

Ancient Halieis is an unusual archaeological site. It draws its name ("the salty places") from nearby sea-level flats that were used to dry salt, which it exported along with the valuable purple dye that came from the locally plentiful marine snail *Murex*. Unlike other ancient cities, with many layers of habitation, it had a clearly defined life, from its founding at about 700 to its abandonment at about 300 BCE. Although small, Halieis possessed all the features of the typical Greek polis—an acropolis, several sanctuaries (including one with two temples), a stadium for athletic contests, a necropolis, a harbor, and substantial fortifications. It presents us with a typical city of the Archaic and Classical periods when the Greeks were developing their unique form of political organization, secular and sacred architecture, and the classical tradition of art.

This volume presents the archaeological evidence for the development of the fortification system at Halieis, from simple earthwork defenses to massive walls with towers and gates. Halieis possessed an excellent natural harbor and thus became a target for attacks from other cities, including Sparta and Athens. The increasingly complex defenses are the city's response to this aggression and new developments in siege warfare. McAllister presents both an overall view, extensively illustrated, of the fortifications and a detailed analysis of the materials and methods of construction.

Contributions by other authors include Michael H. Jameson's study of the fortifications that are now submerged in the ancient harbor, James A. Dengate's study of the city mint located in a command post attached to the fortification wall, and Frederick A. Cooper's report on his engineering study to establish the elevations at the site.

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# The Excavations at Ancient Halieis

Volume 1

## The Fortifications and Adjacent Structures

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with contributions by

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## — CHAPTER THREE —

# The Towers and Gates

Towers both rectilinear in plan (here called square, although they are never exactly so) and curvilinear (part or full circle, called round) occur along the Halieis circuit wall. The square towers may not all be contemporary; the round ones, on the other hand, probably do belong to the same building program. The gates for which there is any measurable evidence are all associated with towers with the exception of the East Gate. Tower 16, which is square, is accompanied by a small gate. In their latest and now most recognizable form the main gate towers are round, but it seems probable that all had rectilinear predecessors, either towers or simple bastions. In theory the tower is subordinate to the gate, but because they are better defined and on the whole easier to comprehend, the towers take the lead here, beginning with those rectilinear in plan. Where appropriate, the discussion of any gate follows. To present the facts as directly as possible, both stages of the gates associated with the round towers are discussed together with the latter. The East Gate is discussed with the square towers with which its form has more in common. The gates that have no associated towers and the posterns come last.

The Halieis towers occur at the expected places (Fig. 19): at significant changes of direction in the trace, at intervals in long stretches between these points, and at the gates. The distances between towers are roughly 100 to 120 meters, except on the north side where some intervals are

<sup>1</sup> Lawrence gave the length of a bowshot as 30–35 m, somewhat less for the bolt-projectors used in the 4th century (1979, 381), but Martin (1947/1948, 99, note 1) put the average range of an arrow at 75–80 m. Winter (per lit.) gives the effective range as probably not more than 50–55 m. The small nontorsion catapults that became common before the middle of the 4th century are given a range of 200–300 m by Ober (1987, 570).

For the purposes of this volume, towers are considered to have had appreciable projection, whether inside the curtain or out, on the order of 2.50–5.00 m. After the earliest period, a

much less; Towers 12 and 13 are less than 40 meters apart. The bastions in the Northeast Wall are about 55 meters apart, and the interval between Towers 16 and 17 is only slightly more.<sup>1</sup>

The locations of the major gates follow the layout of the streets within the town and presumably also the roadways outside, although these cannot be so clearly demonstrated. Avenue B and Avenue C each end at a gateway in the Southeast Wall (Fig. 18). At the other end the former connects with Street 8, very likely also a major thoroughfare, at the main land gate; there the traces of the ancient roadway have been found offshore. Lawrence's observation (1979, 304) that Greek planners preferred to place gates "midway on a long, more or less straight, frontage" applies both to the East Gate and later to the Southeast Gate; his remark (1979, 303) that, if the traffic were equal on two routes, each would have a gate, describes the rationale for their coexistence.

### The Square Towers and Their Gates

These towers are of two basic types: some had hollow chambers at ground level (Towers 12, 13, 16, and quite possibly 17 and 18), while others were solidly filled (Towers 2, 5, 10, and 19, and the predecessors of Towers 6, 9, and 11). Those in the second group were probably all built of mud brick above a base of conglomerate orthostates, a common Greek type. The stone base followed the outline of the tower; any projection outward or,

hollow story at the walkway level sheltered sentries and defenders, who may have used the roof as a fighting platform. Bastions, on the other hand, projected only the minimum amount. They were designed to augment the fighting area at walkway level, whether at the East and Southeast Gates or along the Northeast Wall. Whatever shelter was provided may have been only of wood and reeds above the masonry parapet, since the space seems too limited for any but hand-held catapults. For the unequal projection of the towers in the Northwest Wall, see below, 32.

less often, inward interrupted the wythe of the curtain.<sup>2</sup> In its earliest form, such a tower rose no higher than the curtain, any tactical advantage being derived from its projection. If the walkway passed behind the tower (on the side toward the town), as at Towers 2–4, 12, and 13, a structure on the upper level need not have interrupted it.<sup>3</sup> Two-story towers, with a chamber at the upper level, were probably the general rule in the 5th century, owing to the obvious advantages in protecting men and equipment, as well as the value of the added height of the roof as a vantage point.<sup>4</sup> The access would have been from the walkway, often reached from a stair located near the tower; hollow towers with ground-floor access were a later, largely 4th-century development.<sup>5</sup> There is no evidence at Halieis as to whether any of the towers were continued above the walkway, either in mud brick or some sort of half-timbered construction, but the use of such an upper story was common practice by the 5th century (Winter 1971, 153–54). Whether the walls of the hollow towers were carried at least as far as the walkway in stone cannot be demonstrated; the level top of the stone base course in Towers 12 and 13 and the lack of any masonry tumble in their vicinity suggest that the upper walls were of mud brick.

### Tower 1 (Fig. 1)

Southward from the shore of the harbor at the northwest corner of the trace, there is a small knob at the top of the first steep rise, now largely bald bedrock at the edges but crowned with a few shrubs and pine trees. The commanding position overlooking the harbor entrance, as well as the moderate change in the direction of the trace at this point, suggests a logical place for a tower. The Admiralty chart (Pl. 1), which is difficult to interpret in detail, seems to show a rectangular tower, or even a gate, projecting outward.<sup>6</sup> The

<sup>2</sup> This economical system that used the minimum of cut-stone blocks applied also to bastions and sometimes to wall access.

<sup>3</sup> Thucydides (3.22) made a point of the towers in the siege wall around Plataiai, which went from face to face so that the guards walked through them.

<sup>4</sup> Winter 1971, 152–53. Adam (1982, 48) pointed out that the hollow ground floor made it possible to defend the area close to the foot of the wall from arrow slits, but filled towers were used down to the Roman period, possibly because they were less vulnerable to battering rams as well as simpler to construct.

<sup>5</sup> Winter 1971: towers hollow at ground level were built at Mantinea (240; time of Epaminondas) and Gyphtokastro (162, note 44; last third of 4th century) but were unusual before the Hellenistic period; cf. Lawrence 1979, 223. Thucydides (2.18)

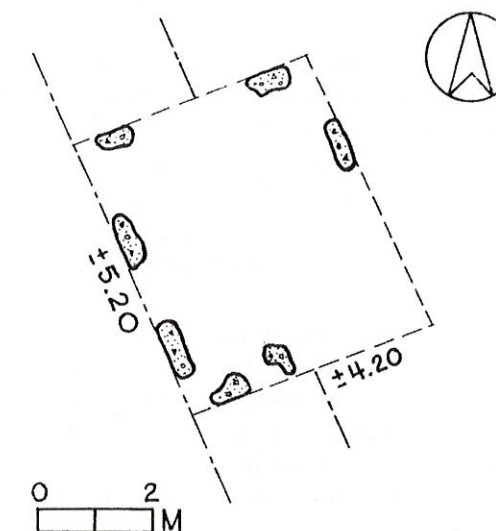


Fig. 1. Tower 1

existing remains, on the other hand, indicate a projection on the inside of the wall just south of the angle. The evidence consists of some conglomerate blocks, very much eroded, which are scattered about the crown of the knob, enclosing an area considerably smaller than the bedrock outcropping (see below, 46, note 4). Two of these blocks appear to be in situ and form a straight line on the southwest, the same line that is continued southeastward as the wall trace. Two other blocks probably mark the return on the southeast, and a northern corner can be made out, but the remainder is little more than rubble. It seems clear, however, that a small square tower, just over five meters wide and projecting northeastward (inward) for somewhat less than five meters, once occupied this spot.<sup>7</sup> The core was probably solid, of rubble and earth. The natural

described the refugees in 431 taking shelter in the "towers of the walls," which Winter (1971, 162) interprets as perhaps the earliest instance of chambers at ground level. The southeast-angle tower at Phyle, variously dated from the end of the 5th (Winter 1971, 139) to the middle of the 4th century (Lawrence 1979, 175), is sometimes considered to be a special case because the steeply sloping terrain required a story of solid masonry below the hollow chamber at the level of the courtyard.

<sup>6</sup> For the oval enclosure also shown in this area on the Admiralty chart, see below, 43.

<sup>7</sup> NB 616, 20 records the outer face of the wall as "continuous as far as dump [of road scrapings] against knoll" and places the remains of the tower inside that line.



relatively soft material.<sup>69</sup> Alone, they seem a thin line, more suitable as a barrier for wheeled traffic than for resisting a battering ram, but excavation produced no trace of a second wall or fill other than fallen mud brick. These blocks would, however, have made a sufficient base for a mud-brick wall built against the outside of the gate.<sup>70</sup> If plastered like the rest of the fortifications, its vulnerability would not have been apparent from the outside.

The remains on the southwest side of the gate are difficult to interpret. Proceeding inward from the block at the square corner, the tops of the next two conglomerate stretchers are progressively lower and are continued by a low wall of rubble and mud mortar. The second block from the corner lies next to the southwest jamb base block; the third is leveled with the second by a row of tightly fitted small stones. A conglomerate orthostate, which appears to be in situ, rests partly on the third conglomerate stretcher and partly on the rubble wall. The space between the drain and the gate passage is level with the second stretcher and is packed with rubble and earth. None of this construction equals the workmanship of the round tower and the square exterior corner opposite it.

Excepting a few large Corinthian pan tiles and one large Lakonian cover tile of unusually thick section, there was little ceramic material in the fill of the passageway. Diagnostic pottery was limited to some blisterware fragments found on the road surface at the inner end. There were no traces of coping blocks like those associated with Tower 6. Several thick squared pieces of shelly limestone can be seen in the terrace wall along the modern road, and one was found beside the northeast socket block, but there is nothing to indicate how or where they were used.

