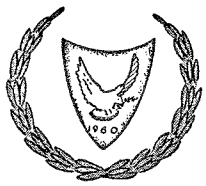
REPUBLIC OF CYPRUS

MINISTRY OF COMMUNICATIONS
AND WORKS

REPORT OF THE DEPARTMENT OF ANTIQUITIES CYPRUS, 1987



PUBLISHED BY THE DEPARTMENT OF ANTIQUITIES, CYPRUS
AND
PRINTED BY ZAVALLIS PRESS LTD., NICOSIA
1987

CYPRUS UNDERWATER SURVEY, 1983-1984 A PRELIMINARY REPORT

(PLATE LVII)

INTRODUCTION

This article presents two seasons of underwater and coastal archaeological and geomorphological survey conducted by the Underwater Research Group[1] along the west coast of Cyprus during the summers of 1983-84. The survey area covered approximately 13 kilometers of coastline, from Maa,[2] extending northwards to Lara peninsula (Fig. 1).

The overall aim of the project was to study the archaeological aspects of the changing physical and human environment of the coast of western Cyprus. The work involved surveying archaeological sites, analysing their location, and relating the archaeological evidence to the changing geomorphology of the area.

Lack of highly sophisticated equipment limited the underwater team to shallow water and the use of basic search-recording methods; these included visual inspection by snorkel, scuba swimline searchs and photogrametry.

This study shows that even very shallow and exposed underwater sites can yeild useful archaeological data which when integrated with geomorphological evidence can be used to re-construct patterns of coastal activity.

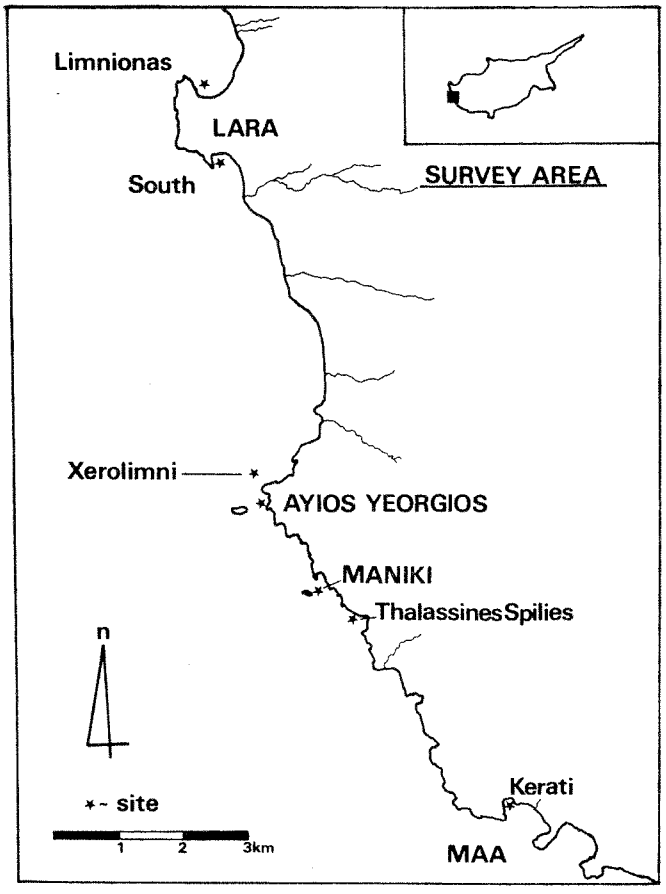


Fig. 1. General location map, showing sites surveyed.

METHODS

Archaeological

The survey of such a large area required careful selection of locations to be investigated. The most obvious areas, where ships might have sheltered, or where modern ships anchor, were selected initially using hydrographic charts, and large scale maps of the area. Local people were also found to be a useful source of information. Once an area was chosen, preliminary searches were conducted using snorkellers. This allowed a wide coverage of the sea-bed in a relatively short period of time. Any significant concentrations of archaeological material or geomorphological features were recorded for future investigation using one or more of the following survey techniques.

Survey Techniques

The survey started at Maa, in the large bays surrounding the peninsula. Following a compass bearing of 120 degrees divers swam transects across the bays and at two minute intervals noted the depth, bottom type and any geomorphological or archaeological material. Meanwhile, from two theodolite stations on land, sights were made at the same two minute intervals on a surface marker buoy held by the divers.

Random sampling of the sea-bed was also conducted around the entire base of the peninsula. This was accomplished by placing a metre square frame on the sea-bed and collecting all the material within. This method insured that if worn sherds, which might be mistaken for stones were present, they would be found when the sample was later shifted and closely examined on land.

At smaller sites, such as Kerati, a more intensive survey technique was used. If the sea-bed could be observed in its entirety, it would remove many of the elements of random sampling associated with large areas. Calibrated base-lines or jackstays were laid across the bay at 20m. intervals, the ends of which were surveyed with theodolites and tied into the Cyprus Department of Land & Surveys 1:5000 topo-

