Military studies are superficially an accessible subject within ancient history. Lecturers find their classes filled with young men fascinated by warfare, having learnt from mass media of Thermopylai or Alexander. More academically, historians catalogue innovations to create tactical studies. Yet the history of Greek warfare is not primarily exploration of technology. Innovation arose from the socio-political matrix and became meaningful in politics when activated by institutional evolution. In naval warfare, mere technological progress seldom motivated the emergence of hegemonic strategy. Our prime exhibit will be the *trieres* 'trieme'¹, the three-banked warship and standard unit of classical navies.

We explore the context of naval warfare, interweaving three themes: vessel procurement, manning, and deployment, instrumentalities by which combat interacted with other dimensions of *polis* life. Here a distinction in archaic society between categories of maritime *poleis* becomes significant. In one group are Corinth, Chalkis, Eretria, and Miletos (to a degree); states typified by location at intersections of routes; early colonization; and trade intermediated by other communities². In another are Aigina, Phokaia, and Samos, states characterized by placement flanking routes; later and reduced colonization; piracy; and less intermediated commerce.

Consider the *trieme*’s introduction. Thucydides places this at Corinth ca. 700, noting the work of the Corinthian shipwright Ameinokles at Samos (I 13, 2-3), but continues that *triremes* were not numerous until later, somewhat before the Persian Wars and death of Dareios (I 14, 1-3; cfr. 18.2). This account has in-

* This piece is offered in fond memory of Nikos Birgalios, an esteemed scholar and great champion of philhellenism in our discipline of ancient history. His generosity and energy are sorely missed.


vited correction or rejection. Such arguments ought not to inspire credibility. For example, postulating a lost reference to biremes here offers no solution. To warrant mention, this must be a two-banked warship larger than a pentekontor, a vessel poorly attested (excepting perhaps Hom. Il. 11 509-510; Thuc. I 10, 4). Its complexity and complement would place its affinities with the trireme, making the mystery of the trireme’s late maturation the enigma of the bireme. And the Greek trireme force of Pharaoh Necho (ca. 600) would become inexplicable (Hdt. II 159, 1; cfr. 158, 1). One must explain the lag in the trireme’s predominance, because the plain sense of Thucydides requires that Ameinokles constructed triremes. In the process, we shall note other, albeit later, attestations of early triremes.

An early Attic tradition attempted to account for this gap. Kleidemos (ca. 350), the Athenian poet, tantalizingly linked the trireme with the mythology of Theseus. Unfortunately, Plutarch’s text appears questionable at a crucial point. The received text: ιδίως δὲ ποικὶ καὶ περιττῶς ὁ Κλείδημος ἀπήγγειλε περὶ τούτων, ἀνωθὲν ποθεν ἄρξαµεν· ὅτι δόγµα κοινὸν ἦν Ἑλλήνων, µηδεµίαν ἐκπλεῖν τριήρη µηδαµόθεν πέντε πλεῖστονας δεχοµένην… (obeliskos after Jacoby). As this stands, a prohibition barred triremes from receiving more than five men, i.e., five epibatai. That would exclude expeditionary, amphibious warfare where squadrons attempted to dominate other poleis through embarked infantry. This koinon dogma parallels the Amphictyonic Oath (Aesch. II 115), proscribing certain siege tactics, or the Euboian convention during the Lelantine War prohibiting missile weapons. Unfortunately, the next sentence is also problematic, contrasting Jason’s suppression of λῃστήρια with the koinon dogma: τὸν δὲ ἄρχοντα τῆς Ἀργοῦ Ἰάσονα µόνον περιπλεῖν, ἐξείργοντα τῆς θαλάσσης τὰ λῃστήρια. Editors postulate a lacuna after περιπλεῖν; Lindskog offered τριήρει πλήρει 3 Davison 1947; Williams 1958, 121; Busch 1987, 185; Meijer 1988; Wallinga 1993, 30-31, 103-118. Intermediate date (seventh century): Morrison - Williams 1968, 158-159; Casson 1971, 80-81.


6 Damastes attributed the bireme to the Erythraians (FGrHist 5 F 6).

7 Casson 1971, 62-63 suggests a familiarity with such ships is implicit in Thuc. I 10, 4.


9 FGrHist 323 F 17 (Plut. Thes. 19, 5). See Jacoby FGrHist 3b, 1, 74-75.

10 Stib. IX 1, 12; cfr. Polyb. XIII 3, 4 (Liv. XII 147, 5).
ἀνδρῶν ἱκανῶν …, apparently a gloss that entered the text to provide contrast to the previous clause by asserting that Jason used a fuller ship’s complement. Next, Minos clearly acted παρὰ τὰ δόγματα by pursuing Daidalos, a fugitive to Athens, μακραῖς ναυσὶ. After Minos was blown off course and perished, Theseus began building ships. When Deukalion, son of Minos, threatened Athenian hostages, Theseus attacked Knossos successfully. Nonetheless, distortion may run deeper. This tradition may have imagined an agreement forbidding forces larger than five triremes (a typical colonial expedition?). That proviso would provide the logical counterpoint to the actions of Jason, Minos, and Theseus.