At the inner (southwest) corner of the gateway are four wide, shallow steps (Pl. 9c); the top step, of sandstone, is a reused cover slab from the drain that ran through the curtain about a meter southwest of the passage (see below, 59–61). The bottom step, also sandstone, projects into the gate passage and is curved at the corner, as though to ease the turn to the left into Street 1; the

southeast end of the step is missing. There is a small conglomerate block at the northwest end of the poros second step, a sandstone one at the other, both somewhat higher than the tread; perhaps these were bases for door posts. The poros third step is damaged at the southeast end and pieced out with a higher block of shelly limestone at the northwest. The actual corner is now a pile of rubble; conceivably it is a deteriorated conglomerate block. Between the corner and the first cover slab of the drain, more or less level with the drain cover, is a small square limestone base.

Beyond the drain along Street 1, the corner of a room was exposed, apparently the northeastern end of the Chambered Curtain. If the bottom of the drain was level with the street, the floor of any chamber above it would have been about 0.60 m higher. The whole area when excavated was seen to be filled with fallen mud brick. It is not clear whether there was a guardroom on this side of the gate or whether the construction at this corner was originally solid at least to the level of the walkway. The corner steps, which are wide enough to suggest public rather than private access, seem too casual in their construction to belong with the fortifications; they may represent some late reuse of the area after the gate had been blocked or fallen into disrepair. Moreover, because many of the drain cover slabs are missing and one was reused for the top step, the drain must not only have been out of use but exposed when the steps were built.

#### *Tower 11 and the Hermion Gate (Fig. 28)*

**Tower 11.** This tower is wrapped closely around the north corner of its square predecessor, using wedge-shaped headers like those of Tower 9. Like Towers 14 and 15 it is 9.20 m in diameter.<sup>71</sup> There was no investigation of the basis for this conglomerate course, the top of which is now just at the surface of the water. Although the tower itself would have been on dry land, the harbor was not far away across a gentle slope. If the construction was similar to that of Tower 9, the Classical water level would have been only about

Aeneas Tacticus (28.1–2) that when a city is afraid of attack every gate should be blocked except the least accessible (to the enemy).

<sup>71</sup> Compare the diameter of Tower 6 on the acropolis at 10.85 m; see Williams n.d.

<sup>69</sup> They probably are what Aeneas Tacticus (32.5) called a wagon-filling stone (λίθος ἀμαξοπληθής), in this case up to 1.30 m long, 0.50 m wide, and about 0.70 m high, even larger than those in the Spur at the Harbor Gate (below, 42).

<sup>70</sup> Lawrence mentioned the practice of blocking nonessential gates in times of danger (1979, 248–49), citing the instruction of

1.50 m below the socle. Bedrock is assumed to be well below the ancient ground level in this place, which would have been part of the valley-bottom land, and stone foundations might have been carried deeper in this instance. The use of the wedge-shaped headers appears to be linked to construction on compacted soil as opposed to the more certainly stable bedrock (see above, 13). Although there is no evidence for a course of orthostates above the headers and a hollow ground floor, it is possible that all three waterfront towers (11, 14, and 15) were similarly constructed, if not Tower 9 as well.

*The Hermion Gate.* Land travelers coming from the north or, nearer at hand, from the sanctuary of Apollo, would see the Hermion Gate first. Traces of a road were found in shallow, water running northeastward from the gate for some 35 meters. The road probably paralleled the shore and, turning northward, passed east of the sanctuary race course on the way to Hermion.<sup>72</sup> Inside the town, the road continued as Street 8, just beyond the terminus of Avenue B.<sup>73</sup> The remains of the gate are obscured by the small Late Roman/Early Byzantine bath that was built on top of them (see below, 85) and are difficult to examine because they are now submerged. The aerial photograph provides the best view, although it cannot make the relative elevations clear. While admittedly speculative, some cautious observations can be made.

The square tower to which Tower 11 is attached borders the roadway and forms the northwest side of the gate in the classic relationship, on the unshielded side of the attacker. The line of the curtain can be seen clearly as it approaches from the southeast; there is no sign at all of any tower on that side. The position of the actual gate is uncertain. A single block is visible against the southeast side of the square tower; it is aligned with a structure across the gateway that parallels the Northeast Wall, perhaps an access

stair and guard room (see below, 59). If the gate was at this point, it would have been deeply recessed. Inside the curtain and across the roadway from the tower are two walls that form the southern corner of a rectangular area of the same orientation, which differs noticeably from that of the overlying bath. The enclosure seems to be related to the road and its continuation in Street 8, rather than the lines of either the North or the Northeast Wall;<sup>74</sup> these, when projected, intersect at the square tower about two meters inside its east corner. The walls of the enclosure appear no heavier than those of nearby houses, but it may still have served some of the purposes of a gate courtyard, providing a second line of defense and a mustering place for troops just within the main gate.<sup>75</sup>

It is now impossible to make out the connection with the curtain of the North Wall.<sup>76</sup> Nevertheless, the fact that both the square tower and especially the round one attached to it appear to be well outside it suggests that the gate structure was extensive. The purpose in the outward projection of the round tower may have been to permit a clear view of the outer face of the Northeast Wall as far as Tower 10 and of the North Wall as far as Tower 14, as well as of any activity along the east shore of the harbor and the road from Hermion. The apparent retention of the square tower in the remodeling program may have been to provide additional space for the defenders and their stone- or bolt-throwers.

#### *Towers 14 and 15 and the Harbor Gate (Figs. 29, 36; Pl. 19)*

**Tower 14.**<sup>77</sup> The form of the tower is a complete circle. It is built of wedge-shaped conglomerate headers like those of Towers 9 and 11 but with a solid core of untrimmed pieces of conglomerate that form a platform base, similar to those suggested for Towers 12 and 13. They do not, however, give the appearance of a floor. The solid

been such a mustering place, just within the main gate.

<sup>75</sup> Winter (1971, 217) put the development of the courtyard gate at the beginning of the 4th century.

<sup>76</sup> See below, 53, for the connection of the Hermion Gate to the North Wall, on both earlier and later traces.

<sup>77</sup> Figure 29 relies heavily on the aerial photographs. It cannot be stated too strongly that accuracy under these conditions is difficult to achieve. The photographs, while revealing much detail, vary from shot to shot depending on what the divers were able to clear and what the currents had buried or reburied in the silt. I take responsibility for their interpretation where actual measurements were not available.

<sup>72</sup> Cart tracks in the bedrock can be seen today at the edge of the water near the sanctuary and have been detected underwater farther south in aerial photographs (Jameson 1969, 338, fig. 8; Jameson et al. 1994, 48–49).

<sup>73</sup> Street 8 has been tentatively indicated parallel to Streets 3–7. Remains visible in the aerial photographs of buildings just to the northwest suggest that the street was wider than the others, the line on that side closer to that of the gateway. This was probably a major avenue.

<sup>74</sup> Aeneas Tacticus (15.3) wrote of assembling the defending forces at the gates, one or two companies at a time, in preparation for sallies against the enemy. This rectangular area may have



core of boulders may have continued in brick or rubble to the walkway level, or, if the lowest story was hollow, they may have been covered with a layer of clay or with slabs. The headers, 0.20–0.25 m high and currently about two meters below the water surface, rest at 3.20 mbsl on poros blocks, 0.40 m high, that carry through to the outside face and rest on yet another course of poros. If the Classical water level is correctly estimated to have been about 3.60 mbsl (see below, 86), or about 2.60 m below the present surface, it came roughly at the top of the lower poros course. Throughout Halieis, poros plinths are found at ground level.

The top of an orthostate base course 0.60–0.70 m high resting on the headers would have been even with the top of those in Tower 15. The diameter is 9.20 m, the same as that of the other waterfront towers, 11 and 15. The blocks on the east side are set in to permit a bond with the end of the North Wall curtain approaching from the east (see below, 53). On the southeast side of the tower additional poros blocks continue the line of the widened quay to form the northeast side of the gate, opposite the Platform (below, 42). The exact line of the shore in the Classical period is unknown but can be estimated to have been about ten meters from the tower (Fig. 19).

**Tower 15.** Twenty meters to the southwest a second tower, also 9.20 m in diameter, guarded the other side of the Harbor Gate. The remains are not only submerged but are heavily covered with rubble and sherds of late Roman amphoras, washed down from the shore. About two-thirds of a circle can be seen, together with a confusion of straight walls on the landward side. The construction of the round tower is of conglomerate orthostates set as headers and doubled stretchers, the latter separated by a space to form a hollow wall about a meter thick. The top of this wall is at about 2.50 mbsl, with an opening on the south side toward the town. The nature of the foundation has not been discovered but may well have been similar to that of Tower 14. The regular finish on the interior of the tower wall, which is if anything thicker than those of Towers 12 and 13, indicates that Tower 15 was hollow at ground level. If the ground-level story may be said to begin with the conglomerate blocks above the socle, those of Towers 6 and 9 were filled solidly. The situation

at Towers 11 and 14 has not been determined; there is no evidence remaining for Tower 7. The apparently exceptional design of Tower 15 together with the importance of its central location suggests that its purpose may have been similar to one mentioned by Aeneas Tacticus (11.3) at Chios. He spoke of the ship-sheds and stoa adjacent to the tower "in which the magistrates took their meals," a description that might well apply to Tower 15 at Halieis.<sup>78</sup>

**The Harbor Gate.** The gate between Towers 14 and 15 must have been as important to the town as the Hermion Gate, if not more so. It opened directly on the shore and saw the daily passage of those going to and from the boats in the harbor. The twin towers that guarded it suggest the intention to present an imposing appearance and to offset the vulnerability of the gate. Its design, however, is peculiar to its location and difficult to interpret or to parallel.

The gap between the twin towers is reduced to about seven meters by a construction (hereafter, "the Projection") that runs northeast from Tower 15 for eleven meters and by a single row of poros blocks on the southwest side of Tower 14. The conglomerate blocks of the Projection that remain rest on a course of poros and are 3.00 mbsl at the northern end, roughly even with the headers in Tower 15. They are 0.25 m high, laid flat, and are tightly fitted with rather irregular joints to form a surface 3.25 m wide and about 6.00 m long ("the Platform") at the northeast end. Between the Platform and Tower 15, the Projection narrows to about 1.20 m. It is not bonded to Tower 15 and so could have been built subsequently, but it is probably contemporary. There is no evidence to suggest what sort of structure may have risen above the Projection to close this interval in the fortifications.

At the northeast corner of the Platform are three cuttings, one small hole each in the north and east blocks and one overlapping the joint (Fig. 10b). The small holes are 0.15 m by 0.25 m in plan, the larger 0.30 m by 0.50 m; all are 0.20 m deep. The block on the east face is rectangular and is joined to an irregular block behind it by a double-T clamp. This clamp is not only unique in the Halieis construction known at this time but is among the few known to exist in Greek fortifications before the Hellenistic period. It is

buildings associated with fortifications.

