

The Age of the Supergalleys

The trireme came into being in a world dominated by city-states, nations that consisted of no more than a city and the territory immediately surrounding it. Such small polities necessarily had but limited resources; only a few could afford a navy of any size. One great and rich empire did exist at the time – Persia – but its location determined its destiny as primarily a land power; when it needed a fleet it commandeered squadrons from the Greek and Phoenician coastal city-states under its domination.

What enabled the city-state of Athens in the fifth century BC to build up its formidable navy was its position as the head of a defence league that embraced most of the important Greek city-states in the Aegean area, both on the islands and along the coasts. The prime purpose of the league was to share the expense of maintaining a powerful fleet, each member contributing in proportion to its size a certain number of ships or amount of money; when Athens, the biggest and most important member, took what was intended as a voluntary association and converted it into a compulsory union under Athenian domination, the league fleet became in effect Athens' fleet. Sparta and the other city-states that opposed Athens in the Peloponnesian War were finally able to destroy this navy only by talking Persia into giving them the funds for the construction of one that could match it.

Early in the fourth century BC, Athens began the rebuilding of the league and was so successful that by 330 BC it again possessed the biggest fleet on the waters, boasting some 400 triremes. Less than a decade later not only had that mighty aggregation been wiped out, but the trireme had lost forever its commanding place in the hierarchy of ancient warships. For a different world had come into being, in which the nature and size of the dominant powers had changed radically and, inevitably, so had the nature and size of navies.

The first indications of what this world would be like appeared in the west, when Syracuse, the principal Greek city-state in Sicily, ceased to be a democracy and fell under the autocratic rule of Dionysius I. By gradually extending his sway over almost all the other Greek communities on the island, Dionysius made himself lord of a veritable empire which yielded him revenues far richer than any individual city-state could supply. This enabled him to finance a navy that at his death in 367 BC numbered about 300 units and included not only triremes but two types of even bigger warship, the *tettreres* ('four-fitted') and the *penteres* ('five-fitted'); indeed, he is credited with the invention of the latter. Then, in 334 BC, Alexander the Great led an army out of his homeland of Macedon, north of Greece, into Asia Minor and launched the spectacular campaign that brought him to the borders of India. It set in motion political, economic and cultural forces that transformed the world into which he had been born.



61 LEFT Alexander the Great (356–323 BC). Portrait on a coin in the British Museum.

62 RIGHT Demetrius I of Macedonia (336–283 BC). Portrait on a coin in the British Museum.



63 LEFT Ptolemy I (366(?)–282 BC). Portrait on a coin in the British Museum.

That world had been a world of city-states. When he died in 323 BC, Alexander was ruler of an empire reaching from Greece to India; what Dionysius had once held was but a principality in comparison. Vast Persia was merely a part of it, and the Greek and Phoenician city-states that had figured so prominently in history up to then had either been swallowed up in it or were dominated by it. But only an Alexander was capable of holding this huge realm together. At his death it broke apart – not, however, back into the small political fragments that had preceded his rise but into great kingdoms ruled by his former generals. The next segment of ancient history, the Hellenistic Age as it is called, which embraces the three centuries after Alexander's death, is largely the story of how these men, fiercely ambitious and with a lifetime of experience in leading massive armies, divided up his empire and implacably fought one another – first they and then their successors – to keep or expand what they held. The rivalry went on until Rome put an end to it by conquering their territories one by one.

Two decades of warfare among the half-dozen or more original contenders thinned the ranks to three major figures, who succeeded in founding dynasties that lasted. Grizzled, one-eyed Antigonos and his brilliant son Demetrius for a short time held the lion's share of Alexander's empire, but their progeny, the Antigonids, eventually ended up with just Macedon and parts of Greece. Bull-necked, jutting-jawed Ptolemy cannily saw to it that Egypt, richest of all the lands Alexander had conquered, fell to his share and solidly established his family on the throne. His was the longest-lived of the great Hellenistic dynasties; it stayed in power right down to 30 BC when Cleopatra, besieged by Roman armies, pressed an asp to her bosom and the rule passed into Roman hands. The third, Seleucus, founded the Seleucid dynasty, whose base was Syria and Mesopotamia.

Seleucus, with a widespread and turbulent territory to administer, was fully occupied on land and for the most part left the sea to the others. Antigonos was quick to perceive the advantage of controlling the waters of the Aegean and eastern Mediterranean, and with the aid of Demetrius, a bold and imaginative designer of mighty siege machines as well as mighty war galleys, set about building a naval force that would outclass every other afloat. Ptolemy and his successor, Ptolemy II, felt compelled to keep abreast, and this touched off an arms race that led to what was to be the high-water mark in the history of oared warships. The rivals poured out immense sums of money. Over and above the cost of the huge vessels they kept launching, they had to pay the huge crews needed to row them. Only autocratic rulers of great kingdoms were in a position to bear such expense.

Since his homeland of Macedon was exclusively a land power, Alexander embarked on his career of conquest without a navy. As he swept over the Greek cities on the coast of Asia Minor and then the Phoenician

cities of the Levant, he commandeered the squadrons these maintained and thereby put together a fleet that reached the respectable total of 240 units and, in a battle off the island of Amorgos in 322 BC, was able to end once and for all Athens' days as a naval power. By this time the units larger than the trireme that Dionysius had introduced into Syracuse's fleet, *tetrereis* and *pentereis* – 'fours' and 'fives', as we may call them for convenience – were to be found in increasing numbers in all up-to-date navies. Athens, for example, as the naval records reveal, in 330 BC had eighteen 'fours' alongside the 400 triremes that made up the bulk of its forces; by 325 the number of 'fours' had grown to fifty, and seven 'fives' had been added. Sometime before his death in 344 BC, Dionysius' son and successor, Dionysius II, introduced 'sixes' into the Syracusan navy.

