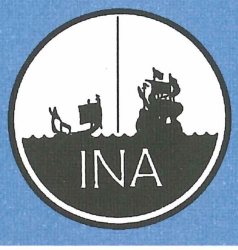
THE INA QUARTERLY



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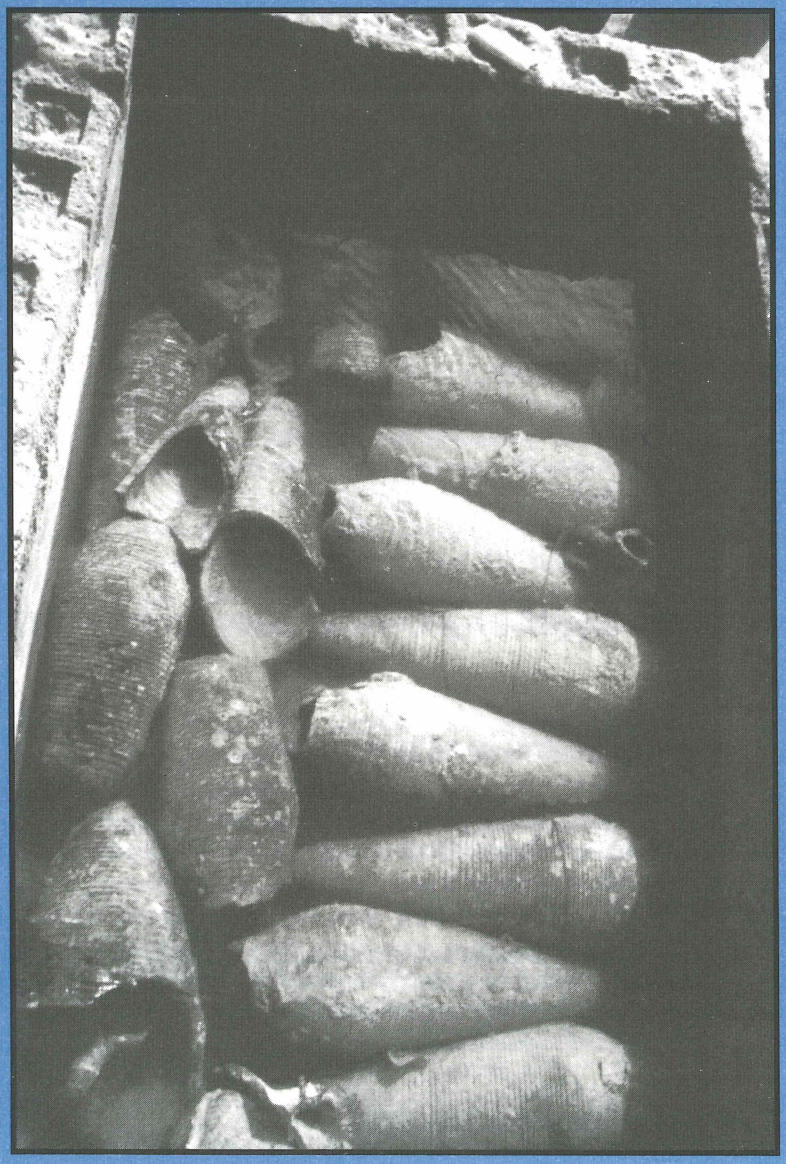

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On the cover: Amphoras from the shipwreck at Black Assarca Island, Eritrea, in their storage tank. Photo: R. K. Pedersen

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The *INA Quarterly* was formerly the *INA Newsletter* (vols. 1-18). Editor: Christine A. Powell

Under the Erythraean Sea: An Ancient Shipwreck in Eritrea

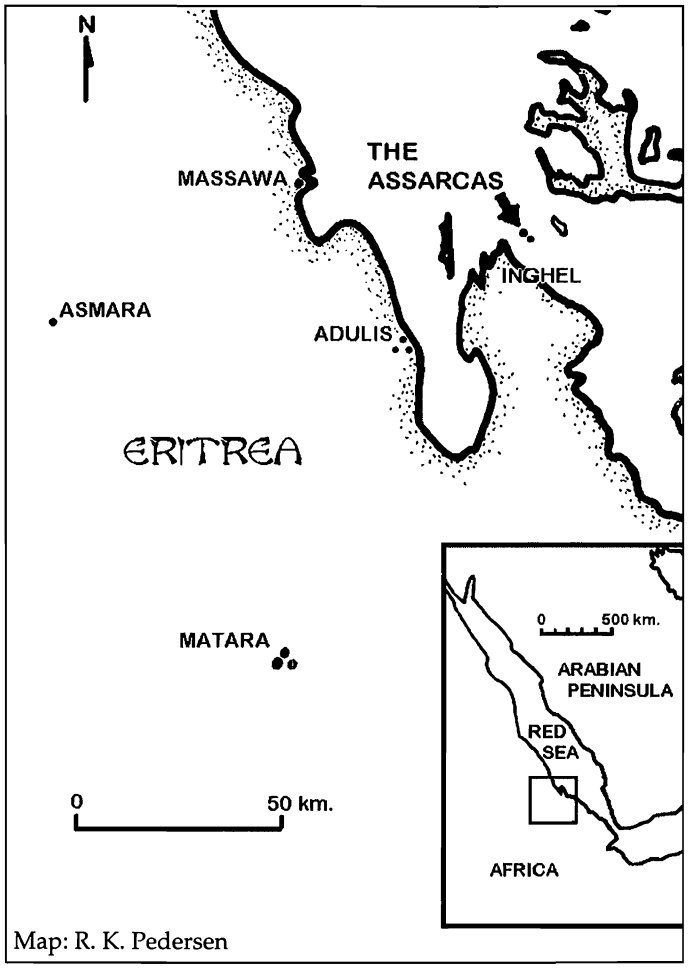
Ralph K. Pedersen

"This island is cursed!" Nesreddin spat this invective while the other Eritreans quietly nodded. Indeed, it seemed Nesreddin was right. Little had gone right for us since we had landed on Assarca on February 3, 1997. Rain, high winds, and chilly temperatures had prevailed for weeks. The nearly daily pounding by wind and rain left little opportunity to pursue our goal: the excavation of the ancient shipwreck lying just offshore. The storms typically lasted for four or five days, followed by a calm of two or three days' duration. Compounding this were the daily equipment problems caused by the damp and the wind-blown sand that got into everything. Long periods of inactivity shortened people's tempers, particularly those of ones unaccustomed to "roughing it" in isolated environments. Every day was a challenge. I had long ago realized that each day the team remained on Assarca would be a triumph. We had already been given thirty of them; twenty-five remained.

We had come to this small desert island off the Eritrean coast to excavate a fifteen-hundred-year-old shipwreck (fig. 1). Like many shipwrecks of archaeological import, it was located far from the nearest outpost of civilization. Massawa, Eritrea's main port, lay thirty miles across the sea. Inghel, a group of traditional villages, was several miles away on the mainland at the tip of the Buri Peninsula. Inghel had no shops, roads, cars, or telephones. There was, however, a medical clinic. Aside from our neighbors at Inghel, we were truly isolated. Our one link to the world was our single-side-band radio hooked up to a solar-charged car battery. This, however, enabled only the most intermittent contact with Massawa.

Our wreck had settled in the shallow waters of the Assarca Islands. The Assarcas consist of two islets. One, surrounded by fine sandy beaches and overgrown with trees, is called White Assarca. The other, surrounded by jagged, black coral cliffs and barren but for cacti, is Black Assarca. *Guess which one we were on!*

Black Assarca, our base, is little more than an obstruction to shipping. Essentially, it is nothing but a massive sand-covered coral head lying two meters above sea level. Except for a sandy beach on its northern side, the island is nearly featureless. A reef, never more than a meter underwater, completely surrounds Black Assarca, forming a barrier to landing. At low tide, the highest tops of the coral protrude from the sea like pickets, as though defending the place from intrusion. The island is populated by only goats and hand-sized spiders. The flora is limited to grass and a large cactus species called euphorbia. These cacti provide a windbreak as the only natural shelter on the island.



Map: R. K. Pedersen

Fig. 1. *Eritrea. The location of the Assarca Islands is approximate.*

It was some fifteen centuries ago that a ship met disaster on the reef. The wreckage settled at the base of the cliff, possibly remaining undisturbed until 1995. In that year, a group of tourists decided the Assarcas would be a good place for snorkeling. Sailing under the guidance of Doi Malingri, an Italian yachtsman running tours for the Eritrean Ministry of Marine Resources (MMR), their yacht put in at the islands.

During their snorkeling adventure through the clear water, the group noticed odd objects at the base of the reef twenty-five feet below. Malingri investigated these artifacts, which proved to be ceramics. He raised a sherd, containing a neck and handles (fig. 2), that he turned over to the Ministry upon his return to Massawa. Malingri reported to the MMR that there were many more sherds at the island. Shortly

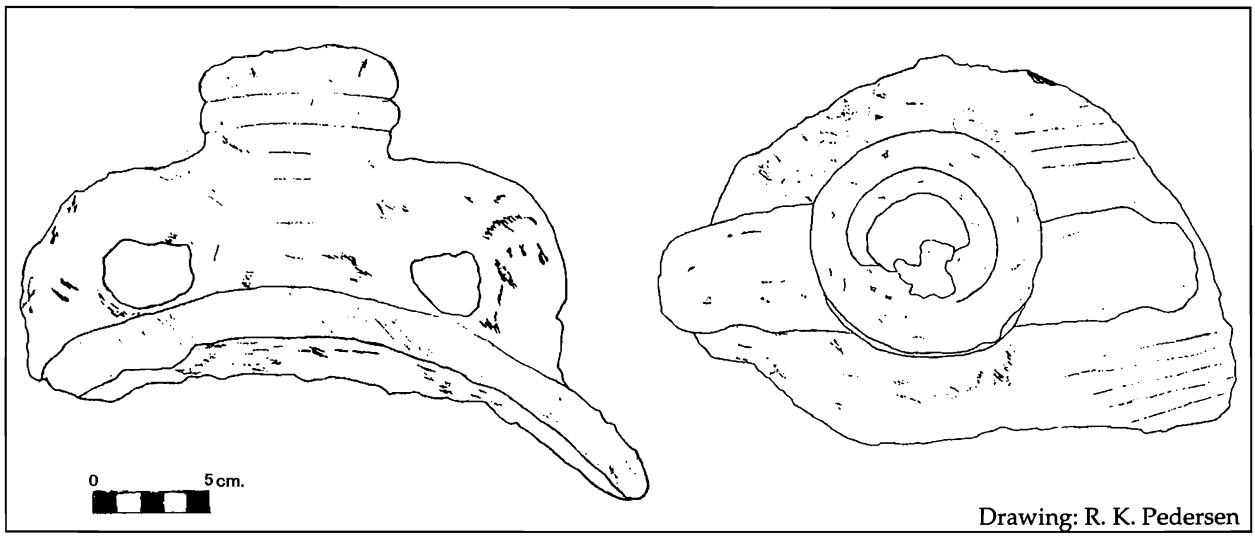


Fig. 2. *The sherd raised by Doi Malingri in early 1995.*

after this, the sherd was shown to a visiting photographer from the National Geographic Society. The photographer suggested to the Eritrean authorities that, as the piece might be ancient, they should contact Dr. George Bass at INA.

It was at this time that I was preparing for a fact-finding trip to Eritrea. This was in response to an invitation issued to INA in late 1993, by the then-existing Eritrean Department of Culture. By May 1995, all arrangements had been made for my trip. I was planning to merely shake hands and see about the feasibility of conducting a shipwreck survey along the coast. A week before my flight to Africa, I received a phone call from Dr. Bass. He informed me that the Eritrean MMR had contacted him about a possible ancient shipwreck in their waters and they wanted him to examine it. He informed the MMR that one of his research associates was already heading their way to visit the Department of Culture, which surprised the MMR officials. Two weeks later, I was in the Red Sea searching for the shipwreck.

The Survey at Assarca 1995

On my arrival in Asmara, Eritrea's capital, I first met with Zemede Tecle, Head of the Department of Culture. I informed him of Malingri's discovery and that the Ministry of Marine Resources in Massawa was expecting me to take a look at it. Zemede had not heard of an ancient wreck being discovered off their coast. I promised to report my findings to him. I then headed down to Massawa, on the edge of the Red Sea.

Asmara lay nine thousand feet above sea level, and the weather in mid-May was still cool. The coastal regions, however, were already baking in the heat. The road to Massawa snaked its way from Asmara down the edge of the Ethiopian plateau to the desert along the sea. The change in climate was impressive. It ran from greenery in which baboons ran wild to an arid waste in a matter of hours. The coastal desert was forbidding, with dry riverbeds the only evidence that rain ever fell here. Dust devils reached high into the sky. These slender twisting cones appeared to be pillars of smoke and I initially thought they were from fires.

I arrived in Massawa by afternoon. The town is located on two islands and part of the mainland. Its oldest part is on the island of Batsli. Here, Turkish, Egyptian, and Arabic architectures blend together in an exotic mix. The city was still scarred from its battles in 1991 in the war of independence. Bullet holes marred the walls, and spent artillery shells lay half buried in the dust. Shattered Soviet-built tanks lay in ruins about the city. Many people had died in Massawa during the battle for its liberation. More died in a revenge bombing by Ethiopian MIGs after the city had been won by the Eritreans. Despite the overall "shot up" look of the place, the city was slowly being repaired. Feelings of euphoria and optimism were palpable in Massawa as elsewhere in Eritrea. The Eritreans, after all, were forming a new nation.

My contact at the MMR was Dr. J.C. "Chris" Hillman. An overseas Briton, he and his wife Sheila had spent their lives in East Africa. Living in a small trailer that did triple duty as home, office, and school for their two daughters, they were studying the marine life of Eritrea. Once in the MMR offices, I met with officials who showed me the sherd found by Malingri some months previously. Skeptically, I had been expecting the pottery to be relatively modern, perhaps a pot tossed from a nineteenth-century ship. I was stunned to see what my hosts pulled from the storage cabinet. It was the top of an amphora containing a neck and both handles. I had spent over a year preparing

to do the groundwork for an archaeological survey in Eritrean waters. Instead, I was confronted with the real possibility of an ancient shipwreck.

My first instinct was that the sherd had to date to the seventh century CE. It reminded me of the amphoras from Yassıada I used to haul around the museum in Bodrum. The sherd was Mediterranean, at least in style if not origin. It would have been easy to let my imagination run wild, but after spending some time with the sherd, I was confident of my initial analysis. I was holding a piece of a Byzantine amphora found under water in the southern Red Sea. As far as anyone knew, nothing of its like was known to have been found previously in Eritrean waters. Indeed, there were few other known ancient wrecks in the Red Sea. The best known of these was the first-century CE wreck at Zagrabad Island, Egypt. This wreck has been looted by sport divers, and the site was no longer archaeologically viable. Given that Eritrea had been at war since the early 1960s, sport diving had yet to affect the area. Thus, if Malingri's sherd was indeed from a shipwreck, and not merely ancient jettison, there was a good chance the site could be in pristine condition.

The place where the sherd was discovered was the Assarca Islands (var. sp. *Assarka* and *Asarka*). I was told this name derived from an Arabic word meaning "Guardian." The position of the Assarcas, in the middle of the Massawa Channel, explained why the island was so named. A careless captain could easily pile his ship onto the island. Indeed, an old British pilot for the area warned ships to give the Assarcas a wide berth.

Our survey team included Hillman, Yassin Aden of the MMR, and myself. As none of the team had previously visited the site, we searched for it based on Malingri's directions. Once at the islands, we began our search with Yassin at our boat's helm, and Hillman and me in the water equipped with snorkeling gear. We were towed behind the boat scanning the seafloor with Hillman at the end of one line, and myself at the end of a longer one. My first thought was that we were the perfect shark bait: Two large hunks of meat being trolled behind a boat. This, however, came with the territory: the Red Sea has the highest concentration of sharks in the world. If we were going to worry about sharks, there was no point even getting into the water. After about ten minutes of towing, Hillman spotted something on the seafloor. He immediately dropped off his line. A few seconds later, I saw something too: the long shape of an amphora lying fully exposed on the seafloor. Hillman and I gawked at it, thinking this had been too easy. We grinned at each other before swimming down to take a look. Returning to our boat, we quickly donned our scuba gear, and dived to examine the site.

Located at only twenty feet, the ceramics rested both in the sandy areas between coral heads and atop the reef. Some scattered sherds lay below the coral on sand that sloped down to an undetermined depth. The artifacts were spread over an estimated area of one hundred square meters. The most noticeable aspect of the site was the pile of four or five broken amphoras and assorted sherds lying in a group.

Examination of the site revealed four pottery types. Three of these were closely related in decorative style and fabric color. The most numerous type was a long, conical amphora with a relatively wide mouth. The body was covered with horizontal ridges extending from the neck to the vessel's toe, ending in a button. All examples were broken, exposing a dark brown fabric. Two amphoras had intact bodies, missing only handles and neck. We noticed several examples partially buried and others concreted into the reef. We dubbed these long conical amphoras "Type I" (fig. 3).

