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APPENDIX K

Trireme Warfare in Xenophon's *Hellenika*

§1. The disaster at Syracuse^a (415–413) marked the effective end of Athenian naval supremacy. She would rebuild her fleets and continue to be a force, but Xenophon's account of the following half century tells of a hard-fought struggle among many contenders to dominate the Aegean Sea.^b Although in the ancient Mediterranean world geography and tradition favored islands and coastal cities as emergent sea powers, dominance could not be achieved without also having access to the vital resources of timber, manpower, and plenty of revenue.^c Thus the Persian king Artaxerxes and Jason of Pherai^d posed alarming threats to the traditional masters of the Aegean. Athens, Sparta, and reportedly the Phoenicians managed on occasion to raise fleets of two or even three hundred warships,^e but mostly the seas were dotted with much smaller flotillas that nevertheless effectively patrolled, threatened, or deterred.

§2. The standard ship of the line in all these navies was the trireme, a seaborne projectile armed with a bronze ram and powered by three banks of rowers.^a Triremes patrolled coasts, blockaded harbors,^b guarded sea-lanes (especially those from the grain-rich Black Sea),^c enforced the collection of tribute and tolls,^d and transported armies,^e important people,^f and news. But most essentially triremes were designed for battle on the open seas. Speed and ramming were their primary offensive weapons. Only a small complement of fighting men—ten marines and four archers—was traditionally stationed on a trireme. The number and nature of armed men on board could vary,^g but the ram remained the primary weapon. Unlike those of tubby merchant ships, built for capacity, trireme hulls were long and narrow,^h probably able to slice through the water as fast as any oar-powered ship before or since, propelled by the coordinated strokes of 170 oarsmen. A crew of sixteen sailors and officers operated the sails, and they, together with the normal complement of armed men and the rowers, brought the total number of men on a trireme to 200. Triremes could also be equipped with sails, so wind had to be taken into account as

K.1a Syracuse (in Sicily): Ref. Map 1.

K.1b Aegean Sea: Ref. Map 2, BX.

K.1c See 5.2.16, 6.1.11, 7.1.3–7.

K.1d Pherai (in Thessaly): Ref. Map 2, BX.

K.1e Large Phoenician fleets: 2.1.20, 2.2.7, 3.4.1.

Phoenicia: Ref. Map 1.

K.2a See Figure K.2.

K.2b See 2.2.9, 4.8.6, 5.1.2, 5.1.7, 6.2.7–8.

K.2c See 1.1.22, 2.1.17, 4.6.14, 5.4.61.

K.2d See 1.1.8, 1.1.12, 1.1.22, 4.8.27, 4.8.31, 5.1.6, 6.2.38.

K.2e See 6.4.18.

K.2f See 1.1.9, 4.1.15.

K.2g See 1.2.1, 6.2.37.

K.2h Approximately 120 by 15 feet.

