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Cover illustration: Submerged structures from shipsheds in the Zea harbour, Piraeus.
Photograph by Bjørn Lovén-©ZHP 2006.

# Three pieces of the Piraean Puzzle - towers M-T1, P-T1 and P-T2

Mads Møller Nielsen

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]

Approximately 2 km and up to eight courses of the ancient coastal fortifications in Piraeus are preserved along the coast, mainly between the two harbours Kantharos and Zea (Fig 1). The work of the Zea Harbour Project along the coast of Peiraïki has focused mainly on two (out of 22 preserved) towers of what is commonly known as the Kononian wall.[2] Under Konon, Piraeus for the first time received a fortification wall enclosing the entire peninsula. The Kononian walls were constructed directly on the coast and were built in the *emplekton* scheme, that is, with the sides of the wall constructed in large rectangular limestone blocks and the inner part filled with mud and rocks.

A review of the remains of the fortifications of ancient Piraeus supplies a vivid picture of the varying fortunes of the harbour city of Athens throughout the significant phases of its history and offers occasional interesting confirmation and elucidation of historical accounts. Furthermore, since the development of fortifications on the mainland and the islands is to a great extent influenced by Athenian building techniques and concepts, the study of the ancient fortifications of the Piraeus is of great importance in that it can supply a firmly established framework and concise outline of the development of Greek walls found in these areas.[3]

In 1939 Scranton defined nine distinct phases in the Piraeus.[4] Of these phases, six can be dated almost to the year, while the remaining three can be dated approximately. The chronology is based on the discovery, or rather rediscovery, of inscription IG ii$^2$ 1657 on a block from the Kononian fortifications (see below), and which was reported in the corpus as lost for almost thirty years.[5] The earliest section of wall (Phase 1), dating from the sixth century BC, is a very short stretch of masonry. It is characterised by curvilinear stonework found above Mounichia harbour and beside the new Yacht Club house. Two Themistocleian periods are identifiable, one (Phase 2) of polygonal masonry along the Akte and beyond the Eetioneia, the other (Phase 3) of ashlar at the Asty gate. A round tower of smooth ashlar masonry (Phase 4), also beside the Yacht Club, probably dates from the late fifth century BC, as does a 'carelessly constructed section of ashlar wall' in the valley below the Eetioneia ridge (Phase 5). (Phase 6) is clearly identified as a Kononian phase by the inscription IG II$^2$ 1657.

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[2] Steinhauer 2000, 52.

[3] Scranton 1939, 301-2.

[4] Scranton 1939, 301-2.

[5] Scranton 1939, 301.

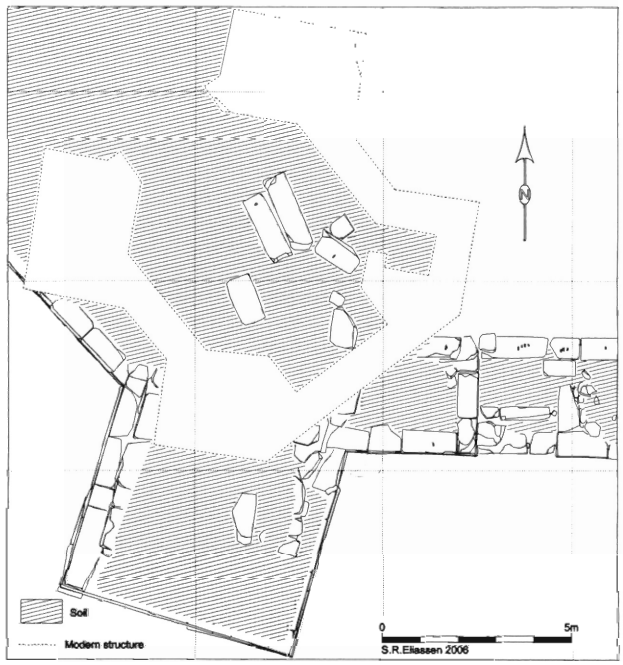


Fig. 13. Peiraïki, P-T1.
Scale 1:200.

