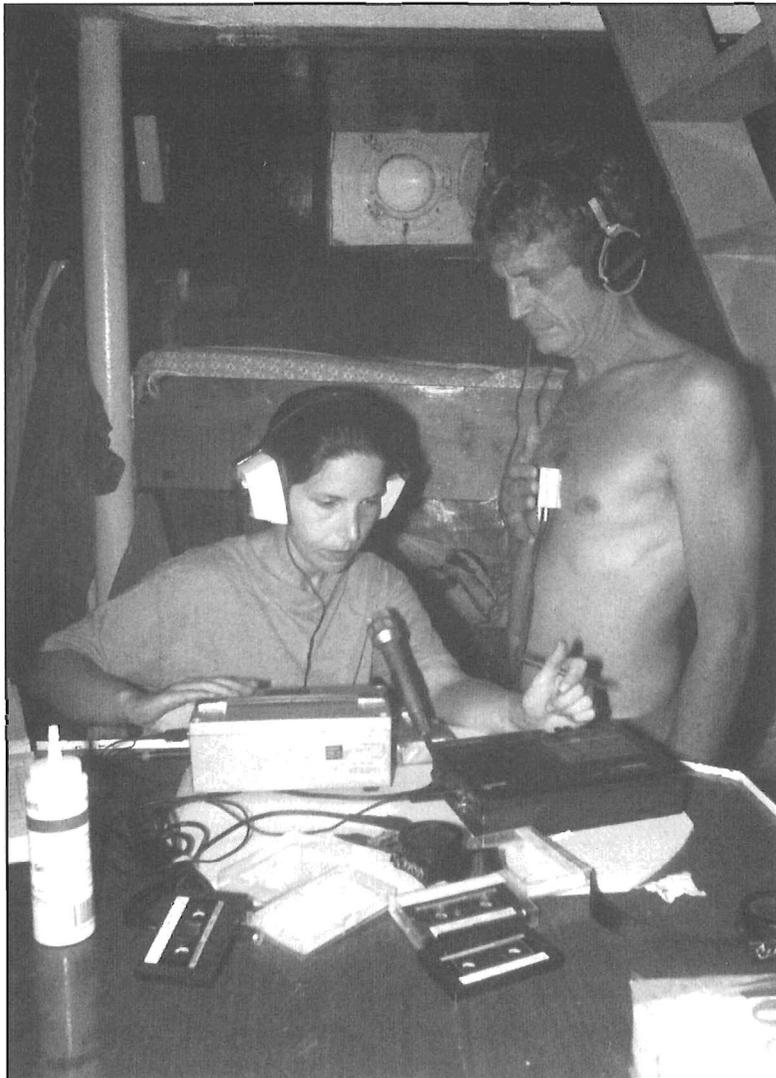
urements over long distances (see *INA Newsletter* 15/2) (fig. 10). SHARPS was primarily used to check the accuracy of the datum points archaeologists use to make triangulation measurements with plumb-bobs and tape measures. We were extremely pleased to learn that in most cases datum points previously established manually were within one half of a centimeter of those measured with the SHARPS system. SHARPS, used effectively, can save valuable diving time and, undoubtedly, will become a standard measuring tool on many underwater archaeological projects.

In addition to archaeology, fieldwork at Ulu Burun is now making contributions to the diving sciences. Caroline Fife, Hyperbaric Medicine Research Fellow at Duke University Medical Center and a veteran of two previous campaigns at Ulu Burun, collected diving data for a period of six weeks in compliance with her research

on the development of safer decompression profiles for scientific diving (fig. 11). Well-controlled field testing of decompression tables by monitoring gas bubbles in the bloodstream with a doppler device using large number of divers (of both sexes) having carefully documented dive profiles is apparently very limited. It was noted several years ago by Yancey Mebane, co-investigator of the doppler project and our field physician for several seasons at Ulu Burun, that diving at Ulu Burun provided an excellent opportunity for obtaining just such data. During the past five excavation campaigns, approximately 8,500 dives to between 140 and 180 feet, totalling some 2,100 hours of bottom time, have been made using compressed air. Ulu Burun further promotes such dive studies because divers remain in a specific area at a known depth for the duration of their dive.



**Figure 10** *The Ulu Burun shipwreck excavation team used a handheld computerized acoustic distance measuring device—the SHARPS system—to take accurate and efficient measurements over long distances. Using the device to precisely locate objects like this stone weight-anchor will save archaeologists hours of bottom time. (Photo: Don Frey)*



*Figure 11 Due to time constraints only eight volunteers could be monitored for Fife's research into decompression profiles. Those who were not chosen for one reason or another soon realized what bliss it was to be excluded and could not but harbor the deepest sympathy for diving comrades who were regularly monitored three times after each dive, twice a day, six days a week, for six weeks! Their already busy daily schedules became even more demanding because of their commitment to science and their concern for the safety of their fellow divers. These less fortunate souls could always be recognized, even as they performed menial camp chores, marked as they were by globs of green gel—used to attach doppler transducers—that dribbled down their chests. (Photo: Robert Neyland)*

### Acknowledgements

The project was funded for the year by INA Board of Directors and grants from the National Endowment for the Humanities, National Geographic Society, Texas A&M University, the Institute for Aegean Prehistory, and the Frederick R. Mayer Faculty Fellowship. Since the inception of the project in 1984, Cressi-sub of Italy has supported our work with significant concessions for the purchase of diving equipment. Devcon Corporation kindly contributed towards the purchase of 50 pounds of their Wet-Surface Repair Putty.

Under the direction of George Bass, the 1989 team comprised excavators Cemal Pulak, excavation director; INA staff Don Frey, Robin Piercy, Tufan Turanli, Murat Tilev and Sheila Matthews; and physicians Karl Ruppert and Caroline Fife. The excavation would not

have been possible without the participation of volunteer archaeologists Faith Hentschel, Michael Halpern, Gokhan Ozagacli, Harun Ozdas, Alison Darroch; Texas A&M graduate students Nicolle Hirschfeld, Jack Neville, Ralph Pedersen, Claire Peachey, Jerome Hall, Peggy Leshikar and Robert Neyland; and graduate student Birgit Schroder of the University of Tubingen. Yasar Yildiz from the Bodrum Museum of Underwater Archaeology not only represented the Turkish Department for the Protection of Cultural and Natural Resources, but was an enthusiastic participant. Back in Bodrum, Ulu Burun finds were conserved by Jane Pannell, assistants Erika Topolewska and Gunes Ozbay, and drawn by Netia Piercy.

