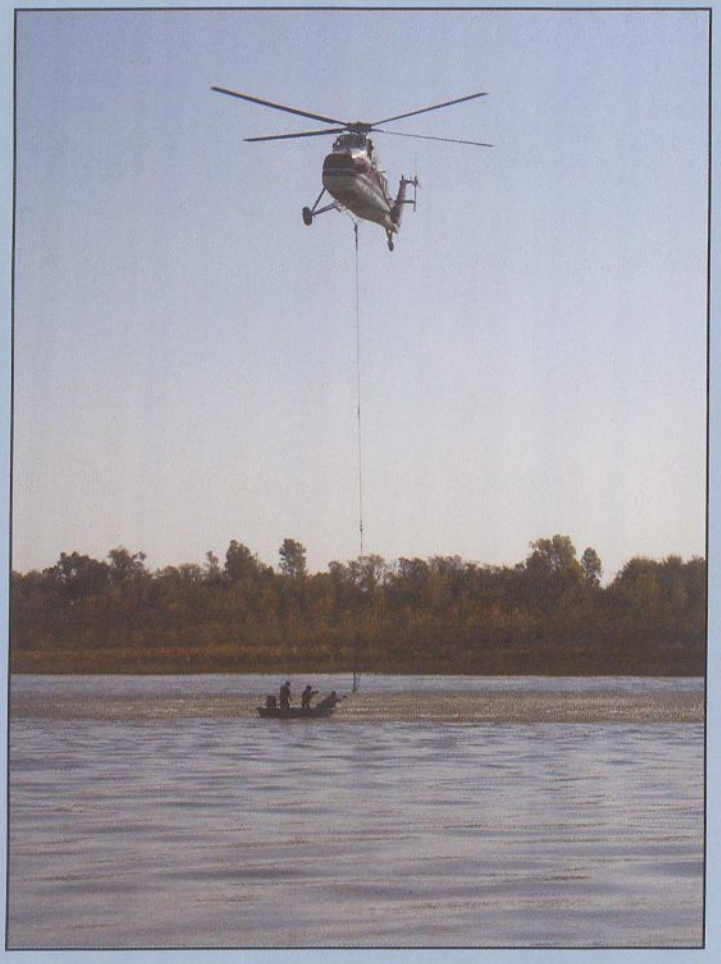
THE INA QUARTERLY

Summer 2007 Volume 34• No. 2



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On the cover: *November 2006: INA-TAMU and Oklahoma Historical Society archaeologists attach helicopter lift slings to paddle wheel machinery sunk in the Red River on the steamboat Heroine. Photo by Katie Custer.*

ISSN 1090-2635

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The *INA Quarterly* was formerly the *INA Newsletter* (vols. 1–18). Editor: Courtney R. Higgins

Easy as One-Two-Three: Completing the Steamboat Heroine Excavation, 2005-2006

Kevin Crisman

Since 2002 the Institute of Nautical Archaeology has been working in partnership with the Oklahoma Historical Society (OHS) and Texas A&M University (TAMU) to excavate an early Mississippi River-type steamboat (the earliest ever to be investigated by archaeologists). The vessel, called *Heroine*, was built in 1832 during the formative years of western steam navigation and had an eventful life paddling tens of thousands of miles through the interior of North America. Its career ended in early May of 1838 when *Heroine* was impaled on a submerged log in the upper Red River while delivering supplies to the U.S. Army post at Fort Towson in the 'Indian Territory' (now the state of Oklahoma).

Loyal readers of the *Institute of Nautical Archaeology Quarterly* may recall the last official news of the steamboat *Heroine* excavation, published in the winter 2005 issue (Vol. 32, No. 4). That article described the completion of a highly productive campaign on the wreck in June of 2005, when much was learned about the steamboat and its contents. In the whirlwind year and a half since then three more campaigns have been successfully carried out, and *mirabile visu*, the end of our labors in Oklahoma's Red River is now in sight. It has been an all-consuming endeavor, involving extremes of heat and cold, islands of flowing sand, much hard work, a flood of archaeological discoveries, and at the end, an exciting episode involving a helicopter.

One: Into the Bow, August-October 2005

Our June 2005 excavation worked principally along the port side of the hull, from the paddle wheel to the forward end of the heavy 'cylinder timbers' that once supported the boat's single piston on the main deck. Beyond the cylinder timbers nothing was visible of the hull, only a rippled plain of riverbottom sand. We knew from earlier probing, however, that the wreck continued beneath the sand for a distance of 15.24 meters (50 feet). The probing suggested that the forward hull was deeply buried, but its condition and contents were anyone's guess.

Drought conditions in Texas and Oklahoma continued throughout the summer of 2005, keeping the Red River abnormally low (Fig. 1). OHS Project Manager John Davis and I saw this as a golden opportunity to tackle the steamer's bow, temporarily leapfrogging the unexplored area amidships. To prepare for the fall campaign we spent a

Fig. 1. *In 2005 and 2006 the work on the* Heroine *benefitted from dry conditions in Texas and Oklahoma which kept the Red River unusually low. Photo: Kevin Crisman*

week in late August reconnoitering the area where the bow was believed to be. Much to our relief, the first test trench came down squarely on the *Heroine*'s forward hatch. Digging slightly ahead of the hatch showed the deck narrowing toward the stem and revealed two small companionway openings in the deck. We were further cheered to find this part of the wreck well preserved, with much of the main deck planking and the forward-most length of portside deck overhang - the 'guard' - still intact. The bow sloped steeply downward, the result of profound hogging that occurred after the wreck settled on the river bottom. Our only concern at this point was the immense amount of sand that would have to be removed, up to 2.44 meters (8 feet) just to reach the main deck.

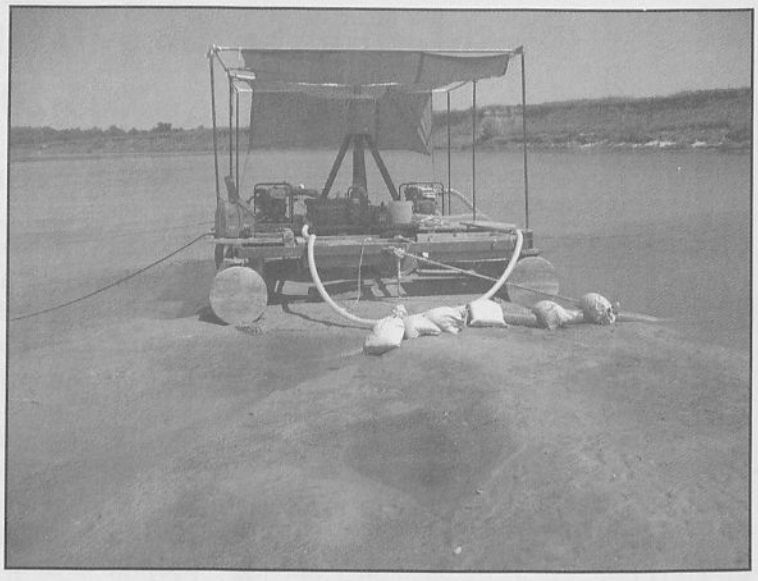

Fig. 2. *Intensive digging combined with a low river often left our screening barge high and dry after a good day of work. Photo: Becca Sager*

We returned for full-scale excavation on September 12 with a crew of ten divers and screeners and three powerful 4-inch dredges to move the sand. The project quickly settled into a routine that included many hours of steady digging, beginning with the uncovering of the forward deck. We soon had a crater on the river bottom the size of a large swimming pool. Once the deck was exposed, we began digging into the hull, gaining entrance through various openings in the deck. The water dredges worked well, almost too well, for sand went up the spoil pipes faster than it could be swept away by the sluggishly-flowing river. It accumulated steadily, forming an island with our work barge grounded atop the sand pile (Fig. 2). The problem was remedied by frequently moving the barge and by jetting away excess sand with a 2-inch pump.

With each day's digging the features and condition of the bow became more apparent (Fig. 3). We learned that the 'intact' part of the bow included only the forward-most 7.62 meters (25 feet) of structure; abaft the forward hatch the deck was missing, the keel and keelson were cracked, and the sides of the hull were broken away. We also found a 'wall' of horizontal planks between the forward hold and the bow compartment, a watertight divider known as a 'snag chamber bulkhead' intended to prevent the entire hull from flooding if *Heroine* punctured its bow on a submerged log. Snag chamber bulkheads were reportedly in widespread use on western steamboats in the 1820s and 1830s, but then fell out of favor; the bulkhead on *Heroine* is, to the best of our knowledge, the only one ever seen by archaeologists.

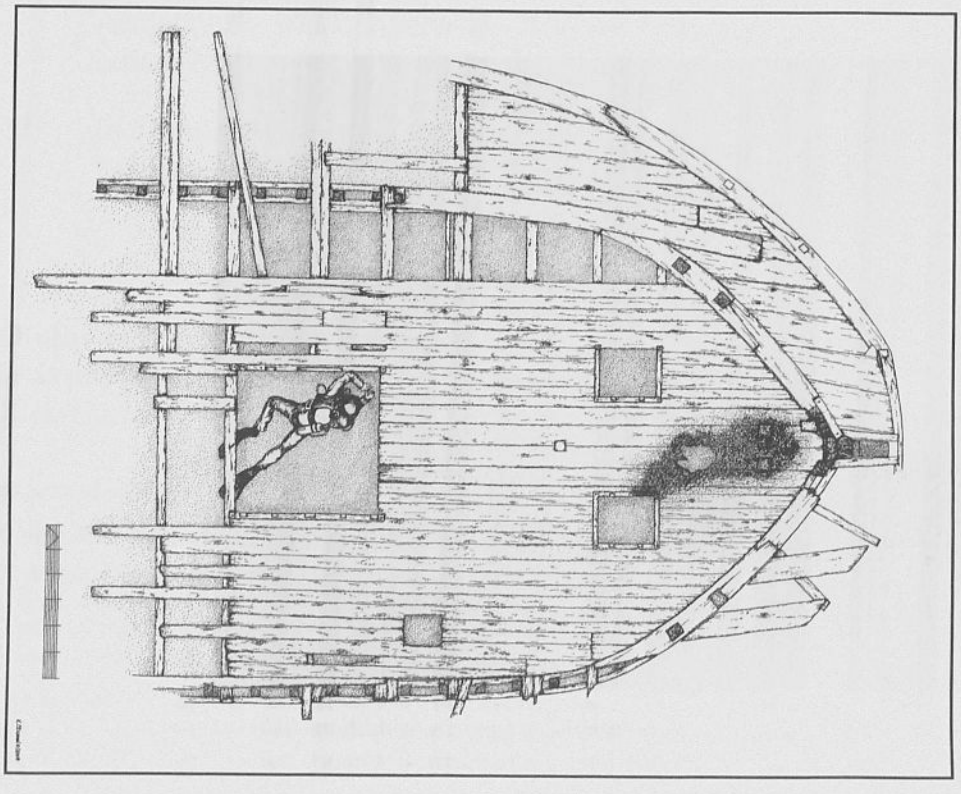

Fig. 3. *Plan of the* Heroine*'s bow as it appeared during the excavation in 2005. In some places the original paintwork was still evident. Drawing: Kevin Crisman*

Other noteworthy structural features were recorded during the fall 2005 excavation. For example, the steamboat's bow was strengthened against collisions and groundings by having the floors of its first twelve frames doubled. We were reminded, too, of the shallow-water design of western river steamers when digging both inside and outside the wreck: the depth of hold at the forward hatch was only 1.83 meters (6 feet), while the roman numeral 'V', carved into the stem not far from the top, indicated the maximum 5-foot (1.52 meters) depth of water the builder expected *Heroine* to draw.