The second type of vessel was similar to the sherd raised by Malingri. Like his, none of these amphoras were intact. Small sherds and handles were readily evident, but no large pieces could be found. Malingri had reported that the sherd he raised belonged to a type of amphora that was lentoid in shape. Although we could find no conclusive evidence of this, it was clear that this type was round on at least one vertical axis. We therefore found no reason to doubt his observation. The fabric color was the same dark brown as the conical amphoras, indicating, possibly, a similar origin for the two varieties. These "Type II" sherds had ridges like the conical amphoras but they were verti-

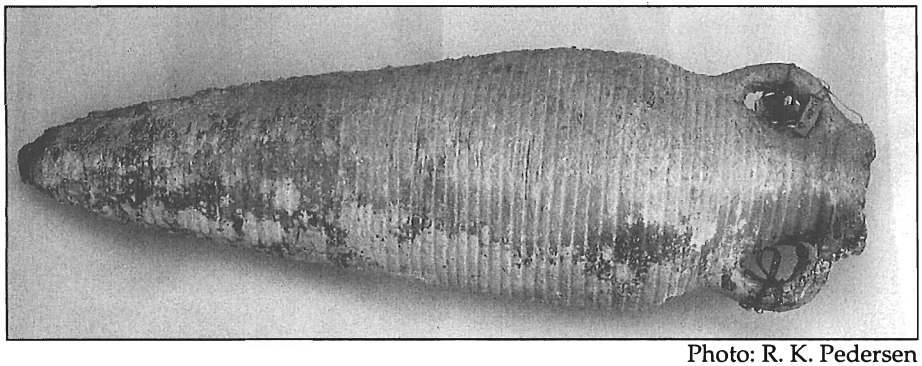


Photo: R. K. Pedersen

Fig. 3. *Amphora A3–010. This Type I vessel was the only one found intact in the 1997 season.*

cal instead of horizontal. These vertical ridges aided in the identification of sherds of this type.

The third amphora variety, "Type III," was also conical, but it had a body noticeably wider than the "Type I" amphoras. Found by Yassin, it was located at the eastern end of the site. The neck, the handles, and the shoulder, were missing. The amphora's toe was buried and thus not examined. The body had horizontal ridges similar to the other amphoras, and shared the same dark brown fabric.

Only one sherd of a possible fourth type, "Type IV," was found. This had no ridges like the others. Unlike the dark-brown fabrics of the other types, this sherd had a light brown fabric. There were no other discernable features.

We found no anchors, nor were any hull members visible. Handfanning around the site revealed several amphoras beneath the sand, some of which were lying side by side. While the exposed ceramics were damaged and apparently wave-tossed, the more intact amphoras under the sand indicated that this was not merely a cargo dump.

Although my original opinion was that the pottery dated to the seventh century, I believed a date a few centuries earlier or later was also possible. Upon my return to New York, my further research revealed this analysis was probably correct. Published examples of ceramics from sites in Africa and the Mediterranean correlated to the ones at Assarca. The dates for all of these ranged from the late fourth century through the seventh. Most informative was a publication concerning an excavation on the Red Sea coast at Berenike, Egypt. Here, amphoras of the narrow conical type, correlating to the Assarca Type I, were found in strata datable to 400 CE.

The importance of the shipwreck lies in its connection between the Mediterranean world and the first-century Aksumite kingdom of Abyssinia, a kingdom noted by both the Romans and the Byzantines as the "Third Power of the World" (see sidebar, page 14). Here at Assarca for the first time, archaeologists had the opportunity to examine a ship within the realm of the Indian Ocean with links to two of the major economic powers of the ancient world.

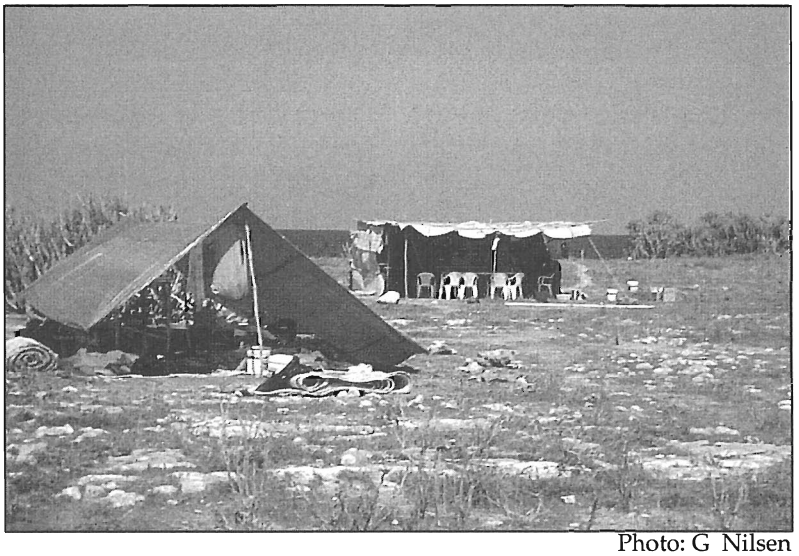


Photo: G Nilsen

Fig. 4. *Spartan and exposed, yet comfortable, our camp served us well for nearly two months. In the foreground, the director's shelter. In the background, our kitchen and dining area. Note the tall euphorbia cacti surrounding the structures.*

The 1997 Field Season

Nearly two years of planning and preparation came to a head in January of 1997. Unfortunately, it was not the best time of year to work in the Red Sea, but circumstances had forced the project to be delayed from the previous autumn. Thus it was that our nine-person team (comprising Eritreans, Americans, a Briton, and an Ethiopian cook) assembled in Massawa in mid-month. Using Dr. Hillman's base at the Environmental Resources Division Headquarters for our deployment, we gathered the supplies we needed, including bedding and kitchen equipment, and materials for a diving barge. For the platform, a dozen steel drums were purchased from the Massawa power plant to serve as a base. This required special permission, as the items were in short supply. At four by three meters, the barge proved impossible to tow to Assarca. We fastened it behind the *Norah*, the ship that took us to the islands, but once underway the bow wave in front of the barge submerged it. To continue would have meant its destruction. We returned to port, disassembled the barge, and stowed the timbers and drums on the *Norah*. Ultimately, we would build a smaller platform, only four square meters in area, but large enough to support our surface supply compressor, a dive tender, and supply box. She was of durable design, and she would serve us faithfully. The new barge was dubbed *Unsinkable II*.

From our first day in the Assarcas at the beginning of February, we were at the mercy of the elements. High winds whipped our bleak little island. Clouds threatened rain... and delivered it. It was constantly chilly. This was certainly not the weather I had been told to expect. As white caps pounded the beach, I wondered how much excavation we would get to do. Our spirits sank lower and lower as the days of poor weather continued. We constructed a bamboo and grass mat kitchen, and for other shelters we used large blue tarpaulins (fig. 4). The first night brought rain, as did most of the ensuing nights.

The cold windy days and rainy nights continued for the first five days. People were itching to see the wreck.

Then on the sixth day, Mother Nature rested. Seeing our determination, perhaps she gave us a break. Fine weather followed for three days, during which we were able to locate the site and anchor our newly constructed *Unsinkable II* over it. Then, the storms returned. This weather pattern repeated itself with uncanny predictability. As we moved through February and March, the weather changed to a pattern of five fair days followed by three foul.

All materials, food, and water had to be brought from Massawa on a weekly basis. The thirty-mile journey took two to four hours, depending on which supply boat was sent. Neither the larger *Norah* or the smaller *Abu Salema* could approach the island due to the surrounding reef. In good sea conditions, we off-loaded the supplies into our small inflatable boat from the anchored vessel. All, that is, but the twenty-five jerry cans of potable water. These were lashed together and tossed overboard. Two people would then snorkel out to the cans and swim them ashore. In bad sea conditions the supply boat anchored off the island's far side in the lee of the wind, and everything had to be carried to our camp one kilometer away. This was backbreaking work, but there was no alternative. When it came time to leave Black Assarca, the bad seas meant that we would be forced to carry all our gear, including the excavated amphoras, across the island. This took the better part of two days.

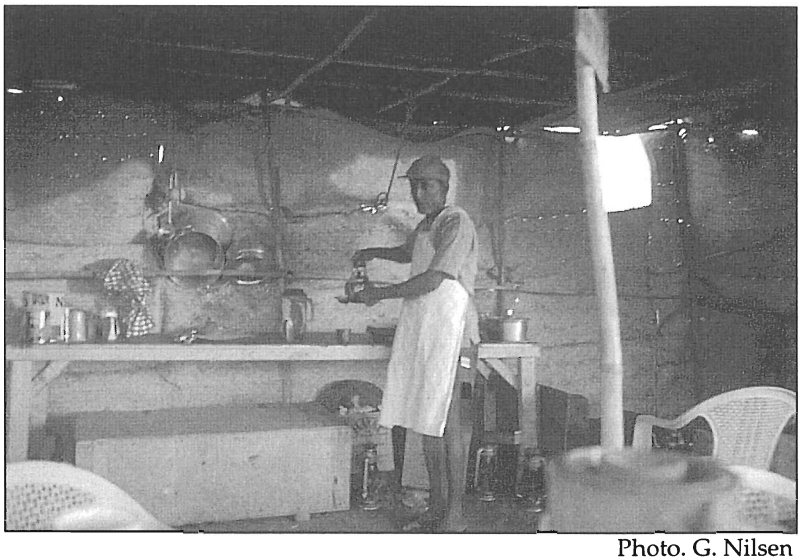


Photo. G. Nilsen

Fig. 5. *Mulat, our cook. Veteran steward from Ethiopian and Soviet ships, Mulat worked culinary wonders while battling goats for control of the kitchen.*

Our cook, an Ethiopian named Mulat (fig. 5), had been a steward on various Ethiopian and Soviet naval ships. Using two kerosene burners, Mulat fed us for nearly two months. Without refrigeration or electricity, he provided filling and tasty meals, including fresh bread made daily in nothing more than a frying pan. Fresh fish—in abundance just meters away—was our sole source of protein. Mulat made the most of the pasta and lentils that were the bulk of our menu. Good vegetables were hard to come by in Massawa; fruit, however, was plentiful. Our favorite meal was a dish Mulat called *adis*, a spicy stew of lentils and tomato (fig. 6).

Water was always in short supply, so we husbanded it carefully. If we were to run out, we could take our small boat over to the mainland, weather permitting, and purchase water from the local chieftain at Inghel. Fortunately, this was never necessary.

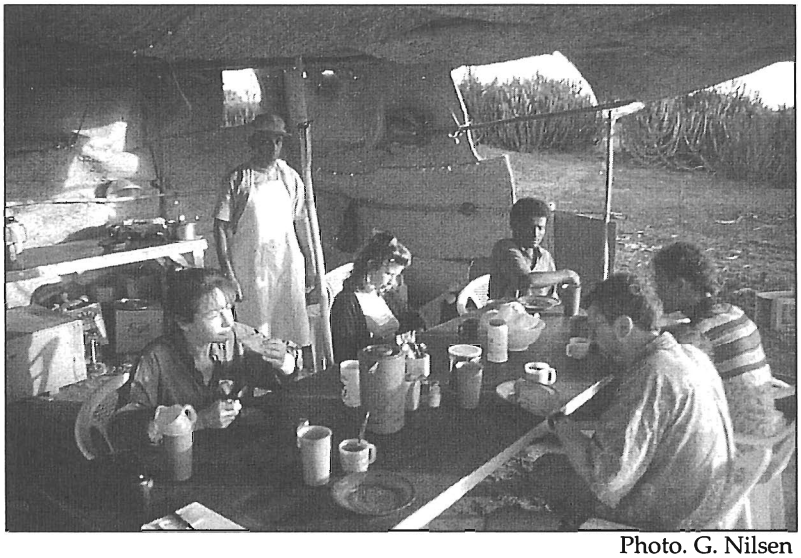


Photo. G. Nilsen

Fig. 6. *A breakfast of* adis. *From left: Louise Fisher, Mulat (standing), Tina Erwin, Yassin Aden, Ralph Pedersen, and Tesfay Tades*see.

Black Assarca was inhabited by two hundred goats. With no fresh water supply, these caprids had adapted to drinking seawater. It was amusing to see a herd of goats standing in the surf drinking. Their food source was both the scrub grasses and the euphorbia. They were cautious about us at first, but as days progressed they became curious and moved closer to our camp. Soon, the goats were raiding our camp, eating whatever they could. On several nights, I was awakened by an eerie feeling I was being watched. It was the goats. They would stand in a semi-circle about ten feet away from my open shelter watching me sleep. I guess I was the most curious thing they had ever seen.

Four-inch spiders were the other notable inhabitants of our island. They were frightening, but we never learned whether the arachnids

were poisonous, as no one was bitten. Our first encounter with one was when a spider came out of a roll of drafting vellum. Faces paled at news of this discovery. From then on, reports of the creatures came in regularly. Occasionally, a shriek would ring out across the camp, and everyone knew a spider had just surprised someone.

With *Unsinkable II* on the sea, we had to worry whether her moorings, not to mention her structure, could withstand the storms (fig. 7). The barge was anchored with concrete blocks, which although barely movable on the surface, tended to drag across the sea floor. Fortunately, we had at our disposal the ruins of an old lighthouse and its keeper's hut. A solar-powered lighthouse now stood on the island, while the remains of a propane-powered light-tower along with the ruins of the hut lay strewn about the east side of the island. Concrete blocks, heavy angle iron, corrugated roofing, and several empty propane cylinders proved a bonanza for us. To the anchoring point furthest out, we attached a large ship's anchor we had brought in from Massawa. This anchoring point took the brunt of the storms, as most came remorselessly from that direction.

A second anchoring point was to the reef itself. As this was on the lee of the storms, there was not much stress here. The remaining two points, east and west, were the ones giving us the most problems. Team member Charles Pochin suggested using the propane cylinders as dead weights attached to the barge's concrete block anchors. Then, to keep the block and cylinder assembly from dragging, pieces of angle iron arranged in an x-shape were to be pounded into the seabed directly in front of the assembly with the anchor line passing between the lower legs of the "X."

The system worked. Pounding the pieces of six-inch angle iron into the seabed, however, was no easy task. The anchors lay at a depth of forty feet, the limit of our surface supplied air. With the exertion of swinging a heavy hammer, air was at a premium. Team member Tesfay Tadessee and I went down to fix the angle irons in place. With the air hoses pulled taut, there was little room to maneuver. The noise of pounding the angle irons amplified to a deafening roar underwater. After a few swings, I saw Tesfay's eyes bulge as he yelled something through his regulator and pointed frantically over my shoulder. With the thought of sharks in my mind, I spun around to see one of the most mesmerizing sights I have ever seen. Swimming broadside to us barely ten feet away was a huge fish. It was larger than our nine-foot inflatable and taller than my six-foot-plus frame. Its huge eye stared at us, while us humans, feeling puny indeed stared back in awe. Barnacles covered parts of its body, indicating great age, while an entourage of small colorful fishes escorted it. The fish obviously had been disturbed in its lair somewhere in the depths off Assarca by the noise we were making. Curiosity getting the better of him, it swam up to see what was creating the disturbance.

As Tesfay and I watched the monster fish swim slowly off, we stood on the seabed transfixed. Then Tesfay tapped me on the shoulder. I turned to see him pointing again, this time not into the sea but directly above us. I looked up. There only a few feet away were two sharks circling. These were the first sharks I had ever seen underwater. We took a split second to admire them, and then dropped to the seabed. We crawled on the sand until we were under the barge. We surfaced and scrambled on board. It was a dive never to be forgotten.

The sharks had come into the area three weeks after we had landed on the island. This was no surprise, as I had noticed two definned shark carcasses, one a hammerhead, on the beach when I visited in 1995. For the first weeks we had seen none. Suddenly they were everywhere. We were a bit puzzled about the sharks' sudden appearance.

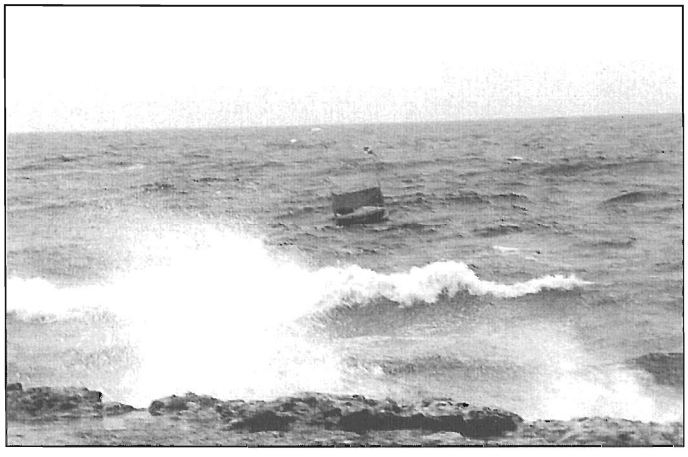


Fig. 7. The diving barge Unsinkable II *in a storm (left), and in calm (right). The small platform, designed by Charles Pochin and the director, survived many a storm and became a symbol of our perseverance.* Photos: R. K. Pedersen

With the next supply delivery, we were informed of the reason: Eritreans from poor villages occasionally cross the Red Sea to the Arabian peninsula to find work as servants. They do this in boats that are often unsafe and overloaded, as this is all done unofficially. One such boat, rated for forty-five people, was loaded with ninety. Once at sea, the overloaded boat capsized. As only three people on board could swim, the rest drowned. This attracted the sharks into the area. Thus, along with foul weather, we also had to deal with sharks that had a taste for human flesh.

We had the good fortune to catch one shark. Two team members were out in the inflatable boat fishing for our dinner when they accidentally hooked the shark. We debated its fate. In the end, it escaped being barbecued. Team member Gary Nilsen removed the hook from its mouth with pliers, and the shark was pushed into the surf. This close encounter removed the fear from most of us, but not the caution. Then, several days into March, the sharks vanished as suddenly as they came. We never saw them again.

