The Battle of Artemisium: The Naval Component of the Defense of Greece in 480 BCE

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Abstract. This paper commemorates the 2500th anniversary of the Battle of Artemisium by combining epigraphic and archeological findings (such as the ram of an ancient warship that was retrieved from the Straits of Artemisium a few years ago) so as to integrate the specific naval battle in a comprehensive Greek strategy against King Xerxes' Persian invasion.

PRELIMINARIES AND OPENING MOVES

The Persian campaign of the year 480 BCE against Greece that unfolded under the direct leadership of the Great King Xerxes himself (1) is well known, so that it is superfluous to enter here into much detail. Suffice it to say that it was the culmination of the attempt of a global empire -Persia- to expand westwards and subjugate Greece. This boundless empire, that extended from Thrace and Egypt to the West up to the gates of India in the East, and from the Danube, the Caucasus and the Caspian Sea to the North to Nubia (modern Sudan) and the Arabian Peninsula to the South, stretched for more than 3.000.000 km^2 and was inhabited by up to 35.000.000 people (2). In other words it was the single superpower of its age. This huge empire sent a correspondingly huge army made up from contingents sent by all the then known nations of Western Asia, which the ancient sources number in the hundreds of thousands of warriors (3), to march mostly along the eastern coast of northern Greece and reach the Pass of Thermopylae in the apex of the Maliakos Gulf (4). There this massive force stopped in front of a Greek infantry force of between 5,000 to 11,000 men led by one of the kings of Sparta, Leonidas (5).

Along with the land army of the Persians, came a huge fleet that was recruited in the same way from all the naval nations of the eastern Mediterranean basin which were subordinate to the Persian king. The fleet's main mission was to supply the numerous Persian army by sea — it was so numerous in fact that the rivers in its path dried up when the men quenched their thirst and the poor Greek land was unable to sustain it during its southwards march. The other task of the fleet was to overcome any Greek naval forces that barred its path and bypass any Greek land army, like that of Leonidas, by disembarking marines to its rear so as to trap it between them and the advancing main army. Faced with this fleet, the Greeks deployed their own fleet, about level with the Pass of Thermopylae and based on the beaches south of the cape of Artemisium in Northern Euboea (6).

Although the Battle of Thermopylae has now passed into the universal subconscious as the deliberate sacrifice of the few free versus the many who want to enslave them (7), in fact the original design of the Greeks should not have been so. This is evident because, along with the few thousand infantry led by Leonidas, the Greeks risked their fleet that was manned by about 70,000 men – for such was the numerical strength of the crews of the Greek fleet in Artemisium as will be shown below. Therefore, it was by no means a 'suicide mission' (8).

On the contrary, it seems that King Leonidas honestly believed that the position of Thermopylae was impregnable. He did not know of the existence of the *Anopaia hodos* (or *atrapos*), the parallel path to the main coastal road that Ephialtes betrayed to Xerxes, and the Persians followed to get to the rear of Leonidas' army. The Spartans learned of its existence as soon as they arrived at Thermopylae, when it was too late to change their plan, as reinforcements had already been dispatched from the Peloponnese as a follow up to Leonidas' vanguard (9).

Therefore, it seems fairly certain that the plan of the Greeks was to stop the Persians in front of the pass of Thermopylae, and bar their way to Southern Greece indefinitely. When the Persian host was immobilized before the pass, the lack of supplies and pestilence would do their job and decimate the hungry Persian troops (10).

In this plan the contribution of the Greek fleet would be definitive: it would exclude the Persian fleet from keeping in touch with the army and thus prevent it from resupplying it (11).

It should be noted that both a previous as well as the subsequent plan of the Greeks after the defeat at Thermopylae were quite similar.

A few months before Thermopylae, the Greeks had sent an expeditionary corps of 10.000 hoplites to the pass of Tempe that separates Thessaly from Macedonia. An accompanying fleet was positioned around cape Artemisium. This plan was abandoned when the Greeks learned that there were more passes leading from Macedon southwards and they retreated to the South. This move, while safe, led to the surrender of the Thessalians to the Persians when they crossed into Thessaly (12).

