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Sebastos: the royal harbour at Caesarea Maritima—a short-lived giant

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Two thousand years ago, in the year 10 BCE King Herod the Great, the over-ambitious ruler of the Jewish state of Judea and a loyal vassal to the Roman Emperor Augustus, had accomplished his most daring project: a royal harbour of the size of that at Piraeus, built with free-standing moles off an exposed shoreline and an adjacent city. Caesarea was the name of the new city, called after Herod's patron, and the harbour was called Sebastos, the Greek equivalent to Augustus. Within 12 years the unprecedented project was finished and the inauguration festivities were held exactly 2000 years ago (JA, 1930: 331–342; JW, 1930: 410–414).

The occasion of the bimillenial jubilee provides us with a duty to try and reconstruct the later history of this ill-fated harbour and its final dissolution, based on a comprehensive study of our recent research at the site and consequent revaluation of the historical documents accordingly.[1]

There is no doubt that Sebastos went out of use in antiquity. This was clearly attested by Procopius of Gaza, who wrote early in the 6th century AD: 'The harbour of the city named after Caesar had disintegrated through age and lay open to every threat of the sea. Its structure no longer measured up to the category of harbour, but of its former condition it kept the *name* alone' (Migne, 1865: col. 2817).

The term *Portus Augusti* is to be found for the last time among historical documents relating to Caesarea on a coin minted there during the reign of Trajan Decius (AD 243/4) anticipating a future visit of the Emperor during his planned trip to the East. This trip never took place (Kadman, 1957: 67).

About two centuries earlier the epithet of the city was 'Καισαρια η προσ Σεβαστω λιμενι' as is to be found on the reverse sides of the coins minted there by the Jewish king, Agrippa I (AD 44), and during the 14th regnal year of Nero (AD 66/7) (Ringel, 1975: 153–4). It is intriguing to discover if Procopius' claim for the state of the harbour which shortly before his time had retained only its *name*, but lay *open*, was already true in the days of Trajan Decius. Maybe the use of the title *Portus Augusti* on the coin minted in anticipation of his visit was an attempt made by the people of Caesarea to be granted proper resources by this Emperor to renovate the disintegrated royal harbour, as happened later by Anastasius I.

Three recent studies reviewed the historical sources for the state of Caesarea's harbour during its later days. Hohlfelder (1988: 59, n. 20) claims that Trajan Decius' coin might be considered direct evidence that the royal harbour at Caesarea was still operational in the mid-3rd century AD. In an earlier study the same scholar has reviewed the coins retrieved from the area of the harbour entrance by CAHEP and concluded that the Sebastos was actually in regular use all through the later Roman and earlier Byzantine eras (3rd–5th centuries AD; Hohlfelder, 1985). Levine (1975: 17–18) referred both to the above mentioned 3rd century coin of Trajan Decius and to a legal discussion in a Rabbinic source (Gittin, I.1, 43b): 'Rabbi Ya'acov beRabbi Zivdi said: It happened that someone brought a bill of divorce from the port of Caesarea [in Palestinian Aramean Hebrew the actual phrase is *Lamina de Kisrin* = the Limen of Caesarea]. The case came before Rabbi Abbahu [the famous head of the Rabbinic school in Caesarea during the second half of the 3rd century] who said: Yes, one is obliged to attest—"it was written in my presence, it was signed in my presence" [as was the Rabbinic law for bills of divorce brought from

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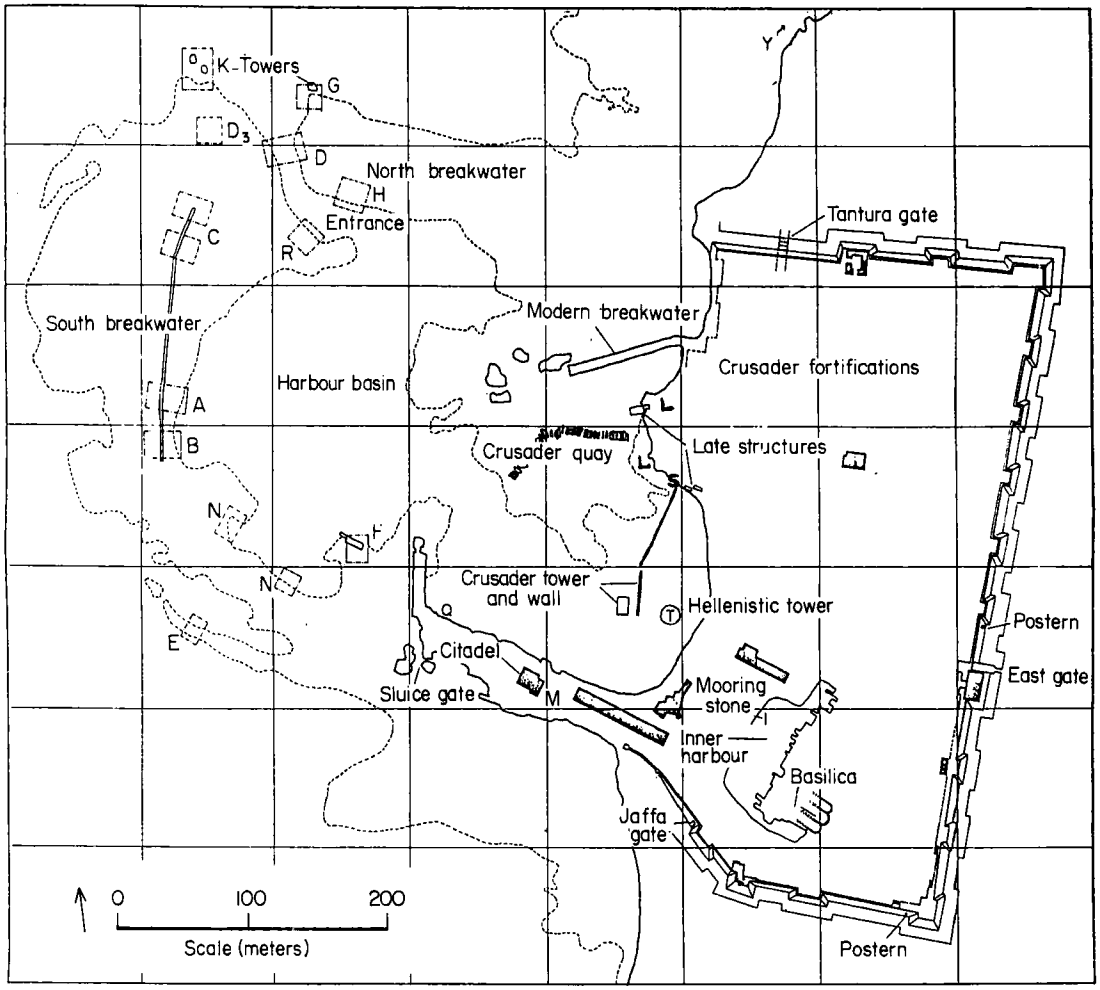