Photo: R. K. Pedersen

Fig. 8. *The deepest level of the excavation revealed yet more vessels and sherds. In the foreground is a Type II amphora. Center left is the top of a Type I amphora, and center right are the toes of two Type I amphoras lying side by side. Whether any of these represent intact vessels is unknown.*

The ruins of the lighthouse were useful both for our barge and our artifact storage tank. Using a concrete platform found on the beach, we built a tank with concrete blocks from the ruins of the keeper's hut. Realizing the goats would jump into the tank to get water, we used the remains of the corrugated roof of the keeper's house as a cover. Still the goats came and we frequently had to chase them off the cover. Although the seawater in the tank needed daily replenishing due to leakage and evaporation, the tank was an indispensable asset.

The Excavation

Over fifty-five days, we struggled to excavate the site. With one of our two surface-supply compressors mounted to the deck of *Unsinkable II*, two divers at a time could work the site. A dive tender remained on the barge monitoring the compressor, the divers, and the sea conditions. Four small air bottles with regulators were positioned on the site in case of emergency, although the shallowness of the wreck allowed for an easy free ascent. Each dive lasted forty-five minutes to an hour, depending on water temperature.

Handfanning was our sole method of clearing off overburden. Each diver was assigned a specific area to excavate. Artifact recording was by triangulation, the system of measuring the position of an artifact using three points, as the uneven bottom prevented the use of a grid. Several datum points were set up around the site for this. Meter tapes, each with a line level attached to aid in measurement, and plumb-bobs gave accurate measurements. Coral pieces were removed from the site, and larger pieces were chiseled into more maneuverable sizes. Some artifacts were concreted into the coral. These were removed with careful chiseling.

Each amphora was tagged and its position measured before being removed from the site. Areas were designated "A1" through "A8." Thus, an artifact from area "A1" would be given a number beginning with that designation, such as "A1–001." Once an artifact's position was recorded, it was placed in a storage area off the site until it could be raised by underwater balloon. On the surface, smaller artifacts were stored in seawater in buckets or trashcans. Once ashore, amphoras were stored in trashcans and in the storage tank. Each team member was required to keep his own notes about his area and whatever artifacts he raised. These notes included measurements and drawings of the artifacts. Field drawings and conservation were by Tina Erwin. Artifact photography was by the director.

Most artifacts were located in the field immediately at the base of the reef. This area was excavated down to approximately one meter below the original seabed (fig. 8). At this point, there were still ceramics to be excavated, but time did not permit deeper excavation. Judging by one amphora at this level, which was apparently standing straight up, at least another sixty centimeters of wreck level could be present. Indications from the area immediately downslope of this amphora and under a large coral head in the center of the site support this view. As the coral head sat atop the amphoras, this area was excavated horizon-

tally. Thus, it was ascertained how one amphora lay piled upon another to a depth of approximately a meter and a half. As excavation undermined the base of the coral head, threatening to cause it to tumble down, we suspended efforts in this area.

Amphora sherds were ubiquitous. Even at the deepest levels of excavation, the sherds were found mixed in among more intact vessels. The sheer number of the sherds led us to dub the site "The Place Amphoras Go to Die" (fig. 9). Perturbation, responsible for two well-encrusted spark plugs found several centimeters deep in the site, undoubtedly accounts, in part, for the mix of sherds. Wave action in storms may account for our finding the amphoras and sherds atop the reef.

As was noted on the 1995 survey, the most common ceramic form in the site was the conical amphora, Assarca Type I. These were found in all excavated sections of the site. Although all but one was broken, they formed a body of material cohesive in both form and style. Some amphoras were simply missing handles. Others had necks broken off as well, while many had broken bodies. Several Type I amphoras were cleanly broken at the joint where the upper body segment joined the bottom segment. This was a weak spot in the vessels. The juncture was obvious on all Type 1 amphoras as the ridges, or rilling, at the joint was roughly done. Unlike the evenly spaced rilling applied to the body segments while on the wheel, the rilling added to the joint was irregular.

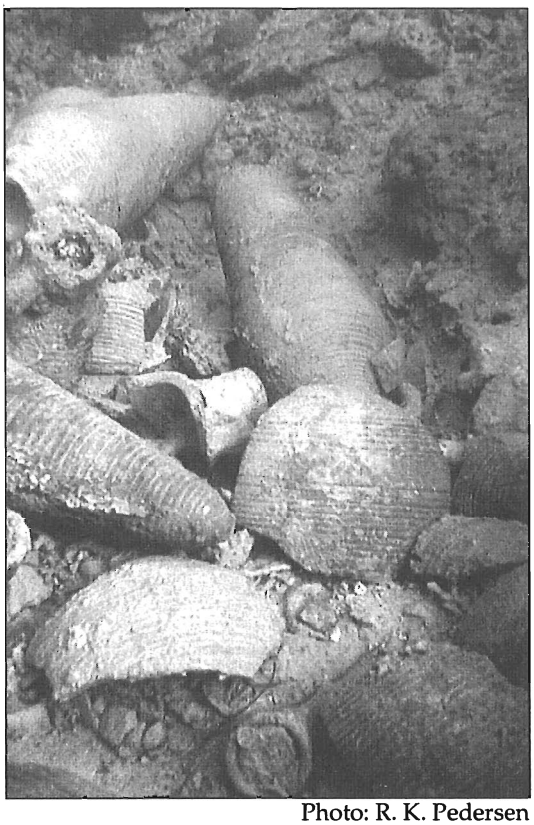


Photo: R. K. Pedersen

Fig. 9. *"The Place Amphoras Go To Die." The excavation revealed hundreds of sherds mixed in with more intact amphora bodies. Note here, in the central area of the excavation, the mix of conical Type I and globular Type II amphoras.*

The rilling was a spiral, interrupted at the joint, but otherwise continuous from toe to neck. On average, the skillfully placed spacing was approximately 1.2 cm. The team observed this decorative motif on all the amphora bodies they excavated or observed. This design was peculiar to vessels of Syria, Palestine, and Egypt in the first century, although later it could also be found distributed throughout the Mediterranean.

The broken amphoras revealed that the Type I vessels were covered in a brown wash or slip. The interior fabric on most sherds of the type was red-brown when wet, drying to dark brown. However, some sherds revealed a light fabric, green-gray when wet, drying to gray. There appeared to be no overt differences between the amphoras or sherds with the brown or gray fabric. The colors may be attributable to firing temperatures in the kiln, rather than different clay sources, as a kiln that is too hot will cause clays to turn white as they are fired.

Only one amphora was found completely intact. This vessel, amphora A3–010 (fig. 3) was found toward the end of the season near the western end of the excavation. Having been overlaid with sherds of various sizes, as well as coral and sand, the amphora was relatively free of encrustation. Its stopper was missing and the vessel was filled with sand. The amphora's contents were sifted for archaeobotanical analysis but other than the eggs of an unknown type of sea animal, no botanical materials were found. Small chips on the surface of the amphora revealed it had the gray fabric. Otherwise the form and styling were the same as the brown-fabric amphoras.

We also found a number of sherds of Assarca Type II vessels. None of these indicated a lentoid shape, but rather a globular one. More often than not, the necks of these vessels still had their handles attached. Not one of this type, however, was found intact. The largest piece had both neck and handles and included a large section of the body that extended down past the center of the body's side. This enabled us to see that the vertical rilling covered the vessel, spiraling ultimately to a small button in the center of the side. Other Type II sherds contained other areas of these bodies. At least one showed a wide blank band separating the rilling on either side of the body. This band covered the area where the two hemispheres of the vessel were joined. According to *The Handbook of Mediterranean Pottery* by John W. Hayes, this type of vessel is called a *costrel*, common in Egyptian and Palestinian sites of the first half of the first millenium.

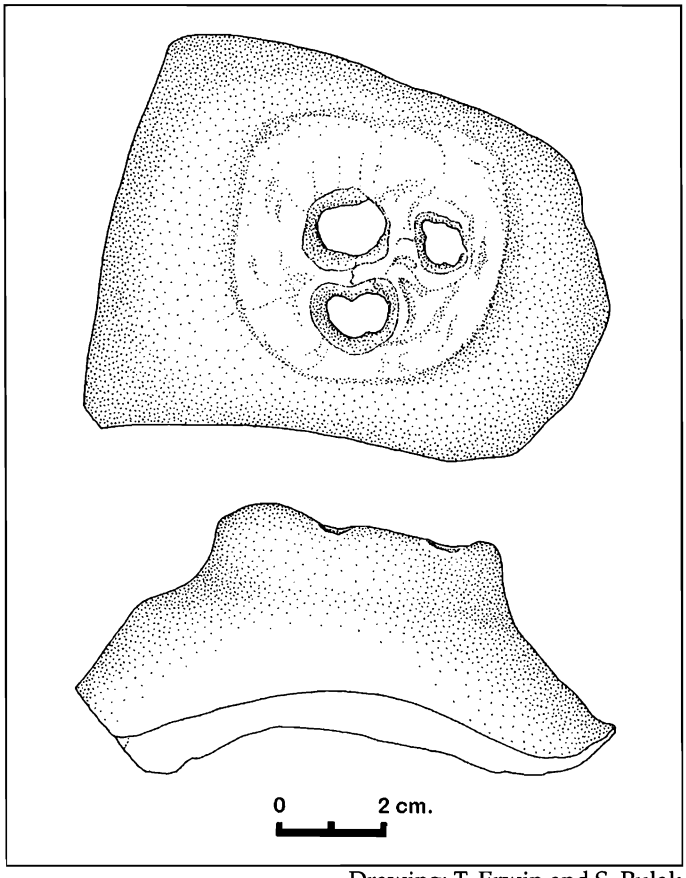
The only example of Assarca Type III was that found on the 1995 survey. Missing handles, shoulder, and neck, the body of the amphora was similar in style to Type I (see cover photo this issue, lower left). The shape, however, was considerably wider than that variety. The pattern of the rilling, the shape of the toe, and the brown fabric all

displayed an affinity to Type I. No traces of this vessel's missing pieces were found. It is at present unknown whether any of the numerous sherds found at Assarca belong to this type of vessel. As such, the vessel is unique to the site.

As noted during the survey, several thin, undecorated sherds were found. Some of these may have belonged to amphora stoppers, several of which were found during the excavation. The stoppers were plain disks of light brown color and fabric. One of these was found still in place in an amphora neck. The stopper rested on a lip inside the neck and was fixed in place with a black/dark brown resinous substance. Unfortunately, this neck had long since separated from the rest of the vessel. Another type of stopper was found in a neck. Also, set in the resinous substance, this stopper differed from the others. On the exposed face, the stopper had rilling similar to that of the amphoras. Obviously, a ceramic piece from a broken vessel had been knapped into a disk-shape for this use. Such recycling of sherds for stoppers is not unknown. The seventh-century shipwreck at Yassıada, Turkey, contained 165 of these, of varying diameters and thicknesses.

The insides of many sherds and amphora bodies contained the remains of a coating. This was a black resinous substance similar to that used to fix the stoppers in place. Mediterranean wine amphoras were sealed with a resin to prevent leaching through of the liquids inside, and we find the same method in the Assarca types. One sherd, which comprised only an amphora toe split vertically, was filled with a solid mass of this resin. This was the excess resin that collected in the bottom of the amphora when the interior was being sealed. This piece also revealed that the toe itself was not a solid piece but was hollow.

None of the toes of the excavated Type I amphoras showed much wear, indicating the vessels were relatively new at the time of sinking. The toe was a simple knob 4.5 cm. in diameter and protruding 1.5 cm, with the rilling started immediately above it.



Drawing: T. Erwin and S. Pulak

Fig. 10. *The neck of the* gargolette. *The filter was crudely done, made by simply poking three holes through the clay.*

Other Ceramics

Only one vessel was found that was not an amphora. This was the remains of a jug whose neck contained a filter such as that found on a gargolette. The filter was crudely done, made by simply poking three holes through the clay (fig. 10). Little beyond the neck remained, but the vessel was light in color and thin walled.

Other artifacts

Few artifacts were found that were not ceramics. One of these was a piece of glass. Greenish-blue in color, this piece appeared to be the base of a goblet or wineglass. A delicate hollow rim was its most distinctive feature. Wine glasses found at other late Roman and Early Byzantine sites contain this feature. Such glasses, often more crude, were produced in abundance in the fourth and fifth centuries and later. Whether the presence of this shard at Assarca indicates a trade item or merely scrap is unknown.

Found near the glass shard was a weight in the shape of a lead ball (fig. 11). The weight had the remains of a copper-based hook on top. There was no cladding over the lead, and there were no distinguishing features. It weighed approximately 520 gms. The weight has parallels in Byzantine sites in the Mediterranean dating to the mid-first millennium. The sixth and seventh century levels at Sardis, Turkey, for example, contained several such weights of various sizes. This type of weight was a counterweight used on a steelyard, the basic weighing instrument of the period. A number of steelyards have been found on other wrecks, including those at Yassıada and Serçe Limanı. The presence of this weight on the wreck at Assarca may indicate that the steelyard awaits future excavation.

Conclusions

At present, it is impossible to determine the nationality of the ship. It is also not possible to determine whether the site involves the remains of a ship headed to India, Arabia, or to some point on Africa's Indian Ocean coast. Possibly, the vessel was a local trader carrying goods along the Eritrean coast or to as yet undiscovered Aksumite settlements in the Dahlak Archipelago. In any case, the site holds great potential for our understanding of Red Sea commerce and seafaring in late antiquity, of which we know little.

Our knowledge of ancient maritime trade on the Red Sea relies in great part on classical authors such as Pliny the Younger and the anonymous author of the *Periplus of the Erythraean Sea*. These writers recorded the kinds of cargoes carried by Red Sea ships during the period of the Roman/Byzantine Empire and the Kingdom of Aksum. However, the information they gave is far from complete, as the authors mentioned only items they considered important. Ships' cargoes often included contraband, private cargoes carried by individual crewmembers, personal belongings, and other mundane items. These cargoes generally were not recorded, and remain unknown. The first season's excavation of the shipwreck at Black Assarca gives us our first glimpse at this little known trade.

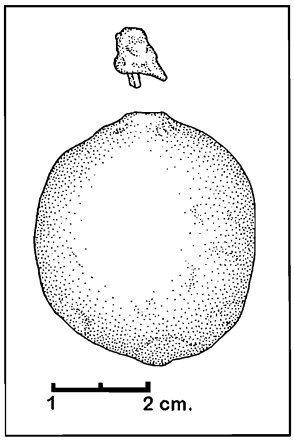


Fig. 11. *The lead counterweight with the remains of its hook. Drawing: T. Erwin and S. Pulak.*

Epilogue

In the spring of 1998, war broke out between Eritrea and Ethiopia. The war has been fought sporadically over the past two years, mostly in the spring when the climate best permits fielding large numbers of men. Approximately one hundred thousand soldiers are reported dead or missing on both sides. The airport in Asmara has been bombed twice. Large numbers of Eritreans have been deported from Ethiopia, and lately Eritrea has been rounding up the Ethiopians in their country. Refugees flooded out of Eritrea into Sudan during the most recent round of fighting, in which Ethiopia struck deeply into Eritrea. The streets of Asmara are deserted of young people, as they are all at the front. Outside the city, burgeoning camps are harboring people fleeing the war zone. Meanwhile, drought and famine are once again wracking the region.

The Eritreans who worked with us on Black Assarca and who became our friends were all veterans of the war of independence. As such, they may have been required to fight in the present war. Mulat, an Ethiopian, may be one of those deported. I wonder if our friends are safe and alive.

As of this writing the two warring countries have agreed to a cease-fire and the installation of a United Nations peacekeeping force along the Eritrean-Ethiopian border. Pray for a lasting peace.

Acknowledgements: The 1997 excavation team consisted of Yassin Aden, dive master; Dania Avalone; Tina Erwin, field illustrator and conservator; Inge Fischer; Louise Fisher; Meaze Naizghi; Gary Nilsen; Nesreddin Osman, dive master; Charles Pochin; Tesfay Tadessee; and the director, Ralph K. Pedersen. The director thanks his team for their hard work under mostly difficult circumstances.

We would like to thank the President of Eritrea, His Excellency Issaias Afewerki, for his permission to come to Eritrea and conduct our research. We also thank the Minister of Marine Resources (1995-97) Saleh Meky; the Minister of Marine Resources/Minister of Fisheries (1997) Petros Solomon; Kfle Woldeselassie, Head of Policy and Planning at MMR, whose assistance and friendship is much appreciated; Zemede Tecle, Head of the Department of Culture (1995); Dr. Woldeab Yisak, President of the University of Asmara; and Dr. Yoseph Libsekal, Director of the National Museum and Head of the Archaeology Department at Asmara University. We also thank sincerely all those many others in Eritrea who provided aid in uncountable ways, including Doi Malingri, without whose foresight this project would never have happened.

Our sincere gratitude to Dr. John Sutton and Dr. David W. Phillipson of the British Institute in Eastern Africa; Martha S. Pedersen, whose aid at our home base in New York juggling faxes, finances, and equipment was indispensable; Dr. Jerome Lynn Hall, Dr. Shelley Wachsmann, Dr. George F. Bass, Dr. Donny L. Hamilton, Dr. Henry Wright, Dr. Lionel Casson, Dr. Faith Hentschel, Ficre Gebreyesus, Noreen Doyle, and Chris Monroe, all for providing support and advice. Special thanks to Jeff Gers for providing invaluable editorial advice. We humbly thank Sema Pulak for turning our field drawings into beautiful illustrations.

We especially thank the Hillman family, Chris, Sheila, Jessie and Jenny, who worked tirelessly hauling gear, keeping us supplied, and doing countless chores as well as providing us with friendship. We salute them.

