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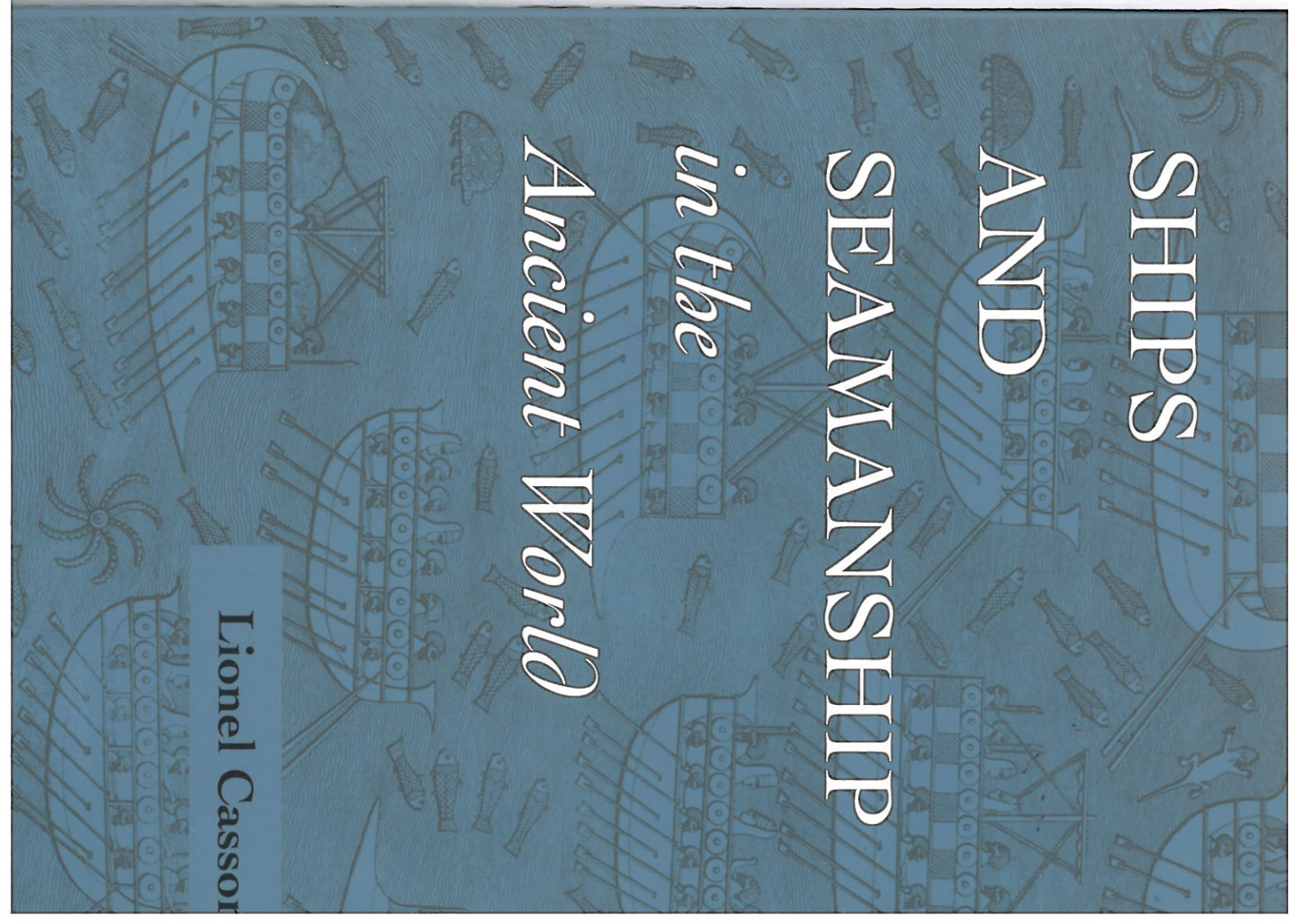
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SHIPS
AND
SEAMANSHIP
in the
Ancient World

Lionel Casson

the ram at this period ceases to exist.⁴ The horizontal extension still needs explaining; but, until conclusive evidence turns up, little is gained by guessing.

Turning to rig, we find that a series of seals⁵ of the same age, type, and fashion of workmanship shows an enigmatic structure above the deck which has frequently been taken to represent two, even three, masts of equal height.⁶ The seamen of this age were admittedly precocious, but hardly enough to invent a rig that was to drop out of sight until shortly before Columbus embarked for America; explanations more in line with the technological level of the age can be found (34 above).

⁴ Kirk (125-27) simply accepts Marinatos' conclusion that the low end is the prow, making no effort to improve on the arguments, and holds that the projections were at first structural but then soon became a ram. That neither Homer (49 below) nor the Peoples of the Sea (38 above) knew anything of the ram he explains (126, note 37) by assuming that the ships involved were all merchantmen. This posits a distinction between oared merchant vessels and warships which is not only unproven but most unlikely at this age. And what of the Egyptian ships shown attacking the Peoples of the Sea (Fig. 61)—fighting craft pure and simple, yet with no ram? If the ram was known in the Bronze Age, the Egyptians would necessarily have adopted it, for it was a weapon like the naval gun—once one fleet had it, all had to have it.

Two fragments of pottery from Thessaly of about 1600 B.C. have been restored by Theohares (*op. cit.* above) to show ships with rams. The restorations have been accepted uncritically; see W. Taylour, *The Mycenaens* (London 1964) 162-63 and Williams, *GOS* 7 and pl. 1a. Yet they are almost entirely fancy—from a tiny fragment of what Theohares takes to show part of a prow (but which may not even be part of a boat at all), he has reconstructed a total ship. Even if a prow is intended, it is not at all one with a ram but only a traditional projecting cutwater (cf. THREE, notes 12 and 13).

⁵ Marinatos nos. 42-51; Kenna, *CMMS* VII nos. 49, 55; Kenna, *Cretan Seals* nos. 241, 288; Xenaki-Sakellariou, *Coll. Gimm.* 339. Cf. Figs. 42-45.

⁶ See Marinatos 200, note 4, for citation of literature. Marinatos (200-208), rightly aware that multimasted ships could not have existed at this date, sought to explain the rig as a square sail divided vertically down the middle into two panels—a blunder arising from his use of 18th and 19th century line-drawings of ship-pictures from Pompeii, which seemed to show such half-sails; cf., e.g., his fig. 6 with Fig. 151. Seals showing poles alone (e.g., Fig. 44) he sought to explain (207) as storm-tossed ships with their canvas torn and in disarray, a conclusion of the evidence hardly warranted. Milner, too, questioned (907) the characterization of these ships as multimasted. Recent editions of seals, however, unconcernedly continue to refer to two- and three-masted vessels; cf. Kenna, *Cretan Seals* nos. 241, 288; Xenaki-Sakellariou, *Coll. Gimm.* 79, 81, 339.

The Eastern Mediterranean:

1000-500 B.C.

By 1000 B.C., after the last waves of barbarian invasion had washed ashore, a new cast of characters appears on the maritime stage in the eastern Mediterranean.

The Mycenaens have left, replaced by the Phoenicians, who swiftly achieved the reputation as seamen and traders that they were to maintain for a millennium. The Phoenicians did not have matters to themselves for very long. In the ninth century B.C., Greeks were back on the scene—Greeks of the Iron Age this time, just starting on their celebrated career in history. By the middle of the next century they had developed the merchantmen and warcraft with which they planted and defended new coastal settlements from Marseilles to the shores of the Black Sea. For both Phoenician and Greek ships, we have the evidence of contemporary pictures. For the Greek we have, in addition, the numerous precious references in Homer's *Iliad* and *Odyssey*.

I THE HOMERIC GALLEY

A PREFATORY remark is in order. Homer composed probably in the eighth century or early seventh B.C.—but he purports to describe a war carried on by the Bronze Age Greeks, the Aegeans, of four to five hundred years earlier. What he says fits very well with what we know of eighth century galleys from other sources (49 below), but also fits the little we know of Aegean galleys, particularly since the poet seems to have been careful not to commit anachronisms.¹ It is safest to assume that he has in mind the vessels he himself sailed on, though certain statements may equally well be true of the previous age.

¹ E.g., he never mentions the ram, although it was a prominent feature of the warcraft of his own day; cf. 49 below.

HOMER constantly calls his heroes' ships "swift"—which is what we would expect of the low sleek hulls pictured in contemporary representations (e.g., Fig. 62).² The ships were "hollow,"³ i.e., undecked. There was a scant deck forward for the lookout and a slightly larger one aft, where the captain or an occasional passenger could stretch out,⁴ the crew did its dozing on the benches, which is why, unless utterly unavoidable, nights were spent ashore.⁵ Gear and provisions were stowed under the decks and rowing thwarts, dry provisions such as grain in leathern sacks, and water or wine in clay jars or skin bottles.⁶

There were several standard sizes of galley. The 20-oared, the smallest mentioned, seems to have been used for ordinary dispatch and transport work;⁷ the 50-oared—or penteconter, to give it the technical name it was known by later—seems to have been a common troop transport;⁸ and there were large carriers which had as many as 100 rowers.⁹ Homer fails to mention the triaconter, the 30-

² For statistics on Homer's use of epithets, see *GOS* 45-46.

³ ἄλαφρος (e.g., *Il.* 2.454, *Od.* 3.287) or κοῖλος (e.g., *Il.* 1.26, *Od.* 1.211).

⁴ *Od.* 12.229-30: εἰς ἑγυῖα πρὸς ἕβανον πρῶτος "I stepped on to the foredeck"; *Od.* 12.411-14: πρὸ μνη εἰς πηλὴ πᾶλ' ἔτε κυβερνήτην κεφαλῆν . . . ὁ δ' ἔθ' . . . κέρπειν ἀπ' ἑγυῖων "[The falling mast] struck the head of the helmsman in the stern of the ship . . . and he . . . fell from the deck." Vase-paintings frequently show the lookout on the foredeck; see Fig. 90. Odysseus slept on the afterdeck of the Phaeacian ship during the voyage to Ithaca (*Od.* 13.73-75), and Telemachus shared the afterdeck with Athena on the run to Pylos (*Od.* 2.416-18) and with Theoclymenus on the way back (*Od.* 15.285-86).

⁵ E.g., *Il.* 1.476; *Od.* 9.150-51, 168-69.

⁶ Grain in leather bags, *Od.* 2.354; water and wine in skins, *Od.* 5.265-66; wine in jars, *Od.* 9.164.

⁷ Chryseis was sent back to her father in a 20-oared galley (*Il.* 1.309); Telemachus used one to go to Pylos (*Od.* 1.280); and the suitors planned to intercept him in one (*Od.* 4.669).

⁸ Philoctetes' transports were 50-oared (*Il.* 2.718-20), as were Achilles' (*Il.* 16.169-70). The only other size of transport mentioned is even bigger; see the following note. Odysseus' transports also seem to have been at least 50-oared: on arrival at Circe's island, the total aboard was 46 (*Od.* 10.203-206) and this was after losing 6 to the Cicones (*Od.* 9.60) and 6 to Polyphemus (*Od.* 9.289, 311, 344). Homer has the Phaeacians use a 50-oared galley to take Odysseus to Ithaca (*Od.* 8.34-36, 48; the *κῆροι* "youths," i.e. the total complement, numbered 52, probably 50 rowers and 2 officers). This may have been an honorific gesture (even as a state today will transport distinguished visitors in a battleship or cruiser rather than a destroyer).

⁹ The Boeotian transports were manned by 120 *κῆροι* (*Il.* 2.509-10), i.e., a total

oared galley, but it almost certainly existed in his day.¹⁰ All types were long and narrow,¹¹ and so low that, when the beached Greek ships were under pressing Trojan attack, Hector could reach up and grab the ornament atop the sternpost, and Ajax could leap from the gunwale to the ground.¹² They were so light that Odysseus could get his vessel free of the Cyclops' island with one good shove on the boat pole,¹³ and the crews could run them up on the beach at night.¹⁴

The hull was black¹⁵—either painted, or, more likely, smeared with pitch. Viewed in profile, stem and stern rose more or less straight for a distance and then finished off in a curve, for Homer compared the shape of his ships to the "straight horns"¹⁶ of cattle as against, say, the curly horns of a ram; contemporary vase-paintings (Figs. 62, 65, 66, 72) show precisely what he means. He also calls them "rounded on both sides," which must mean that, viewed head on, they showed gracefully rounded bilges.¹⁷ The bows were decorated with patches, red or purple or blue.¹⁸ The hull was made up of keel, stempost, sternpost, frames, planks, gunwales, and beams—which may also have served as the rowers' benches—all put together with tree-

complement that must have included deck hands as well as officers and men. On these ships, see 59 below.

¹⁰ Herodotus unquestionably considered it old: he mentions (4.148.3) the use of triaconters in the colonization of Thera, which he thought took place in very early times. For 30-oared galleys in the Bronze Age, see 34 above.

¹¹ For estimates of their size, see 54-55 below.

¹² *Il.* 15.704, 716-17 (Hector); 15.729 (Ajax).

¹³ *Od.* 9.487-88.

¹⁴ E.g., *Od.* 9.546.

¹⁵ *Il.* 1.141, 433, 524, etc.

¹⁶ ὀρθόκηνυτος "straight-horned" (e.g., *Il.* 18.3), but also *κορμῆς* "curved" (e.g., *Od.* 19.182).

¹⁷ ἀμφοῖν ἄστρον, in the Iliad used exclusively and frequently of the Greek ships lined up along the beach (2.165 = 2.181, 9.683, 13.174 = 15.549, 17.612, 18.260) and hence as seen from front or back rather than from the side. Cf. *Od.* 6.263-64, cited in SIXTEEN, note 5.