1. Institute of Archaeology, University of London.
2. The Late Bronze Age site excavated by Dr V. Karageorghis.

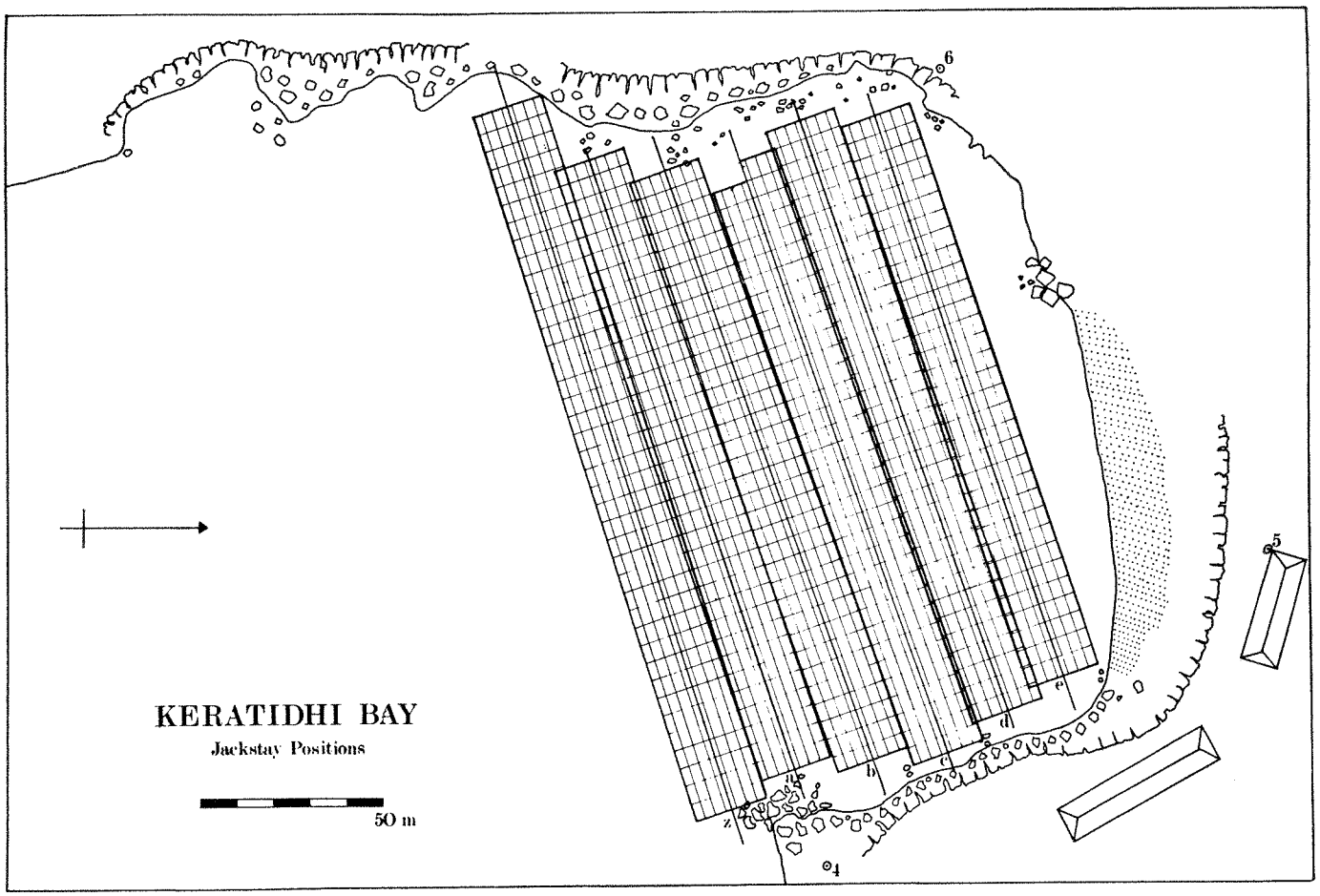


Fig. 2. Swimline survey coverage at Kerati along six jackstays. The carob houses are shown at the northern end of the bay.

graphic maps (Fig. 2). A swimline was then used to regulate the survey. A distinction is drawn between a swimline search and a swimline survey as described here.[3] The first implies the search for a specific object, or a more general search of a large area such as the Cape Andreas survey.[4] A swimline survey uses the same principles as a means of regulating more detailed recording of a specific area. In the survey of Kerati the four divers were 3m. apart, surveying a 10m. wide strip either side of the jackstay. In average visibility the whole line could be seen. This and the intentionally slow rate of advance made control easy, allowing the divers to concentrate on the sea-bed rather than each other. The divers at the jackstay end of the line controlled the rate of progress, initiating the command signals via a series of tugs on the line, and ensuring that the line remained at right-angles to the jackstay. The diver at the opposite end was responsible for maintaining line tension and returning signals. Every 5m. the line was stopped for the divers to record the number of sherds seen and the nature of the sea-bed. Any sherds that were potentially diagnostic, such as bases, rims, or handles were raised. When such a piece was found the diver concerned stopped the line. The decision whether or not to raise it was made by an archaeological supervisor who either dived with the line or snorkelled above.

Sea-bed type was also recorded with a letter code that referred to both the geology and biology; sand, gravel, clay or eelgrass etc. Where more than one type occurred that were noted in order of predominance eg. S, g e. Although this relied on a subjective judgement from each diver the sea-bed types were easily categorised. In one area where survey was intentionally repeated the consensus was high.

In addition to the information of sea-bed type and pottery distribution, the outline of features such as rock outcrops and piles were surveyed independently, being buoyed at intervals and fixed with theodolites from the shore. The same procedure was used for other significant features such as stone anchors and some of the more important pottery finds. Other recording techniques used for specific groups or small areas were a drawing grid, still-photography and photomosaic (Pl. LVII: 2).

At Maniki, the preliminary snorkel search revealed three stone anchors. A baseline was run between the two largest anchors which became datum

3. S. Wignall, *The Spanish Armada Salvage Expedition*, (1968). The swimline search was developed by Lt-Comdr. John Gratton and used by Wignall in the search for the Santa Maria De la Rosa in the Blasket sound.
4. J. N. Green, "Cape Andreas Expedition", *The Research Laboratory for Archaeology*, (1969).

points for the purposes of this preliminary survey. They were buoyed and their positions fixed with theodolites. Using the baseline as a jackstay a swimline survey was made of the area 20m. either side of it. The pottery and anchors found were photographed in situ, drawn and trilaterated from the two datum anchors. Only diagnostic pieces on the surface of the sea-bed were raised.

In the bays at Lara, in an attempt to interpert the complex pattern of sherd distribution revealed by the swimline survey it was decided to record the sherds according to the following three size classes: small-less than 7cm., medium 7-15cm. and large-greater than 15cm. This was done to see whether sherd size relates to other factors such as depth, susceptibility to wave transport, or perhaps reveal something more about the location of the original zone or zones of deposition.

These techniques encompass the work on all other sites investigated. Not all were used on every site but were applied selectively depending on the situation.

