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Archaeological park for divers at Sebastos and other submerged remnants in Caesarea Maritima, Israel

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After 15 years of underwater and land surveys and excavations to study the remnants of Caesarea's port facilities, the Centre for Maritime Studies at the University of Haifa, in collaboration with Caesarea Development Co., The Israel Diving Federation and the Gal-Mor Diving Center in the old harbour, are promoting an underwater archaeological tourist park, in order to enable visiting divers to explore much of the presently submerged site by following clearly marked guidelines.

As part of a series of public events and cultural festivities that have taken place during 1990–1991 to celebrate the bimillennial anniversary of the city and harbour built by King Herod the Great, the annual national gathering of the Israeli Diving Federation took place at Caesarea in mid-June 1991. The underwater park had been completed and was made ready for over 500 divers who visited the site, following the cable guidelines that were fixed to metal posts along the sea-floor and were marked at 25 designated locations. Equipped with plasticized illustrated and annotated guidebooks, these divers traversed four different underwater courses, each about 400 m long, enjoying the first opportunity made available for lay divers to be ushered around this otherwise rather meaningless submerged architectural complex. Since then, during the three summer months of 1991, it has been possible to meet dozens of divers every day following this underwater self-guided tour.

According to Isaeli Law the site is free to all divers with no admission fees. However, the local dive shop at the site, and a few others in the vicinity, are offering boat services and diving instructors who are ready to take groups and individuals on a tour of this underwater park.

Considering the fact that the park area is rather shallow and that entire courses run over either a rocky seabed or ever-shifting sands, the endurance of the guide cables and marking signs is to be tested over an extended period. Most components have survived the first few months with no real damage, except for that made by passing motorboats, curious fishermen and a few undisciplined divers.

Learning from this initial lesson, the staff of the Gal-Mor Dive Shop, who took upon themselves the responsibility for maintaining the park, have replaced the brass signs by rigid plastic boards, with cut-out, hollowed digits, and eliminated most of the marking buoys except for two large, heavy-duty ones that are used as moorings for the dive boats.

Presently three of the four courses are furnished with guidelines made of plastic covered steel cable that run about half a metre above the sea-floor, leading the divers from the starting point of each course, along the course, and back to the starting point, at the mooring buoy.

A schematic map of the four courses and their various marked sites is given in Fig. 1.

What can be seen?

Caesarea, being located at the southern part of the Levantine coast of the Mediterranean, suffers from seasonal sea pollution when the visibility in in-shore waters might be reduced to less than 3 m. The worst visibility might be expected during the summer months of July and August, and during winter storms. The best will be during spells of calm seas from October to April, when the water temperature changes from 26° C (in October), to 16–17° C (in February) and up to 20–21° C (in the beginning of May). May–June and September–October are the best in terms of sea conditions with the latter being better, both for visibility and water temperature.

