Last Harbor for the Oldest Ship

By SUSAN W. and MICHAEL L. KATZEV

Cairn of amphorae betrays the seaweed-shrouded tomb of a 33-century-old Greek merchant ship sunk only half a mile off the coast of Cyprus. Divers clear sand and silt from the wreck with air horns (right) before making a detailed photographic survey. The remarkably preserved vessel was then raised piece by piece. Fitted back together, ribs and planks testify to the skill of ancient shipwrights.

HER VOYAGE IS FINISHED NOW. Back in the days of Alexander the Great, she had taken on cargo—almonds and long-necked jars of wine—and unfurled her square sail.

But what caused her to sink to the seabed off Kyrenia, Cyprus, so many years ago? Perhaps it was the sudden fury of an early autumn storm. Or was she simply tired? Indications are that she had been patched and repatched during her long life.

Whatever the cause, the merchantman settled 90 feet to the bottom, where sand and mud covered and protected her, leaving only a mound of amphorae to mark her grave.

For a month Michael and I had searched the Cyprus coasts for ancient shipwrecks.

Andreas Cariolou, diving near his home port of Kyrenia, had seen amphorae on the bottom. We dived where he had found them, and our archeological detective work began.*

How old was the “Kyrenia ship,” as we named her? Two summers of underwater excavation gave us the answer. Radiocarbon dating and bronze coins we found indicated she had sunk about 300 B.C.

By August 1969 we had raised all her cargo, but the most exciting treasure still lay before us. The hull, stretching like the skeleton of a giant underwater beast, was flattened but remarkably well preserved.

Still, the centuries had taken their toll; the

*Michael Katzen described the first two seasons of work on the Kyrenia ship in the June 1970 Geographic.
sunken timbers, riddled by shipworms, had the strength of wet cardboard. Clearly we could not lift this ship as a whole. So, before separating the timbers, we mapped and photographed and labeled every one.

As we dismantled the hull, we loaded the fragile parts onto metal trays and gently balloon-lifted them to the surface. Before October seas could rage, the dismembered ship was safe inside Kyrenia's medieval castle. Under the vaulting of a great crusader gallery, the ancient wood lay in the stillness of a big freshwater tank—for, should the timbers dry out now, they would shrivel to a quarter of their original size.

Chief Requirement: Plenty of Time

Frances Talbot, our conservator, chose PEG—polyethylene glycol—as the medium with which to preserve our wood. She poured waxlike flakes into a water-filled tank containing samples, and heated the tank. Each day, the wood absorbed more PEG. After four months she removed some of the samples, but as they dried, the surfaces sagged and cracks appeared.

Frances shook her head. "Don't be discouraged; it's too soon. We should have a successful treatment worked out in a few more months."

Still, while the timbers of Aleppo pine stored in the freshwater holding tank awaited their PEG bath, there was enough work to keep us busy. Each piece was photographed from both sides—and as pictures piled up, so did full-size tracings, color-keyed to identify nail holes, mortises, and other details.

And there were emergencies. Robin Pierce, assistant project director, will long remember the night, many months later, when the electricity failed. The crew, already tired by a hard day's work, fished pieces of wood out of the rapidly cooling solution—driven by the thought of their ending up encased in a fourteen block of solid PEG.

Robin erected a temporary plank scaffold over the tank, and balanced precariously there while he grooped in the dark liquid below. Suddenly he skidded on the plank, slick with the hot solution, and dipped a leg into the PEG. In the seconds he took to regain his balance and pull his leg out of the tank, which still simmered at 160 degrees F., he suffered a dangerous burn.

We rushed him to Kyrenia's hospital. A sleepy and bewildered staff—it was five in
Restored merchantman reveals the ancient shipwright's art

She had given perhaps a century of service, but she would give no more. Within sight of Kyrenia harbor a bow seam opened, and the threecanted ship slowly filled. Her crew of four gathered their valuables before abandoning the doomed vessel. She had been a tramp coastal trader, not especially large—47 feet long by 14½ across—or very fast—4 to 5 knots. Unremarkable during her working life, the Kyrenia ship today stands as the oldest craft ever raised and restored. Here artist Richard Schlecht, working from hard data and educated conjecture, captures her likeness.

Dual steering oars (1) kept the ship on course. Though more efficient than a single rudder, the exposed oars were more vulnerable to damage.

Leadsheathing (2) was added, long after the ship was built, to protect the hull from worms. Fastened with thousands of copper nails, the watertight skin added years to the vessel's life.

Weather cloths (3), probably of woven matting, shielded wine-filled amphorae (4) from waves. The mats could be removed to facilitate loading and unloading of cargo.

Ribs (5) shown in this cutaway were added after outer planking was complete. This "shell-first" construction was a trademark of ancient naval architecture.

The mast step (6) allowed the mast to pivot backward for easy lowering. When upright, small wedges locked the mast's heel in position; fore-and-aft partners (7) gave added support.

Brailed sail allowed almost infinite adjustment for varying winds. The many brailing lines (11) made this rigging impractical for vessels carrying several sails, but let the Kyrenia ship point close to the wind.