Working under the steamboat's deck was not a job for divers who suffer from claustrophobia or fear of dark places. It was always a squeeze getting through the narrow openings of the bow compartment while encumbered with a buoyancy compensator, a large scuba tank, and a smaller 'spare air' tank. Stirred up sediment stayed in suspension, greatly limiting visibility: our head-mounted flashlights rarely cast more than a dull brown glow in the murky, near-opaque water. We discovered, too, that the sediment filling the bow was a dense, clay-like fine silt that had to be laboriously shaved away with a trowel. As the fall campaign progressed, the weather cooled and the water turned downright chilly. Altogether, getting at the bow's secrets was no easy task.

The forward hold contained relatively few artifacts, suggesting that the crew was able to salvage cargo through the hatch after the sinking. We did, however, find a fine pair of wrought iron tongs used for loading bales of hay or cotton. We expected the bow compartment (typically used as a storage space) to yield tools, ship's equipment, and crew possessions, but it was strangely devoid of the miscellaneous debris archaeologists find in ship's holds, and must have been swept out prior to the last voyage. Finds did include an iron hammer, a wooden mallet, three *lignum vitae* block sheaves, two rope thimbles, and a peculiar, single-sheaved iron block at the end of an iron post. An intact, octagonally-sided bottle bearing the embossed words 'Miller's Tonic' showed that at least one crew member dosed himself with a patent medicine (Fig. 4). Perhaps the most intriguing discovery in the bow was an array of cast iron boiler and steam engine pieces stacked on the keelson: two firebox grates, half of a cam frame, and five flat plates that may have been a slide for the piston. Some pieces may have been spare parts, but others were clearly scrap destined for recycling at an iron foundry (Fig. 5).

Fig. 4. *Carrie Sowden with the 'Miller's Tonic' patent medicine bottle found in* Heroine*'s bow compartment. Photo courtesy of Institute of Nautical Archaeology*

By the first week of October the end of our work was in sight. With the interior of the bow free of silt the visibility improved, and we were able to take sections at three frames, at the apron and upper stem, and to record many features. During the bow recording we located a patch between two starboard cant frames where a section of hull planking had been knocked off in a collision and subsequently plugged by wedging a heavily-tarred timber over the hole. We were baffled: was this the hole that sank the *Heroine*? It did not look big enough to be fatal, and besides, it was repaired. If the snag that sank the steamboat did not enter the bow, then where did it hit? We could only hope to find the answer in 2006.

Diving wrapped up on October 7 when we moored our rafts to the river

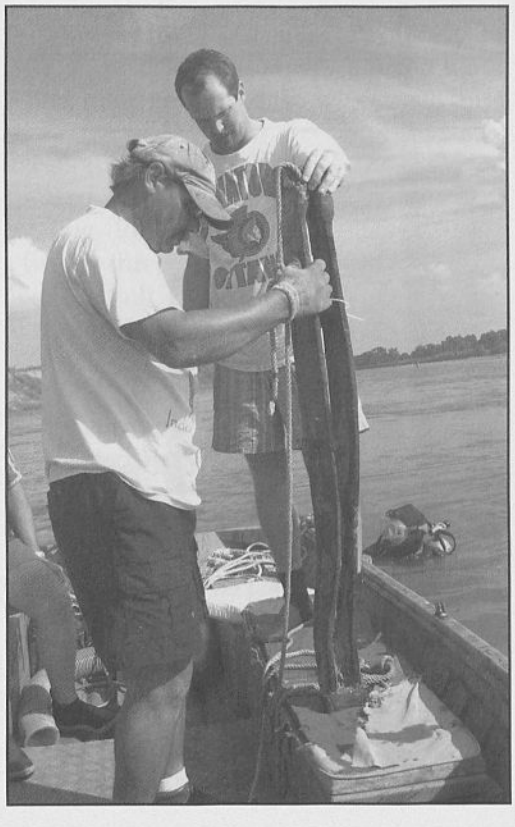

Fig. 5. *John Davis (L) and Dan Walker hold a cast iron fire grating found in* Heroine*'s bow compartment. The grating, warped from overheating, was evidently being retained for sale as scrap metal. Photo courtesy of Institute of Nautical Archaeology*

bank and stowed away gear for the winter. The entire 2005 season of the *Heroine* excavation was remarkably productive, thanks to a low river, more and bigger dredges, greater efficiency in our operations, and a lot of hard work by the project's participants. The bow of the steamer was 'in the can' as far as the project checklist was concerned. As soon as we turned off the dredges and rolled up the hoses the sand began to swiftly flow back into our excavations, and we could see that in a few days' time the Red River would leave no trace of our visit to *Heroine*'s bow.

Fig. 6. *John Davis (L) briefs Dr. William Lees on the progress of the excavation, while Field Conservator Jennifer McCaskill looks on from the screening barge. Photo: Becca Sager*

Two: Finding the Killer, May-June 2006

The fourth and final season of *Heroine*'s excavation was divided into two campaigns: five weeks in May and June, and four weeks in September. The goal of the May-June operation was to tackle the un-excavated amidships hull between the bow and cylinder timbers. This locale was of particular interest to us, for it was where the boilers and firebox were mounted on the main deck. We also planned to excavate the starboard side of the hull adjacent to the cylinder timbers. If all went according to schedule in June, we would return in September to recover the paddle machinery for conservation, study, and eventual display by the OHS.

The river was high in early spring, but by the time work began on May 28 lack of rain reduced the Red's depth and current back to the low levels experienced during the previous year. The summer 2006 campaign was undertaken as a TAMU field school with a crew of 12 divers and surface assistants (Fig. 6). This year we came equipped with *four* 4-inch water dredges to excavate the deep layer of sand blanketing the hull. These allowed us to remove the equivalent of a truckload of sand each day and were our best hope for getting everything finished in five weeks' time.

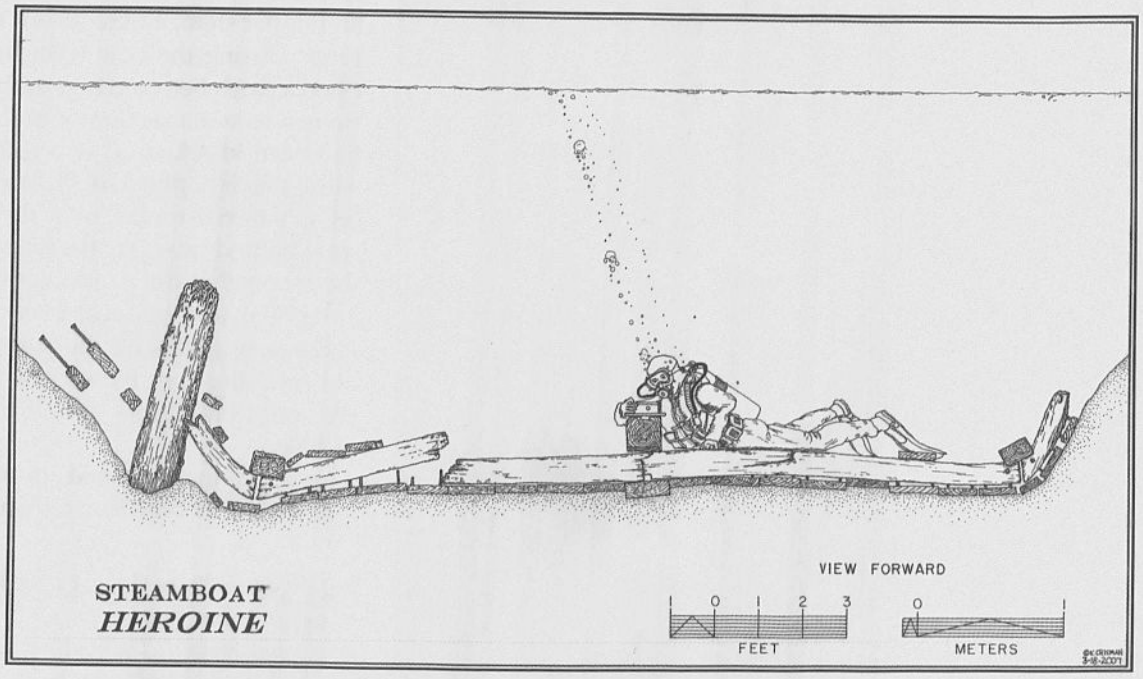

Fig. 7. *A section of Heroine's hull, taken at the forward end of the cylinder timbers. The snag (submerged log) that sank the steamboat protrudes through the port side at the turn of the bilge. Drawing: Kevin Crisman*

Not long after the digging commenced we discovered that the wreck was severely damaged amidships, immediately forward of the cylinder timbers. The main deck was missing, the port side was broken and peeled outward, and most of the starboard side had separated above the turn of the bilge and was missing. Stratigraphic and structural evidence suggest that the amidships break up occurred prior to, or perhaps during, the massive Red River flood that buried the wreck in 1843. Most of the artifacts recovered in June 2006 were relatively heavy objects that lodged on the bottom of the hull. We did not find *Heroine*'s boilers (they were probably salvaged in 1838), but we did find three fragments of their cast iron mounting frame, along with many charred bricks from the firebox and pieces of thin sheet iron that likely formed the casing for the boilers. Related cast-iron finds included two fire gratings, a long section of steam pipe with a 45° bend at one end, and an H-shaped assembly of pipes with a check valve that supplied water to the boilers. Despite the battered state of the hull amidships, the surviving structure ultimately provided the evidence we needed to reconstruct the steamboat's central section.

Fig. 8. *The killer snag that sank in the* Heroine *on or about May 7, 1838. This innocuous-looking softwood log punched a hole through the steamer's port side, ending a six-year career on the western rivers. Photo: Becca Sager*

In the fall of 2005 we had been perplexed by the absence of snag damage in the bow. The answer to this mystery came early in June 2006 when a 3.76 meter (12 feet, 4 inches) long softwood log was found lodged in the port side, nearly 15.24 meters (50 feet) abaft the stem. The snag penetrated the hull at the turn of the bilge, the point where the bottom turns up to form the side (Fig. 7). Judging by the shattered state of the frames and planking, the injury to *Heroine* was profound, causing the steamer to fill and sink very quickly. Inboard of the snag, the keel and keelson were snapped in two at the forward end of the cylinder timbers, a break that marked the start of hogging at the bow. The 'killer log' was too interesting a find to leave behind, so we extracted it from the hull and took it back to TAMU for conservation treatment (Fig. 8).

Several cargo-related objects turned up amidships, including a grindstone, unused and apparently broken in half during shipment (Fig. 9). The oaken staves and wooden hoops from two or three pork barrels were found on the port side of the hull, an un-salvaged remnant of *Heroine*'s final cargo. The amidships area also yielded a cast-metal U.S. Army uniform button with the raised letter I for 'Infantry' on its face, a narrow-bladed caulking iron, an iron cold chisel, and a small collection of plain and transfer-decorated whiteware ceramic fragments.