<sup>78</sup> M. H. Jameson brought this passage to my attention in connection with a discussion of the mint and other public

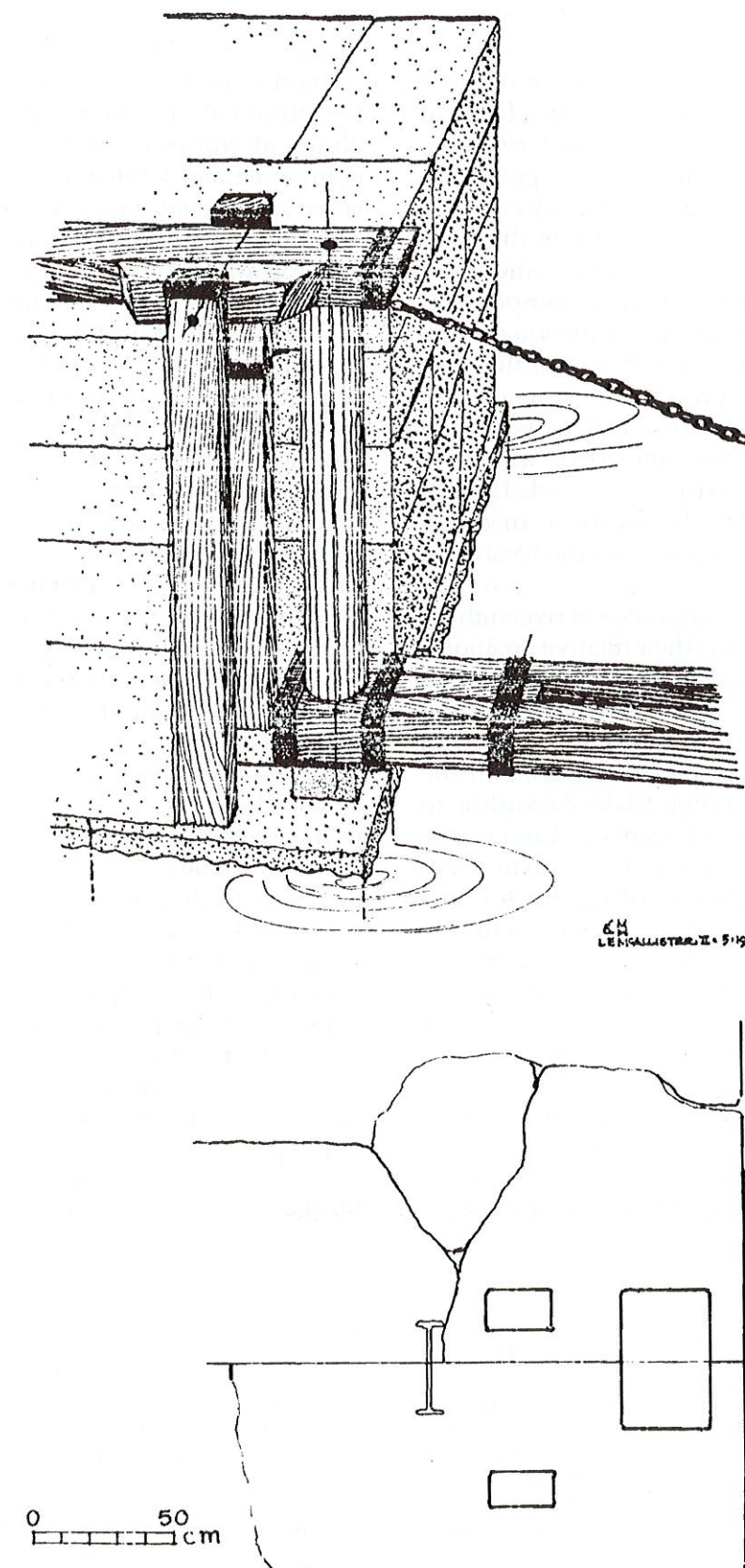


Fig. 10. (a) Reconstruction of the Harbor Gate. (b) Cuttings for the Harbor Gate



noteworthy that these generally occur in waterside construction.<sup>79</sup>

While the cuttings are reminiscent of those regularly found on pivot blocks in classical gateways, they differ in important respects because of their special location. The large cutting is 0.50 m from the east face but only 0.10 m from the end of the Platform; it straddles the joint between two blocks, a weak arrangement for which the clamp was intended to compensate. Sockets in pivot blocks are normally square and shallow.<sup>80</sup> The additional length across the joint would give the insert, presumably fine-grained stone, greater purchase so that it acted like a dowel. The eastern of the other two cuttings is approximately centered on its block (partly exposed but clamped). The western, in a less vulnerable location, is aligned with the west edge of the large cutting.

The most striking difference between these and normal gate cuttings is their relative positions, with the smaller cuttings to the side rather than outside the main pivot.<sup>81</sup> A possible reconstruction calls for a stone insert in the large cutting, with an appropriate socket for a pivot of bronze in the bottom of a vertical post (Fig. 10a).<sup>82</sup> According to this proposal, two vertical beams as high as the masonry construction on the Platform were anchored in the smaller cuttings by tenons. Courses of stone must certainly have continued higher than the usual orthostate course in this exposed location; the alignment of the cuttings suggests that the masonry was flush with their west and south sides. The pivot at the top of the post was set in a horizontal beam sandwiched between the two verticals and anchored back into the main mass of the masonry. A boom was formed of two parallel horizontal members attached on either side of the pivot post and bound together

at intervals throughout their length, perhaps with metal straps. Additional support was provided by a chain from the top of the pivot post to a point two-thirds of the way along the boom. (A second chain at the one-third point would further counteract any tendency to sag and accord with common present-day methods of boom support.) The natural tendency of the boom would be to pull the top of the pivot post outward, with an accompanying inward thrust at the bottom. The top is restrained by the beam embedded in the wall, the bottom by the socketed pivot block. There is no stress on the relatively weak outer margin of the conglomerate blocks at the northern edge. The rectangular stone insert braces against the masonry to the west when the boom opens inward to the east, while leaving clearance for the back end of the boom. The offset position of the eastern socket provides more stability for the open position.

The additional construction at the south side of Tower 14 might have supported a pivot block for a second leaf or boom for the gate, but this would have required an anchor post within the opening. It is more likely that a post here secured the free end of the boom swung from the south side of the gate. No sill or road metal was found in the gap between the Platform and Tower 14.

From the Projection a wall runs southward on the east side, passing to the east of Tower 15. It appears to align with the lowest (nearest) preserved section of the Middle Wall, but this association may be illusory. A wide spur wall (the "Spur") of large poros blocks in two courses runs westward from the Projection for seven meters, bonded in 4.50 m south of the end where the cuttings are and resting on conglomerate rubble. The top of the upper course lies at 3.20–3.25 mbsl, the top of the lower course at 3.60–3.70 mbsl. Two blocks of the upper course, 1.25 m by 0.80 m and

<sup>79</sup> Winter (1971, 136, note 37) wrote that clamps prior to the Hellenistic period were probably confined to the slabs of the walkway and gave Messene as an example. Although Thucydides (1.93.5) mentioned as a remarkable detail the clamps used in the Themistoklean walls of Athens and Peiraeus, E. Vanderpool wrote (per lit. 2/3/72), "I know of no archaeological finds to illustrate it." The only clamps of that period that have so far come to light are in the Kerameikos along the bed of the Eridanos (Noack 1907, 153–55). In discussing the walls of Peiraeus, Judeich (1905, 139, note 4) referred to a 5th-century wall at Parion in the northern Troad where the face is bonded to the fill with wooden clamps. Clamps in harbor works were recorded by Georgiades (1907, pl. I, fig. 4) at Lechaion. Paris cites the harbor at Mytilene, the mole at Knidos, and the quays at Kenchreai (1915, 10). Only two clamp cuttings were reported at Eretria by Pickard (1891, 378): one is a T, the other a hook,

both at the junction of the mole and the round tower at the southwest corner of the circuit. At Thasos, swallow-tail clamps were used in both the schist blocks and those of marble that topped them in the Archaic seawall, which the excavators took to indicate that at least one course of schist was above the water line (Archontidou-Argyri et al. 1989, 55–56).

<sup>80</sup> Lawrence in his discussion of these installations gave the size of the socket in a gate at Eleusis as 0.11 m square and 0.03 m deep (1979, 253).

<sup>81</sup> See the description of the blocks at the Southeast gate, above, 37.

<sup>82</sup> Louis E. McAllister Jr was the principal author of this reconstruction, which first appeared in Jameson 1969, 335–36, fig. 7. This type of barrier is frequently found today at road entrances to state parks and the like.

0.35 m high, remain in place at the east end. A dislodged block at the west end and traces of the rubble foundation at 4.00 mbsl suggest that this spur originally continued even farther.<sup>83</sup>

There are many questions raised by Towers 14 and 15 and the gate between them; the answers cannot depend solely on this presentation of the physical remains. A full discussion of the Harbor Gate, together with the North Wall and the adjacent areas to the north and south, is given by M. H. Jameson below (chapter 7). It draws on other information from the underwater investigations and refers to the history of the fortifications and the site as a whole.<sup>84</sup>

#### Tower 18A

The Admiralty chart (Pl. 1) shows an oval enclosure occupying most of the stretch between Tower 1 and the north shore, an area currently covered by a 20th-century villa. A large oval tower is so improbable that it suggests the delineator, in transcribing the surveyor's notes, mistook the contour of the knob for a structure. (It might also be noted that the chart shows the acropolis enceinte as a large square enclosure, only one corner of which, the Phase 5 tower, would have been visible.) Williams (n.d., note 18), however, took the oval as an indication of a round tower. The location indicated on the chart, not only close to a square tower (perhaps Tower 1, although it is shown projecting outward) but short of the actual corner of the trace, seems unlikely, but the possibility of a round tower lower down at the northwest angle of the fortifications has important implications, discussed in the final chapter.

#### Gates of Unknown Form

There are several places in the defense circuit where small gates might have been a convenience for passage to daily labors outside the walls. There is insufficient evidence, however, to decide whether they would have been gates or posterns (see below, 44).

#### The West Gate (Fig. 20)

There is no sign of a major gate in the whole length of the West Wall. This is hardly surprising, for not

<sup>83</sup> The measurements taken by the divers indicate a slight slope down to the west, no more than 5–10 cm in 7.00 m, which could be the result of natural settling.

only would there have been only local traffic on this side of the city but this stretch would have been most vulnerable to surprise attack from raiding parties landing in one of the small coves along the long entrance channel to the main harbor (Fig. 17). On the other hand, in peacetime a passage through the West Wall would have been a great convenience.

About nine meters south of Tower 2, the inner wythe of the defense wall apparently terminates in a cross block. After an interval of about eleven meters the wall can be found again farther south, with at least one block projecting beyond the outer face. This would have been the logical place for the gate; the natural route across the ridge is indicated by the present-day track, which, just south of Tower 2, branches off the modern road and continues down the west slope to coves along the entrance channel. The road to this point has taken the natural line across the site; very likely it marks the ancient route as well, continuing either Avenue C or a hypothetical Avenue D higher up the slope all the way from the Southeast Wall. The remains now visible support the hypothesis of some sort of structure south of the opening and just where the direction of the curtain changes, on the unshielded side of an attacker. Hardly more than a postern, not even on the order of the East Gate but overlooked by Tower 2, it would have been relatively easy to defend or even to block entirely in times of unrest.

#### Gate East of Tower 4

The possibility of a gate between Towers 4 and 5 is discussed below (47).