Funding for this project was supplied by the Haycock Memorial Fund of the British Institute in Eastern Africa, the Institute of Nautical Archaeology, Harry C. Kahn II, Gary Nilsen, and Dr. George F. Bass. We are grateful to them all.

Lastly, and again, we especially thank Dr. George F. Bass for his friendship to the Pedersen family through difficult times.

The Aksumite Kingdom and Eritrea: The Historical Background

My interests in Eritrea, Ethiopia, and East Africa extend back to boyhood. My interests were sparked not only by articles in *National Geographic Magazine*, but also by Moorehead's *The Blue Nile*. This tome related the author's journey up the Blue Nile to its source, as well as the history of the area once known as Abyssinia. Later, during the course of graduate studies, I became intrigued by the ancient civilization of the area known as the Aksumite Kingdom.

The Aksumite Kingdom rose to prominence in what are now Ethiopia and Eritrea in the first centuries after Christ. Earlier, the area had frequent contact with Ptolemaic Egypt, and Greek-inscribed stelae have been found in the area. With increased sea-borne traffic and trade from the Roman Empire, Aksum supplied luxury goods gathered from the Ethiopian highlands. The Aksumites fed the Roman hunger for ivory and hides in exchange for wine, fine glass, oil, and metal objects. Aksum also served as a waypoint in the trading network between the Red Sea ports of Egypt and Arabia. This same network extended beyond the Red Sea into the Indian Ocean. Roman, Arab, and Aksumite ships sailed on the monsoon each year to India, a supplier of spices as well as an entrepot for goods from the Far East. Taking advantage of the sea trade, as well as having merchant colonies in Arabia, on Socotra, and in India, the Aksumites rose in wealth and power. They were the only kingdom of ancient Africa to produce their own coinage. These were at first in Greek, and then later in Ge'ez, the ancient language of Abyssinia. The Aksumites' importance was so great the Romans considered Aksum one of the world's great powers.

It was only with the rise of Islam that Aksum began to wane. After the Islamic conquest of Egypt in the early seventh century, contact between the southern Red Sea and the Mediterranean was cut off. Without the impetus of Byzantium, the flow of goods up and down the Red Sea stalled. With this, as well as other factors, Aksum and the power it wielded began to wither. Over the next century, Islam made inroads along the Abyssian coast and finally, Islamic forces would conquer the area, leaving the Christian Aksumite Kingdom to languish in the highlands. Henceforth, Eritrea followed a separate course from Ethiopia. Turning in on itself, Aksum would soon be forgotten by the world at large, only to return to consciousness with the Portuguese quest for the legendary Prester John in the sixteenth century.

Archaeologically, Eritrea is little explored. There was a German expedition to the ancient Aksumite port of Adulis in 1906, and further explorations after World War Two. A French expedition under Francis Anfray examined sites such as Matara in the 1970s. War, however, kept much archaeological work in the realm of theory.

Eritrea, having once been part of the Ottoman Empire, the Egyptian Caliphate, the Italian Empire, and then, after 1945, a United Nations endorsed British Protectorate, had hoped for independence. The United Nations placed the country, however, into a federation with Ethiopia. The federation was annulled with the forcible annexation of Eritrea by Ethiopia in 1961. This sparked a struggle for independence that was to last until 1993. With the Marxist coup in Ethiopia in 1972, the Cold War heated up. Bitter fighting against the Soviet-backed power in Addis Ababa, by not only the Eritreans but also the Tigreans, prevented archaeological research in the area for nearly twenty years.

Famine was also endemic. Food supplies were purposefully disrupted by the Marxist government in an attempt to starve the freedom fighters. Many of the photographs and reports of famine that sprinkled the western press during the seventies and eighties were of Eritrea and Tigre. These famines sparked the "Band-Aid" concert of the mid-eighties. Money raised by the concert and record sales was used to purchase food that was then sent to Ethiopia. Once the food arrived in Massawa, however, the Marxist government used it as a bargaining chip to undermine the cause of the freedom fighters. It was not until the start of the end of the Cold War and the collapse of the Soviet Union in 1991 that the Eritrean and Tigreans were able to prevail. With victory in 1993, the Eritreans proclaimed their independence.

Suggested readings

Anonymous
1989 *The Periplus Maris Erythraei.* Translation and commentary by Lionel Casson. Princeton, Princeton University Press.

Munro-Hay, S.
1991 *Aksum: An African Civilisation of Late Antiquity.* Edinburgh, Edinburgh University Press.

Pedersen, R.K.
1995 Survey Report: The Shipwreck at Assarca Island, Eritrea. http://homestead.juno.com/rkpedersen/assarca/html

INA Responds to Turkish Earthquake Disaster

Dr. Gary Martin

Strong earthquakes devastated much of northwestern Turkey on August 17, 1999, and again on November 12, killing more than eighteen thousand people and causing hundreds of millions of dollars in damage. Several hundred thousand people were left homeless. None of us will forget the horrifying images of the destruction and human misery in the days that followed these unprecedented natural disasters.

Immediately after the August earthquake, friends of the Institute began inquiring as to the well-being of INA staff and students who were working in Turkey at the time. They also wanted to know how they could help the people of Turkey. In the weeks that followed, INA's members and friends contributed more than $38,000 in assistance, and many others wrote to say that they had already given through other organizations.

Every penny of this money was used to directly aid the people of Turkey. Dr. George Bass personally coordinated distribution of the funds in-country. The Turkish search and rescue team, AKUT, was in desperate need of a specific type of electronic mini-camera and listening device. INA made arrangements with the California manufacturer for this apparatus to be built and shipped to Turkey. The device provided by INA was subsequently used by the AKUT team in a successful rescue!

The bulk of the assistance went to the homeless of Turkey most directly affected by this enormous tragedy. The gifts you gave made a real difference in their lives. George Bass personally delivered a check to a Turkish relief organization which, under government approval and supervision, built temporary housing for the homeless. The buildings are designed so that when they are no longer needed to house earthquake victims they will be converted to become neighborhood schools. INA and its friends contributed more than $25,000 to this effort.

Neither INA's headquarters facility in Bodrum, Turkey nor the site of our current excavation of a fifth century BCE shipwreck on Turkey's Aegean coast were directly affected by the earthquake, but our hearts and our wallets were opened to our Turkish friends. On behalf of the Board of Directors of the Institute, thank you for reaching out with us to assist the people of Turkey.

Call for Contributions

I would like to invite all members of the Institute of Nautical Archaeology and other interested parties to consider submitting articles for publication in the *Quarterly*. I am looking for scholarly writing pertaining to any aspect of nautical or maritime archaeology. The content need not be limited to INA projects only.

An article may be of any reasonable length, and should preferably have illustrations (with captions and acknowledgments). There should be a minimum of three references to appear under the heading *Suggested Readings*. In addition to formal articles, the *Quarterly* also publishes *News and Notes* that will be of special interest to the INA membership, and *In the Field* with reports of ongoing INA activities. For submission guidelines see *INA Quarterly* 27.1, 10.

I would also like to hear from all Nautical Archaeology students and alumni worldwide about your thesis, dissertation, and research topics. I hope to use these in an article on what the people in the field are doing. If you can send me a paragraph on your current status, I would be very grateful.

I would enjoy talking about any ideas you may have for the *Quarterly*, so feel free to contact me at any time. You can contact me at Editor, *INA Quarterly*, P.O. Drawer HG, College Station, TX 77841-5137; tel (979) 845-6694, fax (979) 847–9260, e-mail powlrye@texas.net.

Christine Powell, Editor
The INA Quarterly

Kadırga: The Sultan's Galley

Erkut Arcak

INA archaeologists are currently studying Kadırga, *a ship so well known to Ottoman history that its name means simply "Galley." Why is this vessel so important that it has become* **the** *galley in distinction to all others? Erkut Arcak offers some suggestions:*

Kadırga, also known as the Sultan's galley, on display in the Naval Museum in Istanbul, is the only original historic galley still in existence (fig. 1). It was previously thought to date to the mid-seventeenth century based on an inscription—assumed to name Mehmed IV (1648–1687)—adorning the galley's kiosk or canopied deck cabin at the stern (fig. 2). However, additional research suggests an even earlier construction date. Dr. Cemal Pulak and I initiated an investigation of the Sultan's galley in June of 1999, in order to study and document the vessel in detail (fig. 3). We proposed to examine the extant remains of the hull and details of construction, to

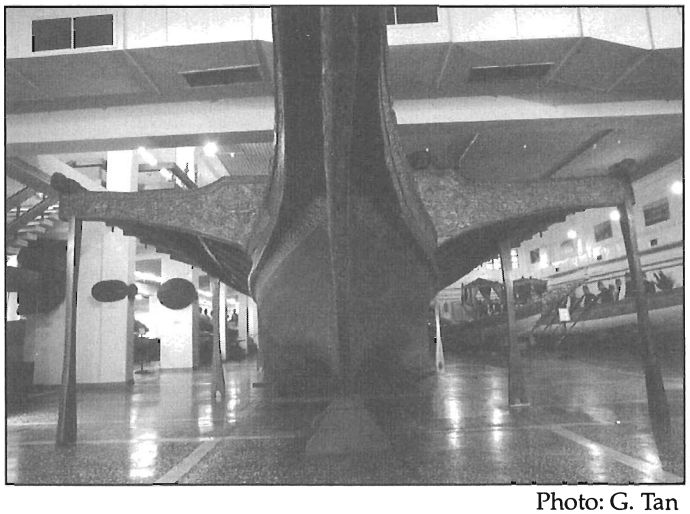


Photo: G. Tan

Fig. 1. *The view from the stern towards the bow of* Kadırga.

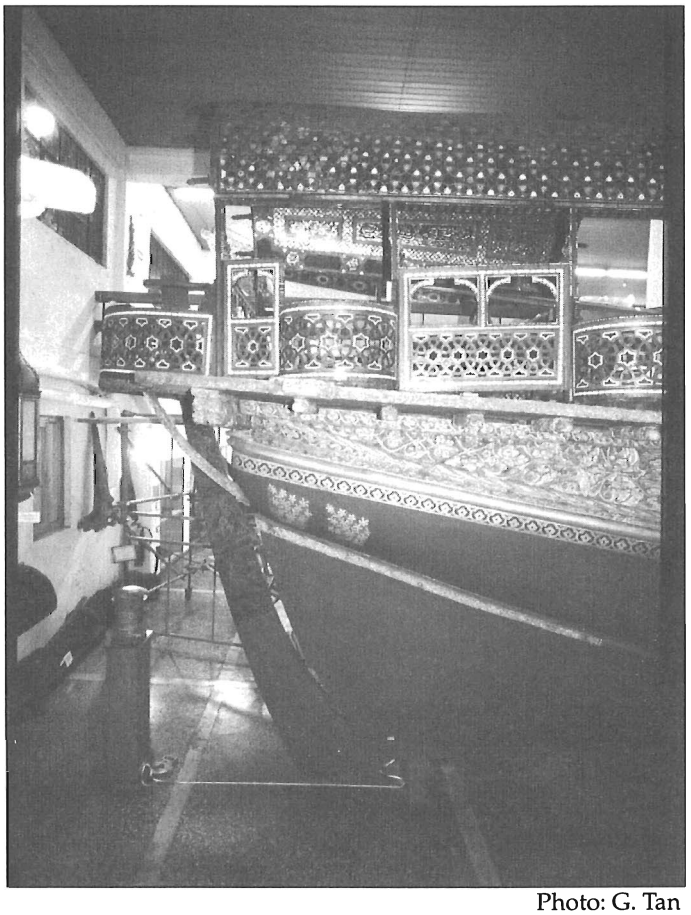


Photo: G. Tan

Fig. 2. *The kiosk of* Kadırga.

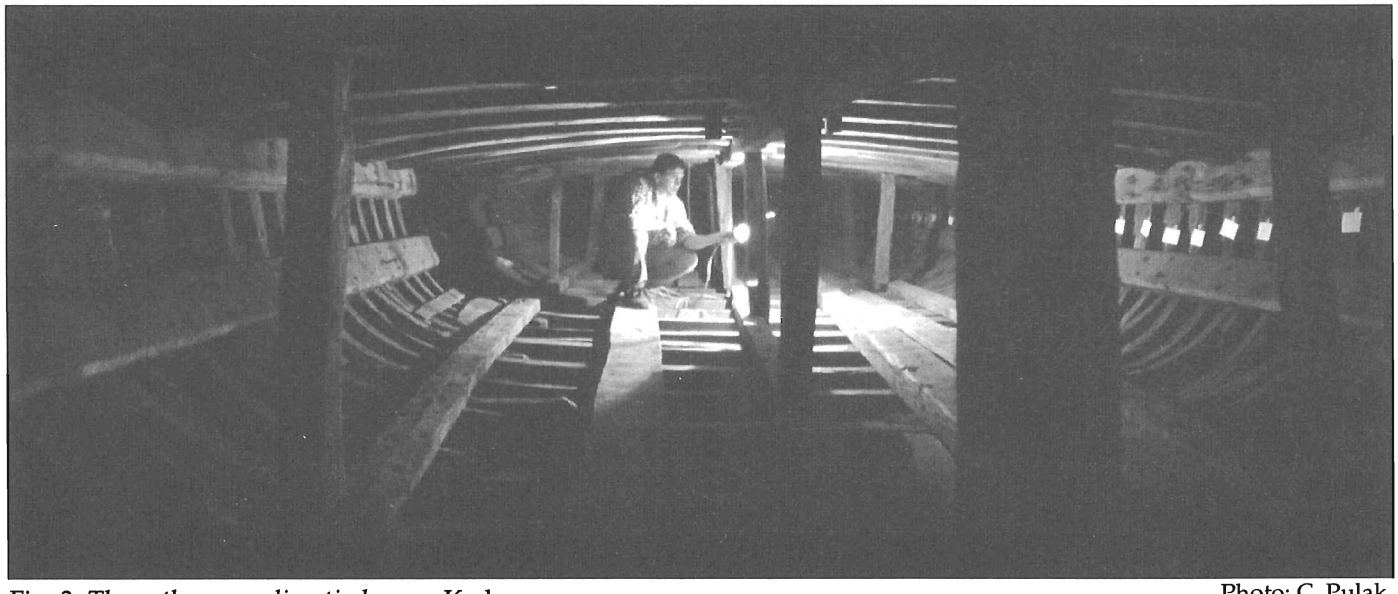


Fig. 3. *The author recording timbers on* Kadırga.

Photo: C. Pulak

document the various renovations and restorations the vessel underwent during its long lifetime, and to place the ship within a broader historical context.

Our investigations are far from complete, but they suggest that the keel, posts, and nearly all of the hull planking has been replaced (fig. 4). Over the years of service, parts of the ship wore out and new parts were substituted, one at a time. Despite the past renovations and restorations, *Kadırga* still contains some original timbers. Although it has seen significant modifications that have altered its original form, the ship is preserved in its entirety. Thus, it can expand our knowledge of a type of ship for which we otherwise have only a few poorly preserved archaeological examples.

We have no accounts of when *Kadırga* was built or to whom it belonged. An inscription on the stern cabin names a certain Mehmed, so there is a common belief that *Kadırga* belonged to Sultan Mehmed IV, nicknamed "The Hunter." However, the vessel may have belonged to Sultan Mehmed II (1444–1446, 1451–1481), the conqueror of Constantinople, who was the first Ottoman Sultan known to possess a private galley decorated with precious stones on the kiosk. In a provocative article, Lucien Basch asserts that *Kadırga* might have belonged not only to Mehmed II, but previously to the last Byzantine Emperor, Constantine XI Palaeologos Dragazes (1449–1453). The venerable ship is decorated with dragon-like figures; unlike a typical dragon with four legs, the beast depicted on the galley has only two legs. These do not recall Ottoman decorative style.

Still other scholars have speculated that *Kadırga* was built in Venice and given to an Ottoman Sultan as a gift, with the kiosk added later in Constantinople. If the cabin was not constructed at the same time as the ship, the Sultan in the inscription—whether Mehmed II, Mehmed III (1595–1603), or Mehmed IV—may not have been the first monarch to own the vessel. An archival search at the Istanbul Naval Museum has revealed several records that refer to the vessel as belonging to Sultan Mehmed II, although others refer to *Kadırga* as first belonging to Mehmed IV. It is impossible to conclude that the authors of these documents knew any more than we do.

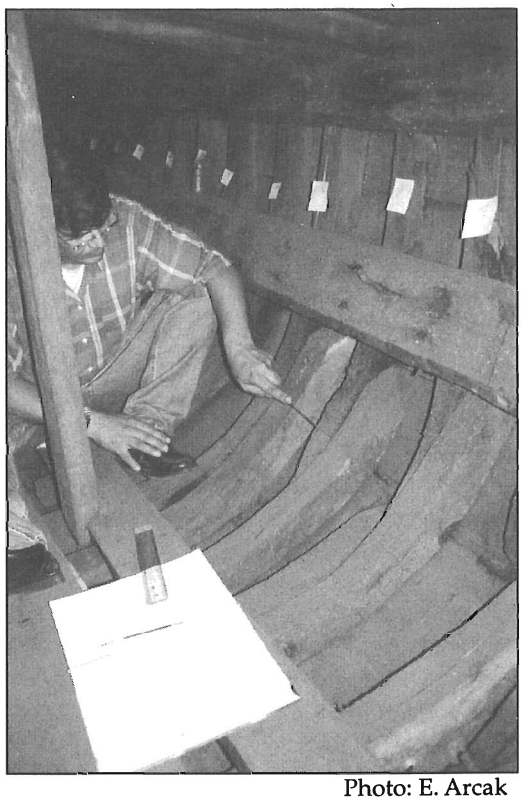


Photo: E. Arcak

Fig. 4 (above). *Cemal Pulak recording the framing on* Kadırga.

