

Richard Marchi

A history of Seafaring

A history based on

506 illustrations 150 in colour

contributors

GEORGE F. BAILEY · ARNE EMIL CHRISTENSEN
OLE CRUMLIN · PEDERSEN · KEITH DeVRIES
MICHAEL L. KATZEV · ALEXANDER McKEE
PETER MARSDEN · MENDEL L. PETERSON
ENRICO SCANDURRA · PETER THROCKMORTON
JOSEPH W. SHAW · FREDERICK VAN DOORNINCK
RICHARD C. VAN GEMERT · ROBERT C. WHEELER

of Seafaring underwater archaeology

edited by
George F. Bass



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Contents

Introduction	9
GEORGE F. BASS University Museum of the University of Pennsylvania, Philadelphia	
1 The earliest seafarers in the Mediterranean and the Near East	11
GEORGE F. BASS Fourth Millennium BC · Third Millennium BC · 2000–1600 BC · 1600–1000 BC	
2 Greek, Etruscan and Phoenician ships and shipping	37
KEITH DeVRIES University Museum of the University of Pennsylvania, Philadelphia Maritime Activities · Ship Types · Ship Fittings and Construction <i>The Kyrenia Ship</i> by MICHAEL L. KATZEV Oberlin College, Oberlin	
3 Romans on the sea	65
PETER THROCKMORTON University Museum of the University of Pennsylvania, Philadelphia Overseas Expansion of Imperial Rome · Naval Warfare · Merchant Ships · Roman Wrecks and Modern Parallels	
4 Greek and Roman harbourworks	87
JOSEPH W. SHAW University of Toronto The Earliest Harbour Installations · Greece · Phoenician Harbours · Hellenistic and Roman Harbourworks · Lechaem and Carthage · Ports in Italy · Leptis Magna · Marine Archaeology	

- 5 Ships of the Roman period and after in Britain 113
 PETER MARSDEN
 Guildhall Museum, London
 The Early History of Boatbuilding · Skin Boats of the Roman Period · Roman Warships in Britain · Roman Merchant Shipping in Britain · Native British Plank-built Boats · The Veneti · Romano-British and Comparable Ships · Post-Roman Ships in Britain
- 6 Byzantium, mistress of the sea: 330-641 133
 FREDERICK VAN DOORNINCK
 University of California, Davis
 Historical Summary · Warships and Naval Warfare · Justinian's Naval Empire · The Marzamemi Church Wreck · The Fourth-Century Ship at Yassi Ada · The Size of Merchant Ships · The Seventh-Century Ship at Yassi Ada · The Pantano Longarini Ship · Sequel (641-1100)
- 7 Scandinavian ships from earliest times to the Vikings 159
 ARNE EMIL CHRISTENSEN
 Universitetets Oldsaksamling, Oslo
 The Origins of Plank-Built Boats · The Evidence of Rock Carvings · Early Plank-Built Boats · The Introduction of Sail · The Vikings · Viking Ships · The Survival of Boatbuilding Traditions
- 8 The Vikings and the Hanseatic merchants: 900-1450 181
 OLE CRUMLIN-PEDERSEN
 Danish National Museum, Roskilde
 The History of the Single-Masted Ship · Scandinavian Ships 900-1200 · Other North European Ships 900-1200 · North European Ships 1200-1450
- 9 The Maritime Republics: Medieval and Renaissance ships in Italy 205
 ENRICO SCANDURRA
 The Historical Background · Warships · The Galley in Lake Garda · 'Round' or Merchant Ships · Navigation · The Later History of Merchant Ships