#### Gate on the Industrial Terrace (Fig. 22)

About at the center of the curtain on the Industrial Terrace, where there is a slight angle in the line of the inner wall, there are two large plinth blocks of poros. They appear to be socle blocks, like those used elsewhere in the circuit, but their top surface is higher than the bottoms of the stretchers to the west. Immediately to the east, the wall blocks are missing; where they resume after more than two meters, a cross block connects the innermost and middle lines of the wall.

<sup>84</sup> For an account of the curtain and mole between Towers 13 and 14, see below, 53.



that the sub-bottom profiler used by Edgerton could solve the puzzle of the gap in the line of the walls north of the town but it proved not to be effective at such shallow depths. His survey, however, did locate a number of anomalies at greater depths under the seabed in Porto Kheli Bay, north of the submerged walls and thus outside the line of fortifications. A test trench in 1968 at the easternmost anomaly found rubble and tile fragments at 1.10 m below the seabed. In 1972 Edgerton returned and, assisted by Bruce Bevan, Karl Petruso, and Priscilla Murray, reconfirmed the location of the three easternmost anomalies for which he left markers on the seabed. In 1966 three more anomalies had been noted between 50 and 90 m north of the Northwest Wall. But in 1972 it was investigation of the eastern anomalies, north of the curtain between Towers 12 and 14, that he recommended, one reason being their shallower elevation. The locations of the western anomalies were not confirmed but it is not clear from Edgerton's 1972 report whether this was attempted. No markers for them could be located in 1973. The three western anomalies are still shown on Edgerton's 1972 chart, identified as found in 1966, but the third from the west is accompanied by a question mark. The sonar readings seem to show that the western anomalies began to be detected at ca. 7.5 m (= 8.5 mbsl). If these are man-made constructions originally at or above sea level they must go back into the Early Bronze Age (with a rise of 0.15 m a century, at least some thirteen centuries before the Late Bronze Age post at 5.67 m).<sup>5</sup>

In 1973 a team of divers (Cynthia Patterson, Stephen Hallin, Ralph Mason, and Geoffrey Robinson) dug test pits at two of the markers left by Edgerton (Fig. 36; NB 750, 2300–2303, 2311–12). Lines of conglomerate rubble proved to be the source of the anomalies recorded by sonar, about 30–35 m north of, and hence outside, the North Wall and some 60–70 m from the present shoreline. The first trench (located at N7276/E16225, Fig. 36, Anomaly 1) was on the easternmost marker, ca. 30 m north of Tower 12. Seabed was 3.60 m (Fig. 37). The first 1.00–1.20 m below the seabed consisted of sterile, gray clay. In the next ca. 0.30 m (4.80–5.10 mbsl) were numerous Late Roman/Early Byzantine sherds, bone fragments, and fruit

stones (later determined to be olive pits). Between 4.75 and 4.95 m came the line of rubble in a single course,<sup>6</sup> no more than two stones wide, running northeast/southwest. Pebbles, medium and small, were noticed around the rubble. The line of stones is referred to in the notebooks and reports as "the Edgerton anomalies" and for convenience we continue the neutral designation, "the Anomalies." Late Roman pottery and organic matter were described as found above and "around the edges" of the stones. A single fruit pit is mentioned as under a piece of porous limestone (not identified as part of the line of rubble). Neither pottery nor wood serves to date the laying down of the line of rubble. Aside from the one pit (which was too small to be dated separately), no pottery or wood was reported below the stones. The rim of a small jug or a chytra (HP 2079) was found at about the level of the bottom of the stones but not under them.<sup>7</sup> To 5.75 m, the deepest point reached in this test, there was sterile gray mud.

A second test was dug at the third marker from the east (Anomaly 3), ca. 70 m northwest of the first (coordinates N7285/E16190). At a depth of 4.94 m nine pieces of conglomerate rubble were uncovered, at most 0.16 m high. The stones formed an acute angle, one line running northeast/southwest while three other blocks joined them from the north. Late Roman/Early Byzantine pottery, less than in the first trench, was found above the stones.

These flimsy lines of rubble cannot be described as constituting a wall, mole, jetty, or even, as in preliminary reports, a "sea wall" marking the shoreline (Jameson 1973–1974 [1979], 264), for which the remains are ill suited. A single course of rubble was observed at the lowest level of the spur projecting from the structure south of the Harbor Gate. Here, we suggest, we have traces of foundations for mudbrick constructions near the shoreline. With the rise of the sea level only the stones at the base of the walls survived. The two small trenches are insufficient to reveal the plan and character of these constructions, whether they formed a continuous wall (Edgerton conceived of the anomalies as a single continuous phenomenon) or are traces of separate structures of varying dates.

<sup>7</sup> HP 2079, Unit 128-1700, about one-third preserved. H. 0.062 m, W. 0.061 m. Fine, sandy clay, Munsell 10 YR 7/3 (very pale brown). Inside, wheel-ridging. Globular body, slight flaring rim.

<sup>5</sup> For Final Neolithic and Early Bronze Age remains on the acropolis at Halieis, see Pullen 2000.

<sup>6</sup> The impression recorded in 1968 NB 504 of a double layer is at odds with the more systematic record of 1973 NB 750.

The organic matter found with the pottery on and around the rubble provides Late Roman/Early Byzantine dates. It included wood (P-2099) and olive pits (P-2098) that give dates of ca. A.D. 200 and 370 respectively (calibrated by the Wiener Laboratory), the later date being the time of production of the olive fruit and its pits. The preservation of the organic matter indicates that from the time of its deposit it had been in water continuously. The date of ca. 200 may be that of the cutting of the wood, which could antedate its lodging in the rubble by a long interval, but the olive pits of ca. 370 should be close in time to the actual deposit. By that time, if not earlier, the anomalies were below sea level but still open to deposition of pottery, wood, and so forth.

Evidence from a wooden post (P-2064) found in the submerged temple of Apollo 700 m to the north of the Anomalies in 1973 shows that the Late Roman/Early Byzantine sea level was, in fact, considerably higher. The post, not carbonized, was found reaching from 2.80 to 3.20 m. As with the Late Bronze Age post in the inner harbor (above, 87), its preservation indicates continuous submersion. Its <sup>14</sup>C date of ca. A.D. 480 (calibrated by the Wiener Laboratory) suggests that when the organic matter at the Anomalies was deposited, the surface of the sea was more than 1 m above the rubble, a preferable hypothesis to supposing that there had been an extraordinarily rapid rise in sea level of ca. 2.00 m in about a century.<sup>8</sup> The Early Byzantine buildings investigated by Frost (1977) at Phourkari, near the eastern tip of the Argolid peninsula, are at the lowest points 1.20 m below the surface of the sea, that is, 2.20 mbsl.

If the rubble of the Anomalies was laid down on dry land, sea level at the time of construction was below 4.95 m, let us say ca. 6.00 m or lower. The post east of the Harbor Gate showed a sea level of 5.67 m or higher. These considerations point to an early date for the Anomalies, Late Bronze Age or Early Iron Age (cf. Fig. 38). From ca. 1300 B.C.E. (post east of the Harbor Gate) to ca. A.D. 480 (post in the Temple of Apollo), the minimum sea level rose from 5.67 to 2.80 m, an average rise per century of 0.15 m. We do not suppose the rise was in fact so regular and we repeat that for both posts we are speaking of minima. Nevertheless, the figure of 0.15 m allows us to see that we are in the right vicinity. A

<sup>8</sup> This was the information furnished to Jameson et al. 1994, 199–200 and table 3.7, where earthquakes are offered as a possible

thousand years after the date of the LBA post, at the time of the latest fortifications, the minimum sea level would be about 1.50 m higher, that is, ca. 4.17 m. Our tests furnished maxima of 4.00 and 4.72 m. The level of the rubble at the Anomalies, 4.95 m, presumably on dry land, suggests a sea level that existed some time between the Late Bronze Age and the Classical period. The presumed Archaic–Classical date of the jug or chytra found at the level of the bottom of the rubble is consistent with a date before the end of the Classical period as is a sea level below the level of the rubble. If we postulate a sea level of ca. 6.00 m, we are closer to the Bronze Age than the Classical for the laying down of the rubble.

Much later, the Late Roman/Early Byzantine occupation with many traces of buildings along the shore (see Fig. 38; Rudolph 1979) deposited considerable debris in the bay. The presence of rubble in the seabed close to shore may have served to catch and hold organic material. Fuel for the bath nearby is an example of the need for quantities of wood to be brought to the site.

The levels containing Late Roman/Early Byzantine pottery at the Anomalies and East of the Harbor Gate are not the same. At the Anomalies the stratum is from ca. 4.80 m to 5.10 m. East of the Harbor Gate it is from 3.12 to 3.82 (these are the measurements made in 1973; a deep test in the entrance of the Harbor Gate in 1968 yielded much the same information, with Late Roman/Early Byzantine pottery at ca. 3.20–3.60 m). The lowest point of the second area's deposit is about 1.00 m above the beginning of the Late Roman/Early Byzantine deposit at the Anomalies, that is, the seabed east of the Harbor Gate was higher than at the Anomalies. A second stratum, a gravelly layer with small sherds, some of which are Archaic or Classical, at a depth of 3.82–4.72 m in the 1973 trench, 4.20–4.40 m in the 1968 trench in the entrance, is absent from the Anomalies, aside from a single sherd from a jug or chytra.

#### Chronology of the Harbor Gate Area (Figs. 37, 38)

In the Late Bronze Age sea level was at least 5.67 m or somewhat higher. A wooden post fixed into the seabed (for mooring a boat or perhaps attaching fishing nets) was ever after immersed in salt water. This area was never dry land or the

contributing factor.



wood would have rotted away, which is not to say that there was always sufficient depth of water to serve as a harbor. It is significant, however, that while Late Roman/Early Byzantine structures were built along the shore of the bay to the east, none were found in the enclosed space East of the Harbor Gate (Fig. 36; cf. Rudolph 1979, 296). In the first millennium B.C. the sea level continued to rise and silt accumulated in the form of heavy gray clay of the same composition as the Late Bronze Age seabed. There was found a single coarse-ware sherd, a pithos rim, probably of Archaic or Classical date (HP 2109). For a long time there seems to have been little traffic in or close to this sector. The next stratum of gravelly soil represents deposits prior to the Late Roman/Early Byzantine period. Substantial habitation of Archaic through Late Classical times spanned the years from ca. 700 to 300. In that time and for the four or five centuries without permanent habitation that followed, the seabed was between 4.72 and 3.82 m (4.20 and 3.60 m in the entrance), levels open to deposition of pottery. Above 3.82 and 3.60 m Late Roman/Early Byzantine pottery begins to appear.

The stratum of gravel may be of similar date to the gravel layer (0.40 m thick, Jameson 1969, 334) found under the conglomerate blocks in the lower course of Tower 13, below which is sterile gray clay (NB 504, 67; compare above, 30). Gravel was noted also under the Southeast Wall, northeast of Tower 9 (see above, 51). The quarrying of poros and conglomerate blocks for the latest line of the North Wall, the one we see ending at Tower 14, may have involved digging in a gravelly area, perhaps the stream bed and valley to the east of the Southeast Wall.

