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Zea Harbour Project: preliminary report 2007–2008

Bjørn Lovén & Mads Møller Nielsen

The Zea Harbour Project (ZHP) is a collaboration between the Ephorate of Underwater Antiquities, the 26th Ephorate of Prehistoric and Classical Antiquities, the Danish Institute at Athens and the University of Southern Denmark.¹ Its objectives are to investigate the ancient naval installations and harbour and coastal fortifications in and around the harbours of Zea and Mikrolimano (ancient Mounichia).² In 2007, ZHP conducted underwater excavations in Zea and land surveys on Koumoundourou Hill, south of Mounichia (Fig. 1). In 2008, ZHP conducted underwater excavations in the harbours of both Zea and Mounichia.

Zea Harbour 2007–2008

Zea Shipshed Groups 1 & 2 (Z-G1 & Z-G2)

Excavations continued in 2007 and 2008 in Area 2 at Zea (Fig. 2). This area lies at the critical junction of the shipsheds of Groups 1 and 2. During our 2005–2008 excavation campaigns in this area we identified the remains of six shipsheds and a number of open slipways, some of which overlap. Evidence of three building phases were found, as well as a wedge-shaped area paved with large ashlar blocks between shipshed Groups 1 and 2. This area was in all probability intended as a passageway to the shipsheds, but may have served multiple functions, such as an assembly area for trireme crews, or a working area associated with the ships and their equipment.

During the 2007 and 2008 seasons a number of trenches were opened and large areas were surface

cleaned. We made several important discoveries during these two intensive campaigns. Two are particularly deserving of consideration. The first discovery was of substantial stratified layers with material that points unequivocally to a 5th century BC date for the first two building phases; further excavations are required to answer the question, which historical sources have failed to elucidate – precisely when in the 5th century BC the first naval installations in the Piraeus were built. The question is an important one, especially as the navy and its bases in the Piraeus served as one of the prime movers

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² In regard to the shipsheds, see Lovén *et al.* 2007; Lovén 2008; Lovén *forth.* In regards to the fortifications see Nielsen 2007 in Lovén *et al.* 2007 and Nielsen 2007, for general information on the fortifications, see Garland 2001 and Eickstedt 1991.



Fig. 1. Areas under investigation in 2007 and 2008. ©Google Earth Pro 2009.

of the Athenian democracy and comprised Athens' largest public institution in the 5th and 4th centuries BC in terms of sheer size, cost and administration, as well as political and military influence.

Secondly the wedge-shaped area described above delineates the southernmost shipshed in Group 1

(Phase 3), and we can now define the last building phase in Group 1 as a 105 m long section of 16 double shipsheds. Altogether, Group 1 covered an area of about 9.360 square metres in the 4th century BC. Under its roofs were stored 32 triremes that would have been crewed by some 6,400 rowers and sailors.