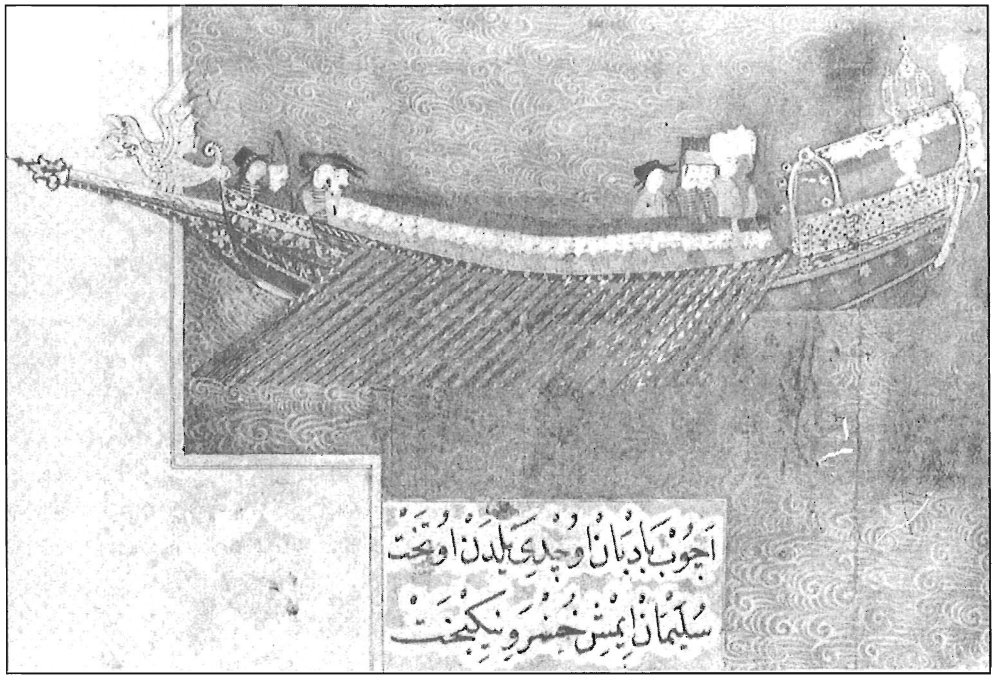


Fig. 5 (left). *Osman II returning from Hotin on a galley that may have been* Kadırga. *Courtesy the Topkapı Museum, Istanbul (Reference H1124 Folio 74a).*

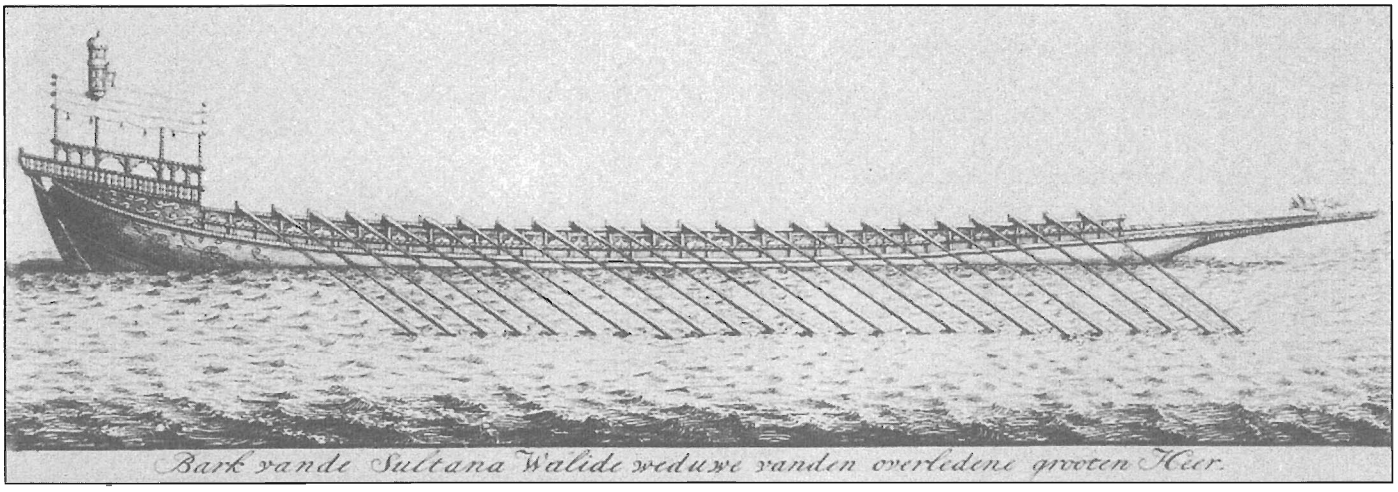


Fig. 6. *A galley (possibly* Kadırga*) carrying the* Sultana Valide *in 1671. Courtesy the Nederlandsch Scheepvaar Museum at Amsterdam.*

Still, some evidence may illuminate the galley's story. The first supporting evidence about the origin of *Kadırga* is found on a seventeenth-century Ottoman miniature (*Şah-Nami-Nadiri*). This depicts Sultan Osman II (1618–1622) on his galley as he returns from his expedition to the fortress of Hotin in Hungary (fig. 5). The decorations, shape of the kiosk, and the beasts on the galley shown in this miniature are sufficiently clear to suggest that the galley is *Kadırga*. There are aspects of the miniature that are different from the present galley—26 oars on the miniature as opposed to 24, and the beasts on the prow rather than at the stern. These may be the result of artistic license, although Basch argues that the figures were likely removed from the prow and placed at the after end of each outrigger-box (*apostis*) at a later date. It is possible, then, that this may be the first known representation of *Kadırga* in Ottoman miniature art.

The second clue may be that of a galley carrying the *Sultana Valide* (Sultan's mother), drawn by Nicolaes Witsen in 1671 (fig. 6). Distinctive features resembling *Kadırga* include the presence of 24 oars, the kiosk, and a distinctive silhouette with a very slight sheer, quite unlike the more pronounced sheer of Ottoman galleys known to have been built in the seventeenth century.

A Sultan's galley was represented again in the seventeenth century by another miniature (Gazneli Mahmud Albumu). Although this illustration of a galley under oar on the Bosporus is not as detailed as the others, it is known that the galley belonged to an Ottoman Sultan. The decorations, beast figures, and kiosk again suggest *Kadırga*.

After its long life in the service of the Sultans, *Kadırga* was retired (we do not know when) and stored in the Imperial Boathouse of the Topkapı Palace. Whether because of its glamorous appearance or respect for earlier possessors, *Kadırga* has never been a derelict. We must also ask whether it was protected for its symbolic significance as a victory trophy by the Ottoman Sultans throughout its active career.

On March 27, 1861, an article about *Kadırga* was published in *Şehbal*, an Istanbul newspaper. The article mentioned that a French naval architect came to Istanbul and recorded *Kadırga* while it was stored in the Topkapı palace boathouse. This was the first known documentation of the ship, which was published in Admiral Paris's famous 1908 book *Souvenirs de Marine Conserves*.

The first known restoration of *Kadırga* was made in 1885 after an official request for repair and preservation was signed, presumably by order of Abdülhamid II (1876–1908). The decayed planks below the waterline were replaced, and the ship was renovated from spur to stern. After the restoration, *Kadırga* was housed under an awning in the Yalıköıkü shipshed of the Topkapı Palace until it was transferred to Kasımpaşa Imperial Shipyards in 1913.

During this period, the existence of the ship served as a source of folklore and myth for the communities of Istanbul and it was believed to possess sacred power. After a visit to the Imperial Boathouse in Yalıköıkü, Halil Ethem Bey published an article about *Kadırga* that recounted the myth surrounding the ship during those days:

> I became extremely interested in the place upon hearing stories that an ancient Venetian galley was stored there. One day I asked my friend Osman Aga about the place. Osman Aga was one of the Chief Oarsmen at the Palace. He told me that the galley was the most extraordinary relict from the days of Sultan Mehmed "the Hunter." It possessed spiritual powers and every night an oil lamp was lighted on top of it. He told me several other strange and frightening tales concerning the galley, so that I simply had to see it. The next day I obtained permission to do so.
>
> The guildsmen took me inside the boathouse. Fascinated, and with deep respect, we walked

around the great hull. As a special favor for me they lifted back the tarp covering the stern cabin.

The kiosk was worked in ivory and mother of pearl, and decorated with rock crystal and turquoise (stones). I was tremendously moved standing next to this most venerable object. The guildsmen gave me a handful of dust from some of the decaying wood. I left the boathouse filled with awe.

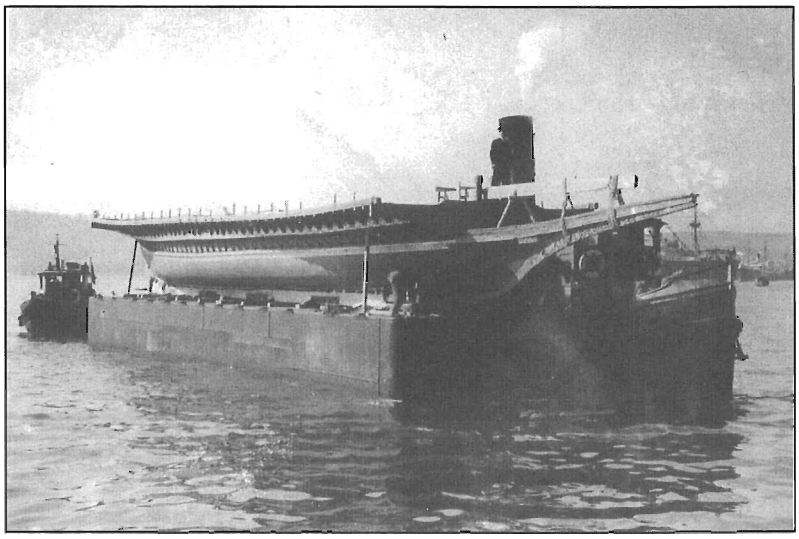


Fig. 7. Kadırga *crossed the Bosporus for the last time—unfortunately, by barge—in 1953. Courtesy of the Istanbul Naval Museum.*

By the end of the century, after the guildsmen who took care of imperial caiques (ceremonial barges), and especially *Kadırga*, were abolished, the legend slowly waned and the ship was nearly forgotten. Dismissed from memory, the ship began to deteriorate: the paint began to spall, the mother-of-pearl and tortoise-shell ornamentation fell off, and the engraved silver plaques adorning the kiosk were stolen.

When the Ottoman government decided to demolish the Imperial Boathouse, *Kadırga* and all the Sultan's caiques were transferred on March 27, 1913 to the Imperial Shipyards across the Golden Horn in Kasımpaşa. The total expense of this trip was 22,810 *kuru* which was provided by the Seraglio's budget during the reign of Sultan Mehmed V (1908–1915). *Kadırga* was afloat on the Bosporus for the last time during this transfer to the shipyard. Deterioration had taken its toll, but according to some not a drop of water was taken on.

Despite the weakened state of the Ottoman Empire during World War I, *Kadırga* was not completely forgotten. In a 1917 museum catalog, Ali Sami Bey, director of the Naval Museum, gave a brief description of the ship. This focused on original decorative painted carvings of *Kadırga*, still preserved despite a long period of deterioration. Due to the collapsing economy, there was no funding for the preservation of the vessel.

When it survived the demise of the Ottoman Empire in 1923, *Kadırga* was in a "somewhat dilapidated condition" as described by Commander F. G. Schurr. According to the pair of photographs taken at Kasımpaşa shipyards, and published in *Mariner's Mirror* in 1923, the lower strakes were decayed and parted from each other. However, with the new republic in Turkey, *Kadırga* was restored and renovated by order of the new government. The condition of *Kadırga* seems to have been very good by 1939, to judge by a photograph then published in a *National Geographic Magazine* article about the new face of Turkey. By comparing the stern strakes on these photographs, it is clear that another major restoration, for which no documents exist in the state archives, must have taken place between 1923 and 1939.

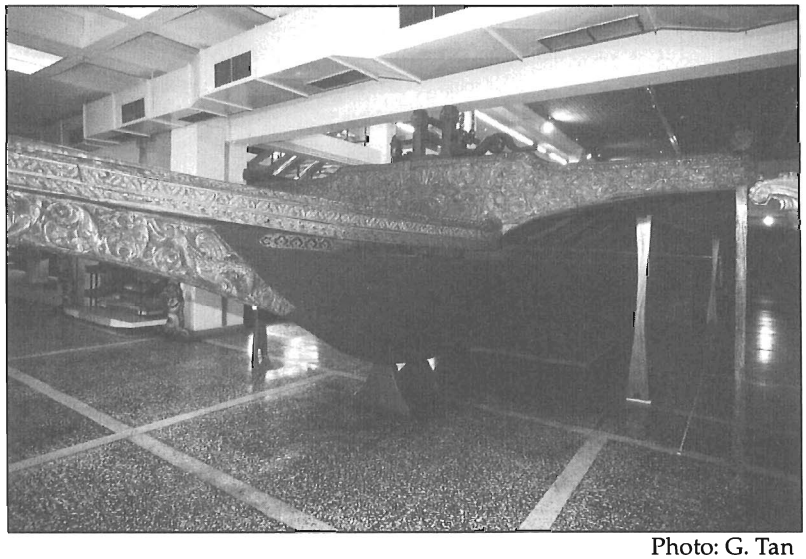


Photo: G. Tan

Fig. 8. Kadırga *on display at the Istanbul Naval Museum.*

Despite the constant overhaul processes, the storage facilities for *Kadırga* did not protect it from the ravages of time, and the ship continued to deteriorate further. Consequently, in 1944 restoration of the kiosk section was initiated by the Topkapı Palace Museum staff, and in 1950 most of the hull was repainted and the decorations on the heavy outrigger stringer were redrawn and painted in by the members of the Art Faculty of Istanbul University.

When the new Naval Museum was opened at Beşiktaş in 1953, the Turkish government decided to transfer *Kadırga* and the imperial

caiques from Kasımpaşa to Beşiktaş. This was to be *Kadırga*'s last trip on the Bosporus. However, this time it was necessary to transport the aged vessel by barge (fig. 7). From 1953 to 1970, the kiosk was removed from the ship and displayed in a separate room. Before the ship was placed on exhibit, one final major restoration was undertaken.

In 1957, the lines of the galley were recorded by Ata Nutku, the director of the Shipbuilding Institute of Istanbul Technical University. Despite the lack of detail in his constructional drawings, this study included the first comprehensive representations of the decorations on the vessel and a short description of the ship. In 1970, *Kadirga* was placed on public display in the gallery of historical caiques in the Naval Museum in Istanbul, where it may be seen today (fig. 8). In 1982 and 1983, some of the tortoise-shell, ivory, ebony, and mother-of-pearl ornamentation was replaced and the entire ship repainted (fig. 9). Another restoration of the kiosk is presently underway.

This is the tantalizing story of the last surviving historic galley in the world. We have yet to determine the origin of *Kadırga*. Although far from completed, our preliminary research of the hull suggests that a date before the middle of the seventeenth century cannot be ruled out, and that an earlier construction date is certainly possible.

While asking the question "when", it is also important to answer the question "why" this ship was preserved alongside the other Imperial boats. If *Kadırga* was indeed constructed before the seventeenth century, and belonged to one of the Mehmeds of the Ottoman Dynasty, Mehmed II seems likely. In Ottoman history, Mehmed II has always been legendary as the conqueror of Constantinople. It seems more likely that Mehmed II's vessel would be preserved as a tribute to its owner (and, possibly, captor), rather than one belonging to a Sultan who had less of an impact on Ottoman history. Clearly, extensive additional research is necessary to completely understand the fascinating story of the unique galley *Kadırga*.

Acknowledgments: I would like to take this opportunity to thank the staff of the Istanbul Naval Museum whose help and assistance has been invaluable throughout this project. My thanks also go to INA and—in particular—Cemal Pulak, whose encouragement and support has been inestimable.

Photo: G. Tan

Fig. 9. *The stern kiosk of* Kadırga *after its restoration in the early 1980s.*

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His Majesty's Hired Transport Schooner *Nancy*

Christopher R. Sabick

Archaeologists from the Nautical Archaeology Program at Texas A&M University have spent three years uncovering the secrets of a vessel that played an important part in the War of 1812. Before the outbreak of the American Revolution, English furtraders had several options for shipping their goods into the interior of the continent. Although the majority of their wares were sent down the Ottawa River with *voyageurs* in large canoes, they also had the option of sending goods as far as Grand Portage (near the tip of the "arrowhead" of present-day Minnesota on the north shore of Lake Superior) in the hulls of private sailing vessels that operated on the Great Lakes. This route was particularly useful for items that were difficult to carry in canoes, including kegs, stoves, and sheets of iron.

With the outbreak of the American War of Independence, the government of Upper Canada placed severe restrictions on the lake trade by demanding that all goods be carried in the Crown's vessels. This was a major blow to the growing fur trade in Montreal. With the King's vessels busy transporting troops and goods around the Lakes region, they had little time or space to carry commercial goods. Items that were sent in Royal vessels were often delayed by months—in some cases, a year or more. The fur companies were willing to put up with these restrictions while the war was in progress. They were, of course, transporting exactly the types of items that would be useful to the rebel colonies: muskets, powder, shot, blankets, and foodstuffs. What outraged the traders in Montreal was that these restrictions remained in place after the war ended in 1783.