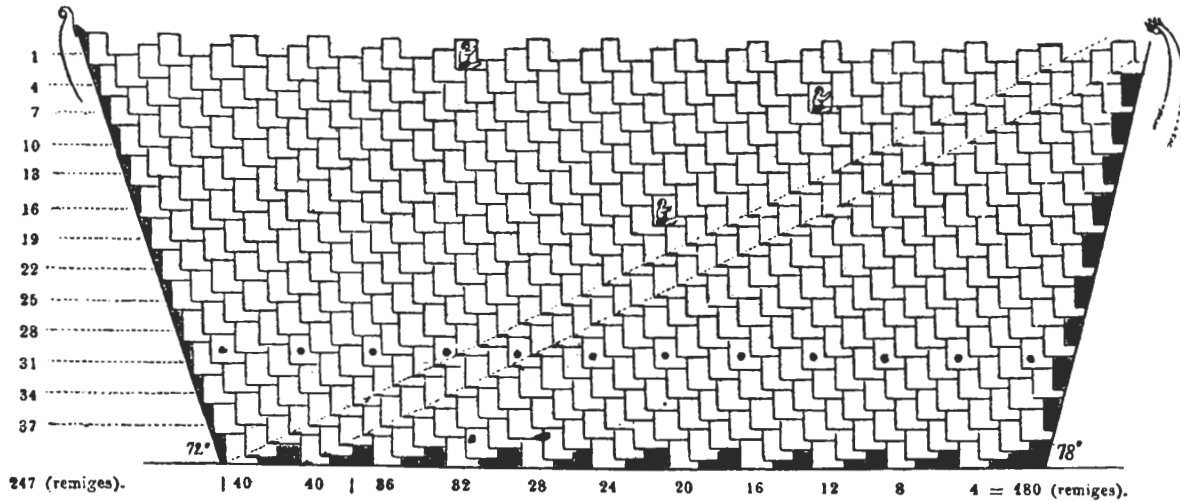
Then the rivalry between the Ptolemies and Antigonus and Demetrius got under way and the speed of change became furious. Ptolemy had managed to get his hands on Alexander's fleet when the great commander died; its biggest units were 'fives'. In 315 Antigonus and Demetrius constructed a fleet which, to outclass it, included 'sevens'. Demetrius then kept launching ever larger ships until, by 301 at least, he had 'eights', 'nines', 'tens', 'elevens', even a 'thirteen'. In 288 he upped the ante still further with a 'fifteen' and a 'sixteen', sizes that, as Plutarch reports in his *Life of Demetrius*, 'no mortal had ever before seen'; what is more, 'the beauty of the ships was by no means neglected, nor did they lose in usefulness because of the vast scale of their construction. As a matter of fact, their speed and performance were more remarkable than their size.'¹

The first Ptolemy kept up as best he could, and his successor, Ptolemy II (282–246 BC), even forged ahead with first a 'twenty' and then two 'thirties'. The summit was reached with the launching by Ptolemy IV (222–205 BC) of a 'forty'. This behemoth never saw action and probably from the outset was intended only for display: the fourth Ptolemy had a weakness for monumentally expensive showpieces.

A proper navy included not merely one or two of the oversize galleys but squadrons of them. The fleet of Ptolemy II, for example, at its strongest had two 'thirties', one 'twenty', four 'thirteens', two 'twelves', fourteen 'elevens', thirty 'nines', thirty-seven 'sevens', five 'sixes', and 224 'fours', triremes, and smaller types.

What was the nature of these mighty ships? What principle lay behind the numbers in their nomenclature? The few surviving representations that may portray them provide no clue, nor do the mentions of them in ancient writings. We must proceed largely by guesswork, starting with what we know about the trireme and trying to make sense of the numbers. In doing so we must bear in mind that, save for the 'forty', these vessels were not experiments or showpieces; they saw action in all the battles of the age. Plutarch's remark cited above attests to the efficiency of even such large units as the 'fifteen' and 'sixteen'.

In the last century a school of thought arose whose members worked



64 The 'forty' of Ptolemy IV as reconstructed by B. Graser in his *De veterum re navali*, published in 1864. The numbers along the left and bottom refer to the total of rowers in the line which starts where the number is placed and slants upward to the right. The longest such line, from the vessel's forefoot at the lower left-hand corner to the stern ornament in the upper right-hand corner, has forty rowers.

on the assumption that a trireme was so called because it had three levels of rowers one above the other, and they resolutely extended this assumption to all the larger sizes. To them a 'four' was so called because it had four superimposed levels, a 'five' because it had five, and so on 51
 right up to the 'forty' of Ptolemy IV. They were undisturbed by the patent fact that the monsters coming off their drawing boards could hardly stand up to a stiff breeze, much less carry out the manoeuvring 64
 ascribed to them in accounts of ancient naval actions. In the early part of this century a school of thought arose that went in exactly the opposite direction. Its members worked on the assumption that ancient galleys were never more than single-level, including the trireme, and therefore all the sizes recorded, from the smallest to the biggest, had to be single-level. In their view a 'four' was powered by a line of long oars each manned by four men, a 'five' by a line manned by five men, a 'six' by a line manned by six men, and so on. The theory had one strong argument in its favour: this was the way galleys were rowed in the later great age of 44
 the oared warship, the sixteenth to the eighteenth century. However, the argument could be extended only to sizes up to the 'eight', for the seamen of that age found out that they could not go beyond eight men to an oar; that was the limit. What, then, was the nature of the 'tens', 'elevens', and bigger galleys launched by Demetrius and the Ptolemies? What was the 'forty' of Ptolemy IV? The only solution this school had to offer was that in such vessels the oars were arranged in clusters, that a 'sixteen', for example, had eight-man oars arranged in clusters of two. This was clearly a solution born of desperation, since there was no reason to group oars in that way – nothing at all was to be gained by it.

