

studied at the Hebrew University of Jerusalem, earning both his B.A. and M.A. degrees *summa cum laude*. His Ph.D. dissertation was on the foreign influences on masonry in Palestine in the Iron Age. He subsequently concentrated his research on town planning, urbanization, and architecture.

As a student Shiloh participated on many of Israel's most important excavations: in the expedition to the caves in the Judean Desert and at Ramat Rahel, Arad, Tel Nagila, the Citadel in Jerusalem, Masada, Megiddo, and Hazor. At Hazor he was responsible for area L, the site's underground water system. The experience was particularly useful in the City of David excavations, when he made a priority the clearing of Warren's Shaft, one of the components of the site's water system that in antiquity accessed the water of the Gihon Spring. His understanding of the scope of a city's functional needs—its water system and fortifications—and of the topological influences on its architecture was the outgrowth of his early research.

Shiloh's experience at large sites was critical to undertaking the multidisciplinary Jerusalem project, where complicated stratigraphy, created by building directly on bedrock and the reuse of earlier walls, had daunted archaeologists since the nineteenth century. Excavation and Shiloh's reassessment of the work of previous expeditions resulted in a clearer picture of the 586 BCE destruction by Nebuchadnezzar and of early postexilic Jerusalem than ever before available.

In addition to his duties as professor of biblical archaeology at the Hebrew University, Shiloh served as director of the university's Institute of Archaeology (1983–1986) and was a visiting professor abroad. He published more than sixty articles and books on various subjects relating to the Bronze and Iron Ages in the ancient Near East and the land of Israel. In 1984 he published an interim assessment of the results from the City of David excavations. Staff members followed his example by completing publication of almost all of the fieldwork and small finds within a decade of leaving the field. An almost complete bibliography of Shiloh's writings was published in volume 3 of the City of David publication (*Qedem* 33, Jerusalem, 1992).

Yigal Shiloh received the prestigious Jerusalem Prize in 1987, just one week before his death. He had distinguished himself in the City of David, as an excavator, administrator, and negotiator at a scientifically and politically sensitive site. [See also Jerusalem.]

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TAMAR SHILOH

SHIPS AND BOATS. In the ancient Near East, ships and boats were major conveyors of people and goods along inland rivers and over the seas that connected land masses. The earliest riverine craft in Egypt and Mesopotamia were presumably propelled solely by paddles and/or punting poles or were towed by humans or beasts from the riverbanks. These craft included boat-shaped floats made of bundles of lashed reeds. In Mesopotamia, round baskets of wicker covered with hides, the modern Arab *quffa* (Akk., *quppu*), served as coracles; and rafts supported by from four to a thousand inflated skins, the modern *kelek* (Akk., *kalaku*), were floated downriver and, after their cargoes were unloaded, dismantled and then carried back upstream on donkeys. *Keleks* probably evolved from single skins used to buoy individual swimmers across rivers.

Models of Mesopotamian canoes are so like modern marsh canoes in the region it is assumed that they also were built of wood; however, exactly when plank-built boats were introduced is unknown. The earliest Sumerian documents describing boat construction can be interpreted to show that the planks were fastened edge to edge by mortise-and-tenon joints rather than fastened to a previously constructed interior framework, as are most modern boats.

There is some contemporary evidence in Egypt of predynastic boats with planks fastened with ropes rather than mortise-and-tenon joints. It is certain that such boats existed in the Early Dynastic period, for the 43.6-meter vessel buried next to the pyramid of Cheops at Giza was built of massive cedar planks joined not only with pegs, but also with ropes lashed through V-shaped mortises. The Cheops boat lacked a keel and a mast and had only a dozen paddles, suggesting that it was towed. Additionally, in pharaonic planked-ship construction, as on the Cheops boat and the disassembled planks dating to the Middle Kingdom found at Lisht, the strakes were often "joggled," to prevent longitudinal movement between the planks.

The use of wind power for propulsion in predynastic

Egypt is known from depictions of sails on Gerzean pottery. From more detailed depictions from the Old Kingdom, it is known that by then masts were usually bipods, with tall, narrow sails stretched between a yard at the top and a boom at the foot. The masts were held in place by stays running forward and aft during upstream trips; the stays were lowered for downstream trips, when paddlers (facing forward) or rowers (facing aft) moved the vessels against the prevailing north wind.