The June 2006 field school on *Heroine* finished on schedule with all major tasks completed, thanks to the steady work on the part of all participants. The last days saw the usual rush of activity: the completion of

Fig. 9. *An unused but broken grindstone found in the steamboat's hold. The find appeared to have been part of an earlier cargo that the* Heroine*'s crew never bothered to throw away. Photo: Becca Sager*

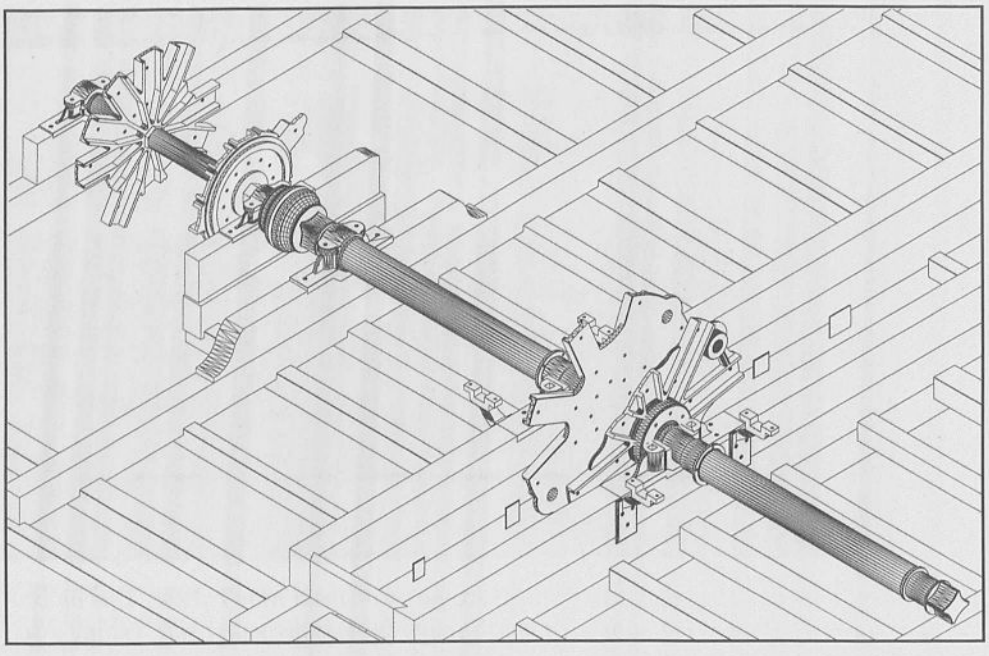

Fig. 10. *Computer-generated view of the cast iron shafts and flanges scheduled for recovery in 2006. Drawing: Glenn Grieco*

Fig. 11 (below). *In early September, 2006 the depth of water over the wreck was only a few inches in most places. Photo: Kevin Crisman*

measurements, cataloguing of artifacts, and the clean up and stowage of boats, rafts, dredges and diving equipment. The river remained low, and we could only hope that it would stay that way through September.

Three: We Get the Shafts, September-November 2006

The second phase of the 2006 project focused on the disassembly and removal of the steamboat's drive train: the port and starboard main shafts and flywheels, the port paddle shaft and wheel flanges, and five pillow blocks that supported the shafts on the bed timbers. Our planning was greatly assisted by computer-generated plans prepared by Glenn Grieco in 2004 and 2005 (Fig. 10, see Vol. 32, No. 4 of the *INA Quarterly*). Thanks to Grieco we had the dimensions, weight, attachment points, and center of balance of each piece, all useful information to know when moving weighty chunks of cast iron.

Fig. 12. *Maria Cristina Pedroso de Lima (L) and Carrie Sowden commence excavation of the port paddle wheel, the start of a massive trench that would be over 3 meters (10 feet) deep before they finished! Photo: Kevin Crisman*

When we returned to the wreck on September 4 the river was lower than at any previous time in our experience (Fig. 11). Low water is preferable to high water, up to a point. Over the next four weeks we had a daily struggle to launch our boats and drag them between the shore and wreck (it was too shallow to run the outboard engines). Excavation took on a peculiar aspect, for we were literally digging holes to dive in (Fig. 12). Each new trench began with the excavator sitting in a few inches of water with a dredge, then gradually – inch-by-inch – sinking out of sight as the sand was sucked away. Diggers started the day wearing a hat and sunglasses, switched to a mask and snorkle at noon, and ended the day breathing scuba or hookah-supplied air. Meanwhile, the sandbars around the wreck expanded alarmingly as the dredge spoil accumulated.

How do you disassemble 174-year-old paddle machinery? Not being sure of the answer to this question, we came equipped with a formidable collection of pneumatic and hydraulic tools: a hand-held band saw, a reciprocal saw, a 10-inch chain saw, air hammers (Fig. 13), bottle jacks of all shapes and sizes, and a powerful hydraulic 'nut splitter' generously loaned by Fastorque Bolting Systems of Houston. A 180-CFM diesel compressor parked on the riverbank supplied the pneumatic tools with as much high-pressure air as they could possibly want. All of these tools proved useful, but we were saved much effort by the discovery that, even after 168 years in the river, many bolts and nuts securing the machinery could simply be unscrewed with a really large wrench (Fig. 14).

We began with the heaviest pieces, the two main shafts with their flywheel flanges, each of which weighed around

Fig. 13. *Jennifer McCaskill uses an air hammer to remove encrustation from bolt heads on the port flywheel rim. Photo: Becca Sager*

2006. In this time we have learned much about *Heroine* and the early years of steamboating on the Mississippi and other western rivers. Best of all, many more discoveries lie ahead. The conclusion of diving in the Red River will allow us to focus on conservation, researching, drafting, and writing, and ultimately to tell the true story of the life and times of this early 19th-century American river steamboat.

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Acknowledgments

The 2005-2006 Red River field crews were comprised of TAMU graduate and undergraduate students, OHS staff, and many volunteers. The folks at the OHS really pitched in to make this project a success: Dr. Robert Blackburn, Dan Provo, Kathy Dickson, Robert Rea, Jeff Briley, Howard McKinnis, William Vandever, Larry Marcy, and James Argo. John Davis, Director of the Fort Towson Historic Site and the OHS Red River Project Manager, has been there from start to finish, every day, every year. Dr. William B. Lees got the research going in 1999 and has helped shepherd it to completion. Special thanks to Dan Walker, Carrie Sowden, Cristina Lima, Peter Hitchcock, Glenn Grieco, Ben Ford, Jessi Halligan, Kroum Batchvarov, Becca Sager, Katie Custer, Jennifer McCaskill, and TAMU alumnus Mark Wieser. The wreck was first brought to the attention of the OHS by Billy Carter, while landowner Ricky Martin was always a genial host. INA President Donny Hamilton and staff members Claudia Ledoux, Michelle Chmelar, and Chasity Hedlund all contributed to the efficient running of the operation. The research has been funded by grants from the Oklahoma Department of Transportation, Texas A&M University, and the Institute of Nautical Archaeology.

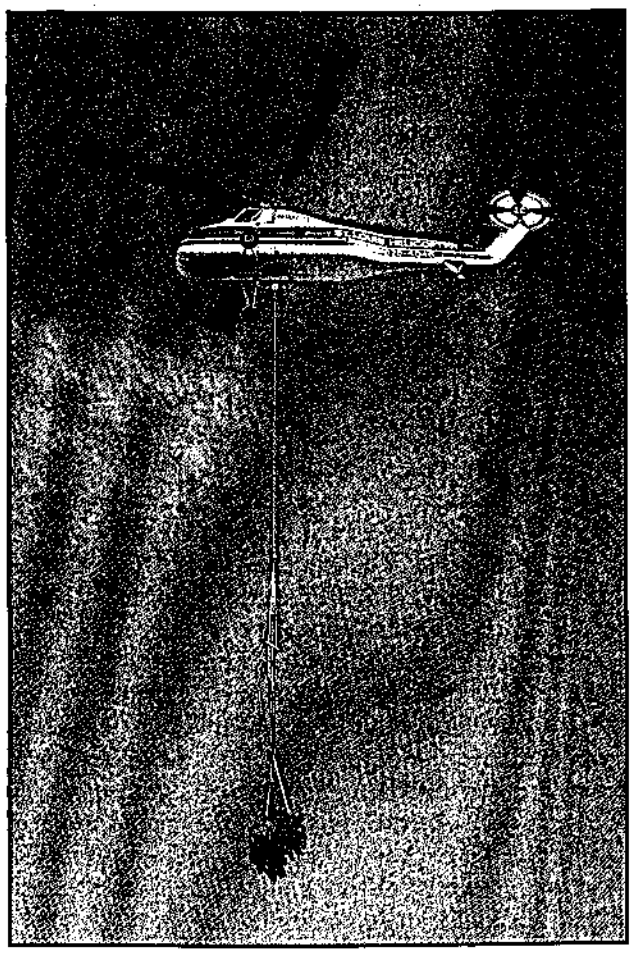

Fig. 18. *The port paddle shaft and flanges are lowered onto the field adjacent to the riverbank. Photo: Jeff Briley*

Fig. 19. *OHS and INA-TAMU field crew with the port paddle shaft and flanges. L-R, standing: Larry Marcy, Ben Ford, Dan Walker, William Vandever, Jessi Halligan, John Davis, Kevin Crisman; L-R kneeling: Becca Sager and Katie Custer. Photo: Robert Rea*

Experimental Crossing from Sumbawa to Komodo by Bamboo Raft

Robert G. Bednarik

Early Pleistocene Indonesians are assumed to have been the world's first seafarers, because the earliest crossings of sea barriers, proven archaeologically, are those from Bali through the islands of Nusa Tenggara (or Lesser Sunda Islands), and on to Timor. These islands of Wallacea were never connected to any other landmass, and in many cases not even to each other. The crossings were first made many hundreds of thousands of years ago, commencing well before 840,000 years BP. For many years, I have researched numerous aspects of these extremely early maritime achievements, and those elsewhere in the Pleistocene, including the means by which they might have been accomplished. In a series of experiments of replicative archaeology, with various teams I designed, constructed, and sailed primitive rafts not only within Indonesia, but also from Timor to Australia (almost 1000 kilometers, in 1998) and in the Mediterranean. Prior to the project described here I conducted six such experiments with rafts made by Paleolithic means.

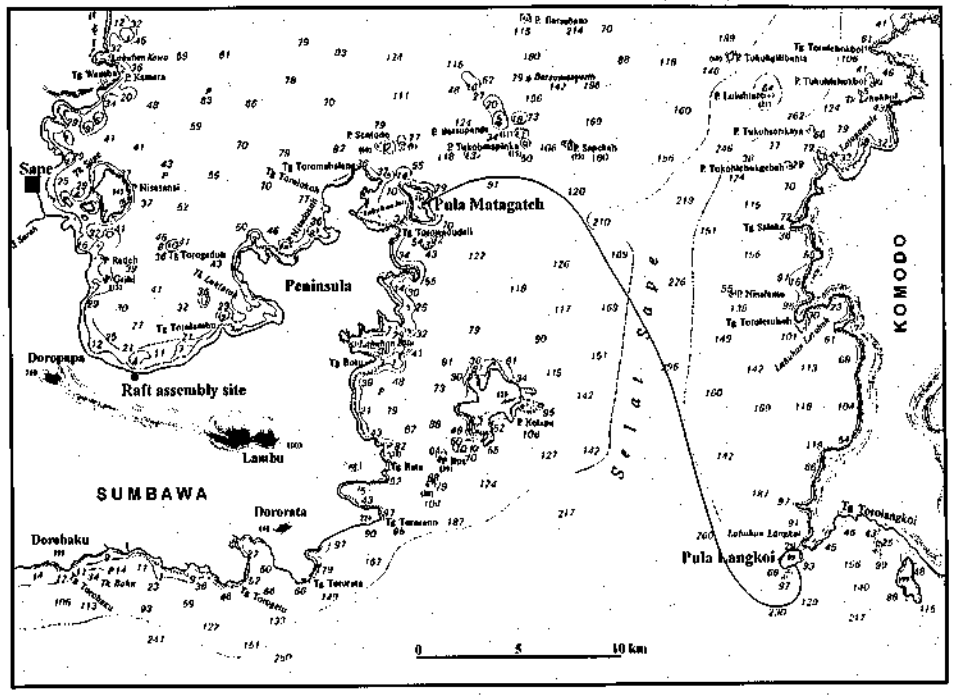

Fig. 1. *Map of Sape Strait, between Sumbawa and Komodo, Indonesia, showing the raft assembly site, its launching site, its course, and its landfall site (depths in meters). Map: Robert Bednarik*

All previous replicative experiments in seafaring were based on speculations of which crossings might have been made in the past. Mine proceeds in a strictly scientific framework: by the falsification of testable propositions concerning sea crossings that have already been demonstrated to have occurred at specific times. This work deals purely with archaeologically proven sea crossings, and its purpose is not to determine how these crossings of the Pleistocene were achieved, but rather how they could not be achieved. Hence the underlying rationale in each of these scientific experiments is to attempt to establish the minimum technological capability necessary to bring a group of people, large enough to become a colonizing population, across a sea barrier. This is then assumed to approximate the maximal technological capability at the times in question, i.e. at the times the particular crossings were first accomplished according to current archaeological evidence.