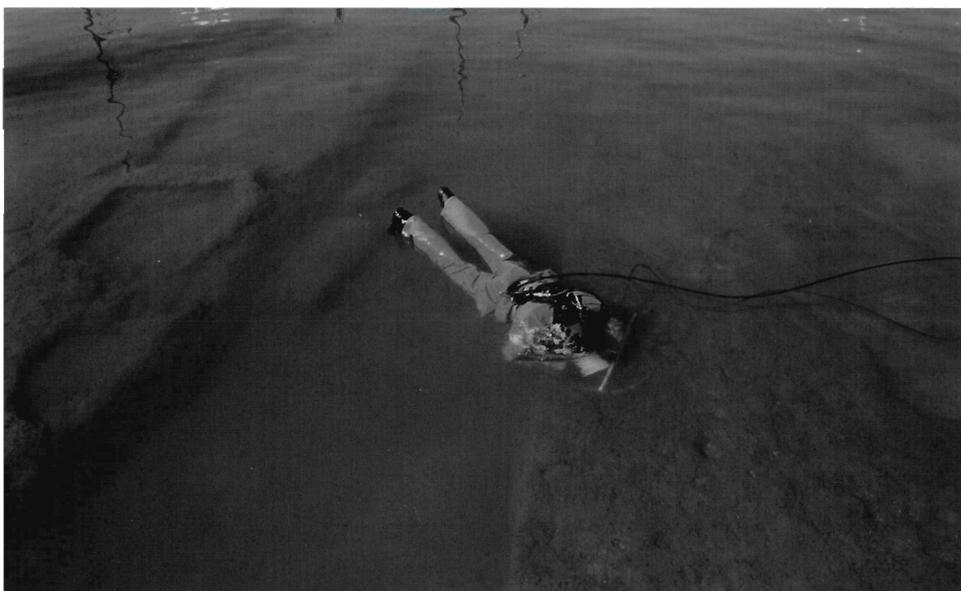


Fig. 2. M.M. Nielsen documenting rock-cut features in Area 2, Zea. B. Lovén ©ZHP 2007.



Fig. 3. The round tower K-T1. D.W. Williams ©ZHP 2007.



Fig. 4. Coastal fortifications (K-W4) in the garden of the Hellenic Sailing Club. D.W. Williams ©ZHP 2007.

Koumoundourou Hill, 2007

Koumoundourou Hill is a small peninsula rising just to the south of the harbour of Mounichia. The hill today is partially occupied by the *Hellenic Sailing Club* (NOE), the members of which were exceedingly helpful and understanding during our work. The objectives of the 2007 investigations were to obtain new information regarding the coastal fortifications, and to record previously registered structures in more detail. Another motivation for the work was to record the current condition of the fortifications in the harsh coastal environment in this part of the Piraeus.

Two areas of Koumoundourou Hill were investigated. In the western part, work focused on a large round tower (K-T1, Fig. 3) and an adjacent wall (K-W5). The main focus of the work, however, took place in the southeast part in the garden of NOE where the remains of the coastal fortifications are still preserved (K-W4, Fig. 4).

Most of the surveyed structures had previously been excavated, but only summarily documented.³ It became apparent that extensive remains were still preserved, although some areas are in a very poor state. This is due not only to the winds and waves of a harsh coastal environment, but also to the destructive action of trees with roots that dislocate blocks from their *in situ* position and in some cases even destroy them.

Over the course of the 2007 season on the hill we came to realize that the ancient remains are under great environmental stress, and that several structures are in immediate danger of total disintegration (K-W4, Fig. 5). There is very little chance of preserving these ancient remains due to their extreme location at the violent interface between land and sea. Electronic survey now and in the immediate future is therefore a critical requirement, not only as a step in our understanding of the development and use of Koumoundourou Hill, but also as an important archive and resource for work in the future.

Of the more interesting features discovered during fieldwork on Koumoundourou Hill in 2007, two are particularly deserving of mention. On the northwest part of the hill a large round tower, now known as K-T1, was documented (Fig. 3). It is the thirteenth fortification tower to be surveyed by ZHP. It has a diameter of 10.3 m, and its exposed elements are still fairly well preserved. The tower is probably a watchtower and possibly part of a larger fortification system on the hill. It has been dated tentatively by Threpsiadis to the late 5th to early 4th centuries BC, based on its construction technique alone. However, excavation of a fill north of the tower could point to no specific date. Although it is inconclusive, an inscription (IG² 244) mentioning repairs to fortifications on the hill indicates that

³ Threpsiadis 1936, 159–95. See especially pl. 1, p. 161.



Fig. 5. Coastal fortifications (K-W4) after cleaning; view from below. D.W. Williams ©ZHP 2007.

the tower was standing in 337 BC.⁴ Further investigations east and north of the tower are needed in order to identify its relationship with other remains on the hill and to obtain a more precise date. This tower may have been associated with a small stretch of wall (K-W3) on the northeast side of the hill (Fig. 6). If so, it would give evidence that the tower

was part of a more extensive and elaborate system of fortification. This is merely a preliminary interpretation and the supposed relation between K-W3 and K-T1 is based only on the similar type of masonry employed in their construction.

⁴ Threpsiadis 1936, 163, note 1.



Fig. 6. Wall section K-W3, possibly associated with the round tower K-T1. M.M. Nielsen ©ZHP 2007.



Fig. 7. Ceramic surface finds from Koumoundourou Hill. M.M. Nielsen ©ZHP 2007.

