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The Hellenistic Harbor of Phalasarna in Western Crete: A Comparison with the Hellenistic Inner Harbor of Straton's Tower

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The Hellenistic Harbor at Straton's Tower[1]

Few harbors from the Hellenistic period have survived to the present day and been studied by excavation. The Inner Harbor at Caesarea is one example.[2] However, the great harbor built there by Herod in the first century B.C.E., which aspired to rival Piraeus in size, was not the first harbor on the site, and it is on the earlier constructions that this chapter concentrates.

According to Josephus, Herod noticed a coastal settlement called Straton's Tower, which had fallen into ruin but could benefit from his generosity.[3] More detail has emerged from several decades of survey and excavation by Avi-Yonah,[4] Negev,[5] Hohlfelder,[6]

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[1] There is a dispute regarding the chronology of the original construction of Straton's Tower. For the opposing views, see A. Raban, "In Search of Straton's Tower"; D. W. Roller, "Straton's Tower: Some Additional Thoughts"; J. A. Blakely, "Stratigraphy and the North Fortification Wall of Herod's Caesarea"; T. W. Hillard, "A Mid-1st c. B.C. Date for the Walls of Straton's Tower?" all in *Caesarea Papers*, 7–48; and Raban, *Site*, 271–74.

[2] For excavations at the inner basin of Caesarea, see Raban, *Site*, 131–37, and idem, "Sebastos: The Royal Harbour at Caesarea Maritima: A Short-lived Giant," *IJNA* 21.2 (1992), 111–24. For Herod's harbor, see J. P. Oleson, "Herod and Vitruvius: Preliminary Thoughts on Harbour Engineering at Sebastos, the Harbour of Caesarea Maritima," in A. Raban, ed., *Harbour Archaeology*, BAR Int. Ser. 257 (Oxford, 1985), 165–72; J. P. Oleson, R. L. Hohlfelder, A. Raban, and R. L. Vann, "The Caesarea Ancient Harbour Excavation Project: Preliminary Field Report on the 1980–1983 Seasons," *JFA* 11 (1984), 281–305; and J. P. Oleson and G. Branton, "The Technology of King Herod's Harbour," in *Caesarea Papers*, 49–67.

[3] Joseph. *BJ* 1.408; *AJ* 15.331.

[4] M. Avi-Yonah, "Caesarea," in "Notes and News," *IEJ* 6 (1956), 260–61.

[5] M. Avi-Yonah and A. Negev, "Caesarea," in "Notes and News," *IEJ* 13 (1963), 146–48.

[6] R. L. Hohlfelder, "Byzantine Coin Finds from the Sea: A Glimpse of Caesarea Maritima's Later History," in Raban, ed., *Harbour Archaeology*, 179–84; "The 1984 Explorations of the Ancient Harbors of Caesarea Maritima," *BASOR*, suppl. 25 (Philadelphia, 1987), 1–12; "Procopius *De Aedificiis* 1.11.18–20: Caesarea Maritima and the Building of Harbours in Late Antiquity," in I. Malkin and R. Hohlfelder, ed., *Mediterranean Cities: Historical Perspectives* (London, 1988), 54–62; idem, "The First Three Decades of Marine Explorations," in *Caesarea Papers*, 291–94; idem, "The Changing Fortunes of Caesarea's Harbours in the Roman Period," ibid., 75–78.

and Raban[7] of the Center for Maritime Studies. R. L. Vann writes that "as a result of the past few decades of field-work, the early town begins to emerge as a coastal settlement focused around its two harbours."[8]

The southern harbor, called the Inner Harbor by the Caesarea Ancient Harbour Excavation Project, was thought to be 40 m. wide and 100 m. long,[9] but recently has proved to be much larger, about 250 x 100 m. in size.[10] The earliest sherds found in it date to the second century B.C.E. and the latest to the first century C.E.,[11] so it must have belonged to the Hellenistic settlement. The harbor is oval in shape and is lined by an internal quay, with a mooring stone *in situ*[12] (both the quay and mooring stone belong to a later phase). Near the quay the harbor was artificially deepened by cutting into the bedrock sandstone (kurkar) to give the harbor a depth of at least 2 m. The ancient sea level is identified by abrasion notches on the quay wall and by marine fauna remains on its face.[13] Within the same area was found a freshwater basin that probably dates to the Hellenistic period.[14]

There are also remains of defensive fortifications of the Hellenistic town.[15] Two towers 12 m. in diameter have been found on land on the northern shore of the area, with an associated wall and long quay nearby.[16] Under water there is a round tower 13 m. in diameter.[17] These towers probably were part of defenses that encircled the Hellenistic town and possibly two harbors, forming a double λιμὴν κλειστός,[18] one on the northern and one on the southern side.