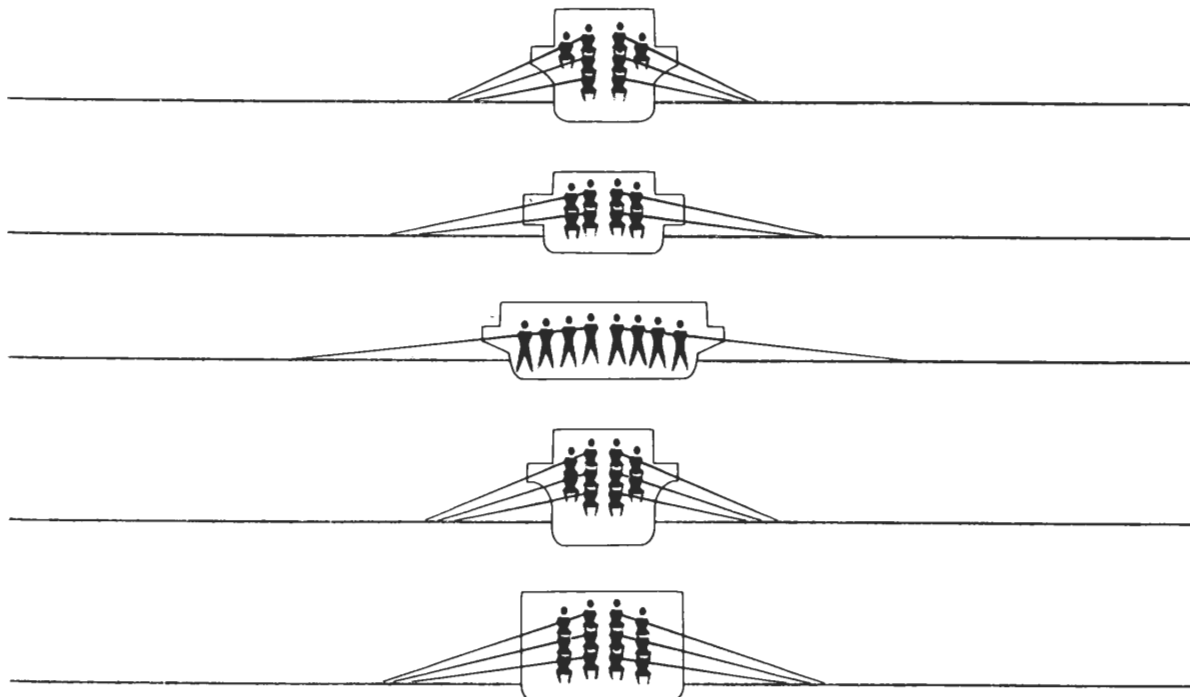
Both schools of thought started from wrong assumptions. The first erred in assuming that the ancients built galleys with more than three levels of oarsmen. They never went above three; even the monster 'forty' went up only to a line of thranites, just like a trireme. The second erred

in assuming that the ancients never built galleys with more than one level of oarsmen. As has been shown in the previous chapters, they built, no question about it, two-level and three-level galleys. Both schools, moreover, were unaware that, as we have seen (Chapter 6), a trireme – a ‘three’, so to speak – got its name from the triad made up of a thranite oarsman and the zygite and thalamite just below him. It follows that a ‘four’ should get its name from a similar group made up of four members, a ‘five’ from a group made up of five members, and so on.

When Dionysius introduced ‘fours’ and ‘fives’ into the Syracusan fleet the innovation, so far as we can tell, did not materially affect naval warfare. Nor did things change noticeably even after these units entered most other fleets, those of Athens or the Phoenician cities. In the light of this, the simplest and most reasonable explanation would be that they were modifications of the trireme. A ‘four’ could have been a trireme slightly adapted so that two men could be put on each thranite oar. Similarly a ‘five’ could have been a trireme adapted to take two men on each zygite oar as well as thranite. When Dionysius II introduced the ‘six’ he might merely have carried this procedure to its logical conclusion by putting two men on each oar in all three levels. This, however, was as far as the ancient naval designers could have gone in increasing oar power by more or less minor adjustments to the trireme. Going further brought in its wake fundamental changes.

In the ancient galleys that preceded the trireme, and in the trireme itself, there was but one rower to each oar and he rowed from a seated

65 Possible arrangements of the rowers of a ‘four’, ‘five’ and ‘six’. The upper three show a three-level, two-level and one-level ‘four’. The lower two show a three-level ‘five’ and a three-level ‘six’.



position, like the crews of today's racing shells. Adding a second man to an oar does not change this; a pair can still row seated. But adding a third man does, and radically. To accommodate three men, an oar becomes so long that the men can no longer row seated: to dip the blade in the water they must rise to their feet and raise their arms, and to deliver the stroke they must throw themselves back on the bench. This is the way the great multiple-rower sweeps of the galleys of the Knights of Malta, of the Papacy and the other navies of the time were operated. The Italian term for such a sweep was *remo scaloccio*, 'big-ladder oar'; it perhaps got the name because, to operate it, the rowers climbed, ladder-like, from the deck on to what was called the *pedagna*, then higher to the *banchetta*, and then fell back on their bench. Since no ancient galley ever went above three levels of oarsmen, in a 'seven' one of the levels must have had at least three men to an oar – three men, say, on each thranite oar and two men on each zygite and thalamite – and the added man must have brought in its wake a switch to the stroke just described. The first fleet to have 'sevens' was that of Demetrius; it could well have been he, responsible for so many advances in the design of war galleys, who invented this type which involved a fundamental change from its predecessors. 44

Once the new method of rowing had been introduced, it must quickly have become apparent that there was no reason to stop at three men to the oar. Thus, alongside the 'four', which, as we suggested, was a beefed-up trireme, it was now possible to build a totally new version which had one level of four-man oars. Such a version offered one great advantage: only the man at the head of each oar had to be a trained rower; the other three simply supplied muscle. This was why ships with three-man oars, four-man oars and so on right up to eight, were standard in the seventeenth and eighteenth century: the benches in those days were manned mostly by poor unfortunates who had fallen afoul of the law and been condemned to the galleys; it was pure luck if any had ever even been near the water. With the naval race between Demetrius and Ptolemy producing ever larger fleets made up of ever larger units, there was an ever larger need for rowers; it was far easier to fill that need if the qualification for the greater part of each crew was not experience but muscle alone. 65