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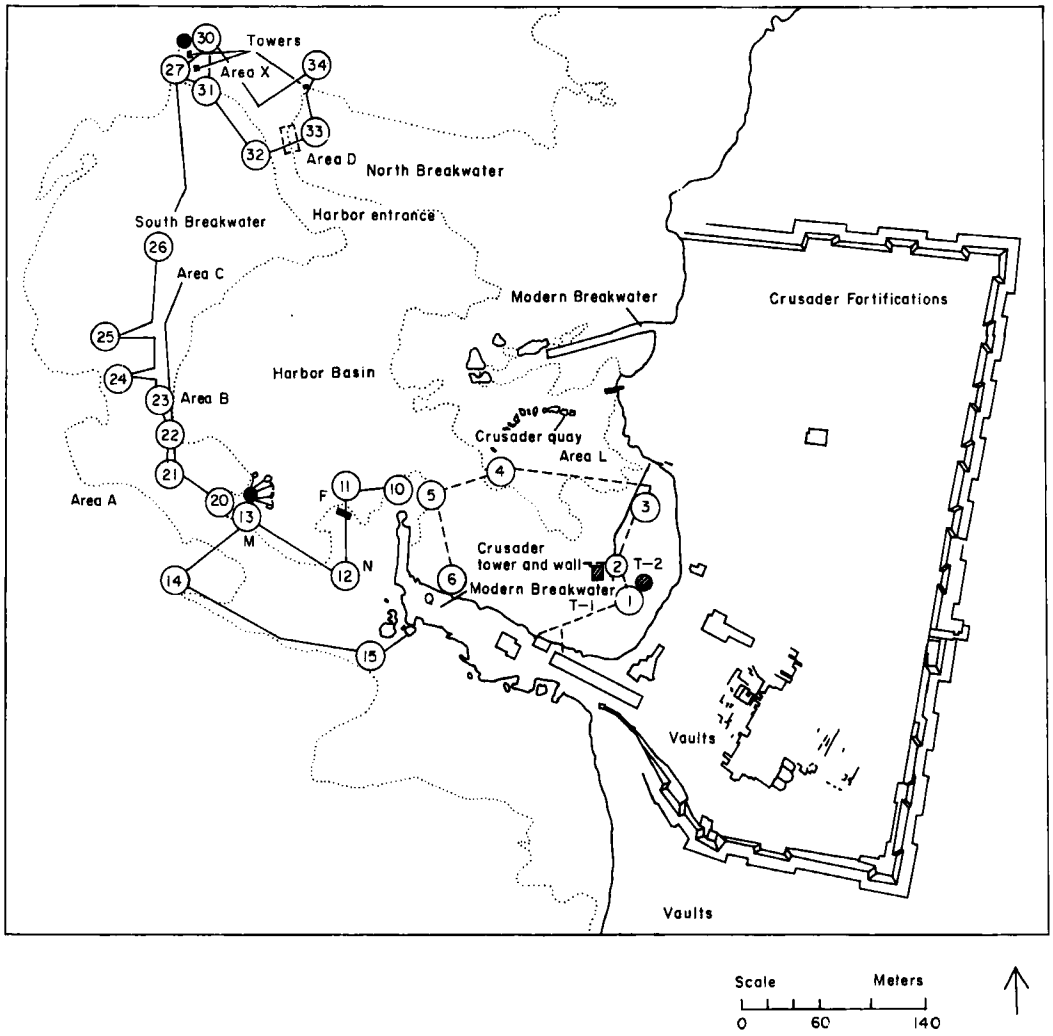

Figure 1. Schematic map of the park, the numbered signs and the general course of the guide cables. —— Guide cable; – – – unmarked snorkelling course.

One need not worry much about currents. With no real tidal changes, the maximum current never exceeds 1/8 knot in any direction—and even that is only when a fresh wind is blowing steadily either from the SW or from the north (rather rare). Yet, one might be aware of the blustery 'sharkias' (easterlies), typical of the atmospheric high pressure spells of the winter. With this wind blowing the sea would be deceivingly calm near the shore, the visibility excellent, but the mooring of the pick-up boat—even done professionally for the surfacing divers—would be risky with the danger of its being wind-blown and carried away quite rapidly towards the open sea.

Course 1

This incorporates the submerged architectural features within the present-day fishing-boat anchorage at water depths of 1·5–4 m only. Being so shallow, within a well-confined area which is frequented by bathers, swimmers and manoeuverable boats, this course has no guide cable. There are only the marking signs which hover about 1 m above the sea-floor, moored with chains to heavy sinkers and kept in place by a couple of small net buoys.