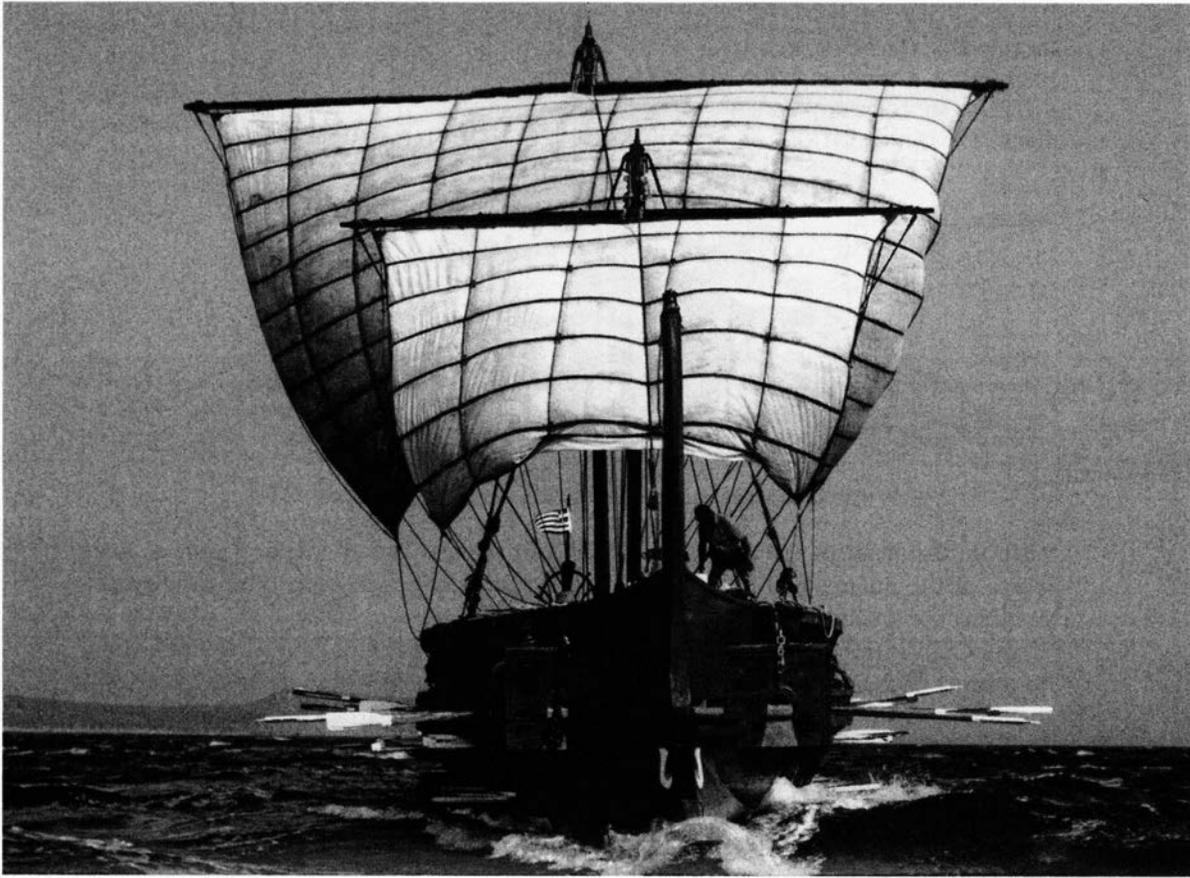


FIGURE K.1. THE TRIREME *OLYMPIAS* UNDER SAIL.

a factor in strategy, but battle tactics were based entirely on rowing maneuvers. In preparation for battle, every care was taken to gain the advantage of superior speed. Sails and all items extraneous to the battle at hand (masts, tackle, spars, supplies) were removed from the ship.ⁱ The hulls themselves were dry-docked as often as possible in order to keep them from becoming waterlogged and thus from sitting heavily and moving slowly in the water.^j Not all triremes were in equal condition or could attain equal speeds.^k Trireme crews took pride in crewing the fastest ship in a fleet, and captains selected the most experienced men to complete their crews.^l The tip of this giant water-arrow was a bronze ram that splintered enemy hulls or oars upon contact. The force of impact was as destructive as the pronged tip of the

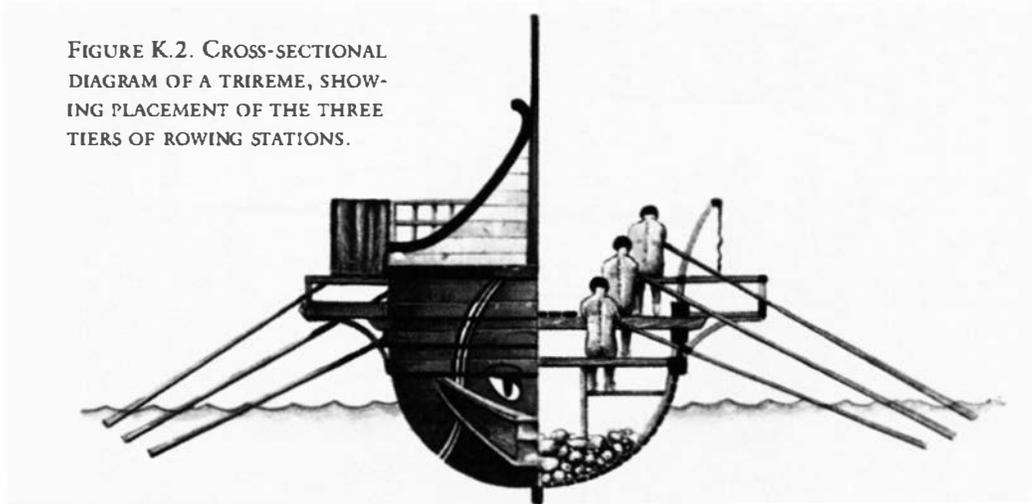
K.2i This would explain how the Athenian general Konon, in flight from Aigospotamoi (Aigospotamos) (Ref. Map 2, AY), was able to capture the main sails of the Peloponnesian fleet (2.1.29), which had been left in camp before the battle. This capture may well have hindered, if not prevented, the Peloponnesians from pursuing his ships. See also 6.2.27.