Forty feet of yard (8) held up to 700 square feet of lines sailcloth. Raised from the afterdeck by a binnacle (9), the yard could be angled with braces (10) to catch the wind.
Getting the wrinkles out, conservator Frances Talbot from irregularities in the ship's keel caused by the preservation process. Before the timbers could be reassembled, each had to be flushed with freshwater, then saturated with a wax-like chemical to give the time-weakened wood new strength. Reconstructor Richard Steffy (below) keys out treated pieces of his jigsaw puzzle that will be added to the hull.

As our stacks of treated timbers grew, so did our questions. Why the double layer of wood in the bow of the old ship? Why those square-headed tenons? Most of all, how could we ever manage to put this jigsaw puzzle back together? We didn’t wonder—well, we take care of Humpy Dumpy. Those reassuring words came from Richard Steffy, just arrived from the U.S. Meeting Dick had been one of those happy accidents. Michael had lectured in Pennsylvania one evening, and afterward Dick had invited him to his home. Soon Michael was asking the questions, receiving an outpouring of nautical common sense and shipbuilding technology in return.

Dick, an electrical contractor, spent evenings building models of old ships. Not coffee-table models, but ones to test theories, solve problems. Clearly, Dick Steffy was the man to rebuild the Kyrenia ship, and he took a leave of absence from his business to do it.

Steel Takes the Place of Ancient Joints

In Cyprus Dick pored over every scrap of wood, trying to determine the merchantman’s original lines. Those two thousand years of submersion had crushed the hull, spreading the ribs from their original curves. Working from our notes and tracings, he rebuilt the hull on paper. We continued to treat the remaining wood with FIG. There were thousands of mortises and tenons connecting the planks. We supplemented them with modern devices—stainless steel rods, which we inserted into the wood—since the watertight integrity of the old hull was no longer a concern.

At last the huge freshwater holding tank was empty. In celebration, we donned swim suits and jumped into it to play a foaming game of aquatic hide-and-seek. Soon afterwards we dismantled the pool to make room for the hull. Each piece of wood was cleaned, catalogued, photographed, traced, and given a final splicing to bring out the color and grain. With this every meaningful detail. Much credit for that exacting work goes to our staff architect, Laina Wynde Swimly. Dick, in turn, developed a rapport with the Greek builder of 2,300 years ago. "Susan, bring your camera," he would call, as he fitted timbers to their proper curves. "Look at that beautiful work! See what happened? A little silver came off this one when it was being installed. A carpenter today would ignore it, but our shipwright took the trouble to put in a small patch where no one would ever see it. I really admire a craftsman like that."

To learn better how the Greeks originally constructed the ship, Robin Piercy began to build a full-size replica of a section of it—shell first. He joined each plank to the next with a row of oak tenons set in mortises. Only after the last plank was set did he fit the frames inside the hull, securing them with long copper spikes.

For more than four years the Kyrenia ship was the focus of our lives. Her length was 47 feet, her beam 14%—roughly the size of the Godspear, which carried early colonists to Jamestown, Virginia. But she was not built to cross an ocean; when she was loaded, her sail cap stood only two feet above the water. Displacement? Net weight 14 tons, and she carried half again that in cargo.

Maneuvering a scale model outside Kyrenia’s harbor, we discovered that she could point surprisingly close to the wind. But it was not easy to set the single square sail around—all those brail lines created a problem. The two steering oars made her amazingly responsive—but they were also more exposed and vulnerable than the single rudder that evolved later.

Dick found, during the restoration, that later shipswrights had patched the vessel at least three times. Built into her hull are signs of a very long working life. Still, even the fine

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crafting could not keep the water out forever. After years at sea, her bow joinery began to loosen, so a thin veneer of pine was nailed on, probably over thick resin caulking. Later, well below the waterline, four planks grew rotten with age, and were replaced. The patchwork, using square-headed tenons, is a marvel of ancient ingenuity.

More hard service, and then the ship began to leak again. This time her planks were weakened by shipworms, so she was hauled out and sheathed in lead. Then the old ship turned to battle the sea again.

Some time near the year 300 B.C., a captain and his three crews loaded their craft for what would turn out to be her final voyage. Samos may have been the starting point; a few amphorae from there were tacked into the back ranks of the cargo. Next, perhaps, was Kos, where millions came aboard, then Rhodes, to pick up more than 300 amphorae.

And finally, off Kyrenia, she sank.

New Danger Befits the Vessel

It was pure good fortune that the Cyprus Department of Antiquities allowed us to reconstruct the ship within the massive walls of Kyrenia’s crusader castle—for, shortly after the project was completed, Kyrenia became a battle zone. As we write this, the old ship still rests there, intact. We pray that the fortunes of war will continue to spare her, for scholars can reap a rich harvest from the oldest vessel ever brought up from the sea.

What kind of harvest? Knowledge of classical ship design, for example, and information about the little known “shell-first” building technique. And knowledge of ancient implements. While Robin Piercy was building the cross section which duplicated a part of the original hull, we learned just how efficient the bronze tools of 23 centuries ago were. Surely, they must have held keen edges, or been sharpened frequently. Even our modern steel chisel blades dulled quickly as we worked with the tough Aleppo pine. And yet the ancients had cut an astounding 4,000 mortise-and-tenon joints into the plank edges of the ship to hold the hull together.

So to us, and to other scholars around the world, the Kyrenia ship is a "time capsule" that links our age with antiquity. If modern conflict spares her, she will continue to yield new understanding of man’s early ventures upon the sea.