No. 1 is in less then 2 m of water, on the south side of a round tower (T-1) that was probably built during the 2nd century BCE as a part of the

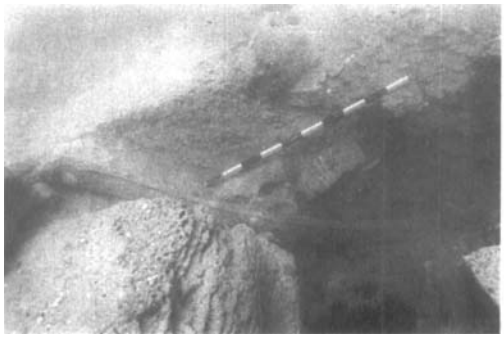

Figure 2. The fresh water lead pipe at the eastern side of the round tower (no. 1).

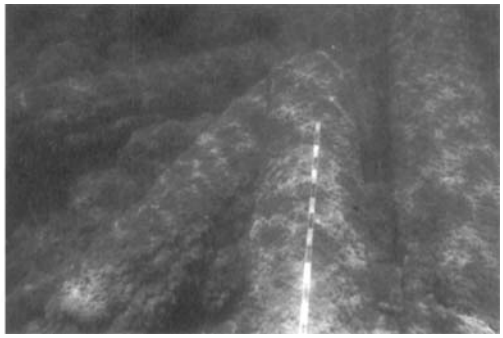

Figure 3. The tumbled pile of reused Roman column shafts at the tip of the medieval jetty (no. 4).

Hellenistic sea-wall of Strato's Tower. It has a radial structure of long, slim headers and a diameter of 13 m. On its eastern side one of the blocks was trimmed diagonally in order to incorporate a lead water pipe that brought fresh water (still flowing today) from the shore, some 30 m away (Fig. 2). This tower marked in antiquity the northern side of the passage from the intermediate harbour basin to the inner one, which is now landlocked.

No. 2 is about 30 m W-NW of the round tower, in 2·5 m of water. It marks the NE corner of a medieval square tower 10 × 12 m in size (T-2), made of cemented rubble which had been enforced by inserting reused column shafts. The sign marks the south end of an adjacent sea-wall or a pier that was built as a protecting device separating the inner boat anchorage of the Crusader city from the mooring basin for larger, seagoing ships.

No. 3 is a northern continuation of that medieval pier. After following it for about 40 m on a due-north course, along a section where only the upper course of cut stones is visible, there is a part in which three to four courses are still standing freely just west of the sign, which reaches from the sea-floor almost to water level.

No. 4 marks the submerged tip of a medieval jetty that was made of horizontally laid reused Roman column shafts of porphyry and marble. It is the southward turning continuation of a long structure which stems from near the north shore of the bay (area L) and runs most of its course at water level. The submerged tip jutted toward the deeper water in the middle of the present harbour basin over a hundred metres west of no. 3 (Fig. 3).

No. 5 is the decomposed remnants of the metal hull of a ship just at the entrance to the modern basin, 30 m NE of the tip of the fisherman's mole in about 5 m of water. This wreck of a modern steamer is interesting for it is the fore section of a vessel that was used as a former for the fishing mole. In 1950 it was filled with cement and concrete and deliberately submerged in much the same way as the Trajanic mole and the base for its lighthouse were established at Ostia. It is inferior by far to the prefabricated square barges that were made for a similar purpose by Herod's engineers and were used for establishing the base of Sebastos' lighthouse in area K-2 (Fig. 4).

No. 6 is at a probe made next to the inner face of the southern Herodian mole. Here the ashlar quay retains the side of a rocky outcrop that can be followed as deep as 6 m below sea-level. Surfacing at that point, one steps on the paved surface of that quay, presently at sea-level, before climbing the modern cement promenade that has been built over it.

Course 2

This encircles the area of the south Herodian mole and its adjacent structures, all of which are just west of the alleged fault line that had caused their subsidence. The start is at the northern tip of the fishing mole (no boat is needed).

No. 10 marks the west side of the flattened hull of the modern steamer (see no. 5 above). From this point on the guide cable should be followed.

