PAPERS AND MONOGRAPHS OF THE FINNISH INSTITUTE AT ATHENS VOL. XXII

THESPROTIA EXPEDITION III
LANDSCAPES OF NOMADISM AND SEDENTISM

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ISSN 1237-2684
ISBN 978-952-68500-0-9

Printed in Finland by Vammalan Kirjapaino

Cover: The Bronze Age site of Goutsoura seen from the south. Photo: Björn Forsén

Layout: Esko Tikkala

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The Walls of Elea: Some Thoughts Concerning their Typology and Date

Mikko Suha

Introduction

Elea is the primary Classical to Hellenistic settlement in the Kokytos valley. The site is located high on the western slopes of the Paramythia mountain range, above the modern village of Chrysaugi and some 4.5 km south-southeast of Paramythia. The settlement of Elea is surrounded by a massive fortification wall on its eastern side. Short stretches of walls can also be found in different places along the perimeter of the fortified area, although the builders of the city have utilized the cliffs to a great extent leaving most of the perimeter unwalled.

The aim of this article is to investigate the eastern walls, as they are the most formidable structures on site.[1] The southwestern gate and the short stretches of walls elsewhere along the perimeter are not considered here. This article concentrates purely on the structural details of the walls, utilizing them and the wall typologies to date the construction of the walls.[2]

In the 1930s N.G.L. Hammond documented the site, publishing his observations in the monograph *Epirus* in 1967. His description is a fairly short one, about one page. He refers to the site as Veliani after the old village which, by the time of his visit, was located just below the site. According to him the circuit is ca. 1800 m long, with an unusually strong fortification wall standing up to 5.7 m high, protecting the eastern side. The wall has two gates, 1.35 and 2.0 m wide. In the enceinte there are no towers but instead there are several right-angle recesses and changes of direction. There are short stretches of walls in the west and in the south and the main gate of the city is situated in the west. The plan of the town is sketchy, as is the drawing of the eastern gate. Of particular interest are the drawing of the lost threshold block of the Eastern Gate and the two photos of the site as it appeared in the 1930s.[3]

S.I. Dakaris described the site in 1971. According to him the perimeter of the site is 1550 m, encompassing an area of 10.5 hectares. The walls in the northeastern and eastern sides are massive, still standing up to 6-7 m high. The masonry of the walls is polygonal, with wall thickness varying between 0.8 to 3.5 m. In the northeastern side, on the inner side of the curtain there is an additional thickening in the lower part of the wall, built to facilitate sentry movement. In the northeastern corner there is a tower, and two gates pierce the curtain in the east and the north. The maps are more or less accurate.[4]

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[1] I wish to thank Björn Forsén for his support and guidance during the Thesprotia Expedition.

[2] The total station measurement and photographic documentation of the walls was conducted during June 2010. All illustrations and photographs used in this article are by the author.

[3] Hammond 1967, 71-72, plan 7 and plan 22, 3a-b, pls. Va and XXd.

[4] Dakaris 1971, 38, 97-98, figs. 43 and 44.

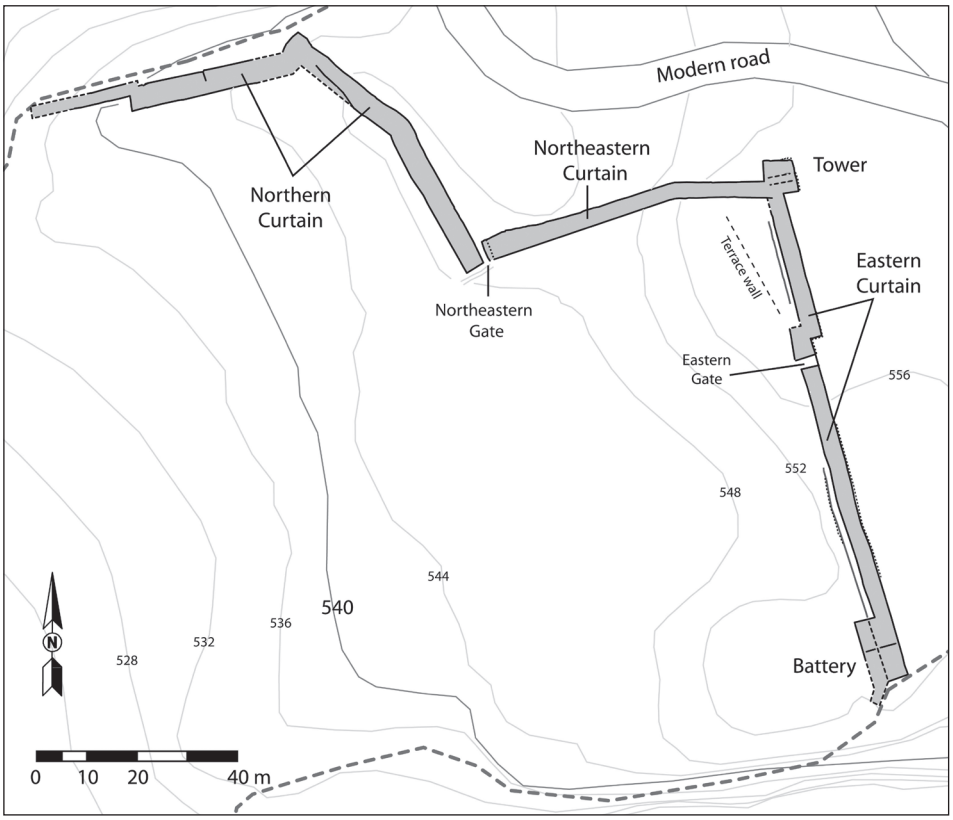

Fig. 1. The walls of Elea. The presumed course of walls, now lost, and structures embedded within the present fortifications have been drawn with dashed line.

In the 1980s, 1990s and 2000s the Greek Archaeological Service conducted cleaning operations within the city, which yielded considerable amounts of finds and revealed the plan of the city centre. The wall circuit was also cleaned, with the mass of tumbled blocks and some soil removed from the base of the walls and corner tower. The Northeastern Gate was cleared of fallen blocks, the broken lintel block of the Eastern Gate was repaired and additional lintel blocks were lifted into place to cover the gateway. Large amounts of finds were recovered from the excavations over the years. A guide book, written by Riginos and Lazaris, was published in 2007.[5]

Curtain walls

Elea is built on a large terrace jutting out westward from the Paramythia mountain range at an altitude of ca. 460-550 masl. The outcrop measures some 190-240 m north to south, by 500-550 m east to west. The terrace is connected to the mountains by a wide saddle at an elevation of 540-550 masl, and it is here where the main fortifications are situated,

[5] Riginos and Lazari 2007, 26-27.

Fig. 2. The battery, looking north. On the right is the outer face of the curtain, in the middle of the photo is the original inner face of the wall and on the left is the extension.

covering all the approaches from the mountainside (Fig. 1). The city centre, including the agora and most of the civic buildings, is located on a lower terrace at an altitude of around 500-520 masl, while the westernmost extremity of the city and its western gateway is located still lower, at 476 masl. The circumference of the site is ca. 1410 m, and the fortified city area covers some 10.5 ha.[6]

The eastern curtain wall starts from the southeastern corner, on the edge of the southern cliff where the first ca. 7 m of the curtain, now consisting of only the scantiest of remains, run in northeasterly direction. This area is almost completely destroyed and covered by thick vegetation, which, by obscuring the edge of the cliff, makes the area quite perilous. The wall then turns towards east-northeast for 4.6 m, reaching a corner where it turns 90 degrees towards north-northeast, running on clear ground.

The first clearly visible stretch of the wall constitutes a large reverse battery, 7.4 m thick by 13.2 m wide, built on the inside of the wall.[7] Originally there was no battery here, only the normal 4.6 m thick curtain wall, as indicated by the fact that the inner face of the curtain wall can still be seen running across the bastion lengthwise (Fig. 2). At some stage a 2.8-meter addition was built on the inside, turning the southern end of curtain wall into a formidable battery. The battery stands on a hillock, thus the preserved height of the wall is only ca. 2 m.

After the battery the curtain keeps its north-northeasterly direction for another 51.3 m until it meets the Eastern Gate. This curtain is in relatively good condition, up

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[6] Hammond and Dakaris have slightly different measurements for the circumference, 1800 and 1550 m respectively. The fortified area is based on Dakaris 1971, 38. Riginos and Lazaris 2007, 25, 115 use the same value.

[7] Dakaris 1971, 98 considered this structure as being some sort of housing for the garrison guarding the walls.