In the 4th century B.C. the sea level was below the cuttings for the closing of the Harbor Gate at the tip of the Projection, at 3.00 m. The top of the Spur on the west side of the Projection, consisting of two courses of poros blocks on a third course of rubble, was either at or close to ground level, or, if we are dealing with a sea gate, sea level, as was the line of poros blocks along the south face of the North Wall (compare above, 86). A short wall projecting out from an important defensive tower makes no sense for fortifications whether on dry land or on the waterfront. The Spur (described above, 88) is best understood as a retaining wall, whether its upper surface was dry land or seabed. The upper surface of the upper course of poros was 3.25, of the second course, 3.70, and of the rubble below it ca. 4.00 m. If this

was a sea gate, the 4th-century sea level was between ca. 3.25 m and ca. 4.00 m. As for the seabed, in the Classical period, ca. 480–338, it was no higher than 4.40 at the entrance (4.72, fifteen m to the east) since it is at this point that gravel and black-glazed sherds begin to appear. While no higher than 4.40, we cannot say how much of the 0.95 m of clay below, between the beginning of the next stratum and the upper tip of the Late Bronze Age post, was deposited in the historical period, nor how much of the gravelly stratum may have been deposited after the town was abandoned (little if any, if we are correct in associating the gravel with the final construction phase). With the sea gate hypothesis, at the time of the latest fortifications the minimum depth of water at the entrance would have been between roughly 0.60 and 1.00 m.

Comparison with elevations in the sanctuary of Apollo at the northeast of the present Porto Kheli Bay shows that the elevation of the northern starting line of the stadion in the 4th century was 3.00 m, the same as that of the cuttings at the Harbor Gate (Plan of the Sanctuary, November 1973). The lowest point on the plan is 3.46 m, the top of a block on the western side of the rectangle supporting the viewing stands. A chart of the seabed of present-day Porto Kheli Bay (Fig. 39) shows that the contours here are widely spaced, that is, that the gradient is very gradual (as much as 325 m from the modern shore to the 4 m contour, 250 m from the 3 to the 4 m contour; contrast the steeper gradient at the Harbor Gate, from shore to 3.00 m in 150 m). The Archaic and Classical buildings in the sanctuary could have been very little above sea level and still some 200 m or more from the contemporary shoreline. If the bottom of the block serving as a support in the stadion viewing stand is taken as above sea level, a minimum depth for Classical sea level is ca. 3.76 m (3.46 + ca. 0.30 m). We have seen that the constructions around the Harbor Gate point to a level between 3.60 and 4.00 m.

By the time the abundant Late Roman/Early Byzantine pottery began to be deposited, the seabed in the Harbor Gate area had built up to 3.60 (at the entrance), 3.82 (at East of the Harbor Gate). Outside and to the north of the North Wall, at the Anomalies, the Late Roman/Early Byzantine seabed was ca. 1.50 m below that in the area of the Harbor Gate, no higher than 5.30 when Late Roman/Early Byzantine pottery began to be deposited. The Late Roman/Early Byzantine sea level is shown by the well-preserved wooden post

(P-2064) in the Apollo temple to have been 2.80 m or higher ca. A.D. 480.

### The Harbor Gate

The problem of this gate, whether it was a land gate opening onto the shore or a sea gate giving access to a small, enclosed harbor, may be considered under three headings: (1) the relation of the gate to sea level and seabed in the 4th century B.C.; (2) the construction and placement of the gate; (3) the relationship of the gate and the empty area to its east to the plan of the rest of the town.<sup>9</sup>

(1) We have shown above why we believe that at the time of the final phase of the fortifications the sea level was between 3.60 and 4.20 m and the minimum depth of water at the entrance was roughly between 0.60 and 1.20 m. In the 7th century, when the settlement at Halieis was becoming more substantial, the ground level or seabed was no higher than ca. 4.20 m in the entrance (4.72 m, East of the Harbor Gate) since it was from that point that Archaic–Classical sherds began to appear. This leaves a very shallow depth of water for a harbor. It needs to be emphasized, however, that the figures are minima, but even as minima they cause, in our view, an insuperable difficulty in interpreting the gate as on dry land (see Figs. 37, 38).

After the construction of the last, 4th-century gateway, 0.40 m of Late Roman/Early Byzantine deposit, starting at 0.60 m below the bottom of the gate, accumulated in the entrance way. Below that was a 0.20 m stratum of Archaic–Classical date. This last, it could be argued, was fill deposited in the construction of the gate or in the centuries before the gate was built rather than material deposited during the use of the entrance. But the next 0.40 m of Late Roman/Early

Byzantine pottery cannot be so explained and the possibility of a robber trench later filled with pottery of the time is disproved by the corresponding stratum in the open area East of the Harbor Gate where robbing is not plausible. It is inescapable that there was an open space of between 0.60 to 1.20 m under the bottom of the mechanism for closing the entrance. Leaving such a gap below the bottom of the wooden leaves of a gate at this large and highly exposed entrance is inexplicable.<sup>10</sup>

(2) The placement and the construction of the gate also point to a sea, not a land, gate. The design of land gates aims to dominate the approaching enemy by means of projecting towers, preferably on the assailant's unshielded right side, or by flanking walls creating a passage through which the attackers must go to reach the entrance itself (Winter 1971, 208–9; McNicoll and Milner 1997, 6; Adam 1992). If a land gate is hypothesized here with the shore of the harbor just outside the gate to the west, we have to suppose that at this most vulnerable spot in the whole system the gateway is exposed with one tower to its north but the other, which could dominate the unshielded right side of the assailants, 12 m away to the south. (For the vulnerability of gates by the shore, note Aeneas Tacticus's recommendation, 10.8, that vessels be required to drop anchor only at specified gates.) All other towered gates at Halieis, in the manner of most Greek gates with towers, have towers on the left side of the entrance, thus dominating the unshielded right side of attackers.<sup>11</sup> If this were a land gate why not place the entrance to the north (right) of the south tower (Tower 15)? Instead, the entrance is to the south (left) of the north tower (Tower 14) because against approaching vessels there was no advantage in dominating one side rather than the other while farther away from the

<sup>9</sup> Consideration must be given to the brief but sharp dissent to the interpretation of an enclosed harbor by Frank Frost (1985) who wrote without benefit of details from more recent investigations. His view that an inlet or embayment close to the north shore of the town site "could not have occurred naturally by any known principle of geomorphology" is not shared by the scientists we have consulted (cf. Jameson et al. 1994, 54, n. 13). Simply lowering the sea level below the modern contours will not recover the depth between ancient sea level and seabed that permits the presence of a harbor. Finally, the comment by an experienced researcher that "it does not feel like a harbour" is not to be dismissed out of hand but does not lend itself to examination or refutation.

<sup>10</sup> A gap sufficient to show the presence of men and horses within the gates of Amphipolis is mentioned by Thucydides (5.10.2).

Lawrence (1979, 256) supposes there was generally a closer fit "though pivots were often considerably above the floor." At the Silenos Gate at Thasos, where the pivots were 0.30 m above the floor, a double row of blocks served as a stop. On pivots at Halieis, see above, 37.

<sup>11</sup> There are examples of towers on the left side of the approaching enemy, as at Oiniadai and Kydna (Adam 1992, 18–19), where the terrain requires assailants to approach with their right flank exposed to the curtain. At Halieis, the East Gate (see above, 25–27) has what has been called a small "bastion" rather than a tower on its left side. Its opening, however, is considerably narrower, 4.30 m compared to 7 m at the Harbor Gate, which, whether on land or sea, was clearly a much more important and vulnerable entry to the town.



shoreline the channel was deeper and less liable to silting. It is possible that an earlier version of this entrance extended the full 20 m between Towers 14 and 15, closed by chains and nets (cf. Garlan 1974, 388–89) and that the 7 m entrance we see now, closed by a boom, was a modification made for greater safety.

The cuttings at the northeast corner of the Projection (Fig. 10b) accord with no example of a fortification gate known to us. Instead, the reconstruction of a boom proposed by Louis and Marian McAllister in our first publication of this gate (Jameson 1969, 334–36) and described above (40–42) seems the most plausible solution. Such a boom is mentioned by Aeneas Tacticus (53.2): "Just before Chios was betrayed, one of the archons, joining in the betrayal, persuaded his fellow archons, saying that since there was peace they should pull the harbor's *kleithron* on to land and dry it out and pitch it." Garlan (1974, 388–89 and fig. 67, 388) illustrates and comments on a metal chain, a *halusis*, which is supported by buoys and anchored to the seabed, as described by Philo of Byzantium, *Mech. Synt.* 5. C. 52.<sup>12</sup> If the harbor entrance had once been 20 m wide, that is, the whole distance between Towers 14 and 15, such a chain would have been used to close the opening. The angled wall east of the Projection may have been used by men hauling the boom open.

(3) The course of the North Wall west of the Hermion Gate and Tower 11 is clearly meant to enclose a larger space than would a direct connection to the Northwest Wall, beginning at Tower 15 (Figs. 18, 19). From Tower 13 the line of the wall angles further to the northwest. Within the space enclosed by the North Wall west of Tower 13, the Harbor Gate, and the construction to its south (the Projection) no constructions of any date have been detected. A line of white poros blocks runs parallel to and south of the North Wall for ca. 105 m, ending on the west at the south face of Tower 14 and on the east half way between Towers 12 and 13. It lies between 2 and 3 m south of the south wythe of the North Wall at a depth of 3.20 m (as measured in 1968). We have suggested that it served as the foundation for a mole on which the North Wall rested (Jameson 1969, 333; it was not determined whether a corresponding line of blocks was placed off the north face of the North Wall). Frost (1985, 65) speaks of "a long,

straight outerwall with its footings underwater" as unparalleled. Moles, however, are common enough and whether they angle in, out, or are curved depends on the space they are designed to enclose.

The empty space east of the Harbor Gate and south of the North Wall is regarded by Frost as an agora. The absence of any larger structures on its margins, as one would expect for an agora, is an argument from silence and cannot be pressed. Blocks from such buildings would have been conspicuous and easily robbed out. Another difficulty derives from the detection of an earlier line of the North Wall that ran southwest from a square predecessor of Tower 11 at the Hermion Gate perhaps to a square predecessor of Tower 15 (see above, 31). To see the empty space as an agora one would have to suppose it was an addition to a preexisting agora further south since it cannot be imagined that the city lacked an agora up to this time. A civic rather than a military purpose for this final revision of the fortifications would be surprising.

The use of a chain to control the entrance to Porto Kheli Bay, ca. 350 m at its narrowest today (somewhat less in the 4th century B.C.), would have been impractical and unparalleled (cf. Lehmann-Hartleben 1923, 74). The doctrine that warships were always or by preference beached nightly has been shown to be untenable (Harrison 1999). The closed harbor proposed for Halieis would have provided shelter for a few vessels (triremes are thought to have been about 37 m in length and less than 4 m in beam, Morrison and Williams 1968, 285) and permitted the foreign garrison that seems most likely to have manned the walls at this time to maintain communications with its home base whenever a chance to slip out offered itself.