No. 11 is an ashlar paved pier, still fairly intact and clearly horizontal, though just next to the suggested tectonic fault line. It is 5 m below the waves and so is the best evidence for the rate of subsidence of Sebastos since antiquity. These

Figure 4. The plates of the forepart of the iron hull of the modern steamer that has been sunk as a base for the fishing mole (no. 5).

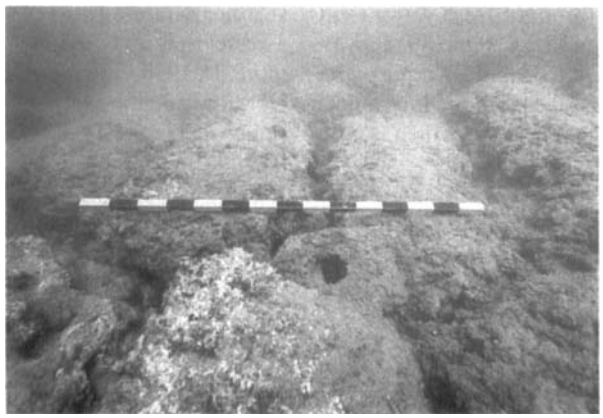

Figure 5. The sunken pavement of the Herodian pier in area F (no. 12).

paving slabs were laid on a sand fill, locked between ashlar walls of a pier that stemmed from the south mole, some 80 m away, and probably divided the outer harbour basin from the intermediate one (area F; Fig. 5).

No. 12 is the wreckage site of a marble carrier. To the east of the sign, in 5–6 m of water, are huge rectangular blocks of marble piled next to each other. Among them there are two crudely hollowed coffins and at least one is a clearly distinguishable 3rd-century type gabled lead coffin (Fig. 6).

No. 13 is about 100 m NW of no. 13. This (area N-1) is the westernmost end of an area from which all the ashlars of the Herodian quay structure were salvaged during the medieval era to be used in the construction of the harbour citadel. At this point, which is furnished with a mooring buoy one can see a variety of ancient anchors tied to the buoy and functioning as originally planned. Among these anchors are the following:

(a) A single-hole stone anchor about 4000 years old. It is one of a series of weight anchors that would be tied along a mooring line at intervals greater than the water depth. The second one on the line has holes at both ends of the rectangular slab, for both segments of the mooring line.

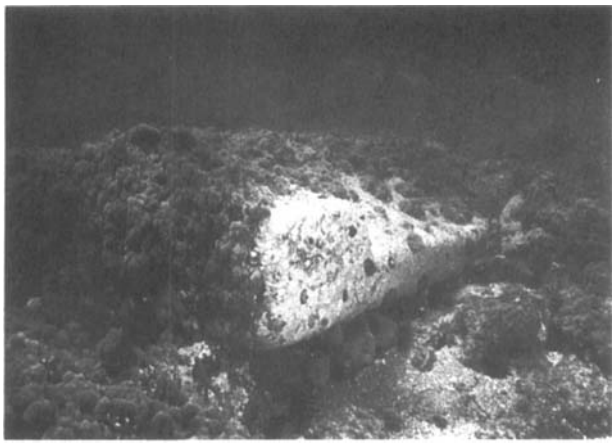

Figure 6. A coffin lead at the wreckage site of a marble carrier (no. 13).

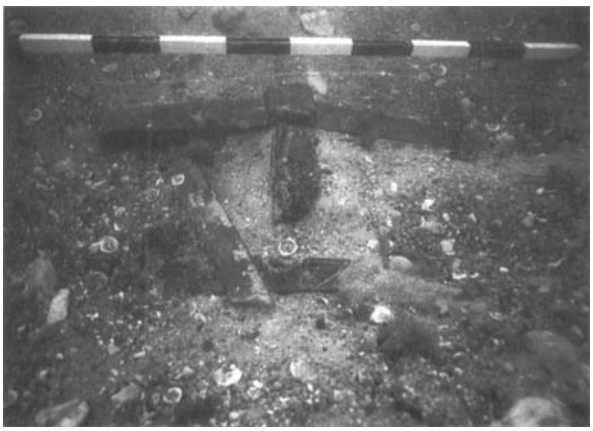

Figure 7. A first-century composite anchor *in situ* in Area R, now restored in the Garden of Anchors (no. 14).