Geomorphology

Geomorphological data was collected with the aim of establishing a local environmental history. Raised shorelines were sampled for molluscan fauna in order to establish the former position of sea-level.[5] The shorelines were surveyed by theodolite or abney level with reference to CUS datum at Ayios Yeorgios. The datum was established by daily tide gauge readings over a four week period. Sediment samples were taken from most valleys for particle size analysis. Seismograph surveys were conducted in five valleys, using a Soiltest portable seismograph on 30m. traverses giving a subsurface penetration of 10m. Traverses were oriented perpendicular to the valley axes to illustrate the relationships between valley cross-section and fill morphology.

GEOMORPHOLOGICAL BACKGROUND

Geomorphological studies of the Maa-Lara area were undertaken to identify environmental changes which may have affected the human utilisation of the area in the past.

Shorelines

Former shorelines provide evidence of sea-level change, and hence changes in the morphology of the coastline. Western Cyprus has extensive remains of raised shorelines. Previous studies have indicated the presence of up to six Quaternary shorelines in the area at altitudes ranging from 5m. to 350m. above present sea-level.[6] The present study recorded shorelines at 100m., 50m. and 0 to 20m. above sea-level. Only the lowest shoreline was continuous enough to provide a reliable record of sea-level change for the whole area.

The lowest shoreline was traced throughout the study area, and was found to have a similar morphology, stratigraphy and faunal content at most points. The height variations which were apparent over very short distances along the shoreline were found to result from extensive coastal tilting (Fig. 3). The similarity of the molluscan fauna between shoreline segments at different altitudes indicated that the tilting is post-depositional, the shoreline itself having been formed at depths between -2m. and 1.5m. above sea-level (Table 1).

TABLE 1: Change in relative elevation of selected shoreline sites. Sites are listed from north to south. The height at which the deposits formed was determined by analysis of their molluscan fauna. All heights are in metres.

Site	Present Height	Formation Height	Elevation Change
2km. north of Lara	+15	0	+15
Lara-*Limnionas*	+10	—1	+11
Lara-*South*	+10	—0.5	+10.5
2km. south of Lara	+ 3.5	+0.5	+ 3
Ayios Yeorghios	+ 1	—2	+ 3
Sklinikara	+ 1.9	—2	+ 3.9
Keratidhi	+ 4	—2	+ 6
Corallia	+ 4	—1	+ 5
Coral Bay	+10	—1	+11
Kissonerga	+ 4	0	+ 4
Niskara	+ 3.6	+1.5	+ 2.1
Kato Paphos	+ 1	—0.5	+ 1.5

Profiles surveyed perpendicular to the present coastline indicate a general seawards tilt of the coastal plain ranging from 3 to 15 percent. The pattern of coastal tilting is consistent with the uplift of the Troodos massif at the centre of the island. Even so, some variations in shoreline elevation are too great to be explained by regional tilting. Height variations at Lara and Ayios Yeorgios seem to indicate a degree of faulting. The position of the fault at Lara was located by the seismograph survey (Fig. 4).

Regional tilting explains the apparent dichotomy between geomorphological and archaeological evidence of recent sea-level change. A study by Flemming of the past and present relationship to sea-level of archaeological sites in western Cyprus indicated subsidence of the coastal margin by 0.5m. in the past

5. G. W. Richards, *Intertidal Molluscs as Sea-Level Indicators*, 1982. Unpub. Ph. D. thesis, University of London 357pp.
6. W. M. Turner, "Quaternary Sea Levels of Western Cyprus" in *Quaternaria* 15 (1971), 197-202.