Kleidemos rationalizes the Minotaur story. He confutes the Thucydidean tradition of Minos as first thalassocrat (1, 4), also referenced by Herodotus (III 122, 2). Minos is briefly a thalassocrat only through defiance of international agreement; his attack on Attica miscarries. Thucydidean tradition on Minos as the first who suppressed leisteia is rejected; Jason is portrayed in that role. Kleidemos visualizes Athens as a potential thalassocrat, but in a manner fundamentally defensive and panhellenic.

This tradition was influenced by classical Attic naval predominance, a perspective also misleading modern analysts. We return, however, from classical fancies to archaic realities. One circumstance shaping deployment should be raised. Usage of equivalent groups of triremes and pentekontors in the same battle line is not attested. When pentekontors appear in the mainly trireme fleets of 480, they comprise a small polis contingent. Because only propulsion by oars was used in battle, pentekontors could not hold station in an advancing line without affecting efficiency. Triremes could, alongside pentekontors, undertake single ship confrontations, but would lose any advantages of a massed squadron. The Themistoclean naval program confirms this, preferring to overbuild with less adequate manning rather than create a mixed force better fitting manpower resources. The suggestion that Athens and Aigina once deployed mixed fleets is without a single attestation. No evidence reports a victory by pentekontors over triremes.

Triremes infiltrated the force structure gradually. One role was conspicuous display for religious or secular purposes. Circa 600, Athens supposedly sent a trireme to Aigina demanding the statues of the goddesses Damia and Auxesia, stolen from Epidaurus (Hdt. V 85, 1). Theoric ships were triremes, at Athens

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12 Thus, the Megarians dedicated a single trireme’s ram (Paus. I 40, 5) from fighting over Salamis before 550. Cfr. Papalas 2000b, 389-390, Soc:n. 51 below.
13 Themistokles Decree (SGHI#23, 30-35); Hdt. VIII, 1 1-2; 46, 2.
subsidized from the naukraric treasury (Androt. FGrHist 324 F 36). The Myti-
lenaean ship bearing to Memphis Kambyses’ invitation to surrender was a tri-
reme (Hdt. III 13, 1; 14, 5-6). As elites provided ships to archaic governments,
triremes gradually infiltrated navies, as aristocratic affluence grew and exhibi-
tionism became a motivating factor. The instances where wealthy men provid-
ed triremes in the fifth century are a vestige of this phenomenon, stronger earlier
when poleis possessed a more limited ability for directly exploiting elite re-
sources. Early naval organization was conditioned by the interventions of ty-
rants, who in the supersession of aristocratic regimes emerged as proponents of
populism and more integrated administrative apparatuses. Unsurprisingly, there-
fore, the personal ships of the tyrants of the Chersonese (VI 41, 1-2, cfr. 39, 1),
as presumably those of their patrons, the Peisistratids, were triremes.

The disparity in oarsmen of the pentekontor and trireme is striking (50 versus 170). Literary sources are mute on possible intermediates, and relatively ret-
icent on sub-categories. More differentia exist for late Medieval/early modern
navies. Ancient testimonia differ from the iconography, leading scholars to de-
velop nuanced classifications. Regardless of archaic terminological distinc-
tions, any sub-classes fell into desuetude for classical sources, leaving two basic
types, pentekontor and trireme, to be distinguished in pertinent use and basis
within logistics and force structure. Cost/benefit calculations in sustaining dif-
ferent size crews militated for the two classes, vessels with around fifty rowers
(either monokrotos or dikrotos), and those with 170. These could only be three-
banked without wasting the additional manpower. Mobilizing 200 men per unit created an administrative threshold before large trireme fleets became feasi-
ble.