10	The influence of British naval strategy on ship design: 1400-1850	225
	ALEXANDER McKEE The Changing Scene · Henry V (1410-22) · Henry VII (1485-1509) · Henry VIII (1509-47) · Elizabeth I (1558-1603) · The Seventeenth Century · The Eighteenth Century · The Nineteenth Century · Merchant Ships of the Period	
11	Traders and privateers across the Atlantic: 1492-1733	253
	MENDEL L. PETERSON Smithsonian Institution, Washington The Earliest Wrecks: Columbus · The Plate Fleet · Privateers · The Ships of the Late Sixteenth Century · The <i>San Antonio</i> (1621) · English Shipping · The <i>Virginia Merchant</i> (1660) · Port Royal (1692) · HMS <i>Winchester</i> · The Fleet of 1715 · The Fleet of 1733	
12	Waterways open the New World	281
	ROBERT C. WHEELER Minnesota Historical Society <i>The North American Fur Trade</i> Explorers, Traders, Trappers, and Voyageurs · Travel, Communication and Major Routes · Fur Trade Craft and their Development · Cargo and Logistics · Loss of Life and Lading RICHARD C. VAN GEMERT <i>Ships of the Great Lakes</i> Ships used in the French and Indian War · The American Revolution · An Age of Innovation · The War of 1812 · The Introduction of Steam	
	Glossary	306
	Select bibliography	307
	Sources of illustrations	312
	Index	317

Introduction

MAN LIVES ON A PLANET which is nearly three-quarters covered by water. Most of this forms large oceans and seas, but even our land masses are crossed and broken by rivers and streams or dotted with lakes. Sometimes a barrier to movement, water has more often served to facilitate contacts between different geographical areas. The earliest civilizations in Mesopotamia and Egypt owed their existence largely to the rivers which served as highways connecting the far reaches of each country. The spread of Neolithic cultures and ideas from the Near East to Greece, Italy and farther west was more often than not by sea – a pattern continued in Classical times when Greeks and Phoenicians seldom travelled far inland through neighbouring lands, but sailed great distances to reach foreign coasts and islands in the Mediterranean and beyond.

The part played by ships in the story of man's progress cannot be overestimated. It would be impossible to consider the history of Western civilization without the spread of ideas, men and goods by sea, or the decisive sea battles which more than once reversed the fortunes of major powers. Indeed, it now seems that before there were either farmers or shepherds there were sailors; before man settled in villages and began to make pottery, he had learned to construct some sort of sea-going craft.

The reason for the great importance and antiquity of seafaring is a simple one. Wherever water is present, the most efficient method of moving materials in any quantity is by floating them in some sort of water craft. A North American birch-bark canoe 35 feet long, as we shall see, carried about 8,000 pounds, including the weight of eight men. The same cargo would require 35 porters if carried over land, assuming that each man could carry 180 pounds for a day! Add a sail, and efficiency becomes even greater. Arne Emil Christensen, one of our authors, has elsewhere compared the 34-ton cargo of a small Norwegian sloop, sailed by only two men and a boy, to 110 sledgeloads, or 340 packs for horses. During Roman times, it cost more to cart a large quantity of grain just 75 miles than to ship it from one end of the Empire to the other by sea. And sometimes the cargo of a vessel consisted of such heavy pieces that it could not have been carried any distance by either men or beasts of burden; there is, for example, the case of an Egyptian queen nearly 35 centuries ago who moved a pair of stone obelisks totalling 700 tons in weight the length of Egypt on the Nile. Then, too, a boat may be paddled or sailed in most cases at a greater average speed than can be attained by a man on foot or an animal-drawn cart or wagon. Lastly, of course, there are many places which, before the invention of aircraft, would have been inaccessible except by water.

This is a book about the development of the ships and boats which have affected the history of Western civilization. It concentrates – and this is a new departure – on the ships themselves, and is not dependent on literary descriptions or artistic representations of ships, which are often unreliable. We have, needless to say, taken due account of the latter, for they have contributed materially to our knowledge of seafaring down the ages, but there can be no substitute for the study of the remains of actual ships of each period of history. We have only to reflect how relatively little we could say about the construction of Greek temples, Roman theatres, medieval castles, or Colonial American houses without the physical remains of such structures, to realize the truth of this.