With their trading areas now extending as far west as the Canadian Rockies, these merchants were desperate to reduce their shipping costs in any way possible. To this end, the traders began petitioning the government for removal of the restrictions. With their business bringing more than twenty thousand pounds a year in taxes, the merchants carried some political weight. In 1788, the government opened Lake Ontario to private navigation, and extended it to all the Great Lakes in 1789.

The first company to take advantage of the lifting of these restrictions was Forsyth Richardson and Co. This small firm was formed in 1787 to compete directly with the much larger and wealthier North West Co. In hopes of reducing their shipping costs, the company sent one of its partners, John Richardson, to oversee the construction of a sailing vessel at Detroit. Richardson, who had served as supercargo on the British privateer *Vengeance* during the American Revolution, traveled to Detroit with a shipwright and party of shipbuilders, arriving on June 20. The crew set up camp on the banks of the River Rouge south of Detroit and launched their vessel by November. Richardson described the new schooner *"...as a perfect masterpiece of workmanship and beauty."* He goes on to mention that *"...the cost to us will be great but there will be the satisfaction of her being strong and very durable."*

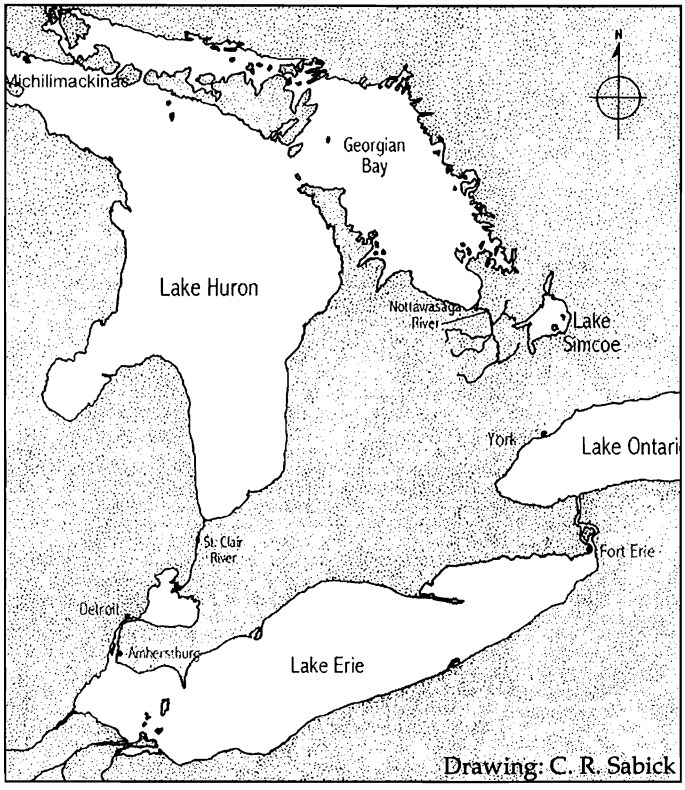

Fig. 1. *The area of the Great Lakes where* Nancy *spent her career as a civilian merchantship.*

The vessel, constructed of white oak and red cedar, was adorned with a figurehead that Richardson describes *"...as a lady dressed in the present fashion, and with a hat and feather."* It is from this figurehead that the schooner became known as *Nancy*, named after either Richardson's wife or daughter who shared the name.

The vessel sailed on its maiden voyage on June 19, 1790, heading for Fort Erie. This was to be the first of dozens of journeys across the Great Lakes that the schooner would make during her long career (fig. 1). Though historical documentation of *Nancy*'s merchant career is somewhat limited, it is clear that she spent most of her time traveling between Fort Erie at the western end of Lake Erie, Detroit, and Michilimackinac on Mackinac Island at the juncture of Lakes Huron and Michigan.

The payment schedule in figure 2 shows the types of goods typically carried in lake vessels and the cost of shipping them. However, historical documentation shows

that *Nancy* was not used exclusively for commercial trade. On at least two occasions, in 1794 and again in 1801, she was hired to carry government dispatches to outposts around the Lakes. In two other instances, she was employed by the military as a troop transport. The journal of a trader at Michilimackinac even reports that *Nancy* arrived from Lake St. Clair carrying a Native American chief and his family who were to receive presents.

Nancy continued to operate in this capacity for Forsyth Richardson and Co. until that concern joined with other small competitors of the North West Co. to form the XY Co. This new firm took the larger business head on, causing the price of furs to increase dramatically. As this was harmful to all concerned, members of the North West Co. advocated a union with the competition. In July of 1804, the XY Co.—and *Nancy*—were absorbed into the larger firm.

Nancy continued in her role as a merchant ship up to the outbreak of hostilities between the United States and United Kingdom in 1812. When word of the Declaration of War by the U.S. reached British commanders on the Lakes, they immediately took control of *Nancy*, which was docked at Moy, opposite Detroit. From this location she sailed on July 30 in convoy with other vessels carrying troops to reinforce the faltering militia force at Fort Erie (fig. 3).

Nancy spent the remainder of the summer of 1812 carrying troops and supplies throughout Lakes Erie and

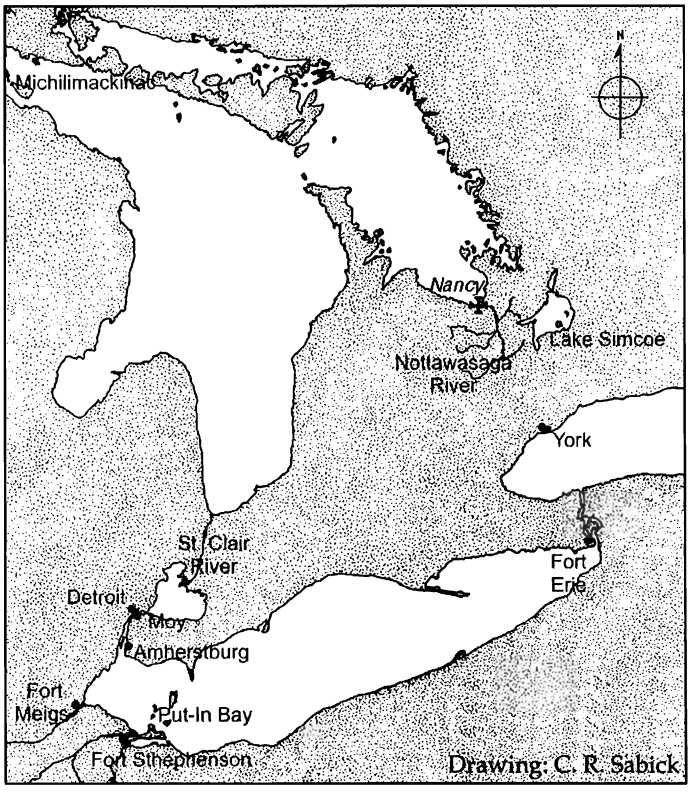

Fig. 3. *The scenes of* Nancy's *military career.*

Transport on LAKES ERIE *and* HURON.

LEITH and SHEPHERD hereby give notice to the Public, that the New Schooner the NANCY launched last November, will ply the ensuing season between Detroit and Fort Erie, and occasionally go to Michilimakinac when freight presents.---That no misapprehension may arise respecting the mode of ascertaining the bulkage, it is subjoined.---The rate of Freight over Lake Erie, will be fifteen Shillings New York Currency, equal to nine Shillings and four pence half penny Quebec Currency, for a barrel bulk; and two Shillings New York Currency, or one Shilling and three pence Quebec, per cubic or solid foot, for goods to be estimated by measurement.---Freight from Detroit to Micilimakinac at the rate af four Shillings New York Currency, or two Shillings and six pence Quebec Currency, for a bushel of Corn; and six Shillings New-York, or three Shillings and nine pence Quebec Currency, for a quintal of Flour.---Other goods the same as over Lake Erie.---Packs over each Lake, not measuring more than five feet, or exceeding 120lbs. in weight, four Sillings New York Currency, or two Shillings and six pence Quebec Currency, per pack.

As this Vessel is constructed for fast sailing, and will be most complete in every respect; the safety and expedition attending Transport in her must be obvious.---

SCHEDULE of Packages computable by Barrel Bulk.

	Barrel Bulk.
Puncheons not exceeding 120 Gallons,	3 1/2.
Porter Hogsheads,	2
Wine ditto.	2
Casks and Barrels of 32 or not exceeding 36 Gallons,	1
Soap 3 Boxes of 1 Cwt. each,	1
Candles 5 ditto of 50lbs. each,	1
Shot 3 ditto of 1 Cwt. each,	1
Iron in Bars 3 Cwt.	1
Do. in Sheets,	1
Stoves Single,	1
Do. Double,	2
Gunpowder 2 whole barrels 100lbs. each,	1
Barrels of Pork ordinary size, 4 Barrels for	3
Kegs of 8 to 9 Gallons, for Kegs,	1
Oil in Jars of 3 1/2 Gallons, 6 Jars,	1
Paint in Rundlets, 8 of 28lbs. each,	1

All other Goods to be measured and reduced to Cubic or Solid feet.

LEITH and SHEPHERD.

Detroit, 26th January 1790.

Fig. 2. *Payment schedule for shippers sending their goods in* Nancy. *Courtesy the Detroit Public Library.*

Huron, then wintered in Detroit. During the summer of 1813, the schooner participated in the unsuccessful British sieges of Fort Meigs and Stephenson in northern Ohio.

After this stint as a troop transport, *Nancy* was used to carry supplies and troops to the isolated fort at Michilimackinac. *Nancy* departed Detroit on August 31, 1813 and arrived at the northern fort ten days later. After unloading, the schooner was employed transporting supplies from the other British posts on Lake Huron to the fort at Mackinac for the remainder of September. During the first week of October, *Nancy* was ordered to return to Amherstburg with a load of sugar, gunpowder, and cannon for the fort there.

The captain and crew of *Nancy* were unaware that the entire nature of the war on the Great Lakes had changed while they were away on their errand to the north. On September 10, the American and British fleets on Lake Erie had met in combat at Put-in Bay. After a hard fought three-hour battle, the American fleet under Commander Oliver Hazard Perry defeated and captured the entire British

fleet of Commander Richard Barclay. This left *Nancy* as the only remaining British Naval vessel on the upper Lakes. In addition to this major naval setback, the American forces had followed up on this victory by recapturing Detroit and taking Amherstburg, effectively gaining control of the passage between Lakes Erie and Huron.

Nancy's crew were made aware of this situation as they were preparing to enter the St. Clair River. They quickly returned to the open waters of Lake Huron and attempted to reach Michilimackinac in order to inform the garrison there of the debacle on Lake Erie. After traveling the majority of Lake Huron, the schooner encountered a violent storm and was forced to run before the strong gale for three days. *Nancy* was carried back to within eighty miles of the St. Clair River before the storm broke. With sails tattered and hull leaking badly, *Nancy* limped into Michilimackinac. After this, it was sent to the Falls at St. Mary's for the winter.

In the spring of 1814, British Naval authorities decided that *Nancy* should come under the command of a Royal Navy officer. Up to this time, the vessel had been captained by Alexander Mackintosh, who had been her peacetime captain. In February of 1814, Lt. Newdgate Poyntz was assigned to command the vessel. He traveled a newly established supply route to the northern lake. With the St. Clair River closed to them, the British were forced to ship supplies north from York (modern day Toronto) overland to Lake Simcoe, upon which they were floated to the western shore and portaged to the headwaters of the Nottawasaga River. From here they could be floated down to Georgian Bay for delivery in *Nancy* to Michilimackinac.

Upon taking command of *Nancy* in early May, Poyntz was employed in transporting supplies to Michilimackinac. There appears to have been a dispute between Poyntz and Lt. Col. McDouall, the military commander at Michilimackinac, that escalated to the point of Poyntz being removed from his command.

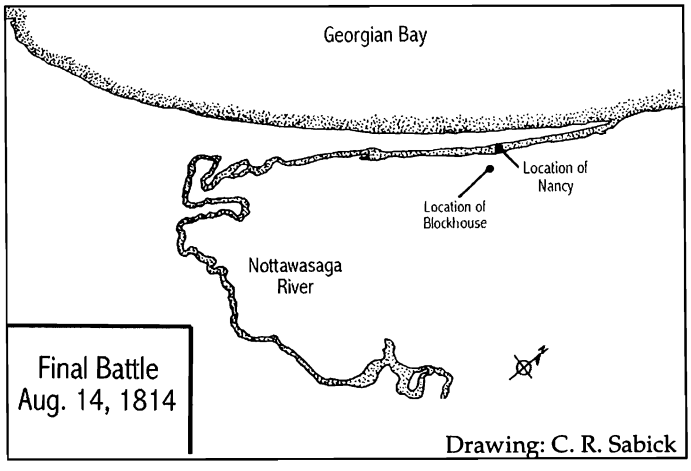

Fig. 4. *The battle at the mouth of the Nottawasaga River.*

He was replaced by Lt. Millar Worsley, who served with the large British fleet on Lake Ontario. Worsley also reached Lake Huron by the new overland supply route, arriving at the mouth of the Nottawasaga River in mid-July. When *Nancy* arrived at the end of the month, he and his crew set about loading the schooner with supplies from the storehouse a couple of miles upstream.

At this same time, a powerful American force under the command of General George Croghan entered Lake Huron intent upon capturing Fort Michilimackinac. This flotilla comprised the twenty-gun brigs *Niagara* and *Lawrence*, the schooners *Tigress* and *Scorpion*, and some seven hundred troops. When the fleet arrived off Mackinac Island on July 26, McDouall sent word to Worsley that the expected American attack had arrived. After thoroughly planning their attack, the American troops stormed ashore on August 4. They were beaten back by strong British opposition and fierce attacks by the Crown's Native allies. Seeing that the fort would not be captured without a protracted siege, Crogan and the American fleet went in search of easier prey, namely *Nancy*. The American commander reasoned that, if he destroyed the supply base on the Nottawasaga and *Nancy*, Michilimackinac would fall quickly.

Upon receiving McDouall's warning, Worsley decided defend his vessel from land. As *Nancy* was armed with only four guns, two six-pound long guns and two twenty-four-pound carronades, he had no hope of standing up to the American vessels in the open water. He and his crew warped their schooner about a mile upstream from the river mouth and anchored her there. This left the *Nancy* separated from the open waters of Georgian Bay by a narrow strip of land. The crew members hastily built a log blockhouse on a hill overlooking the ship and armed it with the vessel's guns (fig. 4).

The American fleet appeared off the mouth of the river on August 13. Although the brig *Lawrence* had returned to Detroit carrying American wounded from the attack on Michilimackinac, Worsley and his crew were hopelessly outnumbered. The British could field only twenty-one seamen and ten Native American allies. Against this force, the Americans had the guns of the *Niagara* and four hundred soldiers.

These troops began landing the following morning. Amazingly, Worsley and his men were able to hold off the attackers until mid-afternoon. At that point, the Americans landed two howitzers that began dropping explosive shells on and around the blockhouse. One of these shells detonated the powder supply in the blockhouse, destroying it. Seeing that the situation was hopeless, Worsley was forced to order the destruction of *Nancy*. She was quickly set afire as the British defenders melted away into the surrounding forest. Worsley's force had escaped with only one man killed

and four wounded. *Nancy* was not so lucky. Being fully laden with cargo, she burned furiously before sinking into the waters of the Nottawasaga River. The twenty-five-year-long career of *Nancy* had finally come to an end.

The hull of the schooner formed an obstruction in the river and over the following years silt began to deposit around it, eventually forming a small island. The vessel was never really forgotten. Indeed, it remained clearly visible into the late nineteenth century, before mud and silt swallowed it. In the following years, the area around the mouth of the Nottawasaga River became a popular vacation destination. The beautiful sand beaches of Georgian Bay attracted tourists from across Canada. Along with the increased tourism came an increased interest in local history. This brought *Nancy's* story to the attention of a number of interested locals who began to search for the vessel's remains.

On a visit to the area, noted Canadian historian C. H. J. Snider located the remains of the schooner, half submerged in the side of the small island. Word of this discovery spread and by the 1920s there was interest in recovering the hull. During the summer of 1925, a group of interested locals took this task to heart and began to excavate the remains from the mud (fig. 5). They recovered numerous artifacts, including pieces of the ship's equipment, plates, cups, rigging, weapon fragments, and hundreds of pig bones from the provisions that had been on board. They even located clumps of flour from the casks that were to be shipped to Michilimackinac. Unfortunately, as was common at this time, most of these artifacts found their way into private collections and very few of them can be located today.

However, the largest artifact of all, *Nancy's* hull, is still present for all to see. After its excavation, it was decided that the schooner would be kept in a museum built on the island it helped to create. This museum is known as the Nancy Island Historic Site. The remains were immediately placed in an enclosure and have stayed in one for most of the following years. This has led to a very well preserved hull, but one that had never been thoroughly studied.

Fig. 5. *In 1925, a group of interested locals began to excavate* Nancy's *remains. Courtesy the Detroit Public Library.*

During the summer of 1997, a team of five archaeologists from Texas A&M University's Nautical Archaeology Program traveled to Ontario to record the hull remains. They followed a thorough documentation of the hull by historical research into the history of the vessel. This was carried out in the National Archives of Canada, the Public Records Office in London, and numerous small collections throughout the Great Lakes region. A description of the hull remains and its construction style will be covered in a future article.

Acknowledgments: My study of the construction and history of *Nancy* could not have been completed without the support of numerous people. I would like to thank my recording team which consisted of Erich Heinold, Brian Atchison, Chris Patlevony, and Eric Emery. Thanks also go to the staffs of the Canadian National Archives, Public Records Office, and Detroit Public Library for their assistance in my historical research. Last but not least, this project could not have gotten off the ground without the continued support, encouragement, and friendship of Dr. Kevin Crisman.

