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The Classical naval installations in the Piraeus

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In his recent book *The Ancient Harbours of the Piraeus* I.1, Bjorn Lovén notes that archaeological investigation of the Classical naval installations in the Piraeus goes back almost as far as the discipline of archaeology in the modern Greek state (Lovén 2011: 15). This enduring archaeological interest in the Piraeus installations is not some ungrounded fascination, but rests on the importance of these facilities not only for the Piraeus, but for the whole of Classical Athens. The commission of these installations was an integral part of a Classical building programme that saw the construction of triremes and the fortification of the Piraeus peninsula. As Vincent Gabrielsen (2007: 256–57) has shown, the building of warships is not necessarily synonymous with the construction of a navy. The latter implies the centralization of war reserves by the city-state and the provision of infrastructure (naval facilities and walls to protect both these facilities and the ships stationed in them), and it would be essential for the state to maintain and operate these resources. Investigations of the Piraeus shipsheds therefore shed light not only on the size of Athenian triremes, but also on the overall planning and works undertaken by the Athenian state in Classical times, in order to command and sustain a large navy.

The last few years have seen a swift increase in our knowledge of the Piraeus shipshed complexes and, by extension, the topography of the harbours of the Piraeus. In 2004 Maria Petritaki (36th EPCA) published the results of rescue excavations of shipsheds in both Mounichia and Zea (**ID2440**, **ID2441**; Lygouri-Tolia 2013: 22–23). In 2012 the Zea Harbour Project (ZHP), a ten-year, extensive survey and excavation project directed by Bjørn Lovén (Danish Institute at Athens) in collaboration with the EMA, reached completion. The ZHP revealed and documented shipshed complexes and remains of harbour fortifications at both Zea and Mounichia (**ID87**, **ID1878**, **ID2474**, **ID2975**; Lovén *et al*. 2007; Nielsen 2007; Schaldemose 2007). A year before that, in the first volume in the *Ancient Harbours of the Piraeus* series (published as two sub-volumes) Lovén presented the results of the first five years of excavation in Zea and Mounichia (Lovén 2011). Lovén focuses on the three phases of naval installations excavated and documented in both harbours, discusses the topography of Kantharos, Zea and Mounichia, and presents measurements of relative sea level change in the Piraeus since the Classical period. The book also offers a comprehensive summary of literature on the Athenian naval installations from the 19th century to the present day. Volume I.2, co-authored by Lovén and Mette Schaldemose, presents the small finds excavated in Zea and proposes a reconstruction of the shipshed roofs, based on roof tiles excavated in the area. It also includes numerous maps and topographical plans.

In 2013, a further study of ancient harbour installations, *Shipsheds of the Ancient Mediterranean*, was published (Blackman *et al*. 2013). This volume includes two articles on the Piraeus shipsheds and the topography of Zea and Mounichia. The first of these articles, authored by Jari Pakkanen, presents a unique analytical study of the man-hours and resources required for the construction of each of the three phases of naval installations (Pakkanen 2013). The second article, by Boris Rankov, examines the sizes, layouts and architectural plans of the three phases of these installations, and offers an alternative view of the relative sea level change around the peninsula since the Classical period (Rankov 2013a). The article also includes a detailed presentation of past scholarship on shipshed remains in the Piraeus.

As these excavations and publications confirm, the remains of the naval installations in Zea and Mounichia represent at least three different phases of construction. To the first phase belong unroofed structures, interpreted as slipways, for the storing of ships (**Fig. 63**). The other two phases featured roofed structures (shipsheds). The authors of these different publications more or less agree on the dating of the three phases. The first phase (the slipways) is placed in the late sixth to early fifth century BC. Rankov supports the earlier date and believes that these slipways predate the fifth-century establishment of the

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63. Zea, Piraeus: documenting slipways. © Zea Harbour Project.