(Phase 7) of Lykourgan date, is identified by smooth-faced masonry and drafted edges, while (Phase 8) is identified by its smooth-faced masonry with bevelled edges and broadly dated to the Macedonian era. Scranton's final phase (Phase 9), is dated to the Late 3rd to early second 2nd century BC and identified as the pseudo-isodomic masonry at the Eetioneia Gate.

Whether Scranton's chronological definitions stand the test is yet to be seen. According to Steinhauer the Themistocleian gates of 493/2 BC are the oldest fortifications in the Piraeus,[6] while polygonal masonry could be a later phenomenon, as similar masonry techniques is known also in Hellenistic times.[7] Nevertheless, Scranton's Kononian phase (Phase 6) is clear, along with Phases 7 to 9 (whether the dates are correct or not, they are obviously later than Konon´s walls). However, bevelled edges similar to those on Scranton's (Phase 8), are found on Peiraic limestone blocks in the fortifications of Athens, and these have been related to a Kononian construction phase of *c.* 393-390 BC,[8] and some reservations as to the actual chronological scheme according to Scranton is probably wise.

Of particular interest are elements that have been dated provisionally to the Kononian period: the two towers along Akti Themistokleous (P-T1, Fig. 13; P-T2, Fig. 14), in the area known as the Peiraïki in Piraeus. In addition, the northern tower (M-T1, Fig. 15) of the ancient harbour entrance fortification in Mounichia was surveyed, and although the present structure as a whole cannot be defined in the same chronological phase as the two towers in the Peiraïki, but rather to a later, as yet undetermined phase, it has been established that features of what is most likely a Kononian phase have probably been re-used and are preserved in M-T1 (see below).

The earliest building phase of P-T1 and P-T2 has confidently been assigned to Konon´s recon-

[6] Steinhauer 2000: 45.
[7] Winter 1971: 413.
[8] Fields 2006: 21, on the city wall of Athens.

Fig. 14. Peiraïki, P-T2.
Scale 1:200.

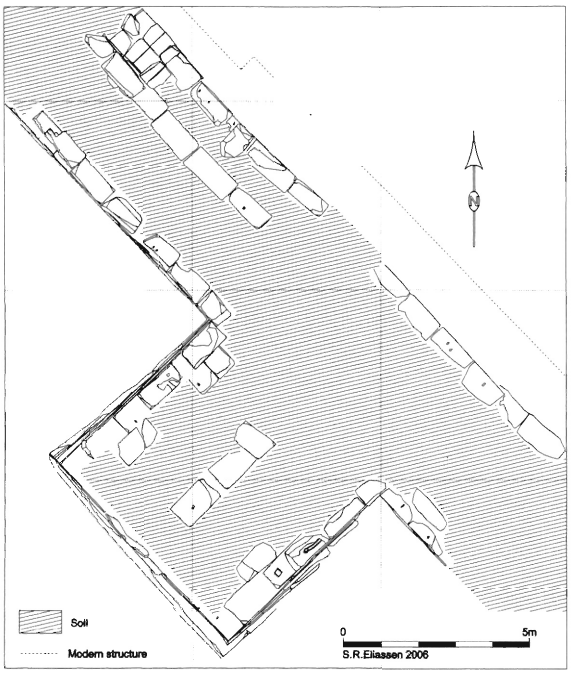


Fig. 15. Mounichia
(Mikrolimano), M-T1.