¹⁸ μῦτροπῆρος "red-checked" *Il.* 2.637, *Od.* 9.125, etc.; φουρικοπῆρος "purple-checked" *Od.* 11.124, etc.; κυανόπῆρος "blue-prowed" *Il.* 15.693, *Od.* 9.482, etc. Bow-patches are a phenomenon common to craft of all ages; see, e.g., R. LeBaron Bowen, Jr., "Maritime Superstitions of the Arabs," *The American Neptune* 15 (1955) 5-48, esp. 5-24. Herodotus' statement (3.58) that "in olden days ships were all dabbed with red" (τὸ δὲ παλαιὸν ἔμρασαι αἱ πῆσαι μῦτροπῆρες) would imply that red was commonest.

nails and joints.¹⁹ There were two massive through-beams, one just behind the fore-decking, the other just forward of the after-decking.²⁰ Ship timber was oak, poplar, pine, fir; masts and oars were of fir.²¹

Oars were worked against tholepins;²² a leather strap held them in place against the pin, and also kept an oar from going over the side if a rower lost his grip.²³ Homer mentions only the single steering oar,²⁴ a large-bladed one on the quarter with a handle socketed into the loom as tiller;²⁵ he may have in mind the Mycenaean Age in this regard, since eighth century pictures (Fig. 74) already show the double steering oars that were to be standard thenceforth.²⁶

¹⁹ *σπόμενος* "keel" *Od.* 5.130, 7.252, 12.421, 422, 424, 438, 19.278; *στέγνα* "cutwater" *Il.* 1.482 = *Od.* 2.428; *ἔφλασσον* either "sternpost" or more strictly "ornament atop the sternpost" as in *Il.* 15.716-17 (the ornament proper is called *ἄκρα κόρυμβια* "high peaks," *Il.* 9.241-42); *στέμματα* "frames" *Od.* 5.252; *τοιχοί*, literally "walls," is used to mean "sides," "side-planking" *Il.* 15.382, *Od.* 12.420; *ἐπηγκένιδες* "gunwales" *Od.* 5.253 (cf. *TEN*, App. 2, note 5); *ῥογά* "beams," "thwarts" *Od.* 9.99, 13.21 (in *Il.* 2.293 a ship is called *πολύῤυγος* "many-thwarted" and in 20.247, in a hyperbole, *ἐκατόῤυγος* "hundred-thwarted"; in open boats such as Homer has in mind, the line of thwarts was a visible measure of size); *ῥόμφοι* "treenails" *Od.* 5.248; *ἀρμολαί* "joints" *Od.* 5.248, 361. For the method of construction, see *TEN*, App. 2. Most of these terms continued in use; see *TEN*, App. 3.

The *Iliad* seems to contain a reference to a more primitive form of boatbuilding with sewn planks; see *ONE*, note 27.

²⁰ The after through-beam was the "7-foot *threnos*" onto which Ajax stepped when leaping down from the poop (*Il.* 15.728-29); the forward one was the *ephol-kaiou* onto which Odysseus says he stepped when lowering himself off a beached ship into the water (*Od.* 14.350-52; cf. *GOS* 49). The latter means literally "low-piece"; very likely it was so called because its protruding butts offered strong points for making fast tow lines. Apollonius Rhodius (4.1609), for example, has a Triton tow by "holding on to the *okhaiou* of the hollow Argo" (*ἐπιρυχόμενος ῥαλαφύρης ὀκhaiou* 'Apyoús); he must be referring to the same feature.

²¹ Oak, poplar, pine, *Il.* 13.389-91 = 16.482-84; fir mast, *Od.* 2.424 = 15.289; fir oars, *Il.* 7.5, *Od.* 12.172.

²² *κλῆιδες* *Il.* 16.170; *Od.* 2.419, 4.579, 8.37, etc. The word means literally "keys," and they look very much like keys in contemporary representations (Figs. 67-69).

²³ *ρροπίς* *Od.* 4.782, 8.53. As the latter passage shows, strapping on the oars was one of the regular steps in the procedure of launching a galley. When rowers lost their grip, the oars, held by the straps, would clatter along the sides (*Od.* 12.203-204).

²⁴ *πῆδαλον* *Od.* 3.281; 5.255; 315; 8.558.

²⁵ *οήϊον* *Il.* 19.43; *Od.* 9.483 = 9.540, 12.118.

²⁶ The poet of the *Homeric Hymns* (7th B.C.) knew the double steering oar; see *Hymn to Apollo* 418: *ἀνα' οὐ πῆδαλαισιν ἐπέθετο ρηῆς* "but the ship did not obey the steering oars."

Rig consisted of a single sail²⁷ placed amidships on a mast that could be raised and lowered. To set sail,²⁸ the crew raised the mast²⁹ from its crutch³⁰ aft by hauling on the forestays,³¹ and set it in its tabernacle,³² which probably projected a certain distance above the keel.³³ The sail was square, bent to a yard.³⁴ Standing rigging consisted of two forestays, one run to either bow,³⁵ and a single backstay.³⁶ Running rigging consisted of braces,³⁷ sheets,³⁸ and brails.³⁹

²⁷ Either *ιστολον* (*Il.* 1.481, 15.627; *Od.* 2.427) or, more commonly, the plural *ιστρία* (*Il.* 1.433, 480; *Od.* 2.426, 3.10, etc.) because the sail was made up, as cloth sails always are, of a series of sewn strips.

²⁸ See, e.g., *Od.* 2.424-26 = 15.289-91 (and *Il.* 1.433-35 for taking in sail).

²⁹ *ιστός* *Il.* 1.434, *Od.* 4.781, etc.

³⁰ *ιστοδοκῆ* *Il.* 1.434. Since the mast was lowered by the forestays, it follows that it dropped sternward, and the crutch to receive it must have been aft. A lowered mast is so pictured on the François vase (*GOS*, Arch. 33 and pl. 11a; 600-550 B.C.). For later practice, see FOURBEN, note 3.

³¹ *πρόστρονοι* *Il.* 1.434, *Od.* 2.425 = 15.290 (cited in the following note).

³² To get past the sirens, Odysseus reports (*Od.* 12.178-79; cf. 51-52, 161-62) that "they bound me hand and foot upright against the *histopedē* and tied the ends of the rope to the [mast] itself" (*μὲ' ἐψησαν θυοῦ χεῖρας τε πῆδας τε / ὀρθῶν ἐν ἱστοπέδῃ, ἐκ δ' ἀπὸ πῆδαρ' ἀνήτων*). Presumably the mast had been left standing even though, with the coming of a calm [168-69], sail and yard had been stowed away [170-71]. Sailing craft of traditional make that are fitted with a retractable mast have a slender vertical casing into which the lowest portion of the mast fits; such a meaning for *histopedē* here would suit the context very nicely. When Telemachus got under way (*Od.* 2.424-25 = 15.289-90), his sailors "raising the fir mast, set it inside the hollow *mesodmē* and fastened it down with the forestays" (*ιστὸν δ' εἰς ἀέντων κοιλίης ἐρσοθε μέσοδμης / στῆσαν ἀεψάρας, κατὰ δὲ προστόρουσαν ἐψησαν*). The *mesodmē* of a house are tie-beams running from rafter to rafter; so the "hollow *mesodmē*" here could be a carling, running fore and aft between two thwarts amidships, that had a hole or notch in it which centered over the mast step. A very similar arrangement appears in a clay model of the 9th or 8th B.C. (Fig. 87).

³³ E.g., a line from Alcaeus (18.6 = D. Page, *Lyrica Graeca Selecta*, Oxford 1968, 148.6) implies that the *histopedē* was a measure of the height of the water in the bilge: in describing a storm, he mentions that *πῆρ μὲν γὰρ ἄντρος ἱστοπέδαυ ἔχει* "The bilge water surrounds the tabernacle."

³⁴ *ἐπίκρουον* *Od.* 5.254, 318.

³⁵ Cf. notes 31 and 32 above. The forestays were run to the port and starboard bows respectively to provide some lateral bracing; Apollonius Rhodius, for example, writes (1.564): "They secured [the mast], stretching the forestays to either side" (*ῥήσαν δὲ προστόρουσι πανυστάσειαι ἐκτρέφει*). When a sudden gust from ahead snapped the forestays on Odysseus' ship, the mast immediately fell sternward and brained the helmsman (*Od.* 12.409-12, cited in part in note 4 above).

³⁶ *ἐπτρονος* *Od.* 12.423; cf. note 39 below.

³⁷ *ἱστροφαί* *Od.* 5.260.

³⁸ *πῆδες* *Od.* 5.260. The helmsman held the lee sheet in his hand (*Od.* 10.32-33). ³⁹ *κάλαι* *Od.* 5.260; cf. 70 below. Paintings of the 6th B.C. indicate how they were

for shortening sail (70 below). Assigning brails to these ships need not be an anachronism for, as we have seen (37 above), there is evidence for them during the Bronze Age. Halyards are not mentioned by name but alluded to.⁴⁰ Sails were of linen, not one piece but, for added strength, patches sewn together.⁴¹ Lines were of twisted papyrus fiber (and probably grass fibers) or of leather.⁴²

The gear carried included mooring lines,⁴³ particularly stern lines⁴⁴ since these ships were generally beached stern to; stone anchors;⁴⁵ perhaps a drain plug for emptying the bilge when beached,⁴⁶ punting poles;⁴⁷ long pikes for fighting;⁴⁸ probably sidescreeens for closing in the waist in heavy weather;⁴⁹ and the bags and jars mentioned above for holding provisions.

rigged (Figs. 89-91). They are always shown drawn taut, so they must have provided some bracing aft, which may explain why these ships carried but a single backstay.

⁴⁰ ἄκρον δ' ἰστέια λευκὰ ἐπιτρέπετροται βοεβήρι "And they drew up the white sails with well-braided thongs" *Od.* 2.426 = 15.291. Milner (910) groundlessly assumes that by the leather ropes here, the backstay is meant.

⁴¹ They are of white (see previous note) linen cloth (ἄβηπος *Od.* 5.258; σπειρίων *Od.* 5.318, 6.269). Cotton was not used since, during the whole of the ancient period, it was an expensive import from remote India.

⁴² Of papyrus fibers, *Od.* 21.390-91; of leather, *Od.* 2.426 (cited in note 40 above) and 12.423. For grass fiber used in light cordage, see *Il.* 2.135 (cited in *Ons.* note 27).

Three specimens of rope were recovered from a Bronze Age shipwreck. At least one was two-strand. Two were of grass fiber, the third a mixture of grass and palm leaf fiber. See Bass, *Gelidonya* 160-61 and fig. 160.

⁴³ πείριαιρα *Od.* 6.269; 9.136; 10.96, 127; 22.465.

⁴⁴ πρηνυήτοια *Il.* 1.436, 476; *Od.* 2.418; 9.137 and 178; 15.498.

⁴⁵ ἄβαλ (*Il.* 1.436, 1477; *Od.* 9.137, 15.498) literally "beds," referring to the look of the flat stones used as they lay on the bottom; cf. ELVERN, note 112.

⁴⁶ Ηεσιδ., *Op.* 626: χελιαρον ἐξέπορας "by drawing the drain-plug."

⁴⁷ κορράλ *Od.* 9.487.

⁴⁸ ναλίαχα βωτά "marine pikes" *Il.* 15.388-89, 676-78 (Ajax' pike was 33 feet long—but Ajax' strength was fabulous). These pikes appear in contemporary illustrations; see *GOS*, *Geom.* 6, 8.

⁴⁹ Alcaeus, fr. 67-8 in Lobel-Page, *Poetarum Lesbiorum Fragmenta* (Oxford 1955) = Page, *op. cit.* (note 33 above) 107-7-8: φαρῆδωλαθ' ἀς ἄκιστα [ἴαλα(?)] / ἐς ἄκυρον ναλιεῖα θῶ[μωικεῖν] "Let us fence our ship as quickly as possible and run for a safe haven"; Aeschylus, *Suppl.* 715: στροβαὶ τε ναλφους καὶ παρασπίλους νείας "the folds of the canvas and the vessel's sidescreeens." On the meaning of φάρων in the passage from Alcaeus, see the note by J. Taillardat in *RPh* 39 (1965) 83-86.

II GALLEYS ON GEOMETRIC VASES

WHAT did Homer's galleys look like?

The answer is supplied in part by the ship-pictures on a series of vases that date roughly 850-700 B.C., the Geometric vases (Figs. 62-72, 74, 77), as they are called from the nature of their decoration.⁵⁰ These portray two classes of galley, one low and open, the other with an elaborate superstructure. To a certain extent both fit Homer's words—they are sleek and fast, have stem- and sternpost so curved as to give the effect of "horns," have round bow-devices that would correspond to Homer's bow-patches, mount a single square sail that can be raised or lowered, show a suitable number of rowers. It is only the open type, however, as we have seen, that he has his heroes use; he may have felt that this simpler form was the sole known in their day.

But both, without exception, show a feature that previous ages never knew and that Homer never mentions: the ram. Very likely it made its debut during the obscure period after 1000 B.C. that marked the transition from the Bronze to the Iron Age. Its introduction must have had as revolutionary an impact as, say, that of the naval gun twenty-five hundred years later. A warship was no longer merely a particularly fast transport to ferry troops or bring marines into fighting proximity with those of enemy ships; it had become an entirely new kind of craft, one that was, in effect, a man-driven torpedo armed with a pointed cutwater for puncturing an enemy hull.

