

THE EMERGENCY RIG OF ANCIENT WARSHIPS

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When the Mediterranean galley first came into being, its rig consisted of a retractable mast stepped amidships on which hung a single broad squaresail. We see it in numerous representations,¹ and it is described in Homer's verses.² It apparently filled its role satisfactorily, for it lasted without substantial change until the end of the ancient world.³

During a fight warships worked under oars alone; with the rapid manoeuvring required, sails were a hindrance rather than a help. Consequently, the practice arose of stowing the sailing gear away before going into action,⁴ or even, if convenient, leaving it ashore.⁵ Yet there were moments during battle when a galley could well use the wind's

¹ E.g. L. Casson, *The Ancient Mariners* (New York 1959) pls. 3b, 3c, 5a-c; C. Torr, *Ancient Ships* (Cambridge 1895) figs. 4-7, 10, 12, 13.

² Il. 1.432-34, Od. 2.424-25 = 15.289-90.

³ Cf. e.g. the pictures on coins of Hadrian's yacht proceeding under sail (H. Mattingly, *Coins of the Roman Empire in the British Museum* 3 [London 1936] Hadrian no. 1393 = pl. 84.11, 1462A = pl. 86.8 [119-38 A.D.]).

⁴ Cf. Livy 36.44.2-3: *quod ubi vidit Romanus vela contrahit malosque inclinat, et, simul armamenta componens, opperitur insequentes naves* "when the Romans caught sight [of Polyxenidas' fleet], they furled sail, lowered the masts, and, while still stowing away the gear, awaited the ships coming against them." Since the Roman contingent had been constantly in motion—it had started from Delos, stopped at Chios and Phocaea, and was headed for Corycus (Livy 36.43.11-13)—there had been no chance to leave the sailing gear ashore.

⁵ Thus Conon, escaping from Aegospotami, in order to avoid pursuit stopped for a moment at Lampsacus and "seized there the big sails of Lysander's ships" (Xenophon, *Hell.* 2.1.29); obviously Lysander had left these there when he took his fleet into action. For other references to leaving the working sails ashore, see Thucydides 7.24.2 (the Syracusans, with the capture of an Athenian fort used as storehouse, fell heir to the sails and other gear of 40 triremes); Xenophon, *Hell.* 6.2.27, quoted in note 8, below; Plutarch, *Ant.* 64.2 (at Actium, Antony's captains wanted to leave the sailing gear ashore but he forced them to take it aboard); Dio Cassius 50.33.5 (Augustus' ships, stripped for action and hence without sails, were unable to pursue Antony when he fled).

aid—to escape from overwhelming odds or to pull out of danger if crippled.⁶ The solution was a second rig for emergencies, one that could be kept on board at all times and be put into operation swiftly and easily.

Very likely this important addition was introduced during the fifth century B.C., when the warship saw so many improvements.⁷ There is no question that, by the early fourth, it was standard equipment on Athenian triremes, where it went under the name of *akateion*,⁸ the “boat” rig as against the regular galley rig. It consisted of a “boat” yard and a “boat” mast⁹ fitted with special partners;¹⁰ the sail was probably a piece of the extra canvas aboard.¹¹ By the next century or

⁶ Cf. the passages cited in note 13, below.

⁷ When Xenophon reports (*Hell.* 1.1.13 [410 B.C.]) that Alcibiades, readying for action, ordered the ships “to strip off the big sails and follow him,” the clear implication is that there were also smaller sails aboard; cf. the passage cited in the next note.

⁸ Cf. Xenophon, *Hell.* 6.2.27: Iphicrates, setting off in 373 B.C., “made all possible preparations for a naval battle. He started by leaving the big sails behind, expecting to go into action. Then he used the boat sails (*akateia*) sparingly, even when there was a favorable wind.”

⁹ This can be deduced from certain entries in the Athenian naval yard records for the years from 377 to 341 (*IG* II² 1604–1622). The earliest fragment (1604) mentions “boat yards” (*κεραῖαι ἀκάτειοι*, lines 17, 18, etc.), “boat masts” (*ἱστός ἀκατεῖος*, lines 64, 85, 92), “big masts” (*ἱστός μέγας* aut *sim.*, lines 23, 48, 50), “big yards” (*κεραῖαι μεγάλαι*, line 23). A fully equipped trireme was issued both sets, as is clear from the many entries that expressly assign all four items to given ships: e.g. 1607.105–12 (373/2); 1609.49–53 (370/69); 1616.46–49 (358/7); 1622.342–50 (342/1). Other entries which do not specifically mention all yet imply their presence: e.g. the trireme *Megiste* in 358/7 is listed as having on board a big mast, big yard, and boat mast, all three of which were unserviceable (1616.50–67); obviously the boat yard had been lost altogether.

