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Cover illustration: Submerged structures from shipsheds in the Zea harbour, Piraeus.
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The Zea Harbour Project: the first six years

Bjørn Lovén, George Steinhauer, Dimitris Kourkoumelis and Mads Møller Nielsen

Introduction

The Zea Harbour Project is a collaboration between the Ephorate of Underwater Antiquities, The 26th Ephorate of Prehistoric and Classical Antiquities and the Danish Institute at Athens.[1]

From 2001 to 2006 the project investigated the remains of ancient shipsheds and harbour fortifications in Zea harbour. In 2005, with the kind permission of the Ephorate of Underwater Antiquities and the 26th Ephorate of Prehistoric and Classical Antiquities, the investigations branched out to include the harbour of Mounichia (modern Mikrolimano). In 2006 we documented two tow-

[1] We wish to thank the following people: Dr. A. Dellaporta, Dr. E. Hadjidaki, Dr. E. Lygouri, Dr. K. Axioti, Dr. E. Konsolakis, Dr. S. Michalopoulou, Mr. R.C. Anderson, Dr. J. Hale, Dr. S.I. Rotroff, Dr. J. Pakkanen, Dr. H. Gerding, Mr. David Blackman, Dr. E. Hallager, Dr. J. Mejer, and Dr. V. Gabrielsen. We wish to thank the following institutions and foundations: The Greek Ministry of Culture, The Carlsberg Foundation, The Archaeological Museum of the Piraeus, The Hellenic Maritime Museum, The Hellenic Coast Guard, Marina Zeas A/S, the Leverhulme Trust, and the staff of the Danish Institute at Athens. We furthermore wish to thank D. Davis for correcting the English text and for useful comments.

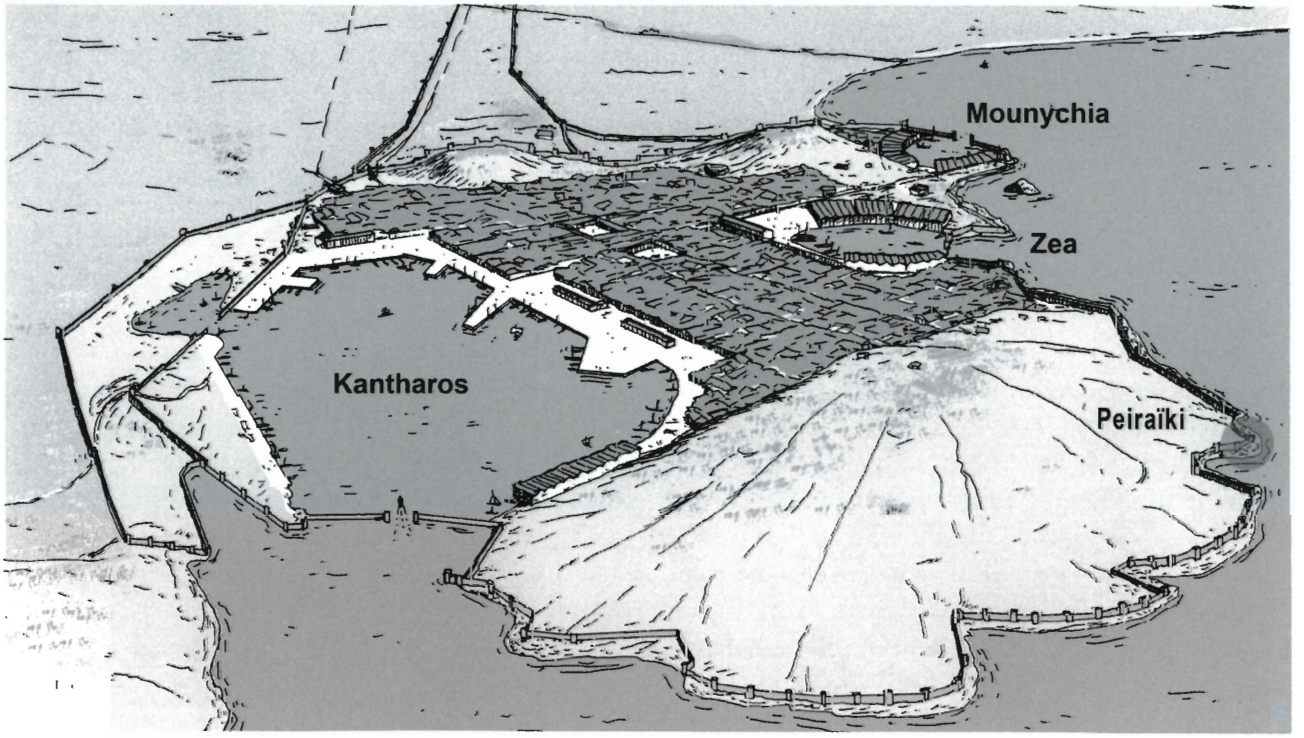

Fig. 1. Artistic reconstruction of the ancient Piraeus (4th century BC). The towers P-T1 and P-T2 in Peiraïki are marked with a shaded circle. Nakas/©ZHP 2004.

ers (P-T1, P-T2) in the Kononian wall in the Peiraïki area, and carried out a preliminary survey of the fortifications on the north-eastern side of the Koumoundouros Hill bordering Mounichia to the south (Fig. 1).

In a separate article M.M. Nielsen reports in more detail on the two towers from Peiraïki (P-T1, P-T2) and the tower M-T1 in Mounichia (p. 75-88). Also in a separate article M.K. Schaldemose analyses a tile deposit and other related finds from the land excavations in Area1 (p. 89-100).

