

Research Note: Rebuilding the Maritime Past

In 1985 an almost intact, 2400 year old merchant ship was located six feet underwater, 70 meters off the Mediterranean Coast, near Kibbutz Ma'agan Michael, just north of Caesarea. The ship's hull and its contents were found in an outstanding state of preservation, and provide invaluable information about ancient shipping in late Biblical times circa 415 BCE (about the time of Ezra and Nechemiah). The boat was carefully excavated, recorded and then disassembled underwater,



plank-by-plank, by diver members of the team. The waterlogged wood was transported to the Center for Maritime Studies at the University of Haifa and conserved.

University of Haifa researcher Dr. Elisha Linder and his colleagues have been studying the ship's wooden elements, particularly the tool marks left by the ancient shipwrights which will be inaccessible once the boat planks are reassembled. Fortunately, a basket containing sixteen shipwright tools, including bow drills and adz handles, was discovered nearby. The researchers are matching such tools to the plentiful preserved markings. They will eventually reassemble the boat by attempting a reenactment of the original shipbuilding process.

The ship's planing (strakes), aligned from stem-to-stem, is made of soft but light pine. The tenons and pegs which hold them together are made mostly of hard but heavy oak. A few components are made of hazel, birch or ash. All seven species found, in the 100 samples examined, grow today in Southwestern Turkey; even the dunnage was made from twigs of Turkish hazel. How the wood and/or the ship got to its present location, 30 km. south of Haifa, is still unclear.

The process of preserving this ancient waterlogged wood was an arduous one. After retrieval and desalination, the water in the timbers was, over seven years, slowly replaced with polyethylene glycol 4000. During this process, many (about 30%) of the planks became significantly misshapened, particularly at their ends, and had to be carefully reshaped by heating them – which temporarily makes them more

matteable – in individually constructed molds. The location of each plank and its conformity with its neighbors gave important clues as to the correct shape. Reshaping also closed cracks in the planks (one sign of success). As an extra advantage, reheating temporarily allowed embedded components, such as pegs and nails, to be

freely removed for analysis; and fractured lengths of planing could be reconnected while warm and then (weakly) “frozen” in place once the polyethylene glycol cooled.

The ship was just over 11 meters long and 3 meters wide. Its wood, even the keel, appears to have been new when the vessel sank, and bark and wood shavings still adhered to some interior parts. In fact, the nearby bag of tools, including a drill and mallet, suggest that work on the ship may not have been completed. Although no caulking sealed the seams between the planks, the planks were coated on both sides with a layer of yellow resin.

Only six other ships dating to the mid-first millennium BCE have been excavated and studied, and none yield archaeological data comparable to the Ma'agan Michael ship. Not only are the ship's keel, false-keel, stem and stern posts, planking, frames, stringers, etc. well preserved, but even such smaller elements such as copper nails, tendons and sewing devices were found intact. The ship's hull was built shell-first, and the internal structures added later. A special museum has already been constructed to facilitate work and to display the ship to scholars and the general public.

Many questions remain. How were the elements crafted to match each other? Were the port and starboard sides symmetric? Why aren't all the tendons the same size, and why do the distances between them vary slightly? Exact measurements, detailed study and careful reconstruction may help answer these and many other intriguing questions about the Phoenician-style merchant ships and hardy sailors that plied the Mediterranean sea lanes in the 5th century BCE.