Fig. 3. General view of the southern part of the eastern curtain wall as seen from the outside. View towards the southwest.

to 4-5 meters high (Fig. 3). While the outer face of the wall has been built on relatively level ground, the inner face traverses highly uneven terrain. The landscape first descends steeply from the southern hillock to a relatively deep valley ca. 13 m wide, before ascending another hill, upon which the gateway and the northern half of the curtain has been built. Thus the inner face of the curtain spanning the valley is much higher than the outer face, ca. 7 m versus ca. 5 m (Fig. 4). This curtain is also extremely thick: The flat-topped foundation spans the lowest part of the valley at ca. 552 masl, roughly three meters lower than the similarly flat topped foundation of the outer face. On both sides the footing protrudes some 10-20 cm from the wall. The wall thickness at the foundation level is 4.85-4.93 m, while the following "middle layer" with a notably uneven top is ca. 4.6 m thick.[8]

It would seem that the builders have, upon reaching this point in construction,[9] decided to reduce the thickness of the topmost section to ca. 3.1 m throughout the eastern curtain (Fig. 4). At least one cross-wall is discernible, running across the upper section approximately half way between the battery and the gate. Another cross-wall is built in the center of the battery, across both the curtain *and* the additional structure. As all the

[8] According to Hammond 1967, 716 and pl. XXd there were two staircases along this curtain, one close to the bastion and another closer to the Eastern Gate. I do not share this view. The first staircase can be explained by the shape of the "middle layer", rising close to the battery. The shape of the wall here does resemble a staircase, but the slope is just too gentle to be one. Besides, if this was a staircase, why would the path leading to it be so uneven? (See Fig. 5). The other "staircase" could not be verified either. The ruins are slightly different today when compared to Hammond's photo from the 1930s.

[9] Dakaris 1971, 98 considered the entire lower part of the curtain to be an "additional structure" along the inside of the curtain, i.e. something built later into the existing wall. He explained this feature as being a walkway for the sentries, leading to the housing unit built on top of the battery. Why would the sentries have patrolled in such a position, with the upper part of the wall, ca. 3 m high and 3 m thick, blocking the view outside?

Fig. 4. The differing thicknesses of the eastern curtain. In the background is the battery. Looking southeast.

curtains are covered by fallen blocks and vegetation, finding more cross-walls proved impossible.

After the Eastern Gate, 2.1 m wide, the wall continues for another 3.3 m until there is a right angle bend, or *jog*, in the wall.[10] The bend juts out some 2.3 m, giving flanking protection to the gateway. The curtain on the northern side of the gate is 4.2 m thick, reducing to 3.8 m as it reaches the projection. Close to the jog the inner facing of the wall has been so destroyed that it is difficult to say anything certain of the wall thickness.

After the jog, the wall continues its original course for a further 29.5 m until it reaches the corner tower. Again, the outer face traverses on practically level ground, while the inner face has been built on a rise. Close to the Eastern gate the ground first rises but descends again slightly towards the north. This curtain retains the two level design, the thickness of the lower part being 4.28-4.52 m while the thickness of the upper one varies between 3.24-3.52 m. Outside the curtain, approximately half way across, there is a huge boulder which seems to have rolled down the mountainside, coming to rest just short of the wall. This rock fall has clearly taken place at some stage well after the curtain was built, as the original builders would certainly have tried to utilize the boulder in the construction of the wall; they would not have left such a dangerous obstruction in front of the fortifications.

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[10] A jog in this context describes a short stretch of protruding wall, or *flank*, situated at right angles between two longer *faces* of the wall. Quoting Lawrence 1979, 349: "…straight outward faces, placed aslant, would be joined by shorter straight returns – *jogs* in archaeological parlance." Especially Winter 1971 uses the term frequently. See Winter 1971, 102, fig. 78, 109, 122; Lawrence 1979, 349-355, fig. 83.

Fig. 5. The northeastern curtain and the tower, seen on the left. View towards the south.

From the tower, the wall runs in a westerly direction for 17.9 m after which there is a slight change of direction towards west-southwest for another 40.2 m. The eastern half of this northeastern curtain is in good shape, in places still reaching up to 6 m, but as the wall runs west it is less well preserved, attaining a height of some 1.5-2 m (Fig. 5). The western end of the curtain was, until a few years ago, covered by a huge mass of tumbled blocks, since removed. After the loose blocks were removed, the outer face of the wall has bulged outwards, resulting in an irregular appearance in plan (Fig.1).

This curtain wall is different from the eastern one in that it consists of only one layer of fairly uniform thickness throughout. At the eastern end the curtain is some 3.15-3.53 m thick, but after the bend it gradually broadens towards the west, so that by the time it reaches the Northeastern Gate, the width of the wall is 4.24 m.[11] The curtain ends at the Northeastern Gate, 1.2 m wide, which, until a few years ago was completely covered by fallen blocks.

The northern curtain wall begins at the Northeastern Gate, running north-northeast for 31.8 m, then reaching a slight bend, after which it runs northeast for a further 28.9 m. This whole wall has been badly damaged rising only to a height of a couple of metres, bulging outwards and obscured by tumbled blocks. The fallen blocks cover most of the inside of the curtain, while on the outside they have been removed to reveal the line of the wall. The thickness of the wall, when possible to measure, varies between 3.99 at the southern end and 4.50 m at the bend. Close to the northern cliff the wall has almost disappeared. In addition, the modern pathway, leading the visitors from the city area to the area outside the wall, runs over the area, obscuring the remains. Judging by the scant remains, there seems to have been a salient in this corner, guarding the most vulnerable edge of the saddle.[12] After the salient the curtain turns to follow the edge of the cliff, although the first 6-12 m stretch of the wall has vanished.

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[11] When I measured the width in July 2010, the actual width of the wall along its top was 4.64 m. When the gate and its adjacent area were cleared of fallen blocks in 2006, the pressure of the fill had begun to push the wall blocks outwards. Today the large block forming the corner of the curtain and the gate leans outwards for ca. 40 cm. It has cracked in half and the pieces are supported by wooden props. The lower part of the block shows the original width of the wall, ca. 4.24 m.

[12] Dakaris 1971, 98 considered this area as forming a second tower. I, on the other hand, see this as a salient, a protruding, chevron-shaped stretch of wall.

The final, very badly preserved sector of the curtain runs along the northern cliff face for some 49 m. The whole curtain is so completely covered by a mass of fallen blocks that nothing clear can be said about it. There is a small jog in the wall approximately half way across, more distinctive along the inner face of the curtain than on the outside. The jog also defines a clear reduction in the thickness of the northern curtain: For the first 32 m or so the wall is clearly 4.6 m thick, whereas after the projection it is reduced to a mere 2.6 m.

Despite the relatively good condition of the walls, especially along the eastern curtain, no remains of the structures situated on top of the curtains are visible anywhere. In a typical fortification wall, upon the curtain there was a *parodos*, the wall-walk where the guards patrolled. The outside edge of the parodos was protected by the breastworks or *parapet*, ca. 0.5-0.6 m thick. If built of stone, such a wall thickness was obtainable by a single row of blocks.[13] It is also possible that the parapet was built of sun-dried mud brick. That could explain the relatively small volume of fallen blocks seen on site, especially near the eastern curtain.[14] Using that estimate, the width of the wall-walk in Elea would have been ca. 2.6-3.5 m, and even in the last, thin stretch of curtain the width would have been ca. 1.9-2.1 m. In all cases the width would have been sufficient for two patrolling guards wearing their full kit to pass each other unhindered.[15] The parapet was either crenellated or it consisted of a continuous screen wall. A crenellated wall is the classical sawtooth trace where higher *merlons* alternate with low *embrasures*, providing cover and field of fire for the defenders. A screen wall or *epalxis* was a level-topped wall, pierced at intervals by arrow slits or larger apertures.[16]

Today the eastern curtain is, on average, 4-4.5 m high, while the northeastern curtain attains a maximum height of some 6 m. Due to the careful construction of the exterior face as opposed to the less careful jointing in the inner, the blocks of the external face are more likely to have remained in place, resulting in an uneven appearance. However, the top blocks presently standing on the outside edge were meant to be incorporated into the wall and not to be seen, as the backs of the blocks were left very rough and irregular throughout the enceinte. To demonstrate, the Eastern Gate is spanned by a massive lintel block[17] on top of which the outer skin of the curtain, still standing approximately 1 m high, is built (Fig. 9). The blocks standing on top of the lintel are carefully fashioned on the exterior face, with narrow, careful seams throughout, whereas on the other side the blocks are rough and the joints are wide. The curtains were clearly built to a slightly greater height than that which is visible today.[18]

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[13] Lawrence 1979, 357.