These two classes reside in different spheres of Mediterranean sea fighting:
leisteia ‘brigandage’, the ‘small war’, and fleet confrontation in battle lines. By
the Peloponnesian War, raiding took two forms: devastation by flotillas, some-
times accompanied by sizable landing forces; or by small forces (sometimes in
smaller ships), operating flexibly. For the latter, bases were unimportant; landing
places were not limited, with any protected beach with water sufficing. The

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16 Note Hdt. V, 47, 1 and the early trireme (with ram) reference by Hipponax, c. 540 (fr.
28W).
17 Hdt. VIII 17, 2; Plut. Alcib. 1; Thuc. VI 50,1; 61, 6; Plut. Per. 35, 1.
18 Sub-classes represent operational features: tacheiai, stratotides, hoplitagogoi, hippagogoi
(Morrison - Williams 1968, 246-249).
19 Shaw 1995.
21 Hdt. VII 184, 1-2; 8, 17; cfr. Thuc. VI 8, 1; VIII 29, 1; Dem. IV, 28. See Morrison - Wil-
liams 1968, 254-255.
sanctioned taking of *sulae* in wartime (i.e., privateering) was derivative. Pintical warfare did not strike against enemy forces or his agricultural subsistence base, but against undefended areas or unprotected littoral communities, and from ambush. It might constitute attritional economic war.

These strategic categories track the distinctions of Thucydides in his *Archaioiologia*. He emphasizes the piratical character of early seafaring (I 4-5, 3), especially regarding the Trojan expedition (I 10, 4-11, 2). His Achaean fleet is many massed raiding squadrons, busying themselves before Ilion with forays. In this perspective, the pirates of the *Odyssey*, even Odysseus himself, would be conducting merely extended plundering. Thucydides systematically contrasts *leisteia* with thalassocracy. Minos, the first thalassocrat, expels pirates (I 3, 4). Corinth, whose naval activity marks Greece’s opening toward the sea, tries to free the Aegean from pirates (I 13, 5). To hold *leisteia* and thalassocracy as opposing combat modes implies that pentekontor warfare and trireme warfare were alike different modalities. This is Athenian fifth-century conceptualization, as in accounts (based on Athenidography) of Kimon’s suppression of the Skyrian pirates23, or in the condemnation of immoral and senseless Aiginetan raids (Aiginetans whom Herodotus styled *thalassokratres*)24. Thucydides’ disdain for *leisteia* and *ploia makra* not only dramatizes a lack of triremes, but also actively disparages continued dependence on the tools of “small war”25.

Classical thalassocracy must never be confused with modern maritime dominance as formulated in the leading nineteenth-century naval strategist, Alfred Thayer Mahan (1890). Mahanian concepts are irrelevant for Mediterranean galleys, as Guilmartin demonstrated for the sixteenth century26. Classical thalassocracy was expeditionary and amphibious. This insight partially explains the trireme’s retarded predominance. Small trireme forces lacked decisive impact because expeditionary warfare demanded mobilizations of scale.

Triremes in number were expeditionary vessels. Here, Thucydides is revealing concerning archaic hegemonism through insular conquests27. Such warfare better approximates protocols of land warfare than marauding, because of its amphibious nature. Triremes could carry enough hoplites to win a battle28.

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24 Hdt. V 81, 2; 83, 2; VI 87; see also Diod. XI 70, 2; 78, 3-4. Cfr. Ephor. *FGHist* 70 F 176.
25 Thucydides’ disinclination toward expeditionary warfare that included *leisteia* is apparent in his treatment of Alcidas’ expedition (427) toward Mytilene (I 16, 3; 25, 1; 26, 1; 27, 1-2; 30, 1-33, 3).
26 Guilmartin 2003, 31-55.
27 Thuc. I, 4; 9, 4; 13, 6.
28 Troop carrying triremes: *IG* I 2 21, 10; I 160; Thuc. I 116, 1; VI 25, 2; 43, 1; VII 25, 1; 62,
their crews could double as infantry upon arrival (e.g., Thuc. IV 32, 2). A large trireme expedition sought landing near an enemy’s asty to interdict food supplies and mount a siege. Defenders were forced to mass to expel or block the intruding fleet, fight a regular engagement, or finally man their walls. This pattern is discernable in the Spartan expedition against Polycliates (525: Hdt. III 54-57, 1). An earlier, if more obscure, example is a Samian and Megarian battle near Perinthos ca. 600 (Plut. Mor. 303E-304C). The trireme expedition was the mainstay of naval operations throughout the fifth century. Note two non-Attic examples in Corinthian campaigns against Corecyra of 435 and 433 (I 29, 1-30, 2; 46, 1-55, 2), although fighting at the Battle of Sybota seemed to Thucydides old-fashioned, like an infantry engagement (I 49, 1-2).