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# Cape Gelidonya—Once More

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by George F. Bass

As part of INA's 1989 survey of the Turkish coast between Bodrum and Antalya, we returned once more to the birthplace of underwater archaeology in Turkey, a tiny island off Cape Gelidonya, where in 1960 I had directed the first complete excavation of an ancient shipwreck on the sea bed. A one-day diving trip a dozen of us made to the site in 1987, purely for nostalgia, had yielded so much new information (see *INA Newsletter* 15/2, pp. 1-5) that we spent two additional weeks there in 1988 (see *INA Newsletter* 15/4, p. 13). And that visit provided tantalizing evidence that the site was far more complex than we had ever suspected.

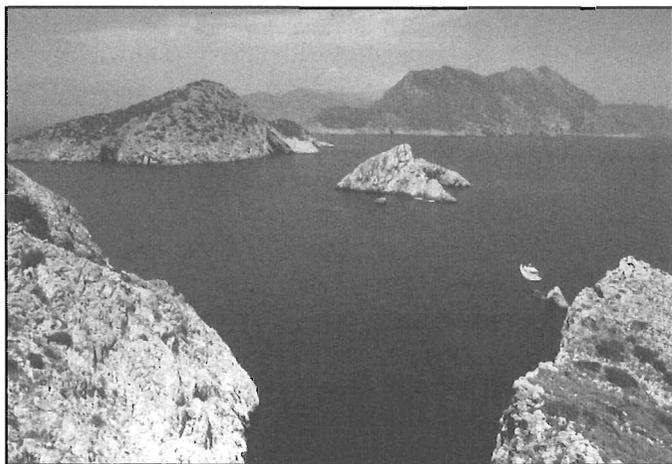
During the 1960 excavation, and in both my preliminary report on the site (*American Journal of Archaeology* 65 (1961)) and its "final" publication (*Cape Gelidonya: A Bronze Age Shipwreck, Transactions of the American Philosophical Society* 57, part 8, Philadelphia 1967), I assumed that the ancient ship had sunk after being dashed against the rocky island cliff at whose base it lay. Because much of the original cargo of 30-odd copper ingots rested in neat stacks on the floor of the sea, just as they had been stowed in the hold of the ship 32 centuries ago, it seemed that the small merchant vessel had settled directly to the bottom with little if any list. It further seemed, because of a concentration of personal effects, that the living quarters of the ship, probably at its stern, had come to rest in the

gully formed between the cliff base and a boulder originally described as "big as a railway car." The wreck site seemed to end there, in the gully.

I remember, somewhat vaguely, that Peter Throckmorton, Frederic Dumas, and perhaps others had snorkeled along the edge of the island in 1960 and had found a pinnacle of rock, not far to the southeast of the wreck, that rose so close to the surface that one could stand on it, dry from the chest up. There was some speculation at the time that the ship might have torn her bottom out on this rock and drifted to the spot where she finally came to rest. There was, however, no way to prove or disprove this theory. Nor did it seem terribly important.

Because of the strong current that sometimes runs in a southeasterly direction, I supposed in 1988 that the two Bronze Age Mycenaean Greek jars discovered in rocks about 50 meters to the southeast of the wreck site had simply been carried there by the current. A bronze spit found lying uncovered on the sea bed between those jars and the wreck site, however, was harder to explain: even the powerful current could not have swept such a dense object any distance. Because the spit is just like those still used for making *shish kebab*, and because its metal is in better condition than much of that found on the wreck in 1960, I wondered at first if it was modern, dropped from a passing boat. Cemal Pulak, however, convinced me of its antiquity. I then speculated that it had been carried from the site in modern times—by a sponge diver or by one of the divers who first explored the site with Peter Throckmorton in 1959—and inadvertently dropped. That would explain why it lay exposed on the sandy bottom. The only other explanation was that the spit tumbled from the Bronze Age ship as she sank shortly before 1200 B.C.

One of our goals during the 1989 survey, therefore, was to examine the sea bed between the wreck site and the general area which had produced the jars and the spit the summer before. Donald Frey and Murat Tilev, who had made those discoveries, searched visually from battery-powered underwater scooters and electronically with a metal detector. What they found was startling. Stretching out in a line to the southeast from the "stern" of the wreck in the gully—in the direction of both the 1988 finds and the rock pinnacle—were fragments of copper ingots, unique bronze implements, and the largest balance-pan



Looking north towards the mainland from Devecitasi Island. INA research vessel *Virazon* is moored over the wreck site. (Photo: Don Frey)

weight ever to come from the site, all too dense to have been carried there by the current.

Others of us examined a target Tufan Turanli had found in 1988 at the southeast end of the gully with the metal detector. It proved to be a huge storage jar, or *pithos*, upside down and completely covered with marine concretion (we assume that the metal detector sensed some iron in its clay fabric). This find extended by several meters the concentration of finds we had considered to be the entire site in 1960.

My guess now is that the Bronze Age ship did rip her bottom open on the rock pinnacle, and spilling small jars, the spit and other bronze items, the weight, and fragments of copper and bronze from the rend, drifted downward till her bow settled on the sea bed and her stern came to rest on the great boulder. As the timbers of her hull were eaten away by marine borers, the sword and other bronzes Cemal Pulak found on top of that boulder in 1988 fell out, and what was left of the stern slid down into the gully. This might explain why so little of the hull was preserved: most of it had been held up out of the thin layer of sea-bed sand that might have protected at least some of the wood before it was devoured by shipworms.

We should return once more to Cape Gelidonya to examine the rock-filled gully between the eastern extent of the site and the newly found *pithos*, and to continue the search for artifacts in the direction of the rock pinnacle.