The shipsheds

Of Piraeus' three natural harbours – Kantharos, Zea and Mounichia - Zea had become the largest naval port in the third quater of 4th century BC. In 330/29 BC the shipsheds at Zea had the capability of holding and maintaining 196 warships manned by some 40,000 men.[2] Zea's shipsheds alone covered more than 55.000 square meters making it one of the largest and most impressive building complexes of the Classical Period. The naval installations constructed at Mounichia and Kantharos, by comparison, numbered 82 and 94 shipsheds respectively.

Although the trireme and fleet warfare in general had made an enormous historical impact on the trajectory of Greek civilization during the Classical period, the ships themselves were somewhat fragile. Triremes, when not in actual use, had two essential requirements: dry storage and covered shelter. Keeping their hulls out of water was critical to prevent their slender, softwood timbers from being consumed by wood-eating worms, a perennial threat to all wooden ships. Without provision for covered shelter, triremes quickly became the victim of the fierce Mediterranean summer sun, which would thoroughly dry and shrink the timbers of an uncovered warship and thus render it hopelessly leaky and unseaworthy. Rainwater inside the ship would soak the timbers, causing them to swell and to suffer from fungal decay. Without these protective measures, a fleet would be rendered useless in a relatively short period of time -hence the importance of structures large enough to house and maintain the enormous Athenian fleet.

The solution was the shipshed, an arrangement of parallel structures consisting of long stone ramps sloping up and away from the water's edge. Their length was sufficient to ensure that ships could be drawn completely out of the water. The ramp itself supported the keel of each ship during slipping and hauling operations, and an inclined tiled roof held aloft by plain limestone columns or walls provided the shade and protection. Passages on each side of the ramp provided access for the hauling and maintenance crews.

The historical scene

Shipsheds and slipways were built in the Piraeus during the second half of the 5th century BC, and in all probability also in the few years prior to and following the Persian War of 480 BC. None of the literary sources specify in which of the three harbours – Kantharos, Zea or Mounichia – the construction of the naval installations took place. If shipsheds and slipways were indeed built before 480 BC, the constructions could also have taken place in Phaleron Bay, to the east of the Piraeus peninsula. During the Peloponnesian War (431-404/3 BC) and in its aftermath, our literary sources make several references to naval installations. At the end of the war they were either wholly or partially demolished and the construction materials were sold for scrap.[3]

By the middle of the 4th century BC the majority of the 283 triremes listed in Naval Inventory IG II^2 1611, 3-9 (dated to 357/6 BC) were in all probability housed in shipsheds. By 330/29 BC, according to Naval Inventories IG II^2 1627, 398-405, a total of 372 shipsheds lined the three harbours: Kantharos (94), Zea (196) and Mounichia (82). Exactly the same number of shipsheds and their distribution in the three naval harbours of the Piraeus are mentioned subsequently in the two preserved Naval Inventories of 326/25 BC (IG II^2 1628, 552-9) and 325/24 BC (IG II^2 1629, 1030-36).

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[2] IG II^2 1627, 398-405, mentions 196 shipsheds. A double shipshed likely counted as two shipsheds.

[3] Isocrates (7.66), IG I^2 91 = IG I^3 52, Lysias (30.22).

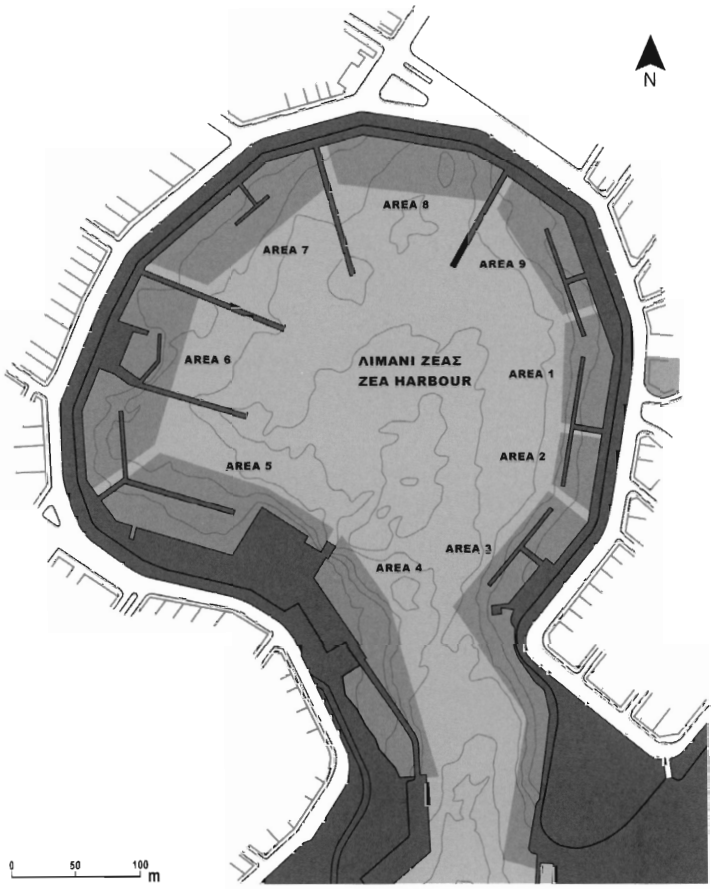

Fig. 2. Zea Harbour, Area designation. The shaded building lot to the east is the basement of Sirangiou 1 (Area 1).