The task of reconstructing the town of Straton's Tower is made extremely difficult by the many subsequent phases of building, from Herod's day to modern times. In many details, however, the harbors and their fortifications bear striking resemblance to those of the closed harbor at Phalasarna in western Crete (fig. 1), which was aban-

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[7] A. Raban, "Caesarea Maritima, 1983–84," *IJNA* 14 (1985), 155–77; Raban, *Site;* idem, "Straton's Tower"; A. Raban and R. Stieglitz, "Caesarea Maritima 1987," in "Notes and News," *IEJ* 38 (1988), 273–78; Holum et al., "Preliminary Report," 79–111.

[8] R. L. Vann, "Man Made Features: Straton's Tower," in Raban, *Site*, 25–27; R. L. Vann, "Early Travelers and the First Archaeologists," in *Caesarea Papers*, 275–90, gives a summary of archaeological work to modern times. See also the chapter by R. R. Stieglitz in this volume.

[9] Raban, "Sebastos," 116.

[10] A. Raban, personal communication.

[11] Raban, "Sebastos," 117; Holum et. al., "Preliminary Report," 89.

[12] Raban, *Site*, 133–34.

[13] Raban, "Sebastos," 117; Holum et al., "Preliminary Report," 89.

[14] Raban, *Site*, 137; idem, "Sebastos," 119.

[15] See above, n. 1.

[16] Raban, *Site*, 26, 143–49.

[17] Ibid., 90.

[18] A. Raban, "Straton's Tower," 22 and 72, fig. 2. For discussion of closed harbors, see K. Lehmann-Hartleben, *Die Antiken Hafenanlagen des Mittelmeeres* (Leipzig, 1923), 65–74; important recent work is summarized by D. J. Blackman, "Ancient Harbours in the Mediterranean," *IJNA* 17 (1988), 147–57, 185–211.

Figure 1. Map of western Crete with major ancient coastal towns. Map by M. Strongilou

doned in the first century B.C.E. It was never reinhabited or overbuilt, down to the present day, and thus provides a laboratory for studying Early Hellenistic harbor installations.

Phalasarna

Phalasarna[19] lies on the far western coast of Crete, facing the western Mediterranean. The ancient city reached its peak in the fourth to third centuries B.C.E., and its λιμὴν κλειστός was mentioned by Skylax and by Dionysios Kalliphontos[20] (fig. 2). A 90 m. high rocky promontory dominates the sea, and has at its highest point an acropolis with at last two temples, public buildings, and cisterns. The bottom of the cape is pro-

[19] For the research to date, see E. Hadjidaki, "Preliminary Report of Excavations at the Harbor of Phalasarna in West Crete," *AJA* 92 (1988), 463–79; and F. Frost and E. Hadjidaki, "Excavations at the Harbor of Phalasarna in Crete: The 1988 Season," *Hesperia* 59 (1990), 513–27. For the ancient literary sources regarding the town and its rediscovery in the nineteenth century, see Hadjidaki, "Phalasarna," 466–68.

[20] Skylax, 47; K. Müller, *Geographi Graeci Minores*, vol. 1 (Paris, 1855), p. 42. Dionysios Kalliphontos, 120; ibid., p. 242.

tected by a 550 m. long stretch of double fortification walls with three defensive bastions *in situ* all constructed of sandstone material from nearby quarries in an isodomic style. Part of the town's fortifications formed in Antiquity the west side of the harbor, which lay along the southern foot of the acropolis.

Inscriptions[21] and coins[22] found at Phalasarna show that the town was a strong maritime state during the fourth century B.C.E. Its wealth seems to have derived mainly from piracy and mercenary service.[23] According to Strabo, the Cretans succeeded the Tyrrhenians in piracy at the beginning of the third century B.C.E., and, together with the Cilicians, they seem to have been the toughest and most able pirates of the Mediterranean.[24] Plutarch reports on their fast ships, which set out from ports that possessed towers and ship sheds. Phalasarna's harbor, as we shall see, was ideal for pirate hideouts, as it was hidden behind steep cliffs that made it invisible from the sea.[25]

This port is particularly remarkable for three reasons: (1) its monumental military architecture and its harbor engineering were unusual in the Greek world; (2) it has not been overbuilt since the Roman conquest of Crete in 67 B.C.E., thus its port and city are intact; (3) because of violent tectonic movements in 68 C.E. and 365 C.E., this part of western Crete has been raised 6.6 m. above sea level,[26] so that the entire port is now on land, and, like the old port of Straton's Tower, 100 m. from the sea.

Excavations begun in 1986 and still in progress have provided the following information regarding the port's construction. The port was built in a preexisting lagoon, parts of which were deepened by cutting into the rock, and was connected to the sea by an artificially dug channel 50 m. long and 10 m. wide (fig. 2). Remains of the rock-cut faces along the channel are still visible, and excavations have proved that it was at least 2.0 m. deep, deep enough to allow passage of warships having a draft of 1.2 m. This artificial channel is unique in the Greek world; nothing similar has been discovered. All other closed harbors said by Skylax to have existed in Greece during the fourth century B.C.E. were created by closing off coves with moles and jetties. In addition, a second channel was dug to help with the desilting of the area.