In the wake of the new weapon came, inevitably, far-reaching changes in ship design and construction. From now on, in order to withstand the shock of ramming, all men-of-war had to be built more powerfully and of heavier materials; the bow area in particular had to be as massive as possible, for blows were felt here first and hardest. The changes are visible even in the simple profile drawings in silhouette which are all we have to rely on for this critical period:

⁵⁰ On the material available, see App. 1. For the dating of Geometric pottery, see J. Goldstream, *Greek Geometric Pottery* (London 1968) esp. 26, 30-31, 302-31 (esp. 321, 330-31).

the Bronze Age artist had rendered the bow area as open or with a latticed design; the Geometric artist shows it as a solid, ponderous mass.

Open galleys⁵¹—or aphracts, to adopt the technical term—no less than the galley with a superstructure now carry the ram. They are recognizable (Figs. 62-64) by a lighter hull with but a low rail along the sides, and by a bow area that is less massive, that often lacks room for the round bow-devices which almost invariably distinguish the other class of vessel. More stable because unencumbered by any superstructure, and more swift, they were probably used for carrying dispatches and transporting personnel, the roles Homer assigns them,⁵² leaving their big sisters to serve as ships of the line. Conformably, they are never shown in combat: we see them in elaborate maneuvers (Figs. 62-63) or storm-tossed (*GOS* pl. 6c) or getting under way (*GOS* pl. 7d), but never fighting.

On the other hand, the galleys with a superstructure are almost always shown in combat. The Geometric artist especially fancied scenes of an attack on a beached ship, which enabled him to introduce elements of land-fighting as well. We are fortunate enough to have several pairs of pictures from two different areas of the same vase, and these reveal a deliberate effort to vary the scenes portrayed: in three instances,⁵³ one of the pair depicts a beached galley, its sails stowed out of sight, beset by an attacking force; while the other shows the galley, its sail set and pulling, drawing away from or out of danger (Figs. 65, 66).⁵⁴ All this serves to give us a welcome fund of information about the ship of the line.

⁵¹ See App. 2.

⁵² Cf. notes 7, 8 above.

⁵³ Figs. 65-66 (= *GOS*, Geom. 25). Fig. 67 (= *GOS*, Geom. 4) + *GOS*, Geom. 7; cf. E. Kunze, "Disiecta membra attischer Grabkratere," *Eph. Arch.* (1953-54, pt. 1) 162-71, esp. 166-67, for attribution to the same vase. *GOS*, Geom. 5(2) (= Kunze, pl. v.1) + *GOS*, Geom. 8 (= Kunze, pls. v.3/vi.1/vi.2; cf. Kunze 167 for attribution to the same vase).

⁵⁴ Kirk, who is quick to interpret in the light of artistic convention (see Apps. 1 and 2), characteristically views (103) the inclusion in the same scene of warriors on land and a ship under sail as one of "the unrealistic tendencies of the conventional Dipylon ship-style." Cf. also his remarks on his no. 28.

The superstructure consists primarily of a deck raised perhaps a good two feet above the line of rowers. In a certain number of paintings (Fig. 67), warriors appear on the deck and, at a distinctly lower level—the distance from a man's foot to his thigh, as will be clear in a moment—is the gunwale, sometimes shown with the key-shaped tholepins (Figs. 67-69) against which the oars work.⁵⁵ The oars themselves and the rowers do not appear, for these are all scenes depicting an assault on a beached ship; presumably the oarsmen are among those fighting to repel the attackers.

At bow and stern were short, rather high platforms (Fig. 72). The one forward—the most important fighting station—was surrounded by a protective palisade (Figs. 67-69). The deck proper, set at a slightly lower level (Fig. 67), ran the full length from the fore to the after platform (Fig. 72), but not the full width from gunwale to gunwale; along the sides the planking must have been left off. This can be deduced from the way the artists position the figures they include. In certain fighting scenes warriors are portrayed with their feet at the rowers' level, their thighs at the raised deck level, and their bodies towering above it (Figs. 68-69);⁵⁶ obviously they are standing on the rowing benches, or on some gunwale-level decking, at a point uncovered by the raised deck. Certain sailing scenes show rowers plying their oars from the same level as the raised deck (Fig. 72).⁵⁷ Obviously the part left uncovered must have been that along the side, where rowers would sit.⁵⁸

Adding such a deck did vastly more than provide these galleys with a useful platform. It enabled the shipwrights to convert a light

⁵⁵ For other examples of the tholepins, see *GOS*, Geom. 5(1), illustrated in Kirk, pl. 30.1; *GOS*, Geom. 6, illustrated in *Ath. Mitt.* 17 (1892) 300, fig. 7.

⁵⁶ For another example, see *GOS*, Geom. 3, illustrated in *JHS* 78 (1958) pl. 13c.

⁵⁷ On the rowers in these scenes, see 55 below.

⁵⁸ Whether the raised deck ran along the center, leaving the sides open, or vice versa, has raised much discussion; cf. Kirk 128-29 and Williams, *GOS* 15-16. Since Kirk considered rowers shown on the raised deck as not really being there (see note 74 below), he was able to argue for side decks. As we shall see (Figs. 75-76), nearly contemporary Phoenician galleys had decking along the center only; it is hardly likely that Greek craft, so similar in most other fundamental respects, differed in this. Egyptian galleys were also decked this way; see 21 above.

hull, which was vulnerably low amidships and offered scant protection to the rowers, into a powerful one with high sides that offered a good deal of protection. Such a conversion had become a *sine qua non*, thanks to the ram: a light hull was fine for ships whose prime purpose was to catch up with and swing alongside an enemy, but not at all for those who must slam their beaks into his side or receive such an attack from him. In the earliest pictures (Figs. 30, 65-66), dated to the latter part of the ninth century B.C., the raised deck is represented as a thin line resting on a row of slender stanchions,⁵⁹ which were so placed as to frame the rowers.⁶⁰ The deck itself, bridging the two ends of the vessel, added welcome longitudinal stiffening; but the slender stanchions left the sides as frail as ever. By the middle of the eighth century B.C., the thin line is replaced by a complex of lines—a thick black band outlined by two thin lines (Figs. 67-69, 72, 77).⁶¹ I take⁶² the band to represent heavy planking, and the lines about it⁶³ to be wales that girdled the ship laterally for added strength (Fig. 69).⁶⁴ These additions not only reinforced the sides but, at the same time, by reducing the area between deck level and gunwale level to no more than a wide slot, gave a certain amount of screening to the rowers. By the end of the century the slot was further closed in when wide partitions replaced the narrow stanchions (Figs. 70-71). Thucydides in the fifth century remarked of the ships which went to Troy that they "were not fenced in (*cataphracta*) but were vessels fitted out rather pirate-style in the old-fashioned way." The Geometric vase-paintings reveal that the process of "fencing in" the

⁵⁹ For other examples, see *GOS*, Geom. 26 and pl. 6c, Geom. 27, illustrated in *A/4* 44 (1940) pl. 22.1. Williams (*GOS* 30) assigns a later date to Figs. 65-66 largely on the basis of its "more natural and developed perspective." For the date I have used, see Coldstream, *op. cit.* (note 50 above) 26, 321. On Williams' views concerning Geometric perspective, see App. I.

⁶⁰ When the tholepins are included (Figs. 67-69), they are placed one each in the middle of the space bounded by a pair of stanchions.

⁶¹ Cf. Williams, *GOS* 14-17.

⁶² See App. I.

⁶³ Kirk (100) dismisses these lines as decorative only.

⁶⁴ Wales are a standard feature in later pictures of both merchantmen and warships; cf., e.g., Figs. 82, 90, 94, 97.

"old-fashioned" open craft of the Homeric poems—or, to use the Greek terminology, converting them into *cataphracts*⁶⁵—was well on its way by about 700 B.C.

III THE INVENTION OF THE TWO-BANKED GALLEY

The introduction of the ram thus triggered the development of a powerful type of war galley with raised deck and screened sides. And the raised deck, in its turn, made possible a rearrangement of the oars that was to determine the entire future course of the ancient warship.

First, some introductory remarks on the oarage of galleys as revealed by the full span of their history. The earliest and simplest way to arrange rowers was to put one at each oar and to seat them all horizontally in a single line, as was done in Pharaonic Egypt (e.g., Fig. 18), very likely on Mediterranean craft of the Bronze Age (e.g., Fig. 22), and certainly on the ships Homer describes. As warcraft grew in size and needed more power, additional oarsmen joined the line—but only up to a certain point: a rower needs a minimum of three feet of room,⁶⁶ and putting too many of them in single file results in an overlong craft dangerously frail amidships. One solution to the problem, the best known to us since it was adopted in the notorious slave-driven galleys of the sixteenth to eighteenth centuries, was to replace the one-man oar with a big sweep pulled by a number of rowers; this provided the desired increase in muscle without any in the vessel's length (though necessarily in the beam, thereby producing a heavier ship). A variant arrangement, favored particularly by the Venetians in the fourteenth and fifteenth cen-

⁶⁵ For the passage from Thucydides, see *FIVE*, note 58. A *cataphract* ship was *ipso facto* a ship with a raised deck since the "fencing in" covered the space between the deck and the gunwale below; cf. 88 below. *Aprhacts*, though they could have decks at either end, and some decking at gunwale level (see note 88 below), had no raised deck from which side screening could be hung and were hence "unfenced"; cf. Tallardat, *op. cit.* (note 49 above) 86-88.

⁶⁶ See Morrison, "Trireme," 21-22, *GOS* 155. Torr's statement (21, note 56) that the distance between tholepins was variable is a mistake.

turies, was to stick to individual oarsmen each pulling one oar, but to crowd three or four together in echelon on the same bench; this tripled or quadrupled the total number of rowers while adding much less proportionately to the vessel's length. Both multiple-rower sweeps and the variant just described required a stroke in which the oarsmen rose from the benches to a full standing position and then threw themselves back on the benches again.⁶⁷

Still another way to gain more oar-power and yet avoid both an overlong hull and the fatiguing sit-stand-sit stroke was to put the oarsmen in superimposed lines instead of all in one. This was, for example, the method used in the Mediterranean from Byzantine times until the Venetians came up with their variant, in Indonesian waters until very recently, and, as we shall see in a moment, by the ancients.⁶⁸ Its great advantages were that it permitted a narrow, fast hull and allowed the rowers to remain seated during the whole of their stroke. That only expert crews could be used and that the hull, standing somewhat high above the water, lost in stability were the chief disadvantages.

To return to the Geometric vases. Among the ships pictured, those identifiable as aphracts were powered, as they are in Homer, by one line of oarsmen. The rowers indicated vary in number from 8 to 19,⁶⁹ but such figures must not be taken too strictly; vase-painters neither then nor later attempted photographic reproduction. When an artist shows 8 rowers on a side, he is perhaps portraying the 20-oared galley that we know from Homer was a standard size; when he shows 19, perhaps he is attempting a penteconter.⁷⁰ These ships would all be markedly long. A single-banked penteconter would run some 125

⁶⁷ *IH* 70-74, 117-25 and *ills.* 91, 92, 95, 147, 148.

⁶⁸ *IH* 42, 130 and *ills.* 51, 155; Tarn's doubts ("Warship" 206, note 85) of the validity of the evidence for Malay biremes and triremes are totally unwarranted; cf., e.g., C. Nooteboom, "Eastern Diresmes," *MM* 35 (1949) 272-75.

⁶⁹ See App. 2. The second example listed there shows 13 rowers, and the eighth 19. If we assume that the space between each pair of stanchions accommodates 1 rower (cf. 52 above and note 60), the seventh in the list had 10 rowers, and the third 8.

⁷⁰ Cf. note 93 below.

feet in length: 75 to accommodate the rowers and 40 to 50 more for poop deck, foredeck (the larger of the two), and ram.⁷¹ The beam would be about 13 feet.⁷² A single-banked triaconter would run some 75 feet in length, and a single-banked 20-oared galley, 50.

So much for aphracts; now for ships furnished with a raised deck. The artists often paint in the oarsmen or—what is just as useful for our purpose—the tholepins about which the oars pivoted. Such pictures (Figs. 67-69, 77)⁷³ make it clear that the rowers sat at gunwale level, well below that of the deck, as we remarked earlier. But there are also pictures (Figs. 72, 74) in which the oars are indisputably worked from deck level.⁷⁴ In other words, the deck was not only a platform for personnel; it doubled as a platform for oars—these ships could be rowed *either* from the gunwale *or* from the deck. The artists furnish clues to what circumstances called for what level. In action, when the decks had to be kept clear and the oarsmen protected, rowing was done from below.⁷⁵ When there was no danger, rowing could be done from above where, in any kind of sea, oarsmen no doubt stayed a good deal drier (Figs. 72, 74).⁷⁶

If the oars could be worked from either level, why not from both

⁷¹ E.g., the artists of the black-figured vases generally give about 2/5 of the overall length to the poop deck and the complex of ram and fore deck (the latter gets the lion's share) and 3/5 to the rowing area. However, a carefully done relief (Fig. 73) which portrays a ship of the very same type as those on the black-figured vases, allows as much as half to ram and decks. So, too, apparently, does the best preserved of four sketchy seventh century wooden models of galleys found in the ruins of the Heraeum on Samos; see *Ath. Mitt.* 68 (1953) III-18, fig. 27.

⁷² The model mentioned in the previous note shows a length to beam ratio of 10 to 1, and the same was true of a 5th century Athenian trireme (82 below). The ship on whose stern Ajax took his stand measured 7 feet along the *threnos*, i.e., just forward of the poop (cf. note 20 above); presumably it was somewhat wider amidships.

⁷³ For additional examples, see notes 55 and 56 above; *GOS*, Geom. 10 and pl. 3c; cf. *GOS*, pl. 3d; *GOS*, Geom. 11 and pl. 4a; *GOS*, Geom. 15.

