The International Journal of

Nautical Archaeology

and Underwater Exploration

Volume 12, 1983

Published for the Council for Nautical Archaeology
by Academic Press London New York San Diego
San Francisco São Paulo Sydney Tokyo Toronto

The International Journal of Nautical Archaeology and Underwater Exploration (1983), 12.3: 229–251

CENTER FOR MARITIME STUDIES AT THE UNIVERSITY OF HAIFA

Recent maritime archaeological research in Israel

Avner Raban

Center for Maritime Studies, University of Haifa, Mount Carmel, Haifa 31 999, Israel

Dor 1982

The 1982 land and sea archaeological excavations at Dor took place during the month of April. This annual research of CMS is on behalf of the *Dor Expedition,* of the Archaeological Institute of the Hebrew University in Jerusalem, headed by E. Stern. During the previous season we completed the survey of the marine installations around the tel (see *IJNA*, **10**: 293–308) and the first stage of the geomorphogical survey and the study of the paleotopography of the area. These were summarised in the master's thesis submitted by Mrs Y. Sneh to the Department of Maritime Civilisations of the University of Haifa.

The 1982 season was devoted to the further exposure of the ashlar-built maritime installations along the southern rim of the tel. The main goal of the excavations was to try to find better stratigraphical and architectural interrelations between the series of quays and landing stages along the waterline and the in-shore structures which were not affected by sea waves and are stratigraphically undisturbed.

In area A, on the shore side of the east end of the main ashlar quay at the water line, the rectangular ashlar floor was completely exposed and a sound stratigraphical sequence established (see Fig. 1).

The *earliest structure* in this area is the cyclopain 'headers' well G, east of the ashlar quay. it was originally built on clean wind blown sand, without shells, coarse particles or any marine fauna. Its lower course is now almost one metre below sea level. Incorporated in its upper course there is a pavement of partially hewn sandstone slabs. This paving continues northward at a level of 0·20–0·30 m above MSL.

In the *second stage* this platform was heightened by additional layers of sandstone slabs and ashlar blocks in secondary use. The platform terminates about 10 m north of wall G and is defined by carefully laid ashlar course (Fig. 2).

The *third stage* comprises a rectangular platform, of which only the north-east half has been preserved. It was made of carefully cut rectangular slabs, which were laid on top of the earlier platform. Its original dimensions were: over 4 m (from north to south) wide by just less than 9 m long. A pavement, about 2 m wide, connected this stage to the backshore, leading north. It was based on the marginal ashlar course, but had muddy filling further to the north. The surface of this stage is 0.81 m above MSL (Fig. 2).

During the *fourth stage* this pavement was heightened by the addition of secondary used slabs, laid on their narrow side (Fig. 3), probably taken from the lower platform. It seems that the need of a higher pavement was caused by the rising sea level. The abundance of marine shells at the base of this structure indicates marine deposits which did not exist in earlier stages.

During the *fifth stage* this high pavement was used as a base for part of a long retaining wall (H) which ran along the south foot of the tel.

The ceramic evidence for dating each of the five stages is not sound enough. Yet it is clear

0305–7445/83/030229+23 $03.00/0

under the mast; the shipyard or the owner, nor if a change of owner produced a change of coins. Mr Cardona confirms that this practice has prevailed on the Catalan coast until now, and that he himself has put copper coins under the mast of the ships he built until he closed the yard. He remembers also that on one ship which was delivered to South America, the new owner changed the Spanish coins for others of his country.

We may consider, that North Africa has always been an importer of wood, and that the lands of the North Adriatic and the north of the Spanish Mediterranean coast were, till medieval times, exporters of wood to North Africa. Therefore, perhaps the only thing we can say, is that both ships could have been built on any shore of the western Mediterranean, but with more probability along the North African coast. There is still another point to be considered: both ships, as others of those times, are constructed following the 'straight wood' principle, as is to be seen especially at the stern post (Palamós), the curve of which is composed of several straight pieces of wood and not made from a tree with a natural curve. Even the first floor of the bow (Fig. 14), usually made from wood of a bifurcation in a tree, is, in the case of the Palamós wreck, composed of straight pieces. The use of curved and bifurcated wood demands trees which the shipyard can select and cut as necessary. If imported wood has to be used, this is normally straight. We can also suppose that, for the mass production of warships, there was neither the possibility, nor the time to select with care every tree to make use of its natural form and therefore warships were made of straight wood. The fact, that the Palamós ship is constructed completely of straight wood could be indicative of a shipyard working with imported wood.

Acknowledgement
I would like to thank Francisco Roselló for drawing the figures.

References

Benoit, F., 1961, Fouilles submarines, L'épave du Grand Congloué a Marseilles. *Gallia* XIV (Supplément) Paris.

•Charlin, G., Gassend, J. M. & Lequément, R., 1978, L'épave antique de la baie de Cavaliére. *Archaeonautica* 2: 9–94.

Foerster, F., 1980, A Roman wreck off Cape del Vol, Gerona, Spain. *IJNA* 9: 244–53.

Santamaria, C., Dumas, F. & Benoit, F., 1965, Dramont A. In J. du Plat Taylor (Ed.) *Marine Archaeology:* 93–103. London.

Tchernia, A., Pomey, P. & Hesnard, A., 1978, L'épave romaine de la *Madrague de Giens* (Var) campagnes 1972–1975. *Gallia* XXXIV (Supplément). Paris.

•Ucelli, G., 1950, *Le Navi de Nemi.* Rome.

•Vidal, C. & Pascual, R., 1961, El Pecio de Palamós. *Actas del III Congresso Internacional de Arqueologia Submarina.* Barcelona.

•The second and last two references are cited in the text; the other references may be of interest to the reader, the initials CRIS are of the Centro de Recuperación e Investigaciones Submarines, Barcelona.