Figure 1. Plan of Caesarea and its harbour, indicating the various excavation areas and fields.

abroad].[1] But is not the Port of Caesarea to be considered as Caesarea itself? Rabbi Abin said: 'The reason in this case was that it was a departing ship, already under sail, within the harbour'. This text was taken by Levine as proof for the integrity of Sebastos in the 3rd century (Levine, 1975: 17). Ringel (1988) published a brief survey of all literary and numismatic evidence of maritime activity in Caesarea during the Roman era (1st–4th centuries AD) and although he points out the relative rarity of maritime symbols on the city's coins and although he quotes Rabbinic entries which refer to the hazards of using the harbour, he concludes: 'In conclusion, and despite the scarcity of documents—especially with respect to the second century—literary and numismatic sources, either directly or indirectly, attest fairly clearly to the continuing activity of the Port of Caesarea during the Roman period, up to the end of the fourth century' (Ringel, 1988: 72).

These scholars' claims can be re-evaluated by a survey of the data yielded through ten seasons of CAHEP's field work and underwater excavations at Caesarea. During the continuing programme of research, data were collected which relate to the destruction of Sebastos in five or six different working areas (Fig. 1). Before describing the data, it is important to make two observations:

1. It is almost beyond doubt that the main basin of Sebastos, that which was formed by free

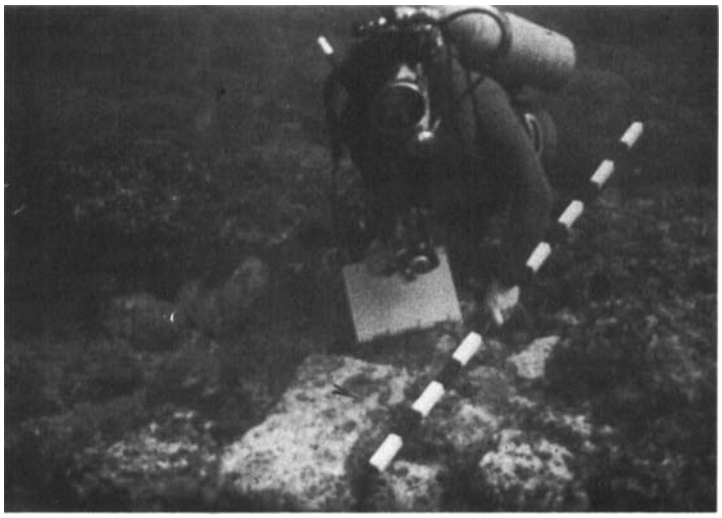

Figure 2. Diver next to a basalt slab from a heap of ballast stones at CAHEP's Area N-1.

standing moles in the open sea, has subsided with the sea-floor by over 5 m since it was built. This subsidence has occurred rather evenly all over the vast area seaward from a supposed fault line which runs parallel to the present shoreline (Neev *et al.*, 1978; Raban *et al.*, 1989: 4–7, 21). The question is when this process began and when it reached a stage of submergence that allowed storm surges to flood the harbour basin in an uncontrolled manner.

2. Data which trace such wave-affected components within the confines of Sebastos to our mind provide the best and most convincing evidence for proving harbour submergence. Whenever the archaeological and architectural context of these data enable us to date them stratigraphically, we can offer good evidence to date the stage when the protected basin ceased to be so, due to the fact that at least in some places along its course the main mole and breakwaters were already overrun by the incoming waves from the open sea.

Of the archaeological data for dating the time of the submergence of the main breakwater, perhaps the most direct is that of remnants of wreck sites on top of what are currently the higher parts of their tumbling structures. Since 1975, 23 such wreck sites have been located on top of both breakwaters. In most cases, the only evidence remaining is a pile of stones usually of a high-density type of rock, entirely different from the type of porous local sandstone (*Kurkar*) that was used everywhere in Caesarea for building structures. These stones, sometimes rubble, or haphazardly shaped slabs, can be considered to be the ballast of either a wrecked merchantman or an intentionally jettisoned one. In both cases, it is clear that these piled stones were dumped in their present location when it was already below the waves. In most cases these stones were found piled up on top of the structure's debris, so it is most unlikely that they have been unloaded and piled on a quay at the time that this part of the Herodian harbour still retained its original elevation and was still functioning. Of these piles of ballast stones, only one, found on top of the southern breakwater, just west of Area N-1, is composed of well-fashioned standard basalt blocks, of rectangular form with concave sides (Fig. 2). Yet, even these beautifully worked pieces cannot be dated typologically to a definite period. In only half a dozen wreck sites are there piles of sherds in considerable quantities. In all cases the sherds are shattered in small pieces, well worn by the waves, and are clustered together by marine encrustation (Fig. 3). Their condition is what is normal in the situation when a cargo of amphoras is dumped in shallow waters, on top of a stony bed with full exposure to high wave-energy. Therefore, not in every site was it possible to extract and identify individual datable sherds. Only in three of the wreck

Figure 3. Sherds of broken amphoras from a wreck site on top of the Western Breakwater (Photo: M. Little).