Early Attic examples were Miltiades’ Parian campaign (Hdt. VI 132-135, 1) and an expedition against Aigina (VI 88-93), both early 480s. For Athens, the late 490s are the latest moment for the dominance of the trireme. Thucydides’ date for the general shift to triremes is imprecise, excepting that the Themistoklean ship-building program consummated it (I 14, 3). For Aigina and Athens, the process was begun by 506—although both poleis possessed fewer than 100 triremes ca. 485—perhaps around 70. Circa 519, at Kydonia, Aigina crushed the Samian exiles, who had possessed forty triremes in 525 (Hdt. III 44, 1-2; 59, 3, ), so that Aigina probably had an early advantage. At Athens, the old naukraric system, although it did not limit Athens to 48-50 ships, undoubtedly complicated modernization. The impetus for acquiring more triremes may be attributed to the ‘Heraldless War’ between the two states from 506 (V 81, 1-3; 89, 1-3). The abortive Athenian attack on Aigina in 489/8 (VI 88-93) was probably conducted with triremes, because lately discovered non-seaworthy Attic ships were replaced with twenty Corinthian vessels (VI 89, 2-3), almost certainly reserve triremes (Thuc. I 41, 2). The poorly maintained ships were not the majority of the Attic trireme force. The fleet of seventy confronting seventy Aiginetan ships was probably exclusively trireme. That the Aiginetans won a later battle indicates a comparable trireme force (Hdt. VI 92, 1). Note Miltiades’ seventy ships at Paros (VI 132). This reconstruction accords with Athens dispatching twenty triremes to aid the Ionians (498). That commitment was risky while Aigina was hostile, and was only viable with a fraction of Athens’ fleet and other triremes in reserve. Contemporaneous was the acquisition by Ionian poleis of comparable trireme

2; Xen., Hell. I 1, 36.


30 Thus less than the Sicilian tyrants (Hdt. VII 158, 4; Ephor. ForHist 70 F 186) or Corecyreans (Hdt. VII 168, 4), noted by Thuc. I 14, 2 as naukraroi aitioleoi before Xerxes.


32 Char., ForHist 552 F 10, with Hdt. V 99, 1.
forces, culminating in the flotillas massed at Lade in 494 (VI 8, 1-2). Expeditory warfare was pioneered at Corinth. Thucydides’ reference to the construction of the first triremes there has already been noted (I 13, 2-3). His supplementary observation that the Corinthian shipwright, Ameinokles, built four ships, presumably triremes, for the Samians is not only notable for illustrating the precocity of Corinthian shipbuilding and attesting this early alliance, but also because its recipients were not individuals, but the Samian polis. Thucydides records the first naval battle between Corinth and Corcyra in 680 or 660 (I 13, 4). Naturally there was earlier sea combat, as Geometric pottery demonstrates. The eighth-century Lelantine War — Thucydides recognized its importance (I 15, 3) — included sea fighting (Hesiod WD 650-662). By first nau- machia, Thucydides means a struggle of fleets in battle lines, a structured engagement with political consequences, not a melee with mainly personal or familial ramifications. These developments are dated to the domination of the Bacchiads (Diod. VII 9, 4; 6), an endogamous clan controlling revenues of the emporion (Strab. VIII 6, 20). Hence, these first Corinthian triremes were vessels whose procurement lay indeterminately between public and private spheres.

Under the Kypselid tyrants, especially Periander, the Corinthian naval establishment became more closely knitted into state structures. The Kypselids’ sumptuary legislation and confiscations from elite adversaries boosted governmental assets (Hdt. V 92ε, 2; 92η, 1; Henecclid. fr. 20 Dilts; Nic. Dam. FGrHist 90 F 58, probably Ephoran). Periander developed a trireme force for use on both Corinthian and Saronic Gulfs (Nic. Dam. FGrHist 90 F 58). He built the harbor at Lekhaion, and constructed the diolkos to move ships across the Isthmus, enabling him to concentrate forces in either gulf. Periander conducted amphibious expeditions against Prokles of Epidaurus (Hdt III 52, 7; Plut. Mor. 403 C-E), Kerinthos in Euboia (Theogn. 891-894) and Corcyra (Hdt. III 53, 7; Nic. Dam. F 59). Early in his Archaioologia, Thucydides indicated that lack of resources, achr ematia, not oliganthropia ‘lack of manpower’, limited sea power. Unsurprisingly, he emphasized Corinthian wealth through its emporion (I 13, 5). Thus, absolute lack of community resources was not everywhere the limitation.

34 In 724 or 704 depending on variant backward reckoning. The notice derives from generational counting (open to recalculation through different generation-length), or from a chronicle like that of Athena Lindia (Cary 1946, 28), or, preferably, from Eiaعون (FGrHist 535 T 1), the early Samian historian (Jacoby 1949, 361-362).
35 Morrison - Williams 1968, 30-33, 42; Basch 1987, 200-201.
37 Salmon 1984, 133-135.
39 Thuc. I 11, 1.
on building naval power, but inadequacy of the *polis*’ financial apparatus. Corinth represents a pre-monetary expeditionary trireme navy. Tyrannical leadership was sufficiently strong and charismatic to oversee complex projects like the building of triremes and naval facilities and the mobilization of manpower.