For seagoing vessels, known especially from reliefs from the time of Sahure and Unas (Wenis), rope hogging trusses running from stem to stern kept the ends of the ship from sagging dangerously when the center of the hull was raised by waves passing below; this was a necessity before development of the keel. Each of the depicted vessels was steered by multiple paddles on either side of its stern. The sizes of these ships can only be guessed, but a cedar ship of the fourth dynasty is described as being 100 cubits, or 52 m, long (Bass, 1972).

Little is known about Egyptian seagoing ships in the Middle Kingdom, but the fictional *Tale of the Shipwrecked Sailor* describes his Red Sea vessel as being 55 m long, about the size of the fourth-dynasty ship mentioned above. What may be a rare fragment of a contemporary ship, a cedar plank cut with mortises, was found at Mersa Gawasis on the Red Sea coast.

Middle Kingdom riverboats, on the other hand, are well known. Models in the tomb of Meketre at Thebes show that by then a single steering oar or paddle sometimes passed directly over the stern, with the added mechanical advantage of a tiller. Sails were no longer much taller than they were

wide. Cabins of cloth- or hide-covered wicker provided vaultlike protection for passengers.

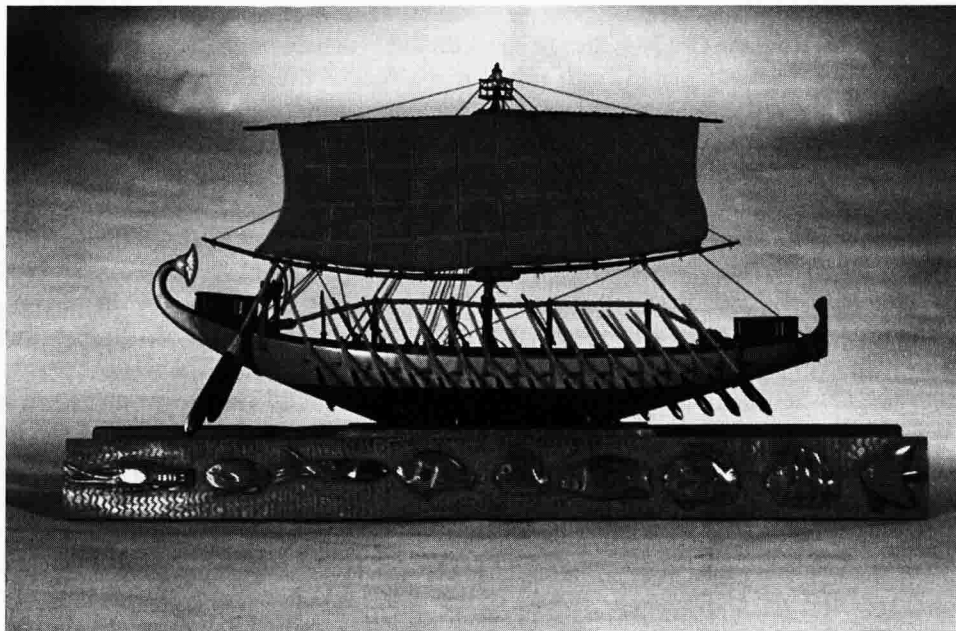
Half a dozen funerary boats from the Middle Kingdom, intentionally buried at Dahshur near the pyramid of Sesostris (Senwosret) III, had planks held together with unpegged mortise-and-tenon joints; dovetailed joints may well be unrecorded additions of the restorers who worked on the hulls after their discovery in 1894. The boats were about 10 m long, with a beam of 2.5 m, and still lacked keels.

Farther east, contemporary sailing ships are known in the Persian Gulf from depictions on seals found on the island of Failaka. [See Failaka.] However, models and seal engravings from the Old Babylonian period are too crude to provide many details. By the time of the New Kingdom in Egypt, sails were often broader than they were tall and were carried on single masts. Seagoing hulls, as depicted in the Deir el-Bahari reliefs of Queen Hatshepsut's expedition to Punt, were still strengthened by great hogging trusses and still steered by large steering oars, or quarter rudders, at the stern. The Deir el-Bahari reliefs also depict the queen's barge, built for transporting two enormous obelisks that weighed about 350 tons apiece; everything about the barge is gigantic, from the eight hogging trusses, to the eight steering oars estimated to have weighed 4 or 5 tons each, to the 810 oarsmen towing the barge with 27 boats.