(b) A composite anchor, roughly a triangular slab of stone with three holes. In two there are wooden sticks that hold the ground, while the top one is used for affixing the mooring line.

(c) A composite, lead and wood anchor of the Hellenistic era. The lead stock and assembling piece are original and were found at a nearby site, within the harbour area. The wooden parts have been replaced by new ones (Fig. 7).

(d) An iron anchor of Late Roman date, also from within the harbour. The stock, or cross bar is missing. The cast body with hammered flukes perpendicular to the shaft are typical for the period.

(e) A large grapnel anchor, with four curved arms and a long, heavy iron shaft. This type was invented by the Arabs, probably in the Red Sea or in the Indian Ocean and was introduced in the Mediterranean at an early medieval date. It is still in extensive use by Arab fishermen and in small traditional vessels in the Levant.

(f) A typical Admiralty anchor with two curved arms, spore-like teeth and movable stock.

From the Garden of Anchors the cable leads southward, across the submerged Herodian mole and the hollow behind it.

No. 14 is at the west surviving end of the subsidiary breakwater, or the *Prokumatia* as Josephus called it. This rather narrow, low-lying and segmented forewall was built in order to create a breakwater in front of the main mole. In that way the quay within the spinal wall could be kept splash-free, and the foundations of the main structure would be kept from being undermined. From that point the cable leads eastward, back toward the shore, some 200 m away, following the crest of the *Prokumatia*.

No. 15 is just NW of no. 13, in over 6 m of water, at the eastern side of an area covered with spilled rubble and scattered ashlar slabs of the promenade of the main Herodian mole. From here the guide cable leads to the west for about 60 m.

Course 3

Starts at the Garden of Anchors, at the mooring buoy.

No. 20 is just NW of no. 13 in over 6 m of water, at the eastern side of an area covered by spilled rubble and scattered ashlar slabs of the promenade of the main Herodian mole. From here the guide cable leads to the west for about 60 m.

No. 21 is the wreckage site of a vessel that attempted to cross over the already submerged mole. Of the ill-fated ship all that can be seen is her neatly shaped ballast blocks. There are concave-sided ashlars of basalt rock that were fashioned in a peculiar manner in order to be better fitted to the bilge of the hull. There are many sherds encrusted in the tumbling mass, but being so fragmented and encrusted by lime substance, it is almost impossible to identify and date them.

No. 22 is farther to the NW at the turn of the mole's course to the north on its inner side. Here the sign marks a segment of the complex where huge paving slabs retain their original composition, though clearly down-tilted towards the NE. It is a good demonstration of the magnitude of the structural components of the main Herodian mole (Area B).

No. 23 marks the south end of a 150 m long course of large ashlar headers that had been laid on the sea-floor as the base course of the quay that was the inner face of the main western mole of Sebastos (Area A). Presently at a depth of over 7 m they indicate the original berthing depth to have been well over 2 m (Fig. 8).