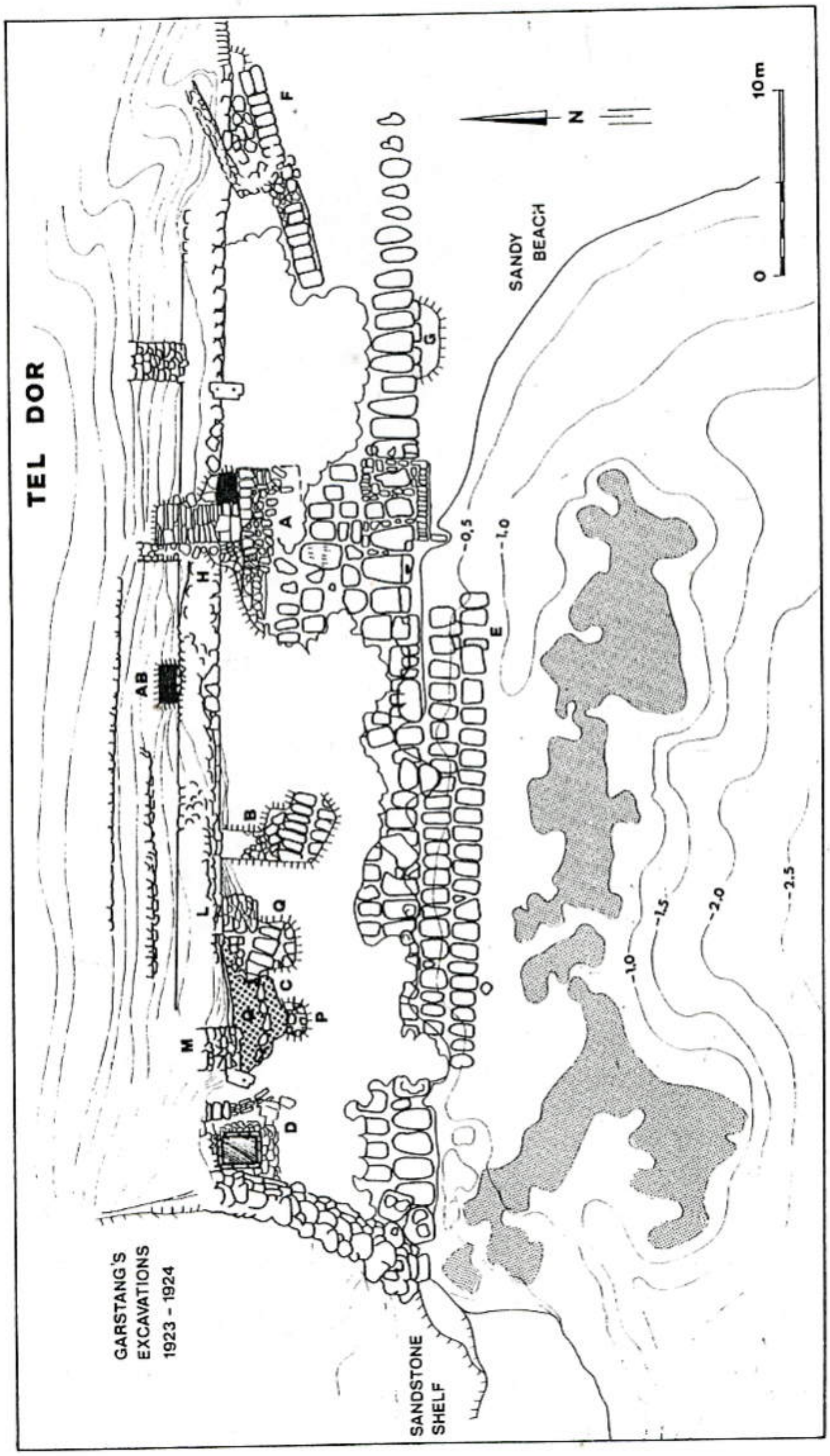

Figure 1. Plan of the coastal structures at the south side of Tel Dor.

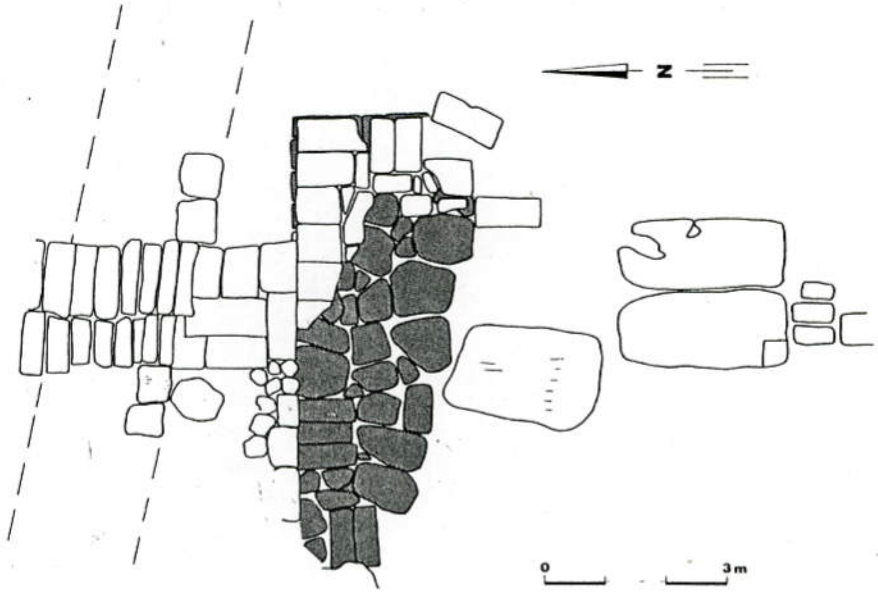

Figure 2. Plan of area A.