Described here is the seventh experiment in the First Mariners series, and is intended to establish the minimum conditions necessary to cross from Sumbawa to Komodo, which at the time the first human crossing occurred was probably part of Flores, due to lower sea levels. The experiment was conducted against the background of the announcement, made shortly after its completion, that a new human species, *Homo floresiensis*, had just been discovered on Flores during 2004. This is thought to be a proposed dwarf species that evolved under endemic conditions locally. The find raised the issue of how its presumed ancestor, *Homo erectus*, originating from the then Asian mainland (presently Java and Bali), might have crossed the several sea barriers that always existed between Bali and Flores. Having previously shown that the treacherous Strait of Lombok can be crossed by a very simple platform of bamboo, made with Lower Paleolithic stone tools from naturally occurring materials, it had become essential to similarly investigate the first landfall on Komodo-Flores, where human presence at the beginning of the Middle Pleistocene was established by T. Verhoeven in 1958. Lombok Strait separates Bali from Lombok and forms part of the world's most important biogeographical division, the Wallace Line. No populations of eutherian terrestrial fauna larger than small rodents capable of surviving on vegetation drifts for many months or even

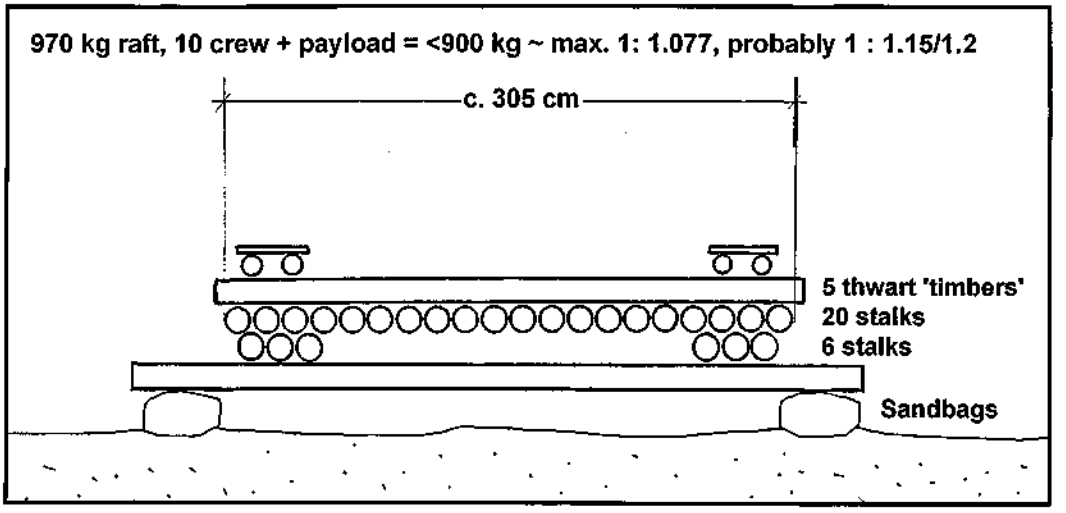

Fig. 2. *Section drawing of the bamboo raft* Rangki Papa. *Drawing: Robert Bednarik*

years managed to cross that line. The only exceptions are elephants and stegodonts, able to traverse more than 50 kilometers of sea, and hominins. The latter are known to be capable of island colonization without the help of watercraft.

Pleistocene seafaring has been demonstrated to about twenty islands worldwide, and to one continent, Australia. Previous sea crossing attempts of the First Mariners Project have in some cases failed, and others were successful. Using stone tools, my teams constructed primitive rafts, ranging in size up to more than 15 metric tons, from bamboo, cane, and inflated animal skins. The archaeological conditions for each experiment differ according to the time when the first crossings succeeded in establishing new populations. All projects have been conducted with the help and advice of local indigenous boat builders, fishermen, and sailors.

Building *Rangki Papa (Father of all Rafts)*

I was requested by *National Geographic* to demonstrate how humans of the Lower Paleolithic period, prior to 840,000 years ago, might have managed to cross from Sumbawa to Flores, I agreed to conduct an experiment at Sape Strait, separating Sumbawa from Komodo (Fig. 1). A simple 12-meter-long bamboo raft was constructed from traditionally available materials on the east coast of Sumbawa, and an attempt wasmade to paddle it to the rocky west coast of Komodo. A construction site was chosen at a long sandy beach 12 kilometers south of the town of Sape, called Papa Beach. This is the point where the Macassan ancestors of the present population of Bugis first landed about three centuries ago. Intending to make repairs to their ships they decided to settle there—hence the name "Father's Beach."

Due to the strong and entirely unpredictable transverse currents that occur in all sea straits it is impossible to cross any of them without some means of propulsion. Making the reasonable assumption that 840,000 years ago the available technology did not include the use of sails, I decided that the vessel would need to be propelled by paddles. The clear advice of local fishermen and sailors was that the project could not succeed in paddling a simple bamboo platform to Komodo, due to the powerful currents in the strait. Although two experienced sailors and traditional boat-builders were involved in the raft's construction, they both refused to participate in the actual crossing attempt, considering it to be a futile and dangerous exercise. Based on my previous experience in terms of the optimum ratio of number of paddlers versus total mass of the vessel, I decided to use ten paddlers. This decision was based on several considerations: the amount of space needed between paddlers to allow them to work determines the required length, while the width is determined by the required number of bamboo floaters to keep the payload just above the water line. Therefore the payload stipulates the total weight of the vessel, bearing in mind that large-diameter bamboo carries about 95% of its own weight. These factors ascertain that the optimum ratio of payload versus cross-section (which determines resistance) favors ten or twelve paddlers. The consequent payload of ten paddlers, paddles and drinking water translates into a raft made of high-quality, large-diameter bamboo weighing about 970 kilograms. This in turn demanded twenty-six 12-meter lengths of bamboo floaters to keep the raft's floor just a few centimeters above the water line. To reduce the width to around three meters, I placed six lengths below the others (Fig. 2). These two groups of three lengths of bamboo was placed along each long side, rather than centrally as a "keel" in order to prevent the raft from flipping. A platform raft is significantly

stabilized by the added lateral weight.

The construction of the raft commenced on October 3, 2004 at the chosen site at Papa Beach, located at S 08° 38.668', E 119° 02.355'. The members of the construction crew, ranging in size between twenty-five and thirty-five local men over the subsequent days, were given individual copies of the section drawing I had prepared (Fig. 2), to ensure that every man was familiar with the intended end product.

The work of constructing the vessel proceeded at a fairly leisurely pace (Fig. 3). After noticing that the bamboo was rapidly developing longitudinal cracks in the hot sun, we covered it with palm fronds and sprayed it with water, while the construction of a substantial sunroof of palm fronds was expedited. Each length of bamboo was carefully checked for beetle holes and cracks, and when we found these they were sealed with heated triodia resin. This dark-brown resin occurs naturally and is collected by raiding the structures of an ant species that uses it to reinforce its mounds. The cracking of the bamboo can be avoided by skinning it whilst green, but this has the significant drawback of weakening the stalks mechanically. It is relevant to note that any hominins who may have used bamboo for floatation must have been aware not only of the need to cure the stalks by drying them for several months; they must have also understood the need to prevent its cracking from solar radiation. They must have also been aware of the effect of bamboo borers, which can be quite significant.

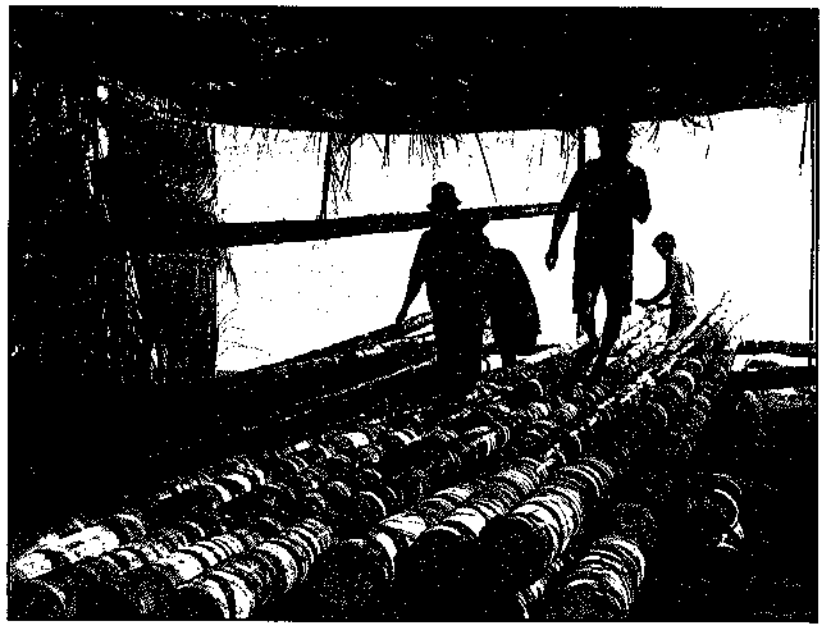

Fig. 3. *Construction of* Rangki Papa *under a sun shelter. Photo: Robert Bednarik*

The Crossing

The *Rangki Papa*, as the crew named the raft, left the east coast of Pula Matagateh at 6:50 am on October 7, 2004, having been towed there the night before. The full crew consisted of Burhanudin Abdullah, Ruslam Ahmad, Saleh Ahmed, Ibrahim Akadir, Junaidin Ali, Kamirudin Arsyad, Robert G. Bednarik, Usman Gani, Ibrahim Habeb, Mike Morwood, Hadji Suaeb Nonci, Bert Roberts, Subhan Solo, Thomas Sutikna and Ali Tahril. Only ten paddled, while the other five were replacements. During the last two hours of the crossing attempt additional rowers were added starboard to counter the strong current. Only about one half of the above men paddled the whole distance, the others were on the three escort boats for much of the time.