Figure 4. Byzantine amphoras *in situ* at CAHEP's Area H-1 as exposed under the Byzantine renovated rampart.

sites was an ample sample of pottery vessels extracted. Two of these are the most common 'cigar shape' jars, known also as 'Gaza type' (Fig. 4) and dated to rather a long time span within the Byzantine period, from the mid-4th to the early 7th centuries AD (Riley, 1975: 90, n. 20; Hayes, 1976a: 117; Zemer, 1977: 61, 89; Landgraf, 1980: 71–2, 83; Levine & Netzer, 1986: 97–9).

However, in one of these sites, on the inner edge of the North Breakwater, the broken amphoras were found to be covered by the rubble rampart of Anastasius' renovation of the harbour area in AD 500 (Olson *et al.*, 1984; 294–5; Raban, 1985: 158–161; Hohlfelder, 1987, fig. 8; Raban *et al.*, 1989: 171). Only at one wreck site, about half-way along the Western Breakwater (20 m north-west of Area A), were there clearly datable Late Roman amphoras, of the type common at the end of the 2nd century AD, and were probably in use till the end of the 3rd

Figure 5. Restored upper part of a 3rd century AD amphora from a wreck site on top of the Western Breakwater.

century AD (Fig. 5; see also Levine & Netzer, 1986: 165; Zeest, 1960: 131–2, pl. XXXV; Karageorghis, 1967: 109, nos. 102, 104, 107; Robinson, 1959: 69, 98, nos. K114, M967; Hayes, 1976*b*: 66, no. 360).

An additional wreck site was traced during CAHEP's 1987 season on the floor of the main harbour basin, in the north-west part of it, within the presently submerged breakwater, some 100 m south-east of the entrance channel and due east of Area R (Fig. 1). The area is at present under more than 6 m of water and the coarse sand, mixed with shingle and shells, is covered by rather even layers of rubble spill 20–40 cm thick. At the eastern third of that spill there are many basalt slabs scattered in close proximity, indicating a jetsam or a wreck site of ballast. Further research during the 1987 and 1988 seasons, including a trial trench which was excavated across this area, revealed two lines of lead brailing rings, still *in situ*, as they were left after the sail had worn away and, in addition, many ship nails, metal objects, iron-working tools and over 30 bronze coins, most of mid-3rd century AD date. Although other, both earlier and later, finds were also made at this site (including various coins ranging in date from the Early Roman to the Early Arab periods (1st–8th centuries AD and a well-preserved wood-and-lead composite anchor of Herod's time), the bulk of the finds are of the same mid-3rd century date, and quite probably constitute the remains of a ship wrecked at that place (Raban & Stieglitz, 1988: 274–5). A shipwreck within a well-protected and fully-operational harbour might be rare at any historical period, though not impossible, but such a mishap must have been more common in a situation similar to that described by Procopius.

Yet more indicative is the fact that the remains of this wrecked vessel are found to be stratigraphically much higher than the original floor of the Herodian harbour. In fact, although the objects are mostly small and heavy, of the type to be expected to sift their way down through wave-disturbed coarse sediments toward a more consolidated sub-bottom, these objects were found to be underlaid by at least 1 m of loose sediments. It is quite obvious that the adjacent rubble spill has kept its artefacts in their original position and that the date of spillage and of the wreckage must have been contemporaneous. More telling than the context is the fact that coarse sediments were already deposited within the harbour basin. This is ample proof that by this stage the breakwater had already lost its integrity and was overrun by considerable wave energy. In other words it was at least partly submerged.

As in the case of the wreck site in Area R, the combined stratigraphical study of sediments, beach deposition and archaeological data enable us to reconstruct the succession of events and to date these also in areas that were in Herod's time on the water line inside the free-standing breakwaters.

One area of this type is CAHEP's Area L, which was formerly designated as S-1 (Fig. 1). This area is on the north side of the present harbour and was incorporated within the intermediate basin of Sebastos in the time of Herod (Stieglitz, 1987: 187–8; Raban & Stieglitz, 1988: 275; Raban *et al.*, 1989: 151–4, 291). The architectural remains in this area comprise a quay and a jetty, or a pier adjacent to it, both built of long ashlar headers of typical Herodian style (Figs 6 and 7), some of which were clamped and fastened together by the use of dovetail lead clamps known elsewhere in Caesarea only in Herodian or pre-Herodian contexts (Fig. 8). The pier went out of use in the Early Roman period and its eastern part was covered by a cement

Figure 6. General view of CAHEP's Area L.

floor of some terrestrial structure which has not survived. Later this floor and the adjacent area to the south were covered by thick beach deposits which were embedded in a fairly steep gradient and are characterized by coarse components typical of the deposition of high energy waves. It is quite obvious that at the time of deposition, this area was exposed to the full force of the open sea surge with no apparent protection from the breakwater of Sebastos. Some time after this deposition phase, a massive ashlar construction was built on this section of the beach. This rectangular structure and its continuation to the south were first excavated and studied by the archaeological group from the Hebrew University in Jerusalem and was dated by them to the 4th century AD or earlier (Levine & Netzer, 1986: 50–3, 65, plan 11). This structure was re-excavated by CAHEP archaeologists during the 1987–1988 seasons (Fig. 9) and the rectangular structure was fully exposed, including the wall next to it to the south (W 21). Both architectural features were found to be built of the same size of ashlar blocks bound together by a unique type of brown-red loam. The wall to the south was found to be inserted into a foundation trench which was dug into the layers of beach deposit mentioned above (Figs 10 and 11). Thus it is quite obvious that the entire complex, which seems to have had no opening towards the sea, was built after the beach was created on top of the Herodian marine structure.