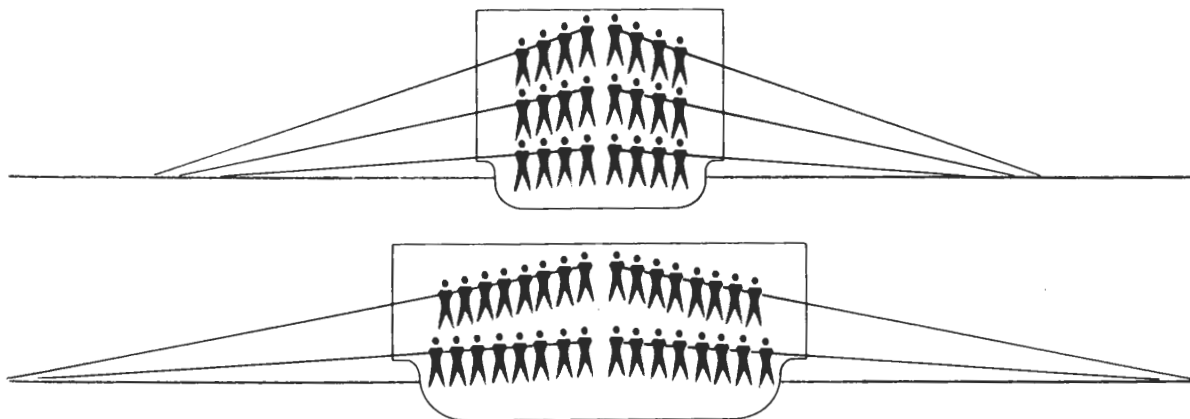
Indeed, any sea-power troubled by a shortage of rowers must have welcomed these powerful one-level types of war galley. They were necessarily broad in beam to accommodate six or more rowers in a horizontal line, and that made them slower and less manoeuvrable than the slenderer types. But broader beam permitted a broader deck, and a broader deck permitted a greater number of marines than any slenderer type could carry; if they were able to get their grappling hooks into one and board, they could be certain of victory. When in 264 BC the Romans entered the First Punic War, the bitter conflict with Carthage that was fought mainly on the sea, they had to build a navy from scratch and fill the

benches with whatever manpower was available to them, mostly men off the farms and the like. They built themselves a fleet of 'fives' and loaded aboard each a contingent of 120 legionaries; undoubtedly the ships were of the type with five men to the oar whose ample deck could accommodate so great a number of fighting men.

On the other hand, there were still navies that favoured the use of the ram, and they very likely preferred the multi-level versions of the 'four' and 'five', which, being slimmer and driven by seated rowers, provided the speed and manoeuvrability that ramming demanded. For example, the Rhodian navy in its heyday in the second and third century BC relied principally on 'fours' and was renowned for the skill in ramming that it achieved with them; the indications are that the type they used was a two-level galley with two men to the oar in each level. The Carthaginian fleet that faced Rome in the First Punic War had a fearsome reputation for skill in ramming, and its standard unit was the 'five'; almost certainly the slender three-level version was represented as well as the one-level.

The designers of galleys in the seventeenth and eighteenth centuries knew only the single-level galley and hence, as mentioned above, could never go past eight men to the oar, an 'eight' to use the ancient terminology. What, then, was the oarage of the 'nines', 'tens', 'elevens' and still greater craft we hear of? Ancient shipyards for centuries had been building galleys with two or three superimposed lines of oars. If we assume that, after the introduction of the galley with one level of multiple-rower sweeps, naval architects moved on to designing hulls that would accommodate two or three levels of such sweeps, we can explain almost all the oversize types. A 'nine', for example, could have been a two-level galley with five men to the oar in the upper level and four to the oar in the lower; or it might have been a three-level galley with three to the oar in each. Demetrius' great 'sixteen' may have had two levels with eight-man sweeps in each, or three levels with sixteen men distributed among them, say six to the oar in the thranite level and five to the oar in the zygite and thalamite.

66 Possible arrangements of a 'twelve' and a 'sixteen'. The upper shows a three-level 'twelve', the lower a two-level 'sixteen'.