The second surprise was the discovery of decorated pottery. The surface finds were found near a large, pit-like feature and it probably represents discarded material or material deposited in a well or a natural hollow in the bedrock. The pottery is possibly of Geometric date, thus indicating an early use of Koumoundourou Hill and possibly also the Mounichia harbour (Fig. 7).⁵ It is now being analysed by the 26th Ephorate.

Mounichia Harbour, 2008

Mounichia was the smallest of the naval stations in the ancient Piraeus, and today it is found directly under, and around, the modern harbour of Mikrolimano. As is often the case, the modern harbour has utilised the ancient structures with both beneficial and disastrous results. Outside the modern harbour, the ancient structures are still to be found preserved in the sea, whereas the remains inside are largely destroyed by modern dredging or anchoring. However, underwater surveys have revealed that extensive remains of the ancient harbour are still preserved. 2008 was our first year of excavations at Mounichia and work was carried out in two areas inside the harbour, focusing on the naval installations and harbour fortifications.

Mounichia Shipshed Group 7 (M-G7)

In the first area one trench (Trench 1) was opened around the shipshed column (or pier) foundations found during survey dives in 2006, while a second (Trench 2) was opened around three *in situ* architectural elements. The two features stand atop a rubble foundation in which the possibility of discovering datable material remains very promising. The southern fortified quay (*chêlê*, M-CW3) runs west from submerged Tower M-T3 and forms the back wall of these shipsheds. The foundations of the column (or pier) are located perpendicular to and at a distance of about 40.0 m from the inside of the fortified quay. Other unidentified *in situ* remains, probably elements of a shipshed, are located about 53.5 m from the inside of the fortified quay. This provides a reliable indication that at least

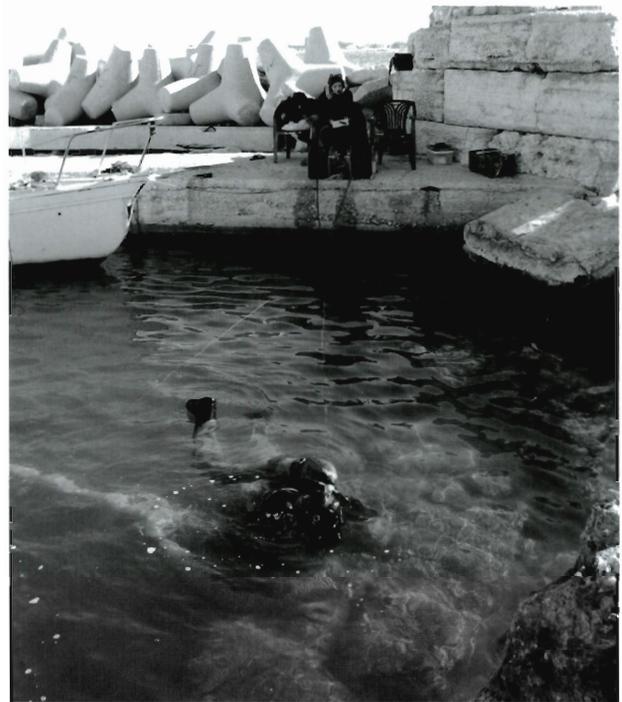


Fig. 8. P. Athanasopoulos excavating the northern *chêlê*. A. Korres is tending the diver and taking notes. M.M. Nielsen ©ZHP 2007.

40–50 m of the harbour front has been submerged since antiquity.

However, it should be pointed out that at least some of the submerged structures were purposefully placed underwater to serve as the wetted foundations of such structures as quays and breakwaters, and are therefore poor indicators of diachronic sea-level change. Indeed, while it seems reasonable to assume that the lower ends of the shipsheds stopped at the water's edge, there are good reasons for extending them in and under water a small distance. Ramps, for example, likely stretched slightly underwater to compensate for the small tidal changes that take place in the Aegean (with seasonal ranges between 0.1 and 0.8+ m). And superstructures may have projected over the water to shelter the bows of warships from rain and slanting sunlight. For these reasons there is a dire need to record and analyse the

⁵ Regarding other geometric ceramic finds from Koumoundourou Hill, see Palaiokrassa 1991, 64–5, pl. 26: Ka 6–8, Ka 10–12 and Ka 15. The main part of the geometric finds belongs to Middle Geometric to Late Geometric periods and only very few finds are earlier.