The book could not have been written even a dozen years ago. The remains of a Bronze Age ship in the Mediterranean were excavated for the first time in 1960. The first examples of Classical Greek ships, here

described, were not found and excavated until after the book was put in hand. While we had some clues concerning the design of Imperial Roman ships, from finds on land and in rivers and lakes, and from pieces of their hulls brought to the surface of the Mediterranean by the early aqualung divers twenty years ago, we knew nothing of Late Roman and Byzantine ship construction until the 1960s. Only now are we beginning to see where and when the revolutionary change from Graeco-Roman methods of hull-first construction to our modern method of skeleton-first construction took place. We have been familiar with the design of Viking ships from land burials for quite a considerable time, but knowledge of their later development and the first-hand study of northern medieval ships has resulted largely from discoveries of shipwrecks made during the past dozen years. The first Venetian galley was discovered only in 1963, the *Vasa* was raised from Stockholm Harbour in 1961, and research on sunken fur-trade canoes in North America did not begin until 1960. Even more recent have been the studies of shipwrecks of the Spanish Armada. The results of this modern archaeological research are contained in the pages that follow, and a unique feature on this book is that each of the contributors has worked on the actual remains of ships from the area, and of the period, about which he writes.

The archaeology of ships of the later periods might be considered less important than those of more remote antiquity, for we have many contemporaneous paintings and, commonly in the case of ships built since the eighteenth century, the actual shipwrights' plans. But even here, the sixteenth-century *Vasa* presented some surprises in ship design, and many of the plans for early ships and boats in North America simply have not survived. Further, salvaged items of cargo and personal property often reveal facts of commerce and life on water not known from still extant bills of lading or logs.

Owing to the fortunes of archaeology, there are certain gaps in the story. Ships of the Far East are not discussed only because no shipwrecks of that area have as yet been located and excavated. A chapter on Arab shipping might well have followed that on Byzantine ships, but the excavation of the first Arab shipwreck (at Sharm-el-Sheikh) was completed by an Israeli team after the book was ready to go to press. At the time of writing, a seventeenth-century French merchantman is being excavated by the Canadian Historic Sites Service, and there are plans for a complete excavation of the eighteenth-century Dutch East Indiaman *Amsterdam* at Hastings. Had the results of these and other projects been available, Alexander McKee's chapter with its emphasis on British warships might have been differently conceived.

Finally, it was necessary to decide how far to carry our history of seafaring. The raising of the American Civil War ironclad *Cairo* and the excavation of the Missouri River steamer *Bertrand*, to name but two examples, have shown the value of archaeological research on ships recent enough for photographic records to be available. However, the introduction of steam propulsion for water transport seemed a logical point at which to draw the line.

The world of nautical and underwater archaeologists is so small that it has been my pleasure to know personally all of the authors (DeVries, Katzev, Shaw, and Van Doorninck as former students at the University of Pennsylvania). I began and finished the editing at the University Museum in Philadelphia, but much of the work was done while I was a visiting scholar at St John's College, Cambridge, on a fellowship from the American Council of Learned Societies. This enabled me to make frequent visits to London to consult with Mr Thomas Neurath of Thames and Hudson, and to seek the ready advice and help of Mr Eric Peters who worked as hard as I to make the book what it is, but whose major contributions to all aspects of the volume would remain anonymous except for these inadequate words of thanks. I owe also a great debt to Miss Ruth Rosenberg for understanding so well the story we wished to tell in her final selection and lay-out of the pictures, and to the patience and hard work of Mrs Vanessa Whinney and other members of the Thames and Hudson picture research department. Colleagues and scholars who provided me and the other authors with information and illustrations are far too numerous to be thanked adequately here, but the sources of the illustrations will be found elsewhere in the book. Finally, I wish that I might thank Walter Neurath for asking me to undertake this task, and I am especially saddened that he did not live to see the book past its first stages of conception.

GEORGE F. BASS

The earliest seafarers
in the Mediterranean and
the Near East

GEORGE F. BASS

The earliest seafarers in the Mediterranean and the Near East

Long before there were shepherds or farmers in Greece, there were sailors. More than nine thousand years ago, when men still gained their livelihood by hunting and gathering food, these seafarers set out to explore the Aegean. They sailed south to the island of Melos and discovered obsidian, a hard volcanic stone which they fashioned into sharp-edged knives and scrapers. Blades of this glassy material, dating from the eighth millennium B.C., have been found in the Franchthi Cave of the Peloponnese, appearing at the same time as large fish bones which offer additional evidence that men were turning to the sea. And Mesolithic settlers on Skyros could only have reached their destination by water. About a thousand years later, we know not from where, Neolithic farmers had arrived on the great islands of Crete and Cyprus.