[14] M. Maher studied the walls of 19 Arcadian *poleis* for his dissertation, all of which employed mudbrick in some form. Most had stone socles of varying heights, upon which a mudbrick curtain wall and parapets were built, but two had stone curtains up to the level of wall-walks, topped by mud brick parapets. The stone curtains in Alea reached over four meters, while in Phigaleia the height of the stone curtains was some 6-10 m. See Maher 2012, 63-65, 115-116, 351.

[15] Winter 1971, 127 stated that a width of ca. 1.75 m would be sufficient for such a purpose.

[16] Winter 1971, 140.

[17] See note 21 on the present state of the gate corridor.

[18] See for instance the northeastern, eastern and southeastern posterns in Kydna in Lycia, (Adam 1982, 132-135, figs. 85-87). The curtain rises up to three meters above the lintels of the posterns. On the other hand, in the main gate the parodos is built only ca. 50 cm above the lintel block, some 4.5 m from the ground. The height and width of the main gate are almost identical to the one in Elea. See Adam 1982, 129-130, fig. 83.

We may assume that the eastern curtain was built perhaps two courses or ca. 1 m higher than the remains visible today, reaching the height of ca. 5-5.5 m – some ten or eleven cubits. Either a stone or a mud brick parapet, now lost, crowned the walls.[19] It is impossible to say whether the breastworks were crenellated or consisted of *epalxeis*, but it is still safe to assume that in either case they would have added another 2-2.5 m to the total height of the walls.[20] Using the same estimates, the northeastern and at least the first stretch of the northern curtain would also have attained a total height of ca. 7-8 m. Perhaps, after the salient, on the edge of the precipitous northern cliff, the curtain did not need to be built as high. At least the last 20 m stretch, with a very thin wall, could have been much lower.

Gates

There are three gates in the enceinte of Elea. The first is placed within the eastern curtain and another is situated at the junction of the northeastern and northern curtains. The main gate was built in the western side of the settlement, utilizing a natural crevice in the bedrock.[21]

Of the two gateways built into the walls, the Eastern Gate is the best preserved one (Fig. 6). This gate is a simple axial opening across the wall, with three large lintel blocks covering the 2.1 m wide corridor.[22] On the southern side of the corridor the curtain is 3.5 m thick, while on the northern side its thickness is 4.2 m.[23] For the first ca. 2 m of the corridor, the floor was built approximately half a meter higher than the ground level both inside and outside, as indicated by the blocks still in situ. The blocks are of varying size, and the whole "threshold area" is thus uneven.[24] The gate was most likely placed on the outer edge of the corridor.[25] However, this is impossible to verify today, as none of the blocks present have any traces of pivots or bolt holes or indeed any traces connected with the gate itself.

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[19] In Elea plentiful water and clay for the bricks were easily obtainable, which makes the existence of a mud brick parapet a distinct possibility. The estimated height of the Elean curtains fall between the estimated height of the curtain of Alea (over 4 m) and the minimum height of the curtain at Phigaleia (6 m).

[20] Hammond 1967, 715 was of the opinion that in Epirus, where the rain and frost are a constant threat to walls built in this manner, the tops of all the fortification walls had to be covered by roofs to keep the filling of the wall dry. If that is the case, a screen wall would have been a more obvious choice.

[21] As this article deals with the eastern walls, I will not discuss this gate, however. See Hammond 1967, 71-72; Dakaris 1971, 97 and Riginos and Lazari 2007, 33-34 for more information on the gate.

[22] The first block had at one stage cracked, but remained in place. Hammond 1967, 72, pl. Va describe this situation. In the same photo another lintel block is also visible above the gate. Later the crack in the first block had become worse and a steel frame was added for support. In 2006 the first block and its steel frame were visible but no other lintel blocks were in place. By 2007 the cracked block had been repaired, two other lintel blocks lifted next to it to cover the corridor further and the whole roof was consolidated by concrete.

[23] A gate with practically the same dimensions can be found in Gitana, some 29 km to the east-northeast of Elea. It is a side gate, number 2. See Kanta-Kitsou 2008, 30.

[24] The main gate at Kydna in Lycia has a similar, fairly high threshold or step, although there it consists of only one carefully shaped block. The height and width of the gate are identical to the one considered here. See Adam 1982, 130, fig. 83. Another site with a similar step or threshold, 60 cm high, but consisting of several rough blocks, can be found in Kalivo near Butrint in Albania. See Crowson 2005, 54; fig. 5.10

[25] Hammond 1967, 715. I also share this view.

Fig. 6. The Eastern Gate seen from the outside, looking west. The monolithic threshold block, now disappeared, sat on top of the blocks, just behind the modern steps.

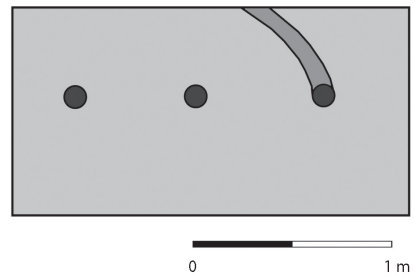

Fig. 7. The threshold block. After Hammond 1967, pl. 22, 3b.

Hammond made a sketch of the gate and, most importantly, of the large monolithic threshold block therein.[26] This block has since disappeared, but Hammond's sketch of the block helps in recreating what the gate originally looked like (Fig. 7). The threshold block sat on top of the uneven blocks described earlier. Its top would have sat slightly higher than the tops of the adjacent blocks on either side of the opening. If this was the case, the height of the corridor would have been around 2.5 m. Such an opening would usually have been covered by a two-leaved, inward-opening gate, with both leaves ca. 1 m wide, but in this case the drawing offers clues to a different arrangement (Fig. 7).

The first hole, on the left hand side, would have been the pivot hole on which the one-leaved gate turned, and the second a locking hole in the middle of the gate. The third one, with the curved groove leading away from it, was connected with the outer edge of the gate. A gate this large would no doubt have been quite heavy, and thus it seems that its outer edge was supported by a knob, which moved along the groove. The groove also indicates that the gate would have opened inwards. There are no traces of matching

[26] Hammond 1967, pl. 22, 3a describes the dimensions of this gate, which, at the time of his visit, seems indeed to have had a massive monolithic threshold block, described in pl. 22, 3b. The block has since vanished.

Fig. 8. The Northeastern Gate seen from the outside, looking south. The huge original corner block of the gateway is visible in the left-hand corner. The measuring stick rests on the later structure, built to reduce the width of the corridor.

holes in the lower edge of the lintel block, but this comes as no surprise as the block was cracked. The pivot and the bolt holes would have been situated in the area which has recently been repaired with concrete.

The Northeastern Gate is situated at the junction of the northeastern and northern curtains, so that the northern wall would have protected all approaches to it. This gateway is interesting, as it seems to have been reduced to half its original size at some point (Fig. 8). Originally the opening was 2.2 m wide, as indicated by the huge, now cracked block situated on the eastern side of the gate. At some stage the width of the opening was reduced by one meter using relatively small, quadrangular blocks. The reduction was made by building directly on top of the original two-piece threshold block. Similarly to the Eastern Gate, the floor of the corridor was built slightly higher than the ground level. Again, no traces of bolts, jambs or pivot holes are visible in the threshold or in the adjacent walls. Thus it is impossible to say, whether the original gate was one- or two-leaved. Nevertheless, after the reduction the now ca. 1.2 m wide gate would most likely have been one-leaved.

After the reduction of its width, the gate corridor would have formed a trap for any enemies entering the gate. Advancing in a very confined space, ca. 1.2 by 4.8 m, would have been very difficult. On the inside, the foundation of a house cuts across the entrance, leaving only a very narrow alley, 0.95-1.0 m wide, between the house and the city wall. Thus, anyone entering would have been forced to turn into this extremely narrow five-

meter long alleyway after clearing the gate corridor, in order to advance further inside. It is likely that the reduction of the gate corridor and the building of the house are contemporaneous.

By reducing its width to half its original dimensions and building a house right next to it, the former gate was reduced to the role of a postern. No pack animals would have been able to clear the narrow corridors and ninety-degree turns, but a small team of soldiers would have been able to use it during a siege, to conduct sallies.

Flanking devices

A large corner tower, built of massive blocks, protects both the eastern and northeastern curtains. It is bonded to the adjoining curtains, which suggests that both the tower and the curtains were built contemporaneously.[27] The tower is somewhat irregular, slightly trapezoidal in shape: it protrudes 3.1 m from the eastern curtain and 4.1 m from the northern. The eastern face is ca. 6.4 m wide, while the width of the northern face is 5.75 m, giving a total area of 36.8 m² (Fig. 9). The tower is solid, its base filled with compacted rubble and stones. It seems that there is at least one cross-wall, running from east to west across the filling. In its present condition this is, however, difficult to ascertain as there is a mass of rubble and vegetation blocking the view.