The other area with the same type of combined architectural and stratigraphic data is the eastern quay of the inner harbour basin, at present land-locked some 100 m away from the waterline to the east. This site (Fig. 1), denoted as I-1 by CAHEP, was first excavated during the 1976 work of the Center for Maritime Studies on behalf of the Israel Electric Co. (Raban *et al.*, 1989: 80–1). This limited probe was extended during CAHEP seasons of 1983–1984 and 1989 (and see Raban, 1985: 166—9; Raban *et al.*, 1989: 132–7). The inner harbour of Caesarea is an artificial rock-cut basin, over 40 m wide on its north–south axis and over 100 m long. Its eastern quay was found to be laid on a levelled ledge of Eolian sandstone bed rock, locally known as *kurkar*, at about 0·8 m below MSL. West of the quay the rock was excavated and the hollow for the basin was made deeper, until it reached a depth of over 2 m below sea level, some 5 m west of the quay. The sloping rocky bottom of the inner basin was found to be covered by a thin deposit of sandstone chips, some sand and a topping deposit of fine mud. These sediments as well as the part of the quay's face below the ancient sea level, was found to be encrusted by extensive colonies of *ostreae* shells, which stratigraphically seal the deposits laid down during the period in which the inner basin was functioning and had contained sea water with ample circulation with the open seas (Figs 12 and 13). The latest datable find from this marine deposition

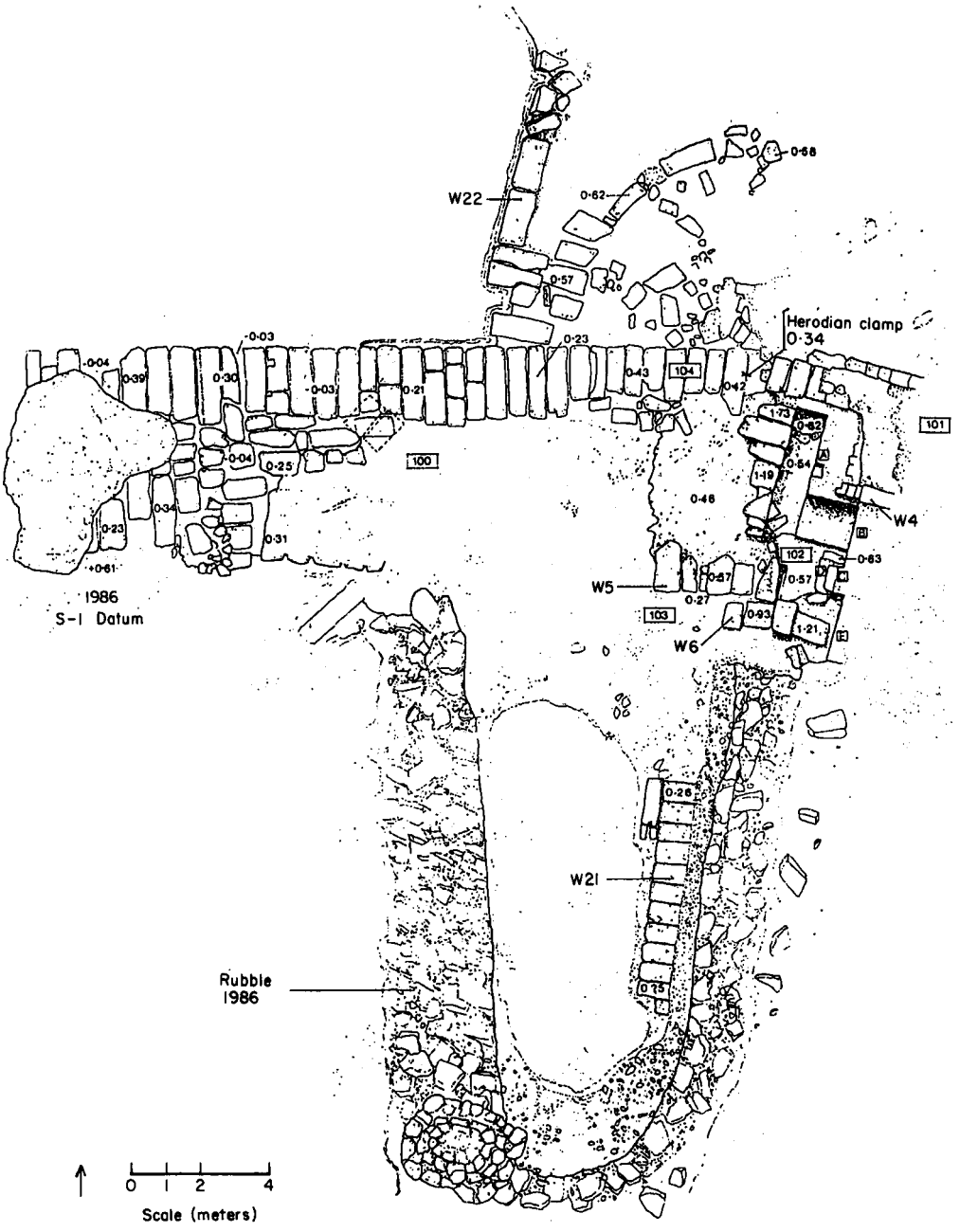

Figure 7. Plan of CAHEP's Area L.

was a coin from the last regnal year of Nero, with a contramark of the first regnal year of Vespasian (AD 67/8). The earliest finds were extracted from this layer during the 1989 season and contain various pottery vessels of the 2nd century BC. The life-span of Caesarea's inner harbour can, therefore, be calculated to be just over two centuries, starting as the closed basin of Straton's Tower (Raban, 1987: 78–87). It probably silted up soon after the issue of the above

Figure 8. The pier of Area L, looking west. Notice the dovetail grooves at the lower right-hand side (Photo: M. Little).

Figure 9. Sloping beach deposits under W21 at Area L, levelled on top for the 3rd–4th century AD floor (Photo: M. Little).