The harbor, which measured 100 x 75 m., was then encircled by enormous curtain walls, all connected to the city's fortifications by five round or square towers, thus fitting perfectly the description of Skylax, who called it a "closed port."

Two of the towers that have been excavated so far, although much smaller than those at Straton's Tower, have a fascinating architecture. A round tower 9 m. wide is

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[21] M. Guarducci, *Inscriptiones Creticae,* vol. 2 (Rome, 1939), 131–33.

[22] J. N. Svoronos, *Numismatique de la Crète ancienne* (Paris, 1890), 268–71.

[23] E. Hadjidaki, "The History of Cretan Piracy," *Festschrift for Dimitri Djordjevich: Scholar, Mentor, Patriot* (Santa Barbara, Calif., 1992), 51–61.

[24] Strabo 10.4.9.

[25] Plutarch *Pompey* 24.1.

[26] P. A. Pirazzoli, J. Ausseil-Badie, P. Giresse, E. Hadjidaki, and M. Arnold, "Historical Environmental Changes at Phalasarna Harbor, West Crete," *Geoarchaeology* 7 (1992), 371–92.

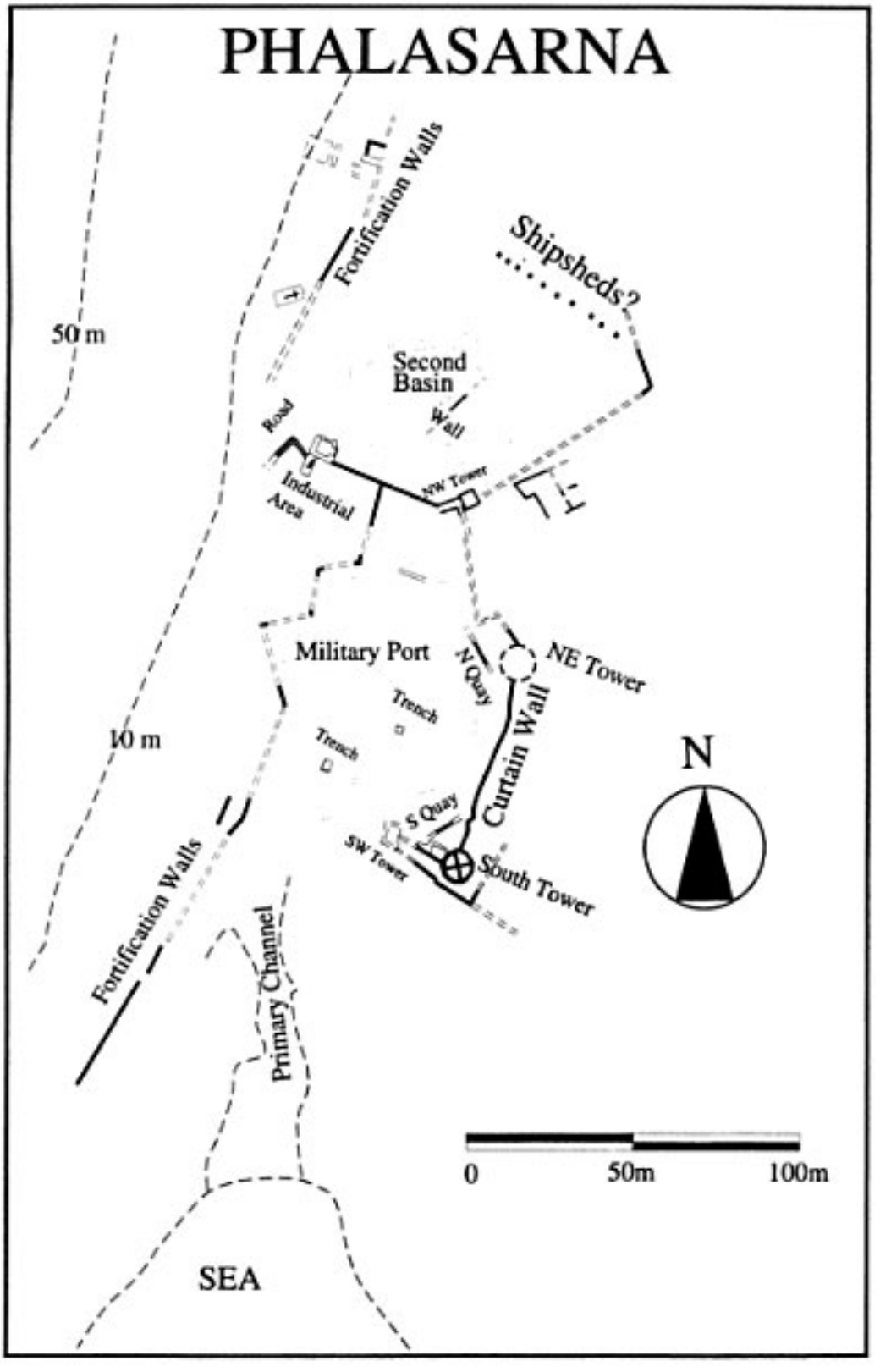

Figure 2. Plan of Phalasarna harbor. Plan by Ellie Cassese

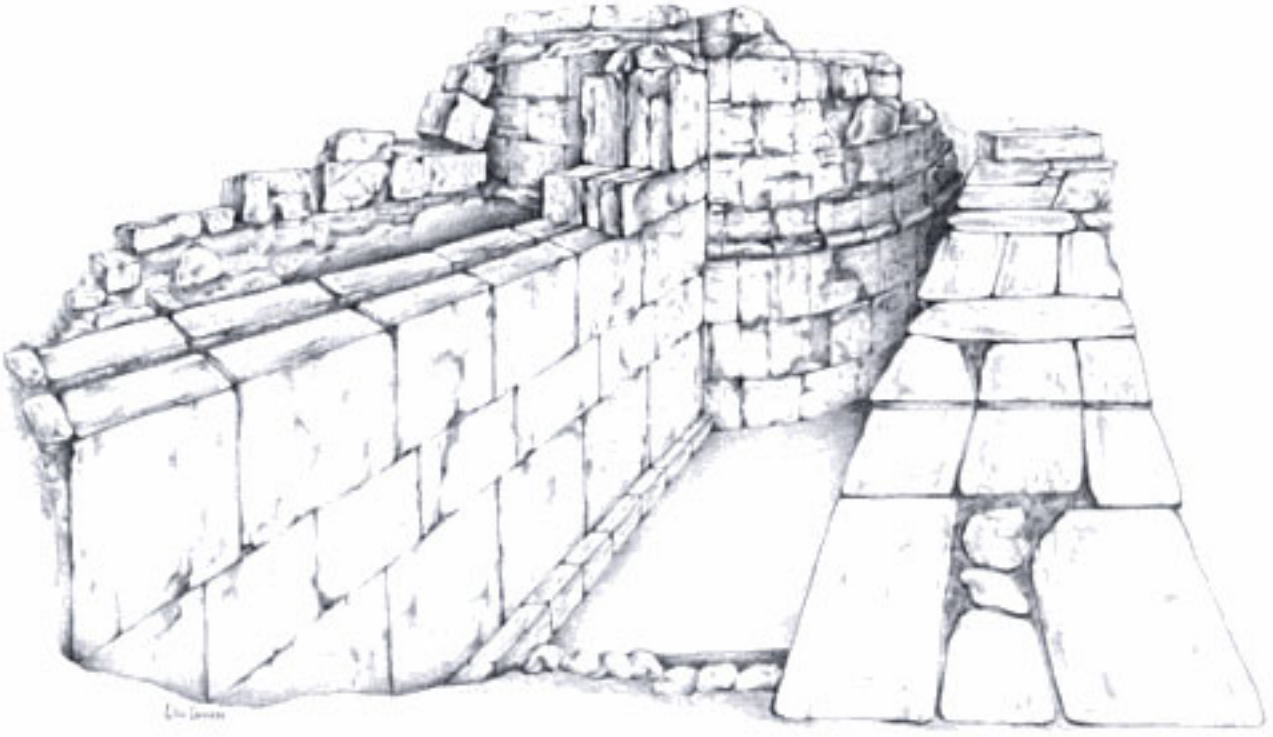

Figure 3. View of round tower with associated walls at the south side of Phalasarna harbor; compare with Raban, Site, 361–62, figs. II.2 and II.3. Drawing by Ellie Cassese

built upon carefully carved bedrock of ashlar blocks in an isodomic style, with the faces of the stones polished smooth (fig. 3); each stone measures 1.2 x 0.7 x 0.4 m.,[27] similar in size to the stones of the underwater tower at Straton's Tower which measure 1.5 x 0.5 x 0.6 m.[28] The base of the tower has a carved molding on the stone (κυμάτιον), which was common in Hellenistic military architecture but is unusual for a harbor tower. The interior of the tower is buttressed by two cross walls, and its sections filled with loose rubble. Hundreds of black glazed sherds and other pieces of pottery from inside the tower fill date it to the end of the fourth century B.C.E.

A water tank 4 m. long and 2 m. deep was added to the tower's outer side by three additional walls adjacent to it.[29] The walls of the tank are coated with hydraulic cement and finished with an outer coating of black color. It has a mosaic floor made from colored sea pebbles, and a depression for gathering silt that is covered with lead sheathing.