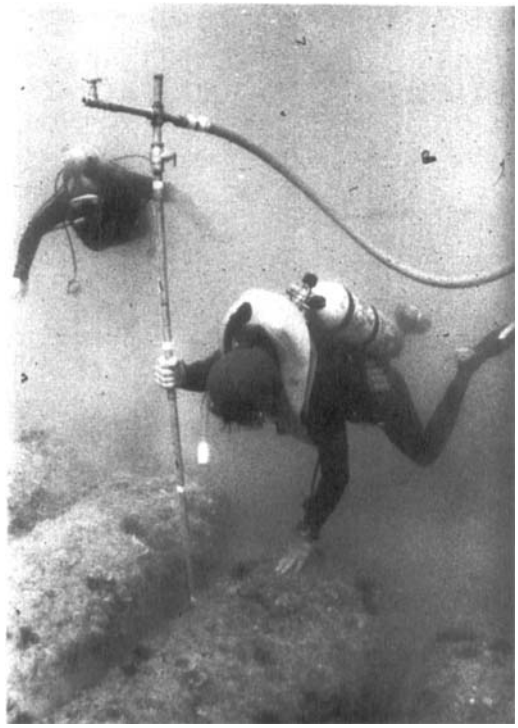

Figure 8. The base course of headers in area A, at the south side of the quay of the main western mole (no. 24).

No. 24. The cable diverges westward from the line of the quay, over a tumbling mass of building materials from the vaulted chambers that were on the mole, and behind them, to the line of the spinal wall. The sign marks a huge tilted block, probably one of the towers that was spaced along that wall. An impressed groove on the face of the block is a remnant of one of the timbers of the wooden form within which this concrete block had been cemented. From here, one proceeds back to the quay, continuing northward.

No. 25. Once again, the guide cable leads westward, across the endless intriguing seascape of a tumbling mass of building materials. The sign marks another wreckage area of an ill-fated merchantman that attempted to reach the shore over the submerged mole. There is a considerable area, at 4–5 m below the waves, littered with fragmented amphora sherds. Through painstaking efforts some of these sherds have been salvaged,

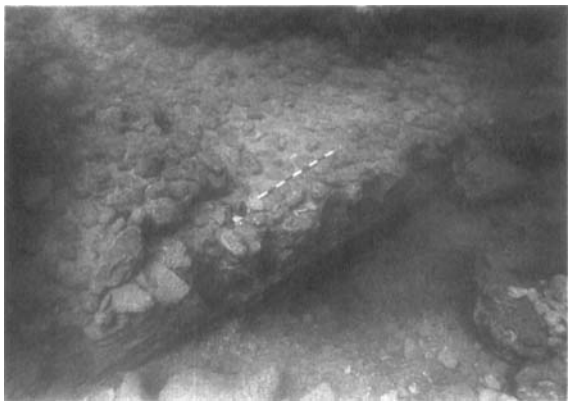

Figure 9. The aggregated concrete within the wooden form in area K-2 (no. 28).

cleaned of marine encrustation, their forms having been restored, and dated to the 3rd century of our era. Back to the east and to the course of the quay the guide cable leads to the north.

No. 26 is a slab paved area, west of the north part of the quay, in 5·5–6·1 m of water. This pavement once covered the promenade that encircled the inner half of the main Herodian mole between the berthing quay and the storage vaulted chambers. It can be seen at that point, and farther along the guiding line, that these paving slabs are laid on a thin layer of rubble that tops a massive sand fill. This naturally deposited sediment had been used by Herod's engineers as a main component in filling in the voluminous base of the mole (Area C). From that point the cable passes over a shallower area of more substantial debris for about a hundred metres, encircling huge blocks on the west side of the tumbling remains of the 'Drusion', or lighthouse of Sebastos.

No. 27 is at the NW edge of those tumbling blocks at the very northern tip of the great mole. The sign marks the western part of a wooden formed block of aggregated rubble in hydraulic cement known as *Pozzolana*. The wooden caisson has survived, with its floor timbers, frames and cross-beams that had been assembled in the shell-first technique (Area K, Fig. 9). From here there are only 10 m to the mooring buoy and the waiting boat.

Course 4

This is a circular one, starting and ending at the same mooring buoy that marks the end of Course 3.

Figure 10. An inner wooden chamber with frames and mortised floor, part of the rectangular barge that was built as a forming device for the artificial island at the base of the lighthouse in area K-2 (no. 32).