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The Trade Axes of La Salle's Ship *La Belle*

Mark A. Feulner

Among the many finds recovered from *La Belle* during the 1996 and 1997 excavations were the goods La Salle brought for trade with the native population. Scattered throughout the wreck were numerous glass beads, brass pins, and pewter hawk bells that were used by Native Americans for personal adornment. In addition, there were various metal goods. These were popular trade items due to their superiority to native tools. The most conspicuous goods were three large casks filled with iron axes (fig. 1).

The first cask we disassembled was the smallest of the three, cask feature #72. The removal of the staves and ends of this barrel exposed a set of lightly concreted axe heads, with over half of them still in their original positions. The axes had been arranged with their eyes to the outside and the blades oriented toward the center, the overlapping blades forming a helical pattern. About a third of the axes had been shifted out of this pattern, either due to the wrecking process or to the container being partially unpacked by the settlers. We recovered eighty-seven complete axe heads from the cask, along with fragments suggesting another seventeen axes, for a total of 104 specimens.

The two larger barrels, cask features #29 and #63, did not appear to have been as neatly packed as the smaller one. There was no discernible pattern to their arrangements, and the random positioning of the axe heads allowed the formation of heavily concreted masses inside the two casks. Although the axes may have shifted when *La Belle* wrecked, there was evidence of packing material in the form of straw or pine needles found in both barrels. This was not found in cask feature #72. The use of packing material and the heavy amount of concretion found in these two barrels suggest that they were loosely packed, perhaps because their larger diameters did not lend themselves to helical packing patterns.

There were 119 complete axe heads recovered from cask feature #29. An additional 157 fragments were recovered, indicating an estimated total of 276 axes. Cask feature #63 contained 101 whole axes. Also, 154 fragments were recovered, 108 of them blades, for an estimated total of 255 specimens.

There are several distinctive features of these early trade axes that set them apart from other styles of axes. They have long, flat-topped blades that flare downward from the eyes along their lower margin. The eyes are circular or ovoid, and lack a lip. And, most noticeably, these axes have no poll, meaning that the iron that encircles the eye is not thickened on the face opposite the blade. This simple design made trade axes like those on *La Belle* easy to manufacture quickly. A wrought iron bar was heated and bent into an U-shape. The two ends of the bar were then brought together around a drift, the shape of which determined the final shape of the eye. The two ends were welded together, and the final shape of the axe was hammered out. Once given its shape, an edge could then be ground out of the iron, or a steel bit could be inserted. This method of manufacture yielded blades that varied greatly in size, ranging from 8.5 centimeters to 13 centimeters in length. We measured the length along the bottom of each axe blade, from its edge to where the eye began. This measurement was selected in order to record axes with broken eyes, and it permitted the measurement of some blade fragments as well.

Another feature that was apparent on a number of the axes was the presence of trademarks stamped onto the blades. These marks were one to two square centimeters in size, and were usually stamped into one face of each blade. The most common was an asterisk consisting of four intersecting raised bars in a round cartouche (fig. 2). There was also a handful of axes stamped with the initials "DG"

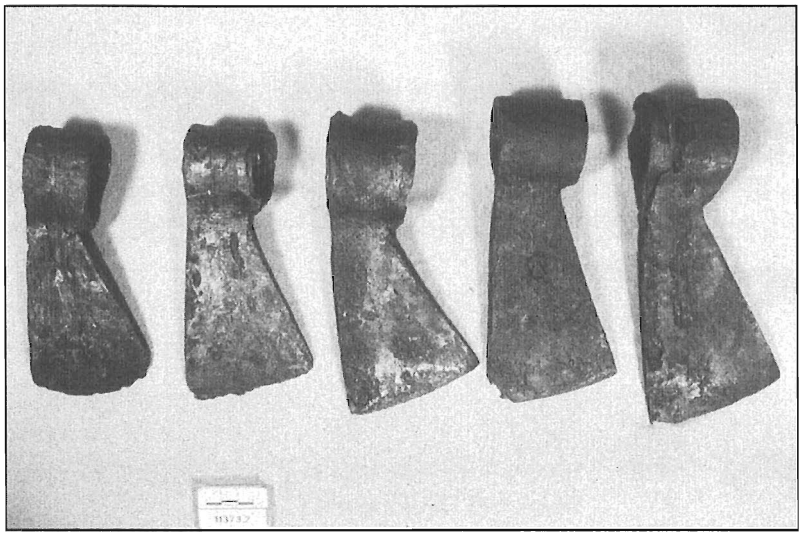


Fig. 1. *Profile of five axes, showing their range in size. The Venus symbol ♀ can be seen on the second axe from the right.*

Photos: Stephanie Judjahn, courtesy of Texas Historical Commission and Conservation Research Laboratory.

Fig. 2. *Detail of the asterisk cartouche.*

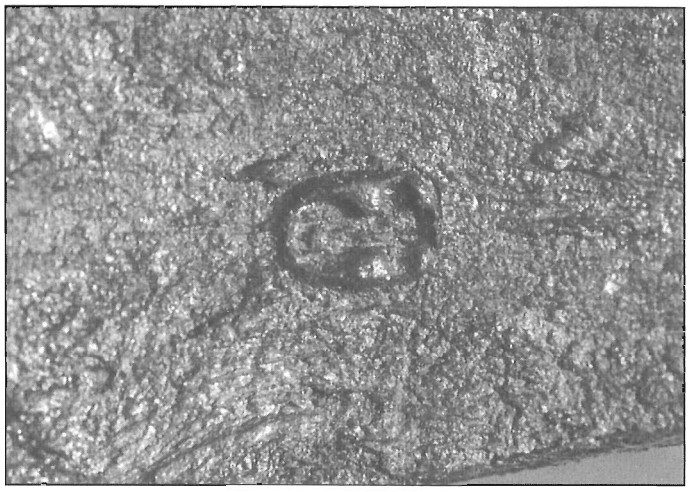


Fig. 3. *Detail of the Venus symbol.*

or "DC" in raised letters. An interesting cartouche contained the Venus symbol (♀) commonly known as the symbol for women (fig. 3). There were several marks consisting of a raised crescent surrounded by three raised dots and a few of the letter "M" found on axes from cask feature #63. Cask feature #29 yielded some axes with a *fleur de lis* cartouche and others with a pattern of two or three punch marks.

The axes recovered from *La Belle* are a good example of the iron axes brought to North America by European traders in the seventeenth century. Similar examples of trade axes have been excavated from Pemaquid and Pentagoet, Maine. This style of trade axe has also been discovered in Florida. Underwater investigations of river systems emptying into the Great Lakes have recovered a large number of specimens that also resemble the *La Belle* axes.

The iron trade axes recovered from the wreck of *La Belle* present a collection of artifacts representative of a significant component of early colonial trade in North America. In the seventeenth century, the value of an iron axe to white settlers as a tool was only surpassed by its worth in barter with natives. The importance of axes and other metal goods in colonial bartering makes the collection from La Salle's *La Belle* an important find. Comparative analysis of these trade axes and other collections will enhance our understanding of early New World trade.

Suggested Readings

Camp, Helen B.
1975 *Archaeological Excavations at Pemaquid, Maine 1965-1974.* Augusta, ME: The Maine State Museum.

Faulkner, Alaric and Gretchen Faulkner
1987 *The French at Pentagoet 1635-1674: An Archaeological Portrait of the Acadian Frontier.* Augusta, ME: The Maine Historic Preservation Commission.

Mercer, Henry C.
1975 *Ancient Carpenters' Tools.* Bucks County, PA: Horizon Press.

Woodward, Arthur
1970 *The Denominators of the Fur Trade: An Anthology of Writings on the Material of the Fur Trade.* Pasadena, CA: Westerlore Press.

Woolworth, Alan R.
1975 "Description of the Artifacts Recovered from the Quetico-Superior Underwater Research Project." In *Voices from the Rapids: An Underwater Search for Fur Trade Artifacts 1960-73.* Ed. R.C. Wheeler, pp. 55-84. St. Paul, MN: Minnesota Historical Society.

In the Field

Tektaş Burnu

George Bass and his archaeological team are preparing for a second summer excavating the fifth-century BCE shipwreck at Tektaş Burnu, Turkey (see *INA Quarterly* 26.4). This project has the potential for illuminating a period that was not only the Golden Age of ancient Greece, but also one of the high spots of all human history. The INA team is conducting the first archaeological investigation of a shipwreck from the era of the Athenian Empire, which was dependent on seafaring. Grants from the National Endowment for the Humanities and National Geographic Society, the backing of both INA and Texas A&M University, and the continued help of Turkish Airlines will make this possible. Dr. Bass also plans to conduct a fall survey with a two-person submersible just built by Seamagine of California for INA with support from the Institute for Aegean Prehistory.

Azores

The millennium season in the Azores will continue work that has been progressing in the islands since 1996. The project is sponsored by INA, Texas A&M University (TAMU), and the Centro Nacional de Arqueologia Náutica e Subaquática (CNANS) of the Portuguese Ministry of Culture, in collaboration with the Lake Champlain Maritime Museum. Dr. Kevin Crisman of TAMU will continue to lead the project. This season's work, from the beginning of July through mid-August, will be a two-fold undertaking including both a survey and timber recording. The survey, with participation from Lee Cox of Dolan Research, will start at the bay at Angra do Heroísmo and expand to include areas outside the harbor on the south coast of Terceira. Since local records show that many ships have wrecked near Angra, a survey may yield future excavation targets.

An emergency excavation held in 1997 to excavate and move two sixteenth- or seventeenth-century shipwrecks, Angra C and Angra D, successfully saved the ships from destruction by a marina construction project in Angra Bay (see *INA Quarterly* 25.2, and 26.1). This season's work will focus on completing the timber recording for both wrecks. Dr. Crisman's archaeological team will include TAMU Nautical Archaeology Program graduate students Sara Brigadier, Erika Laanela, Mason Miller, and Anthony Randolph, with former TAMU students Brian Jordan and Julie Polzer. Archaeologists from the CNANS Department of the Azores—Catarina Garcia, Paulo Monteiro, and Erik Phaneuf—have been working on the site analysis, and will continue with the additional information uncovered this year. A productive season will pave the way for future INA projects in the Azores.

Black Sea

In September, INA archaeologist Cheryl Ward will be back in the Black Sea on a deep sea research vessel with Kathryn Willis of the Nautical Archaeology Program at Texas A&M University . The Institute for Exploration expedition, led by Robert Ballard, will be using remote survey and imaging technology. In addition to seeking ancient ships to better understand seafaring in the Black Sea region, the team will continue its efforts to define the ancient coastline of ca. 5400 BCE (see *INA Quarterly* 26.3).

Malta

In April of 2000, Brett Phaneuf (INA) and Matt Meyer (Department of Oceanography, TAMU) conducted an archaeological hazard survey in conjunction with the Malta Maritime Authority, the Malta Museums Department, and a Maltese architectural firm, TBA Periti. To ensure that no archaeological resources possibly present in the sub-bottom were damaged, the team surveyed the area of a proposed land reclamation site and breakwater construction for a marina around Manoel Island, Malta. They used a high-resolution sub-bottom profiler coupled with a state of the art digital data collection system on loan from Coda Technologies, and precision GPS from Omnistar.

The compensation INA received from the sponsors was sufficient to fund additional survey work in Malta during 2000 (see *INA Quarterly* 26.4). In June and July, the Institute will conduct a preliminary survey, in collaboration with the Maltese Museums Department, to identify underwater sites around the three major islands forming the Maltese Archipelago. The team will consist of Ayşe Atauz (Field Director-archaeologist), and John McManamon (Divemaster-archaeologist). They will be using the Malta Maritime Authority's fourteen-meter survey boat, *Madonna Ta'Pinu*, to conduct operations throughout the archipelago.

The survey will search the seabed for anomalies using side scan and multi-beam sonars and conduct diving inspections of underwater sites. The number of diving locations will vary according to the extent of the survey area and the magnitude of the sites. For places of significant archaeological value, further methods such as basic mapping and recording of artifacts will be carried out after consultation with the Museums Department. The team will raise artifacts, after consulting the Department, in cases where the nature or date of the site cannot be determined using other methods such as photography or underwater imaging.

The team will carry out archival research and interview local fishermen, recreational divers, and other local informants on days when there is no diving activity. In addition, they will begin to form a database of Maltese museum holdings that were recovered from underwater sites.

Portugal

This summer, graduate student Filipe Castro from the Texas A&M University Nautical Archaeology Program will be returning to Lisbon, Portugal, to finish recording the timbers of the "Pepper Wreck." He will also continue the study of the extensive collection of artifacts found on its spice-littered site (fig. 2). The early seventeenth-century Portuguese Indiaman is presumed to be the *Nossa Senhora dos Mártires*. This ship was wrecked by a heavy storm at the mouth of the river Tagus on September 15, 1606 (see *INA Quarterly* 26.4). In this 2000 season, the team will be composed exclusively of current and former students from the Nautical Archaeology Program: Sara Brigadier, Brian Jordan, Erika Laanela, Mason Miller, and Anthony Randolph.

Photo: F. Castro

Fig. 2. *The fortress of São Julião da Barra, Portugal, the location of sites SJB1 and SJB2, which will be investigated again this summer by Filipe Castro and his team of archaeologists.*

Albania

Elizabeth Greene, an INA Research Associate and doctoral candidate in Classics at Princeton University, will lead a team of archaeologists to southern Albania in June 2000 for a coastal reconnaissance project. In collaboration with the Albanian Institute of Archaeology and the Butrint National Park Project, the team will investigate possible wreck sites and survey target regions for shipwrecks and submerged architectural remains. The team will work in the Butrint-Ksamil region of Albania, the area marked for historical preservation by the Butrint National Park. UNESCO has designated Butrint, the site of ancient Buthrotum, as an endangered world heritage monument. This brief reconnaissance project marks the first season of a five-year project of shipwreck survey and excavation in southern Albania.

The rich cultural history and unexplored waters of the region (see *INA Quarterly* 22.2) suggest that Albania's coast may yield important new discoveries for scholars of ancient economics, trade, and ship construction. Greene began planning for this survey in 1995–96, when she spent the year in Albania on a Fulbright grant. Political disturbances prevented a survey at that time, but the 2000 reconnaissance project marks a new beginning for INA research in Albania.

Bulgaria

Kroum Batchvarov, in collaboration with the Center of Underwater Archaeology, Sozopol, will be excavating a shipwreck in the Bay of Kiten, near Cape Urdoviza (see *INA Quarterly* 26.3). The vessel is tentatively dated to the period between the end of the sixteenth and the end of seventeenth century. The team will consist of Dr. Frederick Hocker, Dr. John Macmanamon, Troy Nowak, Mark Polzer, and personnel from the Bulgarian Center for Underwater Archaeology.

The extensive hull remains have much to tell us. Dendrochronology should establish a definite date and may even suggest an origin for the vessel. This information, in turn, may enhance our knowledge of the maritime history and shipbuilding technology of the Eastern Mediterranean and Black Sea. It is possible the vessel could provide new insights on previous INA research. Specifically, it may allow determining whether the Ottoman wreck from Yassıada was a captured Iberian vessel or an indigenous product of the Empire.

Mrs. Angelova from the Center of Underwater Archaeology will be suppling equipment, accommodations, and the exceptional knowledge and experience that she and her talented team possess. This will be the first shipwreck excavated by INA in the waters of this promising region.

Normandy

Off Omaha Beach, Normandy: Somewhere below is the forgotten armada of D-Day—the sunken landing craft and ships, and the men who never reached the beaches of Normandy on June 6, 1944. The men and their vessels are remembered today by the people on board *Robo*, the search boat of the Institute of Nautical Archaeology.

Robo, using side-scan sonar and a magnetometer, is seeking the exact locations of the landing craft and other lost ships that were destroyed as they carried men and materiel toward the invasion beaches.

The search will produce the first definitive map showing where the ships and craft ended their voyage toward the invasion beaches. Earlier, *Robo*, owned by INA Director George Robb, had surveyed Utah Beach, the other destination of the U.S. invasion force. INA has designated the search operation "Neptune 2K," after the code name, Neptune, for the naval aspect of Operation Overlord.

Neptune 2K is a cooperative effort of INA, the U.S. Navy Historical Center, and the National Geographic Society. Final results of the search into the past will be published in forthcoming issues of the *INA Quarterly* and the *National Geographic Magazine*.

To date, at least 10 shipwrecks related to the D-Day invasion have been located, some of which have never before been seen, having spent the last five decades buried in the soft mud of the seafloor. Images of the wrecks and photographs of the area can be seen on the INA website, nautarch.tamu.edu/ina. Funding for the project was provided by RPM Specialist Corporation, Mr. George Robb, the Naval Historical Center, the National Geographic Society, and the Texas Sea Grant Program.

Civil War Blockade Runner Project

INA archaeologists will return to Galveston, Texas, to resume work on the wreck of the paddle steamer *Denbigh*, one of the most successful blockade runners of the American Civil War. The project, led by INA Director of Texas Operations Barto Arnold, identified the wreck in late 1997 (see *INA Quarterly* 26.2). Last summer (1999), Arnold and his team conducted test excavations on the wreck. This year, the team expects to complete a full round of excavations in the areas of the cargo hold, crew's quarters, and engine room. The ultimate goal of the multiyear project, Arnold says, is eventually to recover one of the ship's engines and paddle wheels for exhibit in a museum. According to Arnold, *Denbigh* marks an important milestone in marine engineering. It was constructed in 1860 at the John Laird shipyard in Birkenhead, near Liverpool. These shipbuilders were renowned for their design innovations, particularly in the construction of iron-hulled vessels like *Denbigh*. When new, the ship was heralded as representing "an entirely new order" of coastal packet.