⁷⁴ See also *GOS*, Geom. 39 and pl. 7b, possibly Geom. 20 and 21. In these representations, the oars, plain as day, are worked from the raised deck. Kirk (130) would have it that this is just another instance of the Geometric artist's conventional treatment: the rowers, he claims, should be below, but the artist has put them above to avoid overcrowding and to improve the total composition.

⁷⁵ *GOS*, Geom. 11 and pl. 4a.

⁷⁶ In Fig. 72, a vessel is cruising in balmy weather; in Fig. 74 and *GOS*, Geom. 39 the ships are making a peaceful departure.

at once? A series of representations reveals that vessels were indeed so rowed from the latter half of the eighth century B.C. onward. A fragment (Fig. 77), dated ca. 750 B.C., shows the earlier type of galley, that with deck and open sides, driven by oarsmen along both the gunwale and the deck, while two others (Figs. 70-71), dated ca. 700 B.C., show the latter type, with deck and well-screened sides, also driven by superimposed oarsmen. Finally, Assyrian reliefs (Figs. 75-76, 78) from the palace of Sennacherib, who reigned between 705 and 681 B.C., show Phoenician vessels that, with two lines of rowers working their oars from inside the hull, are full-fledged two-banked craft.⁷⁷

The germ of the two-banked galley, then, lay in adding a raised deck and, *ipso facto*, making available a second level at which oarsmen could be placed. As the Assyrian reliefs graphically reveal, the new ship in its fully developed form was no mere decked single-banker with the complement of rowers doubled. A shipwright could not help but realize that superimposing the rowers would enable him to take further strides in his favored direction, the building of stronger, more shock-resistant warcraft. A 50-oared galley with rowers in two banks, for example, would be perhaps half the length of its single-banked sister—some 65 as against 125 feet; a two-banked triacontar would run some 45 feet as against 75 for the single-banker.⁷⁸ The shorter craft would inevitably boast a hull that was more robust, more seaworthy—and that offered a good deal less of a target to an enemy ram.

The Assyrian reliefs are of key importance, for they reveal the final improvement in design that brought about a proper two-level galley. The eighth century prototype had been a top-heavy craft with one line of oarsmen at gunwale level and the other at the level of the

⁷⁷ The reliefs show the evacuating of Tyre by the king of Sidon, as R. Barnett has demonstrated; see *Archaeology* 9 (1956) 91-93, where he has published a newly discovered piece of the relief (ill. 9 on p. 93) which supplied the clue. That the ships are Phoenician is now a certainty. The originals have been lost except for one piece; for a photograph of this, see *Eretz-Israel: Archaeological, Historical and Geographical Studies* 9 (1969) 6 and pl. 1.

⁷⁸ Cf. 54-55 above and note 71.

raised deck. In the Phoenician version visible on the reliefs, we see an infinitely more compact ship, whose upper oars are worked from the gunwale itself, and the lower through ports in the hull. To fit everyone in with economic use of space, the oars of the two banks are staggered: each one of the upper is centered over the space between two of the lower. The first step toward the creation of the ship rowed in bireme fashion had been an increase in the side planking that left but a wide slot for the lower bank of oars (52 above); the last step, it appears, was the closing in of the slot, thereby making the hull solid right up to the level of the erstwhile raised deck.

The change inevitably brought in its wake a change in the position of the deck. Had this been left untouched, it would have been even with the rowers in the upper bank instead of being above them. It had to be raised—and, fortunately, one of the Assyrian reliefs (Figs. 75, 76) is detailed enough to reveal how this was done. We see what seems to be a line of stanchions forming squares that frame the rowers like those in the Geometric ship-pictures. But a glance at the position of the hands and arms shows the truth of the matter: the artist has carefully portrayed these as being *outside* the stanchions. The stanchions then, do not rest on the gunwale but are *inside* the hull, supporting a raised deck that runs over the centerline area only (Fig. 75).⁷⁹ This superstructure, offering no possibility for the seating of oarsmen, was a fighting deck pure and simple.

A galley with such a fighting deck must have proven particularly useful, because it was produced in a single-banked version as well. A relief (Fig. 79) from Asia Minor that dates between 725 and 680 B.C. and is clearly Phoenician in inspiration,⁸⁰ shows a vessel similar to the

⁷⁹ The plan, Fig. 75, is from Salonen, *Wasserfahrzeuge* 40, who was the first to point out this feature. Basch (148), in dismissing it as the mere result of artistic convention, is being unfair to a careful and consistent sculptor; see my note in *MM* 56 (1970) 31.

⁸⁰ Found at Karatepe in Cilicia; see R. O'Callaghan in *Orientalia* 18 (1949) 193-99 and pl. 27. For date and connection with Phoenicia, see H. Frankfort, *The Art and Architecture of the Ancient Orient* (Pelican History of Art 1954) 186-88. A horizontal supported by vertical stanchions runs from afterdeck to foredeck; two figures seated upon it prove that a deck, not a rail, is intended.

A Phoenician galley appears in a fragmentary Assyrian wall-painting of the 8th

Phoenician bireme in all key respects save one: it has rowers only along the gunwale (the hull, having to accommodate but one bank of oarsmen, is as a consequence somewhat shallower). The type, first attested here, apparently swiftly gained favor elsewhere (60-64 below).

Thus, the earliest evidence for important advances in naval construction comes from the east, predating that from Greece by at least a century (60 below). The credit, it would seem, ought to go to Phoenician shipwrights. Do they also deserve credit for the total development—for the introduction of the galley with a raised deck? Or, indeed, for the introduction of the ram itself? Both these features, to be sure, make their first appearance on Greek vases of the ninth century B.C.—but this may simply reflect the fact that Greeks liked to decorate ceramics with maritime scenes and Phoenicians did not. For the time being, at any rate, it is safest to leave such questions open.

What were the sizes of the earliest biremes? Among the Phoenician vessels pictured on Assyrian reliefs, there are examples of 8 oars per side, of 9, 11, 15, and one has at least 17 and very likely more.⁸¹ Herodotus and Thucydides, in dealing with the warcraft of this age, speak of triaconters and penteconters; those in contexts implying dispatch or transport could be either single-banked or double, more likely single, but those described as serving as ships of the line are surely double-banked. When Homer specifies (note 8 above) that the ships in which Philocteres or Achilles ferried their troops to Troy were penteconters, he probably has single-banked craft in mind—

B.C. (F. Thureau-Dangin and M. Dunand, *Til-Barsib*, Paris 1936, pp. 71-72, and frontispiece; for a far clearer reproduction see G. Garbini, *The Ancient World*, New York 1966, p. 86, fig. 50). Whether it is a combat craft or just a naval auxiliary is uncertain. The forefoot juts out in a long needlelike extension, but this may be only the structural projecting forefoot (cf. 35 above) and not a ram, since rams on Phoenician warships are distinctively cone-shaped (Figs. 75-76, 78-79).

⁸¹ See Figs. 76, 78. The craft with 15 oars per side—a two-banked triacontar, with 8 oars in the upper bank and 7 in the lower—is illustrated in V. Place, *Ninive et l'Assyrie III* (Paris 1867) pl. 50 bis, no. 3 (= Köster pl. 16 and *Antiquity* 32, 1958, pl. 22a), a relief from the time of Assurbanipal III (668-after 633 B.C.).

but when Herodotus and Thucydides assume the pentecontar to have been the standard ship of the line until the arrival of the trireme, they surely have the two-banked version in mind.⁸² And ships with rowing complements much larger than 50 necessarily were biremes. For example, Homer gives to the Boeotian contingent the distinction of using galleys that carried 120 men each, which must include the officers and deck personnel as well as rowers (cf. note 9 above). The figure cannot be dismissed as poetic fancy, for Thucydides, no armchair admiral, accepts it as sober fact.⁸³ Such ships had to be biremes: a galley with two banks per side of, say, 25 to 30 rowers is perfectly feasible (the two lower banks of a trireme, as we shall see, had 27), but a galley with 50 to 60 on each side—some 200 feet in length at the very least⁸⁴—that would still be narrow enough to be a useful fighting ship is a structural impossibility.⁸⁵ The Boeotian galleys, as it happens, are the largest warships recorded until the invention of the trireme.

The rig carried by all the various war galleys of this age was

⁸² Herodotus and Thucydides make it clear that, for many years before the widespread use of the trireme in the 5th B.C., the standard warship was the pentecontar; see Davison 19-22. On the other hand, they never mention two-banked craft, although, as we have seen, these had made their appearance before 700 B.C. This has been reckoned a problem (cf., e.g., Davison 23-24, Kirk 136-37), and various solutions have been offered. Kirk, for example, has suggested that the two-banked galley was but short-lived among the Greeks, lasting just long enough for them to discover that it was "unsuitable for the open sea"—a solution which, *inter alia*, overlooks the fact that two-banked galleys served the Roman and Byzantine fleets for nearly a millennium. Actually there is no problem. One arises because it has been presumed that since a pentecontar was in origin single-banked, it always remained so. A pentecontar was a galley with 50 or so oars whether they were in one line or two (cf. *AM* 84-86, Anderson 4-5, *GOS* 155). Herodotus and Thucydides, to be sure, never characterize penteconters as two-banked; neither does a modern historian bother to characterize, say, today's fighter aircraft as jet-propelled. As it happens, the one clear reference we have to a two-level pentecontar is from a tragic poet. Euripides, *IT* 407-408, describes Orestes' ship, which is a pentecontar (cf. line 1124), as moving "with a double-beat [*diphrotos*] surge of oars of fir" (*phōthlos eNArthros dikpōrotai kōrtas*); cf. *GOS* 194-95.

⁸³ See note 103 below.

⁸⁴ Allowing only 30-50 feet for afterdeck, foredeck, and ram—no more than in a pentecontar; cf. note 71 above.

⁸⁵ Cf. Torr 3. Anderson 2 suggests that they were single-banked with two men to each oar. Perhaps—but the subsequent development of the galley that culminated in the trireme would seem to be against this.

standard: the single square sail set amidships on a retractable mast. On the Geometric vases the sails are filled in with cross-hatching (Fig. 66), probably to represent the sewn patches that made up the surface. The stays are best shown on the Phoenician ships (Fig. 78), a double forestay and single backstay, just as described in Homer (47 above). The mast-top, known from the Bronze Age (Fig. 61) though not mentioned by Homer, continued in existence, at least on some ships (Fig. 80).⁸⁶

IV SIXTH-CENTURY WARCRAFT: THE BLACK-FIGURED VASES

For the seventh century B.C., representations of ships⁸⁷ are relatively few and portray only single-banked galleys, both aphaeracts⁸⁸ and the new version with fighting deck,⁸⁹ the first Greek evidence for the latter. For the next century, the period of the black-figured vases, the material is abundant.⁹⁰

Though artists of this age have the same partiality for single-banked craft with their more slender, elongated lines (Figs. 88-90), they have left a good number of representations of two-banked galleys, which, as we would expect, are all the latest version with solid hull and the lower oars worked through ports (Figs. 81-83, 85).⁹¹ These are, as it happens, of a lighter class, with no fighting deck.

⁸⁶ See also *GOS*, Arch. 8 and pl. 8c.

⁸⁷ A full catalogue of the evidence is presented by Williams in *GOS* 73-83.

⁸⁸ For examples of 7th century aphaeracts, see *GOS*, Arch. 2, 27, 28; cf. Kirk 119-23. *GOS*, Arch. 2 shows an interesting scene. The rowers, having dropped their oars to don battle dress, are standing at attention. Since their feet are on a level with the oars, they must be standing either on the rowing thwarts or, equally likely, on a line of gunwale-level decking that ran down the center. Williams (*GOS* 74) argues that, since the circular shield was in reality a small affair covering only the upper body, the men must be seated; other pictures, however (see Fig. 80), show the same kind of shield covering the entire body.

⁸⁹ *GOS*, Arch. 5 and pl. 9a (from the same source as Fig. 80, the famous vase by Aristonothos [= Torr, ill. 3.15]); *GOS*, Arch. 31 and pl. 10d, an ivory plaque from Sparta.

⁹⁰ Williams (*GOS* 84-117) furnishes a comprehensive catalogue of the evidence. ⁹¹ Other examples are BM 60 (*AM*, pl. 6b; cf. *GOS* 112 and pl. 22b) and G. Micali, *Storia degli antichi popoli italiani* (Milan 1836³) pl. 103.3. Possibly the fragment by Exekias (Fig. 88) should be included; see 62-63 below.

On the other hand, single-banked galleys with a fighting deck over the centerline, more graceful versions of the type first attested in the previous century, are common (Fig. 84).⁹²

The pictures are abundant and varied enough to illustrate galleys of all sizes:⁹³ single-banked⁹⁴ and double-banked penteconters,⁹⁵ single-banked⁹⁶ and double-banked⁹⁷ triremes, and a variety of other types. $2 \times 25 = 50$ and $4 \times 13 = 52$ (pls. 12b, 14c and d, 17a and c-e, 18d, 21a and d).

Vessels with a fighting deck can generally be distinguished from those without. The latter have above the hull a line or set of lines, often very light, running past the rowers' faces to indicate a rail (cf. Fig. 89); the former invariably have a heavy line (cf. Fig. 84) supported by vertical stanchions (which may be omitted; cf. App. 1, note 6) running over the heads of the rowers. Now, a rhyton of ca. 600 B.C. in the form of a ship (*GOS*, Arch. 30, pl. 10c)—a poor object to use, but three-dimensional evidence is so scarce we cannot afford to be choosy—has the foredeck's palisade set well inboard of the sides. If we prolong the lines of the palisade, they follow exactly the course of a fighting deck covering only the area over the ship's centerline.