Zea Harbour

Zea, Area 1 (Fig. 2)

In 1872 B. Graser carried out the first underwater investigations of the Area 1 shipsheds. He found several structures on the beach and, by wading into the sea, found more associated structures underwater which he identified as the remains of shipsheds.[4] Some thirteen years later, in 1885, I.C. Dragátsis conducted rescue excavations of 12 shipsheds in the vicinity of Graser's explorations (our Area 1, Fig. 2). W. Dörpfeld joined the continuation of the excavations later the same year and produced a plan and two sections of the remains of shipsheds highlighted in the sea.[5]

In 2000, at a time of year when there was no visibility of submerged structures in the harbour basin, BL employed Graser's 'technique' in Area 1. This very basic, yet fruitful inspection demonstrated that ancient structures were still preserved in the sea. The Zea Harbour Project was formed the next year.[6] The initial research objective was to determine to what extent the lower parts of the shipsheds remained preserved under water. Since 2001, the project has documented extensive submerged harbour installations all around Zea. We credit Dragátsis and Dörpfeld with laying the foundation of shipshed studies at Zea, and with providing the stimulus behind the Zea Harbour Project.[7]

The upper ends of three of the shipsheds excavated by Dragátsis are preserved in the basement of the apartment building Sirangiou 1. A plan of the basement was drawn up in 2001, and in 2002 selected areas of the basement were re-excavated and surveyed. During the re-excavation a closed

[4] Graser 1872.

[5] Dragátsis 1885, 63-71, pls. 2, 3.

[6] see *www.zeaharbourproject.dk* for a description of the diving, surveying and excavation operations.

[7] BL wish to thank Mr. K. Kitsais and P. Athanasoupoulos for translating Dragátsis 1885, and our fruitful discussions.

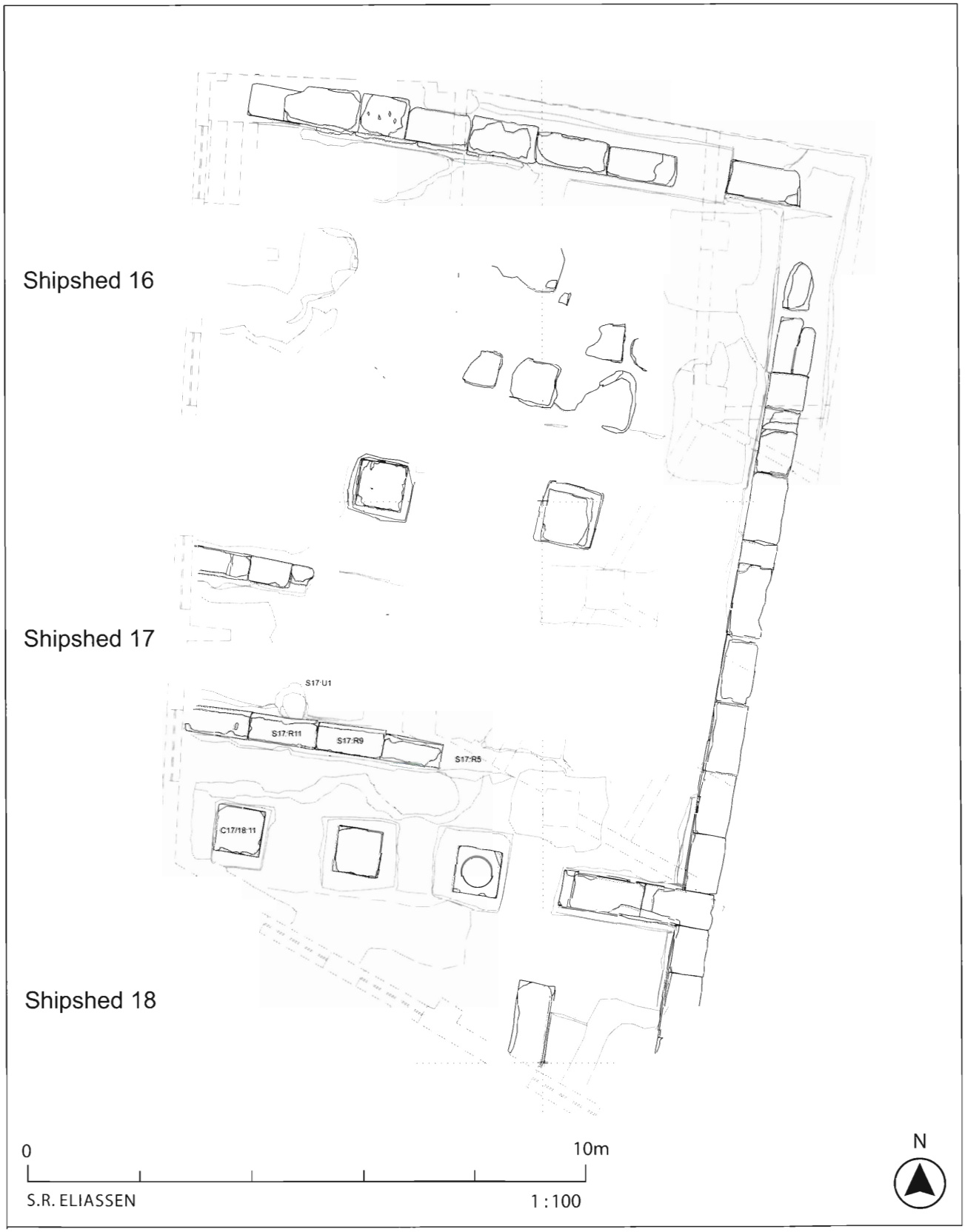

Fig. 3. Plan of Shipsheds 16, 17 and 18 preserved in the basement of Sirangiou 1.

deposit was found in the ramp structure of Shipshed 17 (see p. 89). Because our survey techniques have been refined and have developed considerably since the project's first surveys in 2001 and 2002, the basement was re-surveyed in 2006 in order to revise the dataset accordingly (Fig. 3), as were parts of submerged slipways and shipsheds excavated in 2002 and 2003.