The tower is built on a level footing course which protrudes ca. 30 cm from the walls, especially near the southeastern and northeastern corners. In the northeastern corner the foundation extends up to 50 cm from the line of the walls.

There would have been a chamber on the wall-walk level. Probably another, similarly proportioned chamber could have been situated above that, bringing the total height of the tower to 8-12 m, depending on the shape of the roof and the height of the

Fig. 9. The tower, looking southwest.

[27] Lawrence 1979, 221 on bonding.

Fig. 10. The jog protecting the Eastern Gate, indicated by the flight of steps on the foreground. View towards the north.

chamber(s). However, as the tower is in such a bad condition it is impossible to say whether that was indeed the case.

If we assume that the walls of the chamber were of roughly the same thickness as a typical parapet, ca. 0.5-0.6 m, the area within the chamber would have been some 23.7-25.65 m². Only the smallest of defensive catapults could be housed within such a small chamber, up to three one-cubit machines or two three-span arrow-shooters.[28]

If, on the other hand, the walls of the tower chamber were ca. 1-1.1 m thick as in the tower of Agios Donatos,[29] the size of the chamber would have been even smaller, some 16-16.5 m². In that case the chamber could only have housed up to three or, more likely, only two one-cubit catapults. Of course, it is entirely possible that no artillery whatsoever was used here.

Some 3 m north of the Eastern Gate the curtain makes a right angle turn, protruding some 2.3 m; this jog is built to protect the gate (Fig. 10). Flanking fire could thus be directed to the unshielded right side of the enemy approaching it.[30]

The reverse battery in the southeastern corner can be considered here, although it does not offer any flanking protection to the walls. The battery was built on the inside of the curtain by thickening the existing 4.6 m thick curtain with an additional platform measuring 2.8 by 13.2 m.[31] The masonry of the addition, which is clearly not bonded to the original curtain, appears to be different, much coarser. The whole structure is based on a small hillock, reducing the need for building high walls. A cross-wall is built across both the curtain as well as the addition at ca. 6 m from the start, halfway across the battery.

The reason for building such a battery here was to offer protection to the southern part of the saddle and the whole southeastern sector in general. A great number of defensive artillery pieces could be housed within, if the battery was roofed.

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[28] Bakhuizen 1992, 159. A one-cubit catapult shot bolts 46 cm long, while the machine itself was 1.54 m long by 0.87 m wide. The bolts of a three-span machine were 69 cm long, while the size of the catapult was 2.32 by 1.31 m.

[29] Suha 2009, 123.

[30] Such a layout of gate and flanking protection is typical. Lawrence 1979, 304; Winter 1971, 210.

[31] In Arcadian Gortys there are two reverse bastions built in the inside of the northwestern curtain, one adjacent to the Gate A, and the other between Posterns 1 and 2. Unfortunately, nothing much is said about them. The one adjacent to the gate is described only shortly, mentioning that it is 5.7 m thick. Nothing is said of the other, but it is visible on the map. See Martin 1947, 99, 101, n. 4.

If the battery was open to the rear, with three walls the thickness of the parapet, some 0.5-0.6 m, the area inside would have been some 12 x 7m, amounting to 90 m². Using Bakhuizen's estimates on catapult sizes, such a chamber could have housed up to four ten-mina stone-throwers[32] or three four-cubit arrow-shooters.[33]

If, on the other hand, there was also a similarly proportioned back wall in the battery, the area would have been some 12 x 6.5 m, or 78 m². Such a chamber could have housed up to four three-cubit arrow-shooters.[34] The weight and recoil of any such machines would not have been a problem in such a massive, solid construction, as even the largest, ten-mina machines would only have weighed around 813 kg.[35]

As seen, the walls utilize only the slightest of enfilading: The jog controls a face of ca. 70 m of straight curtain, while the tower, forming a second projection, controls another 30 m of straight curtain. The northeastern wall is protected by the tower for ca. 18 m, until there is a bend in the wall. From there on, the northern curtain offers flanking protection, and conversely receives it from the northeastern curtain and the tower. On the edge of the northern cliff there probably used to be a protruding salient in the northeastern corner and a fairly shallow jog, protruding only ca. 1 m, halfway across the curtain. Here the placement of the jog was probably dictated by the natural contours on site.

The large reverse battery in the southeastern corner, built inside the curtain, gave no enfilading protection although the artillery based in it could have protected the eastern side. The area immediately below the battery would nevertheless have been a dead zone; the enemy reaching it would have been safe from artillery attacks as the machines within could not have been pointed low enough. Archers would have been able to give flanking protection to the area if they were stationed at the jog next to the gate. On the other hand, only a couple of archers would have fitted into the 2.3 m wide projection, and it would have blocked the catapults in the tower from reaching the area immediately in front of the battery and the gate.

Masonry

The style of masonry is polygonal[36] throughout the enceinte, but the finishing of the blocks and the execution of the joints differs radically in different areas. The masonry in the outside face has four main styles, while on the inside face only one or two masonry styles are present, depending on the location.

The first style in the outside face of the eastern curtain is present in the southernmost few meters, around the battery on the hillock. The blocks used are mostly small (ca. 0.3 x 0.5, 0.6 x 0.4 m) but the lowest masonry courses consist of large blocks (ca. 0.8 m high by

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[32] Bakhuizen 1992, 159, tables. A ten-mina engine would have used a stone shot with a caliber of 4.37 kg. Such an engine would have been 6.37 m long by 3.18 m wide.

[33] Bakhuizen 1992, 159, tables. The length of the arrow would have been some 1.85 m, and the size of the engine would have been 6.18 by 3.5 m.

[34] Bakhuizen 1992, 159, tables. A three-cubit bolt would have been 1.39 m long and the catapult itself would have been 4.39 m long by 2.62 m wide.

[35] Bakhuizen 1992, 159, tables.

[36] Polygonal meaning that the blocks have more than four non-parallel sides in their facing, meeting at an acute angle. On terminology see Scranton 1941, 16-17, 45

Fig. 11. The masonry in the southern end of the eastern curtain, on the left, is coarser than the one found in the following sectors. View towards the west.

Fig. 12. The masonry in the outer face of the eastern curtain. Note at the bottom the shallow footing course with a level top, the following large, tooled-faced masonry, above which is the neat, quarry- or hammer-faced polygonal masonry. The frequency of triangular plugs in the lower section is also noteworthy.

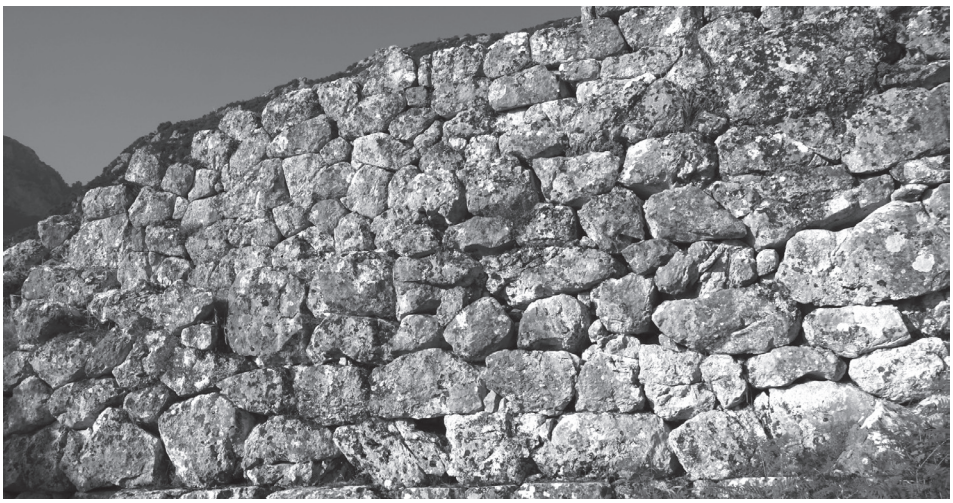

Fig. 13. The inner face of the same curtain. Note the protruding foundation with level top at the bottom, the rough appearance of the following section and the slightly more accurate finish in the thinner upper part.

1.0 m wide).The blocks have a rough appearance since the joints are very crude, leaving wide gaps around the blocks. The surface of the blocks is slightly smoothed, creating a so called tooled face[37] (Fig. 11). This kind of masonry slowly gives way to a different kind of masonry as the wall progresses toward the north.