Piraeus as the primary military and commercial port of Athens. The second phase is dated later, in the fifth century, and most likely represents the naval installations demolished by the Thirty Tyrants in 404 BC. The third phase, of the fourth century, predates the naval inventories inscription (*IG* II^2 1627), which lists the numbers of shipsheds in each of the three Piraeus harbours (Mounichia, Zea and Kantharos). Lovén identified in the excavation record an additional slipway-phase at Zea, which postdates the phase-three shipsheds (2011: 74). These later slipways most likely housed *penteres*. The Athenian navy's acquisition of such ships in the 320s is taken as the earliest possible date for these structures (**ID 2975**). Finally, Petritaki has identified a Roman building phase in Mounichia, which extended the Classical shipshed structures further inland (**ID2440**).

However, the recently published reports differ with respect to the architecture, size, layout and use of the naval installations. I will, therefore, consider these aspects of each phases in sequence.

In order to determine the type of ship housed in a slipway or shipshed, the gradient of the structure, i.e. the degree of its inclination towards the seafront, needs to be established (amongst other measurements). In the first phase of the Piraeus installations, unless this gradient renders the structure safe and/or practical for a ship the size and weight of a trireme to be hauled and launched securely, then it can be concluded that the structure accommodated another, lighter, and possibly earlier, type of ship. Lovén calculates this gradient as 1:19 and believes that the phase-one slipways could have housed triremes. He also suggests that the maximum reconstructed length of the slipways was *ca*. 57m, even though their surviving length does not exceed *ca*. 12m. *Olympias*, the replica of a Classical Greek trireme, measures 36.9m by 5.5m (Morrison *et al.* 2000). Thus the length proposed by Lovén is ample for a trireme. By contrast, Rankov views Lovén's gradient as trireme-inappropriate and argues that the maximum length of the slipways was *ca.* 19m, meaning that these structures were never intended to house triremes. Rankov also dates these structures before the Themistoclean development of the Piraeus and the construction of triremes by the Athenian state. Nevertheless, both scholars note that phase-two and phase-three shipsheds were constructed on top of the slipways and damaged their original architectural plan and gradient. Such radically opposing views confirm that the evidence available for the phase-one slipways is inconclusive and open to different interpretations.

Although Lovén and Rankov present two different gradients for the phase-two shipsheds, they agree that these roofed structures were longer than the earlier unroofed slipway, and appropriate in size and gradient to accommodate triremes. While there is no agreement on their exact dimensions, it is safe to say that their width was *ca.* 6.5m and their length did not exceed 50m.

The greatest point of disagreement in recent scholarship on the architecture of the Piraeus naval installations concerns the third phase of shipsheds. In 1905 Walther Judeich first proposed that the shipsheds in Zea would have been long enough to house one trireme behind the other, i.e. that they were 'double shipsheds' (1905: 384–86). Lovén, based on the most recent archaeological findings, supports Judeich's view. Rankov and Pakkanen, on the other hand, argue that such long structures were never constructed.

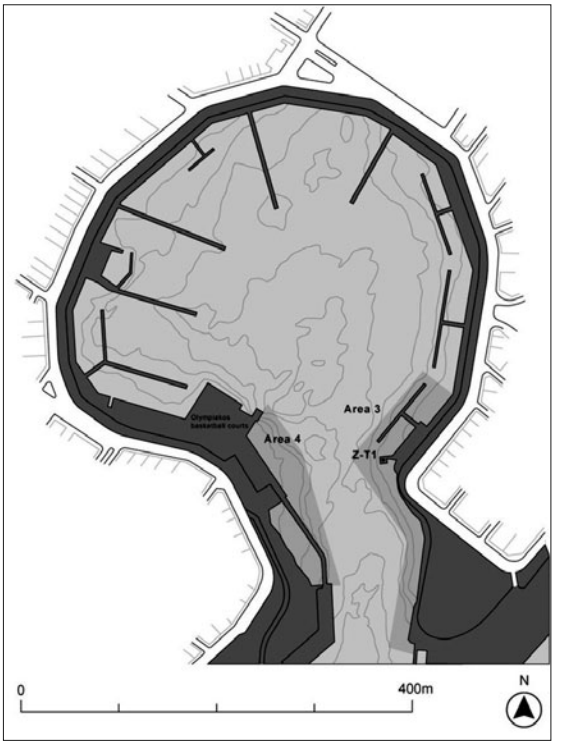
Reconstruction of the architectural plan of the phase-three shipsheds depends on the inland extent of their surviving remains and on the relative sea level change since the Classical period, which determines the rough maximum of their seawards stretch. Lovén notes that these shipsheds extended much further inland than their predecessors and had a much steeper gradient than the phase-one slipways. The excavation record attests to a minimum relative sea level change of -1.9m and he proposes a hypothetical maximum