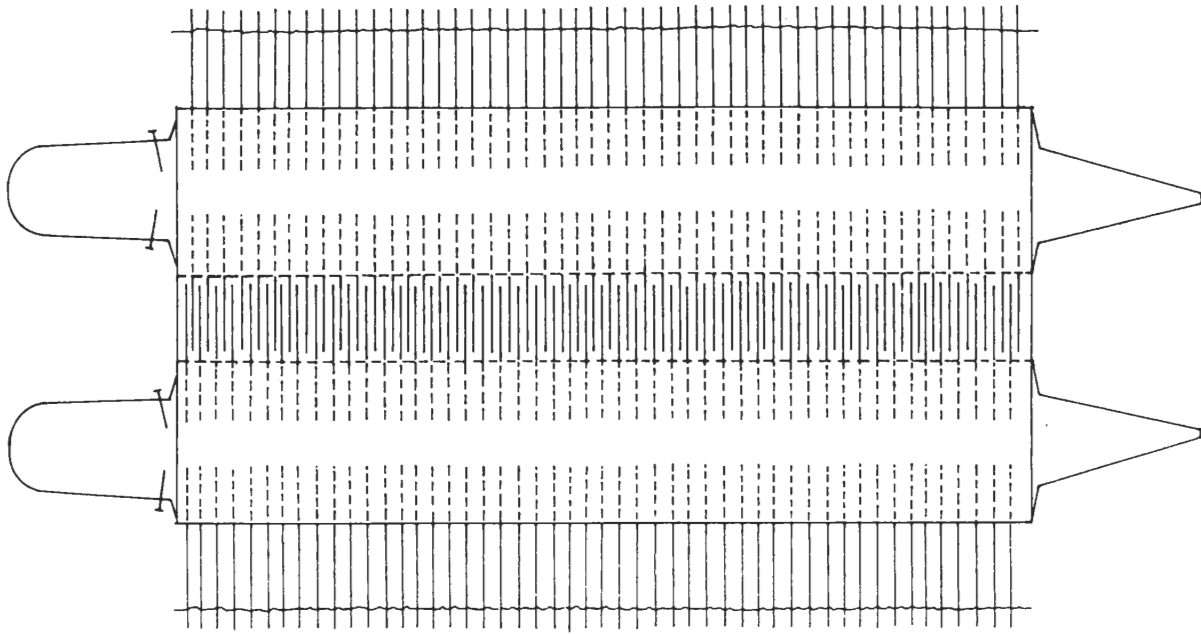
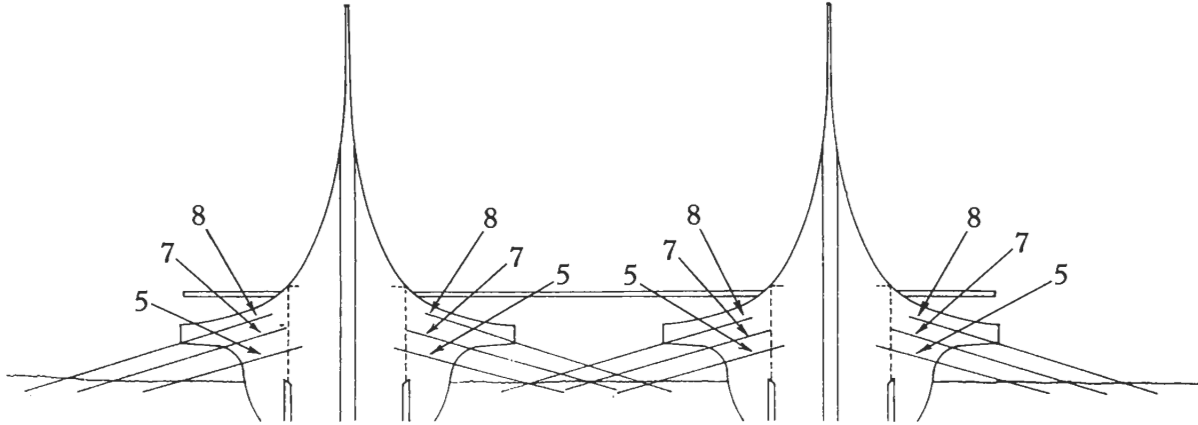
But what of Ptolemy II's 'thirty'? Even three levels of eight-man oars fall short of that figure. There is no question that the ship existed and, moreover, was prized, for the base of a statue has survived with an inscription in Greek reading 'King Ptolemy for Pyrgoteles, architect of the "thirty" and the "twenty"'; the statue that once stood on it had obviously been erected by a grateful monarch.

It is the monster 'forty' of Ptolemy IV that provides a vital clue. It was so extraordinary a work of man that the salient details about it were written down and thereby entered the historical record. Here they are, as reported by Athenaeus, a Greek writer of the second century AD who compiled a book given over to unusual matters of all kinds (the dimensions as cited by Athenaeus are in cubits, which I have converted to feet):

It was 420 long, 57 from gangway to gangway, and 72 high to the prow ornament. From the stern ornament to the part where the ship entered the water was $79\frac{1}{2}$. It had four steering oars that were 45 long, and thranite oars – the longest aboard – that were 57; these, by virtue of having lead in the handles and being heavily weighted inboard, because of their balance were very easy to use. It was double-prowed and double-sterned. . . . During a trial run it took aboard over 4000 oarsmen and 400 other crewmen and, on the deck, 2850 marines.²

The mention of thranite oars implies the existence of zygite and thalamite; the ship, then, was a three-level galley. Now, if we try to distribute forty rowers over a thranite-zygite-thalamite triad, at least fourteen of the forty must be assigned to one oar, and the obvious candidate is the thranite, since we are specifically told that the thranite oars were the longest. But we are also told that they measured 57 feet (17.3 m), and a 57-foot oar is the proper size for only eight rowers, not fourteen. And what about the 2850 marines and 400 deckhands and the like? They must have been carried on the deck and, even if the deck of the 'forty' covered the whole expanse of the ship from the tip of the prow to the tip of the stern, it would still offer no more than some 24,000 square feet. This would have accommodated 3250 persons only if they were lined up as if on parade, leaving the deckhands no room in which to move about for handling lines and sail and the marines no room in which to take up a position for shooting arrows, hurling grapnels, etc.

The clue lies in the description of the vessel as 'double-prowed and double-sterned'. If it had two prows and two sterns, it must have been made up of two hulls yoked together – in other words, must have been what we call a catamaran. Now, if the hulls were not yoked close together but just far enough apart to allow for oarsmen on both the port and starboard side of each hull, we can explain why it was called a 'forty'. Let us assume that there were eight men to each thranite oar, since that is the proper number for a 57-foot oar. Assume seven men to each zygite oar and five to each thalamite. Each hull would thus be a 'twenty'; yoked together they make a 'forty'. We are told that there were four steering



67 TOP Reconstruction of the 'forty' of Ptolemy IV viewed from the stern.

68 Reconstruction of the 'forty' viewed from above.

oars. This is what we should expect in a catamaran of such a size: to steer the unwieldy complex there was a steering oar on both the port and the starboard quarter of each hull. And the deck that spanned the twin hulls, including the space between them, would be a vast affair, like the deck of an aircraft carrier, offering plenty of space for 400 deckhands and almost 3000 marines to carry out their duties. This monster of a ship was almost certainly not the first and only example of the catamaran galley. The 'thirty' of Ptolemy II that preceded it must have been a catamaran, made up of two 'fifteen' hulls yoked together. Very likely his 'twenty' was a catamaran as well.