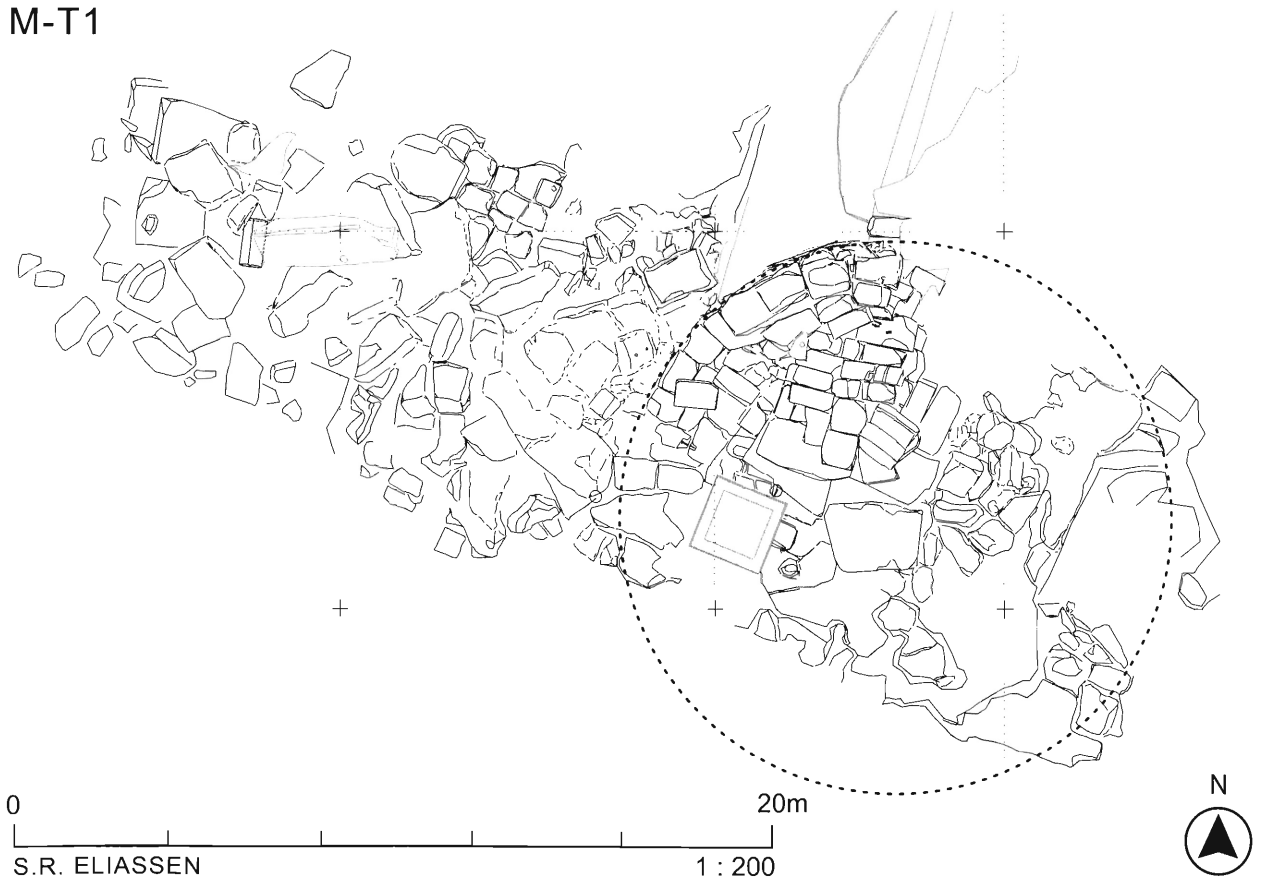

Fig. 16. Peiraïki, P-T1, curtain west of tower P-T1, with polygonal block in lowest course, and blocks with bevelled edges in 4th course from bottom (M.M. Nielsen 2006).