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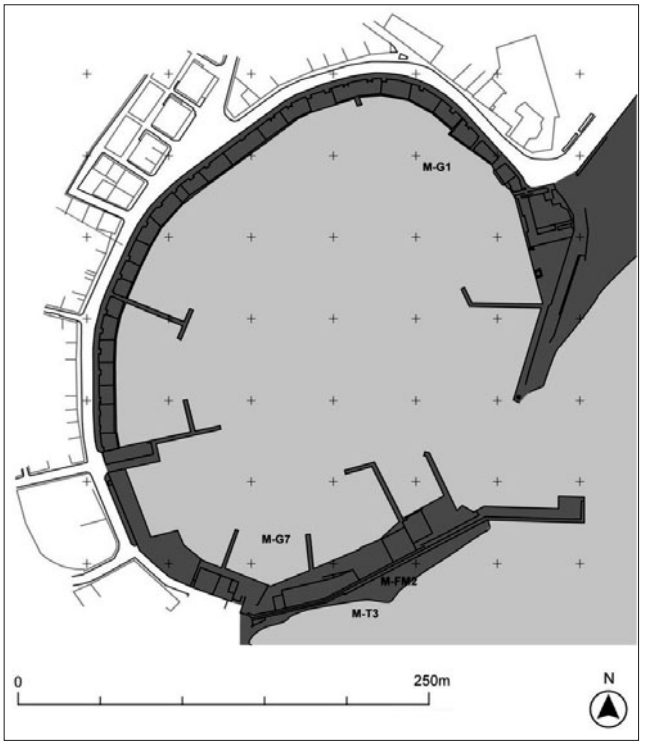
sea level change of -2.9m, which also accords with the archaeological evidence. Lovén thus calculates the length of the phase-three shipsheds at *ca*. 89m. Such structures would have been long enough to house two triremes, one behind the other. Rankov does not accept such high figures for the relative sea level change or such a steep gradient, and calculates the maximum length of the phase-three structures at *ca*. 58m. He adds that even though these buildings appear too long for the requirements of a single trireme, they were nevertheless too short to house two. In his analysis, Rankov occasionally places disproportionate emphasis on data collected in the 19th century (for example Graser 1872).

As expected, several problems arise with such radically different interpretations of the archaeological record. First, as most shipshed scholars and excavators agree, the size of a shipshed depends on the size of the ship(s) it was intended to house (for example Rankov 2013b: 85). So why would the Athenians spend the extra time, resources and space in the densely-populated, fourth-century Piraeus to construct a length-wise single-unit shipshed that by far exceeded the length of the single trireme it was intended to house? Rankov proposes that fourth-century triremes were longer than fifth-century ones, because they appear so in the iconographic record. First, this argument poses methodological problems regarding the interpretation and use of Classical Greek art and does not necessarily constitute evidence for the length of ancient warships. Secondly, I would like to pose a broader methodological question which is not restricted to the Piraeus shipsheds: when the archaeological evidence for the dimensions of shipshed complexes is inconclusive, can we extrapolate these dimensions from the hypothetical dimensions of ancient triremes? After all, the length and width of Classical triremes remain estimates, based on the dimensions of shipsheds.