The same hold true for the aftermath of the Thermopylae campaign. While the Greek land army manned the fortified Isthmus of Corinth, the Greek fleet fixed and eventually defeated the Persian fleet in Salamis (13). The defeat and departure of their fleet and their stalemate inside devastated Attica eventually forced the Persians to retreat to the relatively unplundered Thessaly and then obliged King Xerxes to withdraw a major part of the army back to Persia leaving behind a remainder, under general Mardonius, that was eventually defeated by the combined Greek army at the battle of Plataea next year (479 BCE). Yet even the reduced army that Xerxes attempted to lead back suffered so much from lack of provisions that most of the men died of starvation and disease, never returning to Asia. From the eventual success of the

Greek strategy in 479 BCE one gets a hint of what the original strategy at Thermopylae had been. In fact it was an early example of the strategy that a later day ancient general, Gaius Julius Caesar, explained in detail. Caesar used to say that he followed the same policy towards the enemy as did many doctors when dealing with physical ailments, namely, that of conquering the foe by hunger rather than by steel.

C. Caesar dicebat idem sibi esse consilium adversus hostem, quod plerisque medicis contra vitia corporum, fame potius quam ferro superandi. (Sextus Julius Frontinus, *Statagems* IV.vii.1) (14)

But that would happen in the future.

THE NAVAL BATTLE OF ARTEMISIUM

Along with the battle at Thermopylae, the naval battle of Artemisium was taking place simultaneously. The opposite fleets were numerically unequal. The Persian fleet traditionally numbered 1207 triremes and many more merchant roundships or horse-transports (15). But now the gods, or Fortune, intervened to even the odds. Shortly before the naval engagement began in the strait to the north of Artemisium, a sudden storm caused the sinking of one-third of the Persian warships (about 400) near Sepias Acra on the Thessalian coast across the island of Sciathos (16).

Then, from the main body of the Persian fleet, a squadron of 200 ships was dispatched to circumnavigate Euboea and encircle the Greek fleet by cutting off their escape route through the straits of Euripus. A few days later, however, these ships also met with a storm in the 'Coela of Euboea', probably the coast between modern day Kyme and cape Caphereus, and were also wrecked on the rocks of the Euboean coast (17). Thus, the approximately 600 Persian ships that remained after these twin disasters (18) were faced by a maximum of 324 Greek triremes (as some Greek squadrons joined their fleet only after the naval battle had begun) of which about half were Athenian.

The naval battle took place over three days and each phase had separate tactical features (19).

On the first day of the naval battle, probably in the afternoon of September 16th, 480 (20), the two fleets met head on inside the strait. The Greeks were formed in a circular formation and the Persians surrounded them. During the battle that followed, the Greeks defeated all Persian attacks and captured 30 Persian ships. In some modern accounts of the battle, the Persian ships appear to be larger and bulkier than Greek ones (21). This certainly makes the naval battle even more agonizing and heroic. The few who are smaller/weaker versus the many that are bigger/stronger! But, is that so?

The historian Herodotus (8.60) clearly states:

[οἱ Ἕλληνες] νέας ἔχουσι βαρυτέρας καὶ ἀριθμὸν ἐλάσσονας

[The Greeks] have fewer and heavier ships

I have argued elsewhere that one must believe Herodotus; otherwise no modern account of the

Persian Wars can stand (22). However, some scholars recognize in the ancient Greek word **baryteras**/"heavier" the quality "slower" (23). That is, they predicate that the Greek ships were of the same or smaller size to the Persian (especially the Phoenician) ships, but inferior to them is speed. And this poor quality has been attributed to the untrained Greek shipbuilders (after all the Athenians did not know of the trireme as a ship type just 20 years before [24]); or the lack of maintenance in the Greek Fleet (the ship's keels had not been cleaned recently, therefore the friction between a ship's bottom and the water during the cruise was greater and the ship rowed slowly). A careful review of the data, however, allows us to read the word for what it is: heavier means just that; a ship with thicker wooden walls and therefore stronger during the impact with an opponent (25). First of all, subsequent Byzantine naval warfare textbook authors attribute weight as characteristic of larger ships (e.g., Emperor Leo VI the Wise, *Naumachica*, 77) and lightness as a characteristic of small fast-moving vessels useful in reconnaissance or for attacking the enemy by surprise (Emperor Leo VI the Wise, *Naumachica*, 54) (26). The weight of the ships is attributed to the thick walls which make the ships more resistant to the collision with the enemy ships (e.g., Nicephorus Uranus, *Tactica*, 54.3 [*peri thalassomachias*]) (27).