Anyone who sails the Aegean today, even during the relatively calm summer months, can guess what terror sudden wind storms brought to these earliest sailors. But what their primitive craft were like, whether skin-covered boats or dug-out canoes or rafts of logs, we do not know. Modern technology may one day provide the means of locating their sunken remains beneath the sand and mud of the sea bed. Until that time we must turn to the great riverine centres of the Near East – to Mesopotamia and Egypt – for our impressions of the earliest boats.

The Nile, emptying through its Delta into the Mediterranean, and the Tigris and Euphrates, which flow jointly into the Persian Gulf, provided ample opportunity for fishermen and ferrymen to venture gradually out into the open sea. To meet conditions there, they would have to build larger and stronger ships.

Fourth Millennium B.C.

cf. 3 A clay model of the oldest known sailing vessel was found in a grave at Eridu, in southern Mesopotamia. A vertical cylindrical socket, placed slightly toward one end of the boat, indicates where the mast was stepped, and holes piercing the gunwale may have been for stays. The broad, almost oval shape of the hull suggests that perhaps this was a skin-covered boat, like the round coracles (*quffas*) shown on later Assyrian reliefs.

The sailing skiff was from the 'Ubaid period, around 3500 B.C. The succeeding Uruk period, covering most of the second half of the fourth millennium in Mesopotamia, saw the appearance of the earliest written records. Among the many pictograms scratched onto clay tablets is the representation of a vessel with the high prow and stern which were to become distinctive of Mesopotamian ships. Marked on the hull are pairs of lines, suggesting that it was built up of bundles of reeds lashed together, much like a boat from the same area represented on an eighth-century Assyrian relief.

Similar vessels appear on a pair of finely carved seal stones of the same Uruk period. Their high, in-curving prows and sterns, seemingly bent over and tied down, end in leafy patterns. This does not provide certain proof, however, that these hulls were made of reeds; Egyptian wooden ships of a later period long preserved an in-curving stern ending in a floral decoration, a legacy from the days when most Nilotic craft were made of papyrus bundles. In each of the carvings, a man sits at the stern, either paddling or steering, while another man stands in the bows holding ready a forked stick for punting or sounding the river bed.

The shapes of such high-prowed ships are so typical of Mesopotamia that when similar vessels appear in prehistoric Egyptian art, we now call them 'foreign ships' from the East. Egyptian ships of the same time, scratched or painted on pottery, indeed seem quite different. One of the earliest, on a bowl of the Amratian period, shows the low, 'sickle-shaped' hull which continues well into the historical period of Egypt. Paddles for propulsion may be seen near the prow, with an additional pair of paddles for steering near the stern. On deck are two hut-like cabins or shelters, and a tassel hanging from the prow may represent the line used in mooring the ship.

These low ships are best known from innumerable examples painted on pottery of the following, Gerzean, period towards the close of the fourth millennium in Egypt. The pictures are so stylized that some authorities have thought them to represent palisaded fortifications on land, like those used on the western frontier in America, and one scholar even suggested that they were

pens for ostrich farms! Now they are generally accepted as low hulls with lines protruding downward to represent oars or paddles. On each a palm branch or sprig of vegetation at the bows shades the look-out's bench, and just below is a tassel-like mooring line. A pair of cabins are placed amidships with a space between them; no oars are usually represented immediately beneath this space, so it is possible that a gangway was situated here. Just by the cabins are one or two posts supporting the standards of various prehistoric *nomes*, or districts. A rare mast and sail, possibly of matting, is placed forward in one of the hulls, but strange shield-like devices on poles are drawn near some of the ships and these may represent removable masts and sails. Crew members are not shown.

A unique example of such ships is found painted on a tattered textile fragment from El-Gebelein in Upper Egypt. Double-cabins, bearded rowers (facing forward), and steersmen are clearly seen.