K.2j See 1.5.10.

K.2k See 2.1.24, 5.1.27.

K.2l See 1.6.19.

FIGURE K.2. CROSS-SECTIONAL DIAGRAM OF A TRIREME, SHOWING PLACEMENT OF THE THREE TIERS OF ROWING STATIONS.



weapon; the head of the ram was designed to strike a broad area and split as many seams of the enemy hull as possible without actually penetrating (and thus getting stuck in) the foreign wood.

§3. Conventional sea battles began with a face-off: the two opposing navies lined up against each other.^a Each line was extended as far as possible in order to prevent the enemy from sailing around the ends of the line and attacking the unprotected sterns from behind (*periplous*). At the same time, the line could not be over-extended; ships had to be spaced closely enough to prevent the enemy from sailing through gaps (*dieklous*) and either smashing through one's own oars or wheeling about and attacking from behind.^b And commanders had to consider yet a third factor: ships could not be so closely packed that their oars interfered with those of the adjacent ship in their own line. If a commander did not trust his single line to hold out against a superior opponent, he might form a second line behind the first, to cover the point(s) of weakness.^c A fleet whose line had been outflanked or breached had few defensive options. A commander with skilled crews could pull his ships into a circle, prows bristling outward, and hope to stave off his opponents until exhaustion or nightfall prompted them to give up the attack. Or he could order a tactical retreat to a nearby beach from which his ships could be similarly defended.^d

§4. It was extremely difficult to achieve any of these offensive or defensive formations. Ancient accounts of naval encounters frequently describe how winds, currents, the crews' varying levels of skill and commitment, and the unpredictable fortunes of war^a altered the blueprints of battles. Drills on the *Olympias*,^b a modern reconstruction

K.3a See 1.6.31, 2.1.23.

K.3b The Athenian formation at Arginousai was designed to prevent this; see 1.6.31.

K.3c See 1.6.29–32 for the deployments of the two opposing fleets at the battle of the Arginousai Islands (Ref. Map 2, BY).

K.3d See 1.1.7.

K.4a For example, Kallikratidas' unfortunate tumble at 1.6.33.

K.4b The *Olympias* was designed by scholars and marine architects and commissioned in 1987. The ship is on permanent display at the Hellenic Navy Museum, near the Peiraius. See Figures K.1, K.2, K.3, and 2.2.7; see also J. S. Morrison, J. F. Coates, and N. B. Rankov, *The Athenian Trireme: The History and Reconstruction of an Ancient Greek Warship*, 2nd ed. (Cambridge: Cambridge University Press, 2000), esp. pp. 231–75.