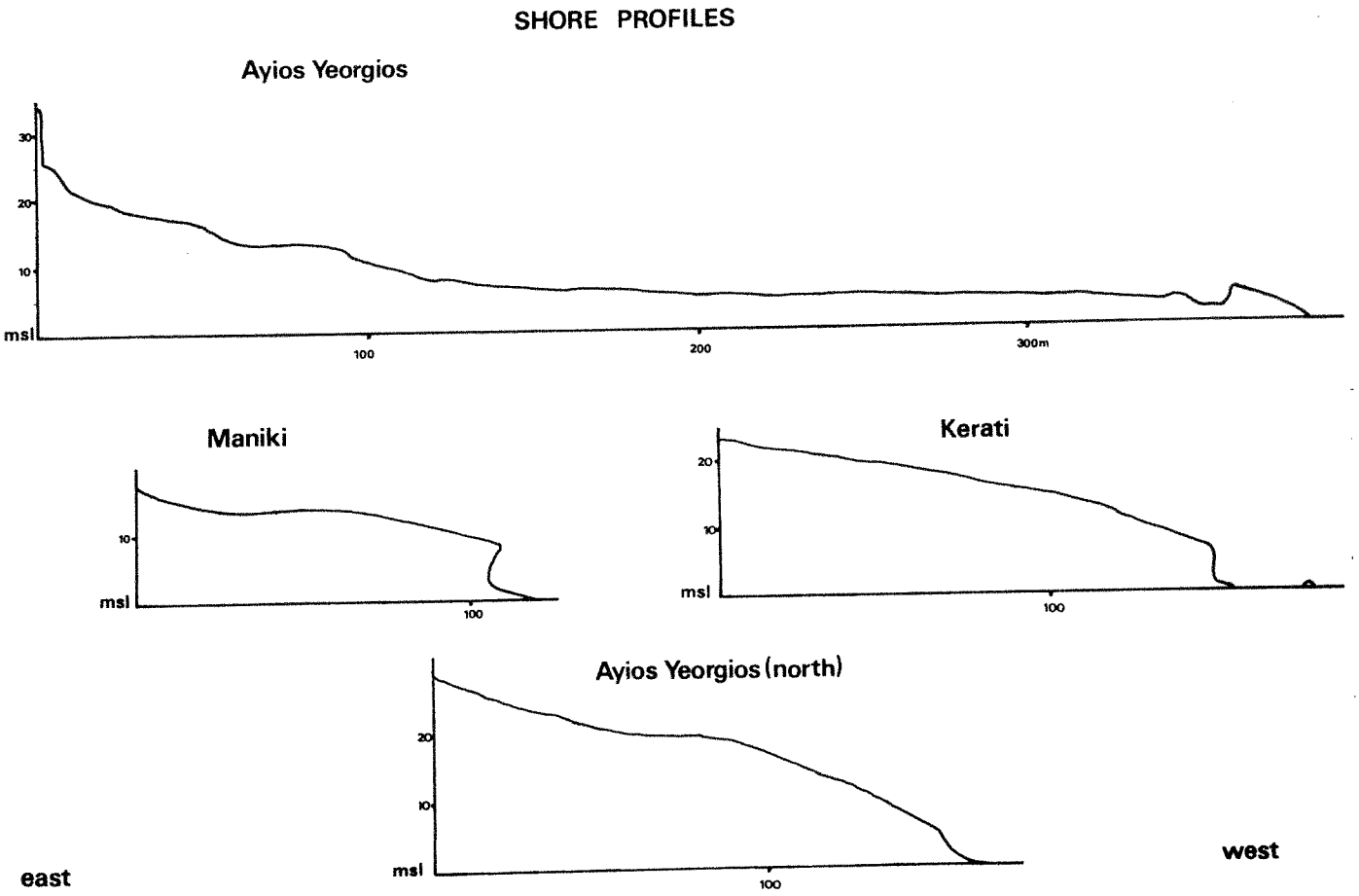


Fig. 3. Shore profiles perpendicular to the coastline, illustrating the general seawards tilts of the coastal plain. The surface of each profile is covered by Pleistocene shoreline deposits, which were originally laid down horizontally.

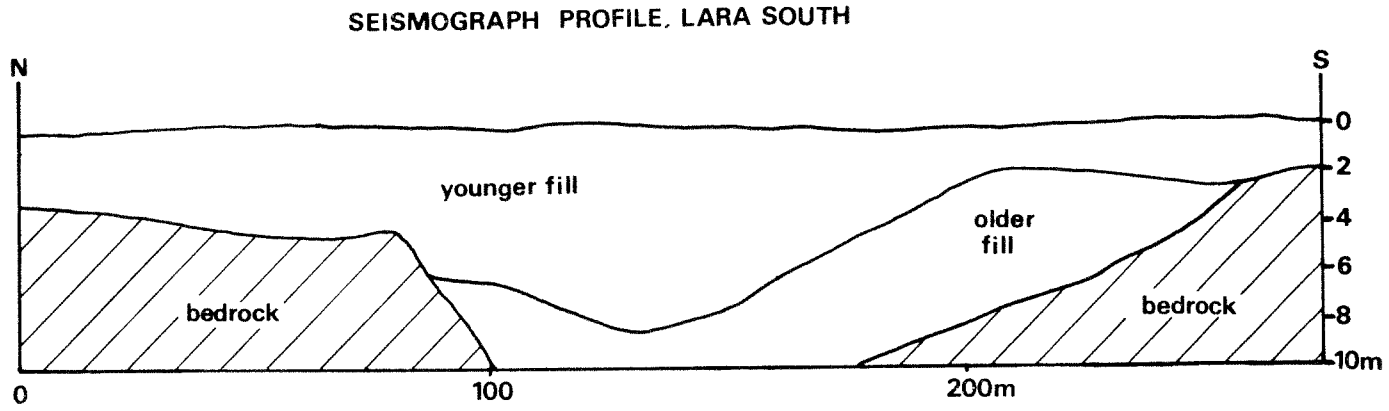


Fig. 4. Subsurface geomorphology of Lara-*South*, showing the stratigraphic relationship between the two major alluvial units in the survey area.

2000 years.[7] The shoreline evidence, however, points to uplift of the coastal plain. Archaeological sites used as sea-level indicators are invariably close to present sea-level. Coastal tilting would tend to submerge areas close to present sea-level, including most coastal archaeological sites, whereas shorelines further inland would be emerged.

Thus at Ayios Yeorgios in the centre of the study area, old quarries on a western promontory have worked surfaces now submerged at high tide. In contrast, a fish tank a few hundred metres to the east has an inlet above present high water, indicating a minimum uplift of 45cm. since Roman times. Thus the position of sites relative to the regional tilt is of crucial importance in analysing their former relationship to sea-level.

The evidence points strongly to a tectonic origin for recent sea-level change. Very little eustatic change appears to have taken place over the last 2000 years, in accordance with the findings of Flemming.[8] The evidence for extensive tectonic change is matched by evidence from raised shorelines in other parts of the Mediterranean.[9] The spatial scale of tectonic deformation is extremely small, even less than the 25km. × 25km. block movements indicated by Flemming.[10] Thus the effects of sea-level change on the relative position of harbour sites can operate at a very local scale.

First order radiocarbon dates[11] on shell material from the shoreline indicates that all sites are older than the Holocene.[12] This rules out a possible post glacial origin for deposits close to sea-level.

These findings conflict with the uniform uplift envisaged by Turner.[13] As in other areas of the Mediterranean, the height of a shoreline is not a reliable guide to age. The extent of the tectonic deformation of the area should become apparent once material from the shorelines is conclusively dated.

Alluvial Deposits

Recent alluvial deposits are common in valleys in the study area. An extensive stratigraphic and sedimentary survey of these deposits was carried out in 1983, and supplemented by seismographic surveys in 1984. Sections and seismic profiles indicated that the present valley floors are filled with a loosely compacted alluvial deposit, between 4m. and over 10m. thick. This deposit thins towards the interfluves (Fig. 4), and is always confined to the present valley. The deposit is well sorted, and generally composed of medium sand, with a mean grain size of 0.7 phi to 1.40 phi. This younger fill is underlain by a more compact alluvium which generally extends to depths beyond seismic range, but is occasionally found lying on bedrock within 10m. of the surface. This older fill is found to extend over the interfluves, and covers large areas of the coastal plain in a series of coalescing fan deposits. The sediments are coarser than in the younger fill, with a mean grain size of 0.3 phi to p.4 and exhibit much poorer sorting. (Pl. LVII: 3).

The older fill was not found to contain any artefacts. The younger fill contained numerous Roman and Medieval pottery fragments. Thus the younger fill must be either Medieval or post-Medieval. The stratigraphy and sedimentology of these deposits matches closely the sequence noted by Vita-Finzi in many other parts of the Mediterranean. According to Vita-Finzi, the older fill should be of Wurm age, between 30,000 and 10,000 years b.p.[14] The present study is the first to record the presence of the older fill beneath the younger fill, therefore clarifying their stratigraphic relationship.