Other incidents suggest limitations on Corinthian naval power. Thucydides reports their lengthy efforts to amass forces in the 430s, first to challenge the Corcyreans besieging Epidamnos, and, second, the protracted preparations for direct attack after Leukimne. This involved equipping new ships, mobilizing laborers from other crafts and acquiring personnel, some colonial allies and others recruited from Attic allies (Thuc. I 35, 3-4; cfr. 31, 1). That this longer mobilization cycle was inherent in Corinthian military organization is indicated by attacks undertaken earlier against local enemies. Amphikrates of Samos attacked Aigna ca. 618-13 (Hdt. III 59, 4), and Thrasyboulos of Miletos assaulted Sikyon ca. 400 (Front. Strat. III 9, 7). Corinth probably instigated both. If Corinth, with its naval tradition, could not launch such attacks, some limitations on its mobilization protocols were the cause. Corinth was able to sell Athens twenty ships, presumably reserve craft, ca. 489 (Hdt. VI 89, 2-5); thus it did not lack ships.

The practitioners of *leisteia* and ‘small war’ exhibit another pattern of warfare. The first corporate activities of Aigna were raids against its former *hegemon*, Epidaurus (Hdt. V 83, 1-2). Depredations against Attica triggered the Haemkleless War ca. 506 (V 89, 1-3). Interception of an Attic theater vessel occurred after Marathon (VI 87), prompting further hostilities. Aignetan *leisteia*, not confined to Peloponnesian squadrons based there, regularly occurred during fourth-century conflict between Sparta and Athens (Xen. Hell. V 1, 2; 29; VI 2, 1), and damage to Athenian interests continued during the conflict with Philip. Aigna was well placed for this: its position and town site were ideal for intercepting Saronic Gulf commerce. Aiginetans were also famous traders. Independently of Polykrates’ later raiding, archaic Samians practiced *leisteia*, acting collectively or led by individual aristocrats. Amphikrates’ assault on Aigna

40 Before Leukimne, Corinth equipped seventy-five triremes (including empty Elean ships, but only thirty of theirs [Thuc. I 27, 2; 29, 1]). Thereafter, they needed two years to prepare 150 triremes, including their ninety (I 31, 1; 40, 1).
42 Figueira 1993, 23-28; also Salmon 1984, 227.
44 Figueira 1993, 338-359.
46 The name Syloson (Hdt. III 39, 2; 139, 1-4; 144; 146-47; Polygen. VI, 45); interception of diplomatic gifts (Hdt. I 70, 2-3; III 47, 1-3); Aikes’ dedication (*SGBI* #16); Samian exiles’ *mêling* (Hdt. III 57, 1-59, 1); the exiles’ sojourn at Kydonia (Hdt. III 59, 1-4); a testimonium from a lost
was noted above. Samian trade is illustrated by Kolaios’ famous journey to Spain (Hdt. IV 152, 2-4), and Samian involvement at Naukratis (II 178, 3). The Phokaians penetrated the western Mediterranean in armed pentekontors (III 16, 1-3)47. These commercial voyages probably possessed a belligerent dimension. Chios would not sell Phokaians the Inoussai islands for fear of an emporion there (I 165, 1). Justinus has latrocinium maris as one source of Phokaian subsistence (XLIII 3, 5). Phokaians leisteia stands foremost after displacement westward following the fall of Ionia (Hdt. I 166, 1-167, 4). Later, the Phokaians Dionysios, chosen Ionian admiral at Lade, presumably for experience in combat maneuvers, drilled Ionian triremes in advanced tactics (VI 12, 1-4). Escaping the Greek defeat, Dionysios became a leistes in Sicily, preying on Carthaginians and Etruscans (VI 17). Pentekontors were used by Phokaian and Aiginetan leistai and traders, and by Polykrates of Samos. Thus, in late archaic Greece, the pentekontor was the exemplary vehicle for leisteia or armed trade.

Nevertheless, the limits of this paradigm are apparent for the Phokaians. Thucydides thought their navy noteworthy, citing an early victory over Carthage (I 13, 6-14, 1). Upon the Persian advance into Ionia, they resolved to relocate to Akain, their Sardinian colony (I 164, 2-165, 3). Half the Phokaians, regretting their decision, returned home, leaving 60 of 120 pentekontors to sail westward. In Sardinia, the Phokaian exiles supported themselves by leisteia for five years (Hdt. I 166, 1-167, 4). Thereupon they were challenged by 120 Etruscan and Carthaginian ships, which they defeated, unfortunately losing 40 ships with 20 disabled through damage to their rams48. The pentekontors’ rams were not adequate for sustained combat, although they presumably had appreciable utility in individual duels and for deterrence. Phokaians inability to stand another attack caused a retreat eastward (eventuating in the foundation of Elea).