And then the question of anchors remains. No ship sailed without them. Twenty-three anchors have already been found on the Bronze Age wreck we are excavating at Ulu Burun, eleven of iron were found on the 7th-century Byzantine ship we excavated during the 1960s off Yassi Ada, and seven more of iron were found on the 11th-century wreck we excavated in Serce Liman in the 1970s. Yet none have turned up at Cape Gelidonya.

It might seem logical that the crew of the Cape Gelidonya ship, seeing the island ahead, had thrown out its anchors in a vain attempt to slow its fatal course. But the island is small, requiring only minimal maneuverability of a vessel trying to pass on either side. And the suspected cause of the wreck, the rock pinnacle, would have been invisible until the ship was upon it. Nevertheless, we should search for anchors in deeper water farther from the island.

The search for more information from the Cape Gelidonya shipwreck will do more than provide material to increase our understanding of the site. The brief annual visits to Cape Gelidonya now allow the core of the Ulu Burun excavation staff the chance to re-acclimatize themselves to diving in depths of only 85 to 110 feet before resuming work on the Ulu Burun wreck 145 to 180 feet deep.



*Tufan Turanli searches for buried artifacts with a metal detector. (Photo: Don Frey)*

Two footnotes are in order:

*\*In my article on the 1987 visit to Gelidonya (INA Newsletter 15/2), I stated that we had found the first metallic tin on the site. This visual identification was reported too hastily, for Dr. Robert Brill, Chief Scientist of the Corning Museum of Glass, informs me that the samples he examined for me were not of pure tin but of a mysterious, solder-like alloy of lead and tin.*

*\*Members of the 1989 Cape Gelidonya survey were veterans of many past expeditions, most having dived together for at least fifteen years: George Bass, Donald Frey, Faith Hentschel, Sheila Matthews, Cemal Pulak, Murat Tilev, and Tufan Turanli; Bahadır Berkaya, commissioner from the Turkish Department of Antiquities, was as helpful as always. Valued visitors were INA Director Claude Duthuit and Ayhan Sicimoglu, also companions of our past expeditions, whose friendly rivalry in the galley led to the most sumptuous and exotic meals INA's research ship Virazon has ever witnessed!*

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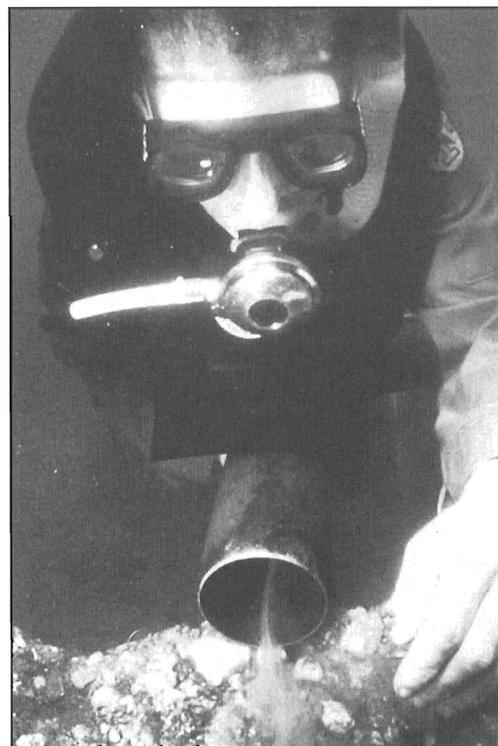
# Discoveries from Port Royal

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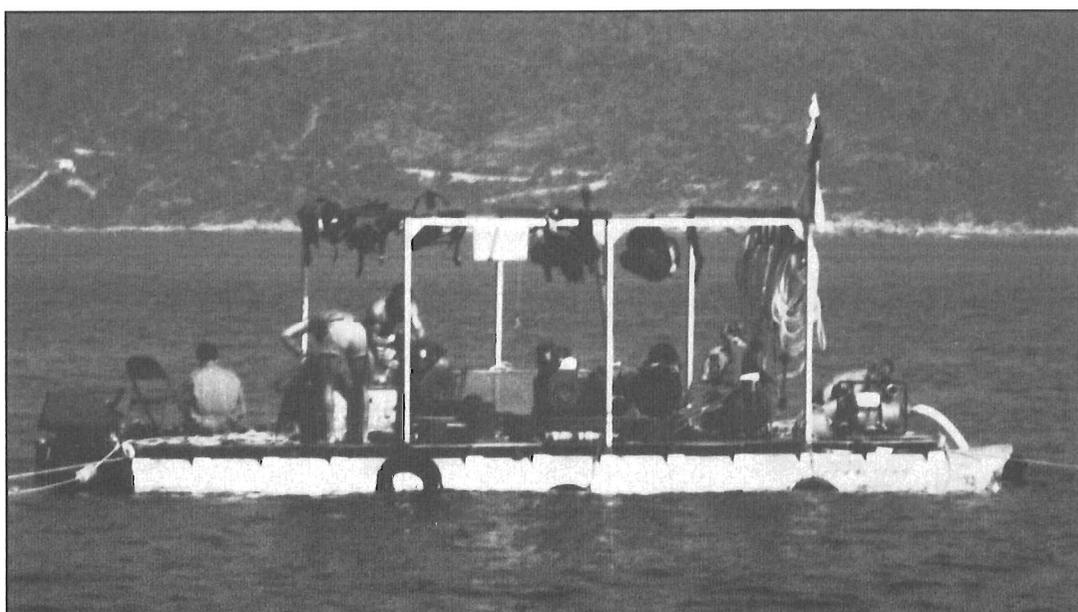
by Sheila Clifford

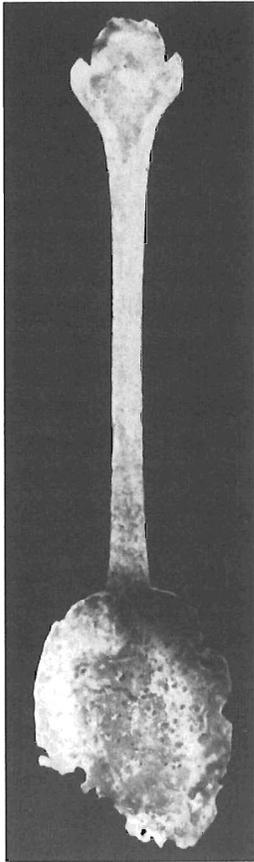
Dr. D.L. Hamilton, excavator of the sunken city of Port Royal, Jamaica, has used a fall sabbatical to accelerate his study of this 17th-century site in anticipation of the 300th anniversary of its sinking in 1992. One of the season's more striking finds was the remains of a ship that had torn through the floor of a building currently being excavated; its most tragic find, the discovery of partial skeletons of two young children. Sheila Clifford, a Texas A&M Nautical Archaeology Program graduate student, has prepared a few pictorial highlights of the season's work to pique your interest, while the Summer 1990 *INA Newsletter* will feature a more detailed description of the 1989 season.