Initially, a weak southerly current was not resisted because, based on observation and consultation, I expected a strong northerly current in the main channel, so I aimed to keep just to the south of Pula Sapekah (Fig. 1). The speed began at 1.7 knots, then improving to 2.5–2.8 knots after 45 minutes. For the first two hours the course aimed generally at the very central part of the Komodo coastline,

Fig. 4. *The* Rangki Papa *approaches the coast of south-western Komodo. Pula Lankoi is visible on the right. Photo: Robert Bednarik*

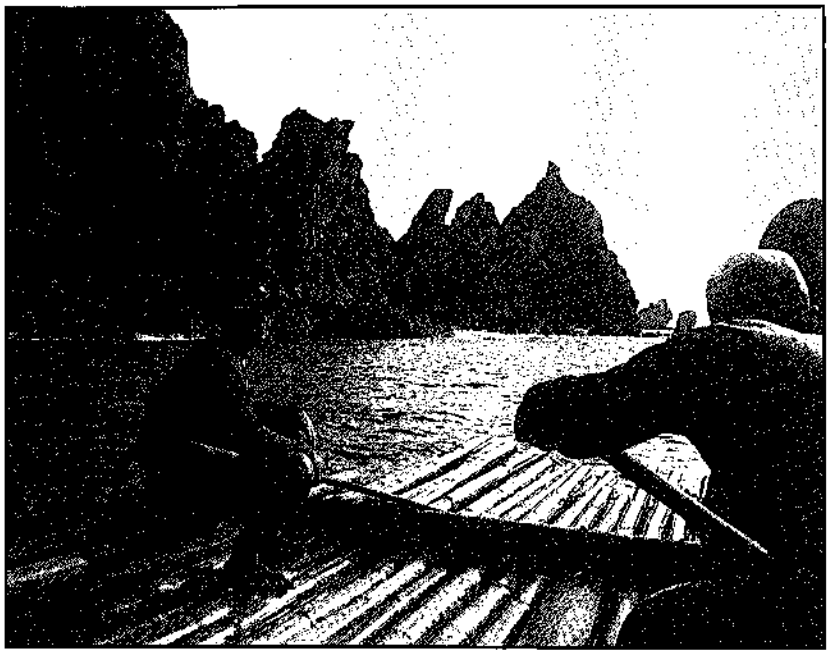

Fig. 5. *The landing site on the southern ramparts of Pula Lankoi. Photo: Robert Bednarik*

faintly visible in the distance. Waves were very moderate, about 70 centimeters, with a slight SW breeze. However, towards midday the southerly drift became increasingly apparent as the deeper channel was approached. By the time the 200 meters isobath was reached, the speed was consistently above 3 knots, peaking at 3.6 knots; however, this was largely attributable to the strong northern current. Efforts to cut across it were only of limited success, and at the cost of lower speed, of 2.0 to 2.5 knots. It seemed still feasible to reach the southernmost bay of the Komodo west coast, Labuhan Langkoi, north of a very prominent spur formed by Pula Lankoi, by trying to maintain as much latitude as possible (Fig. 4). However, most of the inexperienced crew was very tired by then, and the raft continued to drift southwards. I decided to allow the vessel to drift to south of the Komodo coast, that way we could take advantage of the expected weakening in the current where it fans out. By staying in the lee of Pula Lankoi, we could turn north and try for the sheltered southern coast.

Thus much of the afternoon our course followed a narrowing spiral centered on that steep and rugged island. Making as little as 0.8 knots, the *Rangki Papa* eventually headed straight for the southern ramparts of Pula Lankoi. The strategy of aiming for its lee side paid off at last and as the rock towers were approached, a landing site was found on this entirely precipitous coastline. At 4:12 pm the raft touched the rocks of Komodo (Fig. 5).

Discussion

The *Rangki Papa* traveled about 36.4 kilometers, taking 9 hours and 22 minutes. The result of this experiment was impressive since the raft was built by a crew which, with the exception of two fishermen, lacked any experience; and it was sailed by a crew bereft of maritime experience. All my previous similar experiments were conducted with crews experienced in vessel construction and sailing. These expeditions had no standby paddlers, and in one case traveled for two weeks without any escort vessel.

Archaeologists lacking maritime understanding have sometimes suggested that hominins might have crossed sea barriers by drifting on floating vegetation mats. The accumulations of vegetation materials one can encounter in Indonesian waters can measure up to some hundreds of meters, but they are generally much too thin to support a person. Certainly they may facilitate the travel of small animals, such as rodents, lizards, snakes, and insects. Natural rafts capable of supporting humans occur occasionally near the mouths of major tropical rivers, such as the Ganges, the Amazon, the Orinoco or the Zaire, but they have not been reported from Indonesia. More importantly the use of debris caused by tsunamis, to ferry humans across sea narrows is impossible, because such straits are always dominated by strong transverse currents. No sea strait in the world can be crossed in a reasonable time by mere drifting. The experiment described here vividly illustrates this point, as have all previous such experiments. Moreover, if hominins were able to cross Lombok Strait (or any such barrier) in this way, then hundreds of other mammalian species of the rich

Sundan fauna would have been able to do the same. The fact that no mammal larger than Muridae managed to do so speaks for itself. Hippos, tapirs, rhinos, deer, pigs and many others can certainly swim considerable distances and were plentiful in Sunda, but none managed to cross Wallace's Line. Objectors to my proposition that hominins had at their disposal a means of traversing the sea that was not available to these other species need to explain why only animals capable of swimming in herd formation for over 50 kilometers crossed the Wallace Line, besides hominins, or demonstrate by experiment that Lombok or Sape Strait can be crossed on natural vegetation rafts.

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Acknowledgments

This project was underwritten and filmed by *National Geographic*. I thank them and David Hamlin for inviting me to undertake it. My thanks are also to the crew of about thirty-five Sumbawan men who helped me build the raft, to Haji Najib and Jack Daniels, to translator Diah Puspasari, and to the crew that helped me sail from Sumbawa to Komodo.

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News and Notes

Texas A&M Archaeological Diving Club Completes Successful First Year

As previously discussed in these pages (*INA Quarterly* 31(1):21), the recently organized Texas A&M Archaeological Diving Club exists to extend nautical archaeology education beyond the classroom. The goal of the club is to provide a safe training environment to practice underwater archaeology skills and an inviting forum to discuss new methods and ideas. The members benefit from increased access to practical training and continued exposure to new skills throughout the year. INA benefits from having a cohort of diversely trained and water-ready archaeologists available for projects.

During the 2006/2007 academic year, the club organized six events, including four dives. The year began with a skill review in October, during which the divers refined their buoyancy, honed their basic SCUBA skills, and practiced zero visibility dexterity and planning. The following month the club officers conducted an inspection dive on the Caney Creek Wreck. This wreck was brought to our attention by Craig Hlavinka of the Southwest Underwater Archaeology Society as a possible training site. The wreck is the nearly complete remains of a ca. 1870 side-wheel steamboat. The hull is intact except a portion of the stern and all of the machinery is still in place. This wreck offers some very exciting possibilities for practicing site recording and zero-visibility diving. The site will hopefully become a fixture in the club's program. The final dive of 2006 took place in December at Blue Lagoon. Braving chilly waters, the members were rewarded with 50-foot visibility that facilitated hull recording. Divers practiced trilateration and direct measurement techniques, as well as familiarizing themselves with goniometers. The club's fourth dive took place in the Offshore Technology Research Center at Texas A&M. In addition to being a unique diving environment, this large wave tank was an excellent venue to practice rigging and lift-bag wrangling. This event was also covered by the Aggieland Yearbook, in which the club will be featured.

The Archaeological Diving Club also organized two dry events. During February, Catherine Sincich, the club's risk management officer, organized a knot course. She taught us basics of line handling as well as four useful knots. The final event of the year was a gear day. Largely organized by the club advisor, Jim Jobling, this event consisted of casting dive weights, assembling octopus neck-

laces, and constructing wrist slates. Members came away from the event with new gear for the field season and the skills to construct their own equipment. Like most of our events, the gear day included a barbeque where the members socialized and discussed new ways to approach old problems in underwater archaeology.

This first year of activities was a success and all of the members who participated benefited from the experience. Next year promises to be even better. In addition to basic archaeological and site recording skills, the club plans to begin training with PhotoModeler and Site Recorder software. Archaeologists with a good foundation of diving skills and traditional surveying mechanics are best suited to make full use of this new and exciting technology.

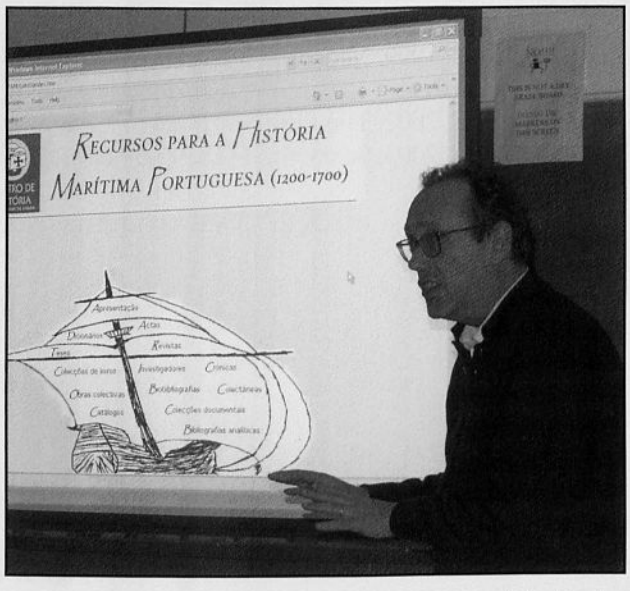
For more information about club activities please check the website: http://arcdive.tamu.edu or contact Ben Ford at bford94419@aol.com.

Center for Maritime Archaeology and Conservation Lecture Series

Dr. Francisco Contente Domingues

Dr. Francisco Contente Domingues visited Texas A&M University, the Institute of Nautical Archaeology, and the Nautical Archaeology Program (NAP) in February 2007, as part of the Center for Maritime Archaeology and Conservation Lecture Series (CMAC). He currently holds the position of Assistant Professor in the Department of History at the University of Lisbon and is an adjunct professor at Texas A&M. Author of a multitude of books concerning Portuguese activities during the Age of Expansion, Dr. Domingues is considered one of the leading scholars in Portuguese maritime history.

The purpose of his visit to College Station was to meet with NAP students and professors to discuss current trends in the study of Portuguese history and to establish a network of researchers interested in Portuguese seafaring. In addition to a dinner hosted by Dr. Filipe Vieira de Castro and his family, Dr. Domingues offered a lecture to present his views on the subject.



Dr. Domingues summarizes the current trends in Portuguese maritime scholarship. Photo: Mark Polzer

At the CMAC lecture, Dr. Domingues introduced themes within the field of Portuguese maritime history which he believes require further exploration. These included shipbuilding technology, nautical cartography, nautical science, economic history, and biographies, as a whole, in Portugal. He encouraged students to take advantage of the research potential of these topics by providing an inventory of resources available to researchers on the internet and in numerous archives in Europe. He also comprised a list of possible journals in which to publish articles as well as a directory of agencies offering funding opportunities.

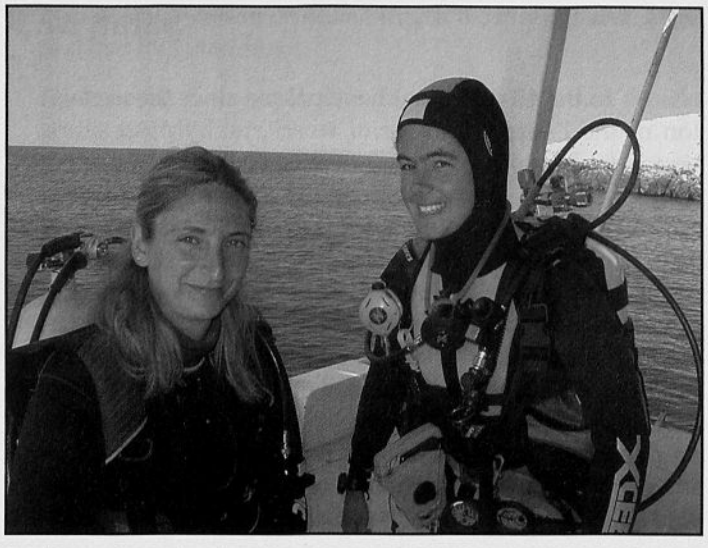
With an overwhelming willingness to assist scholars and share his wealth of knowledge, the working relationship between Texas A&M and Dr. Domingues will undoubtedly continue to facilitate the exchange and compilation of information relating to Iberian seafaring and further serve to enhance our understanding of the subject.

-Byrana DuBard

Dr. Bridget Buxton

Studies in archaeology often lead to interesting and unexpected relationships. Nautical Archaeology may be the study of ships and shipwrecks, but no investigation is complete without historical inquiries and anthropological analysis. A thorough investigation can often lead to even more diverse partnerships. It is doubtful that Dr. Kevin Crisman had any idea that researching the Red River shipwreck would make him something of an expert on 19th-century pork production, or that the excavations would eventually involve a helicopter. Texas A&M students and INA researchers come from diverse educational and personal backgrounds, and approach investigations in different ways.