Syro-Canaanite ships are also depicted in New Kingdom art. Those in the tombs of Nebamun and Kenamun at Thebes (fifteenth and fourteenth centuries, respectively) are tubby merchantmen whose broad sails have yards and booms supported by single masts; the latter provides the earliest evidence of a crow's nest. Both vessels have wicker



SHIPS AND BOATS. *Egyptian funerary boat model*. Dated to 2000 BCE. (Courtesy Pictorial Archive)



SHIPS AND BOATS. *Model of an Egyptian cargo boat. Fifteenth century BCE. (Courtesy Pictorial Archive)*

fencing running along the sides, presumably to keep spray from the deck. By the reign of Rameses II, the Egyptians had adopted this type of Syro-Canaanite vessel for their own use and termed it a *mnš* ship. This adoption of foreign shipbuilding traditions may have been influenced by the absorption of Levantine shipwrights into Egypt; a document dating to the reign of Thutmosis III mentions Syro-Canaanite shipwrights responsible for the building or repair of ships in the Egyptian dockyard of *Prw-nfr*—apparently located at or near Memphis.

Actual evidence of a possible Syro-Canaanite ship of this period comes from the excavation of a fourteenth-century BCE merchant vessel at Uluburun, near Kaş, Turkey. [See Uluburun.] The preserved portions of the ship's fir hull reveal planks fastened edge to edge with mortise-and-tenon joints, with oak pegs running through the top and bottom of each joint to prevent its coming apart. The ship lacks a true keel, having a keel plank instead; no traces of frames (ribs) were found. Carrying at least 15 tons of cargo, much of it on dunnage of thorny burnet, the ship is estimated to have been about 15 m long.

From the end of the Bronze Age (c. 1200 BCE) the wreckage of another ship, almost certainly Syro-Canaanite or Cypriot, was excavated off Cape Gelidonya, Turkey. Unfortunately, little of its wood is preserved. The 1994 discovery of one of the ship's large stone anchors (Syro-Canaanite or Cypriot in type) suggests that an original estimate of 10 m for the length of the ship, based on the distribution of a ton of preserved cargo on the seabed, may have been low. [See Cape Gelidonya.]

Shortly after the ship sank at Cape Gelidonya, Rameses

III recorded the Egyptian naval defeat of the Sea Peoples in reliefs at Medinet Habu (c. 1176 BCE). The ships depicted are all double-ended, or symmetrical. The Egyptian ships have lion heads for the prows, whereas those of the Sea Peoples have bird heads. For the first time, sails are shown without booms at their feet, and they seem to be furled by lines known as brails. Splashboards rather than wicker fencing protected the decks, and crow's nests were common.

During the Iron Age, the Phoenicians—heirs to the rich tradition of Syro-Canaanite seagoing merchants—became the most renowned traders in the ancient world. [See Phoenicians.] Phoenician sites have supplied scant evidence for their ships, however. The main iconographic source of information is Assyrian art, for upon subjugating the Phoenician coast in the ninth century BCE, the Assyrians employed Phoenician ships in their military strategy and to transport tribute and plunder. [See Assyrians.]

Shalmaneser III's bronze gate covers from Balawat depict the receipt of tribute from the Phoenician cities of Sidon and Tyre. [See Balawat.] The vessels transporting the tribute have devices shaped like a horse's head on top of the stem and sternposts facing outboard. This same device appears commonly on later depictions of Phoenician ships, at the bow facing outward. One type of Phoenician ship was termed a *hippos* ("horse"), perhaps after those decorative devices. Another type, *gauloi* ("tubs"), denotes a broad merchantman.