Navies, whether ancient or modern, rarely succeed in keeping all units up to par. The Athenians were no exception: in 356/5, for example, one warehouse had on hand “big yards” for 231 ships but “boat yards” for only 83 (1612.49–56).

¹⁰ The *parastatai*, literally “stand-bys” (cf. e.g. 1604.52, 69, 80, etc.), a pair of objects which form part of the wooden gear of triremes. They appear in the lists along with the boat yard and mast, and disappear from them precisely when the latter do (e.g. they do not appear in the entries mentioned in note 17 below). They are usually identified (e.g. Torr [above, note 1] 83) as supports for the regular mast but, to judge from their correlation with the emergency gear, they were more likely partners for the boat mast, propping it so securely that it could stand with a minimum of standing rigging. The only ships that continued to be issued *parastatai* were triaconters (1632.6–11 [323/2]), whose regular mast was no doubt relatively short.

¹¹ There is no mention ever of a “boat sail” or of “boat ropes” in the naval records, a point that has been considered puzzling (cf. Torr [above, note 1] 84) but is not inexplicable. Every trireme had, as part of its regular issue, a number of canvas awnings (*katablêma*, *hypoblêma*, *pararrhymata*; cf. e.g. 1611.299–301 [357/6]); any one of these could have been cut and fitted to double as a small sail, using the lines from the regular

so, the emergency rig had changed its name from *akateion* to *dolôn*—perhaps “sneaker,” that which enabled a craft to sneak out of harm’s way¹²—and, under this name, can be traced right through to the Byzantine period. The *dolôn*, too, consisted of a small-scale mast, yard, and sail.¹³

What did this emergency rig look like? Pictures of Greek warships down to the fifth century B.C. show only the billowing sail of the working rig, while the whole of the next half millennium has yielded no pictures whatsoever to go on. When pictures do finally come to

gear. Venetian galleys, for example, used to press the deck awning into service as a sail (F. Lane, *Venetian Ships and Shipbuilders of the Renaissance* [Baltimore 1934] 22–23). In the storehouses, *pararrhymata* were actually kept in the same boxes as the sails; see *Syl.*³ 969.86 (347/6).

¹² In the sense “dagger,” which the word also has, it is clearly derived from *δόλος* “trick”; cf. H. Frisk, *Griechisches etymologisches Wörterbuch* I (Heidelberg 1960) 408. Why not the nautical sense as well? (Conformably, its meaning in Artemidorus 2.14, where it is some form of fishing gear, would be “lure” rather than “fishing pole”; the latter, given in *LSJ*, probably stems from the identification, discussed below, of the *dolôn* mast as one that slants over the bows.) Frisk rightly points out that there is little to be said for a suggested derivation from *δέλτος*.

¹³ In 307 B.C., a Carthaginian admiral, anticipating capture, committed suicide—senselessly, since “his ship, catching a favorable wind, raised the *dolôn* and escaped from battle” (Diodorus 20.61.8; the word *dolôn* here may reflect the usage of Diodorus’ own day rather than of the time he is describing). At the Battle of Lade in 201, “one [Rhodian] ship, because it had been rammed and was going down, raised the *dolôn* . . . and escaped” (Polybius 16.15.2). In the encounter with Polyxenidas’ fleet in 191, the Romans, after striking their regular masts (see note 4, above), in order to straighten their line of battle, had the left wing “step the *dolóns* and head for the open sea” (*dolonibus erectis altum petere intendit* Livy 36.44.3; *erigere* is used of masts, not sails, so clearly a complete second rig was carried). Polyxenidas’ ships were similarly equipped since when things turned against him, “he raised the *dolóns* and headed into hurried flight” (*sublati dolonibus effuse fugere intendit* 36.45.1). The following year his ships again sought safety in their *dolóns* (37.30.7). In 36 B.C. some Roman galleys escaped from a defeat by “raising their short sails” (Appian, *Bell. Civ.* 5.111); the ships, then, had two sets aboard, the “short” and the regular. The fleet Belisarius led against Africa in 533 A.D. carried both large and small sails, and Procopius pointedly calls the latter *dolóns*: “[Belisarius ordered the ships] lowering the big sails, to follow using the small, which they call *dolóns*” (*Bell. Vand.* 1.17.5). *PLond. Inv.* 2305 (3rd B.C.) includes in a list of items (pitch, paint, deck planks) for finishing up the hull of a *kybaia* a *τράπεζα δολωνική* (cf. *LSJ*, s.v.). This could be a plank with a hole in it that fitted over the mast-hole in the deck to adapt it to the reduced circumference of the *dolôn*. The *kybaia*, as I shall show in a future study, was a sea-going merchant galley.