The remains of six slipways (Phase 1) and twentyone shipsheds (Phases 2 and 3) were excavated in Area 1 between 2002 and 2006. The earliest phase (Phase 1) is defined by rock-cut features found in six of the ramps, and they likely held transverse timbers (Fig. 4). No features can be related with certainty to the superstructure of these ramps. and they were probably uncovered slipways. Phase 2 consisted of monumental stone shipsheds, the remains of which are clearly defined in the sea (Fig. 5) and indicated on Dörpfeld's plan and sections. Phase 3 comprises a 4th century BC extension up the natural embankment and into the sea to form double shipsheds about 80-90 m long. The upper ends of the Phase 3 remains are preserved in the basement of Sirangiou 1 (Fig. 3).

Fig. 4. Slipway 3, rock-cutting for transverse ramp timber. Note the rock-cut foundation trench for the later ramp of Shipshed 10 (Phase 2) in the bottom of the photograph. Heath/©ZHP 2006.

Fig. 5. Slipway 3 and colonnade dividing Shipsheds 10 and 11. The column base belongs to the Phase 2 shipsheds. Lovén-©ZHP 2006.

Fig. 6. Two phases of possible shipheds in Area 2. Lovén/©ZHP 2005.

Preliminary research suggests that the Phase 3 shipsheds employed the foundations of the Phase 2 shipsheds, and that the Phase 2 structures were completely overbuilt. Diagnostic finds remain undiscovered in the few stratified deposits excavated underwater in Area 1. We know that most shipsheds were more or less destroyed and their components sold for scraps at the end of the Peloponnesian War in 404/3 BC. The reused column drums reported by Dragátsis in Shipsheds 17 and 21,[8] and found reused in the ramp of Shipshed 17, probably belong to the Phase 2 shipsheds, or, less likely, to another colonnaded building. This indicates that building Phases 1 and 2 probably belongs to the 5th century BC. Schaldemose' research on tiles found in a closed deposit in the ramp of shipshed 17 also point towards the possibility of roofed monumental shipsheds in the 5th century BC (see p. 98).

Zea, Area 2 (Fig. 2)

In 2004 three submerged structures possibly related to shipsheds were excavated in Area 2. The investigations demonstrated that possible Shipsheds P1 and P2 are built atop each other and in two different orientations (Fig. 6). Apart from the two different phases of possible shipsheds, the architectural structures also show that this section of the complex changed orientation at some point in time.

Parts of a ramp structure, dubbed presumed Shipshed Q, was identified in the southern part of the excavated area. It appears to be from the same building phase as P1, and the southern part of the excavated area was intensely quarried at some point after the shipsheds went out of use. The quarrying has destroyed large parts of Q, P1, and the southern part of P2. The following year, in 2005, surface cleaning and excavations were carried out on five structures north of the presumed Shipsheds P1 and P2, three of which had been identified during the 2001 survey. The most important discoveries in this area were substantial stratified layers, a rare phenomenon in the surf zone at Zea. When Schaldemose has completed her studies of the excavated material we will hopefully know more about the chronology of the naval installations in this area. In 2007 it is planned

[8] Dragátsis 1885, 65, 68.

to conduct intensive excavations in this key topographical area, where the eastern and south-eastern group of shipsheds formed one of the corners in the polygonal harbour basin.

Zea, Area 3 (Fig. 2)

During the Peloponnesian War, the entrances of the three harbours of the Piraeus were, according to Thucydides (2.94), fortified on the seaward side. The fortified quays ended in towers flanking a narrow harbour entrance. Chains probably stretched between the towers forming a so-called *kleithron*. At Zea, surveys in Areas 3 and 4 (Fig. 2) determined that remains of the *chele* and other structures related to the harbour fortifications remain preserved in the sea.

In 2001 we located submerged remains from the south-eastern part of the fortified quay forming a portion of the *chele*. The area was surveyed using a combination of hand-drawn plans locked into place with electronically measured reference points. To maintain data uniformity, the area was resurveyed in 2004 using the new survey method initiated in 2002.

The tower foundations have been overbuilt a number of times, but several blocks of local pale yellow limestone remain *in situ*. The *chele* fortification wall continues at least 8.5 m west of the modern quay and is preserved to a height of at least two, possibly three, courses. We had planned to excavate this part of the harbour fortifications in 2005, but it was impossible to work at the site because the modern vessel Lefthero had sunk near the visible parts of the *Chele*. Diving in this vicinity remains unsafe.

A frame-constructed sidewall interconnects with the tower foundation and is preserved to a height of two courses. The wall is most likely ancient, but excavation of the fill is required to identify and date this structure. Just to the north of the tower foundation and side-wall are preserved architectural structures that may be elements of the outermost shipshed in this part of the complex. This structure was surface cleaned in 2005, and a test trench was excavated along its southern side. We are still not able to confirm whether this structure is related to the last shipshed in this side of the complex but hope that continued investigations will clarify this.

