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978-0-521-56456-4 - The Athenian Trireme: The History and Reconstruction of an Ancient Greek Warship, Second Edition

J. S. Morrison, J. F. Coates and N. B. Rankov

Excerpt

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QUESTIONS AND ANSWERS

The Greeks called the standard warship of the classical period a *trieres*. The Romans called it a *triremis*, and English scholars have traditionally followed the Romans and called it a trireme.¹ But since the Greek ship is the theme of this book we shall use the term ‘trieres’ (plural ‘triereis’) throughout, except when we are speaking of the Roman vessel.

At the outset a number of questions require to be answered. Why is the trieres important? Why did a book need to be written on the subject? Why should the book have been followed up by the design and making of a full-scale ship? And, finally, why was the definitive book not written, and a satisfactory ship built, long ago, since the evidence has been available for a good many years?

The importance of the trieres

Oared warships, of which the trieres is the most famous, lie at the heart of the Greek, Hellenistic and Roman story as it unfolds from Homer to Constantine. In the seventh and sixth centuries BC, oared galleys took Greek colonists from their mother cities to all parts of the Mediterranean and the Black Sea. In 480 BC a great Persian armada was defeated by a much smaller Greek fleet in the narrow waters between Attica and the island of Salamis. Athens’ ensuing maritime supremacy was founded on the crucial role which she played in that famous victory. The skilled use of the trieres enabled her to win, and for some decades to keep, the hegemony over some, at least, of her former Greek allies. In the fourth century larger oared ships – ‘fours’, ‘fives’, and ‘sixes’ – were built in Sicily at Syracuse to

¹ Unlike the French (*trière*) and the Germans (*Triere*). The word ‘trieres’ probably means ‘fitted with three’ of something. Aeschylus *Persians* 679 and 1074 uses the epithet *triskalmos* of triereis. Lionel Casson calls the ships of higher denomination ‘fours’, ‘fives’ etc.

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meet the growing seapower of Phoenician Carthage, and 'fours' and 'fives' were employed at the end of the century by Athens and in the Levant. After the death of Alexander, his successors in the late fourth and third centuries BC disputed among themselves the command of the Eastern Mediterranean in fleets of increasingly large denomination. Rome had to build fleets of 'fives' (quinqueremes) and accustom herself to their use in a war with Carthage for the control of Sicily. In 31 BC at the sea battle of Actium, fought in oared ships of a great variety of sizes, the young Octavian defeated Antony and Cleopatra and gained the mastery of the Roman world as the emperor Augustus.

To understand the naval confrontations of ancient history, on which the future of western civilisation has so often turned, it is essential to know as much as possible of the nature and potentials of the vessels in which the two sides fought, as well as to form an idea of the economic and social aspects of the organisation of fleets; and knowledge of the trieres is basic to the understanding of the larger ships. The trieres was the first type of oared warship to be pulled by oars at three levels. No representation of an oared warship exists showing oars at more than three levels. It seems likely, then, that the types of denomination five to eight were pulled at three levels employing more than one man to an oar, in a five at two levels and in the others at all three levels. The four is likely to have employed two men at each of two levels and the types larger than eights to have employed gangs of men at big oars again at two levels. It follows that understanding of the trieres is important in relation not only to the deployment of that ship herself but also to the deployment of the larger ships which also were pulled by oarsmen at three levels.

To Athens in the fifth and early fourth century BC the importance of the trieres hardly needs to be emphasised. The fleet of 200 triereis built shortly before the second Persian invasion, when she was involved in a naval war with Aegina, enabled the Greeks successfully to repel the invasion when it came. The entrance fee to the club of naval powers was high, and we are told that Athens was only able to afford it by using, at Themistocles' suggestion, the proceeds of a lucky strike in the silver mines at Laurium. These ships were also, Plutarch tells us (*Cimon* 12.2), specially designed by Themistocles 'for speed and quick turning', information which suggests that he had his own ideas of trieres tactics. Only by understanding these tactics and the nature of the ships which employed them

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can we form an idea of how the Greeks were able to defeat a fleet three times the size of their own.