Both types of boats, the squared 'Mesopotamian' and the slightly crescent-shaped 'Egyptian', appear frequently as rock carvings in the Wadi Hammamat, a natural passage through the eastern Egyptian desert from the Nile to the Red Sea. As the carvings are found far from any water, we may guess that the artists recalled both ships of the Nile and ships that arrived from the Red Sea. Some have even seen in this an 'Asiatic' invasion of Egypt which ended the Amratian period and introduced the more advanced Gerzean period. This is far from certain, however, and we may safely conclude only that the carvings were made during the fourth millennium, when contacts between Egypt and Mesopotamia are clearly established by other archaeological evidence.

These two types of ships are seen to better advantage on what is the earliest known representation of 'naval warfare'. It appears on the carved ivory handle of an exquisite flint knife, now in the Louvre, and reported to have been found at Gebel el-Arak in Upper Egypt. On one side of the handle is carved in relief a hunting scene, including Near Eastern motifs, but on the other appears a battle scene in four registers. In the third register from the top is to be seen a row of 'foreign' ships with high prows and sterns, while the bottom register shows the sickle-shaped 'Nilotic' craft. Between the two registers are the bodies of slain warriors, perhaps floating in the water. Does the scene commemorate an invasion of easterners into Egypt, or is it only a battle between two Egyptian tribes dressed in differing garb? The knife has been dated, by stylistic analysis, to the Gerzean period.

A similar scene occurs painted on plaster over the mud-brick walls of a Gerzean tomb at Hierakonpolis in Upper Egypt. Here the typical Nilotic boats do not have the numerous paddles of those in the vase paintings, but otherwise they are quite similar; even the space on the hulls between the cabins where oars do not appear has been delineated as on the pottery, suggesting that it may have had some special significance. A ship of high-

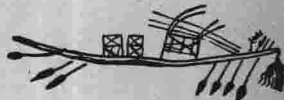
prowed 'foreign' type sails among them, its dark colour leaving no doubt that the artist wished to distinguish it from the others. Contests between warriors are seen elsewhere on the fresco. An invasion? Is this the same battle that was shown on the Gebel el-Arak knife? Or are the warriors not connected at all with the ship scene, which may depict simply boats that pass on the Nile?

Probably the best example of these 'foreign' ships is one painted as a solitary silhouette on a Late Gerzean vase. The stem is vertical and the stern slightly incurving. A mast, supporting a square sail with no visible rigging, is stepped rather far forward in the hull.

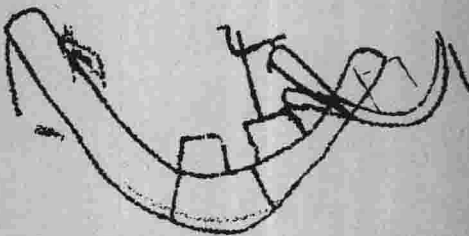
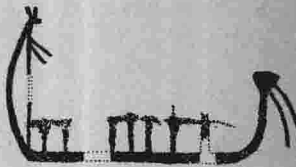
1 Pictographic sign on a clay tablet from the Uruk period in Mesopotamia. Fourth millennium BC



2 Nile boat depicted on a bowl of the Amratian period. Fourth millennium BC



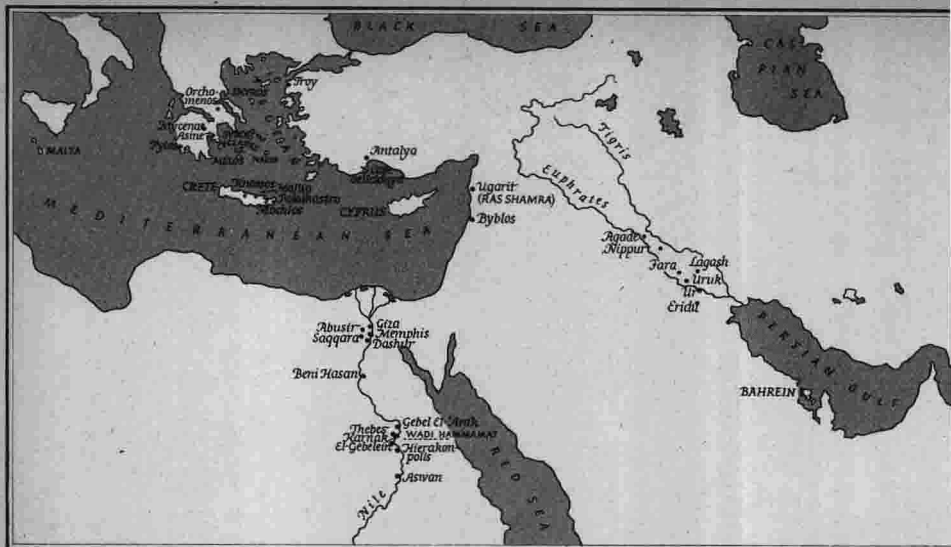
3 Square 'Mesopotamian' boat on a rock carving from the Wadi Hammamat. Fourth millennium BC