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We know the dimensions of the 'forty' only because they were unusual enough to be recorded; we have no information about those of any of the other types larger than a trireme. However, for one type, the one-level 'fives' used by the Romans in the First Punic War, we fortunately have grounds for a good guess. These ships, we happen to know, had a crew of 300. The figure includes officers, ratings and deckhands. On a trireme these numbered about fifteen; if for a 'five' we reckon on twenty or so, the total number of its oarsmen comes out to 280. At five to the oar, that works out to fifty-six oars, or twenty-eight to a side. In the late sixteenth century the French navy had galleys with almost the same orage, twenty-six five-man oars a side. The ships were 180 ft 6 in. (55 m) long overall and had a maximum breadth of 26 ft 3 in. (8 m); the dimensions of the Roman one-level 'fives' could not have been very different.

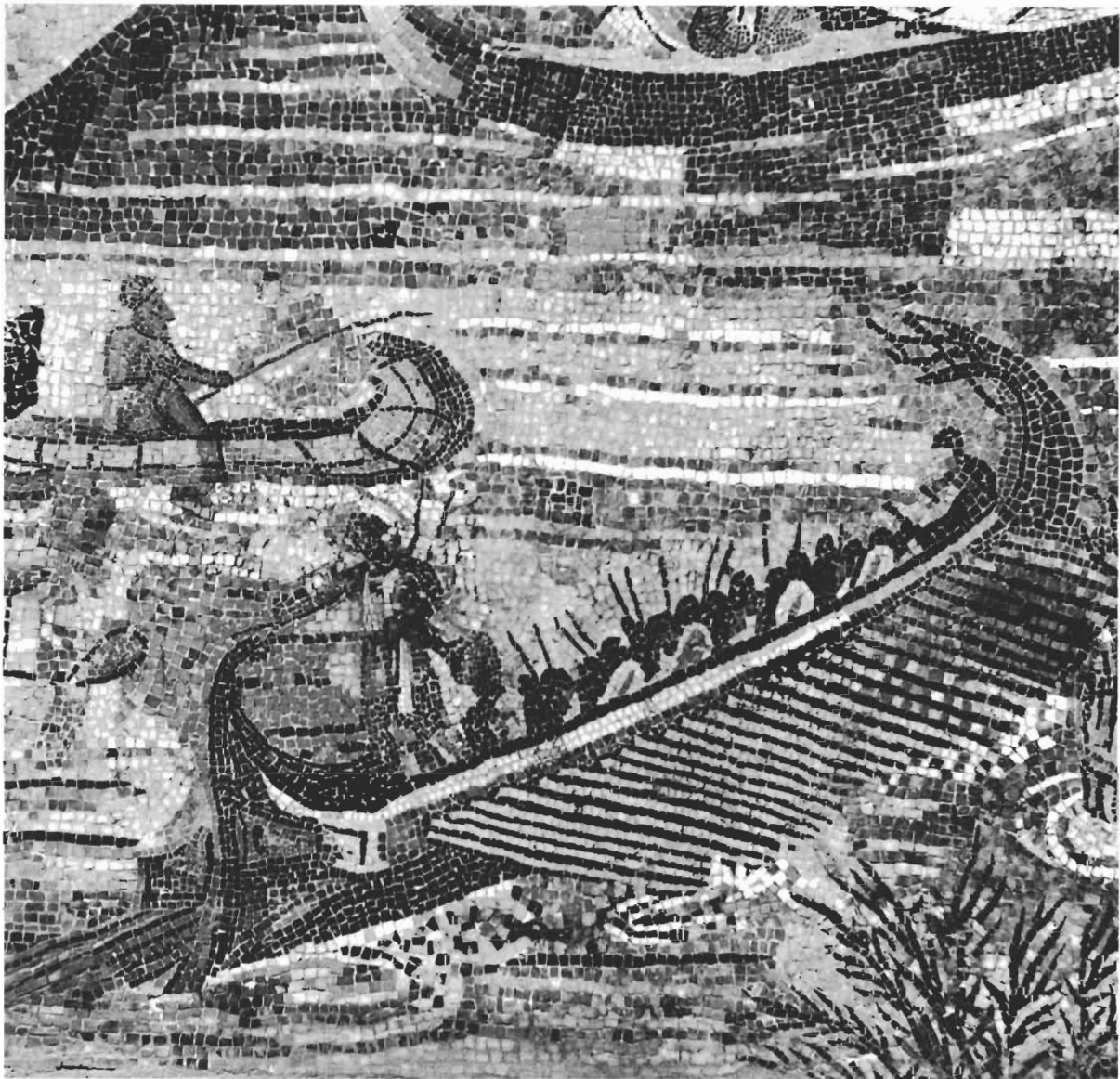
In all the multi-rower galleys of the sixteenth to the eighteenth century, the oars were not worked over the gunwale but were housed in an oarbox which, instead of following the curve of the hull, had straight sides; in bird's-eye view it looked like a long and narrow rectangular frame with the point of the vessel's prow emerging at one end and the bulge of its stern at the other. A similar arrangement was used for housing the multi-rower oars on Hellenistic galleys. In a mosaic of the first century BC, for example, there appears a ship with just such a frame; protruding from it are two lines of oars set in echelon one slightly above the other. And a three-dimensional rendering of the front face of the oarbox forms part of the famous statue of the Victory of Samothrace, sculpted around 180 BC, which portrays the goddess of victory alighting on the prow of what is probably a Rhodian 'four'.