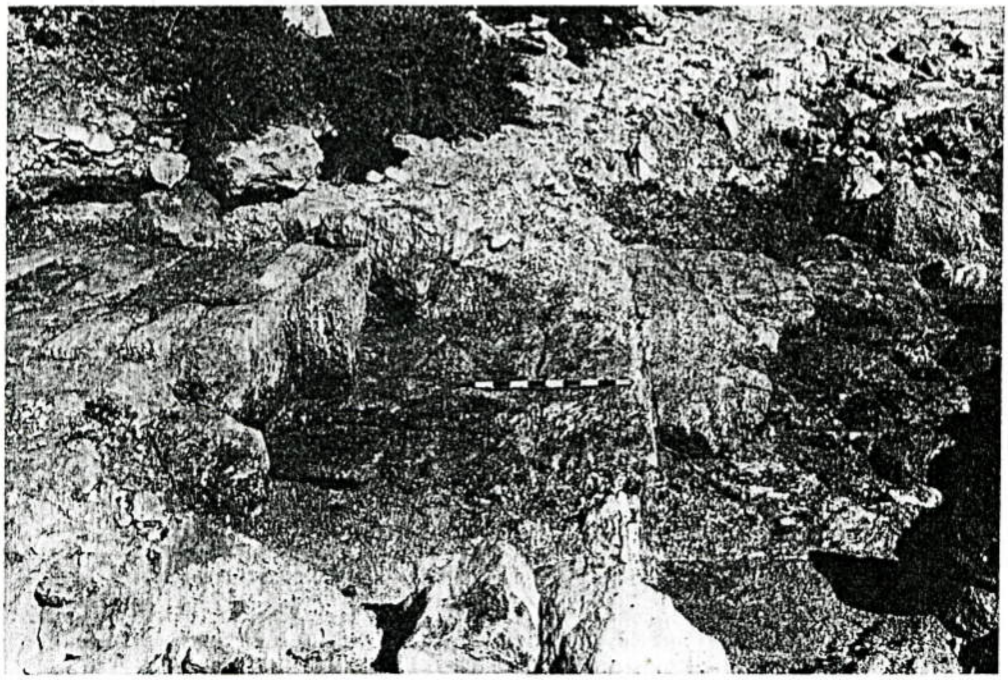

Figure 3. The pavement at area A from SW.

that the post-transgressional stages (4–5) are later than 1200 BC; and should be dated sometime in the Early Iron Age. The few pottery sherds which are securely associated with the floors of the second and third stages are all of the second half of the Late Bronze Age.

The main working field this season was in *Area D:* just east of the great section excavated by Garstang in 1923 (Garstang, 1924: 40–5). This section was made by the British School of Archaeology in Jerusalem during 1923 and cut through a series of occupational levels—down to the bed-rock (see *ibid.* Pl. II, fig. 1) just north of the southeastern extremity of the sandstone outcrop (see Fig. 1). This section revealed the west face of a wide stone wall, at the east end of the dig. This wall was dated to the second phase of the Early Iron Age. Area D is located on the other (eastern) side of this wall. Here we have exposed two main architectural features: a rectangular well, with an internal ashlar facing and a drainage channel built of large slabs (Fig. 4).

The well is 1·95 × 1·65 m across and it is preserved to a maximum height of about 3½ m. The ashlar slabs which pave the inner walls are 0·22–0·30 m thick and the height of their courses varies from 0·48 to 0·28 m. The lower part of the well, from +0·95 m above MSL is quarried in the bedrock and the bottom is 0·42 m below MSL. Although it is only 2–3 m away from the waterline of the sea, the well contains freshwater with minimum salinity. Some 0·80 m above the floor of the well there was a calcified crust which cemented a few fallen ashlar blocks from the upper courses. The filling on top of it is wave-carried with shells and well-eroded pottery sherds from various time periods. Underneath the crust layer there was a muddy grey filling, some fallen ashlar blocks and some crushed pottery vessels of Late Arabic types. There was some sand on the bottom of the well, and fresh water shells were found in it. These data show that the well had been cleared and re-used in recent times.

The ashlar facing of the well was used to pave a rubble-made structure. This structure was built in three different stages. In the first stage, one course of large blocks was laid above the rocky surface, creating a wide platform around the hollow of the well, almost 2 m wide at each side and just over 1 m above MSL. The

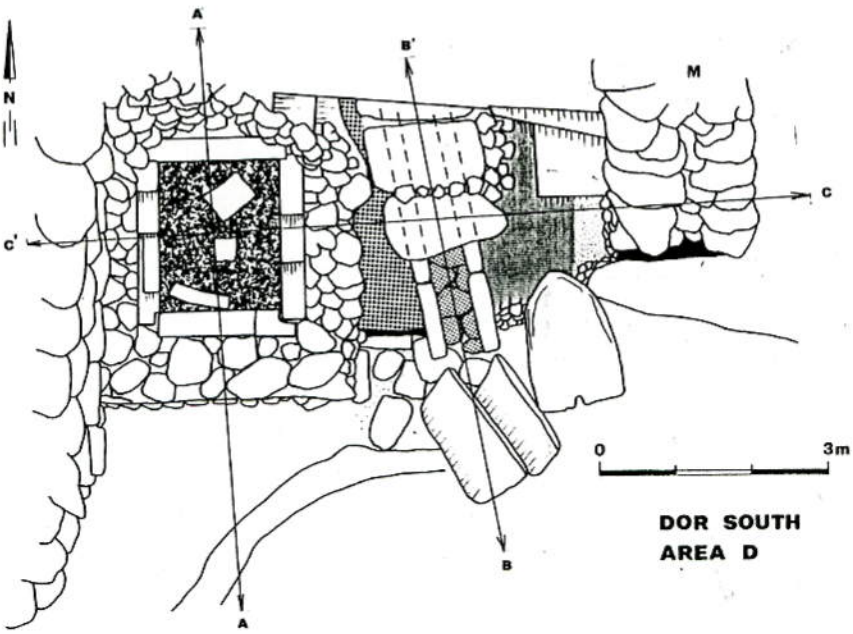

Figure 4. Plan of area D.

gaps between the stones were filled by small pebbles and dark greasy mud. This platform was once washed by the sea waves, which left a thin layer of shells, now well-cemented, on its surface. Then the platform was raised, by an additional course of stones, to a level of 1·45 m above MSL. The stones of this course were cemented by very thick dark-brownish mud.

In the third stage the rubble walls were built around the well to a height of over 3 m above the present sea level. At about the same time the area to the east was dug out, the layers of wave-deposited shells removed, and the great drainage channel was built. The hollow remaining between the well structure and the drainage channel was filled with dark black mud (Fig. 5). This mud contained no pottery sherds or sea shells, but some faunal residues of fresh or brackish water. On top of this filling was a layer of pebbles and small sandstone rubble, as a base to a reddish floor that covered the drainage channel.