*Limenes kleistoi*, "closed" or "closable" harbors, are not uncommon, appearing often as a secondary harbor, smaller than the principal commercial harbor of a town (Lehman-Hartleben 1923, 65–74; Blackman 1982). Most, to be sure, are known primarily from textual references and have not been explored carefully. But another example may be added: Zangger (1994, 232–35) has investigated the harbor of Asine at the upper end of the Argolic Gulf. A wall, composed of roughly hewn cubic blocks of 0.20–40 m to a side, now

<sup>12</sup> Aeneas Tacticus (8) says such barriers are treated in his *Paraskeustika* and therefore omitted from the *Poliorketika*.

Chapters 51–62 of Philo of Byzantium *Mech. Synt.* 5. C discuss protection against attack from the sea (Garlan 1974, 313–14).

mostly submerged, runs for some 200 m along the west side of Kastraki, once an island, later a fortified hill, leaving a gap of less than 50 m between the southern tip of the wall and the land. Zangger, who dates the wall to the time of the Hellenistic fortifications, believes that "It would be highly unlikely that this basin was used as a port, because it is so small and shallow [today 3 m at most to judge from p. 235, fig. 15] that even navigating a canoe in it is difficult." Rather he suggests that the submerged wall may have "been an extension of the Hellenistic defence system, providing protection from approaching ships" and perhaps also serving as a quay. The Hellenistic fortress at Asine, now dated with the reoccupation of the site to the late 4th or early 3d century (Penttinen 1996), was not the work of a local population for its own defense any more than the walls at late Classical Halieis. At both sites the utility of a small protected harbor should not be overlooked.

In the light of McAllister's observation on the remains at Tower 11 (the Hermion Gate) (see above, 16), the sequence of the city walls in this area can be conjectured as follows:

(1) The antecedents of the surviving North Wall (west of Tower 11) and Northwest Wall (west of Tower 15) and their relationship to the Middle Wall (at present known only as far north as Tower 19) are unclear. McAllister (above, 80) sees two possibilities: (a) that traces of a wall running southwest from Tower 11 and the Hermion gate, parallel to Street 8, came up to a hypothetical square predecessor of Tower 15, as did an extension of the Middle Wall from Tower 19. (b) But in the absence of any surviving trace of an earlier tower or of walls coming up to it from the east and south, she thinks it more likely that the wall running southwest from the Hermion Gate ended at Tower 19. In either case the area enclosed by the later North Wall and Towers 12–15, including the Harbor Gate, lay beyond the fortifications at this time but would have been reached by a gate also providing access to the western valley.

(2) The stretch of city wall angling WNW from Tower 11 was built out into the bay, probably at the time round Tower 11 replaced the rectangular tower at the Hermion Gate. This line ended at the round Tower 14. An opening of ca. 20 m, flanked on the south by round Tower 15,

was left for entering the harbor enclosed by the new wall.

(3) The harbor entrance was narrowed to 7 m by building a projection out from Tower 15 at the tip of which a boom was set. Significantly the remaining entrance is at the northern end of the 20 m opening. Silting at the south end of the entrance, a problem perhaps addressed by the spur wall running out from the Projection, could have made the wider entrance usable only at the north end. The smaller entrance, with Tower 14 on one side of it, would have been easier to control than a 20 m opening. Silting has rightly been seen as a threat to an enclosed harbor (Frost 1985, 65). The town may have been abandoned less than fifty years after the round tower phase of the fortifications and so perhaps before the more serious disadvantages of the harbor's design had been encountered.<sup>13</sup>

The exploit of the Spartan Aneristos in capturing Halieis with a merchant ship full of soldiers (Herodotus 7.137.2; cf. Jameson n.d., chap. 1) probably occurred in the third quarter of the 5th century and therefore before the three stages in the development of the harbor's defenses outlined above. The system of rectangular towers is dated to the end of the 5th or beginning of the 4th century (Phase 5) and the substitution of round towers (Phase 6) to before the mid-4th century. But from the earliest period of the town's fortifications it would have required protection along the shore,<sup>14</sup> with walls following roughly the same line as that in stage (1). The lesson learned from Aneristos may have led to the harbor gate, first wide and later narrow, seen in stages (2) and (3).

Two submerged buildings not related directly to the fortifications were examined in the course of our study of the walls and gates, a hypostyle building outside the Hermion Gate and a bath of Late Roman/Early Byzantine date, built over the old gate and its towers.

#### The Hypostyle Building (Fig. 40, Pl. 19)

The presence of a rectangular structure with two rows of column bases in its interior was revealed by balloon photographs in 1967 and explored by divers in 1968 (NB 504, 49–51; Jameson 1969, 338 and pl. 91a). The remains were overlaid by heavy

<sup>13</sup> For the round tower program, see above, 82–83. On the acropolis, this is Phase 6 (Williams n.d.).

<sup>14</sup> For examples of walls along the shoreline of a harbor, cf. the

large commercial harbor of Knidos (McNicoll and Milner 1997, 55, fig. 11, after Krischen 1938, pl. 2) and Seleukia Pieria (McNicoll and Milner 1997, 84, fig. 16).