⁹² Even in the case of these sophisticated artists, the number of rowers shown cannot be taken at face value precisely. This is obvious from the way the number of rowers' heads and the number of oars more often than not disagree. A very instructive example is the fragment of a mixing bowl done by the famous Exekias (*GOS*, Arch. 53; Fig. 88 shows two of the five ships figured), so noted for his skill and care (cf. Davison 24; Williams, *GOS* 91). Five ships are shown. Of the two best preserved, one has 23 heads and oars (Fig. 88, ship to left)—but the other has only 20 heads for 29 oars (Fig. 88, ship to right).

Another clear case in point is a bowl in Vienna with four ships painted about the rim (*GOS*, Arch. 51). Although the oars are very few—from 7 to 11—there are consistently two or three fewer or more heads than oars (*GOS* pl. 14a-b shows three of the ships, and the fourth has been reproduced in *Art in America* 29, 1941, p. 210, fig. 1). A bowl in Madrid (*GOS*, Arch. 65) has five ships painted about the rim (*CV4* III H e pl. 6.3 and 7.1-4 [Spain, pls. 24-25]). Of these, three are perfect triremes, 15 heads and 15 oars. Yet, of the other two, one lacks an oar and a second was given 16 heads and oars. The vase in Vienna, as it happens, is connected with Exekias (*GOS* 91).

Often the artist paints in many more heads than oars, even double the number. The fact that he will double the number is significant: it seems likely that he was trying to indicate, sometimes summarily, the rowers on the farther side. E.g., a bowl in the Louvre, F 61 (*GOS*, Arch. 67), has one ship (*GOS* pl. 17c) with 23 heads to 13 oars and another (not illustrated) with exactly 20 heads to 10 oars; another on the same vase has 18 heads and 11 oars (*CV4* III H e pl. 2.4 [France 74]). *GOS*, Arch. 81 bis shows four ships, one of which has 9 oars and 16 heads; another 10 oars and 23 heads (or 24, allowing for one hidden behind the forward parapet); a third 11 oars and 23 (or 24) heads, and a fourth 12 oars and 18 heads. Paris Bibl. Nat. 322 (*GOS*, Arch. 81) has one ship (*GOS* pl. 18b) with 27 heads to 15 oars and another (*CV4* III H e pl. 5.35 [France 439]) with 28 to 16. London B 679 (*GOS*, Arch. 93) has one ship (*GOS* pl. 21d) with 26 heads and 16 oars.

All the above renders doubtful the value of putting much weight on the precise number of oarsmen depicted, as Williams (*GOS* 29, 39) occasionally does.

⁹³ *GOS*, Arch. 54 (pl. 14c) ca. 18 oars and ca. 28 heads; *GOS*, Arch. 55 (*CV4* III

$$2 \times 10 = \frac{2 \times 15}{4 \times 8} = \frac{3}{2}$$

gle-banked and double-banked (Fig. 85) triaconters,⁹⁶ single-banked stand either for 40-oared galleys or for penteconters,⁹⁹ even as those with 12 or 13 a side may stand for triaconters.¹⁰⁰ One ship, painted by Exekias, among the most skilled and careful of the black-figure artists, has 25 oars, and, in addition, a row of ports in the hull; it

H e pl. 2.1 [France 74], ship to left) 26 oars and 24 heads; Arch. 73, 25 oars; also GOS, Arch. 53, pl. 14d, if it is not two-banked (see 63 below).

⁹⁶ The galley in Figs. 81-82, though in effect a double-banked penteconter (12 oars in the lower bank, 10 visible in the upper) strictly speaking is a *hemiolis*; see 128 below.

⁹⁸ Single-banked: GOS, Arch. 63 = Louvre F 145 (CV4 in H e pl. 88.5 [France 62g]), four ships, one with 16 oars, another with 17, a third with 14; GOS, Arch. 72 = Louvre Camp. 11247 (CV4 in H e pl. 155.8 [France 828]) 14 oars and 15 heads; Arch. 65 = Madrid 10902 (cf. note 93 above); Arch. 68 = Villa Giulia 959 (CV4 in H e pl. 56.2 [Italy 140]), 14 oars and heads; Arch. 81 = Paris Bibl. Nat. 322 (see note 93 above), one ship with 15 oars and another with 16; Arch. 93 = London B 679 (see note 93 above) one ship with 16 oars; Arch. 74 = Berlin 1800 (GOS pl. 17e) 15 oars and apparently the same number of heads.

Double-banked: Fig. 85, 8 oars in each bank; perhaps Fig. 83, 6 oars in each bank. Cf. the Assyrian relief of a galley (see note 81 above) with 8 oars in the upper bank and 7 in the lower.

⁹⁷ GOS, Arch. 61 and pl. 16c = Leningrad B 1525, one ship with 9 oars and ca. 16 heads; Arch. 67 = Louvre F 61 (see note 93 above), one ship with 11 oars and 18 heads and another (not illustrated) with 10 oars and 20 heads; Arch. 97 = Louvre Camp. 11248 (CV4 in H e pl. 155.10 [France 828]), 10 oars and 9 heads; Arch. 91 = Würzburg 527 (E. Langlotz, *Martin von Wagner-Museum der Universität Würzburg, Griechische Vasen*, Munich 1932, pl. 135) 10 oars and heads and (GOS pl. 21b) 11 oars and 10 heads; Arch. 35 and pl. 11d = Louvre E 735, 10 oars; Arch. 51 and pls. 14a and b = Vienna 3619, one ship with 10 oars and 9 heads, another with 11 and 8, a third with 9 and 7; Arch. 68 = Villa Giulia 959 (see note 96 above, pl. 56.1) 10 oars and 16 heads; Arch. 90 (= *AM* pl. 5a), 11 oars and 16 heads; Arch. 79 and pl. 18a = London E 2, 11 oars and 18 heads; probably Arch. 81 bis, which shows four vessels with oars ranging from 9 to 12 (see note 93 above).

⁹⁸ GOS, Arch. 66 and pl. 17b = Leningrad 86, one ship with 18 oars and 17 heads, another with 17 and 18; Arch. 56 and pl. 14g = Munich 781, 19 oars and 22 heads; Arch. 53 (see note 93 above; not illustrated), 20 oars; Arch. 55 = Louvre F 62 (my Fig. 89) 22 oars and heads; Arch. 70 = Louvre Camp. 11244 (CV4 in H e pl. 154.6 [France 827]), 20 oars and heads; Arch. 84 and pl. 18d = Salerno Museum *dinos*, 19 heads (no oars shown).

⁹⁹ Cf. note 93 above.

¹⁰⁰ GOS, Arch. 67 and pl. 17c = Louvre F 61, 13 oars and 23 heads and still another on the same vase (see note 93 above) has 11 and 18; Arch. 92 = Naples bowl (*Academia dei Lincei, Monumenti Antichi* 22 [1913] pl. 60.2; cf. GOS pl. 21c), one ship with 13 oars and 18 heads, another with 12 oars; Arch. 68 = Villa Giulia 959 (see note 96 above, pl. 56.3), 13 oars and 16 heads.

looks for all the world like a two-banked 100-oared vessel being rowed from the upper bank alone.¹⁰¹ Still another (Fig. 88) with a row of ports in the hull and, above, a line of 29 oars,¹⁰² looks like the exact equivalent of the type that Homer ascribes to the Boeotians (note 9 above). As a matter of fact, numbers of galleys larger than the penteconter must have been common in this period, common enough to induce Thucydides to conclude that the penteconter was the smallest transport unit in the fleet dispatched against Troy.¹⁰³ Very likely it gained its favor after experience proved it to be a particularly efficient size. A special version of the two-banked galley was produced on the island of Samos, one somewhat wider and roomier than usual so it could serve as cargo-carrier as well as man-of-war.¹⁰⁴

Sixth-century representations reveal a number of details that could not be discerned, or discerned as well, in the simpler drawings of previous ages. Horizontal lines indicate wales, stout timbers that

¹⁰¹ GOS, Arch. 53, pl. 14d.

¹⁰² Williams (GOS 97) interprets all the ships shown on this vase, with a row of ports below a line of oars, as two-banked.

¹⁰³ Thucydides 1.10.4: *πεπολυκε γὰρ χυλῶν καὶ διακοσίων πλοῦν, τὰς μὲν Βοιωτῶν ἑκάστω καὶ ἑκατὸν ἀπόρων, τὰς δὲ Φιλιοκρήτου πενήνηκοιτα, θηλαῶν, ὡς ἑκατὸ δοκεῖ, τὰς μεγίστας καὶ ἑξαχίλων· ἔλλαθ γούνη μεγέθους πέντε ἐν νεῶν καταπόνησιν οὐκ ἐμνήσθη. ἀνεφέρεται δὲ ἑπτὰ ἡσάων καὶ μεχέλιαι πέντες, ἐν ταῖς Φιλιοκρήτου ναυαὶ δὲ ἑξήλων· τοσούτας γὰρ πέντερας πεπολυκε τοὺς προοκόπουσ· πεπλοῦσ δὲ οὐκ ἐκίς πολλοῖσ ἐμνήσθη ἕξω τῶν βασιλέων* ["Homer] has, out of the 1,200 ships, made those of the Boeotians 120 and smallest units. Of the size of the others, at any rate, the Catalogue of Ships makes no mention. That the men all were at the same time both rowers and fighters he has made clear for Philoctetes' ships, for he has included all the archers as oarsmen. Nor is it likely that many passengers were included in the voyage, aside from the chieftains." Thucydides thus makes it clear that, as he understands Homer's figures, they refer to the number of rower-fighters aboard each ship and do not include any significant number of nonrowing passengers. Morrison (GOS 46, 68) believes that Thucydides overrated the size of early galleys, but it is dangerous to doubt the word of a trustworthy historian who was an admiral in the bargain.

¹⁰⁴ The *Samnia* or *Samaina* "Samos-craft." Plutarch, *Per.* 26.3-4: *ἡ δὲ Σάμνια ναὺς ἕρτω ὑπόρουπος μὲν τὸ σίγμα, κολοστέρα δὲ καὶ γαστροπόδις, ὥστε καὶ πορτοπορεῖν καὶ ραχυνάουρεῖν, ὄρω δὲ ἀνοικήθη διά τὸ πῶδρον ἐν Σάμνι φανήρα, Πόλυπλοῦτος τυράννου κατασκευάσεντος* "The *Samaina* is a vessel board-prowed at the nose and rather big-bellied and roomy so as to sail on open water as well as serve as a galley of the line [*fachmatain*]; see FIVE, note 81]. It was so called because it made its first appearance at Samos, where Polycrates the Tyrant had some built"; cf. Herodotus 3.59. Polycrates reigned ca. 532 to 523 B.C. Phoebus and Suidas, s.v. *Σάμνιον* ὁ ἄνημος specify that the ship was two-banked (*dikrotos*; see 133 below).

girdled the ship horizontally (e.g., the twin lines just above the oar blades in Fig. 89 and below the oarports in Fig. 90). The stanchions that supported the cheeklike projections forward where the hull swelled out from its slender bow to form the rowing chamber are roughly indicated by one or more concave lines running from the upper wales vertically to the waterline (e.g., four lines on Fig. 85, two on Fig. 89, one on Fig. 90).¹⁰⁸ Even the bronze sheath that fitted over the wooden core of the ram is sketched in by one or more vertical lines to indicate where the metal coat ended (e.g., the chevron-like lines in Fig. 89),¹⁰⁸ while sometimes a long horizontal stroke indicates its seam (Fig. 88).¹⁰⁷

The representations reveal as well some novelties. The oars occasionally nestle in ports or half-ports (Figs. 85, 90), and on aphaeracts a latticed bulwark fences in the amidships area (Fig. 90). The stem-post is now a short upright instead of the long curved horn of the Geometric age. The sternpost ends in a graceful fanlike cluster made up of slender curving poles occasionally embellished with a turban-like cap-piece (most elaborate version in Fig. 90); this fanlike form of stern-ornament will remain the hallmark of the warship. The earlier round geometric bow-device has become a true oculus, and the bow-patch tends to be combined with the decorative pattern of the palisade (Figs. 85, 89, 90).¹⁰⁸ And the ram, hitherto just a massive prong, is made to resemble a boar's snout.¹⁰⁹

The rig, being the same as on merchantmen, is discussed below (68).

¹⁰⁸ Cf. Williams, *GOS* 96-97, who was the first to discuss these lines and point out their significance.

¹⁰⁹ The end of the bronze sheath is clearly indicated on the early 7th century Assyrian relief (Fig. 76); the complicated lines shown perhaps represent clamps and rivets.

¹⁰⁷ Cf. Williams, *GOS* 95-96, who was the first to discern the significance of these lines.

¹⁰⁸ On bow-patches, cf. Bowen, *loc. cit.* note 18 above.

¹⁰⁹ The boar-headed prow is mentioned in literature in connection with certain craft of the island of Samos. Cf. Plutarch, cited in note 104 above, and Herodotus 3:59: τῶν πρῶν κερπύων ἐχούσαν τὰς πρῆρας "the [Samiian] ships with boar-shaped prows."

From the two-level man-of-war with both banks in the hull and with a fighting deck over the centerline area to the early trireme—the kind Thucydides described (see FIVE, note 54) as "not fully decked"—is but a step. And though it was taken before 500 B.C., it is best treated as part of the discussion of the trireme (FIVE).