After the repulse of the Persian invasion a naval force under Athenian command proceeded to liberate the Greek cities of Asia Minor and the off-shore islands, as well as part of Cyprus, and later invaded Egypt. In the last third of the fifth century Athens, now at war with her Peloponnesian allies, ensured her power at sea with a mastery of that special skill in fighting with trieris which was the despair of her rivals, and which, in the end, led her to overestimate the value of sea power against a continental league. In 415 an over-confident and ill-planned naval expedition to Sicily ended in disaster, and was a prelude to Athens' ultimate defeat by Sparta and her allies in 404, after some brave attempts to re-establish her naval command of the Aegean. Even after her defeat and surrender she managed with inadequate resources and varying success to cling to some semblance of maritime supremacy in the eastern Mediterranean for more than three-quarters of a century, in competition with strong Peloponnesian, Theban and ultimately Macedonian fleets, until her defeat at sea by a Macedonian-led Phoenician fleet off Amorgus in 322. A fitting epitaph for Athenian sea power is the proud reply put into the mouth of an Athenian traveller by a comic poet (Aristophanes, *Birds* 108) in the year of the Sicilian expedition. Asked for his country of origin he gives the answer: 'Where the fine trieris come from.' It was, it seems, the superior quality of her ships of which she boasted. This, very briefly, is the story of the Age of the Trieris,² and of the trieris as the weapon by which Athens achieved and maintained, and in which in the end she lost, her power and prosperity. The trieris was not only a battle weapon but also the means by which Athens deployed her military power quickly and for the most part effectively.

The need for a theoretical reconstruction

The trieris is important, firstly because her design is basic to the designs of some of the subsequent ancient oared warships, and secondly because she

² Lionel Casson entitles chapter 4 of his *Ships and Seamanship in the Ancient World* (1971) 'The age of the trireme'. Cf. Tarn (1930) p. 122: 'Down to the final destruction of Athenian sea-power at the battle of Amorgus in 322 the standard warship of the Mediterranean had been the trireme.'

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played so significant a role in preserving the political and economic conditions in which Athens was able to make her great contribution to ideas of human society, to art, literature and philosophy. We need to know, and modern historians of Greece have not yet told us, how the trieres played that role, or rather how it was that the Athenians exploited more successfully than others the potential of the three-level oared ship as a naval weapon, and what that potential was. We want to know how she was used, to attempt to recognise the tactical purposes for which she was built, her strengths, and the limitations on her use which those strengths necessarily imposed. Fundamental questions need to be answered about the physical environment provided for her crew, the practice of pulling and sailing, her performance under oar and sail, the pay and recruitment of her crew, and the materials with which she was built. All this may be called the theoretical reconstruction of the trieres, and it needs to be set out as far as the evidence we have will allow.

There are two possible kinds of indisputable evidence for an ancient object: actual recognisable remains and a detailed description in contemporary literature. Neither exists for the trieres.

Recent activities of underwater archaeologists in the Mediterranean have produced no remains of a trieres to give a whole or partial answer to questions about the hull-structure or oarsystem, although numerous remains of ancient merchant ships have been found, some of them deriving from the fifth and fourth centuries BC and offering a useful analogy for building a trieres' hull (below, pp. 128–9). Nor do historians writing at the time when the trieres was the standard warship of contemporary fleets give the kind of detailed descriptions of her such as we have of the monster double-hulled 'forty' which Ptolemy Philopator built (below, p. 15) or of the Byzantine dromon (below, p. 10).

The enquirer must satisfy his frustrated curiosity by picking up information about the trieres from any contemporary source he can.

First will be the narratives of the historians describing the actions and voyages of triereis at sea. These will give him a feel of what sort of ship the trieres was. The picture he gets will be supplemented by passing references to triereis or things connected with them in the poets – tragic and, in particular, comic – and even in the philosophers.

After literature, archaeology provides a variety of indirect information. The excavated remains of the Zea ship-sheds, built for triereis, give the

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maximum overall dimensions of the ship (c. 37 metres long, c. 5.9 metres broad) (fig. 9). The surviving inventories of the Piraeus naval dockyards inscribed on stone and covering a number of years in the last third of the fourth century, provide a wealth of detailed information, in particular the length and number of the oars in the various categories. Finally there are the vase-paintings, reliefs and coins which can be claimed to represent the trieres, though no ship is labelled as such.