There is also a square tower smaller in size, 6.5 m. wide, whose interior is completely filled by solid, medium-size crude stones[30] (fig. 4). The isodomic blocks of this

[27] Hadjidaki, "Phalasarna," 463–74; Hadjidaki and Frost, "Phalasarna 1988," 515, fig. 2.
[28] Raban, *Site*, 90.
[29] Frost and Hadjidaki, "Phalasarna 1988," 516–17, pl. 79 a–c.
[30] Ibid., 517–24, pl. 80, fig. 4.

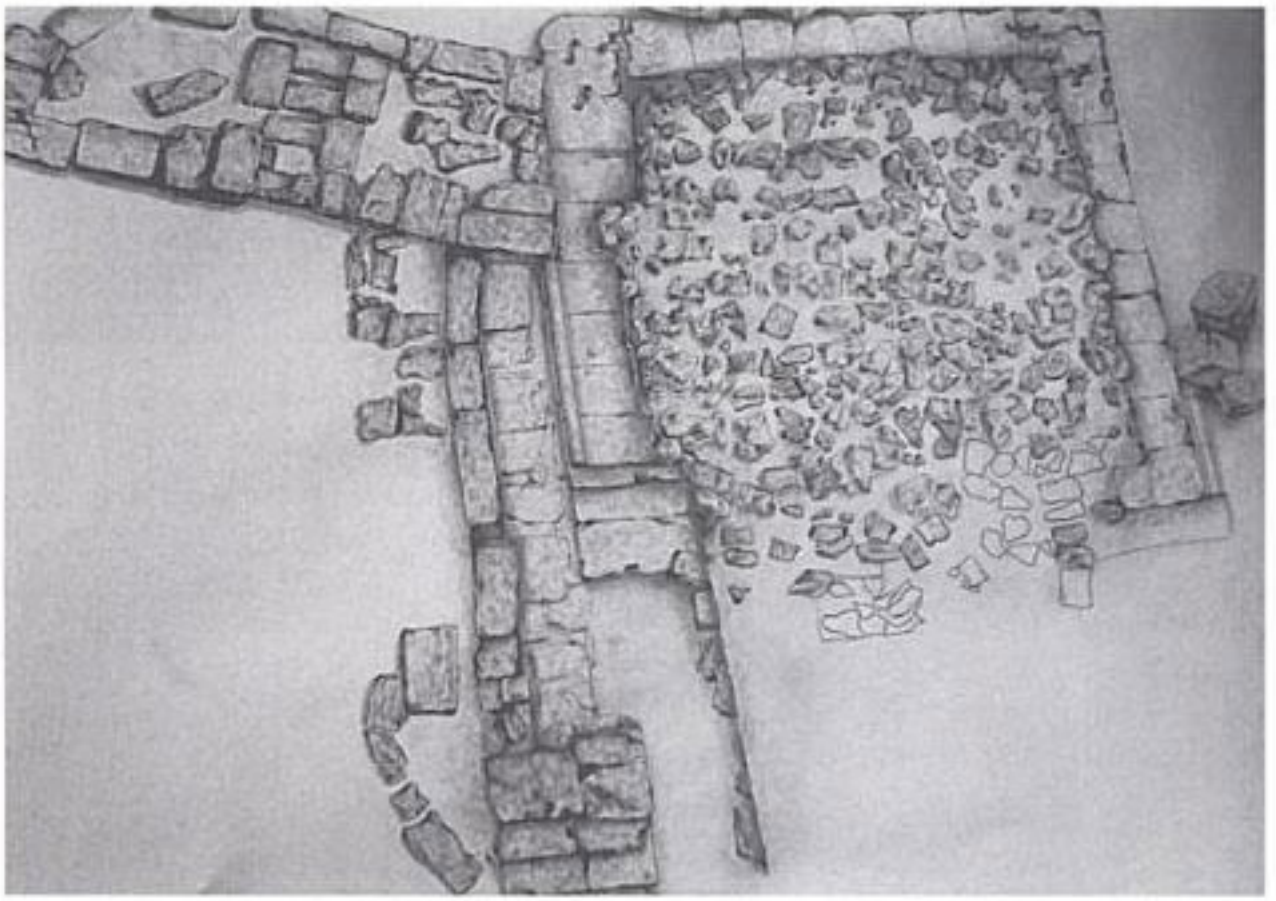

Figure 4. View of square tower with rectangular gateway at north side of Phalasarna harbor. Drawing by Ellie Cassese

tower are connected to one another with metal clamps. One of the clamps has been found, and consists of an iron rod bent to fit a Z-shaped socket, with molten lead then poured around to fill the socket and prevent rusting and swelling of the iron. The exterior faces of the blocks were decorated with περιτένειαι (drafted margins), and all measure 1.18 x 0.65 x 0.43 m.

Again, as in the case of the round tower, there is a κυμάτιον low around the base. Much of the tower's masonry, however, was robbed in the second century B.C.E. to construct a gateway. It adjoins the square tower, and its rectangular shape is 5 m. long and 3 m. wide. On its southern face there is a doorway 1 m. wide, and on its west side a stairway has been partly excavated that probably joins with the nearby northwest tower, on which excavation has just begun.