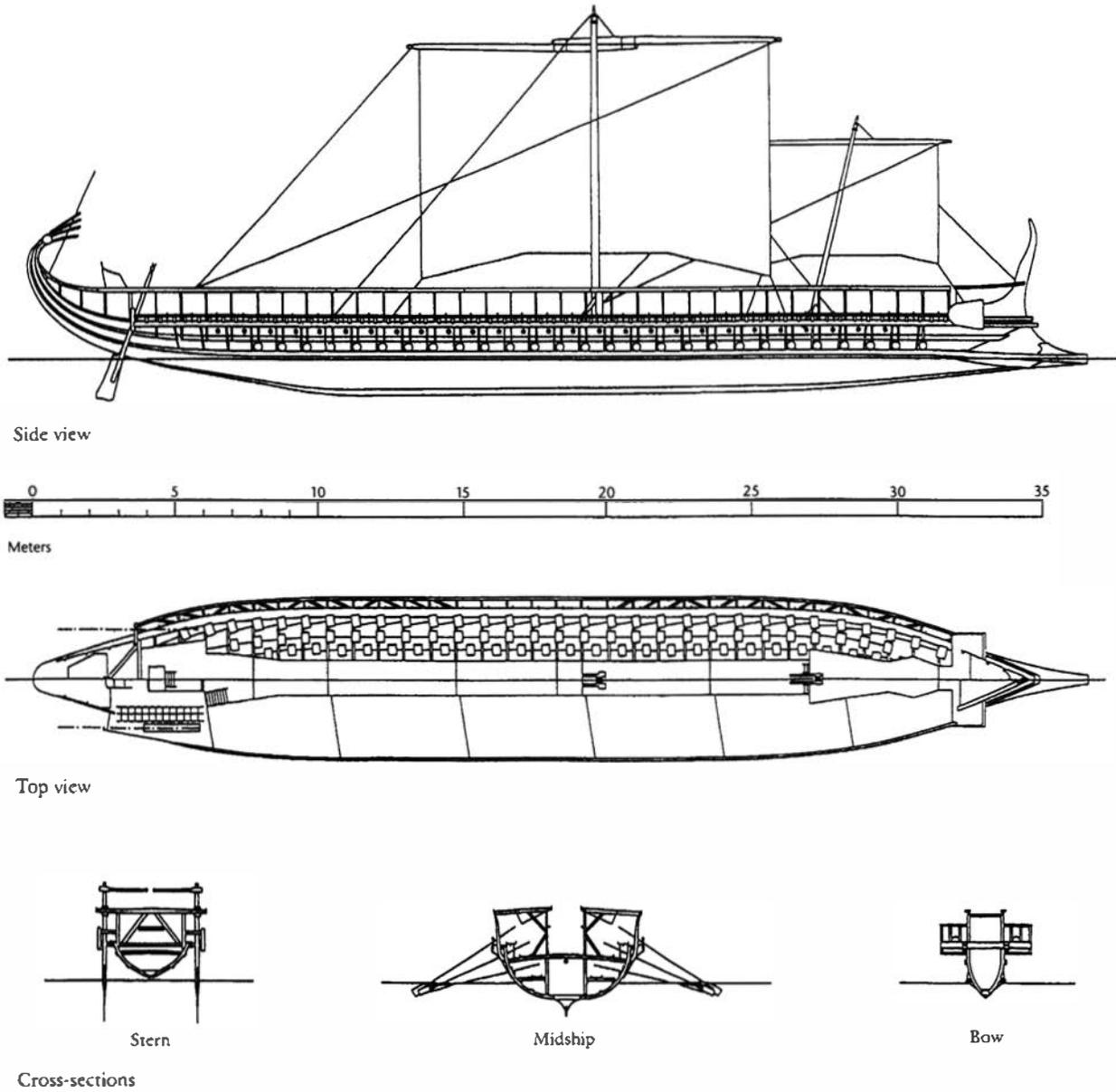


FIGURE K.3. DIAGRAM OF THE MODERN TRIREME *OLYMPIAS*.

of a trireme, have demonstrated the difficulties that a crew would have in hearing and executing orders in quiet, controlled conditions, much less in the tumult of battle.

§5. It is no wonder, then, that commanders frequently resorted to trickery and unorthodox measures to increase their chance of success. The outcomes of many of the sea battles recounted by Xenophon hinged on the element of surprise. One favored technique was the attack or escape under cover of night.^a Landmarks were the primary means of navigation in Greek antiquity, and so sailing was mainly a day-light activity. Even battles ceased at sundown. Perhaps because it was so unusual, Xenophon vividly describes the extraordinary nature of the Spartan vice-admiral Gorgopas' nighttime pursuit of an Athenian squadron and the ensuing moonlight battle.^b Experience on the *Olympias* indicates that rowing triremes is always a noisy process and sound carries great distances over water. Night escapades could only have been successful because they exploited what the enemy reasonably expected. Other tricks succeeded for the same reason. Whatever the exact purpose of Konon's sidescreens,^c his escape plan worked because repetition lulled the enemy into complacent inattention. Those tables were famously turned on Konon at Aigospotamoi,^d where the Athenians were defeated not by fast ships or skilled crews but by hungry bellies and each side's expectation that the other would follow precedent.