The drainage channel was built about 2 m east of the well. It leads in a gentle gradient from within the tel, southwards, towards the sea. Its base was made of small rubble, laid on top of an earlier wall. This wall was built of ashlar blocks of relatively small size which were directly on the bedrock (abraded platform 0·40–0·50 m above MSL). A paving made of large sandstone slabs was laid on top of the rubble layer. The width of the paving is 1·80–1·60 m. Other rectangular stone slabs were used for the side walls of the channel, laid vertically on their narrow side. The width of the walls is 0·30 m, their height 0·85 m and the space between them is 0·60 m. They stand directly on the paving and are roofed by other slabs, some 2 m long and 0·40 m thick. this channel has a gradient of 6°. Its floor is 1·47 m above MSL, at the northern, most exposed area, and only 1·18 m above MSL, some 4 m to the south, where the preserved part ends (see Figs 5–8).

To the east of the channel the dug-out area was refilled with sandstone rubble, with the same reddish floor, made of crushed sandstone and red loam on top of it. This floor is about 0·30 m lower than the one on the other (west) side of the channel and lower than the channel's roofing slabs. This difference was filled-in during a later stage, by crushed jars, rep. nos 34, 36 (Fig. 9) and 37 (Fig. 10) and sandstone pebbles and covered by a new lime floor. This floor now slopes down eastward. Its elevation is 3·02 m in the west, next to the well, but only 2·25 m at its east end, where it was cut by the later wall (M). It resembles in character and location within the stratigraphic sequence the floor on the eastern side of wall M (floor 0). The elevation of floor 0 is only 1·05 m above MSL.

It seems that the area east of the well and

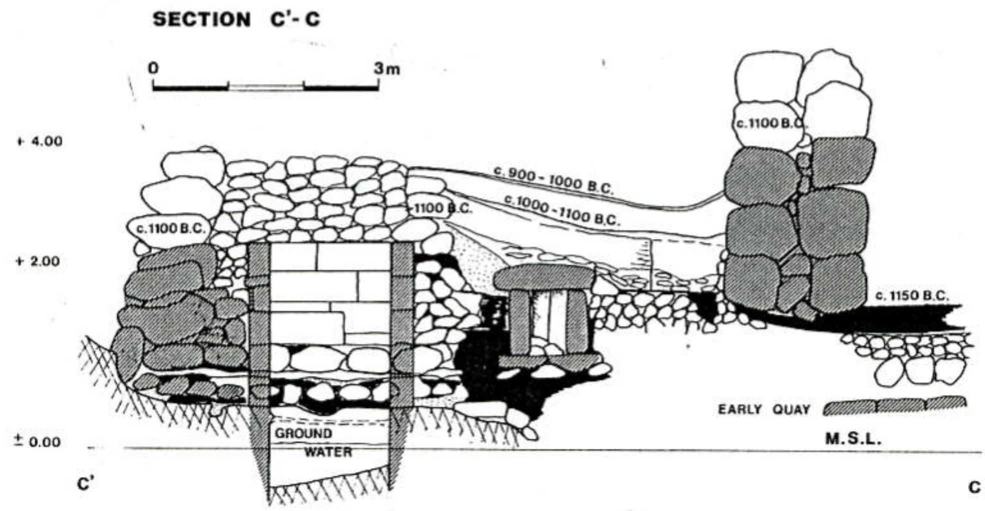

Figure 5. E–W section at area D.

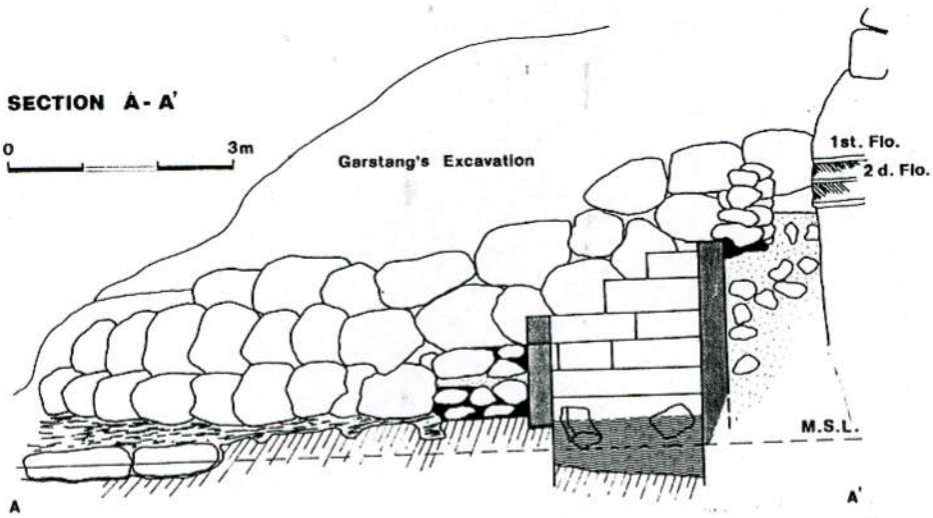

Figure 6. N–S section at west side of area D.

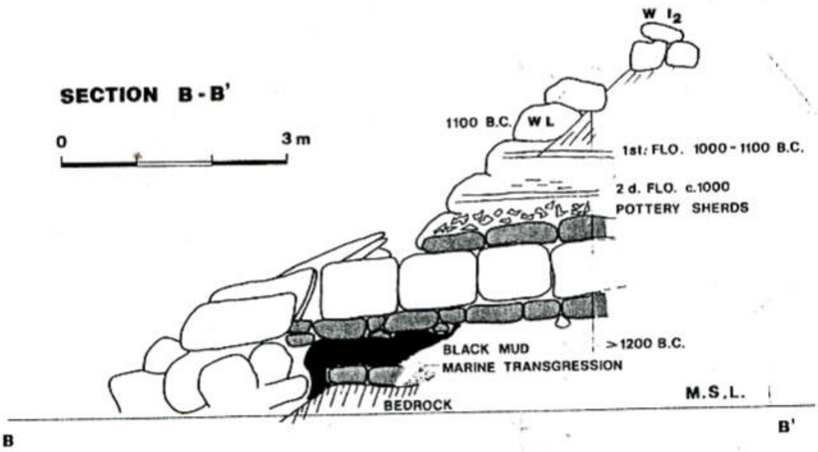

Figure 7. N–S section at east side of area D.

the drainage channel was at that time lower. At the west end the red floor reaches a rubble wall that is superimposed on the NE corner of the well. It is quite clear that during that stage the well was not in use; maybe because of the subsiding sea level, and the fresh water table with it. This superimposed wall was partially destroyed in the recent past probably when the Arab settlers of nearby Tantura re-opened the well. The pottery sherds on this floor are of the same types as those found in the filling on top of it and are dated to the 12th century BC perhaps to the later half of it. Among the sherds was found a piece of Late Cypriot III decorated jug.