From the western side of this complex a broad double wall 50 m. long extends to meet the fortifications that line the base of the acropolis. Where the wall meets these defenses, there is an enormous polygonal structure that has been only partly excavated (fig. 5). It consists of a long retaining wall of rectangular blocks 1.8 m. high, which

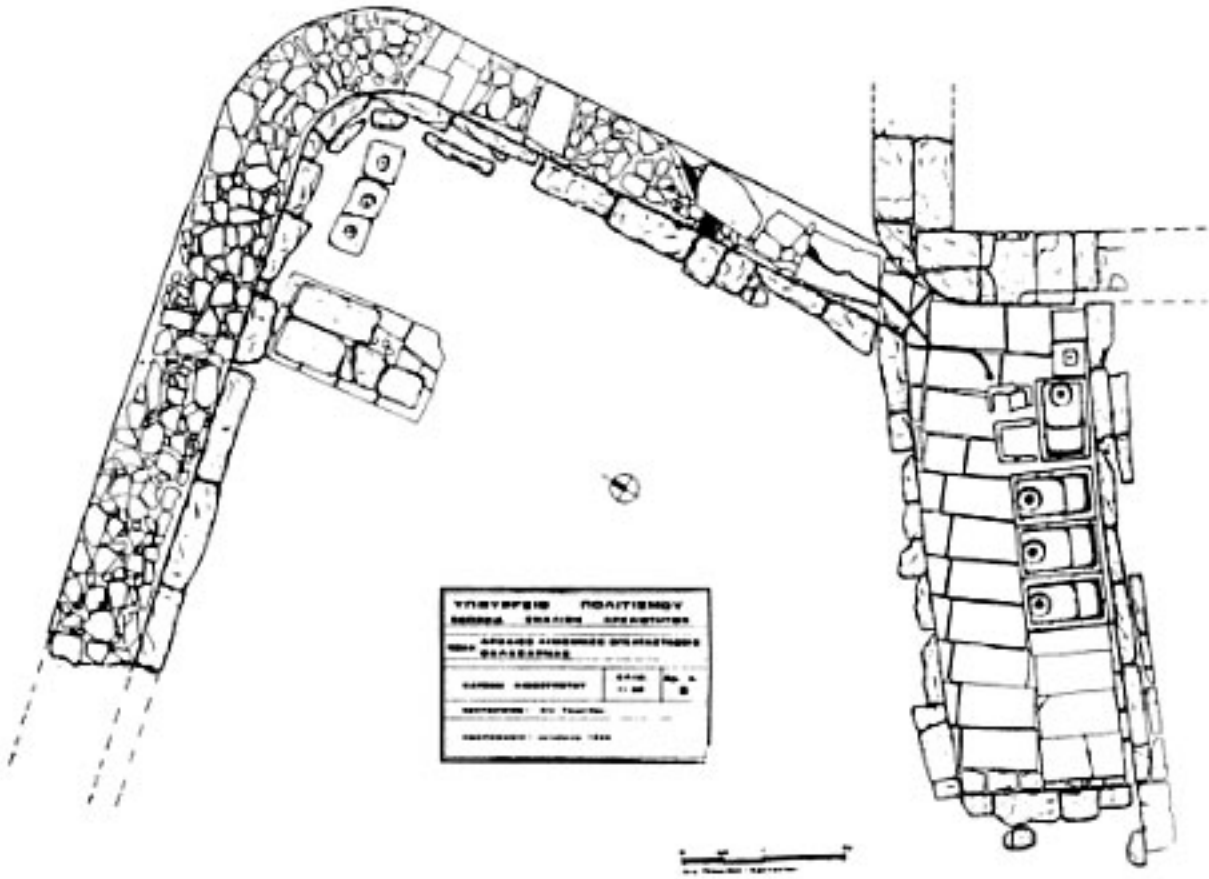

Figure 5. Plan of long polygonal wall with adjoining basins and paved road. Plan by K. Tagonidou

curves at its northern end, and continues west again for a total perimeter of 20 m. Around its northern perimeter there is a paved road made of smooth cobbles that are resting on a sublayer of crumbled sandstone. This is most likely part of the main road that connected the port with the main town. This road is very similar to the long avenue at the ancient town of Olynthus,[31] and may have been the sacred road to the temple.

Adjoined to the south side of this wall is a large room 6 m. long and 2 m. wide. Inside the room were found four sandstone basins carved in the shape of baby baths. Their interior contained a carved step, and at the bottom there is a depression that was once lined with lead. In one of them the lead remains intact. They rested on a carefully constructed floor paved with large rectangular blocks. The baths were filled with large chunks of unbaked clay and tailings from the processing of metallic ore. It

[31] D. M. Robinson, *Excavations at Olynthus: Domestic and Public Architecture*, vol. 12 (Oxford, 1946), 170–78, pls. 141–47.

is presumed that this was a small industrial zone of the Late Hellenistic period, that the baths were used for washing clay and metal, and that the long wall was probably part of an enclosure that still awaits excavation.