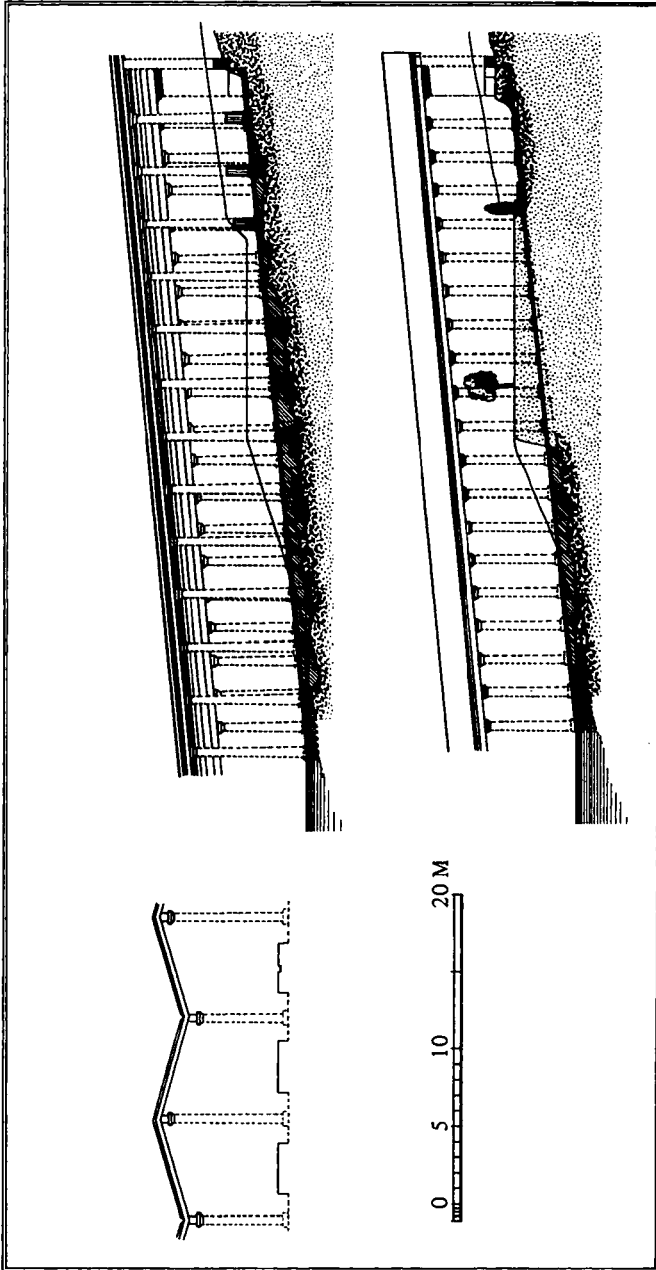
The intricate process of piecing together the clues from all these sources has the fascinating quality of a detective story and has attracted professional interest not only among classical scholars.

The foundations of the present investigation were laid in *Greek Oared Ships* in 1968, but although the general principles of the trieres' oarsystem there presented seem now to be generally accepted, a good deal more work remained to be done. The use of the ship in battle and moving from place to place has had to be more closely studied, and the nature of the ship and her characteristics have had to be deduced as ground rules for a theoretical reconstruction. These ground rules have then had to be embodied in a detailed design which would satisfy the demands of the naval architect as well as those of the historian and archaeologist.

The need for a practical reconstruction

The next step was to build a trieres. One reason for doing this was the truth that the proof of this particular pudding is very much in the eating, since it had to be borne in mind that a three-level oared ship was an elaborate and highly sophisticated phenomenon without parallel elsewhere in time or place. The picture of the trieres which could be pieced together in a book is by the nature of the evidence necessarily a fragile construction, resting on interpretations of difficult texts and puzzling representations. The joint authors of this book by working together for the first time brought to bear on 'the trireme problem' three systems of knowledge: the learning of the scholar and traditional archaeologist, the more recent knowledge of ancient ship construction gleaned by underwater archaeologists, and the professional skill of the modern warship designer. In the light of that pooled expertise there appeared to be, apart from details, only one practicable design for the trieres which conformed to the available evidence. That thesis was strengthened during the development of the design

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9. The ship-sheds at Zea.