By the eighth-century BCE warships were no longer simple troop transports, but were true weapons in themselves. What may be the first depiction of a waterline ram attached to the bow of a warship used in the course of a battle was

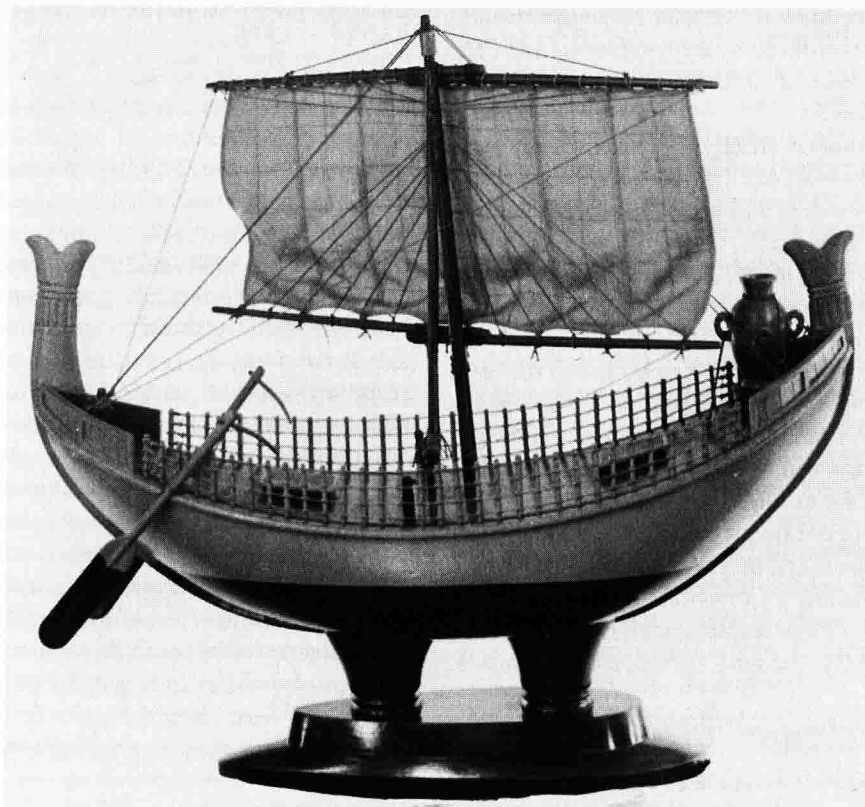
depicted in a now badly destroyed wall painting dating to the reign of Tiglath-Pileser III (745–727 BCE), uncovered at Til Barsip. [See Til Barsip.] The ram is painted yellow, apparently to indicate that it was covered with a bronze sheath. The rowers were protected inside the hull, working their oars through small ports.

In a relief from the southwest palace at Kuyunjik/Nineveh, Lulli, the king of Sidon, and his entourage are depicted escaping to Cyprus in a fleet of oared ships before Sennacherib's advance. [See Nineveh.] Some of Lulli's ships are war galleys, complete with waterline rams and recurving sterns but lacking bow decorations. The second type of ship depicted in the relief has a distinctly tubby appearance in profile and must represent either a transport or merchant ship. The stem and sternpost of the transports lengthen at their tops, although the two-dimensional manner of representation makes it unclear if these extensions are circular or linear. Both types of ship are biremes—that is, the rowers sat on two levels on either side of the vessel in order to increase the power behind each ship's propulsion. The upper row of oars is worked from the caprails, while the lower row of oarsmen was positioned inside the hull. The ships in this relief also portray another feature characteristic of Phoenician ships: a row of shields on either side of the hull.

Timber was an important element of the Phoenician tribute to their Assyrian overlords. In Sargon's palace at Khorsabad, ships are shown carrying cargoes of logs whose length approximates that of the ships. [See Khorsabad.] Additional logs are towed behind the ships. This is reminiscent of the rafts (Heb., *dovrot*, *rapsodot*) by means of which Hiram I, King of Tyre, delivered cypress and cedar logs via the port of Jaffa to King Solomon for his building activities (1 Kgs. 5:9; 2 Chr. 2:16). [See Jaffa.] The oarsmen in these ships face the bows, as if they were paddling rather than rowing. This is almost certainly the artists' error, as it would have been virtually impossible to paddle such heavily laden vessels. Moreover, the men grip the oars' looms in the manner of rowers rather than of paddlers. The masts of these ships are retractable.