Triremes with large crews to sustain were usually impractical for trading. Without many triremes, the Phokaians could not defend against more numerous pentekontors. Contrast the Knidian and Rhodian refugees, who as colonists joined with natives to create a polis in the Lipari Islands (ca. 580-576). They not only held off Etruscan raiders, but ravaged the Etruscans as raiders themselves (Diod. V 9, 5)49. The Liparians were advantaged initially by possessing five triremes. Early in their colonization they annihilated four Etruscan squadrons of five ships (probably pentekontors) in succession, an iconic victory they celebrated at Delphi ca. 500 (Paus. X 16, 7; SIG 14; cfr. Diod. V 9, 2-3).

Thucydides emphasizes achrēmatia as impeding the development of sea

Samian historian (FGrHist 544 F 3); a bout of leisteia by Samian exiles (Plut. Mor. 303 D).

49 Figueira 1984, 192-196, noting material derived from the fifth-century historian, Antiochus (FGrHist 555 T 1, F 1).
power (I 11, 1). Tyrants like Periander, with his harbors and diolkos, and Polykrates with his ship-shed complex, created exceptional facilities. These logistical foundations may be contrasted with Athens, where the beach at Phaleron was long the main base — as development of the Peiraius only began 493/2 under Themistokles (Thuc. 1 93 . 2) — and Aigina, where harbors north and south of Cape Colonna were used indiscriminately for military and merchant vessels into the 480’s, when an advanced military harbor was built. Furthermore, the factor that Thucydides derogates, his refused alternative, oliganthropia, should alike be recognized as significant, because it still reflects contemporary speculation. Yet, oliganthropia may be determinative only if subtended to achrēmatia. Trireme forces had to sustain massive numbers in the context of polis demography. By Thucydides’ implication, a seventy-trireme force marked the lower range of reputation. Yet it ideally required 14,000 men. Even ca. 550, polis treasuries were not very robust. Coinage was still rare; smaller denominations rarer still. Scant issues illustrate the rates at which leading mints (Aigina, Athens and Corinth) disbursed reserves in communal expenditures that could not entirely supersede bullion or pre-monetary media (e.g., cauldrons or spits). Most Greeks, however, were enmeshed in that pre-monetary economy of highly conventionalized exchange among transactors of close social affinity.

To transcend the financial and demographic limitations of early naval organization, new state structures had to be erected. Aigina offers indications of adaptation in response to these challenges. Problems in manning ships could be addressed through slavery. While slaves could not be utilized disproportionately as rowers without problems in motivation and compliance, stratified poleis managed these obstacles through manipulating manumission and clientage. Slavery performed a broader role in archaic economies by concentrating labor; slaves and freedmen became concentrated within the non-agricultural sector. By 450, the Aiginetan damos was primarily of servile extraction. Clientage networks linked commercial ship captains and sailors from the damos. Moreover, a naval treasury supported a larger trireme force, because the sea turtle type of

51 More elusive for us is the possibility that creating serviceable rams required a long period of experimental practical engineering. Mark (2008) offers a study of the iconographic evidence for rams with a sustained polemic against their early appearance. This is not without merit but ultimately inconclusive. His treatment of Herodotus on Alalia and Hippoxus (n. 16 above) is too dismissive, and other possible cases of early sixth-century ramming like a Megarian dedication (n. 12 above) and the victories of the Liparians also deserve consideration. Yet, if Mark’s argument based on engineering challenges turns out to be valid, the tardy development of ramming (after ca. 600) could become another reason for the gradual emergence of large all-trireme navies.
the main mint terminated with the fleet’s suspension in 457/6. Another long-existing minting authority then assumed exclusive privileges. This mint celebrated its terrestrial origin with a land tortoise. Lack of evidence, however, forbids proceeding much further in analysis of these masters of 

To understand how poleis grappled with organizational challenges in building trireme navies, capable in both modes of sea fighting, we must explore the synthetic administrative approaches of Samos and Athens. Herodotus hailed Polykrates as the earliest thalassocrat, referring to ambitions to dominate Ionia and the islands (III 122, 2). These endeavors were realized through conventional expeditionary warfare. Herodotus notes his subjugation of islands and mainland cities, adducing Polykrates’ capture of a Lesbian fleet assisting Miletos (III 39, 4). Thucydides specifies his insular hegemony (I 13, 6). These operations required the entire strength of Samos, which already included a strong trireme force.