As is clear from the circular formation adopted by the Greeks during the first day of the naval battle, with the ships' rams pointing outwards and the sterns inward, they had confidence in the strength of their ships during a frontal impact, with the bows first. It is precisely the formation of heavy horned animals (e.g., buffaloes) pitted against lighter but faster carnivores (e.g., a wolf pack or a group of lions). It would not make sense to adopt such a formation if the Greek ships were smaller and weaker than the Persian ones, because then the Persians would smash them with their weight and mass in a direct attack; something that they patently failed to achieve during this or any other naval battle. Finally, the Greek way of fighting on land was that of the heavy and powerful infantry phalanx that invited a frontal clash and decisive hand to hand combat (28). It would be at least strange for the same people to choose a different way of war-fighting at sea, based on maneuvering and smaller craft. Surely, 50 years later, the Athenians during the Peloponnesian War had developed their naval skills to such an extent that they would execute quite complicated maneuvers with their triremes (they would pass through [**diekplous**] or encircle the enemy battle line [**periplous**] among other fleet maneuvers) but that would happen to them in the future (29). These are not typical tactics either of Artemisium or Salamis (30). And, in any case, the rest of the Greek crews, both then and later, could not imitate them and continued to fight at sea as on the shore, colliding frontally with opposite ships and capturing them after their marines jumped onto the decks of the enemy and won the hand to hand combat that followed (31).

On the second day of the naval battle, the Greeks attacked and destroyed the ships from the Cilician squadron, who may have been stunned by the waves due to a new major storm that struck the area.

On the third day of the naval battle, the fleets faced each other frontally and fought stubbornly incurring heavy losses on both sides. Probably as many as half of the Greek ships suffered lesser or greater damage and many of them were either sank or captured. It seems that the Persian losses were similar or heavier. Finally, when it became known that the Thermopylae position had fallen and King Leonidas was dead, the Greek fleet withdrew through the Euboean Gulf to the Saronic Gulf, where it would eventually engage in the final victorious naval battle against the Persians at Salamis.

The naval battle of Artemisium, though, as well as the subsequent battle at Salamis, signifies more than just the defeat of the Persian invaders and the preservation of the freedom of the

Greeks: These victories strengthened and consolidated the power of the common people - the **demos.** By participating in the naval war either as sailors or as rowers the landless Athenian citizen (the **thetes**) made their presence more than felt. That is, while the infantry army – the phalanx of citizen-soldiers – involved only the wealthiest citizens (the pentakosiomedimnoi [those who produced 500 measures of grain per year], hippeis [horsemen, owners of expensive horses] and zeugitae [oxen owners], i.e. the three upper classes of Athenian citizens), in naval warfare the rowers of the triremes (the **eretai**) were recruited from the landless but free **thetes** – and there were 170 rowers per trireme as opposed to only 10-14 marine hoplites and four (perhaps non-Athenian) archers (32).

The magnitude of popular participation in the battles of Persian wars is evident from the comparison of the men involved.