This March, A&M students had the opportunity to learn about other diverse relationships growing within the archaeological community. Dr. Bridget Buxton, of the University of Rhode Island, visited Texas A&M, including the Institute of Nautical Archaeology in search of insight. Just as the Institute of Nautical Archaeology has a home at Texas A&M University, the University of Rhode Island houses the Inner Space Center, a Graduate School of Oceanography, and the Institute for Archaeological Oceanography. Currently, Buxton is co-deputy director of the Institute, which collaborates with several archaeologists within URI (Dr. Roderick Mather who does Atlantic/ Historical maritime archaeology, and Classical Archaeologist Dr. May Hollinshead) and a number of scholars based at other Universities and Institutions. As part of the Center for Maritime Archaeology and Conservation Lecture Series, Buxton presented two very different aspects of nautical archaeology.



Bridget Buxton (right) with Berta Lledo preparing for a dive in Turkey, 2001. Photo courtesy of Bridget Buxton.

In a discussion titled "Maritime Archaeology of New Zealand," Buxton illustrated the latent possibilities presently un- or under-explored in that country. Due to its remote location and relatively recent colonization, archaeological forays in the New Zealand landscape are likely limited to modern studies. The secluded setting, however, may reveal important finds relating to the countries that have sailed there over time. As a small and distant place, New Zealand does not have the resources to mount major archaeological excavations similar to those seen in other countries. To date, archaeological investigations in New Zealand have been hampered by the lack of adequate funding and proper archaeological influence.

At the other end of the nautical archaeological spectrum are the well-funded programs housed at the University of Rhode Island Graduate School of Oceanography. Similar to the partnership between the Institute of Nautical Archaeology and Texas A&M University, the University of Rhode Island partners with Robert Ballard's Institute for Exploration (IFE), based in Mystic, Connecticut. These two programs are associated with the well known Dr. Robert Ballard as well as *National Geographic*, the JASON Foundation for Education and the Mystic Aquarium and Institute for Exploration. Investigations thus far have focused on using archaeological sites to answer questions regarding oceanography. Research has involved human impact on the seafloor and long-term monitoring of archaeological sites to answer oceanographic questions. Seven students are enrolled at a time in the Graduate School of Oceanography at the University of Rhode Island.

With a pressure-sensitive amphora grabber and three Remote-Operated Vehicles, many of the projects undertaken by the archaeological oceanographers have been located in deep water. The program aims to become the leader in deep submergence archaeology, setting professional and ethical standards in the field. Buxton is outnumbered at the Inner Space Center, where she is the only archaeologist among 15 engineers, but wishes to develop partnerships with other archaeological programs. Buxton cited the lack of international legislation in deep water and the monetary resources and equipment of the affiliated programs as opportunities for exploration in Nautical Archaeology as well as Archaeological Oceanography. She also noted the successful outreach programs conducted by Dr. Ballard which have generated interest in various projects, such as a revisit to the site of *RMS Titanic*. Undoubtedly, the revisit to the Titanic site has been aided by the immensely popular movie.

Just as popular movies and helicopters may seem unlikely pairings with archaeology, underwater excavations themselves may have seemed novel to terrestrial archaeologists just decades ago. Dr. Bridget Buxton's lectures at Texas A&M University this spring have demonstrated both a land with emergent archaeological studies and a program with advanced equipment and state-of-the-art technology. Many applications for this technology have been discovered, yet, there remains much more to discover.

-LeeAnne Gordon

Revisiting the Pantano Longarini Shipwreck

Sarah M. Kampbell

In the 40 years that have passed since the excavation of the Pantano Lognarini wreck, many more ships have been located, including at least five from the same century. In fact, INA's 7th-century Yassıada A ship was still being excavated and was not fully published until 1982. Due to the accumulation of so much data, it is necessary to revisit original conclusions and make changes in light of new information.

There has been debate over the date and origin of the Pantano Longarini ship since its discovery in Southeastern Sicily (Fig. 1). Despite its excellent preservation, the circumstances surrounding its excavation and publication have resulted in scholars ignoring or misinterpreting it. To work towards the inclusion of the correct information about this wreck in current archaeological and historical studies, a reevaluation of the Pantano Longarini shipwreck's date and origin is required.

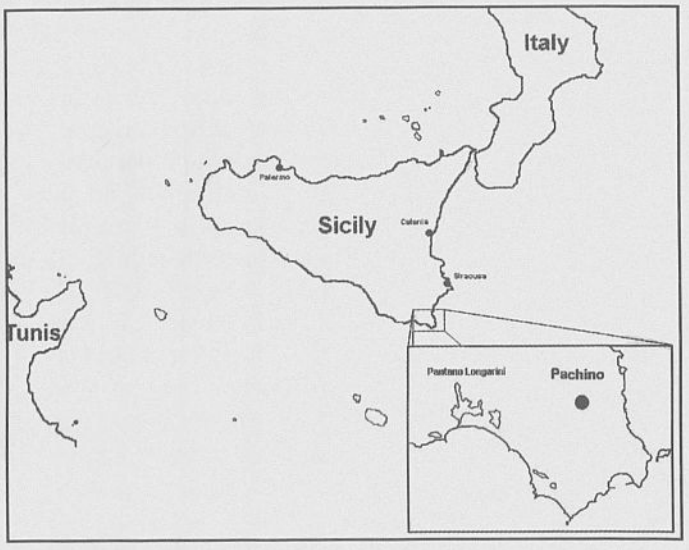


Fig. 1. *Map of Sicily in relation to Italy and Tunisa. The inset displays the location of the Pantano Longarini. Map: Sarah Kampbell, after Terrametrics 2006*

In the winter of 1963-1964, workers digging a drainage ditch for farmer Francesco Spatola discovered a wooden shipwreck in a silted-in ancient anchorage located on the western side of Cape Passaro. Initially, they believed the wood came from a World War II Allied landing craft, but quickly realized that it was an ancient vessel. The find was not reported because of fears that the Department of Antiquities would interfere with progress on the ditch. The extremely large timbers were in good condition, prompting some of the workers to attempt to sell them at a local shipyard. Andrea Patania, a naval architect, and Gerhard Kapitän, a nautical archaeologist working on the Churck Wreck off of Marzamemi, Sicily, discovered the wood in the shipyard, and shortly thereafter Spatola reported the find to the Department of Antiquities.

Fig. 2. *Two workers mapping the site with a water-level. Photo courtesy of Johann Reinhard*

Kapitän, with the help of Heinz Wilms-Posen, the organizing director of the Church Wreck, surveyed the Pantano Longarini marsh in 1964. As they were already engaged in an excavation, they knew they would be able to find neither time nor sufficient funds to investigate the newly discovered shipwreck. Thus, Kapitän suggested that Peter Throckmorton, who discovered the Cape Gelidonya shipwreck, direct the excavation.

The dig required a quick completion because the workers and local villagers had already burned approximately two thirds of the ship. Throckmorton and his crew, with the support of an emergency grant from the University of Pennsylvania Museum, completed the project in three months despite a limited schedule, minimal funds, and inclement weather. They were able to document only the surviving 9.1 meters of the stern out of an estimated initial find of 30 meters, which included the entire starboard side.

The exposed timbers were massive, some weighing more than half of a ton with wales measuring 50 centimeters thick. Due to time constraints, the well-preserved timbers were mapped *in situ* and as many elements as possible were recorded. The wood was in such good condition that the workers were even able to stand on the wreck itself (Fig. 2)! The timbers were removed using a horse-drawn crane, and were placed in Spatola's irrigation tank (Fig. 3). This was intended as a temporary home until Throckmorton found enough money for

Fig. 3. *Horse-drawn crane and wagon moving a timber. Photo courtesy INA Archives*

conservation; however, he discovered raising conservation funds to be far more difficult than raising excavation funds (Fig.4).

The timbers remained in that irrigation tank until 2001, when the Department of Antiquities secured conservation funds and removed them from the site. The surviving wood is currently undergoing treatment in Polyethylene Glycol (PEG).

The Pantano Longarini Wreck has been widely accepted as an early 7th-century AD vessel. It was originally dated through Carbon-14 analysis to AD 500 ± 150 (uncalibrated) for Wilms-Posen. Unnamed experts identified sherds (now lost), located under the frames, as late Roman or early Byzantine globular combed-ware amphoras similar to those found on the Yassıada A ship. These amphoras are found in archaeological contexts ranging from the 4th to the late 7th centuries AD. Despite the early 14C result and the date range for the amphoras, the excavators claimed that the similarity of the construction method between the Pantano Longarini ship and the Yassıada A ship was the most convincing dating evidence. Therefore, Throckmorton and Kapitän chose a date in the early 7th century, towards the end of the established 14C range.

Dating shipwrecks by their construction technique is now known to be extremely unreliable due to the non-linear transition in methods across the Mediterranean in the 4th through 11th centuries AD. The diversity of solutions presented by the archaeological record obscures the picture when dating ships by construction features alone. Radiocarbon dating is a far more reliable technique. In 1970, Barbara Lawn at the University of Pennsylvania Museum returned a radiocarbon date of AD 626 ± 48, which is considered to be far more accurate than the earlier 14C result. This makes the Pantano Longarini Wreck roughly contemporary with the Yassıada A, Anse St. Gervais II, Dor D, and many other wrecks across the Mediterranean.

Determining the point of origin of the Pantano Longarini vessel is complicated by the lack of personal possessions that are used to identify the home port. Furthermore, the absence of cargo raises difficulties in determining the vessel's purpose and destination. Throckmorton and Kapitän suggested that the Pantano Longarini ship was built somewhere in the Aegean or Eastern Mediterranean based on Greek letters carved into a plaque and the wood species utilized throughout the hull.

Recent studies suggest that several wood analyses from shipwrecks excavated in the 1960s and 1970s returned incorrect identifications. This opens the possibility that those species identified for the Pantano Longarini shipwreck (cypress, oak, and pistachio) were not accurate. In addition, the original report from the US Department of Agriculture Forest Products Laboratory in Madison, WI specifically notes difficulties in cutting, preparing and identifying the wood. The analyst even highlighted the unexpected appearance of *Pistachia sp.* Nevertheless, until new samples are analyzed, those published for the Pantano Longarini shipwreck are the only ones available for study. Cypress, oak and pistachio, were growing on Sicily by this period in sufficient quantity and size to be utilized in shipbuilding.

The timber trade further complicates the issue as there is substantial evidence for this practice. The Greeks established Sicilian colonies to access its rich forests. There were merchants at Ostia, Italy in the 2nd century AD who specialized in shipping timber. The cutting location of the timber and the shipyard were not necessarily in close proximity

The nameplate, presumably bearing the vessel's name, was also used as evidence for the Aegean or Eastern Mediterranean origin. Salvatore Garifolo, one of the

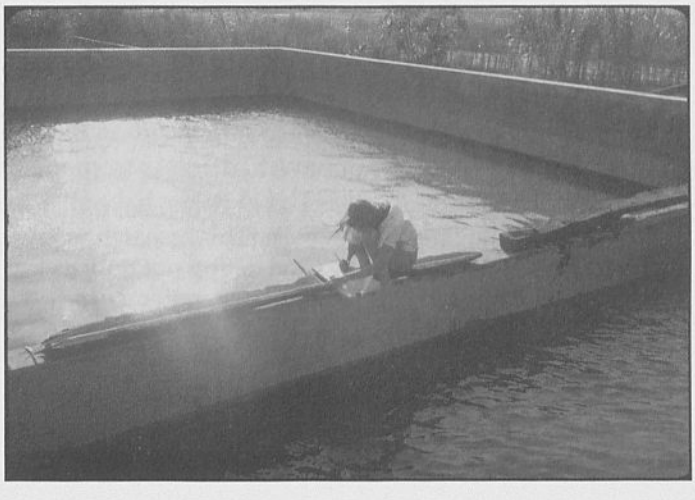


Fig. 4. *Worker recording timbers at Spatola's irrigation tank. Photo courtesy of INA Archives*

workers digging the irrigation system when the shipwreck was found, spoke with Throckmorton about the discovery. He described an item burned by workers as "a plaque with Greek letters and a horse's head above the letters, about 1.20 m[eters] long." He went on to say that the plaque was "metallic and banana coloured" which Throckmorton suggests may have been gilt. Greek remained the dominant language on Sicily through Roman times and well into the period under discussion; it became the official language of the Byzantine Empire in the first half of the 7th century. The Sicilians were speaking and writing Greek when the nameplate was created, so there is no reason to look outside of the island for the origin of this vessel based upon language alone.

