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THE PEPPER WRECK

Archaeologists reconstruct the story of a ship that nearly made it home.

by Filipe Castro

On the morning of September 16th, 1606, people living along the banks of Portugal's Tagus River near Lisbon awoke to an astonishing sight: a black tide of peppercorns, worth a royal fortune, tainting the already dark and stormy water for miles. Bobbing here and there among the peppercorns were boxes of other exotic spices and bales of expensive white cotton cloth from India, along with the bodies of some two hundred crewmen and passengers of the Nossa Senhora dos Mártires, an enormous nau, or cargo ship, that had wrecked at the mouth of the Tagus the day before.

Officers of the king recovered much of the precious pepper following the tragedy, although according to eyewitness accounts nothing could be done to stop the populace from stealing whatever washed ashore. Most of the remaining sunken cargo, as well as the ship's anchors and guns, was likely salvaged by the crown, and what was left of the Mártires lay covered by a thin layer of soaked pepper at the bottom of the river for another four hundred years.
For most of the sixteenth century, the nau, along with its smaller, nimbler cousin the caravel, was the primary vehicle of Portuguese exploration and expansion. From the time of Vasco de Gama’s first voyage to India in 1498, a small fleet of naus, four to ten ships, left Lisbon for India and the Far East almost every year, departing with merchants, soldiers, and Jesuit missionaries, and returning with peppercorns, an expensive condiment popular among the upper classes; other spices such as cloves, nutmeg, and cinnamon; silks and porcelains from China; diamonds; exotic woods; and animals, including monkeys, elephants, and even a rhinoceros, whose trip was recorded in 1512.

Portugal’s preeminence as the Western world’s greatest commercial center relied completely upon its East India route, but remarkably little is known about the ships that plied it. As one Portuguese naval scholar has pointed out, we know less about the “India nau” than we do about the ships of ancient Egypt or Rome. Only a handful of texts and a few depictions, mostly painted or carved by artists unfamiliar with ships, have survived the five centuries following the country’s golden age of exploration and trade. And of the few Portuguese ships from this period to have been salvaged, the only one with any substantial portion of its hull remaining is the ill-fated Nossa Senhora dos Mártires. What we have recovered from the Mártires has helped us to better understand the ships of this critical eastward expansion, which carried people, merchandise, and ideas between two continents.
The East India Route was already more than a century old when the Mártires set sail on a six-month voyage to India, accompanied by four other naus, in June 1605. Eighteen months later, laden with pepper, the Mártires arrived back in sight of Lisbon. After a heavy storm forced another ship from the fleet aground, the captain decided to head for the mouth of the Tagus River, hoping to escape the tempest in the calmer waters of the estuary. Two large sandbanks narrowed the entrance to the Tagus, however, making the waters run dangerously fast. In the middle of the passage, the Mártires was dragged onto a submerged rock and sank in front of the São Julião da Barra fortress in a matter of hours.

Like many other wrecks that occurred in this dangerous channel, the ship was soon forgotten. The tsunami that followed the earthquake of 1755, which also destroyed Portugal’s archives of voyages and trade with India, rolled large rocks over the remains of the wreck, while a fishing trawler that sank two hundred years later littered the site with modern debris. The Mártires was rediscovered by the National Museum of Archaeology during a 1994 survey of the area around the São Julião da Barra fortress, and was identified by the thin layer of peppercorns that still covered the site, as well as Asian ceramics from the late-sixteenth and early-seventeenth centuries and an astrolabe inscribed with the date of the Mártires’ departure to India.

Over the next six years, the Portuguese government, and later a joint U.S.–Portuguese expedition, recovered more than three thousand artifacts ranging from fine Chinese porcelain to coarse Iberian kitchenware, as well as an artifact we had never before come across—part of a nau itself.

Of an estimated two hundred India naus lost during Portugal’s Golden Age, fewer than fifteen wrecks have been discovered and only a few scraps of planking preserved. Nautical archaeologists were understandably excited when the excavation of the Mártires revealed that a small portion of the hull, measuring roughly 20 by 35 feet, remained intact on the bottom of the Tagus. Hopefully, the hull remains, which consist of a section of the bottom immediately before the midship section, including a portion of the keel, eleven frames, and planking, will resolve many of the discrepancies that exist in the handful of shipbuilding treatises and depictions from the time. While most accounts agree that the vessels had three or four decks and large fore- and sterncastles,
Several astrolabes, used for navigation, were recovered from the wreck, including this bronze one inscribed with the date 1605, the year the Mártires set sail from Lisbon.

Archaeologists have been unsure how big the India nau actually were—treatises recommended a keel length of 90 to 110 feet—or how boxy or narrow they were. These vessels had to offer enough space for five hundred to eight hundred people and their half-year supply of food and water, and leave enough free space for the large amounts of merchandise brought back on the return trip. The nau's main cargo, peppercorns, was a very light commodity to store in the holds, especially if the ships were to carry heavy artillery on the upper decks to defend against pirate and enemy attacks. A large amount of ballast had to be added to compensate for the pepper, which created an even greater demand for space in the holds.

Some accounts described nau as notoriously weak vessels that would leak after storms or simply after firing their guns, while other sources mentioned how cannonballs fired by English ships would become embedded in the thick planking of a sturdy nau. Where the materials came from to build the ships was another big question, as timber resources in Portugal were scarce and of poor quality at the time.