During the next stage two cyclopian walls were built of very large limestone blocks, each weighing over one ton. These were probably brought from the Carmel range, some 4 km away. One might presume that at that time the coastal plain was partially inundated, so it was possible to carry the huge stones on rafts. The wall on the west is the semi-circular retaining wall, bordering Garstang's section 1 at its east side (and see above). It was laid partially on the raised bedrock and partially on the

Figure 8. Area D, looking west.

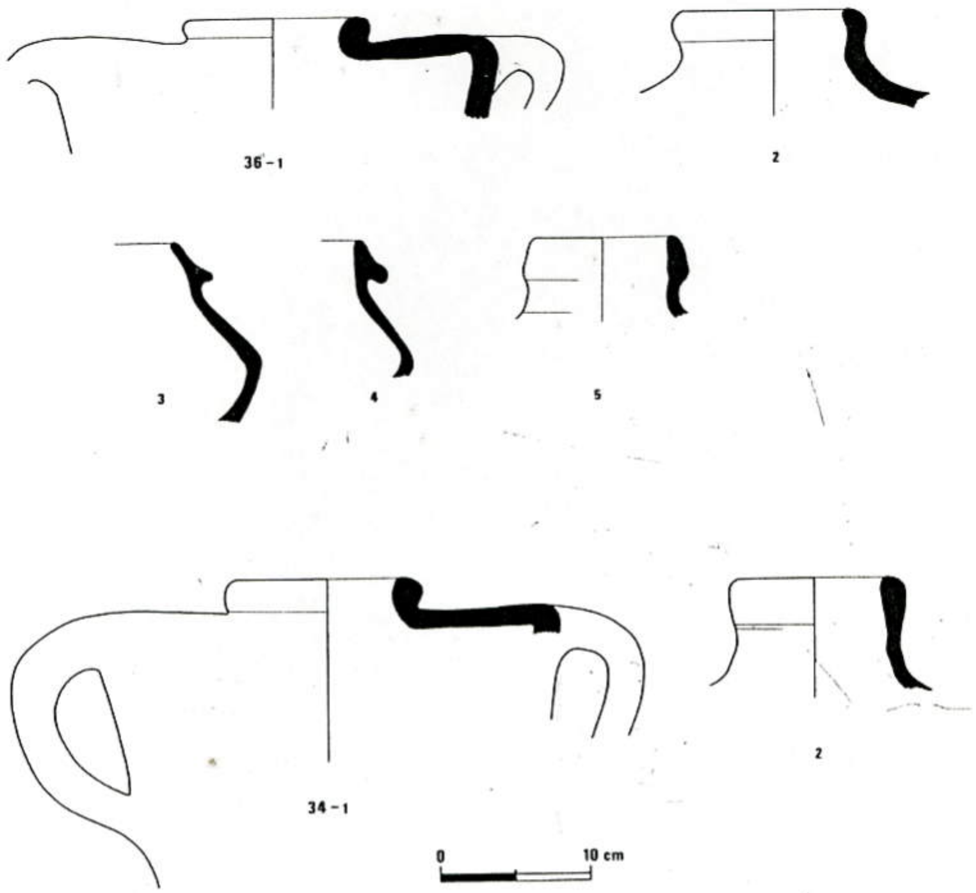

Figure 9. Pottery repertory nos 34, 36.

second stage of the platform surrounding the well. The other is wall M at the east side of area D (wall L, in area C, belongs to the same architectural complex). Wall M was built into a foundation trench which cut through the red floor and the ash layer on top of it. The trench was then filled in with small pebbles, up to the level of a white floor which reached the lower half of the second course of wall M, from the west. The elevation of this floor is 2·83 m above MSL and rises to 3·50 m at its west end, above the well. The pottery dates from the first half of the 11th century BC.

On top of this floor we found grey soil covered by a bright floor (3·30 m in the east and 3·54 m at the west). This higher floor is covered by layers of soil and debris from the eroded slope of the tel. This material is later than the floor and the sherds are mainly 10th century BC.

In area C the red floor has been cleared and the under-laying ashlar course of 'headers' (Q) has been exposed. A deep trial trench was dug from this wall to below wall L and under its western face (N). There a section was cleared to determine the nature of sedimentation layers and the interchanges of land–sea relations prior to the construction of wall H.

As a result of the excavations of 1982, we can tentatively reconstruct the succession of man-made and natural events in area C.

Phase 1. The quay or landing stage, now below the water line, was built. At that time the sea was lower and farther away. A paved platform, based on unhewn sandstone slabs and one course high, was laid at the land side of the