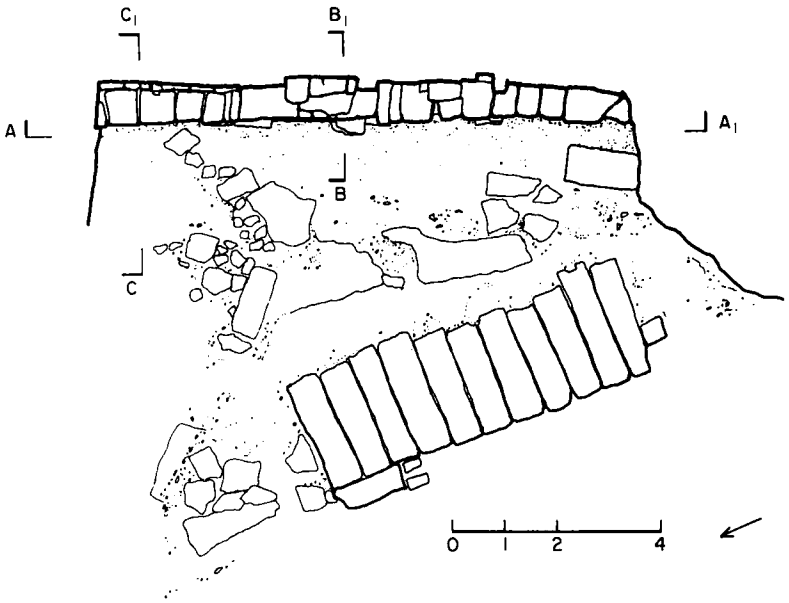

Figure 10. Plan of the south part of Area L with W 21 and the Herodian quay. (Scale in metres.)

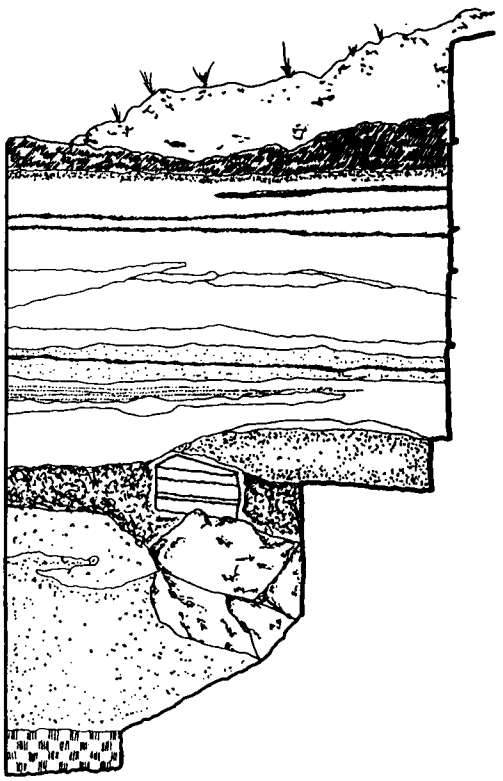

Figure 11. Section C-C1 of the same.

mentioned coin, which was the last to bear the epithet 'Καισαρια η προσ Σεβαστω λιμενι' (Caesarea which is by the harbour of Sebastos). Much later, some time during the Byzantine era, the hollow next to the quay was re-excavated and paved with large stone slabs that joined a level surface 0·15 m above MSL (Fig. 14). During the 1989 season an aquatic deposit was found between and just below these slabs, supporting the theory that the loose paving was made in order to keep some freshwater basin that was installed in the hollow free from the salinity of the lower ground water and above the interface which was then higher than at present, probably due to an eustatically higher sea-level (Raban *et al.*, 1989: 294). In fact, not a single specimen of marine fauna could be traced on these slabs. The deposits in the silted-up inner harbour which predate the Byzantine slab pavement were studied during the 1988 and 1989 seasons.

During 1988 a new area, designated as I-4, was excavated at the projected location of the supposed SE corner of the inner basin (Fig. 1). The probes went down to a slab structure quite similar to the Byzantine one at I-1 and dated to the same period by pottery finds within its context (Fig. 15). Yet, unlike the case at I-1, in I-4 these slabs do not pave the entire area and on the west side of the probe it was possible to go down deeper. There, a series of alternating beach deposits were found to predate the slabs. These deposits (Figs 16 and 17) are over 1·6 m thick and of alternating components of exposed beach (shells, shingles, wave-worn sherds) and terrestrial debris. It is quite clear that the sea waves had reached this far inland at intervals and over a considerable length of time before the Byzantine era. Similar stratigraphy was found during the 1989 season when the excavated area in I-1 was expanded further to the west.

The stratigraphic data from Area I therefore confirms the data from Area L and from Area R, indicating a pre-Byzantine situation when there was an ample opening for the surge to carry its load all the way through the basins of the former well-protected Sebastos.

That Sebastos lost its breakwater integrity some time before the 4th century AD and maybe even prior to the mid-3rd century AD may be deduced from the datable wreck sites in Area R and on top of the Western Breakwater. The name of this harbour was not in use after the Great Jewish Revolt and this is probably connected with the altered status of the city of Caesarea that followed the subjucation of the semi-autonomous Jewish province of Judea (Negev, 1963: 684). With the new status of the city which was entitled *Colonia Prima Flavia Augusta Caesarea* (Ringel, 1975: 85), it seems as if the former royal port was included within her municipal jurisdiction. It has to be kept in mind that when Herod built Sebastos he planned it to serve the royal needs of seaborne commerce and to be an export centre for the cross-country transit commerce of either goods originating from *Arabia Felix* and the Indian Ocean, or the commodities of royal monopoly, such as salt and bitumen from the Dead Sea, spices and exotic products from the royal estates at Ein Gedi, Jericho and the Great Valley (Schalit, 1964: 134–8, 146–54). It is quite obvious that as long as

Figure 12. View of CAHEP's Area I-1.