Fig. 5. *Workers removing the upper layer of horizontal beams reveal the lower level. Photo courtesy of Johann Reinhard*

Analysis of the known data weakens the excavators' claim that the ship must have originated in the Aegean or Eastern Mediterranean. It is much more likely that it was built in Sicily. This region has a long history of shipbuilding, beginning with the maintenance of large fleets for the ancient tyrants. Heavy forests in south central Sicily provided plentiful timber, and construction probably took place in a local shipyard at Catania, just to the north of the Pantano Longarini.

With the generous support of the RPM Nautical Foundation and a fellowship from the L.T. Jordan Institute, I was able to travel to Sicily in the early summer of 2006 to visit the original excavation site. The Pantano Longarini shipwreck was discovered 500 meters inland from the Mediterranean Sea. Due to continued siltation, the lagoon, which may have once been a pirate cove, is now an inland lake. David Baker, an amateur archaeologist stationed with the United States Navy on Sicily in the mid-1960s, shared reports of a Byzantine town, and possible harbor facilities, to the west of the Pantano Longarini. Unfortunately, due to dense overgrowth a pedestrian search revealed no evidence of buildings in the immediate area.

While the timbers of the Pantano Longarini shipwreck have yet to be fully recorded, the accumulation of new data has already greatly enlightened the ongoing work of a deeper analysis of the vessel type. The vast majority of the excavation notes, photographs and drawings are now lost. The Institute of Nautical Archaeology Archives, however, maintains original published and unpublished drawings, slides and photographs, and a wooden model built by Throckmorton. Unpublished photographs, letters and manuscripts that survive in other archives and personal collections have also been gathered. Previously known photographs displayed the wreck as found, and others revealed the bottom planking, but figure 5 is one of only three photographs revealing a second layer of horizontal beams at the stern. This was an unknown construction feature until Johann Reinhard, one of the original excavators with Throckmorton, shared his images. The outcome of this work will be a lines drawing of the Pantano Longarini shipwreck incorporating information from the expanding data bank of excavated shipwrecks.

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Acknowledgements

The L.T. Jordan Institute and the RPM Nautical Foundation were extremely kind in providing the necessary funding for this project. I am grateful to the Institute of Nautical Archaeology for sponsoring the research. I owe a large debt to Filipe Castro for his endless encouragement on this and other projects. Without the cooperation and kindness of Gerhard Kapitän I would not have had access to so many original notes and photographs. Excavators Laina Swiny and Johann Reinhard, as well as David Baker, have all provided copies of their own photographs and materials related to the Pantano Longarini shipwreck. This research would not be possible without them. Dante Bartoli and Lilia Campana have also been extremely kind acting not only as translators, but also providing much-needed guidance. Thank you all for cooperation, advice and encouragement.

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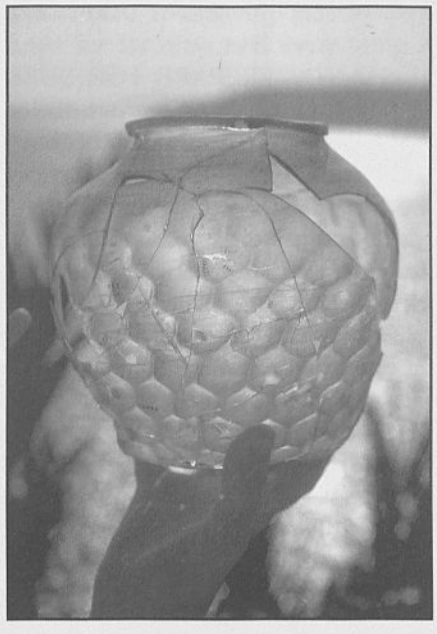
From the Executive Director

Preservation and outreach are two very important words, for they speak to essential parts of INA's mission. Phrases such as "exploration of the waters of the world," "exacting and careful scholarship," "meticulous and cutting edge science," "rewriting and adding to history," and "a commitment to excellence", are all are words used to describe the work of the Institute of Nautical Archaeology.

Recently, thanks to an introduction by two of INA's directors, Toby Darden and Alex Nason, INA has a new partner in preservation and outreach: the Photographic Preservation Society (PPS) of Fort Worth, Texas. With a mission of saving significant collections of historic photographs in local, regional, and national collections, PPS works to digitally scan and document those collections to the highest standard. The originals are then safely preserved in archival storage, out of light and away from human contact, while the digital images are preserved on external hard drives. The digital images can be used for everything from publications, scholarly reference or display on the Internet, as seen through PPS's virtual museum at www.ppsglobal.org



A scanned image from the Glass Wreck slides. Image scanned by PPS. Photo courtesy of INA archives.

Through the decades INA has conducted field schools, excavations and survey projects around the world. As a result, tens of thousands of images, most of them 35mm color slides, fill the INA archives. They include "over the shoulder" views of camp life, excavation crews, work in laboratories, and often stunning views of underwater sites, excavations, and "you are there" images of incredible moments of discovery. Many of the field photos were taken by INA's own exceptional photographer and goodwill ambassador Don Frey. There are also images of artifacts before and after conservation treatment. Due to the dedication of the photographers, the INA archives are an incredible visual resource.

Over time these slides were scanned, and can be seen on INA's website in the virtual museum of underwater archaeology, but not every image is included, nor is every image fully catalogued. That is where Alex and Toby stepped in, recommending PPS. After meetings with PPS's President, Mark Angle and Executive Director Russell Reeves, INA's latest partnership was underway.

In an agreement just signed with PPS, 80,000 of INA's slides – representing projects and excavations such as Cape Gelidonya, Uluburun, Serçe Limanı, Yassıada, and Bozburun will be scanned to the standard used by the National Archives, meaning not only can posters be printed from the digital images, but lower-resolution copies are available for easy viewing on the Internet. At the same time, PPS has pledged to work with INA to catalogue the images. One idea is a digitally-preserved narrative with Founder Dr. George Bass, explaining what is happening and who is in each image, for his projects – a veritable virtual museum - as well as written descriptions.

After archivally scanning the slides, PPS will package them for safe storage in the best museum conditions, preserving the originals for posterity. External hard drives with our digital archive will provide faster access to the entire collection, and create an opportunity not only to support the Nautical Archaeological Digital Library of Dr. Filipe Castro and his team, but also expand and enhance the existing virtual museum on the INA website. That means we can share even more of what we do and what we find, both with fellow scholars and the public.

You may be asking what such a project will cost. To scan, catalogue and archive a significant slide collection to the highest museum and publication standards can cost on average $3 to $4 per image. Multiply that by 80,000! So where will INA get these funds, and would that not conflict with other priorities.

The answer is there is no cost for the Institute of Nautical Archaeology. PPS is undertaking to cover the costs and complete the work through their own fundraising and grants. That leaves INA free to pursue other avenues of support for other projects, such as the surveys, excavations and ongoing study of our discoveries, and then sharing what we learn with other scholars and the public through books, articles, the media, and the Internet.

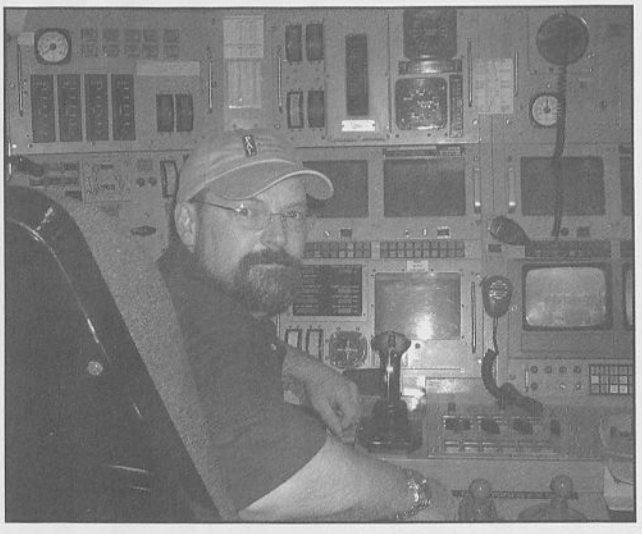
The partnership with PPS is a timely and wonderful opportunity for INA to again demonstrate a commitment to preservation and outreach. As with all good things accomplished, it comes through partnership and the good will of dedicated friends and colleagues. I welcome our new friends at Photographic Preservation Services, and thank them, and especially acknowledge and thank Toby Darden and Alex Nason.

-Jim Delgado (jpdelgado@tamu.edu)

Where are they now?

David S. Robinson, M.A., R.P.A.

"ALL HANDS PREPARE FOR SUBMERGENCE – DIVE, DIVE!!!" barks the voice through the earphones of my headset. The deck beneath my feet begins tilting downward and my heart rate quickens as we start our descent to the edge of the Gulf of Mexico's Outer Continental Shelf more than 100 fathoms below. A broad smile spreads across my face as I briefly contemplate my good fortune of being one of just a handful of archaeologists to have the extraordinary opportunity of conducting their research from the world's only deep submergence nuclear research submarine, the U.S. Navy's *NR-1*. Spending the next three days in the *NR-1* with me is G. P. Schmahl, manager of the Flower Garden Banks National Marine Sanctuary, and 11 of the U.S. Navy's finest sailors, personally selected by the Admiral of the U.S. submarine fleet to serve as the *NR-1*'s officers and crew.



David Robinson at the controls of NR-1. *Photo: Dr. Jack Irion of the Minerals Management Service*

The submarine and its 238-foot support vessel floating above us at the surface, the *SSV Carolyn Chouest*, are serving as our homes-away-from-home from March 2-10, 2007, 115 miles offshore south of the Texas-Louisiana border. We are here as part of the "Flower Garden Banks Expedition," exploring the deep waters surrounding the Flower Garden Banks National Marine Sanctuary in an effort to better understand the history and evolution of this fascinating part of the Gulf of Mexico. The project is multidisciplinary in nature, combining the knowledge and capabilities of a variety of scientists and agencies in the investigation of biological habitats, geological formations, and archaeological landscapes. It is the latter of these that is the focus of my responsibilities and current research interests.

Although my master's thesis was on a 19th-century Great Lakes steamboat, it was during my years as a graduate student in the Nautical Archaeology Program (NAP) from 1990-1992 that the existence and research potential of submerged settlements first caught my attention. It happened when Dr. John Gifford of the University of Miami gave a fascinating guest lecture to the NAP's staff and students on his pioneering work at the inundated ancient Native American archaeological site at Little Salt Springs in Florida.

My interest in submerged settlements archaeology was further stimulated several years later by a request from Maryland State Underwater Archaeologist, Dr. Susan Langley, to search for submerged ancient Native American settlements, as well as shipwrecks during a cultural resource management survey that I performed at the inundated site of Poplar Island in the Chesapeake Bay. In order to meet her request, Dr. Jack Irion, my colleague at R. Christopher Goodwin & Associates, Inc. (the cultural resource management firm where I was employed at the time), and I had to develop a remote sensing survey and sub-surface testing strategy that would be effective in determining the presence or absence of inundated pre-contact archaeological deposits in our project area. Using a combination of sub-bottom profiling and systematic handheld induction dredge testing, we were able to locate and excavate buried deposits of oyster shell and with the assistance of a specialist, determine whether they were biogenic or anthropogenic in origin. Our techniques weren't perfect, but they were a good start.