The cargo left few doubts as to the Asian origin of the Mártires' last voyage; the hull, however, seems to have been built in Portugal. Not only is the basic unit used on its construction very close to the Portuguese palmo de goa (about ten inches), but the building materials are the ones expected to have been in use at Portuguese shipyards: iron fastenings, because wood-eating shipworms in the warm waters of the Indian Ocean made traditional wooden fastenings particularly perilous; cork oak for the ship's skeleton, because of its strength, durability, and natural curvature; and stone pine for the hull planking, because of its availability and supposed resistance to shipworm attack. The small size of the cork oak available on the Iberian peninsula forced the shipwrights to assemble large structural pieces from several small timbers, a less-than-ideal solution that required numerous elaborate fastenings. The Mártires was certainly a sturdy ship as well: the hull planking was over four inches thick, and caulked with lead straps and oakum, an expensive but highly durable solution not described in any written sources.

An India nau would have been built in the skeleton-first
method, common in the Mediterranean from at least the fourteenth century. After erecting the keel and the stem (bow) and sternposts, a central portion of frames would be fastened to the keel, forming a skeleton and establishing the shape of the widest and deepest part of the hull. Thin strips of wood would then be extended between the stem and sternposts, running over the central frames and forming the shape of the hull. The remaining frames were then cut to fit the predefined hull shape, and only after the whole skeleton was in place was the planking laid.

The key to this construction method is establishing how the frames would rise and become narrower as they moved away from the center of the ship toward the bow and stern, a calculation that became more complex as the size of the ship grew. By the early fifteenth century, Italian shipwrights were using a geometrical algorithm called the mezzaluna, or “half moon,” to determine the rising and narrowing of frames used in their large trading vessels, and archaeologists suspected that the Portuguese used the same method in constructing their enormous naus.

When the hull section was excavated, we discovered a number of shipwrights’ marks inscribed on the frames, including sequential roman numerals and vertical lines marking the edges and the axis of the keel. The numbering shows that the frames were predesigned using geometric formulas, like the mezzaluna, before being mounted on the keel.

The waterlogged hull remains from the wreck were carefully drawn and mapped before archaeologists raised them thirty feet to the surface. The wood is currently being conserved at the laboratories of the state agency for nautical archaeology in Lisbon.

When the frames were measured and their heights plotted together with their sequential numbers, we obtained a series of values that very closely followed the rising and narrowing of an India nau described in the Livro da Fabrica das Naus (Book of the Building of Naus)—a theoretical, somewhat impractical book on shipbuilding written by a Portuguese priest in 1580—but did not correspond with the formulas offered by the three other treatises of the time, which generally called for rounder ships. From the measurements taken from this small scrap of hull, we were also able to calculate the size of the nau: a ship with an overall length of about 125 feet, a beam of about 36 feet, and a 27-foot-deep cargo hold—at least twice the size of ships that traded around the Mediterranean and sailed to the New World at the time.

Many of the artifacts recovered during the excavation added to the little that is known of shipboard life in the period. The voyage from Portugal to India required a sail around Africa and, at a minimum of six months each way,
was the longest trip of its time. While the roughly 150-member crew, which included boys as young as seven years, kept busy with their duties, the passengers onboard tried to stave off boredom by gambling, gossiping, praying, and eating. Pewter plates and cheap earthenware found on the wreck evoke hectic mornings spent around the ship's oven, where meals for the five hundred to eight hundred people onboard were prepared. A pile of seven porcelain plates, still neatly stacked and layered with straw, may have belonged to an upper-class passenger; the better-off brought along their own high-status tableware, as well as live chickens and sheep for shipboard meals. Representatives of the Jesuit mission to Japan were on board, and one perhaps was bringing a souvenir back home; part of a small Japanese sword dating from the Momoyama period (1573–1603) was recovered from the site.

A historical investigation conducted for a Mártires exhibition, held in Lisbon in 1998, brought to light information about the lives of some of the ship's crew and passengers. These included Aires de Saldanha, seventeenth viceroy of India (1600–1605), who died just before reaching the Azores on his return trip, and Captain Manuel Barreto Rolim, who survived the wrecking and continued trying to make a fortune on the India Route after being disinherited by his father after an undesirable marriage. Rolim died in 1609 of an unknown disease near the Cape of Good Hope. There was also the unusually lucky Cristóvão de Abreu, an eight-year-old ship's boy on his first trip to India in 1605, who made another nine round trips to India, surviving three more shipwrecks before dying at sea as a ship master in 1645. Clergy and passengers included Jesuit Father Francisco Rodrigues, who lost his life after he refused a place on the ship's boat with the captain, staying behind to help and absolve those who asked for confession in face of death, and Miguel, a young Japanese Catholic convert who was traveling with Father Rodrigues and survived the wreck. Miguel is known to have returned to Asia later, and is believed to have died in Macao around 1609 without ever returning to Japan.

Some well fed, others starving, all badly lodged, the majority suffering from thirst and lack of vitamins, and all permanently shaken by the sea, the passengers on the Nossa Senhora dos Mártires had nearly reached Lisbon a little more than a year after they first left the capital. Ironically, the tragic ending of the Mártires enables us to revisit the people who built these grand ships and those brave enough to invest their dreams in them.

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