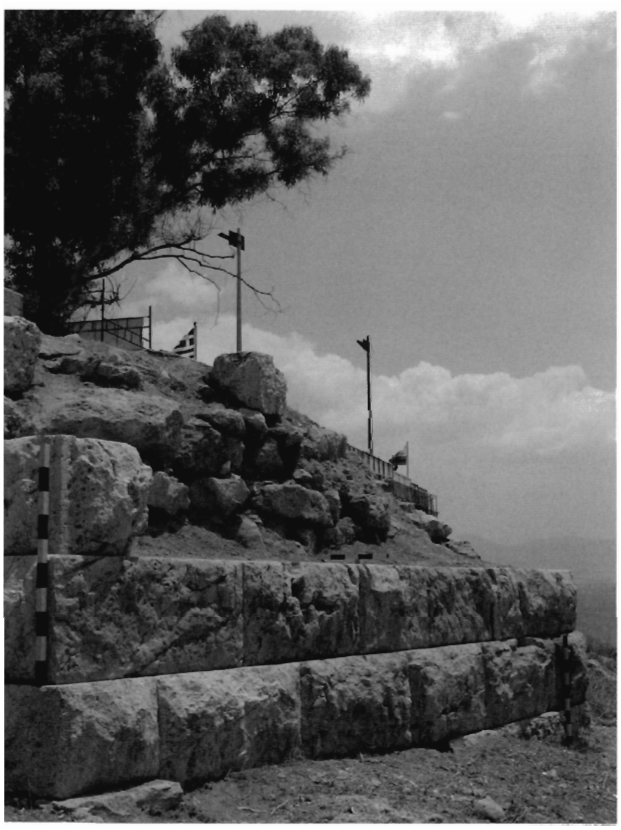

Fig. 17. Peiraïki, P-T1, tower, south face (M.M. Nielsen 2006).

struction of the fortifications before the battle of Knidos, *c.* 394 B.C. (Phase 6).[9] This is a construction phase generally characterised by a natural or rough treatment of the surface (Fig. 16, 17). The assignation of the P-T1 and P-T2 to this phase follows from the fact that the inscription mentioned above is cut on a block of this type of masonry.

Extensive repairs to the Akte circuit, one in smooth-faced ashlar masonry with drafted edges (Fig. 18), another in smooth-faced ashlar masonry with bevelled edges (Fig. 19), assigned to Lykourgos (Phase 7) and the Macedonian period (Phase 8) respectively.[10] It is likely that M-T1 (Fig. 15) belongs to one of these later periods, though the preliminary results are inconclusive. In addition, if we consider the large diameter of M-T1 (c. 12-13 m) as an indication of its use, as an artillery tower or platform, the tower cannot easily be of Kononian date. According to Ober, it is highly unlikely that the construction in Greece of a heavy

[9] Eickstedt 1991, 26-9.
[10] Scranton 1939, 302.

Fig. 18. Peiraïki, detail of blocks with drafted edges in 'sally port' east of P-T1 (M.M. Nielsen 2006).

artillery tower would have taken place so rapidly after the invention of the catapult in 399 BC.[11] This leads us to conclude that the tower could not have been built before the technology had been disseminated, earlier than 399 BC. Since the preliminary results indicate that there is only one phase in the preserved foundations, it must be concluded that this interpretation is valid for the complete structure - tower and foundation - though these do not necessarily belong to the same building phase.

At least two structural phases of the fortifications are evident in Mounichia: towers M-T2 and M-T3. However, the extent of these structures is still not fully known and consequently their full

[11] Ober 1987, 571.

Fig. 19. Peiraïki, P-T2. blocks with beveled edges in tower, east side (detail of Fig.15) (M.M. Nielsen 2006).

description must wait until they have both been fully documented. Both tower foundations are constructed with large, well cut limestone blocks, and possibly contain more than one construction phase. So far, it has not been possible to define the different phases of either tower with any certainty to any specific phase of the fortifications, and hence their specific relation to M-T1 and the harbour fortifications is still unsure.

Further research is needed to clarify these phases and to determine the relationship between the different structural phases of M-T1-3, and P-T1 and P-T2.