*During the ninth field season of Texas A&M's underwater archaeology field school at Port Royal, Jamaica, students from Canada, Japan, Puerto Rico and the United States learned and practiced standard underwater excavation techniques. One of the most common tools in underwater excavation is the water dredge, used here to help excavate about 5,000 square feet of a single building with at least six rooms.*



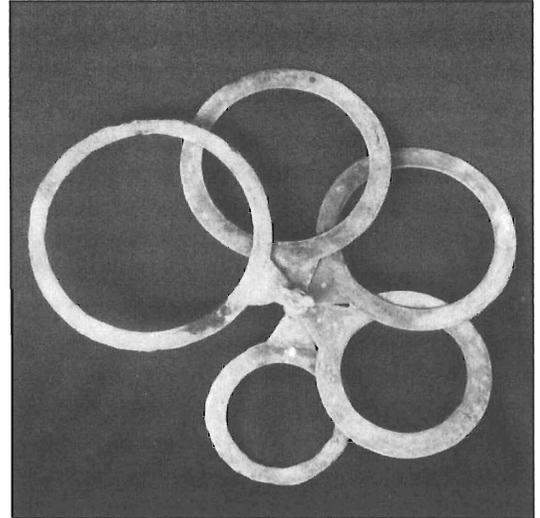
*Because of the shallow water depth at Port Royal, students use a hookah air system and can stay on the bottom for a minimum of 3 hours at a time. The barge served as a diving platform and a base for the air compressor and water pumps used to supply the hookah air system and water dredges.*



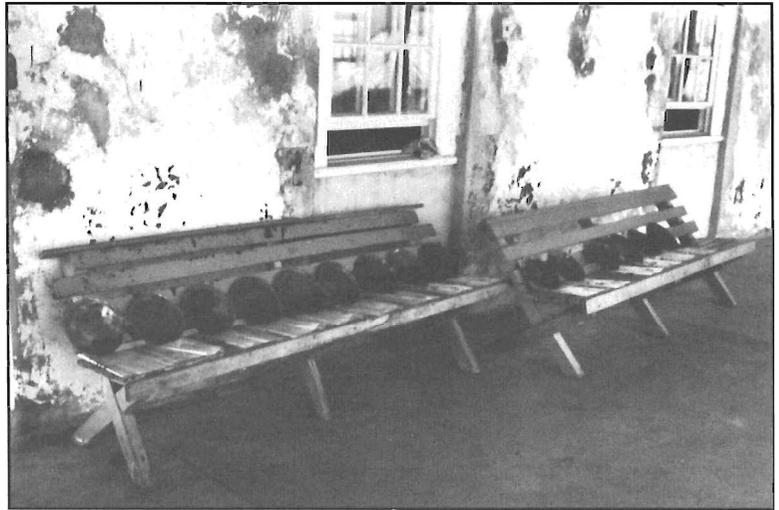


The excavation of at least six rooms of a single building provided a variety of silver forks and spoons, some well preserved and some in much poorer condition.

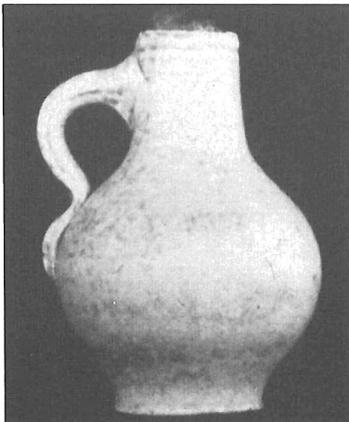
This shot gauge conforms to known calibers of cannon, ranging from a Demi-Culverine to a Falconet, as described in C. Ffoulkes' The Gun-Founders of England.



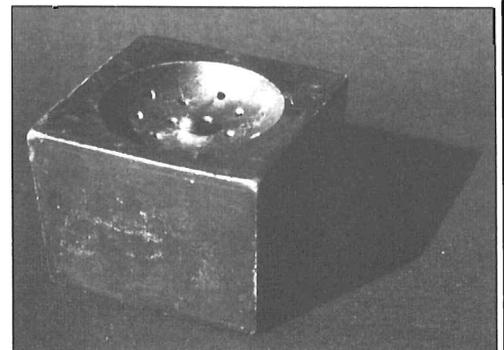
Archaeology students uncovered more than 30 pewter plates with distinct maker's and owner's marks. Dr. Hamilton believes that the plates, found still resting in four stacks, define a staircase well cupboard.



Although Rhenish stonewares were the most common ceramic hollow-ware of the 17th century, this is the first intact juglet found during the TAMU excavations at Port Royal.



In addition to brass candlesticks and two copper oil lamps, artifacts like this pewter "capstan-shaped" salt cellar and pewter sand sprinkler, thought to be part of a larger inkstand arrangement, suggest that this building housed a well-to-do, probably literate family. H. Cotterell's Old Pewter, Its Makers and Marks (1978) provides close parallels for the Port Royal finds.



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# Columbus Caravels Archaeological Project

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by James Parrent

In early 1990, INA will resume the search for the *Capitana* and the *Santiago de Palos* in St. Ann's Bay, Jamaica. Not only are these ships the last Columbus was to command, but their remains mark the earliest European archaeological site in Jamaica, and they are among the oldest recorded shipwrecks in the Western Hemisphere.