TABLE a). First of all, the Athenians just before Xerxes' attack were known to have:

Battle	Strength
Strength of the Athenian army in the Battle of Marathon (490 BC):	9,000 men
Strength of the Athenian fleet built by Themistocles with the proceeds of the silver mines of Laurium and was ready for Artemisium and Salamis ten years later (480 BC):	[200 triremes x 200 crewmen =] 40,000 men

TABLE b). Again in the simultaneous expeditions of Thermopylae and Artemisium (480 BC) the same phenomenon is observed:

Battle	Strength
Strength of the Greek land Army at Thermopylae:	5,200 (minimum) - 11,200 (maximum) men (33).
Strength of the Greek fleet at Artemisium:	[(324 triremes x 200 crewmen) + (9 pentecontors x 70 crewmen) =] 65,430 men

Therefore, the naval battle of Artemisium (and after it Salamis, Mycale etc.) not only saved but also consolidated Athenian democracy. It made the whole people responsible for the victory – and not just the privileged classes (34). In fact it cemented in place and enhanced the widespread sense of Greek and especially Athenian uniqueness and superiority. Moreover, the battle of Artemisium provided both the basis for the mighty Athenian fleet as well as for the Athenian Alliance (Delian League), and therefore introduced chronologically the golden age of Pericles, Plato and Socrates - in short the classical culture to which we are so proud of since it forms the bedrock of modern Western culture (35).

This is also evidenced by what the Athenian aristocrats thought of it. As the philosopher Plato informs us in his *Laws* (D, 707c), the Lacedaemonians (in this case the Spartan Megillus) and the aristocrats of Athens (who in this dialogue are represented by the Athenian Xenus – who is in fact Plato himself) thought that the Greeks were saved during the Persian wars by the land battles. However, the Athenian democrat Clinias objects and insists that they have been saved by the naval victories of Artemisium and Salamis. According both to the conservative Spartans and the Athenian aristocrats, the naval victories made the Greeks worse ("no better") since the simple people decisively participated in them and therefore tasted of an unprecedented social and political power (36).

The ancient Athenians themselves as a people, however, obviously had a different opinion from the aristocrat Plato regarding the quality of their victory at Artemisium and dedicated monuments to the sanctuary of the goddess Artemis (Proseoa) on the modern hill of St. George near the village of Pefki, so as to honor their victorious participation in the naval battle of Artemisium.

On the trophy there was an inscription, as related by the later author Plutarch in his life of Themistocles (8.3):

Nations of all sorts of men from Asia's boundaries
coming,
Sons of the Athenians once, here on this arm of
the sea,
Whelmed in a battle of ships, and the host of the
Medes was destroyed;
These are the tokens thereof, built for the Maid
Artemis. (37)

And the poet Pindar wrote justly enough of the Battle of Artemisium, that:

There the sons of Athens set
The stone that freedom stands on yet. (38)

THE TRIREME AND THE RAM FROM ARTEMISIUM

The main ship of the era that took part in the naval battle and in the numbers mentioned above was the trireme. It was a ship with three rows of oars on each side and had a total crew of 170 rowers and 14 marines/passengers. This ship could sail with its sails, but during set piece naval battles the sails were dismantled and left behind on the beach so that the ship became lighter, faster and more maneuverable.

The qualities of the trireme can be better studied today, since in the year 1987 the Greek navy constructed as faithfully as possible to the ancient ship type the modern trireme "Olympias" (39).

From the battle tactics of the ancient trireme, the one that arouses the interest of the contemporary audience is ramming. According to this tactic, the trireme smashes the enemy ship with the bronze ram that is attached to its bow. The ram pierces the hull of the enemy ship and then as the trireme retires by rowing backwards, the hole is exposed and the enemy ship is flooded and sinks.

The ram, made of good quality bronze, was mounted as a sort of metal holster around the long beams of the ship's keel, who are called **zosteres**. In the slide above the ram appears the smaller **proembolion**.