As the wall descends the hill the masonry in the wall changes (Fig. 12). A flat topped foundation layer protruding ca. 0.2-0.3 m from the wall is built across the lowest sector of the fortifications, disappearing from view when the ground starts to rise close to the gateway. Built on top of the foundation layer is the thick lower part of the wall, ca. 2-3 m high. It consists of tooled faced blocks, predominantly oblong and somewhat more quadrangular than the masonry on the hillock. Some of the blocks have keying.[38] The size of blocks ranges from small (ca. 0.6 x 0.6, 0.3 x 0.7 m) to massive (ca. 0.9 x 1.2, 1.2 x 1.4 m). Due to the shape of the blocks, the horizontal joints can run straight for several meters. Most of the joints are gaping wide, but some of the straight joints can be relatively tight. The largest gaps in the seams are filled using small plug-stones. The plugs are usually located on the top of a masonry course, where they fill a hole between two irregular blocks. Most of the plugs are triangular in shape, standing on their apex between two blocks. Occasionally the plugs are quadrangular, but again they are placed on the upper part of the course (see Fig. 12). This kind of frequent use of plugs has several parallels in the Peloponnese.[39] Plugs are also present in the neighbouring fortress of Agios Donatos, in the internal walls of the tower and in the outside face of the curtain adjacent to the southeastern gate.[40]

The masonry in the upper part of the wall is very different: The blocks are more precisely cut, fairly similar in size, ranging between 0.7 x 0.6 and 0.4 x 0.5 m. The facing of the blocks is bulging, quarry or hammer face.[41] The joints are undulating and tight, adding to the strength of the structure: Straight joint lines would have been more vulnerable.

The masonry used on the inside face of the curtain is again different from that previously mentioned (Fig. 13). The thick lower part of the wall is built of large, slightly rounded, hammer faced blocks with loose, gaping joints, while the masonry of the upper part is similar to the outside face, although slightly coarser with loose joints.

The inside face of the battery consists of even rougher masonry, almost resembling dry rubble.[42] The blocks are rounded, bulging, quarry faced, while the joints are extremely loose, with large gaping holes between all the blocks. It almost seems that the stones used were just picked up from the ground in their natural state, without any fashioning (Fig.

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[37] Tooled face means that the facing of the block was cut smooth with a chisel. Scranton 1941, 21.

[38] Keying means cutting the block to a shape something like a capital L in order to anchor the walls against the direction of the slope. See Lawrence 1979, 238.

[39] Such use of plugs was noticed by Charneux and Ginouves 1956, 528, 532, 541. The sites in question are Paleokastro or Bouphagion and the fortress of Agios Nikolaos, all located in Arcadia. Lawrence 1979, 238 also took note of triangular plugs. Besides small plugs located on the top of the course, Lawrence noted that triangular stones the height of the masonry course could be used as well. In any case such stones always stood on their apex.

[40] On tower walls see Suha 2011, 206, fig. 4; on the curtain see Suha 2009, fig. 7.

[41] Quarry face being just unworked surface straight from the extraction of the block, or, if consciously roughened, the treatment could be called hammer faced. The distinction between the two is vague. Scranton 1941, 21.

[42] Dry rubble consists of unworked stones in their natural state, heaped loosely to form fences or field walls. Scranton 1941, 16-17, fig. 2.

Fig. 14. The inside face of the bastion. Note how extremely rough the masonry and the joints are, when compared to the adjacent curtain, visible on the left and in Fig. 13.

Fig. 15. The outer face of the northeastern curtain. The huge block mentioned in the text sits on top of the foundation, next to the jog. Note how different the masonry is in this area.

14). The masonry of the original inner face of the curtain was most likely the same which is still visible in the adjacent middle layer of the wall.

The masonry around and to the north of the Eastern Gate is notably different (Fig. 15). The curtain has a very distinct protruding, level topped foundation, a middle section consisting of peculiar masonry not found in other sectors, while the upper part again consists of similar neatly finished medium sized polygonal masonry as described previously.

The level topped footing course is again present, although now the height of the footing is around one meter, lowering gradually towards the north. The footing in this sector differs from the previous stretch of foundations in that it consists solely of large, quadrangular blocks. The blocks have a hammer faced, strongly bulging lower part, but with an up to 30 cm wide tooled band along their upper edges.

The following masonry course consists of ashlar-like blocks, with a practically uniform height of ca. 0.5 m. Above this course, the shape of the blocks is again polygonal, if rather rectangular in some cases. The blocks are large to massive in size (ca. 0.6 x 1.5-1.0 x 1.2 m), but one of the blocks is huge, ca. 2.0 x 2.0 m. This immense, nine-faceted

Fig. 16. The masonry used in the lower section of wall between the jog and the tower is very different. Large blocks have wide tooled margins, while the hammered central panel bulges very strongly. The footing course has a wide, smooth band along the upper edges of the blocks.

block forms the corner with the jog in the wall. All the blocks are neatly cut and the joints are tight. Most of the blocks used in the lower part of this sector are different from the ones used in the previous sector in that they have a very strongly bulging, hammer-faced rustication in the center of the block and up to 20-30 cm wide, tooled margins on all sides (Fig. 16). The central rustication can bulge outwards for up to ca. 15 cm.[43] Some tooled faced large blocks are still present, but they are a minority. The lintel block of the gate is tooled faced, low but very oblong (ca. 0.5 x 2.5 m), nearly quadrangular in shape. A few large holes in the masonry seem to have held blocks, now disappeared (Fig. 15).

While the lower part of this stretch of curtain differs from the previous one, the upper part of the wall has masonry similar to that elsewhere, consisting of medium sized, slightly bulging quarry- or hammer faced polygonal blocks with careful, tight joints. A short vertical groove is cut into the upper masonry approximately half way across.[44] The inside face of the curtain is similar to the previously described southern stretch, consisting of two different wall thicknesses but basically similar masonry.

The masonry of the tower (Fig. 9) is similar to the lower part of the previous sector. The blocks used are large to huge in size, coursed, and differing in appearance. On the

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[43] Similar masonry, although with much narrower margins and less protruding bossing, can be found in the southern sector in the enceinte of Arcadian Gortys. The blocks near the gate C have the same central bossing, albeit in greatly reduced scale. See Martin 1947, 106, fig. 12 and pl. XVI.

[44] Lawrence 1979, 242, 243 explains such grooves as having been used by the masons to check with a plumb line whether the wall was vertical during construction. In Epirus such grooves are especially abundant in fortification walls. Hammond 1967, 715 suggested that in Epirus such grooves were built for downpipes draining the moisture from the joints of the blocks, the freezing of which was liable to cause damage.

Fig. 17. The masonry styles in the eastern half of the northeastern curtain, looking south.

eastern face most of the blocks have tooled faces, while some are quarry- or hammer faced. In the center there is a peculiar block. The huge tooled-faced, rectangular block measures some 0.9 x 2.4 m, with a 10 cm wide, beveled edge on its underside while a 15 cm wide ledge, protruding some 5 cm is left on its upper edge. This block is unique, there are no parallels to it anywhere along the curtain. It seems as if it was meant to be used in a temple or some other monumental building, but ended up being used here. On the northern face, the lowest course has only tooled-faced blocks while most of the other blocks have a clear quarry-faced bulge. All the corners of the tower have clearly drafted margins, the width of the drafting being some 10 cm.

The lower part of the northeastern curtain has different kinds of masonry used in different areas, separated by the bend in the curtain. The eastern end consists predominantly of large, tooled faced blocks in the lower part. The masonry is polygonal, but the blocks are laid in such a way as to form straight courses. Occasionally there are blocks with a strongly bulging, hammered central rustication and tooled margins as in the previous sector, although here such blocks are again clearly a minority (Fig. 17). After the bend the masonry consists of large roundish, quarry faced blocks with less careful, gaping seams. Such masonry is slightly reminiscent of the one used in the beginning of the eastern curtain, at the battery. The following sector has only one type of masonry, that

Fig. 18. The masonry styles after the bend. Note how, in the center of the photo, the masonry of the upper part stretches almost down to ground level. The arrows indicate the presence of two of the three vertical grooves in this curtain. View towards the south.

of the upper part, stretching almost to the ground (Fig. 18). Close to the Northeastern Gate the masonry changes again. The huge block forming the corner of the curtain and the gateway has approximately 20 cm wide smooth margins all over, while the central panel with rustication is fairly shallow, almost tooled. The block has cracked and recently been supported by wooden beams.

The upper part of this curtain consists, again, of the same kind of masonry as elsewhere. Unlike in the lower part, the masonry of the upper part is similar on both sides of the bend. Halfway between the bend and the Northeastern Gate this masonry style is prevalent, stretching almost to the ground.

Fig. 19. The crooked groove cut into the bend of the northeastern curtain. The cuts are indicated by the dashed line.

There are three vertical grooves cut into the masonry in this curtain, one across the upper part of the wall at the bend, another stretching all the way to the ground in the middle of the following straight sector and a third, short one approximately two thirds across. The one in the bend of the curtain is peculiar in being very crooked, not even nearly vertical (Fig. 19). There is a slightly shallower cut on the eastern side of the groove, as if the masons may have tried to straighten it.[45]

Fig. 20. Masonry on the inside of the northeastern curtain. In the foreground is a terrace wall. View towards the north.