On June 23, 1503, during his fourth and final voyage, Christopher Columbus was forced to beach his remaining two caravels in St. Ann's Bay, Jamaica. The ships, worm-eaten and leaky, with water almost covering their decks, were purposely run aground near shore, positioned side by side, lashed together, and shored upright. Columbus and his crew of 115 men and boys lived in huts constructed on the ships' decks for more than a year. The ships were abandoned in St. Ann's Bay when Columbus and his men were rescued on June 29, 1504.

This shipwreck site is of great importance for a number of reasons. No naval architectural plans and no actual ships known definitively to be caravels from this crucial era of discovery have been found and identified. Because the two caravels were purposely run aground in soft sediment in shallow water, the chance of finding well-preserved hull remains increases. (Ship's hull remains covered by sediments may be preserved for thousands of years.) When found, the ships will yield new information on caravel construction and, because there are two caravels side by side, will allow archaeologists the unique

opportunity to compare construction variations of this important, but little-understood ship type.

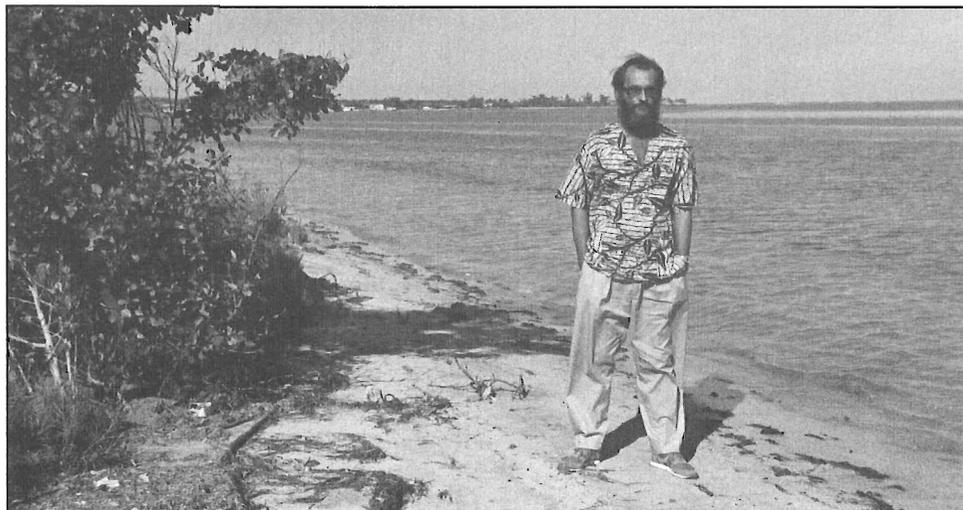
Scholars who debate the role of technology in the discovery of the New World will gain new evidence that will fuel the debate or quench the argument. In addition, since Columbus and his men lived aboard the stranded vessels for over a year and were provided with food by local natives, the site will tell us much about contact-period subsistence of the Arawak. Further, associated artifacts can be used as comparative material for other known or suspected early New World Spanish sites. We may also be able to discern living arrangements on the ships, ways ships may have been fortified, and pastimes of officers and crew.

While important in itself, the significance of the search for the St. Ann's Bay caravels is amplified by the approach of the Columbus Quincentennial in 1992. The discovery of Columbus's ships will capture world-wide interest and stimulate study of the period of exploration. Locating an actual Columbus site will do much to bring history to life in the minds of students of all ages.

The Columbus Caravel Project consists of four phases: Phase I—Compilation and review of the literature and of all available material relating to previous searches for the caravels.

Phase II—Identification of the 1504 shoreline at St. Ann's Bay and, by the use of remote-sensing equipment,

*Mr. Roderick Ebanks, Director of Archaeology, Jamaica National Heritage Trust, on the beach at St. Ann's Bay.  
(Photo: James Parrent)*





*Aerial photograph of St. Ann's Bay provided by the Jamaica National Heritage Trust. (Photo: J.S. Tyndale-Biscoe)*

the identification of high-potential targets off- and on-shore.

Phase III—Testing of selected target areas, chosen in Phase II, by limited excavation and/or coring.

Phase IV—Full excavation of the Columbus caravel site. This phase will include site recording, study, and excavation, as well as artifact preservation, study, and display. A series of publications in both popular magazines and scholarly journals, along with a final site report, will follow. At the discretion of the Government of Jamaica, an international tour is planned to allow the broadest possible public exposure of the remains of Columbus's last ships.

The initial steps of the project have been set in motion. An advisory Committee has been organized. A contract

has been negotiated with the Government of Jamaica. Initial funds and equipment have been provided by INA Directors Samuel J. LeFrak, Donald Geddes, III, and Robert E. Lorton and INA benefactors Grant Lyddon and Orel Hershiser.

The project is a joint venture between INA and the Government of Jamaica. Jamaican archaeologists, Jamaican Defense Force Coast Guard personnel, and staff members of various Jamaican government agencies will work closely with the INA project staff. While the main goal of the project is to locate the Columbus caravels site, a no less important aspect is the opportunity for students of the Nautical Archaeology program at Texas A&M University to participate in an interdisciplinary field research program.

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# PROFILE

## Sema Pulak

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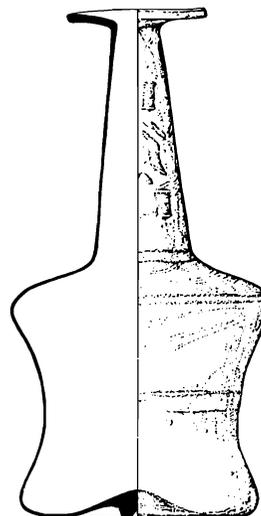
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by George Bass

Sema Pulak was first introduced to the INA staff in the summer of 1979 when, newly married, she stepped ashore at our camp at Serce Liman. She and Cemal had met in 1972 at Robert College, Istanbul, where she majored in marketing and he was pursuing a B.S. in mechanical engineering. We had heard about her from Cemal since 1975, when he began spending his summer vacations as a volunteer diver/mechanic on our excavations, first at Sheytan Deresi and then at Serce Liman. But during those years, we never had the chance to meet Cemal's fiancée, and he seldom saw her himself, because she lived far off in Germany where her father was a surgeon.