Also discovered were the first 10 m. of the harbor's north quay between the partially excavated NE tower and the N tower (fig. 6). It consisted of thick limestone blocks arranged in a header and stretcher line, called by the ancients λίθυς ἐναλλὰξ φορμηδὸν καὶ παρὰ μήκος.[32] The headers are 1.12 m. long, 0.6 m. wide, and 0.4 m. high, and bear traces of sea erosion. The measurements of these blocks are nearly identical to those of the Hellenistic quay by the seashore at Straton's Tower.[33] One of the blocks bears a hole with rope marks inside, and obviously was used as a mooring stone. The quay is 0.8 m. high from base to top, and was half submerged. This leaves only 0.4 m. draft, and only 0.4 m. extension above the water, too little for triremes. Small craft were probably tied to this quay, from which they could bring supplies and personnel out to ships at the center of the harbor, where the water was deep.

Finally, at the back of the military port, there is an inner basin, 50 x 25 m., lined with finely crafted walls[34] (fig. 7). Thus far only one wall has been excavated, to a length of 12 m. It is constructed isodomically, and has a height of 1.2 m. and a width of 0.55 m. The top surfaces of the wall bear marks from erosion, and 0.3 m. below its surface the ancient water line is visible. Although right next to the sea, this basin contained only fresh or brackish water, and had only occasional contact with the sea. I am sure this installation was used for the harbor, but I still cannot guess its function. However, it is striking that a similar basin of brackish water was located adjacent to the inner basin at Straton's Tower.[35]

The harbor at Phalasarna seems to have been destroyed by the Romans under the general Metellus Creticus during the war against the Mediterranean pirates in 68–67 B.C.E.[36] The port fell into disuse, was abandoned, and quickly silted up. In 66 C.E. and 365 C.E. two major earthquakes lifted this part of western Crete 6.6 m. above sea level,[37] while tsunami waves buried whatever was not already hidden by silt. Long abandoned by its citizens, and hidden beneath the earth 100–200 m. from the coast, the harbor of Phalasarna survived relatively intact to the present day.

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[32] *Inscriptiones Graecae* $2/3^2$, 1668.15.

[33] Raban, *Site*, 143–49.

[34] Frost and Hadjidaki, "Phalasarna 1988," 524, pl. 82b.

[35] Raban, *Site*, 133–37; Holum et al., "Preliminary Report," 89.

[36] Hadjidaki, "Phalasarna," 476; Hadjidaki and Frost, "Phalasarna 1988," 525; F. Frost, "The Last Days of Phalasarna," *Ancient History Bulletin* 3 (1989), 15–17.

[37] For the tectonic displacement, see Hadjidaki, "Phalasarna," 466, and Pirazzoli et al., "Environmental Changes."

Figure 6. Quay with headers and stretchers. Photograph by C. Agourides

Conclusions

There are a number of striking similarities between the Hellenistic harbors of Phalasarna and the alleged harbor of Straton's Tower: (1) both were carved out of sandstone in preexisting lagoons near the sea; (2) both had a depth of 2 m. or more; (3) both were built next to freshwater sources; and (4) both were surrounded by walls and towers.

Thus both Phalasarna and Straton's Tower illustrate harbor types that were invented in the Classical period. Each is a λιμὴν κλειστός, since it is surrounded by the city walls. In addition, one must consider the Phoenician tradition of building artificial basins. The earliest of these at Motya dates to the sixth century B.C.E.,[38] but it is too

[38] J. S. Whittaker, *Motya, a Phoenician Colony in Sicily* (London, 1921), 185–93; J. du Plat Taylor, "Motya, a Phoenician Trading Settlement in Sicily," *Archaeology* 17 (1964), 91–100; D. J. Isserlin, "New Light on the 'Cothon,'" *Antiquity* 45 (1971), 178–86; idem, "The Cothon at Motya: Phoenician Harbor