No. 30 marks the twin towers that, according to Josephus, came up from the seabed, outside the harbour channel on the right hand side for those sailing in. The mooring buoy and the sign are attached to the western one of the two. On top of it there is a cut hollow, probably for the base of the bridging arch that once connected the

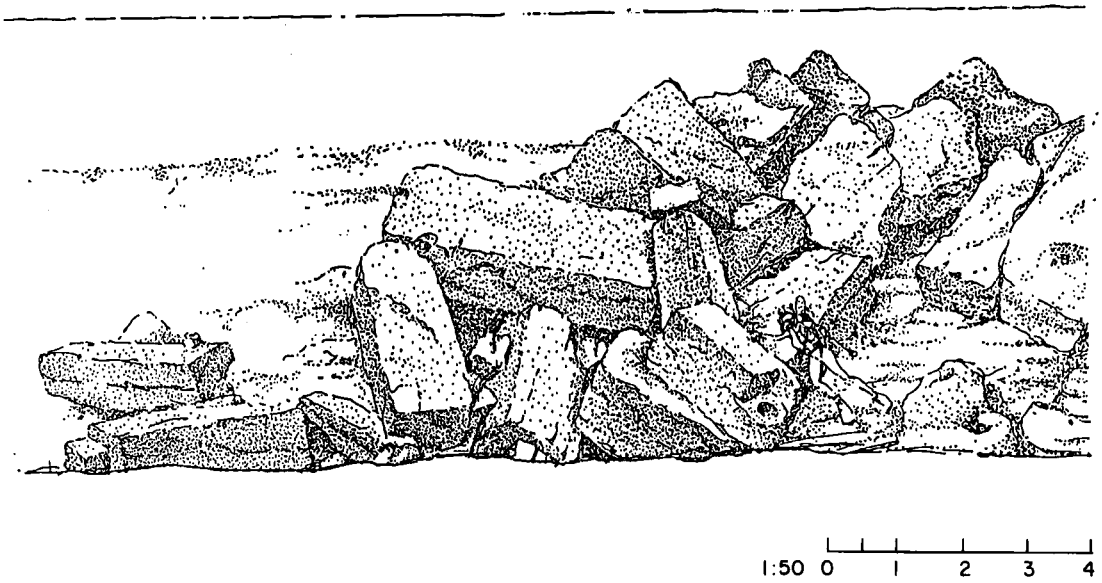

Figure 11. View of the tumbling mass of the administration building in Area D (no. 33).