Torr (above, note 1) 87 makes much of the change in name, taking the *akateion* to be distinct from the later *dolôn*. Their function clearly was identical, and the names were created by seamen, not lexicographers; the one sail need be no more different from the other than, say, a *spanker* is from a *driver*.

our aid, toward the beginning of the second century A.D., they reveal that galleys of the Roman Imperial navy at times mounted a sail familiar to us from its widespread use on ancient merchantmen, a small squaresail set rather low and well forward on a short mast slanting over the bow; in size, location, and function it corresponds almost exactly to the bowspritsail of later ages.¹⁴ This has raised a question: was the emergency rig a mast and sail that replaced the working rig? Or was it, as most believe, this bow-sail we see on Roman men-of-war?¹⁵

If purpose alone is considered, the prevailing view has little to recommend it. A bow-sail is mainly an aid to stability or steering: it enables the vessel to sail more efficiently by keeping the bow from digging in, and, when braced about in the appropriate direction, can aid the steering. It also provides drive—but only in proportion to its size, and its size on a Roman galley was strictly limited by its position over the prow, a position it had to have for exercising the functions just described. On the other hand, a sail carried amidships is a driver pure and simple, and, although an emergency rig designed specifically for handling on a crowded warship during action will perforce be smaller than the working rig, it will beyond the shadow of a doubt be considerably larger than any bow-sail; the greater the size the greater the

¹⁴ Casson (above, note 1) pl. 10b (Trajan's column); Mattingly (above, note 3) Hadrian nos. 243-47=pl. 51.9, 10 (119-38 A.D.); 1394-1414=pl. 85.1-7 (119-38 A.D.). For examples of this sail on merchantmen, see Casson, pls. 11-13; for the identification as the *artemôn*, see J. Smith, *The Voyage and Shipwreck of St. Paul* (London 1848) 153-63.

¹⁵ A. Breusing, *Die Nautik der Alten* (Bremen 1886) 68-78; Assman, *RE* s.v. "Segel" (1921) 1050; E. de Saint-Denis, *Le vocabulaire des manœuvres nautiques en Latin* (Macon 1935) 53, 56, 113; J. Rougé, *Recherches sur l'organisation du commerce maritime en Méditerranée sous l'empire romain* (Paris 1966) 59. The two latter argue for identification with the bow-sail on the grounds that its mast would be conveniently available since it "sans doute . . . restait debout pendant le combat" (de Saint-Denis 56). No doubt this bow-mast did so remain—but a *dolôn*-mast did not, as Livy expressly says (see note 13, above); de Saint-Denis failed to see the contradiction, while Rougé saw it but dismissed it. The sole evidence connecting the *dolôn* with the prow is the word of the late and bookish lexicographer, Isidore of Seville, in a context that is sadly confused. Isidore reports (*Origines* 19.3.3) that *dalum minimum velum et ad proram defixum. artemo dirigendae potius navis causa commendatum quam celeritate*: "The *dalum* is the smallest sail and is set at the prow. The *artemo* is useful for directing a ship rather than for speed." Isidore has here defined perfectly the function of a small sail set at the bow—but he (or his copyists) so misunderstood matters as to assign the function to a sail of one name and the size and location to a sail of another. And it is only a guess that "*dalum*"—the reading of all the manuscripts—is a mistake for *dolôn*.

drive, and drive is what a galley in flight needs above all else. Conformably, when ancient writers refer to the emergency sails, it is often with the distinct implication that these are a substitute for the larger working sails; Livy, moreover, reveals that a fleeing warship had to raise and step its *dolôn*, which makes it sound far more like an emergency rig than a bow-sail, whose unobtrusive location would presumably allow it to be carried in place at all times.¹⁶ Yet all the above considerations, cogent though they may be, are admittedly inconclusive: if a vessel is reported as having lowered her big sail and raised her smaller, it can be still argued that the latter, as on Roman warships, was set on a bowsprit-like mast forward rather than a jury-mast amidships, and that this bowsprit-like mast was unstepped and stored away when a vessel went into action.

There is yet a second problem. For the fourth century B.C. we have at our disposal the invaluable evidence of fragments of the official records of the Athenian navy yard. These reveal that triremes were equipped with "boat mast" and "boat yard" only until shortly after the middle of the century.¹⁷ Was the use of emergency rigs discontinued? If so, why only at Athens, since they obviously continued elsewhere for many a century? It so happens that there is an answer to these questions, and it happily settles the nature of the rig as well.