In the area between the northern part of Area 3 and the *Chele*, which demarcates the fortified harbour mouth, nine parallel rock-cut structures were documented during survey dives over a 43-meter-long area. Remains of three (possibly four) ramps and a foundation trench that may have held a column base have been identified. They are in all probability remains of shipsheds. A number of inclined rock-cut features remain unidentified, but since they have the same orientation as the aforementioned structures, they are probably also related to the shipsheds. The northern, eastern and southern parts of this area were quarried after the presumed shipsheds went out of use. To the west, the structures were destroyed by intrusive dredging in the 1960's.

In 2006, the area south of the fortified harbour mouth, i.e. the area running next to the retaining wall of Plateia Alexandros and outside the naval installations, was investigated on land and underwater (Fig. 2). The underwater investigations focused on the identification and documentation of features and foundation trenches in the southern-most part of Area 3. Some of the areas were heavily silted and/or covered by modern debris. Several very interesting features were identified in the area. Most noticeable were circular cuttings at the southern-most end of Area 3, probably from a foundation trench for a round tower. Furthermore, two building phases were identified in the rock-cut foundations for the fortification wall running along this side of the harbour mouth. Several rock cuttings were located on land along the harbour wall, although many are in poor condition due to deterioration of the bedrock (Fig. 7). Rock-cut foundations were found from the southern most end of Area 3 to the tower at its northern end; they are preserved in the sea and on land. At a point between the southern end and the remains of the ancient *chele*, the cuttings change orientation to coincide with a cutting that extends outwards towards the harbour. This latter feature is probably the remaining foundations for a tower on the outer face of the wall.

Fig. 7. Area 3, rock-foundations for the fortification wall along the eastern part of the harbour mouth. Nielsen/©ZHP 2006.

Zea, Area 4 (Fig. 2)

In 2004, two structures, both well-preserved *in situ*, were found during survey dives in the north western part of Area 4. Structure 1 consists of one long, contiguous row of 17 large, rectangular limestone blocks lying on a roughly northeast/southwest orientation. Structure 2, also a long and contiguous row of large, rectangular limestone blocks, is preserved *c.* 11.5 m from the quay, on a roughly north/south orientation. Structure 2 runs under two large yachts, making survey impossible in the blocked area. The entire area requires thorough cleaning to make a complete record of the extensive remains under these yachts. It was therefore possible to survey only a small section of this structure; the small number of blocks cleaned and surveyed does not adequately represent the full extent of the preserved structure or the number of blocks present. Six blocks from Structure 1, out of an estimated total of 12, have been preliminarily surveyed. Of the blocks recorded, almost all have small, rectangular cuttings near their corners, strongly indicating that features were fastened on top of them.

Further south, the rubble foundations of the western part of the *chele* were located in 2001. In the vicinity were found several dislocated large rectangular limestone blocks, likely originating from the fortified quay wall. In 2006 blocks were found *in situ* near the modern quay, but we were unable to conduct further investigations due to the abandoned ships moored over the site. It is planned to excavate this site in 2007.

In 2005 the partly submerged quarry integrated into the harbour fortifications was surveyed in the southern part of Area 4 (Fig. 8). The fact that parts of the quarry were integrated into the Classical fortification wall demonstrates that it was quarried before or during the construction of the wall, thus the quarry cuttings on land can be roughly dated to the Classical Period. A total of 55 m of the fortification wall, still preserved to a height of up to *c.* 3.50 m, was documented on land, as was 73 meters of quarry. An underwater survey of the partially submerged parts of the ancient quarry has determined that the quarry extends with certainty to a depth of -0.98 m. Features have been found in the bedrock down to a depth of *c.* -1.90 m, but because of extensive erosion we are still unable to determine securely if these features are manmade. Since it is highly unlikely that stone was quarried underwater, the depth of the quarry cuttings is very important for determining the sea level in antiquity, and future investigations may shed more light on this important issue.

In 2006 a rock-cut foundation trench was surveyed underwater with the total station. The cutting runs *c.* 21.0 m from land (surveyed in 2005) into the sea and is *c.* 1.12 m wide. This cutting was constructed on a similar orientation as the ancient fortifications preserved under the road west of the quarry. Whether this indicates a relationship in chronology and/or use is still unclear. It is situated farther to the south of the presumed area of the *chele* and hence outside the actual naval installa-