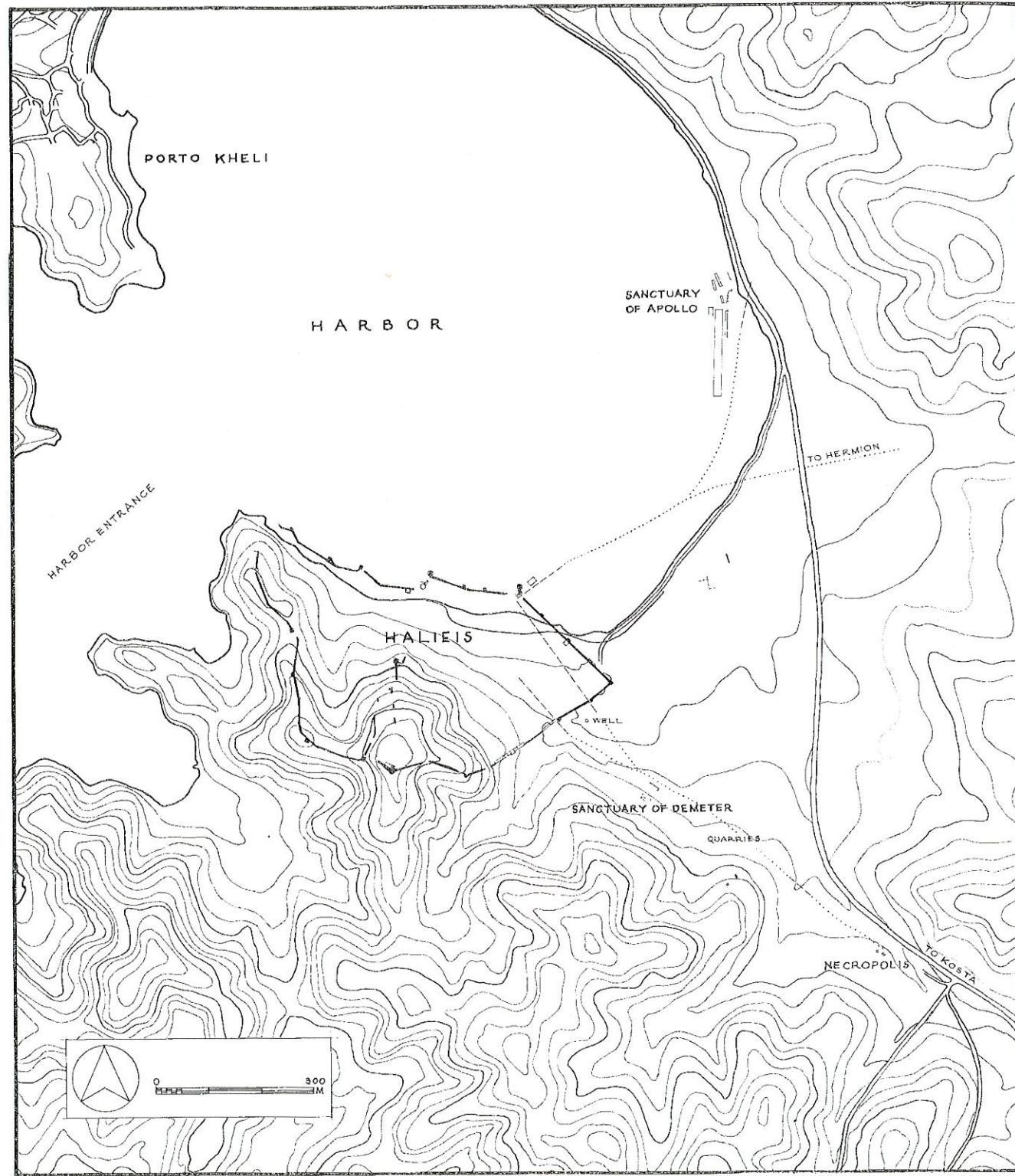


Fig. 17. Site of ancient Halieis and vicinity

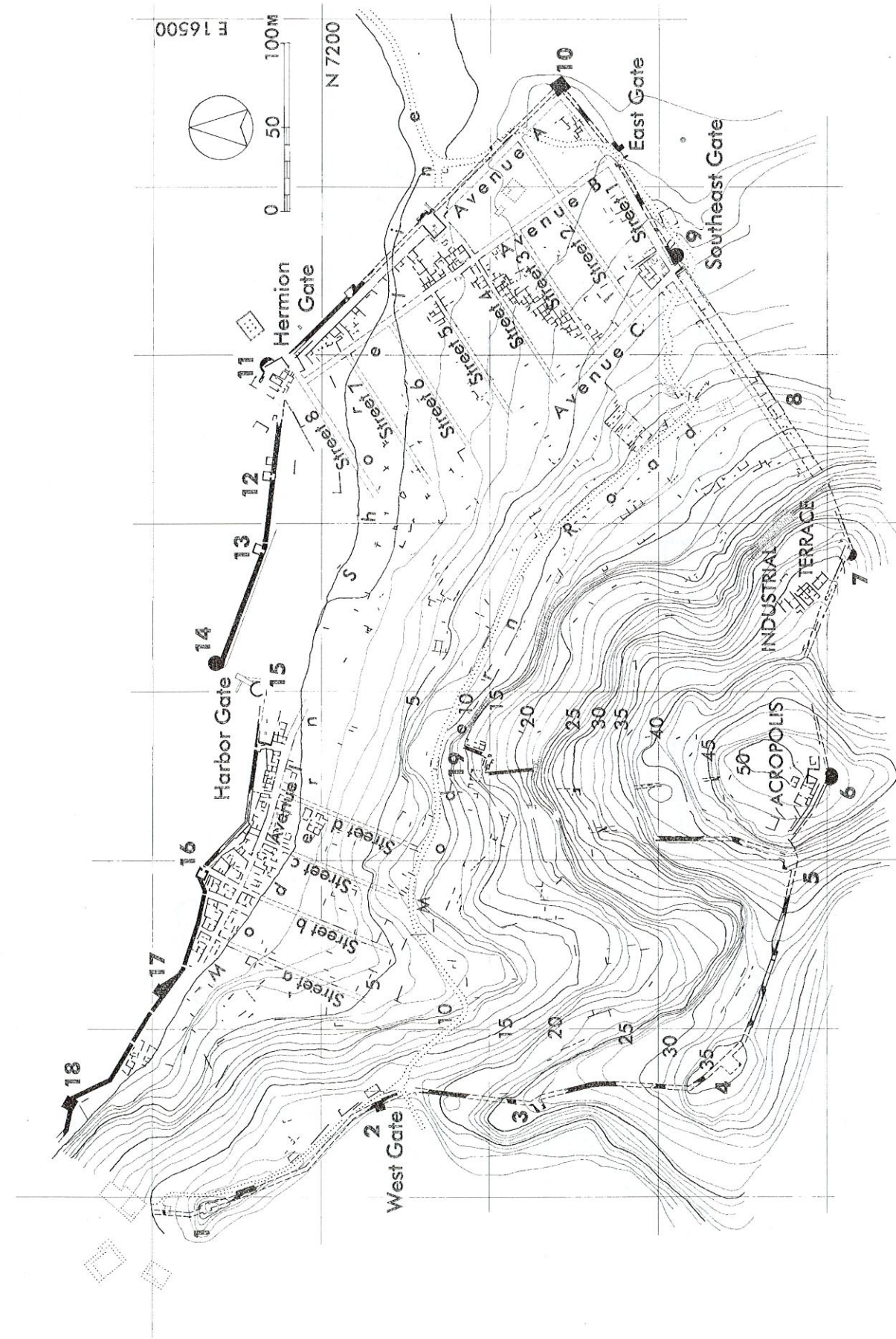


Fig. 18. General site survey plan



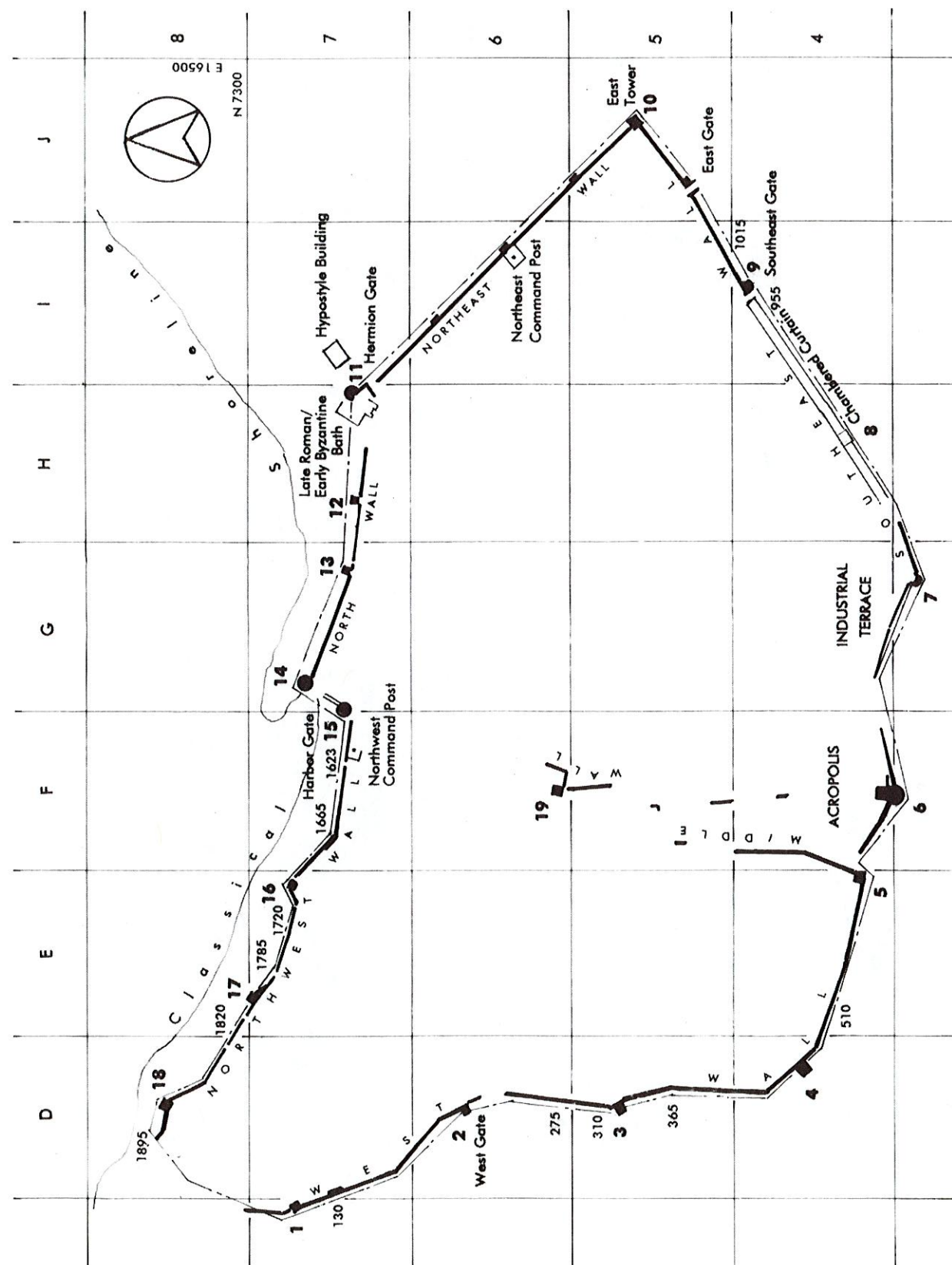


Fig. 19. Key plan showing towers, gates, and sections of curtain wall with running measure line enclosing the circuit; principal structures associated with the fortifications; 100-meter-square excavation sections (1970)