We had already recognized Cemal as extraordinarily multi-talented, and we soon realized that soft-spoken Sema, modest to a fault, matched Cemal skill for skill. Having grown up in Germany where she spoke Turkish at home, German with friends, and English in the American school she attended, Sema moved easily between fluent Turkish, German and English, with perfect French thrown in for good measure. We learned that she played classical music on the piano, sewed beautifully, and sometimes painted.

That year, 1979, brought more than its share of major changes to the lives of the newlyweds. After four years of my coaxing, Cemal had just decided to give the study of archaeology a try with us at Texas A&M. But first he would spend a year in Bodrum with me and my family and a number of graduate students, sorting through the three tons of medieval Islamic glass we had raised from the shipwreck at Serce Liman.



After the summer's excavation ended, Sema and Cemal moved into a room of the three-story building INA has rented in Bodrum as its Turkish headquarters since 1975. Ann and I and our two young sons, who lived in the rented bottom floor of the next building, soon discovered Sema's remarkable skill as a cook. What a treat it was to be invited to dine on musakka, börek, köfte, pilaki, and baklava!

Each day we all worked together in the medieval castle which houses the Bodrum Museum of Underwater Archaeology, trying to make sense out of the half-million to one million fragments of medieval glass facing us (see *INA Newsletter* 15/3). As we developed a method of sorting the shards by color, thickness and texture so that we could find joining fragments, Sema volunteered to draw some of the mended vessels. The following year, on seeing examples of her exquisite work, the former director of one of the world's finest glass museums remarked that they were the finest drawings of ancient glass he had ever seen. Yet she had never drawn an archaeological artifact before!

Settled in married-student housing at College Station, Texas, in the fall of 1980, Sema joined a choral group, drew botanical illustrations for a book, and in general became acquainted with her new environment.

Each summer she returned to Bodrum to draw more of the Serce Liman artifacts for the publications many of us, nearly a decade later, are hard at work preparing. But frustrated at being unable to work in America because she was not a U.S. citizen, she longed for something more to do each fall on her return. She approached the Modern Languages Department at Texas A&M about working on an M.A. in French but learned that the only graduate degree offered by the department was in Spanish.



Photo: Cemal Pulak



The following summer in Bodrum I often saw Sema spend her evenings with a paperback, "Teach Yourself Spanish," but did not think much about it.

A year and a half later, at a faculty Christmas party in College Station, I entered a knot of people just as one was saying, "...and I have this student who is absolutely fluent in Spanish. She just wrote a fifteen-page paper for me, and there is not a single grammatical or spelling error. I could not have done it better myself."

It was the first time I had met Luis Costa, a native of Spain, who is head of the Modern Languages Department.

"Who's that?" I asked idly, trying to join the conversation.

"Oh, you wouldn't know her," he replied. "It's a young Turkish student."

"Sema Pulak?" I asked.

"Yes," he said, surprised that I knew her.

"But she only started learning Spanish last year," I exclaimed.

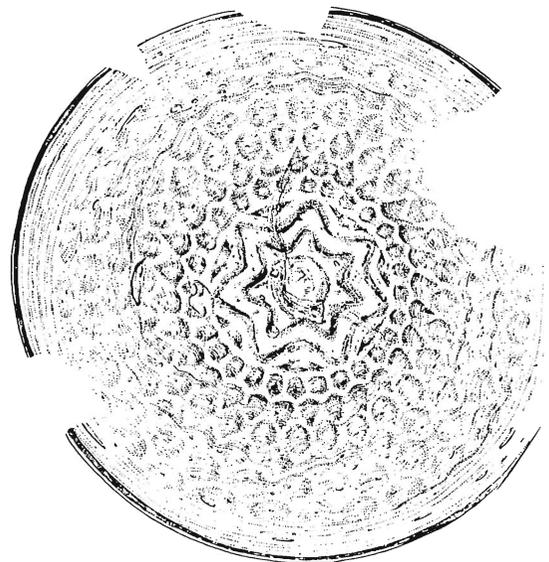
"Yes, I know," he said matter of factly.

While completing her M.A. in Spanish, Sema worked as a graduate teaching assistant in the department, and after graduating went on to add Italian to the languages she reads and speaks with ease.

During all these years she has been held with great affection as part of the "INA family." She and Cemal are

regulars at the "opera evenings" I host on alternate Fridays, when several of the students and faculty watch and listen to an opera at my house on video laserdisk.

Now Sema has a new challenge: her son Altay, born in January, 1989. Motherhood becomes her as much as, or more than, all the other challenges she has undertaken.



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# News & Notes

## Ketelhaven Internships

The Nautical Archaeology Program at Texas A&M University and INA have expanded their association with the Dutch Museum of Ship Archaeology at Ketelhaven in recent seasons (see *INA Newsletter* 15/2). During the summer of 1988, Texas A&M graduate students **Michael Fitzgerald, Sam Mark, and Bob Neyland**, under the direction of **Fred Hocker**, recorded the well-preserved remains of a small cog-built vessel that sank near Amsterdam around 1425.

The vessel, possibly a *coggeschip*, a type of inland craft developed from earlier sea-going ships, had been excavated in the new town of Almere in 1986 and placed in storage at Ketelhaven. The recording project was funded by INA and the International Association for the Exchange of Students for Technical Experience (IAESTE).

In the summer of 1989, Fred Hocker returned to Ketelhaven to begin the reconstruction and analysis of the hull, and Texas A&M graduate student **Kathleen McLaughlin-Neyland** worked at the museum cataloguing the inventory of an early 17th-century ferry excavated in 1986 in the town of Lelystad. Texas A&M students are now completely responsible for the study and publication of this wreck. Ms. McLaughlin-Neyland and her husband, Bob Neyland, remained at Ketelhaven for the fall and winter to study the remains of two prams (flat-bottomed inland craft) that sank in the 18th century.