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Although we cannot even guess at the dimensions of the galleys larger than a 'five', two recent archaeological finds provide dramatic proof of how monumentally big they must have been. We mentioned earlier (Chapter 6) the discovery in 1980 of a warship's ram off Athlit near Haifa, a mighty sheath of high-grade bronze weighing 1023 pounds (465 kg). No remains of the vessel itself were found; the consensus at the time of discovery was that, to be equipped with so ponderous a weapon, it must surely have been one of the big types, perhaps even a 'ten'.

59, 60



69 A two-level galley under way with a complement of marines on the deck. Both levels of oars work through an oarbox. Detail of a mosaic in the Palazzo Barberini at Palestrina, Italy. Early 1st century BC.

Then another archaeological discovery threw an entirely new light on the matter. In 31 BC Octavian – or Augustus, to give him the name he took later and by which he is better known – made himself sole ruler of Rome and its territories by defeating Mark Antony in a naval battle off Cape Actium. He commemorated the all-important victory by setting up in the neighbourhood an elaborate monument, one element of which was a display of rams taken from the ships that he had vanquished. Remains of the monument came to light in 1913. A number of years later it was noted that among its features was a line of curiously shaped sockets, diminishing in size, that had been cut into a long retaining wall. The reason for these remained a mystery until 1986, when it was observed that their shape was just like the shape of the Athlit ram viewed head on. Their purpose now was clear: they held the rams that were part of the monument; they diminished in size because these were from galleys of

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70 One of the sockets in Augustus' naval monument at Nicopolis. It held a ram somewhat bigger than the Athlit ram (Figs 59–60), perhaps from a 'six'. Late 1st century BC.



different sizes. We know that Antony had a heavy fleet ranging from triremes right up to 'tens'. The biggest sockets thus must have held the rams from 'tens' and the rest the rams from the various sizes below that. The striking fact is that, to judge from the size of the Athlit ram and the point in the series where this would place it, it came from at most a 'five', perhaps even a 'four'. The ram that went into the largest socket would have dwarfed it.

During the fourth century BC galleys grew in power and size, but rather slowly. The 'four' and the 'five' were introduced at the very beginning of the century, the 'six' sometime before the middle, but it was not until the third quarter that these sizes began to appear in fleets in significant numbers. Then, within less than half a century, there was a phenomenal increase from the 'six' to the 'thirty'. What caused it?

One obvious advantage of the bigger ships was that their greater expanse of deck space accommodated greater contingents of marines. This points to a change in the nature of naval battles: the age-old tactic of grappling and boarding had again come to the fore, and ramming no longer played as prominent a role as it had in the fifth and fourth centuries BC. The Athenian navy of that age, whose forte was the ram attack, had aboard each of its triremes no more than fourteen marines; the Romans in the First Punic War had aboard each of their one-level 'fives' one hundred and twenty. And a new piece of equipment was now added to aid the marines – wooden towers set up on the deck at prow and stern; from the top of these, archers and javelineers could fire down on the enemy. The towers were collapsible so that they could be put in place just before a vessel went into action.

There was yet another reason for the increase in size: galleys now had to provide room for the mounting of catapults. The catapult was invented by the military engineers of Dionysius I around 400 BC for use in the besieging of walled cities. The earliest version was, in effect, an oversize bow mounted horizontally on a pedestal and fitted with a trough to hold a long arrow and with a windlass at the end of the trough to draw the bowstring. Within a few years a variation was devised that fired stone balls instead of arrows. By the middle of the fourth century a vastly more powerful form was developed, the torsion catapult, which could take much heavier darts or stone balls. Its drive was supplied not by a bow but by springs made up of tightly twisted skeins of sinew, cord or horsehair or even, in emergencies, women's hair.

Catapults were first used only on land. In 332 BC, when Alexander the Great was besieging the massively fortified Phoenician city of Tyre, he got the idea of mounting stone-throwing catapults on some of his second-class triremes – those rated as too slow for the line or those used for hauling troops – in order to pound the city's walls from the sea. Soon after, someone – it could well have been that imaginative military thinker,



71 A heavy two-level Roman warship. In the bows is a fighting tower. Marines preparing to leave the vessel line up behind a low parapet; two, in their eagerness, have already stepped over it. Relief found at Palestrina, Italy, and now in the Vatican Museum. Second half of the 1st century BC.

Demetrius – got the idea of putting catapults on his ships of the line to fire on enemy vessels. In 307 BC a great sea battle took place between Demetrius and Ptolemy I off the coast of Cyprus. Ptolemy's fleet had nothing bigger than 'fives'; Demetrius' had a good number of 'sixes' and 'sevens' as well as 'fives'. What is more, he had set up on his ships – no doubt the larger units but perhaps some of the smaller as well – both arrow-shooting and stone-shooting catapults; the arrow-shooting were of standard size, firing a dart 27 inches (68.5 cm) long. Eventually *katapeltaphetai* ('catapultists'), the ancient equivalent of naval gunners, became a fixed element in galley crews.

The shipboard catapults were probably mostly of the bow type, since it needed little maintenance and was unaffected by dampness, whereas torsion catapults needed constant care and their skeins were very sensitive to dampness. The darts and stones fired by the bow type would have served the purpose. A successful volley would have been quite enough to throw into disarray the marines on an enemy's deck, and, if a dart pierced the deck, it stood a good chance of hitting one or more of the rowers, causing a break in the stroke and an interruption in the vessel's advance. It has been reckoned that a one-level 'five' could accommodate ten standard arrow-shooting catapults and two stone-shooters capable of firing five-pound balls. There would be proportionately more catapults

and of heavier calibre aboard bigger galleys; Demetrius' mighty 'sixteen' and Ptolemy II's mammoth 'twenty' and 'thirty' would have carried enough to lay down a veritable barrage.

Despite the increased emphasis on marines and the adding of catapults to a war galley's armament, ramming was by no means consigned to oblivion. All ships had rams, even the very largest, and they used them when they could. This is clear from the accounts of the naval battles of the time. One in particular is worth citing at length: written in a matter-of-fact style with no literary flourishes, it is the most detailed and trustworthy report we have of a fight in which big galleys, 'sevens' and up, took part. The author, Polybius, who wrote about half a century after it happened, had a professional knowledge of military matters and, as an important figure with friends in high places, had access to official records.