V MERCHANTMEN

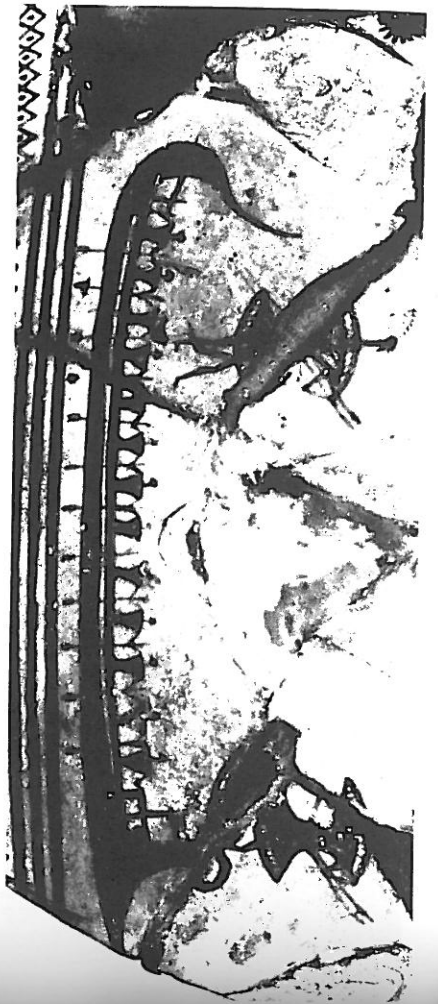
The first merchant ships used in the Mediterranean must have been oar-driven. As the pace and volume of overseas commerce grew, large seagoing carriers came into being, and these were necessarily sailing ships. But the merchant galley stayed very much alive throughout the whole of ancient history (EIGHT) because it performed a particular function: in the Mediterranean, plagued by calms all summer when maritime activity was at its height, only an oared ship could offer speed and reliability.

At the outset, the merchant galley differed from the man-of-war solely in being somewhat roomier and heavier. Homer, when he likens the Cyclops' staff to "the mast of a broad-beamed, black-hulled, 20-oared merchantman that sails the great sea,"¹¹⁰ nearly hits the key features: a sturdier mast, no doubt carrying a bigger sail and perhaps not retractable, and a wider hull. But all this had to change when the ram made its debut. From then on, war galleys, powerful vessels with reinforced hulls and special bow structure, were one thing, and their peaceable sisters another.¹¹¹ The distinction is clearly visible in one (Fig. 78) of the Assyrian reliefs referred to above. The Phoenicians are shown evacuating the city of Tyre in anything that would float,¹¹² and the bowl-shaped merchant galleys are totally unlike the beaked men-of-war. A clay model from Cyprus (Figs. 86-87) illustrates what a heavy merchant galley of this age looked like—and,

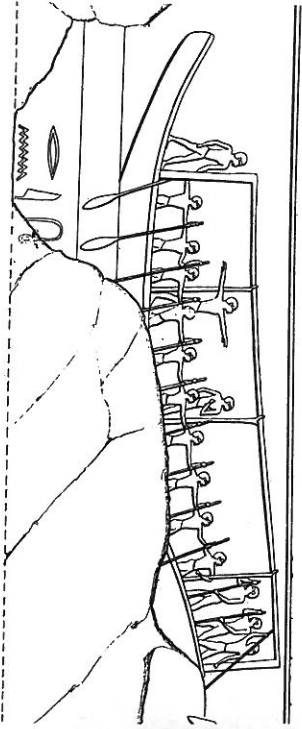
¹¹⁰ *Od.* 9:322-23: ἄραρον θ' ἰσθῶν πρῶς ἐλευσέσθαισι μέγαλιν / φορτίβος ἐπέτης, ἦρ' ἐκτετάδα μέγ' αὖ λαίρην. See 5:246-50 for another allusion to a merchantman's beaminess.

¹¹¹ Compare what happened when naval guns were introduced toward the end of the 14th century. Until then the sailing merchantman and warship had not been too different and were often used interchangeably. This ceased to be when the man-of-war was transformed into, in effect, a gun platform.

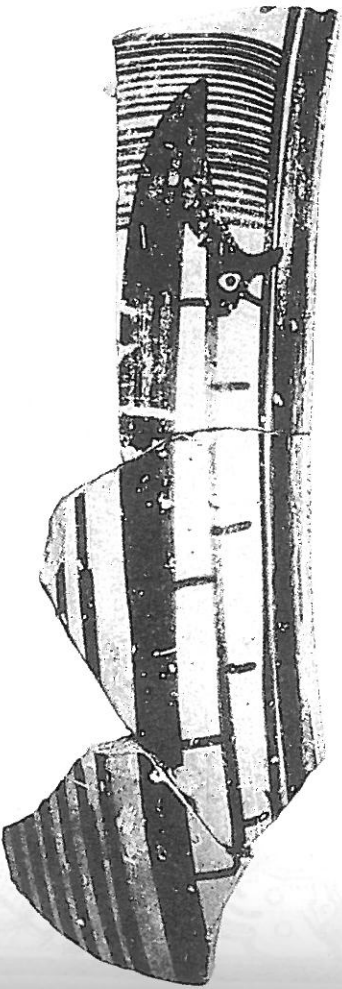
¹¹² See note 77 above.



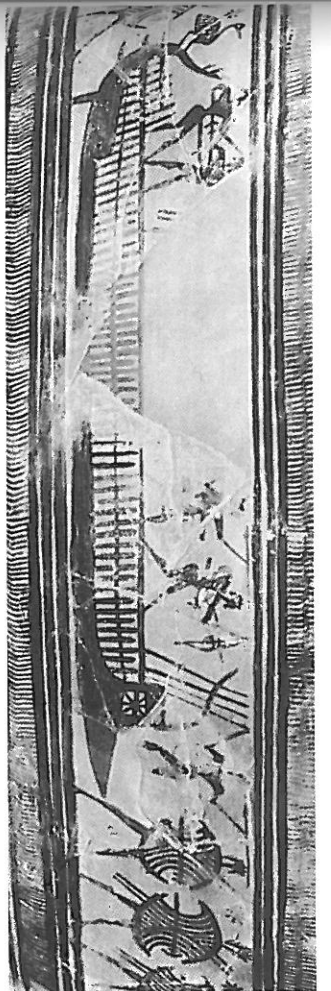
62. Aphract galley, mid-8th B.C.



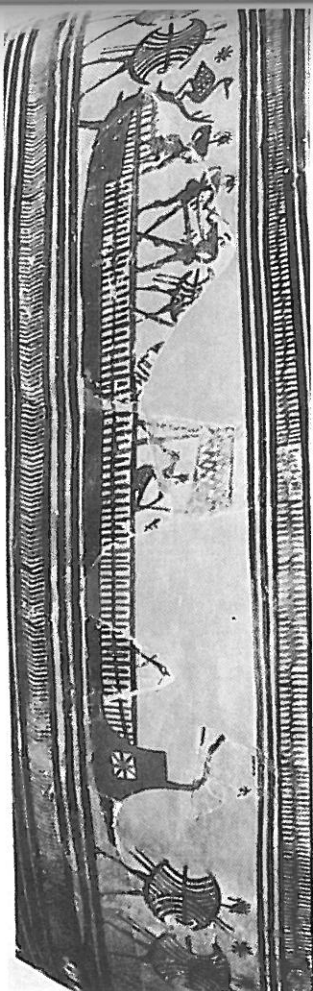
63. Egyptian galley, ca. 2500 B.C.



64. Aphract galley, ca. 725-700 B.C.



65. Warship attacked on shore, first half of 8th B.C.



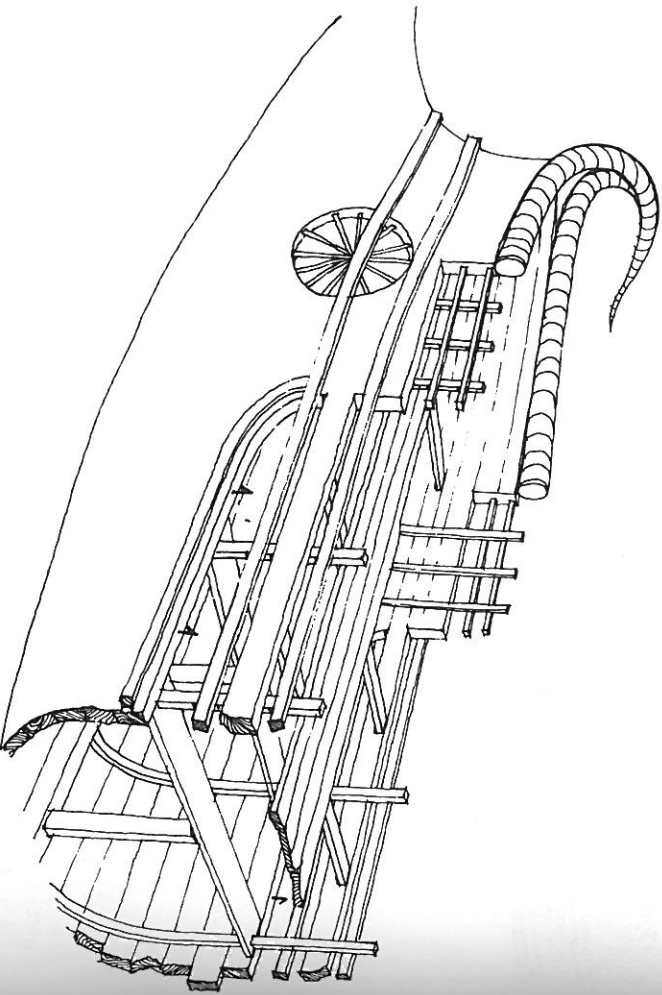
66. Same ship as in Fig. 65 sailing off.



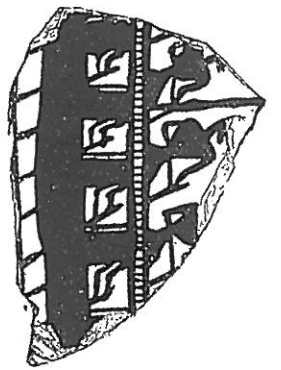
67. Row of a warship, mid-8th B.C.