## INA Participates in USIA Worldnet Dialogue

INA's president, **Robert K. Vincent, Jr.**, and Nautical Archaeology Program graduate **Douglas Haldane** traveled to Washington, D.C., in early November to appear on a special WORLDNET Dialogue program for the United States Information Agency. They discussed techniques and methods of nautical archaeological research with members of a panel in Alexandria, Egypt, consisting of Dr. Mehrez El Hussein, Secretary of the Egyptian Association for Maritime

Heritage and Underwater Archaeology; Dr. Daoud Ibrahim Daoud, President of the Archaeological Society and a professor of Greco-Roman Civilization (Alexandria University); and Dr. Nadia Ibrahim, Director of Tourism in Alexandria. The program is part of USIA's international satellite television service and was transmitted live over WORLDNET's entire European, African and Near Eastern network.

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## In Memoriam

### F. Alex Nason

All of us in INA were saddened to learn of the death in August of F. Alex Nason of Cleveland, Ohio. Mr Nason, a founder of the multinational Lubrizol Corp., was one of our earliest and most loyal patrons. It was due to his generosity that INA's very first project, a 1973 survey for shipwrecks in Turkey, was a success.

Because we try never to make deep dives without a recompression chamber close at hand, the survey was possible only because Alex Nason made a gift that enabled us to purchase a two-person, double-lock chamber to mount on the deck of our survey vessel. That allowed us to dive to 100 feet, where we found the Glass Wreck, the Sheytan Deresi wreck, and the Hellenistic wreck at Serce Limani, all of which have since

been excavated and fully or partly published.

The chamber is now permanently installed on INA's research vessel *Virazon*, from which we are excavating the Bronze Age shipwreck at Ulu Burun. Other gifts followed, always filling needs in INA's research program.

Mr. Nason is survived by his wife of 64 years, Mrs. Katharine H. Nason. A grandson, Alex G. Nason, of New York City is a member of INA and has represented his grandfather on several occasions when INA wanted to honor Mr. Nason who unfortunately was unable to travel because of his illness.

Alex Nason will always be remembered for his contribution to INA's early and continuing success.

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# News & Notes

INA has been mentioned in several prominent media publications recently. In a *New York Times* article on Sunday, July 30, 1989 (pp. 14-15), Scott Redford, Resident Director of Georgetown University's McGhee Center for Eastern Mediterranean Studies in Alanya, Turkey, mentioned INA in his article "Where Crusaders Camped in Turkey". The *US News and World Report* of August 21, 1989, included comments about nautical archaeology and underwater salvage from INA's archaeological director George F. Bass, and Brian Fagan's column in the November/December issue of *Archaeology* provides a favorable review of *Shipwrecks and Seafaring in the Americas* by George Bass.

*National Geographic*, July 1989, included the return to Cape Gelidonya in its Geographica section, and the November issue of this year presents a full-page discussion of glass, the Serce Limani shipwreck, and the recent Centennial award given to George Bass. In addition, *Lindblad Tours* (Summer and Fall, 1989) features INA in its Mediterranean Trips edition. *The Insider's Guide to Turkey* also includes an accurate

description of INA and its work at the Bodrum Museum of Underwater Archaeology in Bodrum, Turkey.

In the September, 1989, issue of the Archaeological Institute of America *Newsletter*, Robert L. Hohlfelder wrote about his excavations at the port of Caesarea Maritima, Israel, and the status of nautical archaeology, including the work of George Bass, current AIA Vice President, and INA. He also assembled a list of underwater archaeology fieldwork opportunities and graduate programs in Maritime History or Archaeology including the M.A. and Ph.D. programs in Nautical Archaeology at Texas A&M.

And "Time Capsules," by Dan Croft in the *Nautilus Journal* (Summer 1989) discussed the Abandoned Shipwrecks Act, INA's work throughout the world, and other news of shipwrecks.

We appreciate and welcome these mentions of INA and its work as symbols of increased public awareness and interest in the goals of nautical archaeology.

In December, INA's Archaeological Director **George F. Bass** gave the keynote address to open the annual meeting of the British Association of Near Eastern Archaeologists at the Royal Museum in Edinburgh, Scotland.

He also presented the results of recent metal and pottery analyses from material excavated from the Late Bronze Age shipwreck at Ulu Burun in an international symposium on Bronze Age trade organized by scholars at Oxford University.

And at the annual meeting of the Archaeological Institute of America, George Bass participated in a symposium on Cyprus as a center for trade in antiquity and, because of the light thrown on Sardinian archaeology by the Ulu Burun shipwreck, in a panel discussion of Bronze Age Sardinia.

\*\*\*\*\*

We are pleased to note the September publication of *Underwater Archaeology Proceedings from the Society for Historical Archaeology Conference* held in January, 1989 in Baltimore.

Edited by J. Barto Arnold III, topics include the new federal shipwreck law, conservation, drowned prehistoric sites, continental shelf research, shipwrecks from the 16th to 20th centuries, and active state underwater archaeology programs. To order these or other proceedings (1978-88), contact the Society for Historical Archaeology, P.O. Box 231033, Pleasant Hill, CA 94523-1033. The 1989 volume is \$15, with discounts for orders in quantities of 6-11 (20%) and 12 or more (40%).

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# News & Notes

Also published recently is the *Archaeological Fieldwork Opportunities Bulletin* 1990. More than 200 programs for volunteers, students, and staff are listed in this Archaeological Institute of America bulletin. It is available from the AIA, Dept. AFOB, 675 Commonwealth Ave., Boston, MA 02215 (617/353-9361) for \$10.50 to AIA members and \$12.50 for others.

\*\*\*\*\*

The March 1990 volume of the *Biblical Archaeologist* will be devoted to nautical archaeology, with articles by **George Bass**, **Michael Fitzgerald**, **Cheryl Haldane**, **Douglas Haldane**, **Nicoll Hirschfeld**, **Claire Peachey**, **Cemal Pulak**, and **Stephen Vinson**. In addition to a commentary on nautical archaeology, the issue features articles on ship construction, ancient anchors, building the model of the Kinneret (Sea of Galilee) boat, archaeobotany, and commerce in the ancient Mediterranean.