However, there is also a relatively recent archaeological find from Artemisium that is connected with triremes and, by extension, with the naval battle of Artemisium. In 1996, the businessman Vasilios Kállios made a gift at the Archaeological Museum of Piraeus of a bronze ram from an ancient trireme that had been brought to the surface from the sea near the cape of Artemisium. This, according to the donor's statement, had been originally given to him by a

local diver who had spotted it during his underwater diving. This ancient ram is the first of its kind to be discovered in the Greek seas (40).
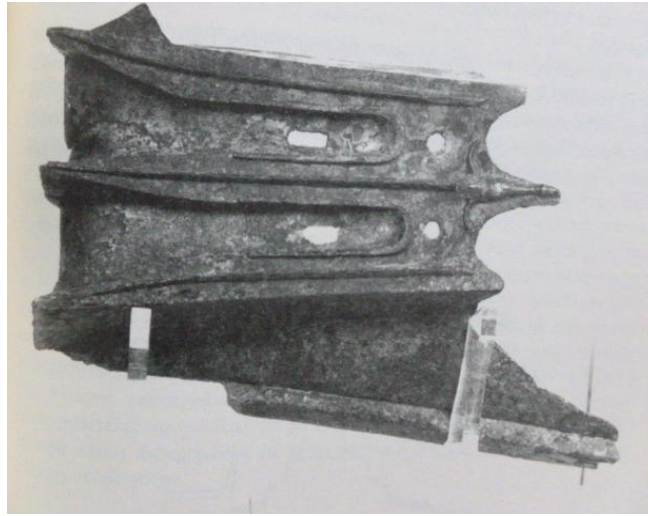
FIGURE 1. The Ram of Artemisium as displayed in the Archaeological Museum of Piraeus (with the kind permission of Dr. Georgios Steinhauer)

Its dimensions are: length 74 cm, preserved height 54 cm and weighs 36.4 kg. Because its remaining part is less than half of the original as the other side and the upper part are missing, the total weight would initially exceed 80 kgs. On the outer side of the ram is depicted a beautiful trident of Poseidon, decorated in its middle by a sword-like lance, emerging from the bud of a plant (**calyx**) together with two thorny (**akanthos**) leaves. From the cutting off at the side and top of the ram we deduce that our ram was violently detached from the warship to which it was attached, probably as a result of ramming during a naval battle.
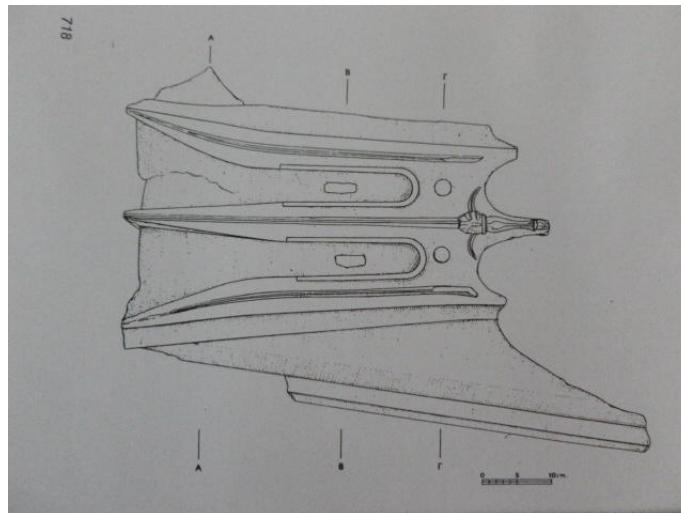
FIGURE 2. The Ram of Artemisium (with the kind permission of Dr. Georgios Steinhauer)

We have no photos or other documentation on how the Artemisium ram was found at the bottom of the sea. However, as recently as 2008-2012, ten rams of ancient Carthaginian or Roman ships were discovered immediately to the west of the island of Sicily that belonged to shipwrecks of the last great naval battle of the First Carthaginian War, that is the battle of the Aegates Islands (241 BCE) (41). These rams were found sitting on the bottom of the sea: the wooden ships to which they have been attached have now completely disappeared, but the bronze rams were found relatively intact (42).

From the comparison of the Artemisium ram with other ancient rams found in the Mediterranean, in particular the so-called Athlit ram from the shores of present day Israel (43), it appears that our ram is probably dated to the end of the 4th century BCE, so it may be related to the subsequent battles of Artemisium in the years 322 and 312 BCE, between the Macedonian and Athenian fleets, rather than the Greek-Persian naval battle of 480 BCE. In any case, however, this ram belongs to a trireme (the three-times as big ram of Athlit belongs to a Hellenistic quadrireme - a later type of heavier warship - weighs 465 kilos and was built in Cyprus between 204 BC and 164 BC, on behalf of either Ptolemy V Epiphanes or Ptolemy VI Philometor, that is Macedonian Kings of the Ptolemaic dynasty that ruled Egypt after Alexander the Great) (44).