RESULTS

Sites

A total of eight sites were examined and in most cases a vast quantity of material was located. In the absence of excavation, site interpretations were made on the basis of surface material. Criteria for site classification were based on the following general points. Firstly, the association of the site with contemporary land installations. Secondly, the degree of natural shelter provided by the site. Thirdly, the type and distribution of material, particularly the ratio of pottery to anchors.

Maa-Palaeokastro

Since 1979, excavations have been conducted at the fortified site of Maa-*Paleokastro*.[15] Although the position of the settlement on the tip of the promontory makes it inevitable that a certain amount of material would have found its may into the water, nothing was found in either of the bays or below the cliffs around the peninsula. There are several reasons for this. One, any material contemporary with a Late Bronze Age settlement would be very difficult to see underwater due to erosion. Two, the survey method

7. N. C. Flemming, "Holocene Eustatic Changes and Coastal Tectonics in the Northeastern Mediterranean: implications for models of crustal consumption" in *Phil. Trans. Royal Society*, London. A289 (1978), 405-58.
8. Flemming, *op. cit.*
9. G. W. Richards, "Fosil Mediterranean molluscs as Sea-level indicators", *Geol. Maq.*, (in press).
10. Flemming, *op. cit.*
11. C. Vita-Finzi, "First-Order 14C dating of Holocene molluscs" in *Earth and Planetary Science Letters* 65 (1983), 389-92.
12. C. Vita-Finzi, pers. communication, 1985.
13. Turner, *op. cit.*
14. C. Vita-Finzi, *The Mediterranean Valleys*, (1969). Cambridge University Press, 140pp.
15. V. Karageorghis, M. Demas, B. Kling, "Excavations at Maa-Palaeokastro, 1979-1982 A Preliminary Report" in *RDAC* 1982, 86-108.

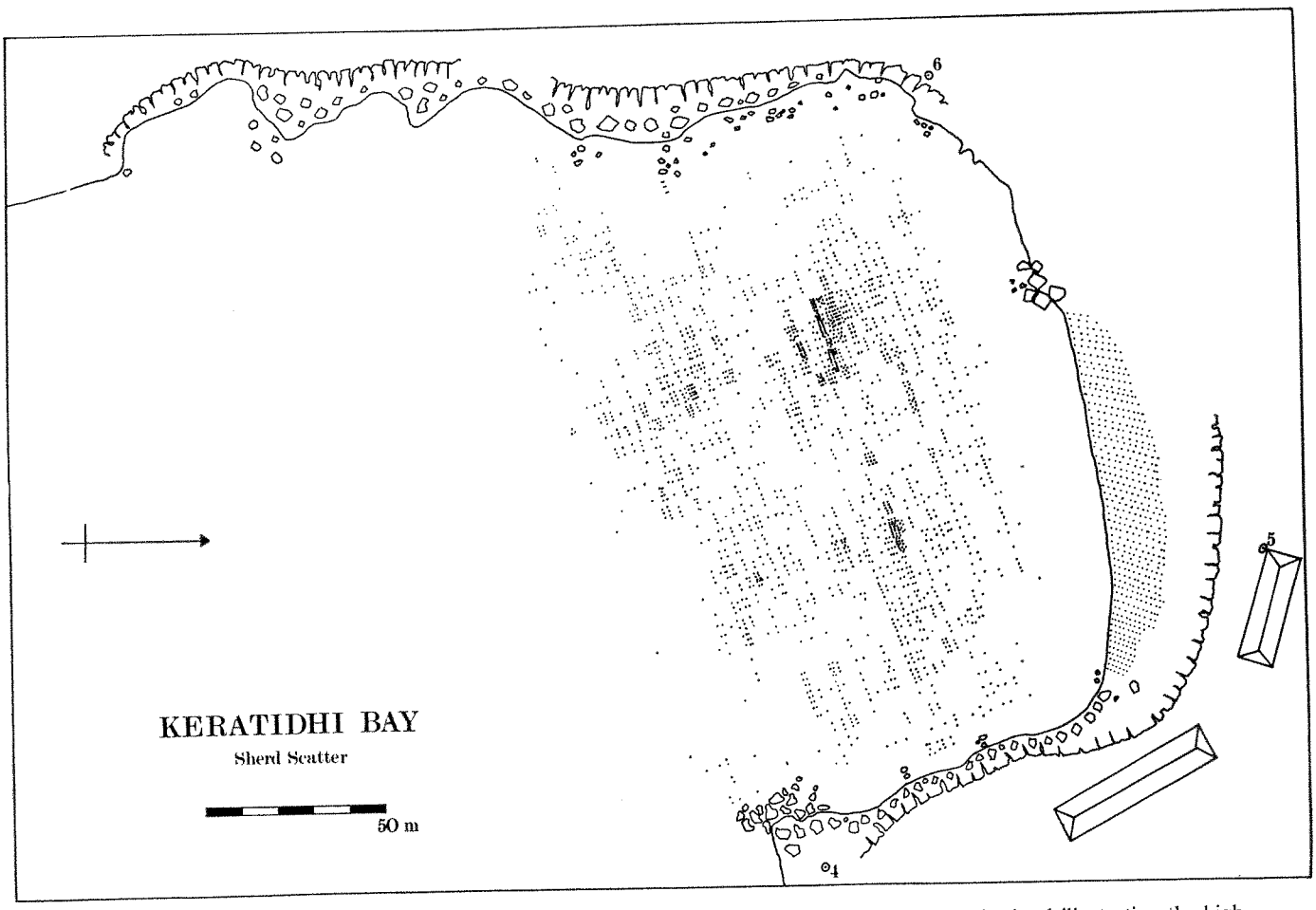


Fig. 5. Sherd scatter recorded by swimline survey in Kerati Bay. Each dot represents a single sherd illustrating the high concentration in the centre of the bay.

used had been necessarily general, given the area concerned and the resources of the team and was not intended to give more than an indication of the density of the material. Judging by the wide range and volume of material found at other sites, the results of this initial survey almost certainly reflects a low density of material, rather than any inadequacy of the method.

Assuming there were no sea walls or breakwaters constructed, the general topography of the coast and the paucity of material (of any period) suggest that any anchorage associated with the settlement would have been elsewhere.