Careful study of the entries in the records reveals that the emergency rig did not die out but yielded to a substitute arrangement. Mention of the boat yard and mast ceases precisely when mention of a new type of sail, the "light" sail, begins: boat yards and masts make their last appearance in records drawn up in 342/1; "light" sails make their first in the very next fragment preserved, dated 334/3,¹⁸ and

¹⁶ Cf. the citation from Xenophon in note 8 above, from Procopius in note 13, and Epicrates as quoted in Athenaeus 11.782-83 f: *κατάβαλλε τὰκάτεια, καὶ κυλίκια αἵρου τὰ μείζω* "lower the boat-size (cups) and hoist the bigger goblets." For Livy's statement (36.44.3), see note 13 above.

¹⁷ Cf. Torr (above, note 1) 82-84. The last appearance is in *IG* II² 1622.321-22 and 347-48 (342/1); the mention in connection with only two triremes out of at least eighteen seems significant. The records continue from 334 to 322 (1623-32), and it is absolutely certain that, in this later period, boat yards and masts were a thing of the past. Numerous entries spell out precisely what a ship's equipment consisted of, and invariably only a *histos* and *keraiā*, working mast and yard, are included (1624.110-24; 1627.440-53, 459-72; 1628.576-608; 1629.1050-84; 1631.257-78).

¹⁸ 1623.44-46, 270-75, 315-20, 330-33.

continue until 323/2, the date of the latest fragment we have.¹⁹ Thus, the trireme *Pandora*, whose equipment before 342 specifically included a "big yard" and by implication complete sailing gear of both sizes, in 323 has only a working mast and yard—but now rigged with a light sail.²⁰ The abrupt dropping of the one and introduction of the other can hardly be coincidence. During these very years the navy was simplifying the other canvas gear issued;²¹ this looks very much like more of the same, an attempt to do away with the trouble and expense of equipping ships with two sets of gear and to experiment with a single set carrying a sail of finer cloth.²² The naval authorities may have reckoned that, for a trireme in danger, the loss of time in setting up the rig was less important than the extra drive a sail of normal size would give—particularly a light one, which would be more effective than heavy canvas in the mild weather that alone permitted galleys to come out and fight.²³ Judging by the presence of the *dolôn* in the next century, the experiment was ultimately abandoned, and warships returned to the old practice of using two rigs.

What the above makes perfectly clear is that, in the Athenian navy, the emergency rig was, as one would expect, a substitute for the main-sail. There is no reason to think that it was any different elsewhere.

¹⁹ 1632.128–30, 143–49, 149–54, etc.

²⁰ Cf. 1622.231–33 with 1631.479–82. There is no doubt the same galley is referred to, since the name of the master shipwright (Xenocles) is the same.

²¹ The awnings called *hypoblēmata* and *katablēmata*. Down to 325 B.C., triremes had been consistently issued one of each (1628.576–91 [326/5], 1627.440–53 [330/29], 1624.110–24 [between 336/5 and 331/0], and compare 1611.238–43 with 244–53 [357/6]); in 323 they were issued *katablēmata* alone (1631.257–68). Quadrirèmes, introduced into the navy just before 330 B.C., carried only *katablēmata* from the very beginning (1627.459–72 [330/29], 1628.592–608 [326/5], 1629.1068–84 [325/4], 1631.268–78 [323/2]).

²² The traditional sails are described as *παχέα* (1631.415–17). If the navy intended to fit all triremes with the new sails, it got no further than it had earlier in providing them with a double set of rigs. E.g. in 330/29 there were 100 sails in storage on the Acropolis, all the old type, and, in the dockside warehouse, 288, of which 74 were light (1627.58–67); in 326/5 the warehouse had 281, of which 72 were light (1628.242–44); in 325/4 the number of light sails was down to 68 (1629.368–71). No quadrirèmes or quinquerèmes are ever listed as having the new sail, which may simply mean that, having less need of it than their weaker sisters, their priority was low.

²³ It may be that the light sail was issued in addition to the regular. The standard entry reads *ξύλινα ἐντελῆ, κρεμαστά ἐντελῆ, ἱστίον τῶν λεπτῶν* (e.g. 1632.147–49, 153–54, 158–59, etc.) which seems to mean "complete set of wooden gear (i.e. oars, spars, etc.), complete set of hanging gear (i.e. lines, awnings, sail), the sail [thereof being one] of the light ones," but might just possibly mean "plus a sail from the light ones."