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as more features were worked out and found to knit together neatly, with the need for no more than minor adjustments to the main parameters. Thus we had on paper a ship which was not only a practical proposition but was also very likely to be in essentials the only possible solution to the trieres problem. Such a ship seemed well worth building.

A reconstructed ship ought to accord with the known evidence about the original in dimensions, materials, construction, appearance and performance. If that is not completely possible, the exceptions should be defined and explained. Consequences or side effects of exceptions should be made clear.

The purposes of building a full-scale trieres need to be defined. Reconstruction of the past, by itself, in most cases hardly justifies the expense and effort involved. The best reason for making reconstructions of past artefacts is to improve our understanding of important aspects of history. As most artefacts are made for use, reconstructions can generally serve their main purpose only if they too work, and their performance can be assessed by proper measurements. An historically authentic working ship reconstruction can give us an insight into the realities of ancient seafaring, mercantile or naval, which would otherwise be unattainable. Another aspect of reconstructions, well expressed by Howard I. Chappelle (1936), the historian of American sailing ships, ‘. . . is that of learning to appreciate the intellect and ability of past generations. It is perfectly natural for each successive generation to look upon itself as far better equipped mentally than the ones before. If, however, one may judge by a comparison of naval architecture of the past with that of today as represented by modern sailing craft, there is little to support this self-admiration . . . men of earlier years had the same abilities and powers of reason and intellect that can be found in similar stations of life today.’ The design of the trieres reconstruction has not only fully demonstrated Chappelle’s point, but also borne witness to the very high level of craftsmanship in wood achieved in ancient times. The reconstructed ship has brought home to many that techniques of wood construction were as refined as those in stone and metal with which we have for a long time been familiar through numerous surviving examples of ancient architecture and sculpture.

The importance of ship reconstructions from the ancient Mediterranean world is enhanced by three further facts. The first is that stone and metal played a role in the general constructive and manufacturing effort of those

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societies that was relatively minor compared with that of wood, though of course surviving relics would overwhelmingly and quite erroneously indicate the opposite.

Secondly, ships represent solutions to more complex and testing structural problems than arise in land-based structures. Thirdly, among ships, those for war were developed to points nearest to the edge of technical feasibility at the time, regardless, it seems, of safety, expense or effort: they were, and indeed always have been, in modern terms, the high-technology products of their time.

The purposes of the reconstructed ship were four: (1) to prove that the reconstruction designed to the historical requirements and built in accordance with archaeological evidence would have a performance consistent with historical accounts; (2) to improve understanding of naval operations in the Mediterranean from the fifth to the third centuries BC; (3) to broaden appreciation of the technical, economic and naval achievements of Hellenic society and culture from the fifth to the third centuries BC by exhibiting the reconstruction to the public in Greece with explanatory material; (4) to recreate one of the major artefacts of Hellenic civilisation and a unique ship-type of outstanding interest to naval historians and architects.

The history of the problem

The last question remains. Why was the problem not solved, and a reconstructed ship not built to everyone's satisfaction, long ago?³ The historian Zosimus, writing in the fifth century AD, speaks (5.20.3–4) of the 'liburnians' which the Gothic chief Fravitta employed in the Aegean at the beginning of the century: 'These seem to be not less speedy than pentecontors⁴ though far inferior to ships of the trieres kind, *the method of construction of the latter having been forgotten many years ago.*' Zosimus (2.22.3, 23.3) speaks of the last engagement in which triereis took part, the battle between Constantine and Licinius at the Hellespont in AD 323.

³ For the history of the problem in great detail from the fifteenth to the twentieth century AD see L.Th. Lehmann *The Polyeric Quest* 1995 Amsterdam.

⁴ Oared ships with 15 oarsmen a side at one or two levels were called triacontors (thirty-oared ships). Those with 25 oarsmen a side at one or two levels were called pentecontors (fifty-oared ships).

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On that occasion 200 of Licinius' trieris were defeated by 80 of Constantine's thirty-oared ships, a result which no doubt contributed to the trieres' final obsolescence.