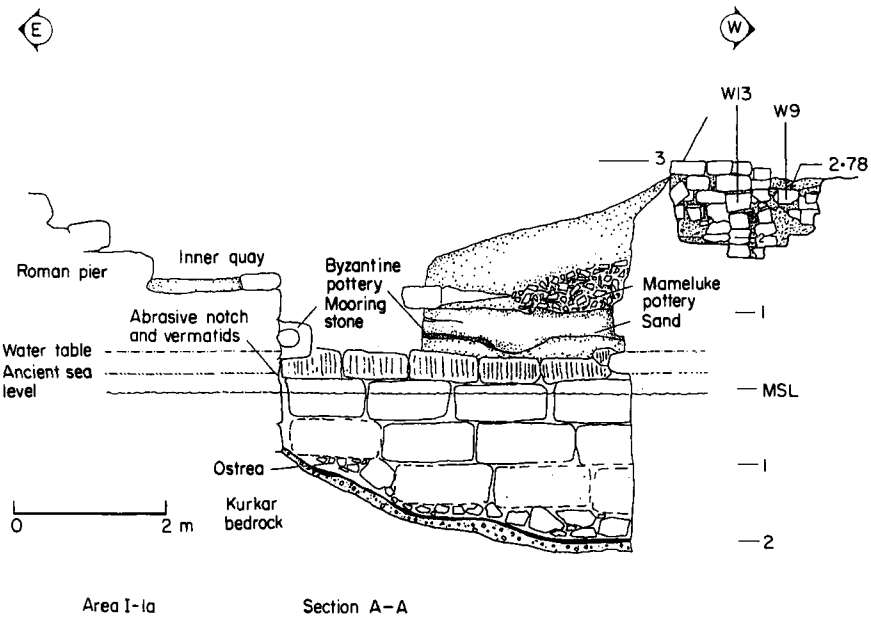

Figure 13. A–A section of CAHEP's Area I-1.

Sebastos was an administrative entity outside the municipality of Caesarea, the citizens of this town would have their own harbour at the bay to the south (Fig. 18), where the Joint Expedition has exposed the local *Horreae* (Holum *et al.*, 1988: 148–9; Raban *et al.*, 1989: 289). The excavations of the Joint Expedition at their Field C shows that the only vaulted harbour magazine that was cleared and was dated to the Herodian period had lost its original function either in the

Figure 14. The Byzantine pavement at the hollow of the former inner harbour at Area I-1 (Photo: M. Little).

Figure 16. View of the western baulk at Area I-4.

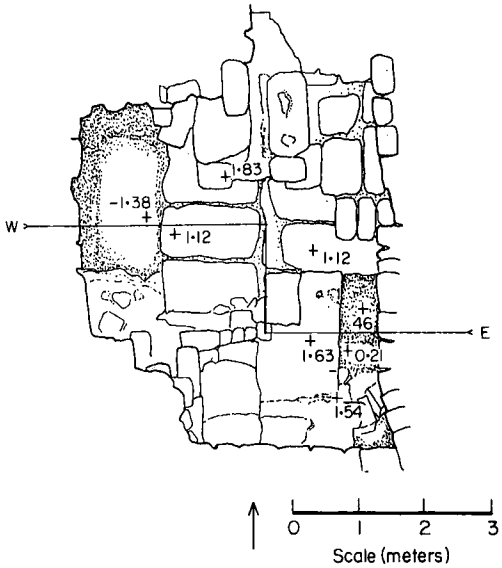

Figure 15. Plan of CAHEP's Area I-4.

late 1st, or early 2nd centuries AD and was converted to use as a Mithraeum (Hopfe & Lease, 1975). This evidence might illustrate the new situation that followed the change in the administrative status of Sebastos, which became part of Caesarea's municipal installations, including its superior storage and quayside facilities. No more would the people of Caesarea have to use their inferior unprotected seasonal haven (typical of many other major coastal sites in the Levant, such as Gaza, Ashkelon and Joppa) in order to avoid the extra royal taxation which would have been imposed at Sebastos. But if the harbour built by Herod was no longer a State Port after AD 70/1 and was given to the people of Caesarea for their own seaborne trade, the vast task of its maintenance would have to be carried and taken care of at their expense. Certainly far too big, too sophisticated and too expensive to maintain for that purpose, one

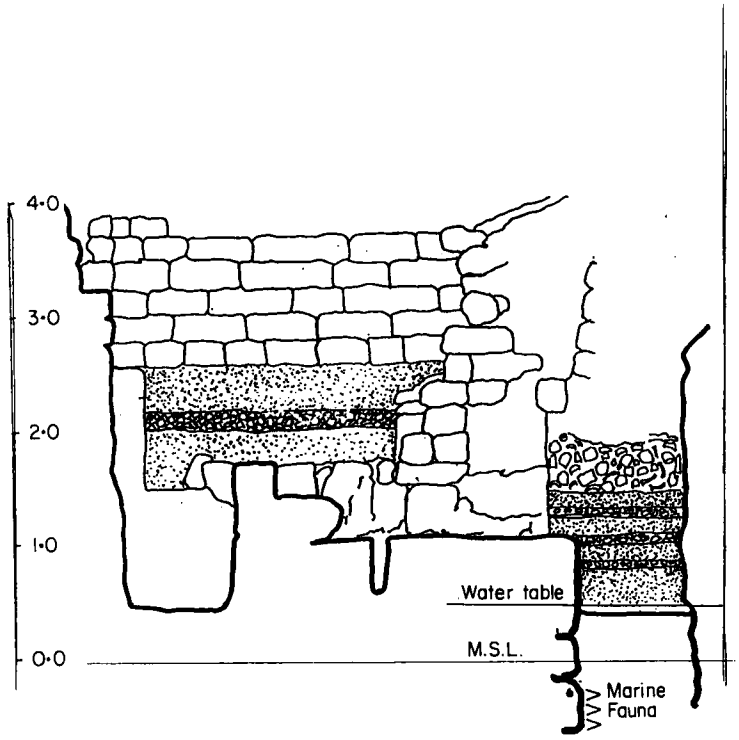

Figure 17. Section A–A at Area I-4.