§6. A rammed ship, even if severely damaged, did not sink immediately. There were no significant obstacles to bar the crews from jumping overboard; the empty wooden hull would swamp and become completely unmaneuverable but would float on the surface for some time until it became completely waterlogged and finally sank. It was the victor's prerogative to sail out among the debris of the battlefield and collect the drifting hulls and men. Captured enemy were enslaved (or worse);^a captured hulls were refitted or salvaged for parts and material.^b Rams, which were made of bronze and could weigh more than half a ton, were salvaged where possible for the value of the metal or perhaps for reuse on other ships. Sometimes captured rams were sawn off by the victors and erected as trophies on land nearest to the battle site.^c

§7. The Achilles' heel of the ancient navy was its crew. The need to feed, finance, occupy, and sometimes even inspire the rowers was a crucial element of any naval campaign. First and foremost was the need to feed and rest the rowers. Rowing was a cramped, stifling, sweaty, smelly job. The long, narrow warships had limited space for provisions or preparing meals and no place at all for rowers to stretch out and sleep. One of the extraordinary aspects of the Spartan admiral Teleutias' night raid into the Peiraeus harbor was that the ships were rowed continuously, with oarsman resting (presumably at their benches) at alternating turns.^a Every trireme captain had to think daily about where he would be able to stop for the night and how his sailors would get fed. Sailors could bring some food on board and eat "on the run," but more often mealtimes meant putting in to shore to allow sailors to forage in town or countryside. These midday breaks, when ships were beached and troops dispersed,

K.5a For instances in the *Hellenika* where forces maneuvered at night in order to surprise their opponent, see 1.1.13, 1.6.28, 4.8.35, 5.1.8-9, 5.1.19, 5.1.25, 6.2.11.
 K.5b See 5.1.8-9.
 K.5c See 1.6.19 and n. 1.6.19a.
 K.5d See 2.1.20-29. Lysander's trickery exploited the poor decision made by the Athenian leaders to

locate their base camp far away from city markets that could supply food to the fleet's crews.
 K.6a See 2.1.31.
 K.6b See 1.1.18, where Syracusans burn ships rather than leave them to their victorious opponents.
 K.6c See 2.3.8, 6.2.36.
 K.7a See 5.1.19.

were moments of great vulnerability. Lysander based his winning strategy at Aigospotamoi on his enemies' need to forage for meals far from their ships.^b The Athenian Iphikrates, whom Xenophon praises as the naval commander par excellence,^c forestalled this danger by training his men simultaneously to eat and to maintain lookouts and be at the ready for immediate redeployment.^d Logistics forced fleets to hug the coasts—a factor that had to be planned for defensively and could be aggressively exploited.

§8. A trireme captain also had to keep his crew paid. The crew could consist of all or a mixture of slaves, lower-class citizens, resident aliens (metics), or mercenaries.^a All had to be paid to row, as they needed to purchase food and other necessities with their own funds.^b Oarsmen, especially noncitizens, might change ships for better pay. Lysander, for example, urged Artaxerxes to fix the pay at one Attic drachma per day on the grounds that “if this was the wage offered, the Athenian crews would desert their ships.”^c Lysander, Kallikratidas, Konon, and Teleutias all struggled to fund their fleets,^d and Xenophon's account is peppered with references to the need to pay rowers.^e

§9. Idle crews were a potential source of trouble and were certainly a waste of money. Thus we hear of Syracusan sailors helping the city of Antandros finish fortifications while their fleet was being rebuilt, of Konon's sailors rebuilding the Long Walls, and of Iphikrates “maintaining” his sailors by letting them work on the land for the Corcyraeans.^a The task of keeping sailors employed was particularly troublesome when the fleets remained stationed abroad over the winter. The sailing and fighting season regularly lasted from May through September; cold temperatures, storms, and contrary winds and currents reduced sea traffic to a minimum in the intervening months, although some instances of voyages and even battles during winter are known.^b

§10. Maintaining crew cohesiveness was paramount to the effective functioning of the trireme. Trials on the *Olympias* demonstrated that even very experienced rowers need extensive group practice in order to coordinate their strokes sufficiently to achieve the speeds and perform the maneuvers ascribed to triremes. First, each individual had to become proficient at rowing on a specific level: oar mechanics and visibility varied significantly depending on one's position relative to the waterline and the ends of the ship. Second, close cooperation was vital to keeping all those oars working in tandem; the consequences of blades clashing like a row of falling dominoes could easily wreak havoc along the entire line. The need for constant training was no different in antiquity.^a One unexpected discovery of the modern experiment was that the dense wooden environment absorbed sound within the confines of the

K.7b See 2.1.25, 2.1.27.

K.7c See 6.2.32.

K.7d See 6.2.28–29.