\*\*\*\*\*

Five Nautical Archaeology Program students have recently been awarded Master of Arts degrees from Texas A&M University. The 1988 graduates and their thesis titles are **Joy Kitson-Mim Mack** ("The Glass Beakers from the Eleventh-Century Serce Limani Shipwreck: A Preliminary Study"), **William R. Lamb** ("The Provenance of the Stone Ballast from the Molasses Reef Wreck"), **Patricia McClenaghan** ("Drinking Glasses from Port Royal, Jamaica, circa 1660-1850: A Study of Styles and Usage"), **Bruce Thompson** ("The Rigging of a 17th-Century Frigate at Mombasa, Kenya"), and **Robyn P. Woodward**

("The Charles Cotter Collection: A Study of the Ceramic and Faunal Remains").

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Congratulations to 1989/90 INA scholarship recipients **Helen Dewolf**, **Tommy Hailey**, **John Leonard**, **Christopher Monroe**, **Hawk Tolson**, and **Paul Willoughby**. The scholarships, based on academic achievement, provide \$200 awards to students in the Program in Nautical Archaeology at Texas A&M University. Applications for the scholarships are available from Ms. Claudia LeDoux, Program in Nautical Archaeology, Texas A&M University, College Station, TX 77843.

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INA President **Robert K. Vincent, Jr.**, discussed INA excavations and archaeological technique in addition to displaying replicas of a sword and goblet recovered from the Ulu Burun shipwreck in an October lecture at the Brazos Valley Museum, Bryan, Texas. **Cemal Pulak**, director of the Ulu Burun excavations, travelled to Grayson Community College, Sherman, Texas, to present a similar lecture as part of their anthropology series.

\*\*\*\*\*

Nautical Archaeology Program graduates **Paul Hundley** (1980) and **Bruce Thompson** (1988) are serving respectively as State and Assistant State Underwater Archaeologists for Maryland. In addition to developing a maritime archaeological program for the state and devising regulations for salvage and excavation of shipwrecks in state waters, the two INA veterans work closely with the

University of Maryland (Baltimore County) to create a New World underwater archaeology curriculum and to continue the establishment of a shipwreck inventory of Maryland waters.

\*\*\*\*\*

Finally, we note the retirement of INA Founding Director **Dr. Melvin M. Payne** from the National Geographic Society. As a fine, full-page spread on Dr. Payne's extensive interest and tenure in the November 1989 issue of *National Geographic* notes, his 57 years at the NGS included service as President and Chairman of the Society's Board of Trustees. For the past 14 years, Dr. Payne also served as Chairman of the NGS Committee for Research and Exploration, forging a strong link between the National Geographic and INA. He will continue to serve on INA's Board of Directors and to provide his expertise to the National Geographic Society as Chairman Emeritus of the Board of Trustees.

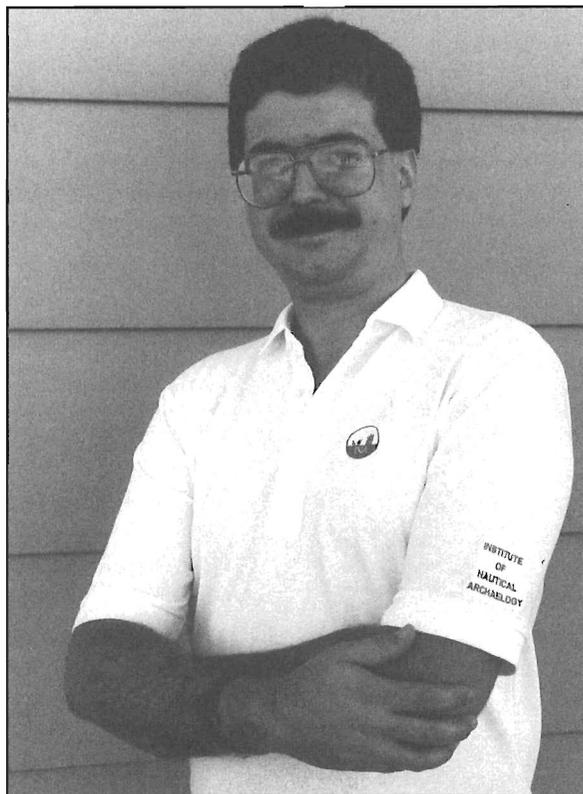
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## Correction

The Fall 1989 *INA Newsletter* 16/3 included notice of the publication of the Kinneret boat by the Israel Department of Antiquities. The correct title of the work is *The Excavation of an Ancient Boat in the Sea of Galilee (Kinneret)*, and it may be ordered from the Israel Department of Antiquities, P.O. Box 586, Jerusalem 91004, Israel, for about \$20.

## Symposium Proceedings Published

The Hellenic Institute for the Preservation of Nautical Tradition has been sponsoring symposiums on ship construction in antiquity for several years. The Proceedings of the first symposium held at Piraeus, Greece, in 1985, have been published. Harry E. Tzalas, president of the institute, edited the collection which includes several chapters by **George Bass, J. Richard Steffy, Susan Womer Katzev, and Michael Katzev**, among others. *Proceedings: 1st International Symposium on Ship Construction in Antiquity, Piraeus 1985* (Athens, 1989) is comprehensive in scope and includes both new information and reevaluations of previously published works. This fine collection will interest both scholars and the general reader.



## INA SHIRTS

For the first time, INA is offering top quality interlock 100% cotton shirts, complete with the INA logo and identification embroidered into the material. Supplied to us by DiFini, one of America's leading manufacturers and distributors of active wear shirts, you will find the shirt smart, comfortable and a pleasure to wear. Each shirt is white and is 15% oversized for freedom of movement. Because of 8% shrinkage, orders should be for standard sizes as detailed. Because we obtain them directly from the manufacturer, we can provide them at well below the normal price. They are \$33 each, including shipping, in the USA. Please send a check or money order with your order and allow 4-6 weeks for delivery.

	<u>Men's</u>	<u>Women's</u>
S	36-38	34
M	40	36
L	42	38
XL	44	40+
XXL	46+	

INA embroidered patches (3 1/2" in diameter) are also available at \$3.00 each, including shipping.

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