## Short Description of Towers

## Mounichia, Tower 1 (M-T1), (Fig. 15)

In 2005 a detailed electronic survey was carried out of the remains of the northern tower (M-T1) in the modern harbour of Mounichia (its upper six courses and foundation) in order to record the remains of the preserved harbour entrance fortification. Further investigations of the base of the tower and its foundations are required in order to complete the site plan. The depth of the seabed varies around the tower, being deepest on the eastern side of the foundations and south of the modern channel-light where the depth varies between 4.95 and 5.50 m. On the northern side of the modern breakwater the depth is 1.57 m.

Most of M-T1 is destroyed, but a substantial part of the north-western side is preserved. The curve of the outer face shows that the tower originally had a diameter of 12-13 m. The total preserved height of M-T1, including the foundation, is 9.23 m. The preserved height of the tower is 3.92 m. It is constructed of local limestone blocks of varying sizes, the larger being used for the outer face of the tower (the largest *c.* 3.4 × 0.8 × 0.6 m), and the smaller being used on the inside face (the smallest *c.* 0.45 × 0.70 × 0.42 m).

The tower stands on a foundation of worked bedrock and large limestone blocks. The maximum height of the foundation is 5.32 m above the seabed; at least six courses of the tower are preserved. The average height of each course, beginning from the top, is: 1st course: 0.50 m; 2nd course: 0.58 m; 3rd course: 0.68 m; 4th course: 0.74 m; 5th course: 0.69 m; 6th course: 0.73 m. A large rectangular block in the 5th course has a corner with drafted sides, a feature similar to the corners of the Kononian phase of towers in the Peiraïki (Fig. 20).

Fig. 20. Peiraïki, Tower P-T1. south western corner with drafted sides (detail of Fig. 11). (M.M. Nielsen 2006).

The submerged parts of the tower are preserved to a far greater extent than those above sea level. The eastern part is particularly well preserved, with substantial remains lying *in situ*. The modern breakwater that protects the northern part of the harbour covers most of the ancient harbour quay. 'Beachrock,' encrustations and different types of molluscs

cover large parts of the structure underwater and make it difficult to assess the full extent of M-T1.

The foundation was built in two phases, lower and upper. The lower structural phase consists of stones laid directly on the sandy seabed, with parts on the eastern and north-western sides set on bedrock. The upper structural phase consists of large, well-worked and multi-angular blocks of limestone set in courses at even levels. They do not seem to follow any particular orientation.
It is clear that the upper part of the tower can be differentiated from the foundation by the structural layout of the blocks. On this basis it is concluded that six courses of the tower are preserved. Furthermore, the foundation itself can be reasonably divided into an upper and a lower structural phase. This interpretation is based on the different construction methods, such as the size and worked condition of the limestone blocks and rocks. The lower part is comprised of largely un-worked or roughly worked limestone blocks of varying sizes. The upper part consists of well-worked rectangular blocks of varying sizes and placed in courses of roughly equal height.

Several significant structures were found under the modern quay extending north from M-T1. Based on the extent and shape of the blocks and their relationship to one another, it is inferred that these also must belong to the ancient harbour fortifications, and most probably to a wall or curtain wall running between the harbour entrance and the shore.

## Peiraïki, Tower P-T1, (Fig. 13)

### *General description*

The combined length of the three segments of the surveyed structure (the three sides of P-T1 and the two electronically-surveyed curtains east and west of the tower) is *c.* 29.89 m. The maximum preserved height of P-T1, from the lowest course at the face of the tower to the top of the upper-most preserved course (in the curtain on the western side), is *c.* 6.35 m. The maximum preserved depth of the wall is *c.* 4.12 m, a measurement taken from the eastern curtain, since the western curtain is covered by the foundation of a World War II-era cannon turret (Fig.16). The entire structure stands on bedrock that slopes downward towards the sea.