4 Crescentic 'Egyptian' boat: rock carving from the Wadi Hammamat. Fourth millennium BC

5 'Mesopotamian' or square sailing vessel on a vase of the late Gerzean period from c. 2900 BC





6 By 3000 BC, seafarers had crossed the Aegean and the Adriatic, sailed the open seas between Egypt and Crete, and ventured into the Red Sea and Persian Gulf. Named on this map are places with which the present chapter is primarily concerned

Third Millennium BC

Mesopotamia and the Indus Valley. Our knowledge of water transport in the third millennium BC is greatly increased by documents written in Sumerian and, somewhat later, Akkadian; although not linguistically related, both languages were inscribed on clay tablets in cuneiform characters. Both continued in use throughout the period covered by this chapter.

The necessity for canals in Mesopotamia for irrigation is well known, but these canals formed at the same time the most important highways for transporting goods. Grain from the fields, stone and timber brought by river from distant mountains, and metals imported from overseas by way of the Persian Gulf, all ended up on canals. From there they were conveyed to the great temples by barges and boats which were tied up to poles at various quays. Such craft were paddled, propelled by punting poles, or sometimes towed from the canal banks. The crew of a river boat is listed on a clay receipt for its oil rations:

2 boat-towing men, 2 men at the outside rope, 1 man watching the depth, 2 men walking the deck, 5 able-bodied workers, 1 scribe = 13 men

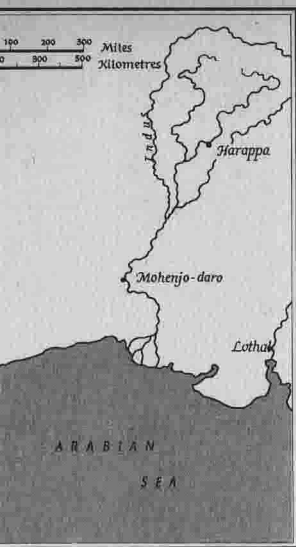
The importance of these crews to the temple economy is evidenced by a list of the people attached to the temple of Bau at Lagash. About 125 men, or a tenth of the

entire temple population, were rowers, steersmen, or sailors, and in addition there were various slaves and porters for moving cargoes; many of these boatmen were foreigners.

Business documents from the Third Dynasty of Ur, about 2000 BC, list some of the materials of which boats were made, including pitch for coating their hulls, material for caulking, and hides for covering leather skiffs. Most of the small boats, we know from cylinder seal carvings, continued to have the high prow and stern of the previous millennium. Sometimes the hulls seem shorter and more U-shaped than those of earlier examples, but this may be due to the cramped space available to the engravers. Models from Ur, in silver and in bitumen, are long canoe-like craft with benches and, in one case, six pairs of paddles.

Larger vessels set sail for such places as Magan, on the Persian Gulf, and Melukkhha, somewhere on the coast of Oman, to obtain timber and other raw materials. Perhaps it was to protect these interests that King Shar-Gani-sharri sent out a naval expedition to conquer the coasts and islands of the Gulf during the last part of the millennium.