Kerati (Keratidhi Bay)

This small, well protected bay has a sea horizon of only seven degrees to the south west. The bay contains a dense concentration of pottery (Fig. 5), several piles of stones and one stone anchor. An artificial platform at the northern end provides easy access to land near the site of two former carob houses.

The entrance of the harbour is probably at the same depth as in Antiquity, whereas the northern end of the bay may have shallowed by up to 50cm. in the last 2000 years. Alluviation has not affected Kerati, although it has probably contributed to the extensive sandy bottoms in Corallia and Coral Bay to the south at Maa. The lack of alluviation may have ensured the continued use of Kerati as a harbour. (see discussion of pottery finds in section two of this paper)

Carob Trade at Kerati Bay

Prominent amoungst the material recovered in the intensive survey of Kerati was the glazed pottery of the 18th-19th c. A.D. The late material is of special interest because it is known that the bay was used for particular kind of trade — the export of carobs.

The primary evidence for this trading activity is provided by the two ruined buildings close to the shore, which Peyia residents remembered being used for the storage of carobs. Additional evidence for trading may also come from several piles of stones located close inshore. They might represent ballast, jettisoned during the loading of goods-possibly carobs.

Cypriots who participated in carob trade confirm that it continued until the present century.[16] From

16. A. & J. Stilanou, pers. communications, 1984.

the beginning of the carob harvest in August (at a date set by law under British rule in order to prevent the picking of unripe fruit), the villagers of the Peyia district brought their carobs by donkey to the Kerati stores. Here the carobs were purchased by merchants, who weighed the carobs in sacks and recorded each person's contribution before the carobs were placed in great heaps inside the storehouses. The ripened fruit could be kept in store for as long as a year, so immediate export was not necessary. The carobs were collected by large ships, which anchored offshore; small caiques loaded up and ferried the carobs out to them. The carobs were destined for the ports of Europe, the Arab countries and Russia.

The presence of considerable quantities of glazed wares of the 18th and 19th c. A.D. in Kerati bay provides archaeological evidence for its use in these periods. Furthermore, the primary use of this particular bay is attested both by the now ruined carob stores beside the bay and by ethnographic data. This combined evidence illustrates an important aspect of the maritime history of Keratidhi bay, and despite its relatively modern date, it should also be of general interest to archaeologists, so often denied detailed evidence about commodities and mechanisms of trade.

Thalassines Spilies

This exposed rocky portion of the coast, just north of Kerati and south of Maniki is difficult to reach from land, because of the sheer cliffs. On rock outcrops and submerged reefs an extensive scatter of pottery is concreted onto bedrock at a maximum depth of three metres. The situation suggests a wreck site or sites. (see discussion of pottery finds in section two of this paper).

Maniki

At Maniki, a small shallow south facing bay and a channel between the bay and Maniki island was investigated (Fig. 6). The presence of a pottery dump and mooring post on shore indicated that the bay was used as a harbour, yet very little pottery was recovered in the bay. The lack of pottery may be explained by reference to the geomorphology.

Around the harbour, soft marine calcarenites are overlain by indurated terra rossa rather than the more resistant shoreline deposits, making this area particularly vulnerable to marine erosion. Large quantities of mud found on the bed of the present harbour suggest that erosion is continuing today. Thus the shape of the bay had probably been altered since antiquity. It is likely that the protecting seaward rock bar has also advanced northwards. Roman pottery dumps around the northern edge of the bay

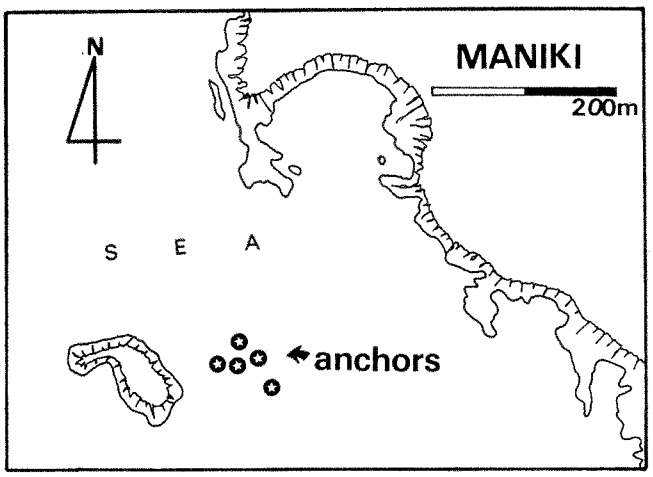


Fig. 6. Map showing the relationship of coastal morphology to the location of the anchors at Maniki.

are now subject to severe erosion.

Wave cut notches around the bay also indicated slight uplift, which would have led to overall shallowing of the bay by 0.5.1m. in 2000 years (Pl. LVII: 1). Thus the effectiveness of Maniki as a harbour has been reduced. Erosion from the bay would also have increased, and this may be the reason for the dearth of pottery in the present harbour.

In the channel between the island and the harbour, five stone anchors and some well preserved pottery including two complete amphora were found in 11-14 metres of water. Four of the anchors are made from limestone, the other chert which may not be of local origin (Fig. 7, Maniki 1). Two of the anchors are very large (Fig. 7, Maniki 1, 2) and may indicate that the ships carrying them were too large to enter the harbour. (see discussion of pottery finds in section II of this paper).

The presence of two complete amphora demonstrates the relative lack of wave action at this depth and the protection afforded by soft sediments. The high ratio of anchors to pottery might indicate that this site is an anchorage, although more material may be hidden beneath the sand. The deposit in this area is likely to be fairly deep at least in pockets. If this is the case the potential level of information retrievable from this site is very high. Despite the shelter given by the island, the water in the channel was often rough even in moderate weather. The presence of so many complete pieces suggests that some ships caught in a sudden squall may well have sunk either at anchor or in the attempt to reach the harbour.

Ayios Yeorghios

Below the Hellenistic/Roman settlement at Ayios Yeorgios a partially natural bay has in recent times been extended to form what is now the best harbour in the survey area. What archaeological evidence

may have been on the sea-bed has now been destroyed by recent dredging.