### *Curtain west of P-T1*

The western curtain is preserved to a height of four courses composed of large rectangular blocks that stand on bedrock. An additional fifth course is confirmed by two severely fragmented and eroded blocks. The maximum length of the curtain is 5.32 m, with a maximum preserved height of 2.47 m.
The general dimensions of the blocks that comprise the two lowest courses are *c.* 0.47 × 1.10 m (roughly 0.52 $m^2$). The lowest course has one polygonal block with a step cut into its upper length that allows for a taller block to lie in the second course directly above (Fig. 16). This makes it possible for the bottom line of the third course to form a straight line. The blocks of the third course have considerably larger dimensions, *c.* 1.73 × 0.67 m (c. 1.16 $m^2$). The blocks of these three courses all have roughly-worked, convex faces. The blocks of the fourth course, although slightly wider than those of the other courses, are similar to the first two courses in dimensions: approximately 0.42 × 1.17 m (c. 0.49 $m^2$). These blocks all have bevelled edges (Fig. 16), a feature that helps identify the chronological phase of both this and the fifth course, where bevelled edges are also visible despite being much eroded. It is not possible to define the general dimensions of the fifth course, as the only two remaining blocks are preserved in too fragmentary a condition.

### *Curtain east of P-T1*

The eastern curtain is preserved to a height of four complete courses of large rectangular blocks with convex faces that stand on bedrock. The curtain's maximum length is 9.38 m from the tower corner to the easternmost surveyed part. The curtain's maximum preserved height is 2.87 m. This portion of the curtain is more uniform in its construction and size of blocks than the western curtain.

Fig. 21. Peiraïki, P-T1, 'Sally port' (M.M. Nielsen 2006).

The general dimensions of the blocks are *c.* 0.47 × 1.30 m in height and width, with a range between 0.80 × 0.89 m and 0.50 × 1.85 m. One block in the top-most preserved course (the fourth course) is noticeably different from the rest of the blocks in the outer face of the curtain: it has a drafted edge *c.* 0.04 m wide on its eastern side that extends the full height of the block.

### *"Sally port" in east curtain*

A large opening *c.* 2.23 m wide (Fig. 21) is pre-

Fig. 22. Peiraïki, P-T1, inner lining with blocks in tower fill, south face (M.M. Nielsen 2006).

served *c.* 3.45 m from the west corner of the east curtain. The opening was intentionally constructed and extends the entire width of the curtain. Blocks are preserved so as to reveal that there was a stepped passage present which sloped upwards and inwards from the curtain's outer face. It is not possible to delineate any steps on the inner face of the curtain where the blocks from the sides of the passage running north–south integrate with the blocks of the wall.

The lower sally port "steps" are heavily eroded, making it difficult to determine their run and rise (Fig. 21). The dimensions of the topmost preserved blocks on the eastern side wall of the sally port passage are similar to the blocks in the curtain, roughly 0.44 × 1.07 m. The three blocks on the top of the west side wall of the passage all have drafted edges *c.* 0.05 m wide on three sides (their ends and bottom). Those blocks in the course immediately underneath appear to extend almost the complete width of the curtain, although it was not possible to obtain their complete lengths due to the presence of soil and other blocks. The dimensions of the two visible blocks are *c.* 1.49 × 0.42 m (eastern side) and *c.* 1.95 × 0.24 m (western side).

Fig. 23. Peiraïki, P-T1, west face and inner lining with blocks in tower fill (M.M. Nielsen 2006).

## P-T1, tower fill (Fig. 22)

The tower has been heavily eroded, and its fill, if original, is visible particularly on the south side. The fill is comprised of an inner fill composed of roughly-worked, irregularly-shaped and roughly rectangular stones of varying sizes. These appear to be arranged in fairly rough courses. The approximate measurements are 0.50 m (L) × 0.30 m (W) × 0.30 m (H).