Certainly the most important of these foreign ports was in a land called Dilmun: 'Ships of Dilmun' brought ivory, timber, gold, copper, and lapis lazuli to the great cities of Ur, Lagash, and Agade. This bountiful land has



usually been identified as the island of Bahrein in the Persian Gulf; although the island is itself not rich in raw materials, it may well have been an exchange centre. The noted Sumerologist Samuel Kramer, however, has proposed that this country of 'great dwellings', this 'dock-yard-house of the (inhabited) land', 'the place where the sun rises', represents, rather, the great Indus Valley civilization to the east of Sumer.

Although there is strong evidence against this identification, recent archaeological research has shown the importance of sea trade in that area. A number of Harappan ports have been located on the Gujarat coast of the Arabian Sea, the best known being that at Lothal (see Chapter 4, p. 89). Here a huge artificial dock of baked brick, together with a warehouse for storage of cargoes, has been excavated by S.R. Rao. Seven stone anchors, five from the dock itself, represent two primitive types: two are simple pierced stones, but five have additional pairs of holes to hold sticks for digging into the sea or river bottom. Five terracotta models from the site included two sailing ships, and three river 'barges'.

Representations of boats painted or scratched on pottery, as well as on a seal, have been found at Lothal and at other Harappan sites. Most have the high prow and stern so typical of even the earliest boats in Mesopotamia. This accords with an extension of Kramer's theory, for he believes that the original settlers of southern Meso-

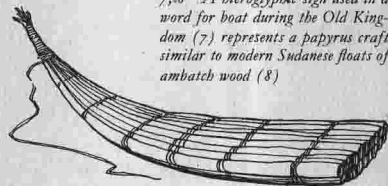
potamia, the 'Ubaidians (see above), were driven out by the Sumerians, and that they fled to the coasts of the Arabian Sea, to form the Indus Valley civilization.

Egypt. Our knowledge of boats and ships during the Old Kingdom in Egypt (c. 2780-2280 B.C.), the time of the building of the Great Pyramids, is enhanced by numerous models, stone reliefs, and written documents. Even the remains of an entire ship, dismantled and buried near the Pyramid of Cheops, has been uncovered and is being reassembled; perhaps intended for sacred pilgrimages by the king in the afterworld, the large vessel (over 140 feet long) preserves in carved wood at stem and stern the appearance of bound bundles of papyrus from an earlier era.

The painted stripes on earlier predynastic clay models had surely represented the ropes or lines used to lash papyrus bundles together, and Old Kingdom tomb reliefs now show such craft actually being built. They were depicted usually as small boats for hunting and fishing in quiet Egyptian marshes. The type has had a long life; Egyptian 'vessels of bulrushes' were mentioned nearly two thousand years later by Isaiah, and similar primitive reed boats have been seen recently in the Sudan and elsewhere. The Old Kingdom examples retained the 'sickle-shaped' hulls we have seen in Gerzean representations, but another early form is suggested by a hieroglyphic sign that occurs in the word for boat or skiff. This represents a papyrus-bundle boat with its bow bent back sharply, and its stern cut off, a type also observed by modern travellers in the Sudan.



7, 8. A hieroglyphic sign used in a word for boat during the Old Kingdom (7) represents a papyrus craft similar to modern Sudanese floats of ambatch wood (8)



Wooden hulls, made with planks, copied the 'spoon shape' or 'sickle shape' of the papyrus boats; centuries later their sterns were often carved with plant motifs only slightly reminiscent of their papyrus prototypes. Contemporary reliefs show that both types, wooden and reed, were sometimes paddled, with crews facing forward and kneeling, and sometimes rowed, with crews seated and facing aft. Steering seems at first to have been effected by men holding long spear-shaped paddles over one or both sides of the boat near the stern, but soon it

was discovered that it was more efficient to attach the paddle to the hull and rotate it on its own axis by means of a tiller attached to the paddle handle.

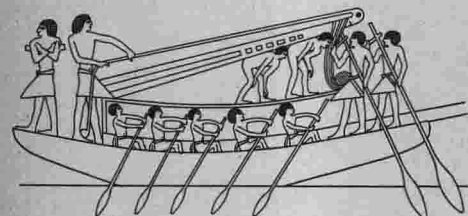
cf. 18

Although some of the wooden hulls were no larger than their papyrus counterparts, others, built for the open sea, were quite sizeable; a cedar vessel built during the reign of Snefru of Dynasty IV was said to be 100 cubits, or 172 feet, long. Expeditions along the eastern Mediterranean coast, to obtain cedar from Lebanon for unforested Egypt, are suggested as early as Dynasty II; and not far from Byblos a Dynasty IV boat crew left its name on an axe-head found near the port.