Another major problem that arises from these two interpretations is what they denote for the topography of the Piraeus harbours (**Figs 64, 65**). *IG* II^2 1627 (398–405) states that (in the fourth century BC) there were 82 shipsheds in Mounichia, 196 in Zea and 94 in Kantharos. Contributors to both volumes discuss how the Athenians could have fitted Zea with 196 shipsheds. Lovén follows Judeich's example and takes a single, double-length shipshed to count as two shipsheds. He thus decreases considerably the total space



64. Zea, Piraeus: areas of the harbour documented by the Zea Harbour Project in 2012. © Zea Harbour Project.



65. Mounichia, Piraeus: areas of the harbour investigated by the Zea Harbour Project in 2012. © Zea Harbour Project.

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– width-wise – required by 196 shipsheds. This way, he solves the spatial problem very efficiently and shows that all 196 could have fitted comfortably around the Classical shoreline of Zea. He even identifies in the excavation record a space opposite the harbour mouth that was not built upon; the area opposite the mouth of a harbour is susceptible to wave and current action. Lovén suggests that the Athenians could afford not to use the space in order to keep their triremes clear of that area, thus protecting them from seasonal weather phenomena. He highlights a similar unbuilt area opposite the Mounichia harbour mouth as well. Rankov includes in his article two hypothetical plans of the topography of Zea (designed by Pakkanen), offering two possible alternatives for fitting 196 single-length shipsheds around the harbour. In relation to this plan, Rankov explains that the northern shoreline of Zea would have extended further inland in the Classical period. He argues that the picture of the harbour that we have today is the result of later silting. Consequently, the perimeter of the harbour would have been considerably larger in Antiquity and it could have fitted shipshed complexes much wider than Lovén's. In Pakkanen's second plan, in particular, it appears as if the sea extended so far north that it almost formed a second bay within the Zea harbour. Unfortunately, these reconstructions remain tentative. So far, there is no definitive archaeological data supporting such a shoreline at Zea. Instead, the evidence available renders Lovén's interpretation of the topography of Zea, and by extension his architectural plan of phase-three double-length shipsheds, more realistic.

Nevertheless, in his identification of single- instead of double-length shipsheds, Rankov raises again the question of why the Athenians would have counted a single building, regardless of its length, as two shipsheds. In the fashion of Klaus-Valtin von Eickstedt (1991: 73–77), Rankov states that Lovén's reconstruction of double-length shipsheds still does not account for 196 shipsheds in total, as the inscription attests for Zea. In my opinion, Lovén's argument is convincing and '196 shipsheds' can be understood as 196 spaces for ships.

Regardless of the length of the phase-three shipsheds, their width was the same as those of phase two, and their gradient appropriate to house triremes. These buildings formed complexes of several shipsheds, one divided from the other by a colonnade. Each pair of adjacent shipsheds shared the same roof. With respect to the layout of the shipshed complexes, all evidence so far indicates that their back wall ran continuously and was interrupted by gates which would have granted selective access to the ships and the interiors of the shipsheds. This ensured that entry to the naval installations was controlled by the Athenian state, thus ensuring the safekeeping of both the ships and the installations.

Finally, special mention should be made of Pakkanen's fascinating article on the costs and effort required for the construction of the naval installations in the Piraeus, which complements the latest archaeological data (Pakkanen 2013). Pakkanen calculates the quantities of materials and man-hours required for each of the three construction phases. He takes into consideration all relevant parameters, such as the origin of the materials and the costs of transfer. His results show that in comparison to the cost of constructing and manning the triremes, the resources required for construction of the naval facilities would have been relatively insignificant. In particular, the phase-one slipways required 360 man-days, i.e. they could have been constructed in just 18 days by an average workforce of 20 men. The costs required for a ten-unit, phase-two shipshed complex would have been equal to the cost of keeping five triremes at sea for less than a month (*ca*. seven *talents*). Also, the number of men involved in the construction of one such complex would be fewer than the crew of a single trireme (200 men). Pakkanen suggests a workforce of 150 men. Regarding the phase-three naval installations, 100 new shipsheds would have cost 150 *talents* and required 460,000 man-days. Consequently, Pakkanen's study shows how the naval installations in the Piraeus were a particularly cost-efficient Athenian building programme.

In conclusion, despite some contradictions in recent scholarship (notably regarding the architectural plan of the phase-three shipsheds), our knowledge of the Piraeus harbours has increased remarkably in recent years. The quantity of recent excavation data, measurements and detailed publications has shed light on numerous aspects of the naval installations. These publications not only enhance our understanding of the fifth- and fourth-century Piraeus, but of the whole of the Classical Athenian state and its building programmes.

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