David Robinson with the Institute for Exploration's towed ROV, Argus, *which recorded sub-bottom profiles, CTD data, and high-definition video. Photo: Dr. Jack Irion of Minerals Management Service*

Since then, and especially over the last six years that I've been employed as the Rhode Is-

David Robinson prepares to leave the harbor in NR-1. *Photo: Dr. Jack Irion of the Minerals Management Service*

land-based Public Archaeology Laboratory, Inc.'s (PAL's) Senior Marine, I've worked intensively on developing and refining methods for locating and excavating submerged settlements in our region (i.e., the northeastern United States). This work has taken me to Denmark on two separate occasions (2002 and 2005) to conduct library and field research with one of the world's leaders in submerged settlements archaeology, Jorgen Dencker, as an invited International Guest Researcher of the Danish National Museum's Center for Maritime Archaeology and of the Viking Ship Museum.

My experiences stateside and abroad compelled me to organize and chair two symposia on submerged settlements archaeology – one for the 2003 SHA/ACUA annual meeting that was designed to educate my fellow shipwreck-biased nautical archaeologist brethren about another type of underwater site that deserves more of our attention, and the other for the 2004 SAA annual meeting, which was largely attended by our terrestrial pre-historian counterparts who otherwise have little exposure to or understanding of the scope and nature of useful data that underwater archaeology can provide.

My work and research experiences and my association with Dr. Kevin McBride, Director of Research at the Mashantucket-Pequot Museum and Research Center and Professor of Anthropology at the University of Connecticut (UConn), also compelled me to pursue my doctoral degree, which I am presently working on and expect to complete this December. In addition to my full-time job at the PAL and my dissertation research, I am also teaching part time as an Adjunct Faculty member in the Maritime Studies Program at UConn-Avery Point. For now, though, I'm just enjoying the ride here in Captain Nemo's realm… uh, wait… hold on – "OFFICER OF THE BRIDGE – VIEWPORTS HAS VISUAL CONTACT WITH THE BOTTOM." Oops – gotta' go – it's time to get to work.

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Just Released

Close Encounters: Sea- and Riverbourne Trade, Ports and Hinterlands, Ship Construction and Navigation in Antiquity, the Middle Ages and in Modern Time,
edited by Marinella Pasquinucci and Timm Weski

Close Encounters: Sea- and Riverbourne Trade, Ports and Hinterlands, Ship Construction and Navigation in Antiquity, the Middle Ages, and in Modern Time is a collection of 18 essays complemented by a short introduction by the editors. Several of the papers were presented at the 6th Annual Meeting of the European Association of Archaeology held in Lisbon in 2000. The title makes clear the eclectic nature of the papers, covering periods from the 6th century BC to the 19th century AD. The geographic range of the essays spans from Europe to Canada, with a clear focus upon Italy. The papers are arranged in roughly chronological order and discuss topics as diverse as ceramic deposits, trade, shipwrecks, and harbors. Such a sweeping scope appears to indicate a lack of focus, yet the numerous topics are all linked by their maritime nature.

The authors reflect the pan-European draw of the conference, hailing from the United Kingdom, Germany, France, Italy, Spain and Portugal, but also Canada. The papers have been translated into English, with varying degrees of quality, making the collection accessible to a wider audience than if each had remained in the author's native tongue. The inclusion of abstracts before the main body of each paper allows quick identification of relevant topics for research needs.

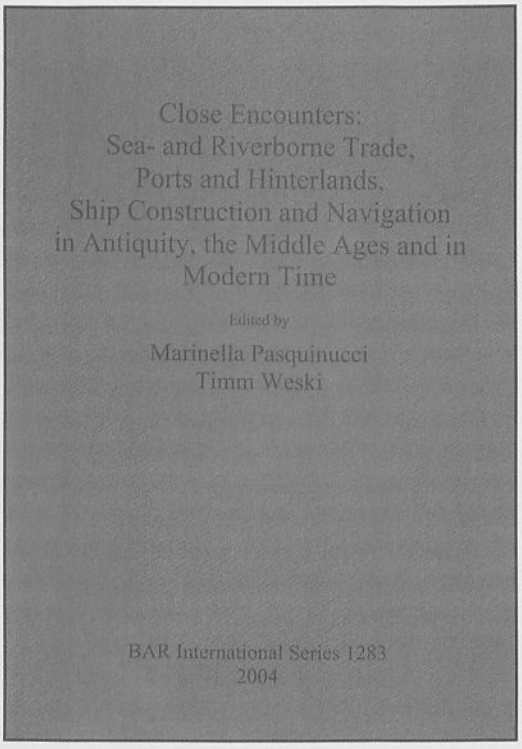
Unfortunately, the illustration quality is uneven, with a number of missing captions, and often text within figures has not been translated. Several papers would benefit from additional maps or more comprehensive site

descriptions, as a wide audience may not have an intimate familiarity with specific sites, for example, the Pesaro site discussed in "1817. From Trieste to Pesaro. Last voyage of the 'Arduz'."

Closer attention to labeling, spelling and grammatical consistency would have created a smoother text. Nevertheless, these are minor issues which can be overlooked for high-quality discussions with original research and focused arguments. The book contains papers that are pertinent to Nautical Archaeology, while also containing comparative terrestrial work. Perhaps more importantly, several of the papers directly link land and sea trade, creating cross-disciplinary discussions which directly situate the work of Nautical Archaeologists within the broader archaeological field.

This collection is of interest to both scholars and general readers which is why it is recommended to *INA Quarterly* readers. Some of the highlights include Ronald Bockius' attempt to determine load capacities from archaeological remains of the Northern European Romano-Celtic river barges. Catarina Garcia presents artifacts that enlighten 17th-century shipboard life including rigging elements, personal possessions such as a thimble, religious artifacts including a rosary, cargo, food remains, and galley artifacts. M.J. Beach and D.E. Atkinson publish the results of experimental archaeology. They describe the reproduction process for a 16th- or 17th-century astrolabe and cross-staff, how to use them and their results. While only three articles have been highlighted here, this volume contains many interesting papers for all levels of interest and experience.

-Sarah Kampbell



Oxford: Archaeopress, 2004 ISBN: 978-1-84171-636-7, ISBN: 1-84171-636-7, 201pp, illustrated throughout, incl. black and white figures.

Additional Recent Publications

Bass, George F. 2006. "New Techniques of Archaeology and Greek Shipwrecks of the Sixth and Fifth Centuries BC." *American Philosophical Society Proceedings 150* no. 1:1-14.
It can be found online at: http://www.aps-pub.com/proceedings/1501/1501toc.htm

Bass, George F., Deborah N. Carlson, and Mark E. Polzer. 2006. "A Brief History of Ship's Hull and Anchors as Revealed along the Turkish Coast by the Institute of Nautical Archaeology." *Hayat Erkanal'a Armağan; Kültürin Yansıması/Studies in Honor of Hayat Erkanal; Cultural Reflections*. Betül Avunç, ed. 138-144.

Carlson, Deborah. 2007. "Mast-Step Coins among the Romans." *International Journal of Nautical Archaeology*. Forthcoming. Online early at: http://www.blackwell-synergy.com/doi/abs/10.1111/j.1095-9270.2006.00132.x

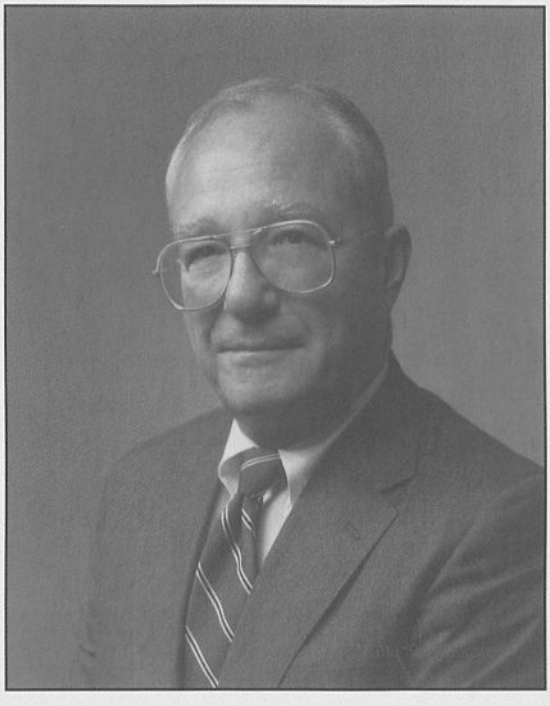
Catsambis, Alexis. 2006. "Before Antikythera: the First Underwater Archaeological Survey in Greece. *International Journal of Nautical Archaeology*. 35.1:104-107

Ford, Ben. 2006. "Down by the Water's Edge: Modeling Shipyard Locations in MD, USA. *International Journal of Nautical Archaeology*. 36.1:125-137.

Stewart, David J. 2007."Gravestones and Monuments in the Maritime Cultural Landscape: Research Potential and Preliminary Interpretations International Journal of Nautical Archaeology." *International Journal of Nautical Archaeology*. 36.1:112–124.

In Memoriam

Frederick Mayer



Frederick R. Mayer, Denver oil man, art collector, and former Chairman of the Board of the Institute of Nautical Archaeology at Texas A&M University (1986- 89) died Wednesday, February 14, 2007, after an illness following major surgery.

This native of Ohio, a self-made man, left a legacy of success in the oil fields of Colorado with his Exeter Drilling Company that he subsequently sold. Its sale along with Captiva Corp. formed the basis for his fortune which he shared with INA by endowing two Frederick R. Mayer INA professorships through the Texas A&M University Foundation. Faculty that have held his professorship over the years include Fred van Doorninck, Donny Hamilton, Cemal Pulak and Filipe Castro. He was acknowledged for his generosity and support of INA by the INA Board at a ceremony in January 1998.

Frederick first became a member of INA in 1982 and in 1986 he was the Chairman of the INA Board. During his tenure as Chairman, INA prospered under his insightful direction and everyone found him to be an enthusiastic, thoughtful, and kind man. He was ever the quiet listener, but when he spoke he commanded attention and respect. I enjoyed his unbounded energy; his love of skiing, sailing, scuba diving, and other sports as well. His vast knowledge as a collector, whether it was wine, stamps or fine art, was impressive.

Frederick was also active during his tenure as a member of the INA Archaeological Committee which chooses INA's numerous world-wide projects. He and his wife Jan were frequent supporters and visitors to INA shipwreck surveys and excavation sites. At an annual meeting in Jamaica one year, Frederick arrived in his sailboat and afterwards generously loaned his boat to the INA Pedro Banks Project, enabling me to complete a magnetometer survey.

In the fall of 2005 Frederick and Jan stopped by my home in New Orleans along with Fred's sister, Elizabeth Boeckman and Dallas attorney husband, Duncan Boeckman, also a former director of INA. While my wife Marilyn regaled everyone about the perils of a Southern Belle art major at the University of Colorado in Boulder, I noticed Frederick examine Marilyn's paintings with a modicum of pleasure. Always with the curious eye of the inveterate collector, I was not surprised to learn that Frederick had endowed his beloved Denver Art Museum. He and Jan, I believe, drew the strength of their marriage from their mutual love of collecting and sharing with others.

Frederick is survived by his wife of 48 years, Jan McCasler Perry, their children, Rick, Tony, and Perry Ellen, eight grandchildren, and his sister Elizabeth Ann Boeckman.

Donald G. Geddes III

INSTITUTE OF NAUTICAL ARCHAEOLOGY