The tilt of the former coastline is particularly pronounced at Ayios Yeorgios (Fig. 3), although the marine calcarenite on nearby Yeronisos island is vertually horizontal. This may indicate that a fault runs between the island and the mainland, and may extend southwards between Maniki island and the harbour on the mainland. The probable effects of these tectonic movements would have deepened the offshore zone and produced shallowing in the harbour, which may have necessitated the recent dredging.

In the channel between the island and the mainland a concentration of smashed pottery indicative of a wreck lies concreted onto a rocky bottom. Here a strong tide caused by the position of the island funnelling water through the channel is an additional hazard. Running against the wind would produce very dangerous conditions.

Xerolimni

North of the harbour of Ayios Yeorgios a dense concentration of pottery some 25m. × 10m. was located in 3-4 metres of water on a very exposed site. The deposit appears to be all pottery, mostly Hellenistic amphorae of the 3rd-2nd c. B.C. The deposit adverages 30cm. thick and is concreted to the rocky sea-bed. The pottery is fragmentary, badly eroded and very difficult to remove. High wave energy has has produced the vertical stacking of sherds and would have also removed a great deal of material. Being in such a remote and exposed position it can only be the result of a wreck. No anchors or any material was located in association with this deposit.

Coastal tilting would have produced shallowing of this site. Therefore the reef would have been deeper and further offshore when the ship was wrecked.

Lara (Limnionas and Lara South)

This promontory, located at the most northern point of our survey area offers natural anchorages in both its north and south bays. Lara-*Limnionas*, the northern bay, has a sea horizon of sixteen degrees to the northwest whereas the southern bay has a sea horizon of 33 degrees to the southwest and is far less sheltered. The north and south bays at Lara are located in similar positions relative to the axis of coastal tilting. The probable amount of shallowing in both bays since Roman times is about 60cm.

Lara-Limnionas

The north bay, known as Lara-*Limnionas* (from the Greek ΛΙΜΗΝ for port), contained the richest concentration of archaeological material in the survey area. Fisherman still anchor here today, although they do not regard it as a very secure harbour.

Fifteen stone anchors testify to the use of the bay as an anchorage (Fig. 7), and most of the anchors are associated with rock outcrops (Fig. 8). The abundance of pottery may indicate more than simple dumping. However, three factors point to its use as an anchorage: One, the pottery is not from the same period, ranging from Hellenistic to later Byzantine. Two, high concentrations of large sherds were found in deeper (6-7 metres) where ships might have anchored. Three, there is a high anchor to pottery ratio. This evidence suggests that large concentrations of material can be produced by random dumping. However, the concentration of large sherds may also be the result of either a low degree of sherd breakage, or onshore movement of smaller fragments. (see disscussion of pottery in section II of this paper).

At Lara-*Limnionas*, after abnormal weather conditions had scoured away a large volume of sand close to the shore, three local divers found several timbers. They retrieved two loose timbers and left them on the beach. They proved to be ship's timbers in remarkably good condition. One was identified as a futtock the other a plank. Unfortunately, because there were no conservation facilities available, the only alternative was to draw, photograph them, and then rebury them underwater where they would remain unaffected by surf action. The futtock was fastened with both iron bolts and treenails, while the plank is pierced with bronze spikes. The plank is also sheathed with layers of pitch, fabric and lead in that order. The timbers are obviously important and it is planned to publish further comment on them at a later date.

Lara-South

Much less pottery was recorded in Lara south than at Lara-*Limnionas* (Fig. 9). The pottery is concentrated in a small area in shallow water (2-3m.), cemented onto a dangerous rock. The anchors are not closely associated with the pottery, which is badly eroded and can not be identified. The evidence suggests a shipwreck rather than dumping from anchored ships. The extensive spread of the sherds from the site of the wreck could be related to the relatively exposed situation of the bay, leading to post-depositional transport.

The extent of the southern bay has been restricted by medieval alluviation, which may have encroached on a third of the original area. Extensive sand deposits derived from the alluvium have probably obscured any archaeological evidence in the eastern part of the bay. This might also indicate that the bay was more exposed in the past.