68. Bow of a warship, mid-8th B.C.



69. Suggested reconstruction of the ship in Fig. 68

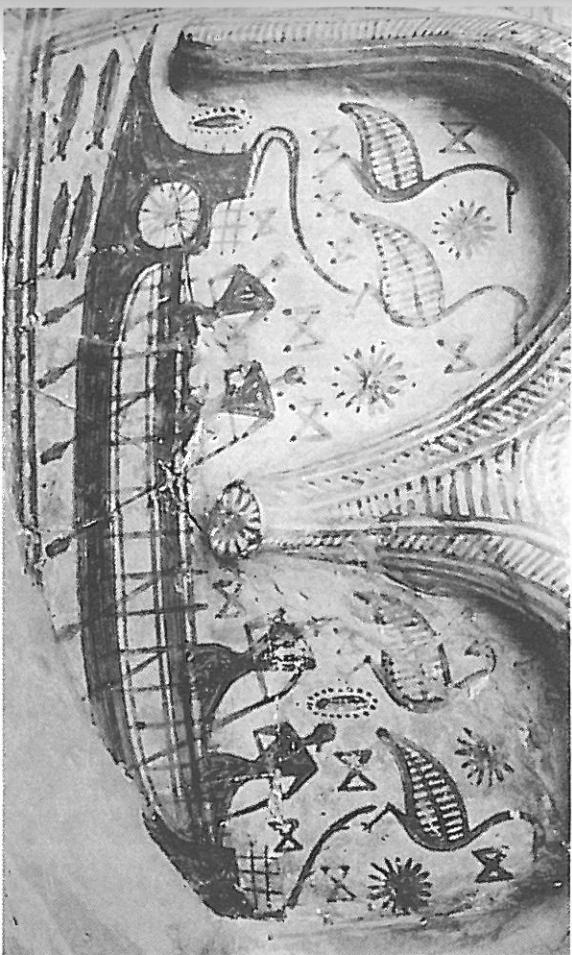


70. Two-banked warship with both levels manned, end of 8th B.C.

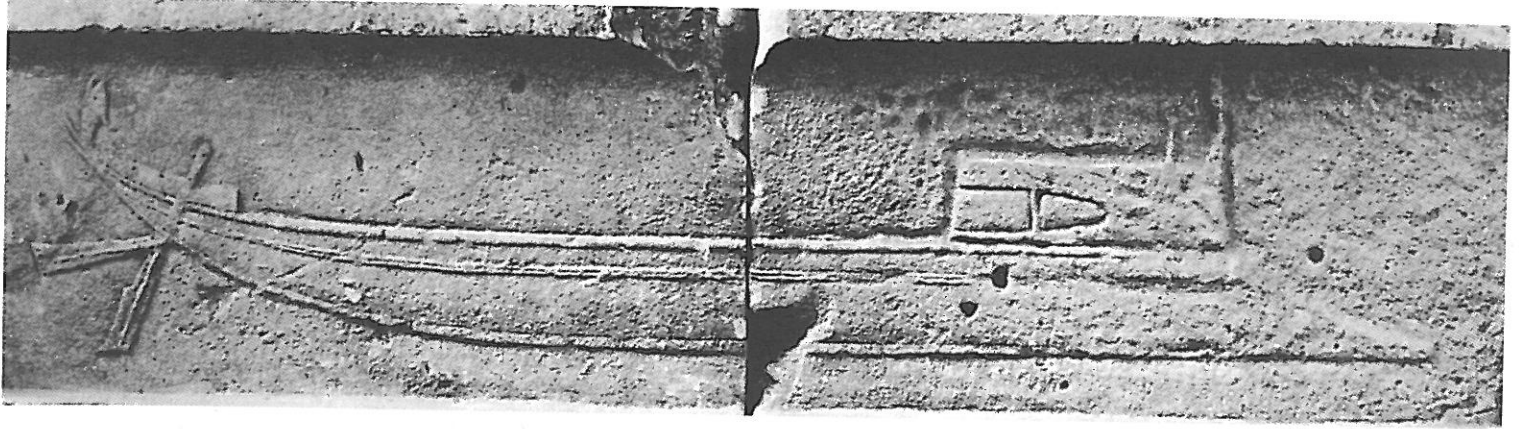


71. Two-banked warship with both levels manned, end of 8th B.C.

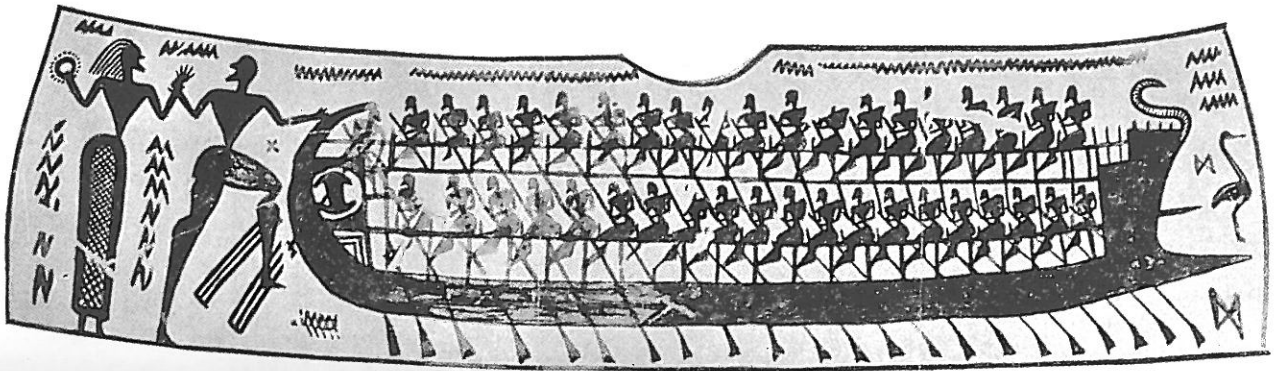
cf p 56



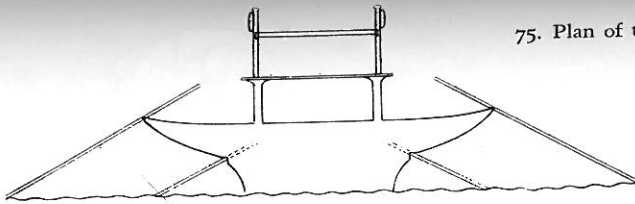
72. Warship cruising with upper level manned, mid-8th B.C.



73. Single-banked aphract warship, 6th B.C.

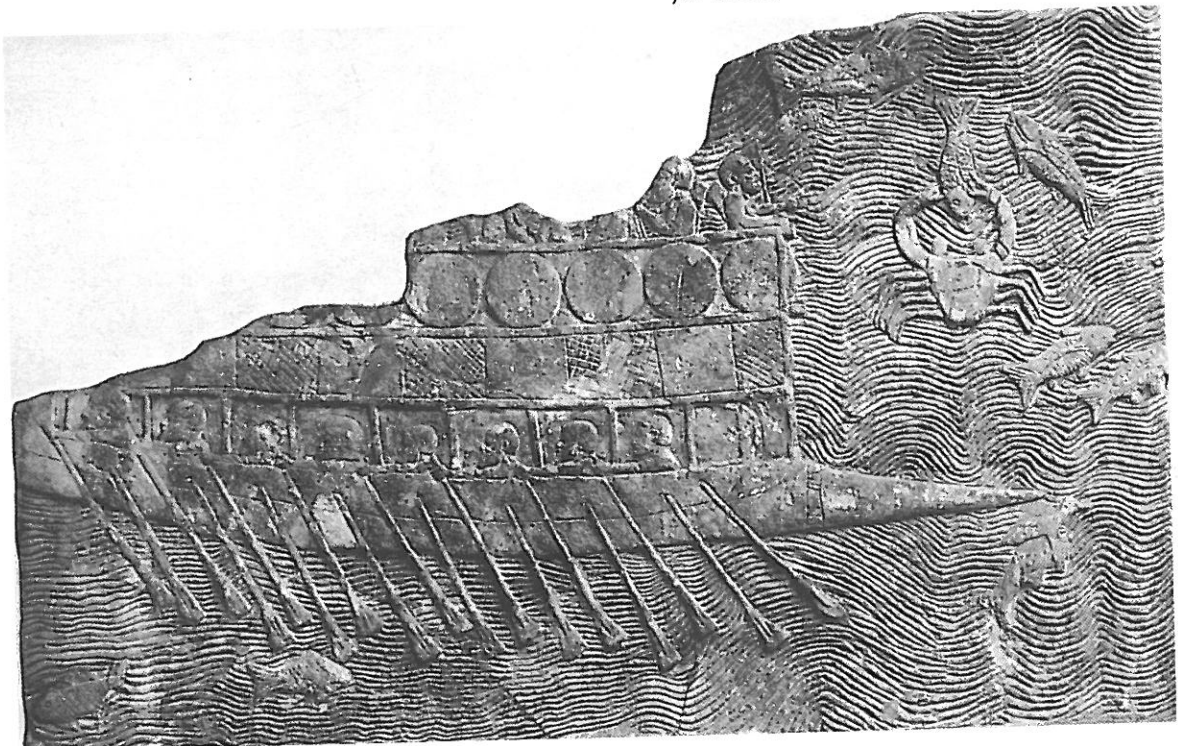


74. Two-banked warship preparing to cruise with upper level manned, second half of 8th B.C.



75. Plan of the fighting deck of the ship in Fig. 76

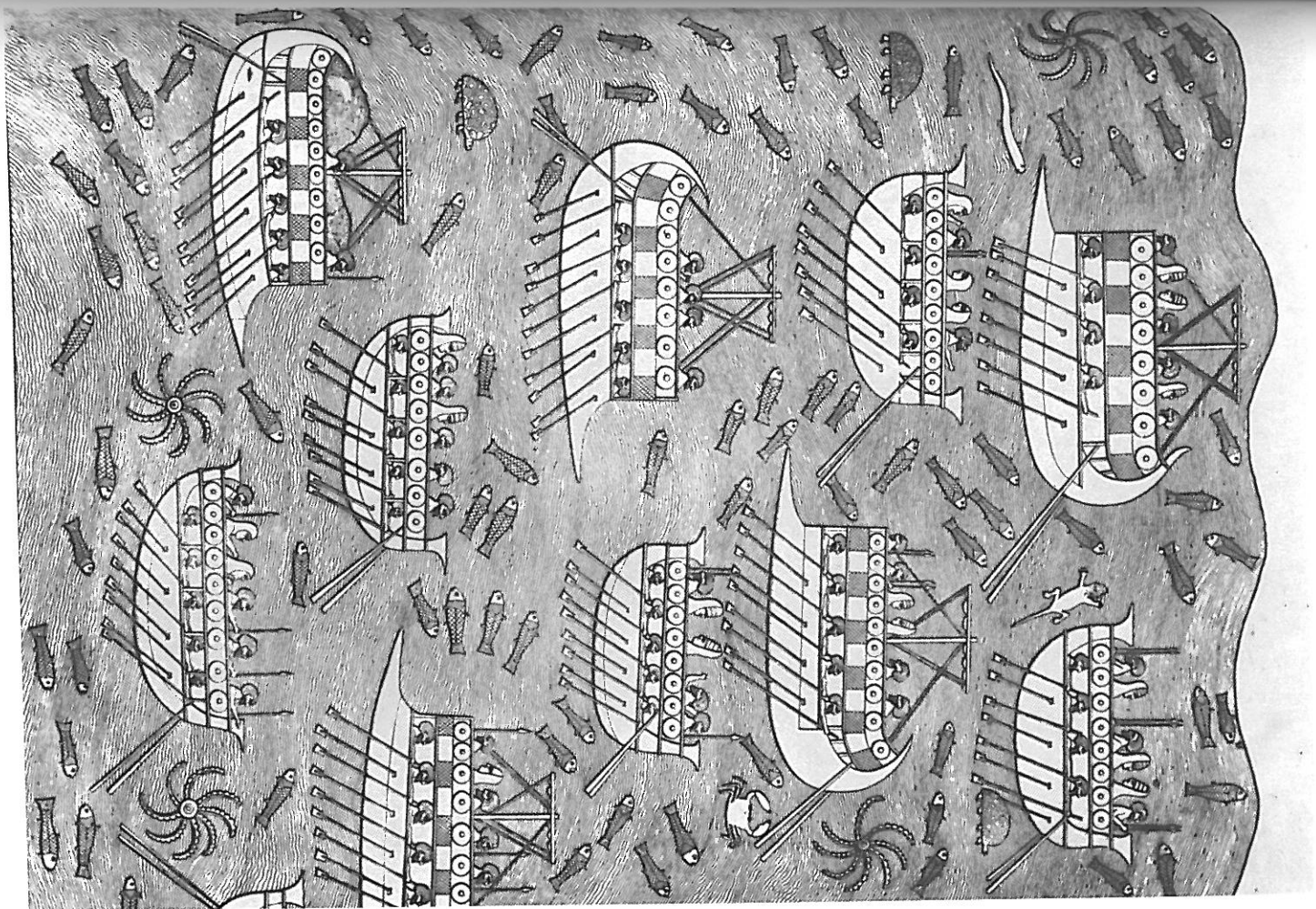
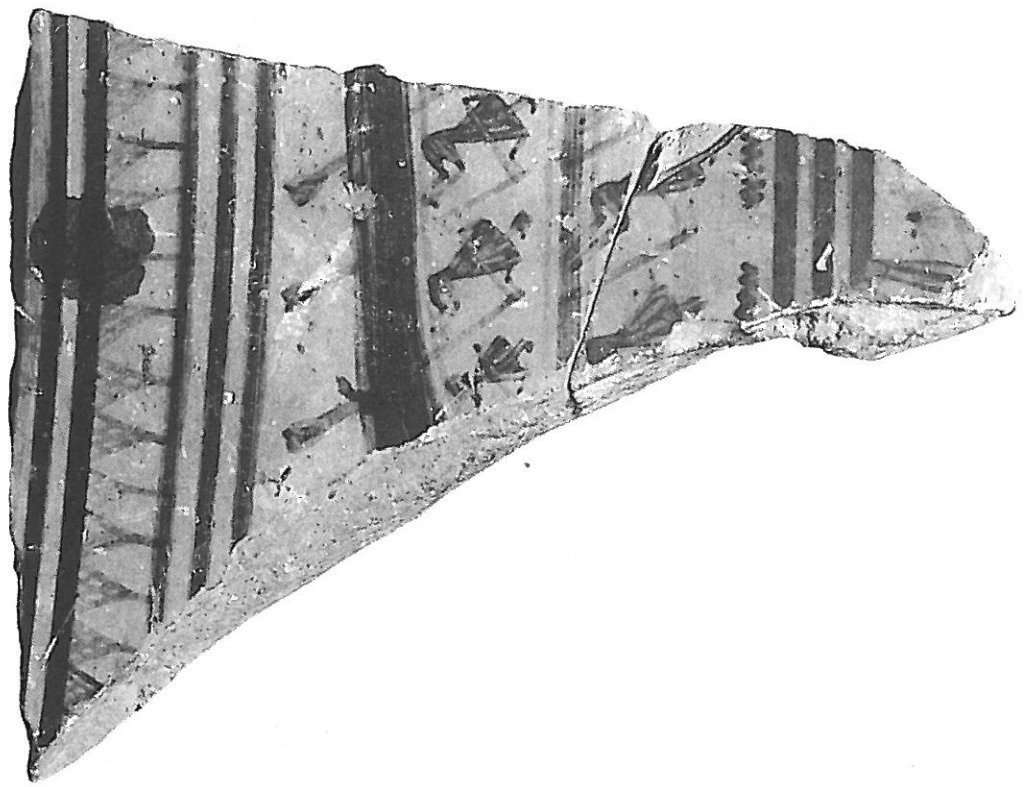
76. Two-banked Phoenician warship, ca. 700 B.C.



cf 056-57

75b

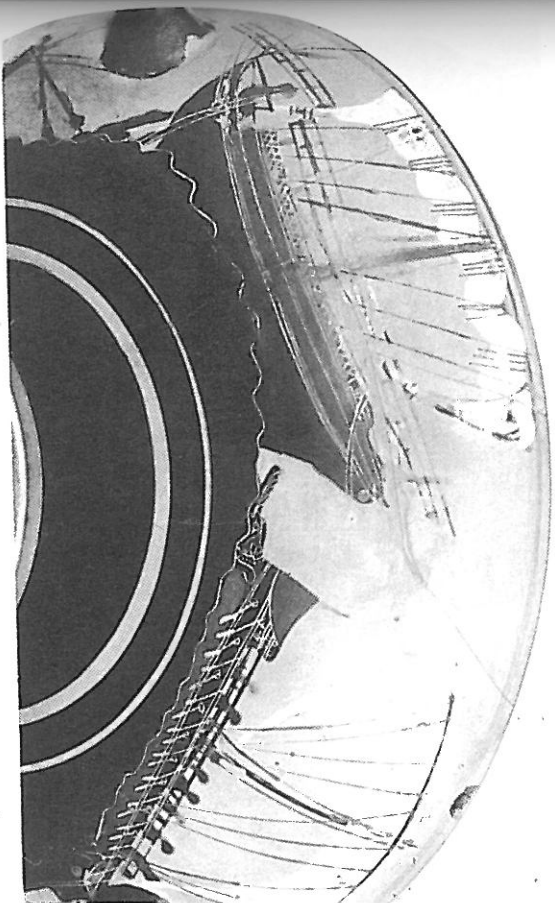
77. Two-banked warship with both levels manned, second half of 8th B.C.