[45] This is very peculiar as such grooves are normally vertical, dead straight. No plumb line could be hung from such a crooked groove, and it is also far too crooked to hold a wooden downpipe. See previous note.

On the inner face of the northeastern curtain the masonry is similar to that in the previous sectors, although the blocks are slightly larger than previously (Fig. 20). The masonry style of the inner face of this curtain is similar throughout the wall, and the wall consists of only one thickness, unlike in the previous stretches. This masonry has a clear parallel at Agios Donatos, located some 5 km south of Elea.[46]

The whole of the northern curtain is badly preserved. The masonry consists of two styles, but the upper part is only preserved in one short stretch, close to the gate (Fig. 21). Large, tooled-faced blocks are used in the lower half, ca. 1.5 m high. The blocks are more regularly shaped than previously; many have an almost quadrangular shape. The joints are tight and fairly straight, due to the shape of the blocks. In the only preserved stretch where the wall still stands ca. 4 m high, the upper part is again built of smaller, bulging polygonal blocks with undulating joints. When removing the fallen blocks and other stones from the area, the restorers have used small stones to fill the gaps where the original masonry blocks have disappeared.

The bend of the northern curtain is defined by a smooth band cut into the blocks at the corner (Fig. 22). All of the original blocks have a tooled face, yet the drafting is visible as an even smoother surface some 5 cm wide, on both sides of the bend. There are no vertical grooves cut into the masonry in this curtain. This is probably because most of the upper masonry, with which the grooves are associated in all other sectors, has disappeared.

A flat topped footing course is again found in the last third of the curtain, north of the bend. The treatment of footing blocks here resembles the foundation to the north of the

Fig. 21. The best preserved stretch of the northern curtain, showing the masonry styles used. On the left, the Northeastern Gate is just visible. The restorers have filled the holes in the wall with small stones. View towards the southwest.

[46] The curved eastern curtain, just south of the tower of Agios Donatos has exactly matching masonry. See Suha 2009, 121, 128, fig. 5 left side.

Fig. 22. The bend in the northern curtain is visible in the center of the photo. Note the smooth band defining the corner, visible to the left of the stick. View towards the west.

Fig. 23. The curtain has a peculiar footing course, seen below the stick. All the blocks in the footing have a smooth band on their upper sides. View towards the southwest.

Eastern Gate, although in a greatly reduced scale. Here, despite the fact that the foundation blocks are oblong and very large, the smooth upper margin of the blocks is only ca. 5 cm wide and the whole footing only protrudes some 5 cm from the wall (Fig. 23).

The last few meters of the curtain have almost disappeared, but it seems that the few remaining blocks forming the salient in the northern corner are more rounded and bulging than any other blocks (Fig. 24). This might, of course, be due simply to the present condition of the salient, as only the largest and crudest blocks are left in place. The inside face of this curtain is not visible as it is still covered by fallen blocks, so no identification of the masonry there can be made. Likewise, the last stretch of curtain on the edge of the northern cliff is so badly destroyed and covered that nothing can be said of the masonry styles used, other than that the few visible blocks in the inside face are tooled-faced polygonal. On the external face the fallen blocks prevent us from making observations.

Fig. 24. The remains of the salient in the northeastern corner. The modern pathway over the curtain can be seen on the right. View towards the west.

Discussion

As seen, the masonry styles change constantly around the enceinte. Vertically, two very distinct styles can be discerned throughout, one on top of another. While the upper part has similar masonry everywhere, the lower part consists of several different masonry styles in different sectors. Such stylistic differences in horizontal plane can be explained by the use of several gangs of masons, working simultaneously. Each gang of masons had their own stretch of wall to build and, it seems, their own tastes as to finishing the blocks used in each respective sector.[47]

Dating any walls using purely stylistic means is difficult, and even more so when one tries to date a wall built entirely in polygonal masonry. In general, in the Greek world polygonal masonry was in vogue during the early Classical period (480-400 BC), but was later superseded by more regular rectangular masonry, *ashlar* and *trapezoidal*. In the Peloponnese "coursed polygonal" walls were again popular for a short period during the latter half of the fourth century, but as the time progressed, ashlar and trapezoidal masonry gained popularity.[48]

Hammond studied Epirote fortifications thoroughly and proposed a slightly different dating sequence for the walled sites in Epirus. Here many early, i.e. fifth and early fourth century, walls were built in trapezoidal or ashlar masonry, but later, during the late fourth and third centuries polygonal masonry became the preferred style.[49]

In 1971 Dakaris suggested a mid-fourth century date for the walls of Elea, based on the few coins found on site at the time. In addition to the finds, the dating was based mostly on the literary evidence. Pseudo-Skylax, an author of the 320s BC described the

[47] Lawrence 1979,234.
[48] Winter 1971, 81, 90; Lawrence 1979, 235.
[49] Hammond 1967, 711-716.

situation in Epirus by the 360s-350s: At that time the Thesprotians and Molossians "lived by villages", in other words no real cities were formed at the time-or at least they were not fortified.[50] More recently, Riginos and Lazaris share basically the similar view as Dakaris, although they suggest that the walls should be dated to the first half of the fourth century.[51]

Hammond, on the other hand, had a very different view as regards the dating of the walls of Elea in 1967. He classified the polygonal walls in Epirus according to the size of the blocks used. He attributed the walls built of medium sized polygonal masonry to ca. 280-230 BC. According to him, succeeding and partly overlapping with such masonry is the large or massive polygonal style, which he dated to the time of the Epirote League, between 230 and 167 BC. This was the most populous period in Epirote history, a time when the latest extensions to the large enceintes were built in large or massive polygonal masonry. Based on this, he saw the Elean fortifications as belonging to the latter period.[52]

Some recent research on fortifications can shed new light on the dating issue, and one helpful publication is the Danish Kephallenia survey of the early 2000s, with its typology of the fortifications of the island. The typology is problematic but it can be used with reservations. I will now apply their typology to the walls of Elea, and compare the styles with the nearby sites when possible. Other parallels are also considered, if available. First I will deal with the masonry styles in the lower portions of the walls starting with the outer face, running from south to north. I shall then consider the masonry styles of the inner face. Thirdly follows the analysis on the upper parts of the curtains, which seem to have a uniform style all over.

The masonry in the external face of the battery seems to be roughly similar to the rest of the southern part of the curtain, although of slightly different size. Thus I will consider both as one style here. The lowermost blocks are somewhat higher, more quadrangular, than the smaller, more oblong blocks laid on top. The joints are wide. I would like to compare such masonry with Randsborg's Type 13, although the description of the type is very short and vague. Based on only one parallel, at Delphi, the type is dated roughly to the fourth century.[53] This type is certainly the most problematic in Randsborg's typology, and thus not very trustworthy. A good parallel, although from far away, is at Cnidus in Asia Minor. The masonry of the curtain between Towers TT 5 and TT 6 is an exact match.[54]

The bulging blocks with the profound central rustication or bossing and extremely wide tooled margins, found to the north of the gate and in the eastern part of the northeastern curtain have no parallels in Randsborg's typology. A parallel can be found in the large enceinte of Arcadian Gortys, to the east of the southeastern gate C. However, in Gortys, the scale of the blocks, the width of the margins and the bulge of central rustication are

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[50] Dakaris 1971, 37-39, 99. The oldest finds were coins of Elea, dated ca. 360-340 BC. In addition he mentions a Kassopaian coin of 343-330 BC, a Kerkyraian and a Corinthian coin as well as one of Philip II, all dated to the fourth century. Ceramics and roof tiles were also dated to the fourth century.

[51] Riginos and Lazari 2007, 28.

[52] Hammond 1967, 660, 668.

[53] Randsborg 2002, 227, figs. IX, 27-28.

[54] McNicoll 1997, 55-58, pl. 28. Cf. the plate with Fig. 12. Although the prevalent style of the enceinte of Cnidus is ashlar, there are many stretches of angular polygonal masonry with small plug stones in the interstices. It is also worth noting that the eastern curtain, built in polygonal style, is immensely thick, 4.8 m as opposed to ashlar curtains varying between 1.4 and 2.8 m. The Cnidian wall was dated to ca. 330 BC.

considerably smaller. The walls in the southern part of the large enceinte of Gortys were dated to the first phase of fortification, to the early fourth century BC.[55] Besides Elea, I know of no other sites with such dramatically shaped blocks.