The 2000 *Denbigh* field crew comes from all over the United States, with both graduate and undergraduate students taking part. A significant proportion of the students are from either Texas A&M University at College Station or Texas A&M University at Galveston, where the field crew is based. *Denbigh* Project work at Galveston will begin on May 29 and will continue through the end of July.

Deadman Bay Project

The Deadman Bay project will document Wreck Baker, a frigate built during the naval arms race that took place on Lake Ontario during the War of 1812. Overlooked by historic Fort Henry, Kingston, Ontario, Deadman Bay contains the remains of two ships that sank at their moorings in less than seven meters of water after the Royal Navy abandoned them. Wreck Baker, the smaller of the two vessels, will be studied under an Archaeological Permit from the Ontario Ministry of Citizenship, Culture, and Recreation. Graduate students Daniel Walker, project director and primary investigator, Amy Borgens-Cramer, and Adam Kane will spend three to four weeks recording the visible remains. They will provide archaeological data on the ship's construction and help identify the wreck. Funding was kindly provided by Professor Kevin Crisman of Texas A&M University.

Guantanamo Bay

The rich history of the island nation of Cuba illustrates the development of the Americas since their discovery in the fifteenth century. Thanks to the unique nature of the U.S. naval base at Guantanamo Bay, INA has received permission to survey the Cuban waters encompassed by the base. Hopefully, this will be a first step towards wider INA work in Cuba.

The harbor of Guantanamo Bay has been under the control of the United States since the Spanish-American War in 1898. As a U.S. possession, it is possible for American citizens to operate there with the permission of the U.S. military. INA has contacted the Commanding Officer at Guantanamo and received a permit through his Public Works Officer. A team consisting of INA President Jerome Hall (principal investigator), graduate students Mark Feulner (project director) and William Charlton (archaeologist), and former Navy SEAL Jonathan Gustavson (diver) will conduct a survey of the bay in August 2000.

Preliminary research shows that the bay has a great deal of potential. It is located approximately seventy miles east of Santiago de Cuba, which was an important harbor during the sixteenth and seventeenth centuries. The history of the bay portrays it alternately as a refuge for ships plying the Windward Passage, and as a lair for pirates who preyed on Spanish shipping in the region. There are also encouraging oral reports from former Navy personnel who were stationed at the base. They describe the locations of several wrecks within the bay, one of which carried a cargo including clay pipes that appear to date to the sixteenth or seventeenth century.

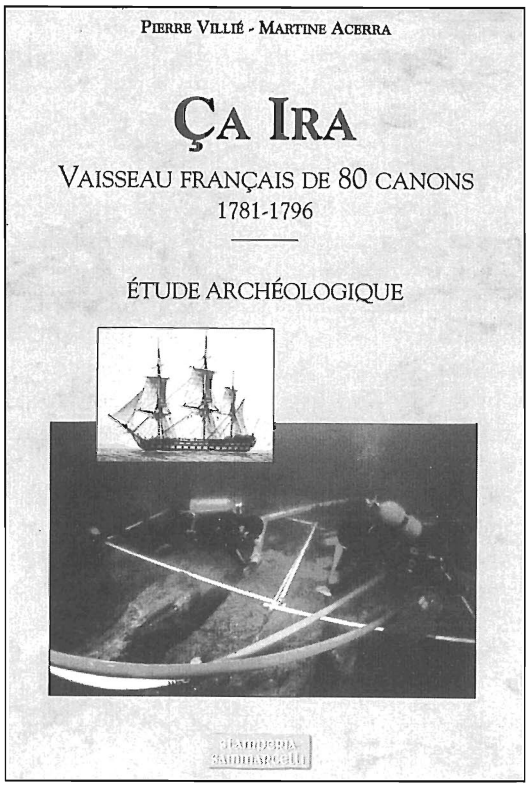
There are two primary objectives of the survey for the 2000 season. The first is the location and documentation of the aforementioned "Pipe Wreck." Reports state that the projected location of the wreck is easily accessible and visible from the air on a clear day. The second goal will be to locate a second reported wreck, which is believed to have sunk considerably later than the "Pipe Wreck." The team hopes to gain additional information on both sites. This will allow determining the feasibility and value of future investigations, and aid in the development of a preservation plan. Tertiary objectives involve the investigation of any additional, more modern archaeological sites that may lie in Guantanamo Bay. The team will conduct interviews with local divers and naval personnel to gain additional information concerning the potential for cultural remains in other areas. If oral reports reveal targets of sufficient interest, they will also be investigated, time permitting.

Review

by Filipe Castro

Ça Ira, *Vaisseau Français de 80 Canons 1781-1796*
by Pierre Villié and Martine Acerra

Stamperia Sammarcelli, Biguglia, 1998
99 pages, 7 b/w plates, 34 drawings and maps, 6 tables, bibliography, paper cover.



This very interesting book in straightforward, uncomplicated French presents a study of the archaeological data retrieved from the ship-of-the-line *Ça Ira*. The analysis is complemented by a study of some of the most important French works on naval architecture of the eighteenth century. The vessel was built at Brest in 1781 as an eighty-gun ship and first christened *Couronne*. In 1791, in the heat of the French Revolution, it was renamed *La Révolution*, and in 1793, after the proclamation of the Republic, its name changed again to *Ça Ira*, after the line of a revolutionary poem "*Ah! Ça ira, ça ira, ça ira, les aristocrates on les pendra*" ("All the aristocrats will hang").

On the third of March, 1795, *Ça Ira* left Toulon in the fleet of Admiral Martin. The ships sought to land six thousand French troops on Corsica and storm the strong British positions on the island. As the victim of unfortunate circumstances—and Captain Horatio Nelson in H.M.S. *Agamemnon*—*Ça Ira* was lost to the British fleet of Admiral Hotham only a few days later, during the Battle of Cape Noli. Transformed into a hospital ship and stationed in Saint-Florent on the northern coast of Corsica, *Ça Ira* burned by accident in April 1796. Pierre Villié's team found it in 1989 and spent the next five years excavating the site. This book is the result of that work.

Ça Ira was excavated in the Gulf of Saint-Florent during five field seasons of four weeks each. The authors compare construction details observed on the wreck with theories of naval architecture propounded by Blaise Ollivier (*Traité de construction*, 1736), Henri Louis Duhamel du Monceau (*Éléments de l'architecture navale ou pratique de la construction des vaisseaux*, 1752), M. de Duranti de Lironcourt (*Instruction élémentaire et raisonnée sur la construction pratique des vaisseaux, en forme de dictionnaire*, 1771), and Vial du Clairbois (*Encyclopédie méthodique de la Marine*, 1783-87).

The book is divided into five chapters. The first chapter gives a cursory glimpse of the first anniversary of the storming of the Bastille in 1789 and the general revolutionary euphoria that led to the adoption of the song *Ça Ira* as the name of a war vessel. The second chapter is a short but comprehensive account of the loss of the *Ça Ira*. The third chapter, written by Martine Acerra, tells the story of the appearance and development of the 80-gun French ship-of-the-line, and presents the context in which the *Couronne* was designed and built. In the fourth chapter, an analysis of the archaeological data is presented. Sections of this chapter discuss the keel and false keel (p. 32), the frames (p. 40), the keelson and maststep (p. 44), the planking (p. 48), the copper sheathing (p. 52), the drainage system (p. 54), the main mast step (p. 67), the ballast (p. 71), the archaeological finds, including the barrels for fresh water and the ammunition (p. 73), the kitchen (p. 78), and the marks of the British presence (p. 79). A short fifth chapter with conclusions and a table summarizing the archaeological analysis finishes the book. There is no index.

Very easy to read and presenting good illustrations—although the captions can sometimes be mistaken as titles and text—this book provides an interesting look at the eighteenth-century evolution of French ship design and construction. I believe that it merits reading, both by scholars and avocational archaeologists.

For many reasons, Pierre Villié and his *Tech Sub Association* are a very good example of what an independent non-profit organization can achieve. It has trained avocational divers to perform scientifically informed work—the publication of the Calvi I wreck by this author in the *Cahiers d'Archéologie Subaquatique* requires mention here. The association has performed excellent work in the study and dissemination of information concerning underwater cultural heritage and deserves credit for those accomplishments.

News & Notes

Serçe Limanı pottery study and restoration

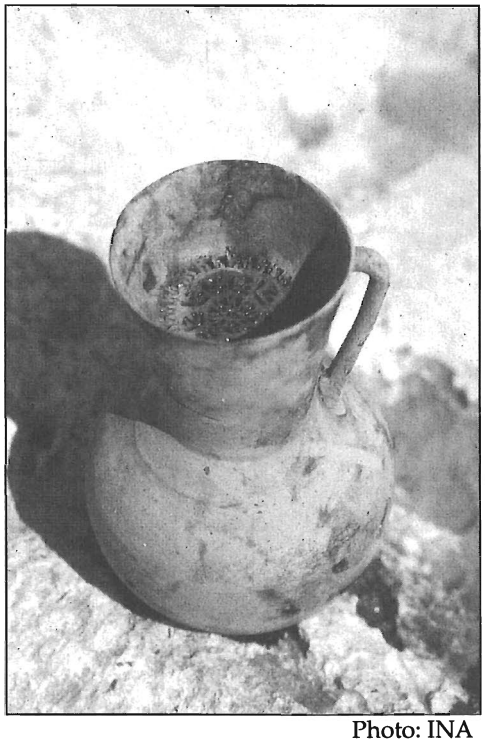
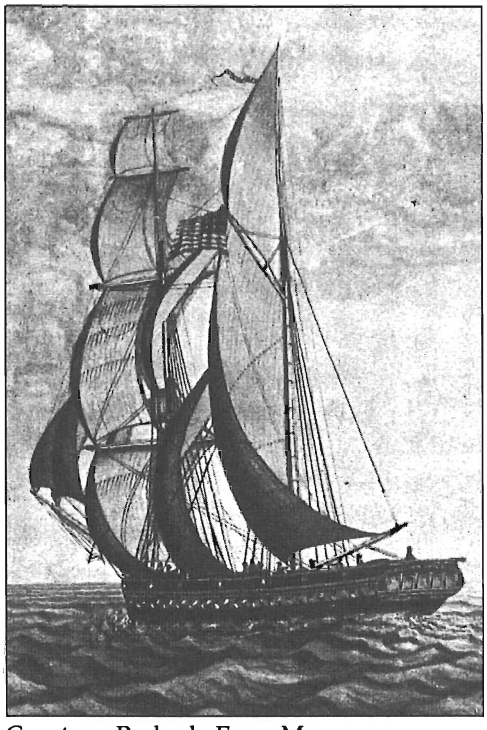


Photo: INA

Fred van Doorninck, editor of the final volume (III) of the eleventh-century Serçe Limanı Glass Wreck publication, spent the month of May in Bodrum working with Sheila Matthews on a chapter devoted to the Islamic plain wares on the ship. The study of this pottery had been well begun in the early 1980s by then graduate student Manuela Lloyd, but much remains to be done. Among the pottery groups finished in May were the five white-ware and five red-ware gargoulettes (one-handled jugs with strainers) recovered from the wreck. It was concluded that all the gargoulettes in either group might very well have been made in the same workshop. The white-ware gargoulettes were probably together in a single cargo package in the stern, and at least four of the red-ware gargoulettes in another cargo package located amidships. Dr. van Doorninck has recently been informed that the white-ware gargoulettes from the Glass Wreck will be used to date strata containing remains of similar ceramics at Fustat (Old Cairo), the medieval capital of Egypt and the Fatimid empire.

During their work, van Doorninck and Matthews encountered evidence of a continuing deterioration of some Glass Wreck pottery due to the presence of salts in their fabric, despite considerable desalinization efforts over the years. The basic problem has been a woefully inadequate supply of absolutely pure water. Particularly in view of the unusual importance of the Islamic pottery from the Glass Wreck for the dating of medieval Islamic sites and artifacts, it was decided that no further delay in purchasing the equipment necessary to produce an adequate supply of pure water at the conservation lab at the Bodrum castle could be justified. At the end of May, van Doorninck left the task of installing the new equipment in the able hands of Kathy Hall and Asaf Oron.

A&M graduate goes to Washington



Courtesy: Peabody Essex Museum

Valerie Buford, an Anthropology graduate student, interned at the Smithsonian's National Museum of American History (NMAH) from January 31 to May 5, 2000. She worked with Dr. Paul F. Johnston, Curator of Maritime History in the Division of History of Technology. Buford was introduced to Johnston by Dr. Kevin Crisman, a Texas A&M professor and former NMAH intern. Since 1995, Johnston has been excavating *Ha'aheo o Hawaii* (*Pride of Hawaii*), also known as *Cleopatra's Barge* (left), in Hanalei Bay, Kauai, and Buford researched artifacts recovered during these investigations. *Cleopatra's Barge*, a hermaphrodite brig, was the first American oceangoing yacht. She was built in 1816 by George Crowninshield, Jr. of Salem, Massachusetts, and sold to King Kamehameha II (Liholiho) of Hawaii in 1820. *Cleopatra's Barge* grounded on a reef and sank on April 6, 1824. Excavations of the wreck have increased our knowledge of her Hawaiian history and ultimate fate. While little of the vessel's hull has survived, a variety of organic and inorganic artifacts, including bone, rope, wood, glass, ceramics, copper hull sheathing, and ballast, have been recovered. The Texas A&M University Conservation Research Laboratory has conserved some of the more complex finds. Interning at NMAH was an enormously educational experience. Buford utilized the vast resources of the Smithsonian's libraries, the Library of Congress, and the National Archives. In addition, curators and researchers within the Smithsonian and other national and international museums and institutions were very helpful, providing valuable information and assistance. Living in Washington, D.C. among the monuments and landmarks was also beneficial. "When possible, more students should take advantage of the wonderful opportunity to intern at the Smithsonian," Buford says.

Students gain ROV experience

As the world of nautical archaeology begins to use increasingly available high-tech equipment, the ability to operate these devices has become an invaluable tool for the archaeologist. The Nautical Archaeology Graduate Program at Texas A&M University offered its first course in this arena during the Spring 2000 Semester. The Remote Sensing class taught by Brett Phaneuf enabled students to attain hands-on experience with different types of remote sensing equipment. They have studied—both practically and theoretically—the innovative technology that is being applied to magnetometers, scanning sonar systems, remotely operated vehicles, and sub-bottom profilers. During the semester, guest lecturers from different technology providers explained and demonstrated their operating systems. Speakers included Neil Hickman from Geometrics, John Pointon from OmniStar, Dirk Rosen from Deep Ocean, and Mark Atherton and Chuck Richards with Kongsberg Simrad Mesotech.

The Phantom ROV provided experience in remote exploration for Texas A&M faculty and students. Photo courtesy of Deep Ocean.

In a class session geared towards assessing the feasibility of deep water excavations using Remotely Operated Vehicle (ROV) technology, Dirk Rosen brought a Phantom XTL to TAMU for student trials. Mock targets for excavation using the Phantom were placed in the wave tank at the Offshore Technology Research Center. Graduate students Ayşe Atauz, Sara Brigadier, Bill Charlton, Catherine Inbody, and Mark Feulner, along with Nautical professors Kevin Crisman and Shelly Wachsmann, spent the morning manipulating ceramic objects around the bottom of the tank with the ROV. Aside from the inherent fun of "driving" the submersible, this type of hands-on experience gave students and professors insight into the mechanical workings of the ROVs, as well as into their capabilities and limitations underwater.

Latest Bozburun Shipwreck date

Dr. Peter Kuniholm from the Malcolm and Carolyn Wiener Laboratory for Aegean and Near Eastern Dendrochronology at Cornell University has just confirmed he is close to isolating a date for the Bozburun Shipwreck, Turkey. By comparing the master tree-ring sequence and a sample of wood from the vessel's hull at Bozburun, a provisional date of 874 CE has been determined. The date was established from a bark ring—the last ring Kuniholm had on the sample provided. This is a tentative date, as it still has to be confirmed by carbon-14 dating techniques and more research with the master sequence. The ship had already provisionally been dated to the late ninth century, based on the amphoras recovered.

Matthew Harpster, a doctoral student in the TAMU Nautical Archaeology Program, continues recording the Bozburun hull at the INA facility in Bodrum, Turkey, this summer. Harpster's studies, along with Kuniholm's tentative date and the results of research into the ship's cargo, will lead to a greater understanding of trading practices of the late ninth century CE.

Real-World Archaeology

Since 1966, the National Historic Preservation Act has created many jobs for archaeologists, while saving thousands of sites, buildings, shipwrecks, and neighborhoods with historic or archaeological value. A key part of the Act is Section 106, which requires consultation between all interested parties concerning any project with Federal involvement—including expenditure of funds or issuance of a license—that might adversely affect a historic property, including underwater sites. To determine which projects might have such effects, Section 106 has promoted a great many archaeological surveys. In most cases, the consultation process results in an agreement to mitigate the adverse impact, often by restoring a site, conducting a salvage excavation, or recording a property prior to modification or destruction. Section 106 is therefore a critical issue for today's archaeological community. Until now, most archaeologists had to learn this process on their own. Therefore, we are glad to report the publication of *Federal Planning and Historic Places: The Section 106 Process*, by Thomas F. King (Walnut Creek, CA: AltaMira Press, 2000). This 195-page paperback provides an excellent overview of the relevant issues for the archaeologist, preservationist, or agency official who must deal with the Act.

INSTITUTE OF NAUTICAL ARCHAEOLOGY