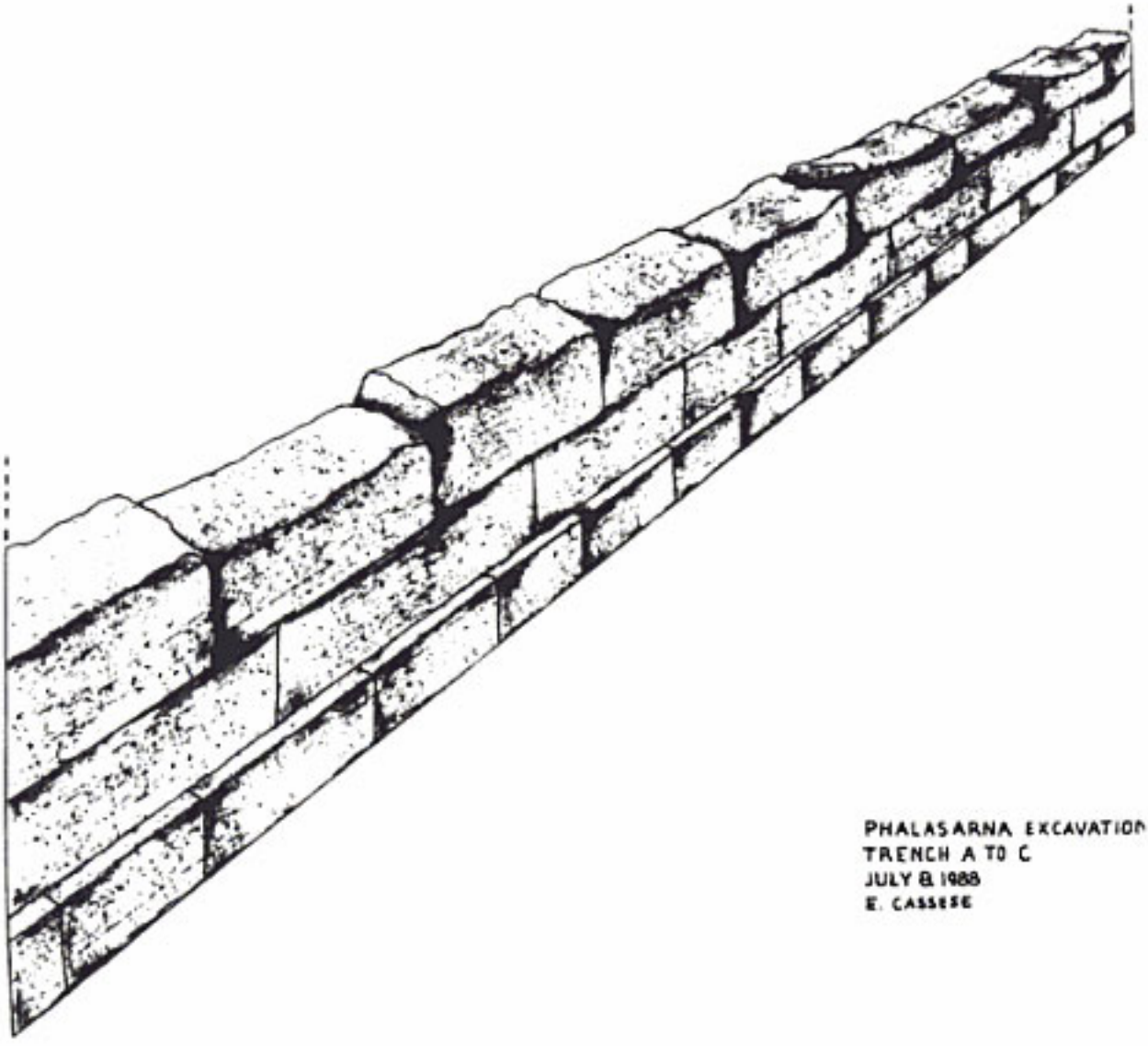

Figure 7. Side view of long retaining wall in the inner basin of Phalasarna. Drawing by Ellie Cassese

small to be a harbor, while the most famous, called Κώθων, at Carthage dates to 200 B.C.E.[39] Earlier construction at Carthage is an excavated channel 15–20 m. wide that dates to 400–350 B.C.E.[40] Thus the evolution of harbor design seems to have

Works," *Archaeology* 27 (1974), 188–94; D. Harden, *The Phoenicians* (London, 1962), 32, 37, 126, 130–31.

[39] H. Hurst, "Excavations at Carthage 1974: First Interim Report," *Antiquaries Journal* 55 (1975), 11–40; 56 (1976), 177–97; 57 (1977), 232–62; 59 (1979), 19–49; H. Hurst and L. Stager, "A Metropolitan Landscape: The Late Punic Port of Carthage," *WA* 9 (1978), 334–46.

[40] Hurst, "Carthage" (1979), 20–22; Hurst and Stager, "Metropolitan Landscape," 338–39; also L. Stager, "Excavations at Carthage 1975, the Punic Project: First Interim Report," *AASOR* 43 (1976), 169.

been a joint Phoenician and Greek tradition, although the earliest examples of artificially excavated, enclosed, and fortified harbors found to date, as at Phalasarna and Straton's Tower, are Greek.

I suggest that the harbor engineers of the Mediterranean had evolved a fairly standard harbor design, which could provide safe anchorage and port facilities for hundreds of years without silting or damage. It is ironic that Herod, in constructing an immense artificial harbor upon the older one, overstepped the engineering knowledge of his time. Within two hundred years, the new harbor was breached and began to fall into disuse.