K.8a For use of mercenaries at sea, see 7.1.12; for slaves, see 1.6.24 and 5.1.11; for metics, see Thucydides 7.63.3.

K.8b See 2.1.27.

K.8c See 1.5.4.

K.8d See 1.1.24–25, 1.5.3–8, 1.6.6, 1.6.18, 2.1.11, 2.1.14, 4.8.10, 4.8.12, 5.1.24. See also 2.3.40, 6.2.1.

K.8e See 1.5.4–7, 1.6.12, 2.1.5, 2.1.12, 5.1.13, 5.1.24.

K.9a For Syracusans at Antandros (Ref. Map 2, AY), see 1.1.26; for rebuilding the Long Walls of Athens (Ref. Map 5), see 4.8.10; for Iphikrates' sailors

working the land at Corcyra (Ref. Map 2, BW), see 6.2.37.

K.9b All locations in this note can be found on Ref. Map 2 at the coordinates indicated. See Thucydides 8.30–44 for naval operations in the winter of 412/11 in the Aegean (BX), Samos (CY), Chios (CY), Rhodes (DY), Ionia (CY), and Caria (CZ). At 1.1.12 the battle of Abydos (AY) is thought by some to have been fought as late as November, and others believe that the battle of Cyzicus (AY), 1.1.14–19, took place earlier than May 410.

K.10a Mindaros' fleet was out practicing maneuvers at 1.1.16. Iphikrates had his fleet train and practice maneuvers as it sailed toward Corcyra, 6.2.30, 6.2.32.

hull, making it very difficult for the rowers to hear signals. As a result, each oarsman relied heavily on the body language of those sitting directly in front of or above him. The crew became an integrated network, and holes or substitutions in the rowing arrangement threw a wrench in the gears of the rowing machine. Rowers were not randomly replaceable.

§11. It was the responsibility of the captain (trierarch) to keep his crew trained and intact.^a In the Athenian system, captancy was a one-year public service, undertaken by only the wealthiest citizens as a sort of patriotic burden or tax. The state supplied a ship, the minimum necessary equipment, and the basic rate of pay for a crew; the captain was responsible for hiring the crew and outfitting and maintaining (and returning) the ship. The amateur captain probably relied heavily on his paid staff. The most important member (and the only one who is ever named) was the helmsman (*kybernetes*). Alcibiades trusted his helmsman, Antiochos, enough to give him command of the fleet during Alcibiades' absence, and it is the helmsmen who are called as witnesses in the trial of the Arginousai generals.^b Ultimate command of a fleet lay in the hands of one or several of the generals (*stratēgoi*) elected by the citizens to lead the army or the fleet. Sparta had a specific office of admiral (navarch), but men appointed to this position might or might not have much experience on the water,^c and the assignment of a commander perceived as incompetent was another potential source of grumbling among the crews.^d

§12. Xenophon's predecessor, Thucydides, had chronicled the glory days of classical sea power. Control of the water serves as a focus and a metaphor in his story of Athenian imperialism. He gives us, also, a glimpse of the beginning of the end. We see the Athenians lose their edge in naval technology; the Peloponnesian allies develop new warship designs and strategies that the Athenians emulate too late. Xenophon is by comparison a landlubber; the sea is an element, but not a centerpiece, in his account of Athens' and Sparta's final bitter decline. His story of the sea and its ships is not nearly as detailed or coherent. But in his narrative we can see the human dimension of naval warfare and the pivotal role of the anonymous rowers in the struggle for command of the Aegean. Two generations later, Alexander the Great circumvented the need for rowers and gained control of the seas by conquering the coasts and ports on which the fleets of the eastern Mediterranean relied for manpower, provisions, and timber.

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K.11a For difficulties in keeping triremes fully manned, see 1.5.20, 5.1.27, 6.2.12.

K.11b Alcibiades leaves Antiochos in charge at 1.5.11–12, and the generals furnish a helmsman as a witness in the Arginousai trial at 1.7.6. Another instance in the *Hellenika* that shows the importance of the helmsman is at 1.6.32, when Her-

on the Megarian advises the Spartan admiral Kallikratidas.

K.11c Agesilaos appointed his inexperienced brother-in-law Peisander to command the Spartan fleet (3.4.29).

K.11d Spartan sailors complained of Kallikratidas' qualifications when he replaced Lysander (1.6.4).