A Phoenician galley depicted on an orthostat from Karatepe bears a bird's-head device facing inboard on its sternpost, an element of Aegean origin. In the fifth and fourth centuries BCE, war galleys appear prominently on the Phoenician city coins of Sidon, Arwad, and Byblos. [See Sidon; Arwad; Byblos.] Given their diminutive size, some of these depictions are remarkably detailed.

From the story of Noah's ark to Jonah's attempted escape from the Lord, the Hebrew Bible contains numerous ref-



SHIPS AND BOATS. *Phoenician-Canaanite merchant ship*. Reconstruction based on an Egyptian painting. Thirteenth century BCE. (Courtesy ASOR Archives)

erences to ships and the purposes for which they were employed. The most detailed account of shipping is Ezekiel's dirge for the fall of Tyre, in which he compares that city to a large seagoing merchantman (*Ez.* 27). This includes a detailed description of the ship's cargo and trading partners. Psalm 107 vividly describes the sea and the sailor's contact with its deep psychological mysteries. A unique Judean seal dating to the eighth or seventh century BCE depicts a fully rigged ship under sail with a horse-head bow ornament and a row of shields along the length of the hull.

Rivers, lakes, and swamps also required watercraft. In addition to inflated skins, pontoon bridges are depicted in Assyrian reliefs. King David's escape with his household across the Jordan River from the revolt led by Absalom was slowed by the need to transport them by a ferry (*2 Sm.* 19:18). Such a ferry consisted of a floating platform or boat that could be pulled across a river by a rope attached to either bank. Two such ferries are depicted on the Jordan River in the sixth-century CE Madaba Map. [See Madaba.] It is likely that the "Jordan boat" mentioned in the Talmud refers to this type of vessel (*B.T., Shab.* 83b).

Solomon built a fleet of ships at Ezion Geber on the Red Sea coast and carried out joint maritime endeavors with Hiram of Tyre. Together with knowledgeable Phoenician seamen sent by Hiram, the ships sailed to the land of Ophir, returning with large quantities of gold (*1 Kgs.* 9:26–28; *2 Chr.* 8:17). While the location of the land of Ophir remains unknown, its existence is proven by an inscription found on a sherd from Tell Qasile in Israel that mentions the "gold of Ophir." [See Qasile, Tell.]

Solomon and Hiram also carried out a flourishing maritime trade in other commodities: "gold, silver, ivory, apes, and peacocks," in a joint fleet that would return every three years (*1 Kgs.* 10:22; *2 Chr.* 9:21).

The Bible mentions seagoing "Tarshish ships" (*Is.* 60:9). There are two possible reasons for the inclusion of a geographic term in the name of type of ship. When a ship was borrowed from a specific location or people, as was the case of the Roman Liburnian, the term refers to the vessel's place of origin. Alternately, it can indicate that this was the type of vessel normally employed in trading with a specific locale—as was the case, for example, with the Boston packets or the East Indiamen of the recent past. In the Bible, "Tarshish ships" and "ships going to Tarshish" are used interchangeably (see particularly *2 Chr.* 9:21). Thus, this type of vessel was apparently a large seagoing merchantman commonly used on the run to Tarshish (presumably Tartessos in Spain).

[See also Anchors; Fishing; and Seafaring.]

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SHIQMIM, a Chalcolithic village and cemetery complex located in the northern Negev desert, along the northern bank of Nahal Beersheba (map reference 1147 × 0675). Situated about 16 km (10 mi.) west of modern Beersheba, Shiqmim is one of several Chalcolithic village sites in the Beersheba valley, among them Bir Abu-Matar, Bir es-Safadi, and Horvat Beter. At about 9.5 ha (24 acres), of which more than 4,500 sq m were excavated, Shiqmim is the largest of these sites. It is distinguished also by the formal cemetery complex, of which about 2,000 sq m were excavated, associated with but physically separate from the village. Excavation of the site's deep Chalcolithic strata confirmed metalworking activities as well as planned settlement. Those findings and Shiqmim's geographic position between the arid inland foothills and the semiarid Negev coastal plain offer important clues in retracing social development in the region.

Shiqmim was discovered by David Alon in the early 1950s, during the course of his surveys of the northern Negev. The findings of an extended survey of Nahal Beersheba