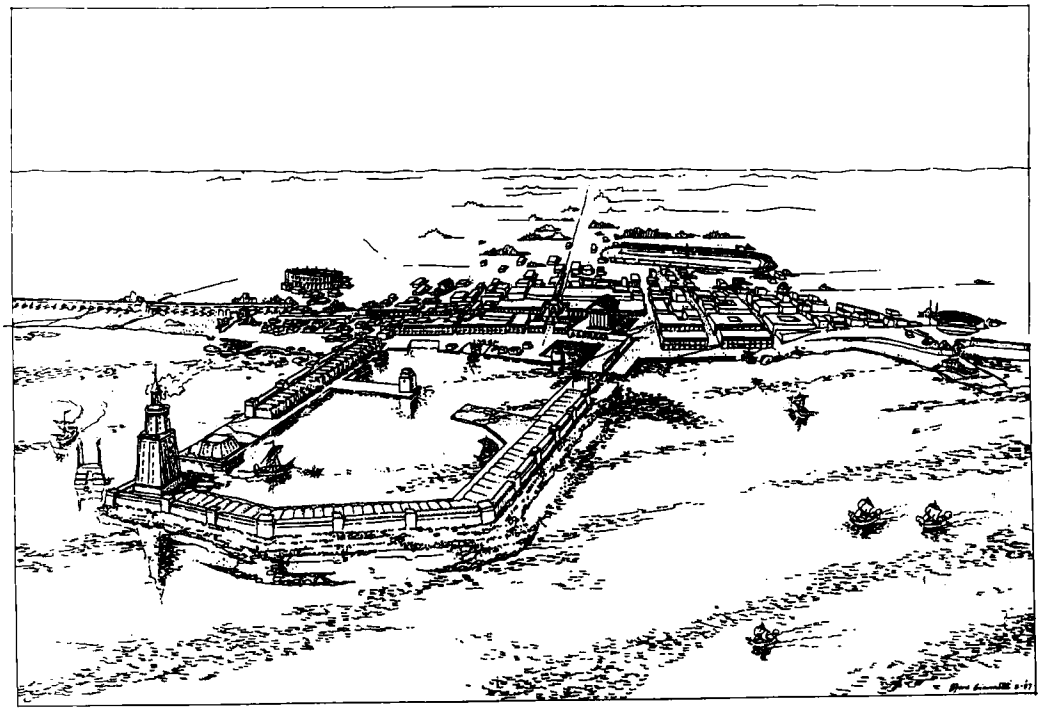

Figure 18. Caesarea and its two harbours during the time of Herod and the 1st century AD (Reconstruction: S. Gianetti).

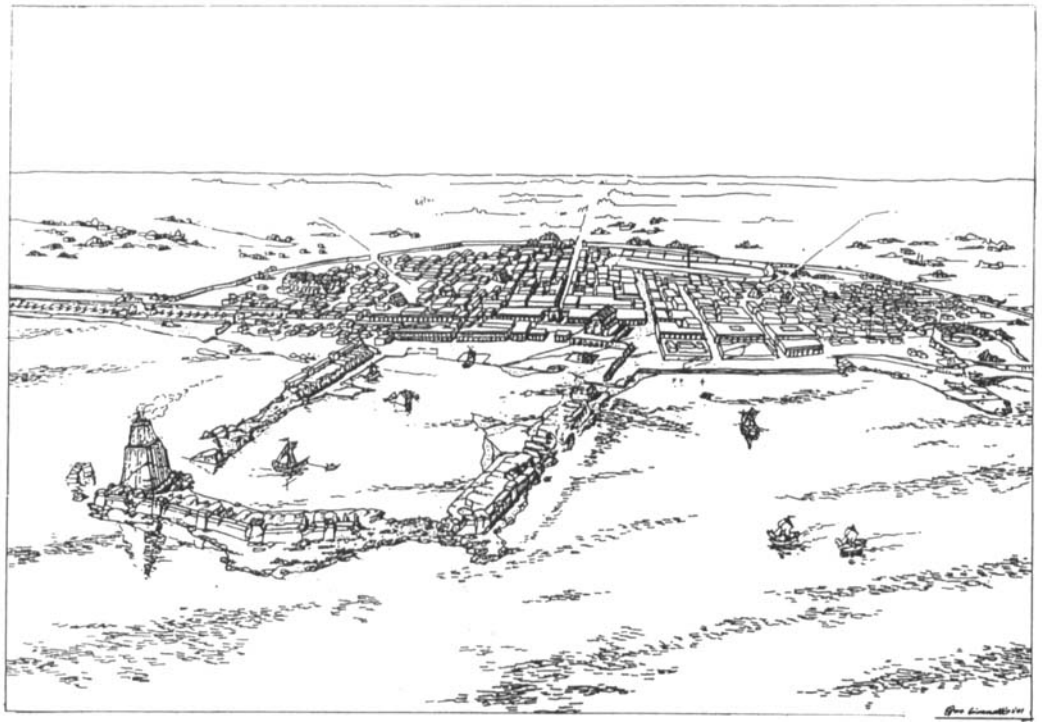

Figure 19. Caesarea and its harbours in the late 2nd century AD (Reconstruction: S. Gianetti).

would wonder how soon this port would have fallen into a state of disrepair, especially if its main basin and its free-standing breakwaters were in the process of gradual subsidence, being laid on a tectionically unstable sea floor.

In conclusion, the supposed discrepancy between CAHEP's archaeological and sedimentological data, which point to the ill-state of the harbour and the circumstantial historical documents which indicate continuous maritime activities at Caesarea through the entire Roman and Byzantine eras, is not necessarily so. The limited needs for the seaborne trade of Caesarea and of the province of Palestine in the post-Hadrianic era could be met within the semi-protected basin, considering that it was by and large seasonal (Fig. 19). As the main breakwater was losing its integrity, and could not be used any more for quayside berth and for storage of goods, their components were retrieved for building materials. It is no wonder that the slabs of the Byzantine paving at CAHEP's Area I are of a quality and dimensions which resemble remnants of pavings along the Western Breakwater; they quite probably originated there. If we wonder why anyone would bother to fill a hollow with such first-class ashlars the answer may be that these heavy blocks were close-by and easily shifted by water to the shore. In a future field season it will be an interesting project to survey the various Late Roman and Byzantine structures of Caesarea in a search for the re-used blocks which were salvaged from the decaying harbour.