In 201 BC, off the island of Chios, the combined fleets of Pergamon and Rhodes attacked the fleet of Philip V of Macedon, last but one of the Antigonids. The battle opened with a drive by Attalus, king of Pergamon and in command of his country's contingent, against Philip's right wing. Here is Polybius' description of what then happened:

Attalus' ship attacked an 'eight' and, getting its blow in first, struck it mortally below the waterline; although the marines on its deck kept on fighting for a long while, eventually he sank it. The flagship of Philip's fleet, a 'ten', fell into the enemy's hands in an unexpected fashion. A trireme-class galley came into its path and it rammed the vessel with a mighty blow amidships below the thranite oars; the ram, however, stuck fast, since the commander was not able to keep a check on his ship's impetus. So, with the vessel hanging from it, it was in a hopeless situation, utterly unable to move. At that moment two 'fives' fell on it and, wounding it fatally, one on each side, they destroyed the ship and all aboard, including Democrates, Philip's admiral. At the same time that this happened, Dionysodorus and Dinocrates, brothers and admirals on Attalus' side, launched attacks, one on an enemy 'seven' and the other on an 'eight', and suffered strange experiences in their combats. In his attack on an 'eight' Dinocrates' ship received a blow above the waterline, since the opposing vessel had its bows elevated, but struck the enemy below the waterline. At first he was unable to break free despite repeated attempts at backing water, and, since the Macedonian marines were fighting courageously, he was in the greatest danger. But Attalus came to his aid; by delivering a blow on the enemy ship he broke the embrace of the two vessels, and Dinocrates was in this unexpected way set free. The enemy marines all fought courageously but they were destroyed, and Attalus' men took over the undefended ship. Dionysodorus, charging with great force to deliver a blow, not only missed doing any harm but, being carried on past the enemy, lost his starboard oars, and the timbers supporting his towers were shattered. As soon as this happened enemy vessels surrounded him on all sides. Amid shouts and confusion the ship was destroyed with all aboard, except for Dionysodorus and two others who managed to swim to a small unit that came to their aid.³

The opponents were drawn up, as was customary, with the ships abreast in two long lines facing each other. When they came together, the fighting

turned into a series of simultaneous individual encounters – and behind Polybius’ matter-of-fact language we can discern the agonising drama that each of these represented. At one point along the line Attalus drove his ship against an ‘eight’ – we are never told the size of his ship but it must have been big to dare such an attack – and, by beating his opponent to the punch, delivered a fatal blow; as the stricken craft settled in the water, its marines desperately hurled missiles at Attalus’ ship, which must have been warily standing by to make sure it went down. At another point along the line, Philip’s flagship, a towering ‘ten’, rammed a trireme-class vessel; the blow from the massive beak reached up to the victim’s topmost level of oars, but it had been delivered with too much drive, and the smaller vessel remained impaled on the ram. The attacker, so encumbered by the weight sticking to its bow that it could not move, became a defenceless target, and its crew watched horrified as one enemy ‘five’ bore down on it from port and another from starboard. At a third point, Dinocrates, attacking an ‘eight’, had the luck to hit it below the waterline since its bow was elevated – perhaps lifted by a wave or by its marines racing aft for some reason and depressing the stern – but he also struck too hard and, though the blow he gave it was mortal, his ram remained wedged in the hull; the crew frantically backed water to no avail, and he was miraculously saved when Attalus’ big ship came up in the nick of time and drove into the ‘eight’ with such force that the ram was shaken loose. Attalus then swept the deck clear of the marines defending it, boarded, and took it as a prize – thereby sparing the lives of the hundreds manning the oars. In the other encounters few of the rowers could have escaped death, certainly none in the lowest levels.

The mammoth galleys of Demetrius and the Ptolemies were short-lived; they did not last much beyond the middle of the third century BC. But the classes just below them, from ‘sevens’ to ‘tens’, remained in the ranks right down to the Battle of Actium in 31 BC. That encounter, however, marked their end. For it left the victor, Augustus, in total control of the Mediterranean with no other fleet in existence to challenge him, and his successors continued to enjoy this state of affairs. Heavy combat units, in other words, had lost their reason for being.

Augustus refashioned the Roman navy, tailoring it to fit the new circumstances. Since it now had only peacetime duties to carry out – patrolling the coasts to hold down piracy, ferrying troops in an emergency, transporting government officials, and so on – he drastically reduced the size of its galleys. He created two major squadrons, the bigger and more important based near Naples, the smaller at Ravenna. The flagship of the first was a ‘six’, that of the other a ‘five’; each had some ‘fours’, but all the rest of their units were triremes plus a handful of liburnians, light and fast two-level galleys that were the ancient equivalent of destroyers. Minor squadrons were stationed at strategic points around the Mediterranean, and these consisted wholly of liburnians.



72 Ships of a Roman fleet commanded by the emperor Trajan approach a port. In the centre is the flagship, a three-level galley, probably a trireme, with its bowsprit-sail-like foresail raised. Above and below are two-level units, probably liburnians. Relief on the Column of Trajan, Rome. Early 2nd century AD.

Every galley still had a ram, but the shape was changed: it now ended in a blunt point instead of an oblong face with three transverse fins. The new form could hardly inflict the damage that the old was capable of, but that did not matter, since it was never called on to serve as a weapon. On the other hand, it was a good deal easier and cheaper to make and it continued to perform its important symbolic function as the badge of a warship.

In the third century AD, the Roman Empire was buffeted by political and economic disturbances from within and invasions of barbarians from without. Its once fine navy was allowed to decay. In the fourth century the triremes, liburnians and the other craft that had made up its squadrons vanished from the Mediterranean. The stage was set for their replacement by the very different galleys of the Byzantine Empire.