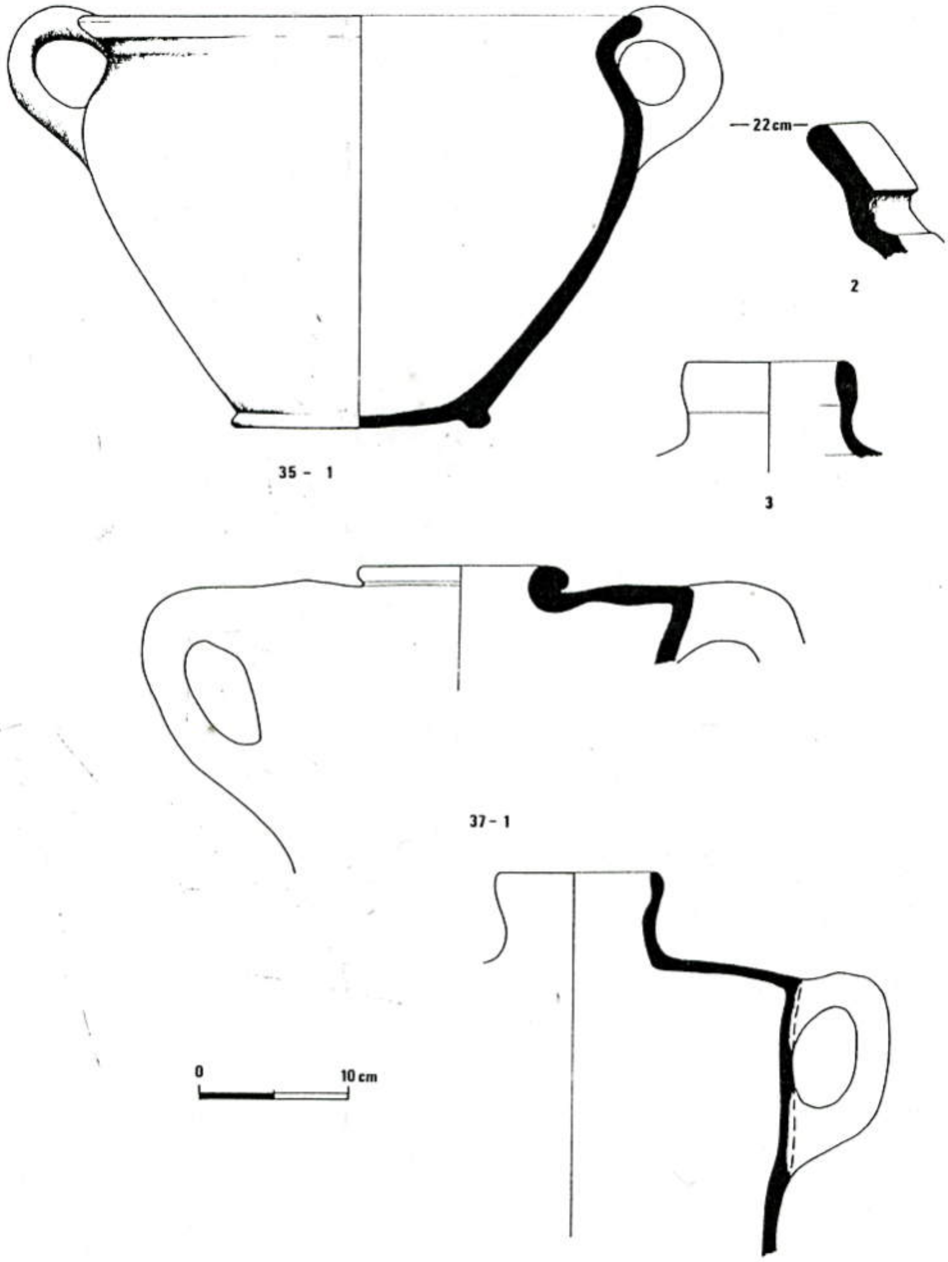

Figure 10. Pottery repertory nos 37 and 35.

quay on aeolian sand, clean of shell and pottery sherds. This platform terminates short of wall Q, in area C; but continues under it in area B. It seems as if this platform is contemporaneous with the first stage of the well in area D and with the rectangular platform in area A. The complete absence of shells in the sandy sub-strata may be due to a paleotopographic situation in which the bay was detached from the open sea by a rocky ridge and was only the backwater of an inner lagoon open to the sea through a narrow channel to the south. The date of this stage must be Late Bronze Age (prior to 1200 BC).

Phase 2. The area had been flooded continuously by sea water. The even thickness, the small quantity of well-eroded sea shells in it, and the horizontality of the marine coating crust of aeolinite which covers some of the structures of the first stage, show that it was a waveless backwater. So it seems as if the transgressions occurred prior to the opening of the bay.

Phase 3. The ashlar wall of headers, Q, was built. This structure was combined with others made of rubble and mudbricks. They collapsed later and their debris still covers wall Q in some places. The fact that they were originally clear above the sea water indicates a sea level somewhat lower than the present one.

Phase 4. Wall Q is covered by debris of the related 'terrestial' structures and everything is overlaid by wave carried shells and eroded pottery sherds (of the Late Bronze Age period). The evidence for wave action is explained by the opening of the rocky ridge at the west entrance of the bay. Whether this happened because of a new transgression, continuous abrasion, or human activity, we cannot be sure. It seems as if the second stage of the well in area D and the raised pavement in area A were built at this time.

Phase 5. In this was the first phase of the great retaining wall H. In area C the wall was laid in a foundation trench that cuts through the layers of debris and marine sand, characteristic of the previous stage. It was built of medium size ashlar blocks, of which two courses survive *in situ*. The red floor O, which seals the marine deposits seems to have been built at this stage. Yet its elevation in area C is somewhat lower than the base of wall H (1·05 and 1·14 m above MSL, respectively). This problem is to be further investigated. The third stage of the well, the drainage channel and the red floor on top of it, in area D, also belong to this same stage of the stratigraphic sequence. They date back to the first half of the 12th century BC and to a time when this part of the site was well protected from sea waves. This may have been because of a lower sea level, or to additional structures south of the red floor, which completely vanished later on.

Phase 6. The muddy deposits on top of the red floor O represent a stage of human neglect in an area sheltered from the sea water. This natural deposit is covered by a gray floor that reaches the upper half of the second course of wall H. It seems that the upper part of this wall, made of rubble and almost 2 m thick, was built at this stage. The other rubble wall, in area D, which sealed off the well probably belongs to this stage as well.

Phase 7. This is the stage of the cyclopian limestone walls (L, M and the semicircular one at the west end of area D). The elevation of their bases is 1·30, 1·75 and 1·45 m above MSL, respectively. This stage is dated prior to the end of the 11th century BC.

The Quays at Dor and other Bronze Age harbours

The quays and other harbour features at the south bay of Dor are not yet fully uncovered and surveyed. Although we cannot reconstruct the exact architectural plan of the quays, the landing stages, the storage area and magazines for each of the several successive periods, we are able to accurately date them and determine the relative sea levels, type of masonry and building techniques exercised in their construction. To evaluate these harbour installations properly one has to study the published data about other harbours in the Mediterranean of the Late Bronze Age and the innovation of ashlar headers for marine installation in the Levant.