Actual seafaring ventures were also recorded during the Old Kingdom. A Dynasty V relief shows ships filled with Syrian captives greeting King Sahu-re, and the same pharaoh sent a fleet southward to Punt on the Somali coast. An inscription on the wall of the tomb of one Khnemhotep, in the following dynasty, indicates that he was a steersman who made eleven voyages to myrrh-rich Punt.

It is from reliefs that we know the principal features of early Egyptian ships, many of which continued into the second millennium B.C. The mast was usually, though not always, a bipod which straddled the hull rather than being stepped directly in the longitudinal centre as in single-masted ships. This was to spread the weight over the weak hull, as is done today in the double-masted reed boats of Lake Titicaca in Peru. The mast was supported by a forestay and numerous backstays, but shrouds were not needed and do not appear. When the ship was floating or being paddled downstream, against the prevailing wind on the Nile, the mast was lowered

15, 16



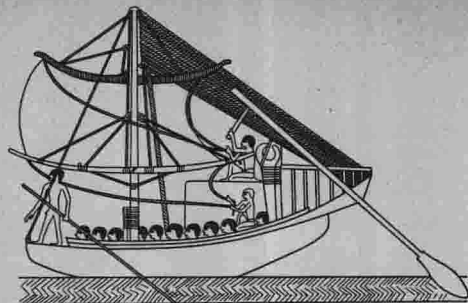
9 Relief in the tomb of Abibi, at Saqqara, of c. 2500 BC, showing men lowering a typical bipod mast of the Old Kingdom

into a crutch near the stern. An upper and a lower yard usually spread the tall, narrow sail, but sometimes spars, instead of a lower yard were used to hold the lower edge of the sail in place. Crew members controlled the sail by means of lines (braces) from the upper, and occasionally the lower, yard.

Running from stem to stern was a huge cable, called today a 'hogging truss', which was tightened in the centre of the ship by means of a stick thrust through two strands of the cable and turned so as to twist and shorten

10

16



10 Relief in the tomb of Ipi at Saqqara, c. 2500 BC. A helmsman holds both the braces to the upper yard and the tiller; a man below controls the lower braces. Note the single forestay and numerous backstays, and the crutch for lowering the mast

it. The purpose of the cable was to hold up the ends of the ship so that they would not sag, especially when a wave was passing beneath the hull amidships. The strong skeletons of most ships now prevent this sagging, or 'hogging', but Egyptian ships were built without keels. Lacking large timbers, the Egyptians built up their ships from small pieces of wood carefully joined together, a method compared by Herodotus two millennia later to that of building a wall of bricks. After the hull was completed, frames (ribs) and a sort of keel were inserted, as well as a series of thwart which sometimes protruded from the sides of the hull. The strength of the ship, however, depended mainly on the strength of its shell, which was held together partly by the pressure of the surrounding water, much as an arch stands from its own weight. An additional latticework of cable was sometimes wrapped completely around the hull, below the gunwale, to provide additional strength.

cf. 20

16

The Aegean. The Early Bronze Age in the Aegean, basically the third millennium B.C., is divided into three geographical areas to which archaeologists have given distinctive names: Early Minoan on Crete, Early Helladic on the Greek mainland, and Early Cycladic in the islands of the Cyclades. International trade and sea traffic were intense at this time, perhaps spurred on by the search for and barter in metals. Copper and bronze implements become more and more common, and jewellers' techniques in gold and silver show a striking similarity from southern Russia through Asia Minor to Mesopotamia, and out across the Aegean.

Early Cycladic sailors ventured between the coasts of Asia Minor, Crete and the mainland of Greece, as far north as Troy in the east and the Northern Sporades in the west. Outside the Aegean, Cycladic exports have come to light as far away as the Dalmatian coast and Sicily. The long boats used by these island traders are known to us through incised pictures on terracotta