The liburnian was originally a light warship with oars at two levels, invented as a pirate craft on the Dalmatian coast and subsequently much used in Roman fleets.⁵ Vegetius, who was a contemporary of Zosimus, came to use the word for warships in general (*On Warfare* 2.1)

There are several kinds of liburnians, the smallest have one column or file (*ordo*: i.e. of oarsmen) a side, the slightly bigger ones have two a side, while those of the ideal size have three or four a side; sometimes they have five levels (*gradus*) a side. This should not seem strange to any one when in the battle of Actium much larger vessels are said to have run.

There are two things to be noted in connection with Vegetius' observations. Firstly there is no evidence for ships being pulled at more than three levels, nor is such a thing feasible. Secondly, Vegetius was writing at a time when 'the method of building ships of the trieres kind had long been forgotten'. He reveals himself as the first of many writers on the subject to explain the ancient types of ships, 'threes', 'fours', 'fives', etc. in terms of the oared ships of their own time. He slips from columns or files (i.e. lines of oarsmen sitting one behind the other from stern to bow at one or more levels: figs. 20 and 26) quite unconsciously to speak of levels, as if the number of files and the number of levels of oarsmen in a ship were *necessarily* the same.

He does this without noticing it because in the two-level liburnians (as in the warships in fig. 26) known to him there were in fact two fore-and-aft files of oarsmen, and one was above the other on each side of the ship. Quinqueremes, then, were for him, by the same mode of reckoning, ships with five fore-and-aft files of oarsmen on each side of the ship sitting *at five*

⁵ Appian (early second century AD), *Roman History* 10.1.3: 'The liburnian was named after a tribe of Illyrian pirates who roved the Ionian sea and islands in ships both fast and light ... whence even now the Romans call their light swift ships with two oar-beats (*dikrotous*) liburnians.' For the meaning of *dikrotous* see Xenophon, *HG* 2.1.27–9 where of the Athenian trieris at Aegospotami, surprised on the beach by the Spartan admiral Lysander's unexpected attack, some were caught *monokrotai* (i.e. with one file of oarsmen manned), some *dikrotai* (i.e. with two files manned), and some entirely empty. See below, p. 28 n. 2.

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levels. He has interpreted the quinquereme, quite absurdly, in terms of the ships he knew, although no representations of ships with more than three levels of oars have been shown to exist.

The warships of the Byzantine navy were called dromons ('runners'). We possess a building brief for them from the hand of the emperor Leo VI (19.7), who was writing at the end of the ninth century AD:

Let each of the dromons be long in proportion to her breadth and well proportioned with two oar-levels, the upper and the lower. Let each oar-level have at least twenty-five thwarts (*zyga*) on which the oarsmen will sit, so that all the thwarts are twenty-five above and twenty-five below, making fifty in all. And on each one of them let two oarsmen sit, one on the starboard side and one on the port side.

Leo's dromon is nearly as big as the Boeotian ships in Homer (*Iliad* 2.509–10); it is a large two-level ship with 50 oarsmen a side in two files of 25, each man pulling a single oar. There is no deck between the two levels of Vegetius' liburnians or of Leo's dromons, nor had there been a deck between the levels in the two-level pentecontor.

The anonymous author of the *Itinerarium Peregrinorum*, however, who wrote in the twelfth century about the crusade of King Richard of England, appears to have known oared warships in which the two levels were separated by an actual deck. He tells (ch. 34) the story of the sea-fight between the Christians and Turks in the bay of Acre in the course of which Turks got possession of the upper deck of a *galea* and her oars and pulled in one direction, while the Christians, still in possession of the oars below, pulled in the other, and succeeded in winning this unusual kind of boat race. When the author comes to mention the ships of antiquity, with echoes of Vegetius, he, like Vegetius, interprets them in terms of the ships he knows, but the ships of his time are different from Vegetius'. They have a deck between the two levels of oars. The ships of the ancients, he says, accordingly 'rose level by level in distinct decks and some smote the waves with the beat of the longest oar, others with the beat of a shorter oar'. There is no need to trust the author of the *Itinerarium's* account of how ancient ships were pulled, any more than Vegetius'. Both are reflections of the oared ships of their respective times.

In Renaissance Europe the general awakening of interest in the ancient world led to speculation about the nature of the oared ships which readers found mentioned in their texts. In 1514 the French humanist Budé,