In any case - whether it is classical or later - the ram of Artemisium, now exhibited at the Piraeus Museum, is indicative of the rams attached to the ships of the Greek and Persian fleets, since the trireme rams do not appear to have changed much between the 5th to the 2nd centuries BCE.

ACKNOWLEDGMENTS

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2. Wiesehöfer 2009, 77.
3. For a useful overview of the Persian numbers see Flower 2007.
4. For the geomorphology of the pass see Kraft – Rapp – Szemler – Tziavos – Kase 1987 and Vouvalidis – Syrides – Pavlopoulos – Pechlivanidou – Tsourlos – Papakonstantinou 2010. On the ancient topography in relation to Herodotus see van Rookhuijzen 2019, 118-169.
5. For the military history of the Persian Wars see among many: Burn 1984[2]; Lazenby 1993 (esp. 117-150 for the battles of Thermopylae and Artemisium); Strauss 2001 (esp. 11-30 for the battle of Artemisium); Green 1996 (esp. 109-152 for Thermopylae and Artemisium); and Rahe 2015 (esp. 202-240 for Thermopylae and Artemisium). For the battle of Thermopylae, see: Bradford 1980 and Cartledge 2006. For a semi-revisionist re-interpretation of Xerxes' invasion see Cawkwell 2005, 87-125. For the discrepancy in Greek numbers, see note 33 below.
6. Lazenby 1993, 117 & 125.
7. As discussed or depicted in innumerable texts and works of art since antiquity. For an eloquent and recent depiction of this, see the 2006 American film '300' and its sequel '300: Rise of an Empire' (2014). For an informed commentary on this see Levene 2007 and Bridges 2007.

8. See most recently and convincingly Matthew 2013. The 'suicide mission' concept has its origins in ancient tradition that presents the battle as sacrifice (the equivalent of the Roman *devotio*) of the Spartans to the gods. For this strand see Flower 1998 and its recent re-interpretation in van Wees 2019 and in Bakker 2019.
9. Green 1996, 111-112. On the nature and (rather limited) means of military intelligence in Ancient Greece see Russel 1999.
10. See Matthew 2013, 76-83: 'Food as a Weapon', 'Water as a Weapon' and 'Illness as a Weapon'.
11. This function of the Persian fleet has been recently challenged. For this see Lazenby 1993, 116. However, see now for the opposite view that reinstates supply as a major function of a fleet in Strauss 2007.
12. Robertson 1976.
13. Lazenby 1993, 155-163.
14. 'Gaius Caesar used to say that he followed the same policy towards the enemy as did many doctors when dealing with physical ailments, namely, that of conquering the foe by hunger rather than by steel' (translation by C. E. Bennett). For the effect of supplies in the conduct of a campaign by an ancient army, see Erdkamp 1998 and Roth 1999.
15. For plausible reduction of these numbers to a maximum of 664 triremes see Bowen 1998.
16. On the topography of the coast in relation to the storm see Bowen 1998 and van Rookhuijzen 2017.
17. On the 'Coela of Euboea' of Euboea see Bowen 1998, 361-363.
18. Wallinga 2005, 32-46.
19. Lazenby 1993, 138-150. Green 1996, 144-148. Strauss 2001, 24-30.
20. Sacks 1976, 245.
21. See for example the recent (2014) epic Hollywood film '300: The Rise of an Empire' (a sequel to the original '300'), where the Persian ships are shown literally towering over the smaller Greek ones.
22. Christodoulou 2016, 99-100. If one ignores this, it can lead to rather eccentric interpretations of among others the battle of Thermopylae as, e.g., the one proposed by van Wees 2019.
23. Wallinga 2005, 34. The Greek ships are 'heavier and slower'.
24. van Wees 2013, 63-69, *contra* the fundamentally unconvincing arguments of Schreiner 2004, 69-93, who attempts to re-date the first naval bill of Themistocles before the battle of Marathon.
25. Strauss 2001, xx, agrees with me.
26. Dennis 2010, 525, 533. Leo VI the Wise *et al*. 2005, 65 & 73.
27. Leo VI the Wise *et al*. 2005, 180-183. For the Byzantine navy of the *Naumachica* era, which seems, from the middle of the 7th cent. onwards, to have re-invented –under the guise of the *dromon*– the ancient bireme/*liburna*, see Pryor – Jeffreys 2006 and Cosentino 2007, 577-603, as corrected by Zuckerman 2005, 79-135, and Zuckerman 2015, 57-98.
28. For the make-up of the classical phalanx and its way of fighting, see now the contributions in Kagan –Viggiano 2013, *passim*. For an overview of the problems related to hoplite warfare, see now Konijnendijk 2018. For the Persian tactics on land, see Head 1992 and Charles 2011.
29. Strauss 2007, 224-228. The Athenian expertise was the result of the creation of the Athenian Alliance/Empire, with its standing fleet and the institutionalization of the salaries for rowers. On this see Evans 1969; Trundle 2016.
30. Unless one accepts that *diekplous* is not a ship but a fleet maneuver, as does Morrison 1991. According to him a *diekplous* is a breakthrough of a squadron of ships in line ahead formation through an opposing enemy squadron formed in line abreast. He believes this is what the Athenians did at Salamis, but the evidence is slim and I am not convinced.
31. This continued to be a standard practice for non-Athenian Greek navies down to the Hellenistic period. See now: Murray 2012, *passim*.
32. Strauss 2001, xix-xx.