The blocks are set in a reddish-brown compact soil that seems to be an original deposition. However, excavation is required to verify this assumption. This fill is set within and enclosed by what seems to be a second inner lining of blocks similar to those of the face of the tower and curtains. These blocks, however, are well preserved only on the western side of the tower. The blocks are slightly shorter in height than those of the face of the tower (between 0.33 and 0.37 m high) but similar in length to these (between 0.95 and 1.20 m long). The discrepancy in height is probably due to erosion, as all the blocks otherwise have smoothed surfaces and are placed in similar fashion to the outer face (Fig. 23). It seems that a similar inner feature had originally lined the eastern side of the tower, but erosion and weathering has affected its preservation.

P-T1 (Fig. 24) is preserved on its western side to a height of four courses, with two complete courses running on all three sides. The blocks of the tower are large, rectangular and roughly worked with convex surfaces. They are fairly uniform in size, with dimensions *c.* 1.24 × 0.51 m; however, the length of the blocks does vary considerably (between *c.* 0.95 m to 1.62).

The ground plan of the tower shows a slightly trapezoidal shape, widest at its front face, but decreasing with height. The south face of the second course is *c.* 6.29 m wide; at the bedrock foun-

Fig. 24. Peiraïki, P-T1, tower, front, south face (M.M. Nielsen 2006).

dation the width is 6.83 m. The northern or inner "side" is 6.26 m wide. As the bedrock slopes towards the south, it is not possible to compare the inner and outer width around the foundation. The western side of the tower is approx. 5.50 m long and the eastern side is *c.* 5.56 m long.

## Peiraïki, Tower P-T2, (Fig. 14)

### *General description*

The combined length of the three segments of the surveyed structure (the three sides of P-T2 and the two electronically-surveyed curtains east and west of the tower) is *c.* 29.35 m. The length of the inner face of the wall is *c.* 16.37 m. The maximum preserved height, from the lowest course at the face of the tower to the top of the uppermost preserved course (course 5), is *c.* 4.38 m. The maximum preserved depth of the wall is *c.* 4.36 m, obtained at the eastern end of the eastern curtain. The entire structure stands on bedrock which slopes down towards the coastline.

The ground plan of the tower shows a slightly trapezoidal shape, widest at its front face. This characteristic decreases with height. At the second course the south face is *c.* 6.55 m wide; at the bedrock foundation the width is 7.01 m. As the bedrock slopes towards the south, it is not possible to compare the inner and outer width around the foundation. On the "inner side", where the tower structure merges with the curtains, the width is 6.49 m at the third course (course number is counted from the front, southern face of tower). At the fifth course, the distance is only 6.37 m. As the tower structure is not preserved to more than three courses at the front, it is not possible to compare the inner and outer width around the tower. The tower is preserved on its western and eastern sides to a height of five courses; three are present on the front (south) face, with one complete course running on all three sides. The blocks of the tower are mostly large, rectangular and roughly worked limestone blocks with convex surfaces. However, the two upper courses, preserved only towards the north end close to the wall, contain blocks with a smoothed face and bevelled edges. Generally, the blocks are uniform in size, though considerably larger on the front (south) face, with dimensions *c.* 0.51 × 1.71 m (c. 0.87 $m^2$); on the eastern and western sides the blocks generally measure *c.* 0.45 m high and c.1.35-1.56 m long, with no variation in dimensions between the different structural phases.

The length of the eastern and western sides respectively is similar; the western side of the tower is *c.* 5.53 m long and the eastern side is *c.*

Fig. 25. Peiraïki, P-T2, east curtain (M.M. Nielsen 2006).

5.58 m long. Again this can only be estimated at the third course, due to sloping bedrock and the extent of the preserved parts of the tower.

### *Curtain west of P-T2*

The western curtain is preserved for a height of five courses above the bedrock. The blocks are rectangular, roughly worked and with convex surfaces. An additional sixth course is preserved on top of the inner segment of the curtain, but is no longer *in situ*. The maximum length of this curtain is *c.* 8.32 m, with a maximum height of *c.* 1.77 m. The dimensions of the blocks are *c.* 0.46 × 1.22 m (roughly 0.56 $m^2$). One block in the curtain has bevelled edges.