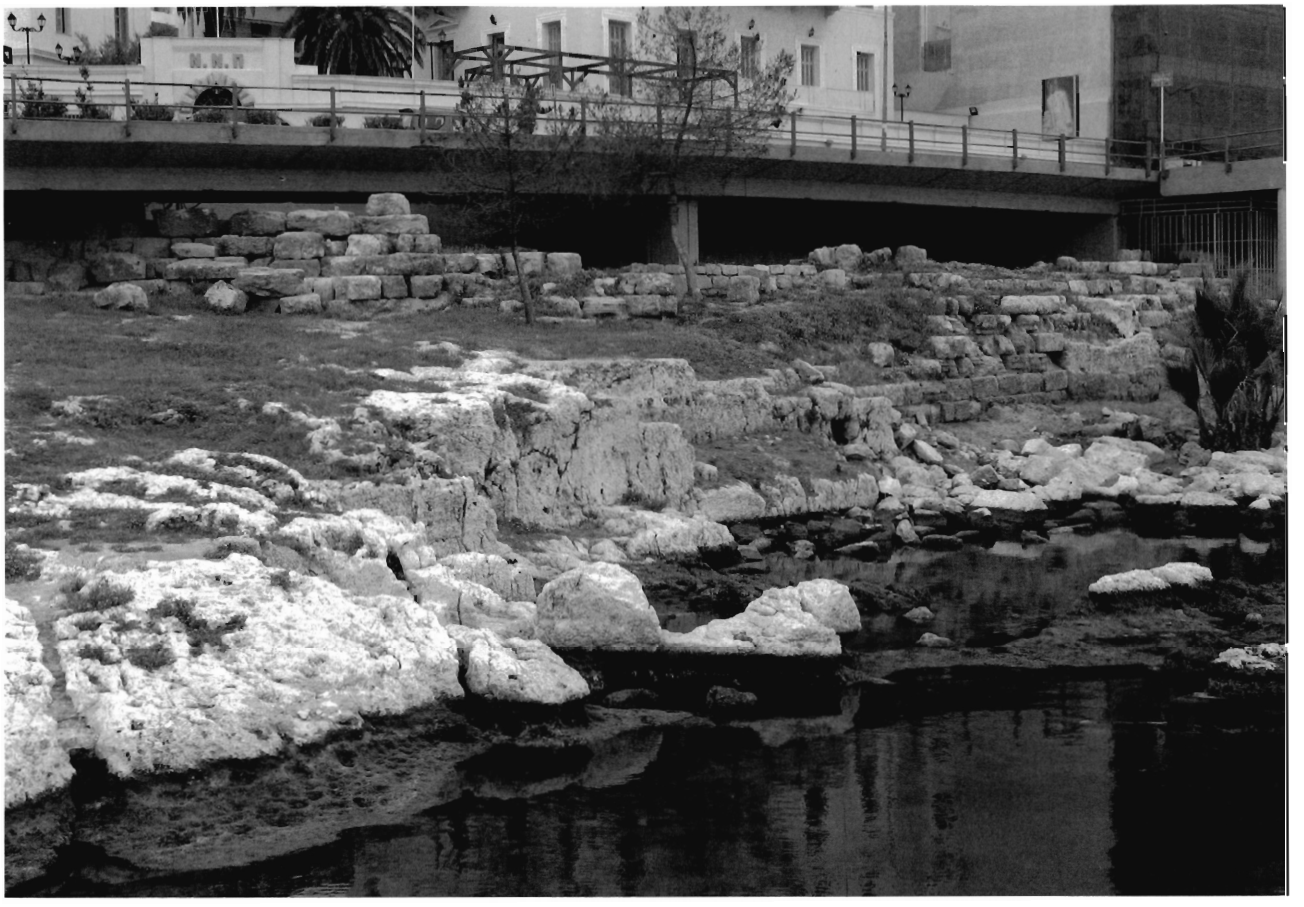

Fig. 8. Area 4, partly submerged quarry integrated into the fortification wall. Lovén/©ZHP 2005.

tions. It is possible that this cutting could have been related to a phase of the ancient harbour fortifications.

Zea, Area 5

Poor underwater visibility and difficult diving conditions in Area 5 have plagued the project in previous seasons (Fig. 2). In 2004, however, water clarity improved to such an extent that architectural structures could be seen from land, and remains of several presumed shipsheds were found. A contiguous row of blocks, one with a rock-cut slot on its top side, was located; they are likely the elements of a ramp since the structure is also constructed on a gradient. To date this is the only structure documented in this area, but intensive surveying of Area 5 is planned in 2007, when the research will focus on the topographical layout of the naval harbour.

Related Research

The report of the Annual General Assembly of the Hellenic Maritime Museum foundation, held on March 21st 1965, mentions 13 column drums belonging to the shipsheds.[9] They were found in the west and north-western part of the harbour during dredging work related to the construction of the modern marina in 1964 (Area 6, Fig. 2). The drums are described as being made of local Piraeus stone, likely referring to the yellowish-grey limestone found everywhere in the Piraeus. They were offered to the museum by the Organization of Piraeus Harbour, who also transported the columns and placed them in front of the museum next to the

[9] Unpublished handwritten document. A copy was kindly given to me by Mrs. Joanna Berbili of the Hellenic Maritime Museum.