A final word to my colleagues among the historians of the period will be a quotation from Delano Smith (1979): 'In the last analysis a port is a man-made feature, and it is on human factors that its survival must depend' (see also Rickman, 1988).

When nature combines force with the human factor, even the most magnificent engineering wonder can be made, as Herod proved in building Sebastos. Yet, it seems as if the very same 'partners' have contributed to the early decay of this monument.

Note

[1] The data upon which this paper is based have been collected over 15 years, in which I have directed the researches at the harbours of Caesarea. Although in directing CAHEP (Caesarea Ancient Harbours Excavation Project) I have shared the responsibility with co-directors, such as Prof. R. L. Hohlfelder of the University of Colorado at Boulder, Prof. J. P. Olson of the University of Victoria, Prof. R. L. Vann of the University of Maryland and Prof. R. R. Stieglitz of Rutgers University at Newark, the ideas and conclusions included in this paper are my own and are not necessarily shared by my colleagues.

References

Delano Smith, C., 1979, *Western Mediterranean Europe*. London.

Hayes, J. W., 1976*a*. Pottery: stratified groups. In: Humphrey, J. H. (Ed.), *Excavations at Carthage, 1975*. Tunis.

Hayes, J. W., 1976*b*. *Roman Pottery in the Royal Ontario Museum*. Toronto, ROM.

Hohlfelder, R. L., 1985. Byzantine coin finds from the sea: a glimpse of Caesarea Maritima's later history. In: Raban, A. (Ed.), *Harbour Archaeology*. BAR International Series, no. 257, 179–84, Oxford.

Hohlfelder, R. L., 1987, The 1984 explorations of the ancient harbours of Caesarea Maritima, Israel. *BASOR* suppl., **25:** 1–12.

Hohlfelder, R. L., 1988, Procopius' *De Aedificis* 1.11, 18.20: Caesarea Maritima and the building of harbours in late antiquity. *Mediterrean Historical Review*, **3**.1: 54–62.

Holum, K. G., Hohlfelder, R. L., Raban, A. & Bull, R. J., 1988, *King Herod's Dream. Caesarea on the Sea*. W. W. Norton & Co., New York.

Hopfe, L. M. & Lease, G., 1975, The Caesarea Mithraeum: a preliminary report. *Biblical Archaeologist*, **38**.3: 1–10.

Gittin, J., *Jerusalem Talmud* (Gittin tractate).

JA = St Thackery, H., 1930, *Josephus, Jewish Antiquities*. Cambridge.

JW = St Thackery, H., 1930, *Josephus, The Jewish Wars Against Rome*. Cambridge.

Kadman, C., 1957, *The Coins of Caesarea Maritima*. Tel Aviv.

Karageorghis, V., 1967, *Excavations in the Necropolis of Salamis I*. Nicosia.

Landgraf, H., 1980, Keisan's Byzantine pottery. In: Briend, J. & Humbert, J. R. (Eds), *Tell Keisan*. Paris.

Levine, L. I., 1975, *Roman Caesarea*, QEDEM 2, Jerusalem.

Levine, L. I. & Netzer, E., 1986, *Excavations at Caesarea Maritima, 1975, 1976, 1979—Final Report*, QEDEM 21, Jerusalem.

Migne, J. P., 1865, *Petrologia Graeca*, 87.3. Paris.

Neev, D. *et al.*, 1978, The Young (Post Lower Pliocene) Geological History of Caesarea Structure. *Israel Journal of Earth Sciences*, **27:** 43–64.

Negev, E., 1963, Where Vespasian was Proclaimed Emperor, Caesarea Maritima on the coast of Israel. *Illustrated London News*, no. 6482 (26 October): 684–686.

Olson, J. P. *et al.*, 1984, The Caesarea Ancient Harbor Excavation Project (CAHEP): Preliminary Report on the 1980–1983 seasons. *Journal of Field Archaeology*, **11:** 281–305.

Raban, A., 1985, Caesarea Maritima 1983–1984. *IJNA*, **14**.2: 155–77.

Raban, A., 1987, The city walls of Straton's Tower: some new archaeological data. *BASOR*, **268:** 71–88.

Raban, A. *et al.*, 1989, *The Harbours of Caesarea Maritima, Vol. 1: The Site and the Excavations*. BAR International Series no. 491, Oxford.

Raban, A. & Stiegflitz, R. R., 1988, Caesarea Maritima 1987: Notes and News. *Israel Exploration Journal*, **38**.4: 273–8.

Rickman, G. E., 1988, The archaeology and history of Roman ports. *IJNA*, **17**.3: 257–67.

Ringel, J., 1975, *Césarée de Palestine*. Strasbourg.

Ringel, J., 1988, Literary sources and numismatic evidence of maritime activity in Caesarea during the Roman period. *Mediterranean Historical Reviews*, **3**.1: 54–62.

Riley, J. A., 1975, The pottery from the first season of excavations in the Caesarea Hippodrome. *BASOR*, **218:** 25–63.

Robinson, H., 1959, *The Athenian Agora V: Pottery of the Roman Period: Chronology*. Princeton.

Schalit, A., 1964, *King Herod: Portrait of a Ruler*. Jerusalem (in Hebrew).

Stieglitz, R. R., 1987, Caesarea Ancient Harbours Excavation Project, 1986: Shore investigations: Notes and News. *Israel Exploration Journal*, **37**.2–3: 187–8.

Zeest, I. B., 1960, *Ceramic from the Bosphorus*. Moscow (in Russian).

Zemer, A., 1977, *Storage Jars in Ancient Sea Trade*. The National Maritime Museum, Haifa.