The masonry of the tower in Elea is unique, there are no other stretches with similar blocks. It could at best be compared to Randsborg's Type 17, although again the description of the type is rather vague and the photos of the walls of this type seem slightly contradictory to each other. Still, this type is the closest match for such masonry. The type is dated only loosely to the Classical period.[56]

The northern curtain wall is well built, the large tooled-faced blocks are longish, and the joints are tight. Such blocks are best compared with Type 16, dated vaguely to the period of ca. 300-275.[57] In Elea, such a date seems far too late, however.

Now the inside face, starting with the battery. It is built of rough, rubble-like material with extremely loose joints. A good parallel is Randsborg's Type 4. This type could not be dated accurately, only vaguely from the Archaic period onwards, down to the Late Classical or even Hellenistic periods (ca. 700 to the third century BC).[58] For this particular structure I would suggest a very late date, close to the end of the third century BC, as it was certainly added to the previously existing curtain.

The inside face of the eastern curtain can be compared with Randsborg's Type 7, which was dated roughly to the fourth century BC.[59] The northeastern curtain has masonry which is comparable to Type 8, dated to around 300 or the first quarter of the third century BC. Such masonry is also found in Agios Donatos, some 5 km south of Elea. There, the stretch of the curtain wall to the south of the tower especially is very similar to this stretch at Elea.[60]

Finally, the upper portions of all the walls, with medium sized, slightly bulging blocks and very carefully shaped joints are comparable with Randsborg's Type 11. According to Randsborg, this type is extremely common in Western Greece. He cites examples in Epirus, such as Kassope, Gitane and Rogoi. He dated the Type 11 walls to ca. 350-275, or even down to 200 BC.[61]

In addition to the, admittedly problematic, Kephallenian typology, other details in the walls might also help in dating them. There are a few clues as to the fairly early dating of the walls. Firstly, the fortifications utilize the natural contours of the site to a great extent, i.e., they tend to follow the highest ground available, even if that would result in a vast circuit which was never meant to be filled with housing. Such *Geländemauer*-type circuits were favoured until the early Hellenistic period when, due to constant warring,

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[55] Martin 1947, 106, 129, 138, fig. 12.

[56] Randsborg 2002, 231-232, fig. IX, 33-35. The best and the clearest parallel is the last, a drawing cited from a previous publication on Lycian Apollonia. Compare the drawing with Fig. 9.

[57] Randsborg 2002, 228-231, figs. IX, 31-33. The first photo is the best comparison.

[58] Randsborg 2002, 214, fig. IX, 8. Compare Randsborg's photo with Fig. 14.

[59] Randsborg 2002, 216, fig. IX, 12 and 13. Compare especially the latter one, depicting the Dema wall in Attica with Fig. 13.

[60] Randsborg 2002, 216-221, figs. IX, 14-17; Suha 2009, 127, fig. 5. Compare these photos with Fig. 20.

[61] Randsborg 2002, 222-227, figs. IX, 21-26. Compare especially Randsborg's figs. IX, 25-26 with Figs. 12 and 18. This kind of masonry seems indeed to be the most popular one in this part of Greece: In addition to the examples given by Randsborg, I have observed similar masonry at Paramythia, Agios Donatos, Polyneri (Koutsi), Dhimokastro and Kastritsa, to name a few.

shortages of manpower became ever increasing in walled cities throughout the Greek world. With diminished manpower, guarding extremely long walls became impossible.[62] Of course, in Elea the natural contours of the site are extremely favorable, so only very short stretches of built walls are required for defence, i.e. it should perhaps not be considered a *Geländemauer*-site.

Secondly, the southeastern stretch of the walls especially is built fairly close to the steeply rising mountainside. To the east of the walls the ground rises, first gradually but then fairly steeply, so that some 90 m east of the curtain the ground level is at 580 masl, some 30 m higher than the walls themselves. This might have been safe as long as the attackers had only hand-held bows, the range of which is approximately 75 m. But if the attackers had catapults, the normal range of which was some 200-300 m, the situation would have become very dangerous for the defenders.

Catapults were invented in Sicily in 399/398 BC. At first they were merely gigantic arrow-shooting crossbows. Such weapons were first and foremost anti-personnel devices, which could not harm stone walls. As the catapult was rapidly refined, it was first adapted to shoot stones, and later on its spring mechanism was renewed completely. The new torsion-spring catapults were considerably more powerful and could thus seriously damage the walls. By the 330s the first heavy torsion-powered stone-shooters were in use, first by the Macedonians, and they quickly spread across the Hellenistic world.[63]

Thirdly, the general impression of the walls is that the defensive strategy behind them is passive. The walls are straight, they traverse flat, easily approachable ground and only minimal flanking is employed. Only one small tower guards the corner of two long curtains, protruding only 3-4 m from the line of the curtains. Even if it indeed had two chambers, one on top of another, only a very limited amount of protective fire could have been directed in front of either curtain, even less so if there was only one chamber on the level of the parodos. In addition, only two small gates or posterns pierce the walls, which makes for extremely limited sallies in times of siege. No outworks outside the walls are built. The passive defensive strategy was favoured before the spread of siege equipment and, most importantly, artillery.[64]

Fourthly, the lower parts of the eastern and the northeastern curtain have fairly rough masonry with gaping, carelessly made joints. Thus they were not designed to withstand a determined assault using heavy siege equipment. Rams and catapult balls were a threat to wide seams. If a ram could break open such joints, it could then dislodge the adjacent blocks which would eventually result in a breach in the wall. Rams were invented in the Middle East fairly early on, but they were truly adopted into Greek warfare only around a decade before the Peloponnesian War, i.e., roughly in the 440s BC.[65]

Although the lower part of the eastern wall has careless, gaping joints it is also extremely thick, up to 4.6 m. Such a massive wall could withstand rams or bombardment quite well. Despite being rather uncommon, such thick walls were occasionally built.[66] In Gitana, some 29 km east-northeast from Elea, the polygonal northwestern wall covering

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[62] Winter 1971, 111-114.
[63] Marsden 1969, 43, 49-62.
[64] Winter 1971, 154.
[65] Winter 1971, 85-86, n. 44, 155-156.
[66] According to Winter 1971, 134-135 “the thickest walls are usually those of the mid-fourth century or later”.

the easiest approach to the city is some 4 m thick, while the thickness of walls on other sectors is ca. 2.5 m. The northwestern sector is further reinforced by six large towers. The settlement was founded and fortified around the mid-fourth century.[67]

In the enceinte of Cnidus in Asia Minor the most vulnerable sector, the eastern wall, is built of polygonal masonry. The wall is some 4.8 m thick, while the ashlar walls of the same enceinte are, on average, 2.5 m thick. It is also noteworthy that the thick eastern wall has reverse towers.[68] In Erythrae the northern curtain is some 3.5 m thick, whereas the thickness of the southwestern curtain is 4.8 m, changing into 5.2 m further east. The wall is straight, following the highest ground along the shortest possible course. Only two towers guard this sector.[69]

McNicoll dated both enceintes to approximately 330 BC. According to him such excessively thick walls were built during the fourth century by cities which had to finance the wall-construction themselves. The thick walls reappeared around the end of the third century due to the changes in defensive strategy.[70]

To counter the threat of ever developing siege equipment, the wall builders of the late Classical and early Hellenistic world refined the structure of walls. The joints were built tighter, more precise and the facing of blocks themselves was intentionally left rough, bulging. The bulge prevented the head of the ram or heavy catapult ball from breaking open the joint, by deflecting it before it could hit home. High bossing was preferred especially against the use of rams, which could hit the same spot repeatedly in quick succession.[71] This change of masonry is very clear in Elea, as the upper parts of all the curtains consist of precisely cut, bulging blocks with carefully shaped, tight joints. The new kind of masonry enabled the builders of the eastern wall to reduce the width of the curtain without sacrificing any of its stability. Such a masonry style is indeed prevalent in many Epirote fortresses, as observed by Randsborg.[72]

More details have to be used to get a better idea on dating. Small triangular and occasional quadrangular stone plugs are conspicuously common in the lower masonry of the eastern curtain, especially along its southern half. Parallels for such a widespread use of plugs are found in Arcadia. In the fortress of Agios Nikolaos the walls consist of polygonal masonry with frequent plugs. In addition, all the corners of the enceinte are drafted. Frequency of plugs was also noted in the fortress of Paleokastro/Bouphagion. Plugs, both triangular and quadrangular, are common in Gortys. The scholars who studied these Arcadian sites suggested that, at least in Arcadia, masonry with drafted corners and frequent use of plugs could be connected with the Macedonian occupation, that is, late fourth to the early third century.[73]

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[67] Kanta-Kitsou 2008: 29-31 on walls. On dating, Kanta-Kitsou 2008, 20, 22

[68] McNicoll 1997, 55-58, 72.

[69] McNicoll 1997, 65.