Polykrates sent forty triremes to aid Kambyses against Egypt, ships staffed by enemies whom he intended to sacrifice (Hdt. III 44, 1-2). Yet Polykrates was still strong enough to fight at sea against this squadron when it defied him (III 45, 1-3). Moreover, Samos deployed sixty triremes at Lade (494: Hdt. VI 8, 2) after a Persian massacre ca. 510 (III 147, 1-2; 149). Thus trireme strength under Polykrates was at least eighty. Ships sent to Kambyses were captained by elite Samians and manned through traditional clientage, making this an attractive means for Polykrates to remove enemies and eliminate their followers. Otherwise, how could Polykrates acquire information to determine whom to suspect from the non-elite strata of Samos? These ships’ crews and their leaders did indeed exhibit solidarity, cohering through five years of vicissitudes (III 45, 1-46, 2; 54-59, 4).

Building on Samian traditions of leisteia, Polykrates also acquired 100 pen-tekontors and 1,000 archers, and thereby conducted pillaging operations (Hdt. III 39, 3). Some were seaborne interceptions; Herodotus would not otherwise be comprehensible, observing how Polykrates did not determine his victims’ status, but made restitution only to friends (III 39, 4). The samaina was probably developed for his force of pentekontors. A specialized bireme, with swiftness and boar’s head ram, it was broader and decked to carry troops. Previously, pent-
tekontors mainly carried oarsmen, who doubled as deck fighters or disembarked leistas. Samainai could carry Polykrates’ archers and other epibatai on interceptions and raids without sacrificing ramming speed. Some have seen Polykrates’ mixed-force structure as betokening transition from the heyday of the pentekontor to that of the trireme, but that hypothesis misses the differentiation in the deployment of the two types and Polykrates’ maintenance of a specialist pentekontor force.

Alternatively, one should view this naval establishment as a tyrannical initiative blending earlier forms. Circa 600, a Samian fleet of thirty ships was dispatched to defend their colony Perinthos from Megara, but its commanders preferred to conspire with captured Megarians to overthrow the Samian aristocracy, the Geomoroi. These ships were probably triremes, because Sylosen, an ancestor of Polykrates, launched a coup ca. 590, during the Heraia, with the support of trireme crews (Polyaen. VI 45). Therefore, in the early 500s, instead of private warships, which armed traders or leistas supplied the polis, Samos possessed a trireme force (like Corinth). By the period of Polykrates, the Samian navy involved a cross-section of elites, including aristocrats with ties of xenia to Sparta (Hdt. III 47, 1), men acting as ‘trierarchs’ who mobilized clientages.

Rather than individual aristocrats taking sole with political permission, Polykrates appropriated leisteia to serve his hegemonic goals. These were intimidation and the institution of a regime of quasi-taxation through confiscation, accompanied by selective redistribution. Hence the apparatus of leisteia could achieve unprecedented scale (100 pentekontors), acquire specialized equipment (samainai), and enlist professionals (Samian toxotai and epikoureis). The ‘thalassocracy’ of Polykrates was vitalized by dual military establishments: a ‘grand warfare’ mechanism with triremes and hoplites, subsidized by the polis, and a ‘small war’ apparatus of ‘special forces’, supported through resources garnered from regional hegemony. When the expeditionary force for Kambyses defected, Polykrates held citizen women and children hostage in the ship-sheds, which his mercenaries could burn (Hdt. III 45, 4). While just strong enough to repel the Spartans, Polykrates was fatally left vulnerable to blandishments from the satrap of Sardis (III 122, 1-125, 4).

The Athenian naukraric order reveals another synthetic system. Naukraroi derived from the ship-owning families of coastal Attica — Kolias is the only identified naukraroi — who originally supplied private ships. Naukraroi later

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commanded ships on public service, somewhat like classical trierarchs (Poll. VIII 108), but had become officials over whom higher magistrates, prytanes, stood. Herodotus believed the prytanes performed important administrative functions during the Kylonian coup (V 71, 2). The naukraric system addressed several glaring needs of archaic naval organization.