### *Curtain east of P-T2 (Fig. 25)*

The eastern curtain stands on bedrock and is preserved to a height of four complete courses of large rectangular blocks with roughly worked, convex faces.

The curtain's maximum length is 2.58 m from the tower corner to the eastern-most surveyed part. The curtain's maximum height is 1.49 m. This portion of the curtain is also uniform in its construction and size of blocks, though this is based on observation of only six blocks. The general dimensions of the blocks are *c.* 0.46 × 1.22 m (0.55 $m^2$).

### *Staircase east, inner face of P-T2 (Fig. 14)*

The staircase has not been fully surveyed, as this would require excavation. Five steps are preserved but severely eroded due to sewage water run-off from a nearby outlet. The staircase is preserved on its east-west axis for *c.* 1.94 m, and is *c.* 1.25 m


Fig. 26. 19th century photograph depicting the ancient coastal fortification in Peiraïki (From the archives of Deutsches Arkaeologisches Institut, ref DAIA Negativ No PIRAEUS 46).

Fig. 27. Peiraïki, P-T2, tower, east side.

wide and 0.92 m high (this latter measurement can probably be extended some 0.75 m more, as the bedrock's slope makes it higher on the inner face of the wall). A photograph from the archives of the German Archaeological Institute in Athens shows a similar staircase (Fig. 26). The picture shows two opposing set of stairs, probably reflecting in the Peiraïki a similar situation to P-T2 (Fig. 14) with stairs on both sides of the tower. At present in the Peiraïki, a corresponding set of stairs remains to be found on the inner face of the eastern part.

### *P-T2, tower fill*

This tower has also suffered from extensive erosion. The top soil here is dark brown, probably due to the sewage flow from an outlet opening directly onto the tower. The fill is set within and enclosed by what seems to be a second, inner lining of blocks similar to those of the face of the tower and curtains, and similar to that of Tower 1. However, apart from the lining of blocks along the outer blocks of the tower, another lining of blocks is preserved in the middle of the tower, on a roughly north-south orientation. This is probably related to the stabilisation of the tower and/or floor support structures. The complete course of these blocks, however, is not very well preserved, and the blocks are slightly shorter in height that those of the outer face of the tower. However, as they are largely covered by soil their full dimensions remain unknown.

## Conclusion and interpretation

The ancient coastal fortifications of the Piraeus are among the finest and best preserved defence structures in the Mediterranean, and the most prominent physical remains of the past in the modern city today. As a group, the preserved fortifications of the Peiraïki and Mikrolimano possess high integrity and represent a unique spectrum of military engineering techniques used by the Athenian polis in its coastal fortifications from at least the fourth century B.C., until the end of the Hellenistic period. As such, they are associated

with, and form part of, important developments within the Athenian polis as an evolving military power in the Mediterranean, and some of the most important historical events in Ancient Greece.

The study has so far defined at least three of the nine phases as outlined by Scranton:[12] the phase of Konon (Phase 6), that of Lykourgus (Phase 7) and finally one Macedonian phase (Phase 8) – as seen in the two towers along Akti Themistokleous (P-T1, Fig. 13; P-T2, Figs. 14, 27). It is still uncertain to which of the phases the upper part of the M-T1 belongs, but it is certain that it is a phase later than Konon's building programme in the fourth century B.C., due to the reuse of building blocks from Phase 6. The lower part and foundations of M-T2 and M-T3, probably belong to the first phases of harbour construction, and therefore possibly an even earlier phase than that of Konon (c. 395 B.C.), whereas that of M-T1 (Fig. 15) belongs to the Kononian or a later phase, because of its size.

[12] Scranton 1939, 301-2.

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