While some scholars regard Bronze Age harbours as rock-cut installations on the lee side of off-shore islets (Frost, 1973); it seems as if the majority were located at river outlets (Shaw, 1972: 89; Raban, 1980: 753 ff.). The riverine location is proved by the siting of almost all coastal Canaanite cities and by the typology of the Bronze Age marine vessels designed for sailing stern first (Johnstone, 1973; Raban, 1981*a*: 43–5). The recent surveys of the Bronze Age harbours around the eastern basin of the Mediterranean has produced interesting data on the surprising level of sophistication in the measures executed by the ancient harbour engineers in order to prevent river silting and to keep the entrance channels navigable. Though we know of altered river courses, dams and retaining walls to keep off the silt and the sand since the early stage of the Middle Bronze Age, the only ashlar structure used in harbour installations in this area is to be found at the Minoan site of Malia.

Malia, on the north coast of Crete, flourished at the beginning of the Middle Minoan period (20th and 19th centuries BC). At that time the first central palace was built, with the city quarters extending right down to the shoreline. The centre of the settlement was located on relatively low ground several hundreds of metres from the shore and separated from it by a ridge of low hills (*Études Crètoises*, **XIX**, 4 fig. 6.)

To the west this ridge terminated in a sandy inlet, which is evidence of the mouth of a river that flowed out here to a lower pre-Holocenian eroded basin. The Minoans, who were faced with the problem of preventing the silting of the river mouth with mud carried downstream and with sand bars made by the waves, dug an alternative entrance canal on the far (western) side of the inlet. Vessels could sail through this canal to the lagoon area to the south of the sandy strip and into the inner harbour. The rock cut canal is about 4 m wide and along one side its levelled edge was paved with ashlar blocks in the fashion of a quay. To the north-east of the settlement there is a small rocky inlet, today called Agia Barbara, at whose mouth is a small rocky island. This bay too was created as the continuation of a Pleistocene river bed; but here the natural slope prevented the penetration of sea water deep inland. Nevertheless, the Malians succeeded in turning the inlet into a convenient and safe anchorage by stopping the process of blocking by flood silt (see Fig. 11). To do this they built a dam across the eastern half of the river mouth and a mole in the water from the centre of the inlet to the island. Thus, a basin protected on three sides was formed in the eastern half of the bay, while the flood silt was carried out through the western half separated by the mole. On the west slope of the promontory of Agia Barbara, along the side of the protected basin there are ashlar walls dated by surface finds of pottery sherds to the Middle Minoan period. Archaeological finds in the two bays (remains of buildings and pottery fragments) date only to the Middle Minoan period (*Étude Crètoise*, **XIX**, 1974: 13–9).

In the Levant it was only at the last phase of the Late Bronze age, in the 13th century BC, that harbour engineers introduced the use of ashlars and paving blocks. They are to be found in eastern Cyprus (Kition and Hala Sultan Tekke) and North Syria (Ras Ibn Hani and Ugarit). The excavations at Ugarit did not reveal the actual installations of the harbour at Minet-el-Baidha. This harbour site is located next to the river course, not far from its outlet into the sandy bay (c.f. Schaeffer, 1962: 153, fig. 1). Yet, the typical combination of ashlar headers with rectangular paving slabs is a surprisingly common feature in the so-called Mycenaean Tombs in the harbour town of Minet-el-Baidha (*Syria*, **XVIII**, 1937: 135f., fig. 5–6). The association of such high level architecture with Mycenaean pottery is unknown elsewhere in the excavated buildings in Ugarit, whether residential or public.

The new French excavations at the site near the narrow headland of Ras Ibn Hani reached the level of the Late Bronze Age and the 12th century BC (first phase of Early Iron Age). The partly exposed Late Bronze Age Palace (Bounni *et al.*, 1979: 221f; fig. 13) was built with frequent use of courses of ashlar header blocks dressed somewhat like those at Palace 4 at Ugarit (Shaeffer, 1962: 171ff; figs 7–8). Perhaps of greater interest are the big oblong blocks of headers used by the builders of 12th century BC structures (Bounni *et al.*, 1979, p. 248, fig. 24). By their size and style they greatly resemble those at the Dor quay. The closest resemblance to the type of ashlar structures at the south bay of Dor can be found at Kition in southeast Cyprus. In the northern part of the ancient city, near the sacred area of the temples, Karageorghis exposed the cyclopian city walls of the Late Bronze Age (Karageorghis, 1967: 315–24). This wall was laid on an earlier brick wall, with its base on the edge of the rocky high ground (Karageorghis, 1968: 302–11; 1976, fig. 10). Beside this earlier wall, to the north, in an inundated depression, probably part of the marine lagoon at the time (Nicolaou, 1976: 73) two ashlar-built 'bastions' were exposed. Though their orientation and building technique did not correspond directly with the brick wall, they were understood to be defensive bastions, related to that wall (Karageorghis, 1976: 59f). Though the abundance of stone