First, it harnessed the resources of the whole polis to supplement assets offered by the maritime sector in its local contexts. Ideally, fleets needed to use coins because their hierarchy of values permitted segmented, spaced disbursals. The Athenaiōn Politeia cites archaic laws on naukraroi levying funds and spending from the naukraric treasury, and notes their connection with eisphorai and oikismoi. Regarding their role in keeping property registers, testimonia compare naukraroi to later demarchs. Thus, the naukrarics were compared to later trierarchic symmories, and some mechanism for assignment of responsibility existed because one could assert a challenge to assignment (Clid. FGrHist 323 F 8; Phot. ναυκραρία). Secondly, the naukraric system did not surrender the advantages of ‘small war’. The late discovery by the Athenians of insufficient seaworthy ships to face Aigina shows that naukraric ships were based in naukraric centers. Each naukraria kept ready a ship and two horsemen, who could raise the alarm for quick action (Poll. VIII, 108). Third, naukrarikoi were incorporated into the tribal system, as sub-divisions of first the Ionian tribes and then Kleisthenic tribes. Thus the naukraries exploited a larger manpower reservoir than available from the followings of the naukraroi or the naukraric districts. Difficulties in mobilizing oarsmen still slowed emergence of a large trireme fleet, but the naukraric system was progress toward their resolution.

Athens was an unusually large polis whose military could interweave disparate social components, in this case fusing a maritime segment which engaged in local trade, coastal transport, and, possibly, leistesia with a large, basically agrarian economy. Athenian experience of tyranny embodied the centralization of administrative functions typifying the Corinthian state. Fortunately for Athens, however, the Peisistratids did not break so violently with traditions as dynastic government elsewhere, and an aristocratic backlash could not stifle populist impulses. Also, Sparta lay too distant to shift the political balance toward reaction and oligarchy. Hence, continuous institutional adaptation progressed toward monetization, a flexible, market-based economy, and demographic growth. Elsewhere, I offered a hypothesis for the desuetude of the naukraroi in their failing to meet the demands of the Aiginetan war in the 480s, and adduced

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64 Ath. Pol. 8, 3; Ἀρριαπόλιον ναύκραροι; Σύδα ναύκραροι; Phot. ναυκραρία; Lex. Seguer. ναύκραροι, Anecd. Bekk. I, 283.
65 Ath. Pol. 8, 3; cf. Hesych. s.v. δήµαρχοι.
66 Ath. Pol. 8, 3; Poll. VIII 108; Hesych. δήµαρχοι, ναύκλαροι; Phot. ναυκραρία.
67 Ath. Pol. 8, 3; Poll. VIII 108; Clid. Φωιθήδες 323 F 8.
as evidence an ostrakon denouncing the strategos Xanthippos (Agora 25, #1065)\(^{68}\). Eventually, Athens reformulated its navy yet again through creating the trierarchy and instituting the authority of the Boule. Fifth-century naval warfare is largely the story of the Athenian fleet and the elaborate mechanisms for its upkeep, subsidization, and manning, which other poleis had to imitate in grappling with the ramifications of Attic imperialism\(^{69}\). Thus, as we explore archaic maritime warfare, we come not only to comprehend the foundations of Attic power, but also to appreciate better its extraordinary accomplishments.

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Bibliography

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\(^{68}\) Figueira 1993, 167-172; 2011, 200-201.

Archaic Naval Warfare


Williams 1958: R.T. Williams, Early Greek ships of two levels, «JHS» 78, 121-130.
Abstract

An enigma in Thucydides’ description of the rise of Greek naval power in his *Archaiologia* is his notice on the late eighth-century origination of the trireme, which may be coupled with his further specification that large trireme navies did not emerge until the late archaic period. This paper stands strongly against the tendency to reject the implications of Thucydides’ treatment, although it also explains how Athidography in the person of Kleidemos confronted the challenge of interpreting Thucydides. It argues that the emergence of the large trireme navy required mastering administrative problems, and not merely solving engineering challenges. Resources had to be amassed for the creation and maintenance of trireme forces in early monetizing economies. Manpower had to be mobilized in a manner conforming to prevailing socio-political structures. In this context, the evidence on the appearance of triremes in archaic navies is presented. I propose that *leisteia* ‘brigandage’ was pervasive in archaic Greece. This ‘small war’ was particularly suited to the use of *pentekontors* by commercial *poleis* such as Aigina, Phokaia, and Samos. Corinth, however, is the best example of an early trireme navy, and its naval administration became highly developed under the Kypselid tyrants. This force structure accommodated commerce that was more passive, intermediated, and colonial, but did not lend itself to rapid mobilization. In the late archaic period, the monetization of naval warfare becomes apparent, and slavery plays a role in addressing manpower needs. Moreover, synthetic regimes of naval organization appear on Samos under Polykrates and at Athens in the *naukraric* system — that balance or blend *leisteia* and trireme warfare. The resolution of the challenges of the trireme navy is an aspect of the achievement of the more integrated classical *polis*, which culminated in the breakthrough of the naval *arche* of Athens.