[70] McNicoll 1997, 72. If possible, the defenders had tried to follow the highest possible ground, no matter how large an enceinte became (see n. 59). As the siege equipment developed and as the constant warring drained the manpower over the course of the third century, the wall builders had to adapt to the new situation. The preference to always follow the high ground was abandoned and the size of the enceintes was reduced. Thick walls were necessary when the newly reduced walls crossed vulnerable sectors.

[71] Lawrence 1979, 240

[72] Randsborg 2002, 222, 224.

[73] Charneux and Ginouves 1956, 528-542; Martin 1947, 128-129, 144. According to Martin the large enceinte of Gortys was built during the early fourth century. During the early Hellenistic period the north-northeastern

Grooves cut into the masonry are found in the upper part of the eastern curtain, between the Eastern Gate and the tower. In the northeastern curtain there are three grooves, one of which is peculiarly crooked. All the corners of the tower are clearly drafted. In addition, where the northern curtain makes a slight bend, there is a shallow drafting ca. 5 cm wide on both sides of the bend. Drafting of the corners, both in towers and other turning points of walls seems to have become customary by the mid-fourth century.[74] Hammond, on the other hand held the view that the drafting only became common during the latter half of Pyrrhus' reign, i.e. during the 280s-270s.[75]

The battery in the southeastern corner was probably built in the last phase, as it is clearly added to the pre-existing curtain wall. The masonry is very crude and the addition lacks drafted margins. In the inside of the wall the large gaping joints posed no danger as the enemy had no access there.

The northern curtain is badly damaged despite being up to 4 m thick and built of large, well cut blocks. Today, most of the curtain is only 1.5 m high with only one short stretch being higher. Before the restoration, the blocks fallen from the wall were spread over a conspicuously wide area. Today the outer face is cleared of fallen blocks, whereas the inner face is not. The difference in condition between this and the eastern curtain, which is still standing up to 4.5-5 m high, is striking. Perhaps the Romans deliberately demolished it in 167 BC, to prevent any future military use of the enceinte, as was done in Orraon, modern Ammotopos, where the entire enceinte was completely destroyed.[76]

Conclusions

In Elea the builders of the wall started to build an excessively thick, massive polygonal wall some 4.5-5 m thick on the eastern side, using the stones quarried on site. The lie of the land, with level ground on the outside, hills and valleys on the inside, required thick and massive building to stabilize the lowest parts of the walls. Excessively thick walls could also withstand siege engines quite well. Contrary to Dakaris' suggestion, the thick lower part of the eastern wall is not an additional structure but originally built like this.

Different gangs of masons were responsible for their own stretches of the curtain as sub-contractors. Each gang had a different way of treating the blocks, and to add to the differences in style, the shape of the blocks themselves also affected the final outcome. The building seems to have progressed at varying speeds at different sectors.

Based on the plan of the walls, with minimum flanking protection, the presence of only one tower of modest size, the masonry of the walls and the parallels, the lower part of the walls can tentatively be dated to the late Classical period. I would like to date the walls to the latter half of the fourth century, perhaps around the 340s to 330s BC.

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wall was rebuilt completely, and the South Fort was built in the third century. More recently, Maher has suggested that the original plan of the site consisted of only one circuit, the southern extremity of which was the "South Fort". He saw only two building periods in Gortys, the original building period during the early fourth century and the Hellenistic repair of both the northeastern sector and the "South Fort", probably after 219 BC. According to him, both sectors were rebuilt following the original course of the walls. See Maher 2012, 487-489, 496, 498, fig. 7.29.

[74] Lawrence 1979, 241-243.

[75] Hammond 1967, 68.

[76] Hammond 1967, 155-156.

In the middle of the construction a new kind of masonry style was adopted. In the eastern curtain and the eastern half of the northeastern curtain the change took place when the builders had reached a height of some 2-3 m. In the middle of the northeastern curtain the work had barely begun before the change of masonry style, but closer to the Northeastern Gate the work had progressed slightly further. In the only preserved section of the northern curtain, close to the gate, it seems that the work had progressed approximately at the same rate as in the eastern curtain, reaching ca. 2 m above ground before the change of styles.

The masonry changed into a more regular one, with slightly bulging, quarry- or hammer-faced blocks and tight, well-cut joints forming an undulating web of joint lines. As the new masonry style was adopted, the thickness of the eastern wall could also be greatly reduced, from 4.6 to 3.1 m. The new kind of masonry could better withstand earthquakes, frequent in the area, despite the reduction of thickness. It was also most likely considerably cheaper to build than the previous, thick wall. However, the fundamental reason for changing the style lay in the rapid changes in siege warfare. The new kind of bulging, tight-jointed masonry could better withstand the besiegers' rams and, more importantly, catapult bombardment. As the heavy stone-throwers only became common during the late fourth to the early third century, I would suggest that the change of masonry took place around the last quarter of the fourth century BC.

The early Hellenistic period was the heyday of Epirus, especially during Pyrrhus' reign (297-272 BC). International trade, closeness to the sea and the stability of the whole area helped the local settlements to gain wealth and invest in fortification building. A couple of decades after Pyrrhus' death were still peaceful, but towards the end of the third century the neighbours of Epirus became ever more troublesome. The Illyrians conquered one of the greatest Epirote cities, Phoinike, in 230 BC. In the 220s both the Aetolians and the Illyrians conducted raids into Epirus, causing widespread destruction and even plundering Dodona in 219 BC.

As Elea was the major population center of the area, it would have been necessary to strengthen the defenses when faced with such turbulent times. Thus I would claim that the last update of the walls, adding a strong reverse battery to the vulnerable southeastern corner and the reduction of the Northeastern Gate to a mere postern, took place around the last quarter of the third century BC.

Bibliography

Adam 1982 = J.-P. Adam, *L'architecture militaire grecque*, Paris 1982.

Bakhuizen 1992 = S.C. Bakhuizen, *A Greek City of the Fourth Century B.C.*, Rome 1992.

Charneux and Ginouves 1956 = P. Charneux and R. Ginouves, 'Reconnaissances en Arcadie, fortifications de Paleocastro, Saint Nicolas et Hellenico', *BCH* 80 (1956), 522-546.

Crowson 2005 = A. Crowson, 'Excavations at Kalivo 2004', in I. L. Hansen, O.J. Gilkes and A. Crowson (eds.), *Kalivo and Çuka e Aitoit, Albania. Interim Report on Survey and Excavations 1928-2004* (http://www.pdfio.com/k-2050491.html**)**.

Dakaris 1972 = S. Dakaris, *Θεσπρωτία* (Ancient Greek Cities 15), Athens 1972.

Hammond 1967 = N.G.L. Hammond, *Epirus. The Geography, the Ancient Remains, the History and the Topography of Epirus and the Adjacent Areas*, Oxford 1967.

Kanta-Kitsou 2008 = E. Kanta-Kitsou, *Gitana Thesprotia. Archaeological Guide*, Athens 2008.

Lawrence 1979 = A.W. Lawrence, *Greek Aims in Fortification*, Oxford 1979.

Maher 2012 = M.P. Maher, *The Fortifications of Arcadian Poleis in the Classical and Hellenistic Periods*, unpubl. PhD-diss., University of British Columbia 2012 (available at: https://circle.ubc.ca/handle/2429/41537).

Marsden 1969 = E.W. Marsden, *Greek and Roman Artillery*, Oxford 1969.

Martin 1947 = R. Martin, 'Les enceintes de Gortys d'Arcadie', *BCH* 71-72 (1947), 81-147.

McNicoll 1997 = A.W. McNicoll, *Hellenistic Fortifications, from the Aegean to the Euphrates*, Oxford 1997.

Randsborg 2002 = K. Randsborg, *Kephallénia. Archaeology and History* (Acta Archaeologica 73:2), Copenhagen 2002.

Riginos and Lazari 2007 = G. Riginos and K. Lazari, *Ελέα Θεσπρωτίας. Αρχαιολογικός οδηγός του χώρου & της ευρύτερης περιοχής*, Athens 2007.

Scranton 1941 = R.L. Scranton, *Greek Walls*, Harvard 1941.

Suha 2009 = M. Suha, 'The Fortification Walls of Agios Donatos', in B. Forsén (ed.), *Thesprotia Expedition* I. *Towards a Regional History* (PMFIA XV), Helsinki 2009, 119-132.

Suha 2011 = M. Suha, 'Further Observations on the Hellenistic Fortifications in the Kokytos Valley', in B. Forsén and E. Tikkala (eds.), *Thesprotia Expedition* II. *Environment and Settlement Patterns* (PMFIA XVI), Helsinki 2011, 203-224.

Winter 1971 = F.E. Winter, *Greek Walls*, Toronto 1971.