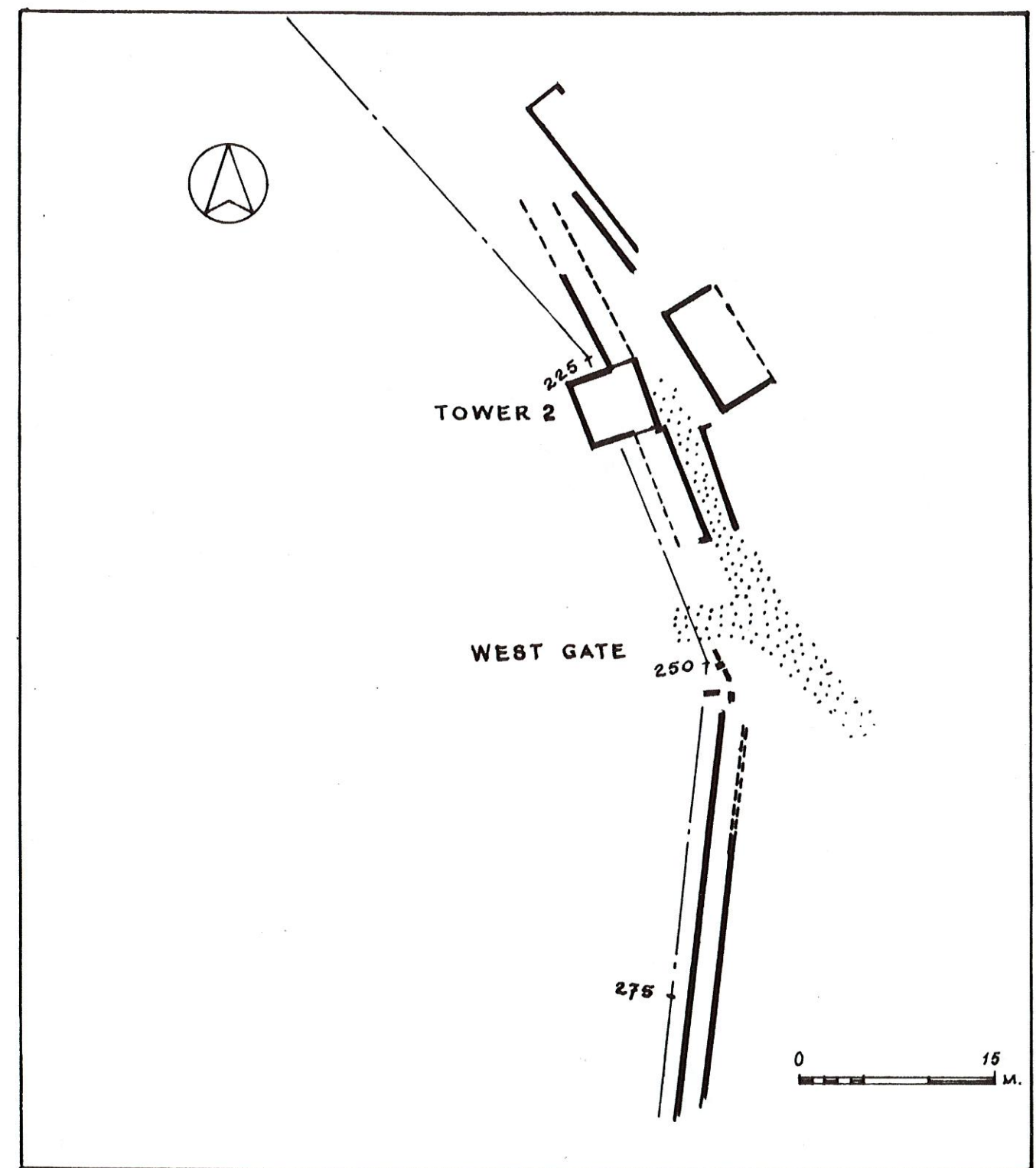


Fig. 20. West Gate and Tower 2



Figures

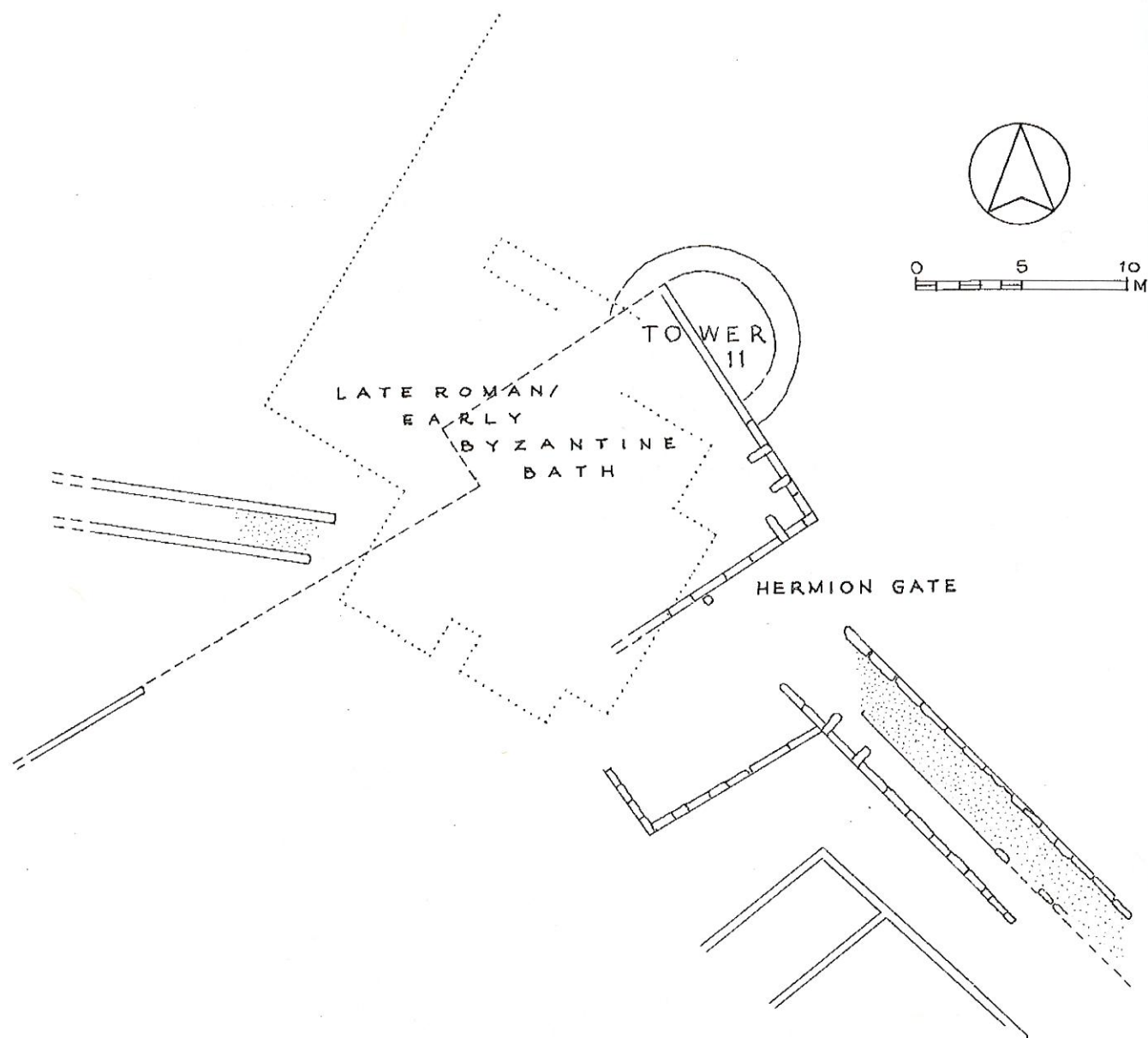


Fig. 28. Tower 11 and Hermion Gate

Figures

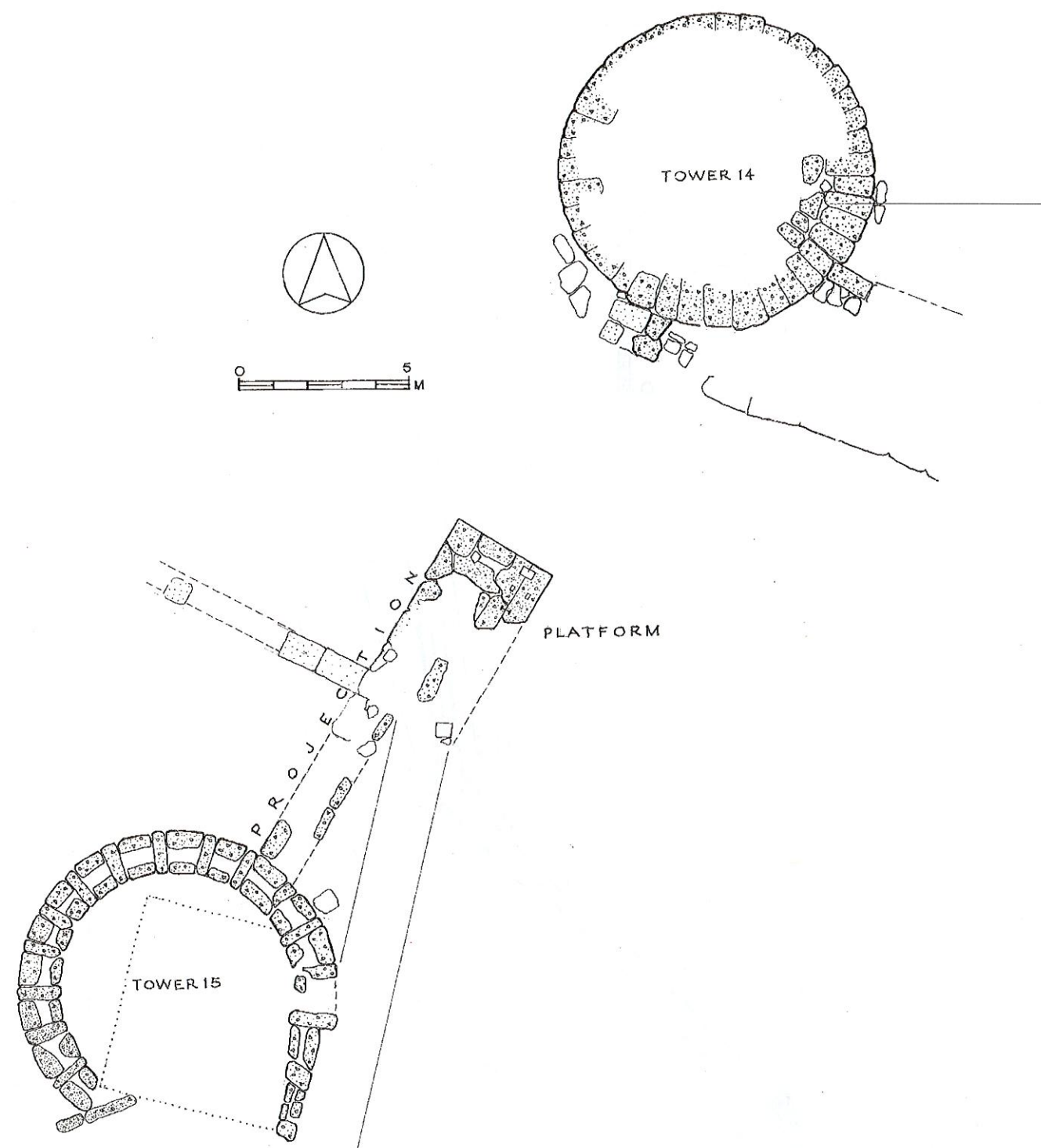


Fig. 29. Towers 14 and 15 and Harbor Gate



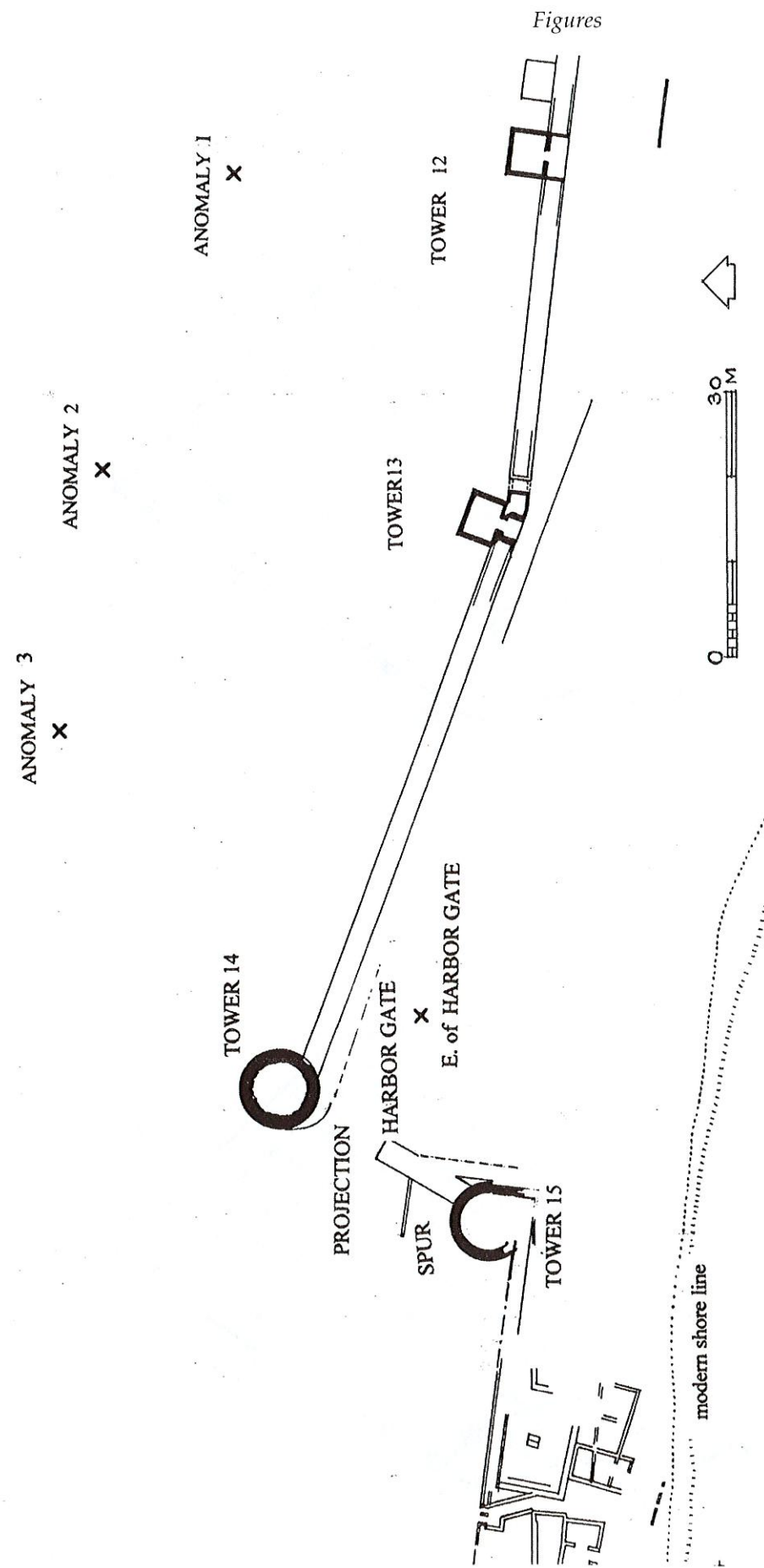


Fig. 36. Anomalies and East of Harbor Gate

Tower 15	Spur 3 courses	Projection 2 courses	Entrance	White Poros Wall	Tower 14 3 Courses	E. of Harbor Gate	Anomaly 1	Stadion Supports	N. Starting Line	Temple of Apollo	LR Post
2.50										2.64 C. threshold 2.84 A. column bases	2.80  I post 3.20
		3.00		3.15	3.00	3.12 seabed LR		3.46	3.00		
	3.25 poros	3.40	3.20 LR pottery		3.20						
	3.60 poros		3.60		3.60	3.82 gravel + BG	(3.60 seabed) sterile gray clay	(3.76)			
	4.00 rubble		4.10 tiles end 4.20 gravel + BG I			I					
			4.40 sterile clay			I					
						4.72 pebbles white clay	4.75–4.95 rubble organic matter LR pottery				
						I	5.00 BG jug/chytra				
						5.67 I post	5.30 sterile gray clay to at least 5.75				
						6.42					

Fig. 37. Elevations of the submerged remains in meters below sea level