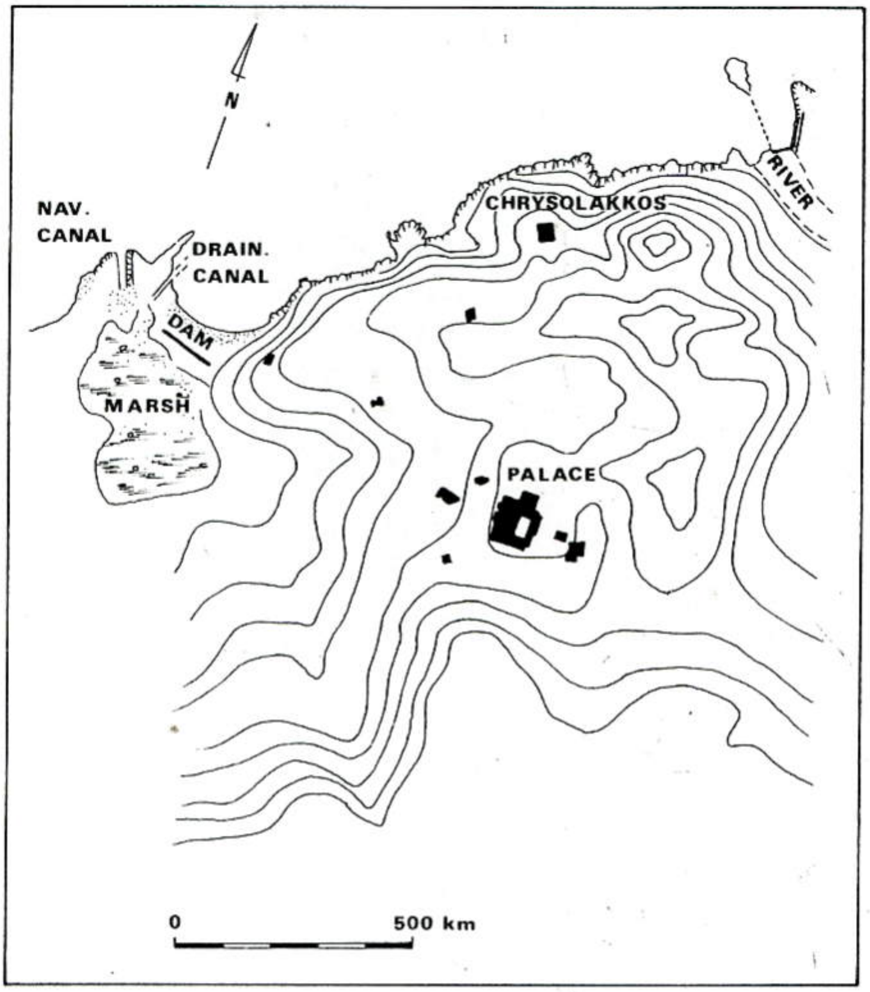

Figure 11. Plan of Malia and its two harbours dating back to the Middle Minoan period.

anchors found in secondary use all around area II, mostly relate to the proximity of the harbour to the area of the temples (Nicolaou, 1976: 81), the excavators ignored this in their publications. Visiting the site while the excavations were carried out and again, and more so after the last season at Dor, we are convinced that Nicolaou's notion of the Bronze Age topography and the existence of an inner harbour at Kathari (on the north side of area II) is both logical and well attested by the architectural remains and the natural features of the topography. Considering the two 'towers' as rectangular quays of that harbour would bring even closer the parallel to the paved area at Dor (c.f. Fig. 9). The similarity of the paving slabs at both sites—including their peculiar grooved sides and actual dimensions—might make one think that the quays at Dor and at Kition were built by people with a common maritime heritage.

In this context it is interesting to note the similar style of ashlar pavement at the nearby site of Hala Sultan Tekke (Hult, 1978, figs 6, 8, 14). This site was probably an inner harbour in the 13th century BC (Nicolaou, 1976: 24) and the many sherds of Canaanite jars found there by the Swedish excavators (c.f. Hult, 1978: 83, no. 1108) and many more were found during later seasons, as has been confirmed by Prof. Astrom in a private letter to us), prove the commercial maritime connections with the Levant. The jar handles with multiple cavities found at Dor on the red floor, O and above it, in the black mud resemble those from Hala Sultan Tekke (Hult, 1978, fig. 171, no. 1099) and strengthen the idea of common origin or heritage with Dor and other 13th–12th century coastal sites in Israel.

The quay at Dor, with its long and narrow ashlar headers is an architectural feature known so far to be a typical innovation of the Phoenician harbour engineering with its earliest occurrence in the 9th century BC, at Tabbat-el-Hammam (Braidwood, 1940: 208–18). The occurrence of such a structure at a much earlier date, at Dor, though not necessarily in marine context, is surprising and intriguing; for no earlier structures with the same engineering concept can be traced among the Late Bronze Age architectural remains in the Levant. The carefully laid large rectangular paving slabs, as have been found in structures of late 13th and early 12th century BC at sites of Eastern Cyprus and along the Levantine coast of the Mediterranean are also new and without local Bronze Age precedent. The introduction of ashlar structures in the Levant and its indirect predecessors in the Minoan architecture have been observed by scholars (see Sandars, 1978: 145–6) without referring to harbour technology, but with reference to other innovations (e.g. ibid: 151–6). In each of the sites discussed above, these architectural features correspond to the new components in the ceramic repertory. The issue of their typological provenance and the historical significance are most frequently discussed by many scholars. The frame of this paper does not suffice even a short summarised survey of this issue. Yet, we believe that the discovery of Late Bronze Age quays at Dor, the architecturual style they represent and the comparative structures of the period at other sites are all valuable additions to a better understanding of the reconstruction of the historical events, around the arrival of the Sea People in the Levant; their date, character and maritime heritage. The new information about the correct name of the ethnic group of 'Sea People' who settled at Dor—now to be called Sikaliu (=Siquly of the Classical sources) instead of the uncertain reading of Wen-Amon's T/S.KL/R (Lehmann, 1979) gives our archaeological data additional importance.

Caesarea 1982: Preliminary report

The 5th season of underwater excavations in the sunken ancient harbours of Caesarea Maritime has come to an end. Excavations began 23 May and ended 2 July 1982. This year marked the third year that this research has been carried out within the framework of CAHEP (Caesarea Ancient Harbours Excavations Project)—initiated and directed by the Center for Maritime Studies of the University of Haifa and the Department of Maritime Civilization, also of the University of Haifa, in collaboration with other Universities in the USA and Canada.

Dr A. Raban, from CMS has been the director of the project since 1975. Professor R. Hahlfelder from the University of Colorado at Boulder and Dr J. Oleson from the University of Victoria, Canada have been co-directors; and Professor R. L. Vann, of the School of Architecture at the State University of Maryland has been in charge of surveying and studying the architectural features, also as co-director.

These four academic institutions have participated in CAHEP on an institutional basis and have sent students, technical workers and faculty members to man the project's staff. This year we had over 40 diving volunteers from the USA, Canada and Australia, including students and a team of five diving architects. Approximately 40 Israeli diving volunteers also participated on behalf of the Undersea Exploration Society of Israel as well as students and faculty members of the Department of Maritime Civilizations of the University of Haifa. The Expedition had its base in the Maritime Sport Center at the nearby Kibbutz Sedot-Yam. As a field base we used the facilities of the Caesarea Diving Center, which is located at the old harbour.

An additional floating base was moored some 400 m offshore, above the main working areas. This raft was equipped with air filters, hooka hoses and manifolds for the air supply to the four airlifts. The professional staff included: Y. Tur Kaspa—acting field director, in charge of the UW equipment; S. Breitstein—diving officer and diving technician; Engineer D. Freidman—in charge of electronics and the