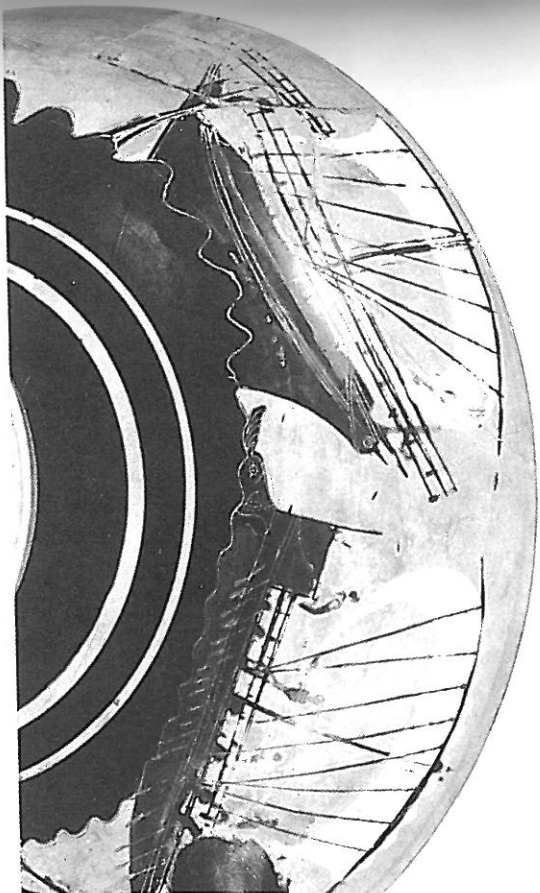
78. Phoenician two-banked warships and transports, ca. 700 B.C.



79. Asia Minor warship, ca. 700 B.C.

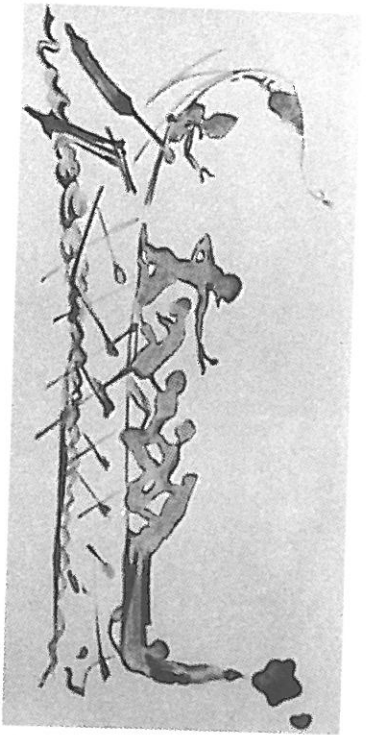


81. Pirate craft chasing unsuspecting merchantman, second half of 6th B.C.



82. Pirate craft preparing to board as merchantman attempts to escape

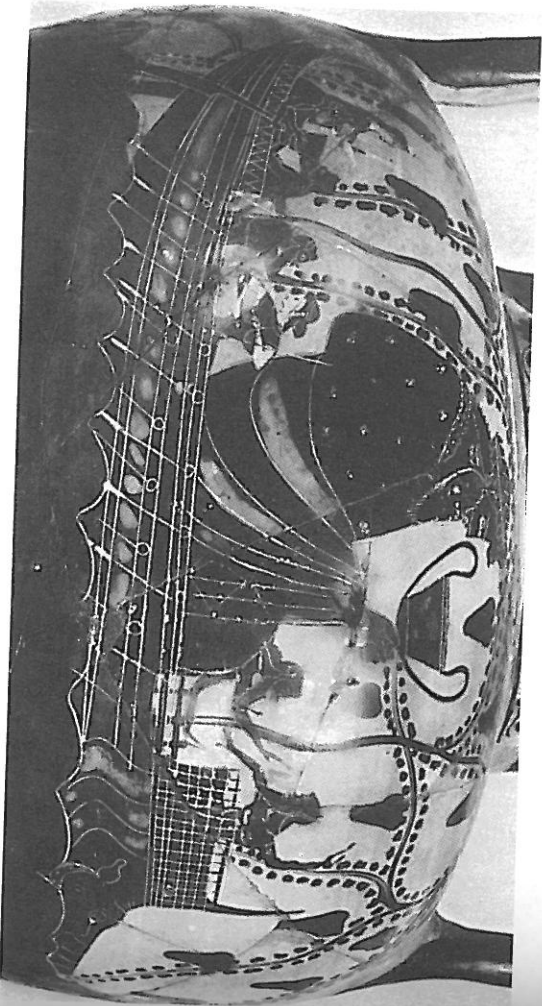




83. Two-banked warship, with the banks out of time, mid-6th b.c.



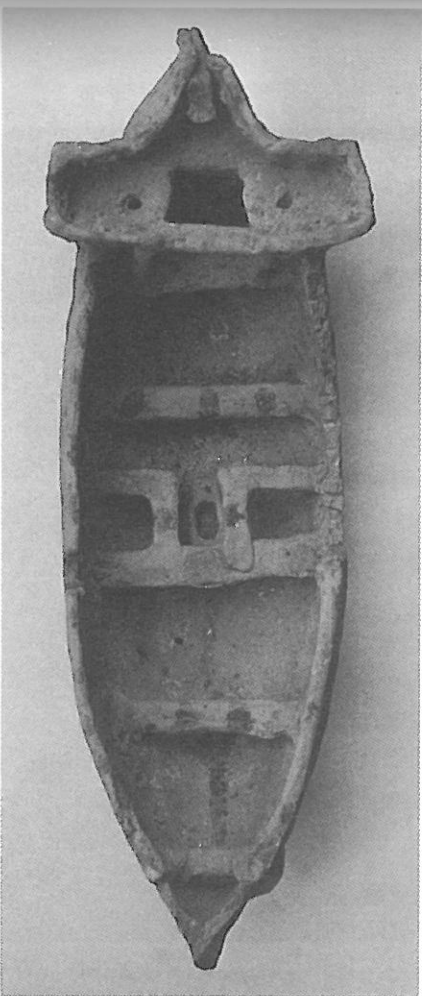
84. Decked warship, end of 6th b.c.



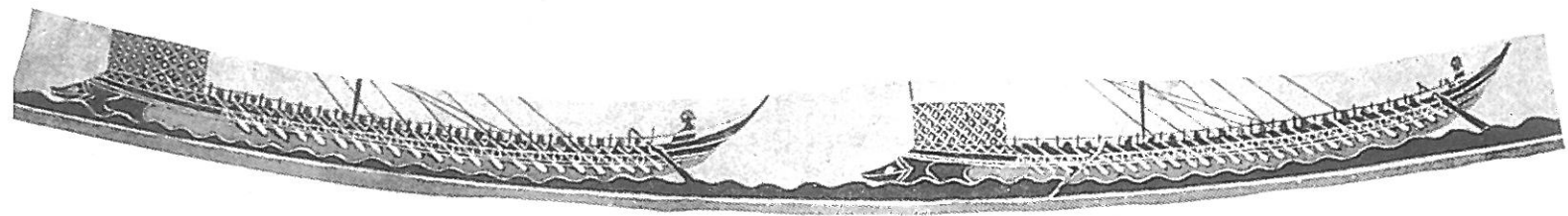
85. Two-banked warship, probably a triaconter, late 6th b.c.



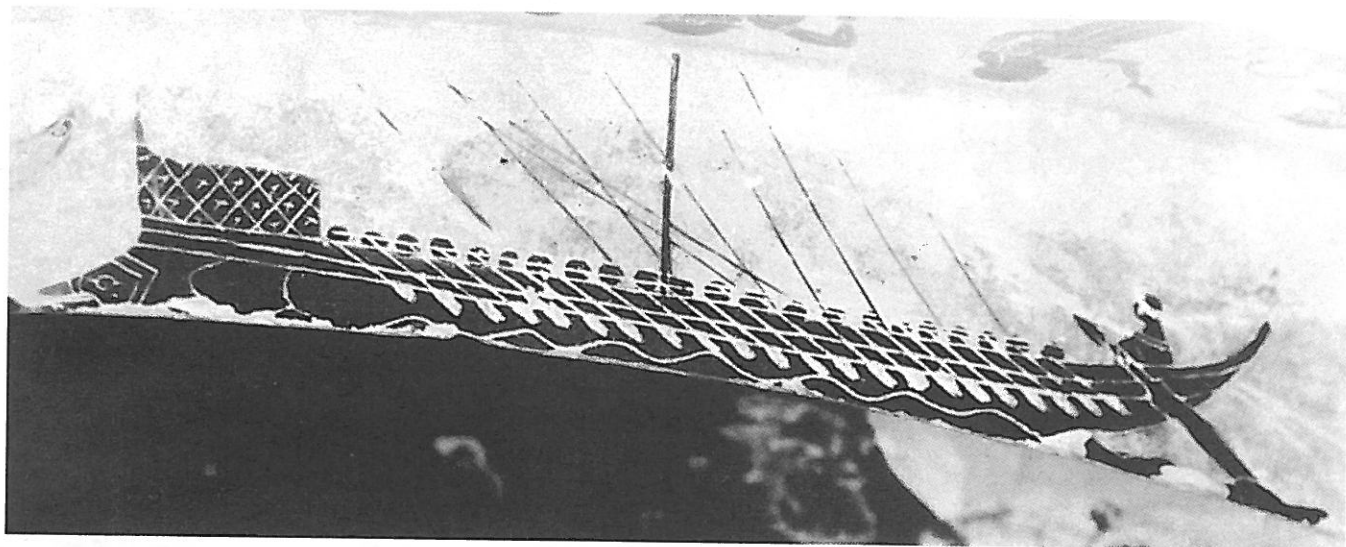
86. Merchant galley, 9th-8th b.c.



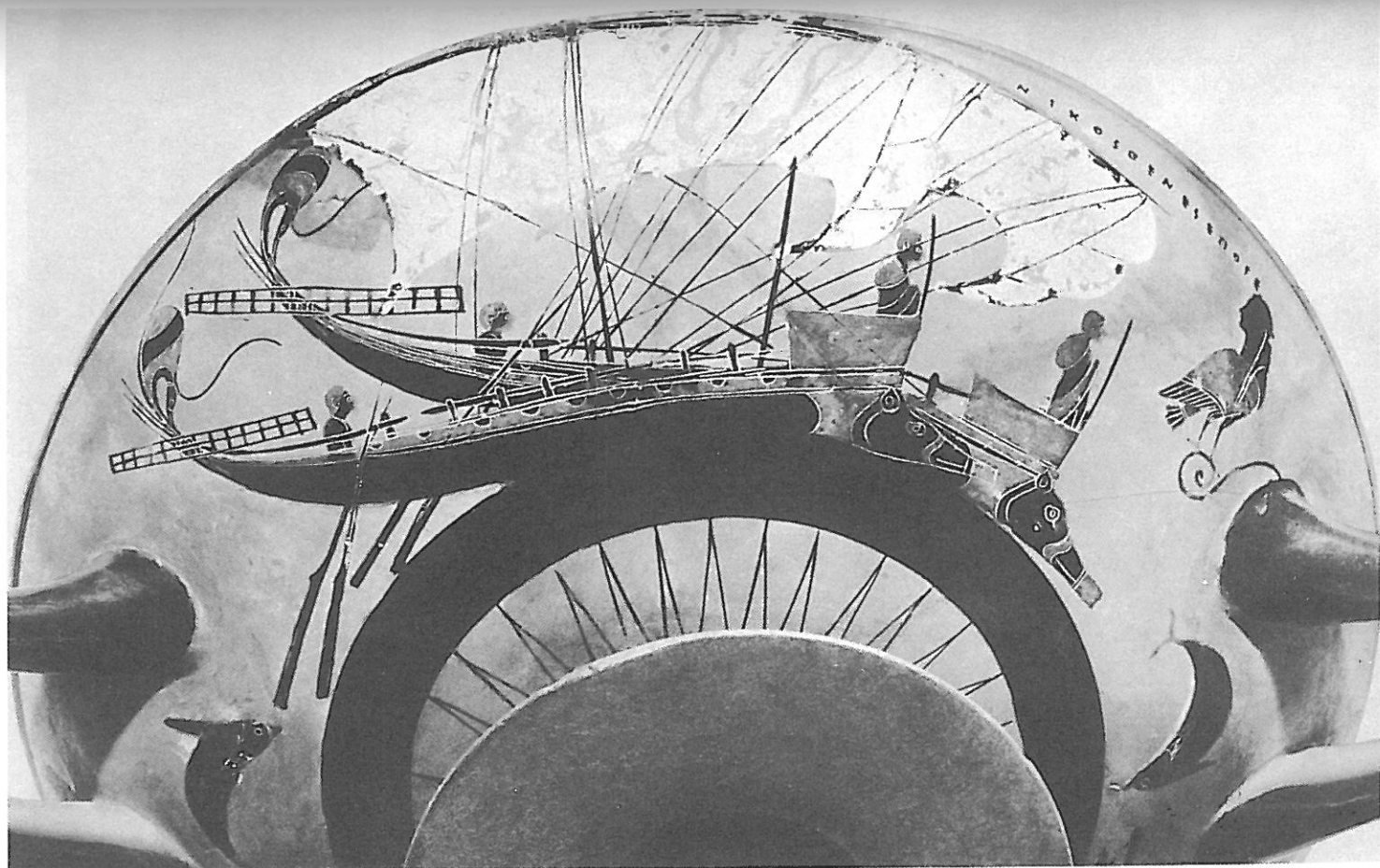
87. Same as Fig. 86



88. Two-banked warships (?) with the upper level manned, third quarter of 6th B.C.



89. Single-banked penteconter, second half of 6th B.C.



90. Aphract warships cruising, second half of 6th B.C.

*Louvre: Coupe a figure
de type A à figures noires*