33. The difference between the maximum and minimum power of the army at Thermopylae is mainly due to the controversial calculation of the force sent by the Opuntian Locrians to Leonidas. Some ancient sources count only 1,000 Locrians, while others number them up to 6,000. For a discussion of the numbers, see: Lazenby 1993, 134-135; Matthew 2013, 65-67.
34. On this aspect of the Persian Wars, see Rawlings 2007, 108-117.
35. *Pace* Rowe 2007, 103.
36. 'Athenian: Why, yes; and that is an opinion which is widely spread both among Hellenes and barbarians. But Megillus and I say rather, that the battle of Marathon was the beginning, and the battle of Plataea the completion, of the great deliverance, and that these battles by land made the Hellenes better; whereas the sea-fights of Salamis and Artemisium-for I may as well put them both together-made them no better, if I may say so without offence about the battles which helped to save us.' Plato, *Laws*, D, 707c (translated by B. Jowett). Rowe 2007, *passim* elaborates on Plato's views. On the empowerment of the lower classes see also Plutarch, *Themistocles* 19.4.
37. Translated by B. Perrin.
38. An epigram/encomium quoted in the previous passage of Plutarch's life of Themistocles (8.2). Translated by J. Dryden.
39. See now the three volumes on 'Olympias': Morrison – Coates 1989; Morrison –Coates –Rankov 2000[2]; Rankov 2012.
40. For the Artemisium ram and the story of its discovery, see Steinhauer 2002.
41. For the finds see the contributions in Royal – Tusa 2019.
42. It should be noted that, unlike the depiction in the film that was referred to at note 7 above – and also in many older epic films, such as 'Ben Hur' (starring Charlton Heston) or 'Cleopatra' (starring Elizabeth Taylor and Richard Burton), representing ancient naval battles – the ancient wooden ships that were rammed did not usually sink, because wood is lighter and floats on the water. In fact they remained as floating shipwrecks on the surface of the sea to be towed by the victor, who could salvage them, have them repaired, and later incorporate them into his own fleet.
43. Murray 2002, 49-52.
44. Murray 2002, 52 (fig. 2.12) and 57; Steinhauer 2002, 713-714.
45. For the periodical abbreviations used in the References section we used the guidelines of the American Journal of Archaeology (AJA) (http://www.ajaonline.org/submissions/abbreviations).

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