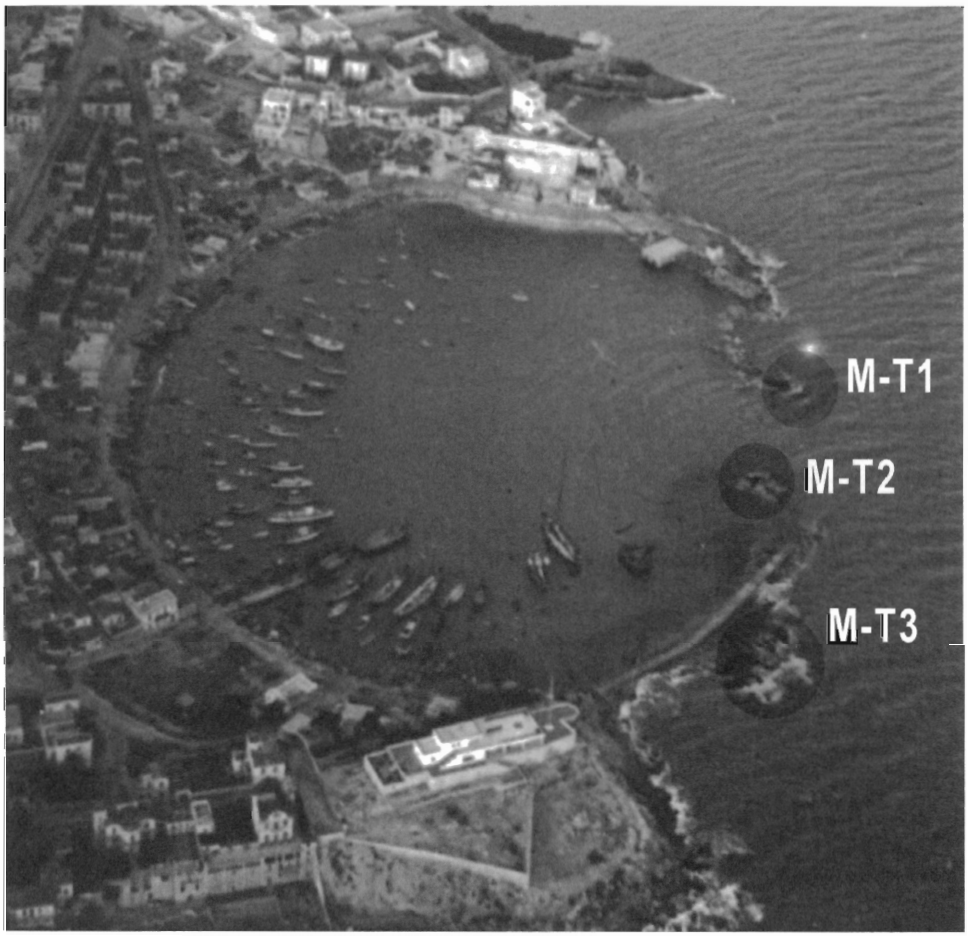

Fig. 9. Arial photograph of the Munichia 1950s, Towers M-T1, M-T2 and M-T3 (© ELIA, 2E70.027).

sea. The report explicitly states that the board members knew that substantial remains of the shipsheds were preserved in the sea it also mentions that the shipsheds had been severely damaged and overbuilt. In 2002, the 13 columns drums, now in 14 parts, were documented and catalogued with kind permission of the Hellenic Maritime Museum. These probably belonged to the shipsheds in Area 6.

Finally, in February 2005, the CHIMERA project (Cultural Heritage Interactive Media Environment for Reality Augmentation) was initiated as a joint venture between the Institute of Architecture and Design, University of Aalborg, Denmark, and the Zea Harbour Project. The aim of the project is to create scientific, three-dimensional digital reconstructions that aid in visualising ancient Zea Harbour.[10]

The first six years in Zea have demonstrated the vast archaeological potential of this important site. Our intensive recording and analysis of Area 1, in addition to our preliminary surveys and analyses of other areas within Zea Harbour, has already formed the fundamental basis of an understanding of ancient shipshed arrangements and construction techniques. Future research will concentrate on recording and analyzing the extent and character of the remaining shipsheds within Zea and in the nearby naval harbour of Mounichia. The project has included a survey and study of selected parts of the harbour fortifications and to what extent and how they interconnect with the naval installations.

From January 1st 2007 the Zea Harbour Project has been taken on board on the new and only Programme of Maritime Archaeology in Denmark at the Institute of History and Civilization, University of Southern Denmark.[11]

[10] The pilot project can be downloaded from www.zeaharbourproject.dk under 'News'.

[11] www.archaeology.sdu.dk.

Fig. 10. Mounichia (Mikrolimano), survey of Tower T-M3

Mounichia Harbour (Mikrolimano)

In 2005 the extensive remains of the northern *chele* tower (M-T1) were documented both on land and in the sea (see p. 80-1, Fig. 15). The survey also showed that there was a good possibility of finding the submerged southern side of the *chele* in and outside the modern breakwater.

Possible foundations of Tower M-T2

In 2006 surface cleaning and surveys were conducted on the possible foundations of the southern tower of the *chele*, the area in front of and immediately to the east of the rowing club Olympiakos in the modern harbour. All structural features, spaces between blocks, clear corners and edges are either severely eroded or covered in beach rock. It has therefore been difficult to achieve a clear definition of the structural design of the blocks in the foundation. However, investigations carried out on Tower M-T3, outside the southern modern breakwater, support the interpretation that these are ancient structures, and have helped in clarifying how to interpret the design of the *chele* and the harbour constructions, as well as in identifying the features in and around M-T2.

Several areas with ancient material were recognised in the vicinity of the sailing club Olympiakos, and also under the modern breakwater (a large part of the modern breakwater is constructed of what is essentially large rectangular limestone blocks, likely re-used from ancient harbour structures). Initially these structures have been interpreted as ancient structural foundations made of large rectangular limestone blocks, and similar features were also recorded west of the breakwater, under the modern jetty in the Olympiakos club area.

A survey of this area will enable us to make a preliminary reconstruction of the extent of what can now be interpreted as the southern side of the

Fig. 11. Mounichia (Mikrolimano), Koumoundouros Hill (lower part).

ancient *chele* of Mounichia. Preliminary investigation of the structural elements has helped us to determine that they are possibly the preserved remains of a tower foundation (M-T2) belonging to the ancient *chele*. They may also be part of the *chele* fortification wall or other unknown structural elements of the *chele*, perhaps a quay area on the inside of the harbour basin. Future investigations of this area will hopefully enable us to reconstruct the total extent and design of the ancient fortified harbour mouth of Mounichia.

Tower M-T3 and adjacent fortification walls

Extensive structures were located and registered in 2006 outside the modern southern breakwater, including the foundations of Tower M-T3 and the adjacent walls, possibly in different structural building phases and/or construction techniques (Fig. 10). Moreover, three courses of the foundation of Tower M-T3, at least on the southern and eastern sides, are preserved. It is still difficult, however, to assess the number of existing courses clearly due to extensive encrustation and marine growth, as well as the presence of beach rock.