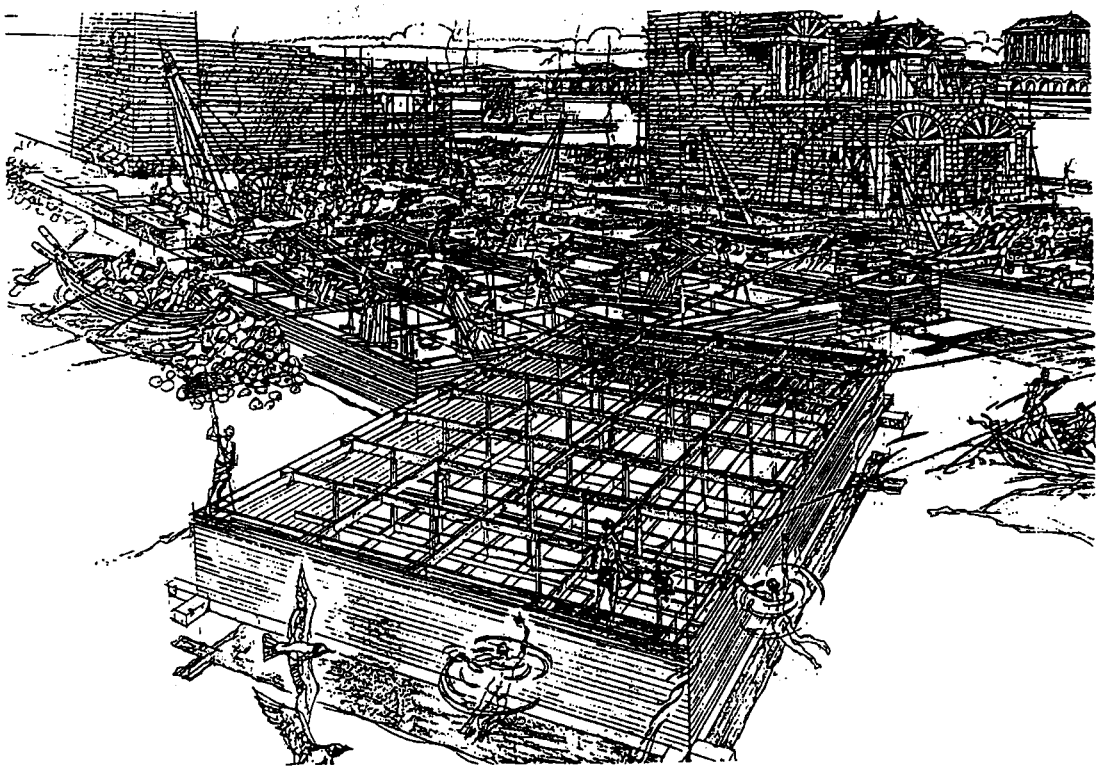

Figure 12. Reconstructed sequence of constructing the northern Herodian mole (B. Toringo).

two towers. At the base of the other tower there are pierced hollows where cross-timbers once bound the wooden caisson within which these structures had been formed.

No. 31 is just a few metres south of the eastern tower. The sign marks the eastern section of a wooden caisson within which the mixture of rubble and the *Pozzolana* were formed to create an artificial island and a base for the lighthouse. This wooden form had been built on land, as a rectangular barge, and afterwards it was partly filled with hydraulic cement, was towed to the building site in the sea and eventually sunk by an additional fill of rubble (Fig. 10). From there the guide cable leads to the SE, for about 80 m, over the edge of the main mole.

No. 32 is a trench cut through a rampart of a rubble fill on the west side of the harbour channel (Area D-2). There, attempts have been made to find the original edge of the entrance during Herod's time. This study proved that the entire channel was filled with rubble during the Byzantine era, most probably during Anastasius' project of renovating the decaying port. Byzantine artefacts were found below this rubble fill, under more than 8 m of water.

No. 33 is on the eastern side of the entrance. The sign marks a huge tumbling structure that was built of large rock-cut blocks, some of which are over 7 m long. The blocks were fastened to each other with iron clamps fixed in lead. The unique featured ends of some of these blocks seem to be fashioned to serve as sockets for wooden shafts of capstans on which chains were rolled up, across the harbour channel, in order to close it against uncontrolled navigation (Fig. 11). The guideline leads from that point around the edge of the tumbling mass of this administrative building which crowned the northern mole, NE toward the NW corner of that mole.

No. 34 is a wooden-formed series of concrete blocks. The marking sign is posted in a channel on the west side of one of these blocks (Area G). This channel was once a hollow defined by double wooden walls on top of a heavy slipper beam and had been filled by a special liquid mixture of tufa and lime, while still on shore. Some of this cemented matrix is still visible below the sand (Fig. 12). From that point the cable leads back to the NW to the starting point, at the mooring buoy almost 100 m away.

Acknowledgements

This first serious attempt to establish a self-guided and annotated underwater tourist-diver park in an archaeological site of worldwide fame is a daring project and surely will demand numerous amendments. A close follow-up on the defective components and the damage caused by human activities and/or the elements, as well as comments made by visiting divers will dictate the future course of improvements. At this point I would like to thank all the volunteers who helped to install these guided courses: Stephen Breitstein and Yossi Tur-Caspa of the CMS, for their main role in the planning and execution of the park; to Duddi Moran, the owner of the Limor Dive Shop and his staff members, Rami and Galit, who are the park's current overseers maintaining its integrity and constantly making improvements; and to Moshe Morag, the director of the Caesarea Developing Co., for his financial and moral support.