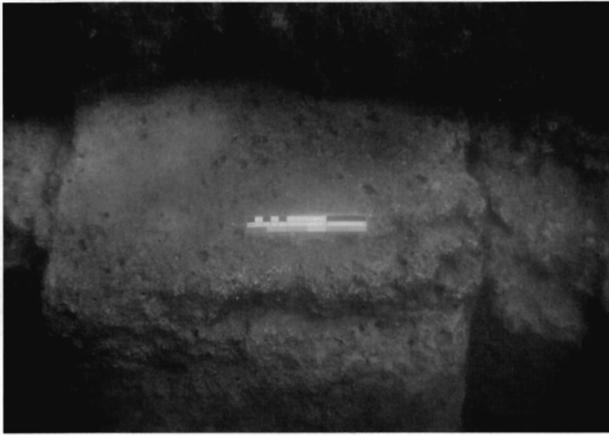


Fig. 9. Detail of the first and second courses of the northern *chélê* (M-CW1) preserved under the modern quay. The second course is set almost 0.4 m back for stability. M.M. Nielsen ©ZHP 2008.

topography and preserved structures of Mounichia in order to better understand their arrangement vis-à-vis those at Zea and the changes that have taken place over the centuries.

Mounichia, Tower M-T1 & the Northern Chélê

In the second area the main focus of our investigations was the northern part of the harbour fortifications, the northern *chélê* (M-CW1) of the ancient

harbour. The structure itself was probably more than 210 m long. The complete width of the wall is unknown, but it was probably close to the 9 m mentioned by Hirschfeld in 1878.⁶ The *chélê* possibly had a double function, serving as both a quay area within the naval harbour and as protection against enemy attack from the sea.

The *chélê* may have had up to three towers, with M-T1 serving as the last and most important one, forming one side of the fortified harbour mouth. The tower is the tallest standing fortification structure known in the Piraeus, rising more than 9 m from the bottom of the sea.

West of the tower a large area was cleaned in order to identify the extent of the preserved remains and to distinguish geological formations from man-made structures (Fig. 8). Three courses of the ancient *chélê* M-CW1 were identified, along with the bedrock on which it was built.

Further north, two trenches were opened along the inside of the ancient harbour fortification wall. In this area M-CW1 is preserved to a height of two courses (Fig. 9), and is standing on a built rubble foundation.

⁶ Hirschfeld 1878, 16, n. 13.



Fig. 10. A reconstruction of the Phase 3 shipsheds (375–350 BC). ©ZHP 2009.

Our investigations so far have revealed that the harbour's engineers not only took advantage of the morphology of the coast, but also enhanced its natural and advantageous features with additional structural elements in order to create a secure harbour.

Presenting the past in the present

Finally, in the winter of 2008/9, ZHP initiated a new research project, *Presenting the Past in the Present*. The aim is to create a more personalised, interactive learning environment via 3D and Virtual Reality recording and presentation. The need for archaeologically valid models that separate fact from fiction is borne of the complexity of the site itself, including its artifacts, the physical landscape, and the architectural structures of the ancient harbours, all of which are set within a dense and modern urban matrix. Such visualisations and interpre-

tive tools can be applied both in the archaeological research community, and in learning environments such as schools, museums and other public spheres. An important part of this project is the creation of an online 3D engine that will enable the user to explore what are essentially 'one to one' reconstructions (similar to the one depicted in Fig. 10, but as an interactive 3D model) of environments so real that you can hear the drone of the surf against the ramps and the squawk of seagulls flitting about these ancient waterfronts.

We also intend to present our survey data in an online program, where anyone can access the data in 3D, in such programs as MicroStation, AutoCAD and Rhino, instead of consulting traditional flat sections and plans presented in paper publications. The addition of the third dimension to archaeological publications is a major scientific step forward, as it will enable users to test our raw field data and our conclusions in a more direct and easy manner.

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