The tower has two different structural phases and/or techniques, both still visibly *in situ*. The first phase is defined by large, well cut limestone blocks; the second is comprised by similarly worked, but smaller blocks set at a different orientation. Swell and surge lines are evident at a depth between *c.* -1.90 m and *c.* -3.00 m, although these lines are not necessarily direct indications of ancient sea levels.

In the vicinity of Tower M-T3 were found areas of rectangular limestone blocks embedded in beach rock. Whether these blocks are *in situ* is difficult to determine at present. The beach rock has inclusions of ceramic fragments of varying size, thus indicating a more recent origin.

Finally a large number of architectural elements were found in the vicinity of Tower M-T3. Sixteen blocks were selected for description, each with interesting architectural features. The most interesting of these are the remains of two massive limestone 'column-drums' (with diameters of *c.* 1.40 m), not unlike those from the Themistocles monument. Perhaps they once belonged to a similar monument or a pharos (lighthouse).

Possible remains of shipsheds in Mounichia

In 2005 a preliminary two-day underwater survey was carried out along the western side of the northern quay and in the northern part of the harbour. Possible remains of shipsheds were documented, but intensive survey and excavations are required to identify the elements conclusively as parts of shipsheds.

In 2006, two areas of interest were identified and documented during survey dives in the southeastern part of the harbour: three large rectangular limestone blocks were located *in situ*, with additional smaller blocks in the vicinity, which might also be *in situ*. The latter blocks have not been surveyed due to the fact that they lie immediately

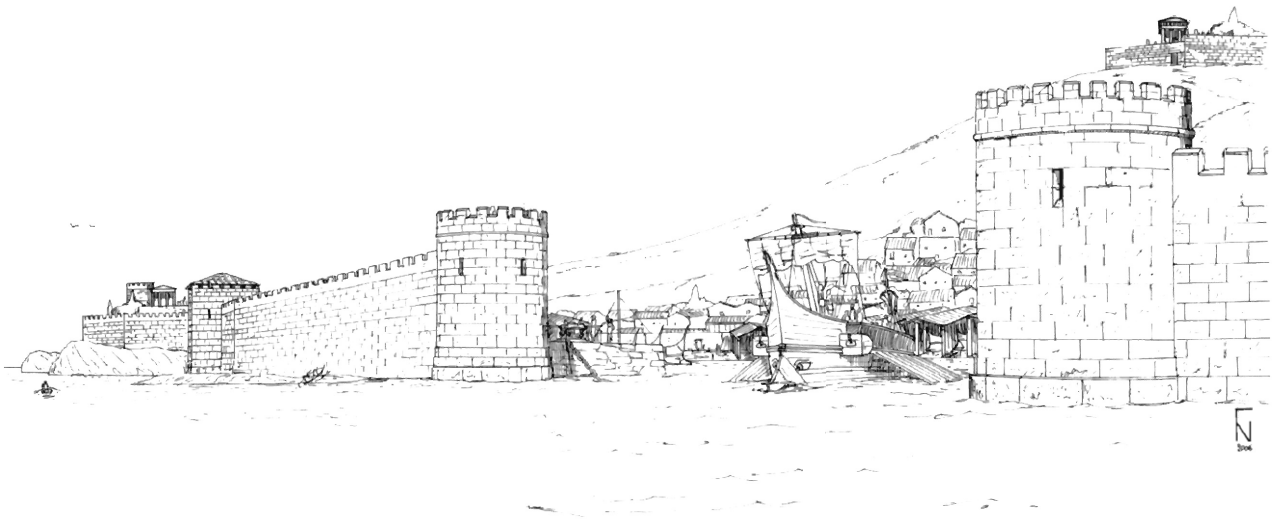

Fig. 12. Artistic reconstruction of the fortification of the Mounichia Harbour. From the left the towers M-T1 and M-T 2. M-T3 and the Koumoundouros hill is seen in the background to the left. (Nakas 2006).

under vessels moored to the jetty extending from the quay in front of the restaurant 'Ιστιοπλοικός'. Two large, rectangular limestone blocks were also located *in situ c.* 15 metres from the quay in front of the same restaurant. They are very well preserved and lie parallel to one another directly atop bedrock. Together these blocks may have formed a column base or possibly a column base foundation belonging to the Mounichia shipsheds.

Koumoundouros Hill, Mounichia (Mikrolimano)

A survey of the lower hill, south of Tower M-T3 and outside the southern breakwater of Mounichia harbour, was planned in 2006, in the area where structural remains of the ancient fortifications of Piraeus were located and photographed earlier in 2006. Since the structures were unstable and direct contact with them was impossible (Fig. 11), the survey was conducted using a Leica reflectorless laser system. This survey technique allows a direct 'shot' to the structure without a prism-person or a person 'pointing' on the structure. The only drawback to this technique is the lack of visibility due to shrubbery on the hill side. A preliminary inspection of the upper hill directly above this area was undertaken to determine the possible extent of the harbour fortifications at both elevations. Extant and well preserved remains of the fortification wall were found *in situ*. We plan to investigate this site in detail in the future.

The work of the Zea Harbour Project in and outside the harbour of Mounichia, even at this early stage, has shown that the harbour has a great amount of ancient remains in widespread areas. There are extensive remains of three towers belonging to the ancient harbour fortifications and the *chele* (Fig. 12), as well as structures which have been interpreted as possible shipsheds. Future excavation and survey will hopefully enable us to define the general plan and topography of Mounichia harbour and add yet another piece to 'the Piraean Puzzle'.

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