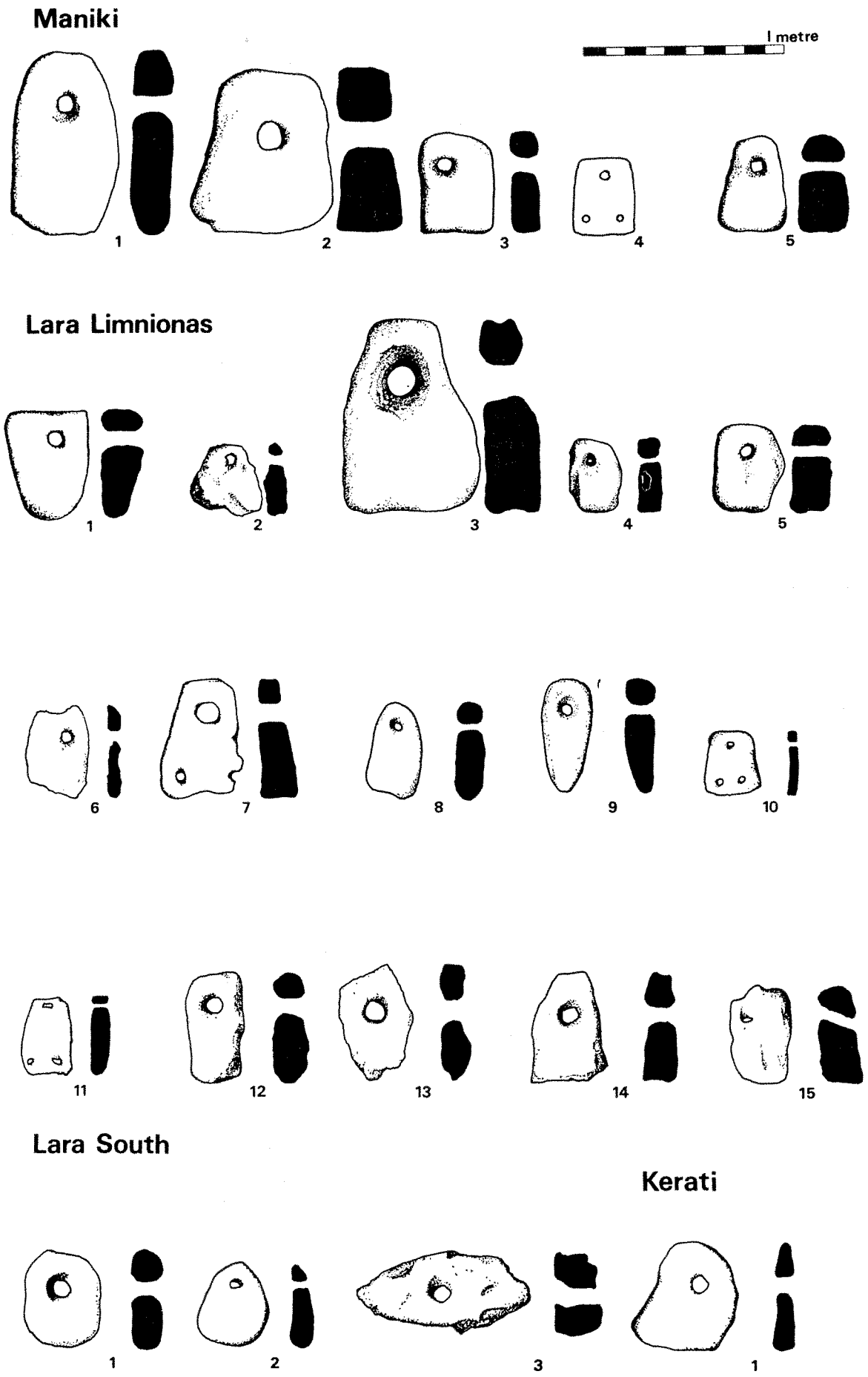


Fig. 7. Drawings of all anchors found by the survey. Note the variety of anchor types.

DISCUSSION

This survey represents a systematic study of shallow water sites over a large area of the coast of Cyprus. The material discovered, and the relationship of the underwater record to land sites provide some valuable insights into the strengths and weaknesses of such survey work.

The grouping of material from the Survey bears relation to the land based archaeological record. Sometimes the link between the two is very direct, as with the Hellenistic wreck site at Xerolimni, which is within 400m. of the Hellenistic land site at Ayios Yeorgios. The presence at Ayios Yeorgios of an early Christian basilica also stresses its importance as an early Byzantine centre. During the Hellenistic and Roman occupation of the Paphos district the general conditions that prevailed were no doubt conducive to trade and the access of small harbours such as Keratidhi and Maniki, which would have served the more isolated rural settlements that farmed the coastal area. When this was all disturbed by the Arab invasions, there is some evidence for a general shift of settlement further inland.[17] Later, during the Crusader period, when Paphos once again became the main centre of occupation the presence of contemporary material at the sites explored by the Survey is probably indicative of a certain level of peace and prosperity. There are other possible explanations for the distribution of underwater finds, and it is likely that other local and regional factors have combined to produce this pattern.

At the regional scale, the temporal distribution of maritime remains can be viewed as a function of patterns of trade. Periods of frequent trading contact between Cyprus and other Mediterranean centres should be best represented in the underwater record. This generalisation may hold for Cyprus as a whole, but in view of the relatively small size of the survey local factors must also be considered.

The absence of certain periods from the underwater record may reflect differing recovery and survival of pottery. The relative "visability" of sherds underwater may affect the identification of material from different periods. For example, characteristic prehistoric sherds (from the Neolithic, Bronze and Early Iron Age) are identified primarily by the treatment of their surfaces, which in the sea are inevitably the first parts destroyed by erosion. The amphorae of later periods, by contrast, are identified by shape and fabric type, and as larger vessels, can survive a greater degree of erosion.

The degree of sherd erosion and marine encrustation will also vary between sites. Sheltered locations such as Keratidhi, and deeper water, as at Lara and Maniki, will ensure a higher degree of sherd survival. In exposed locations, where there is no protective sediment, sherds will only survive if cemented to bedrock as at Xerolimni. The type of sea-bed will also affect the amount of material which can be recorded. On sandy bottoms, only excavation can rereveal buried materials, whereas on rocky bottoms a higher proportion of material will be observed. Diver perception also affects the degree of information retrieval.

The use of particular landing sites has also been influenced by change in sea-level. The progressive shallowing of harbours such as Maniki probably hastened a concentration of trade on locations with deeper water facilities, such as Paphos. In other parts of the island coastal uplift has rendered ancient harbours at Kition (Larnaca) and Akrotiri inaccessible. Sea-level change may therefore place a limit on the range of material found at any one site.

It must also be accepted that the particular survey approach adoped will often determine the types of site recorded. Initial survey locations were based on existing harbours or possible anchorages. Therefore, isolated wreck sites were unlikely to be located. This contrasts with the strategy of J. Green at Cape Andreas, which aimed to locate mainly wreck sites. Where as wreck sites will yield isolated remains from one period, harbours and anchorages may contain remains from a number of periods. In addition, harbour sites will contain material derived from land-based dumping. This will increase the correlation between the land record and the maritime record.

The interplay of local and regional influences on the underwater record means that caution must be exercised in interperting shallow water marine archaeological sites, particularly when sites are considered in isolation. Any site should be interpreted in the context of regional trade patterns, local land settlement, exposure to wave action, sea-level change, the type of site involved, and the survey strategy used.

In spite of the problems of recording material, this survey has shown that a large amount of data can be retrieved in relatively shallow water using very basic survey techniques. It also illustrates the usefulness of integrating geomorphological and archaeological data. In addition, it has shown how underwater sites can be related to the land record to produce a clearer interpretation of the functional context of underwater material. Perhaps, detailed land surveys, such as the Canadian Palaepaphos Survey Project[18] might further elucidate the relation-

17. H. W. Catling, "An Early Byzantine Pottery Factory at Dhiorios in Cyprus" in *Levant* 4 (1972), 1-82.
18. D. Rupp, L. W. Sorensen, R. H. King, W. A. Fox, "Canadian Palaepaphos Survey, 1980-1982", *Journal of Field Archaeology*, Vol. 11 (1984), 133-54.

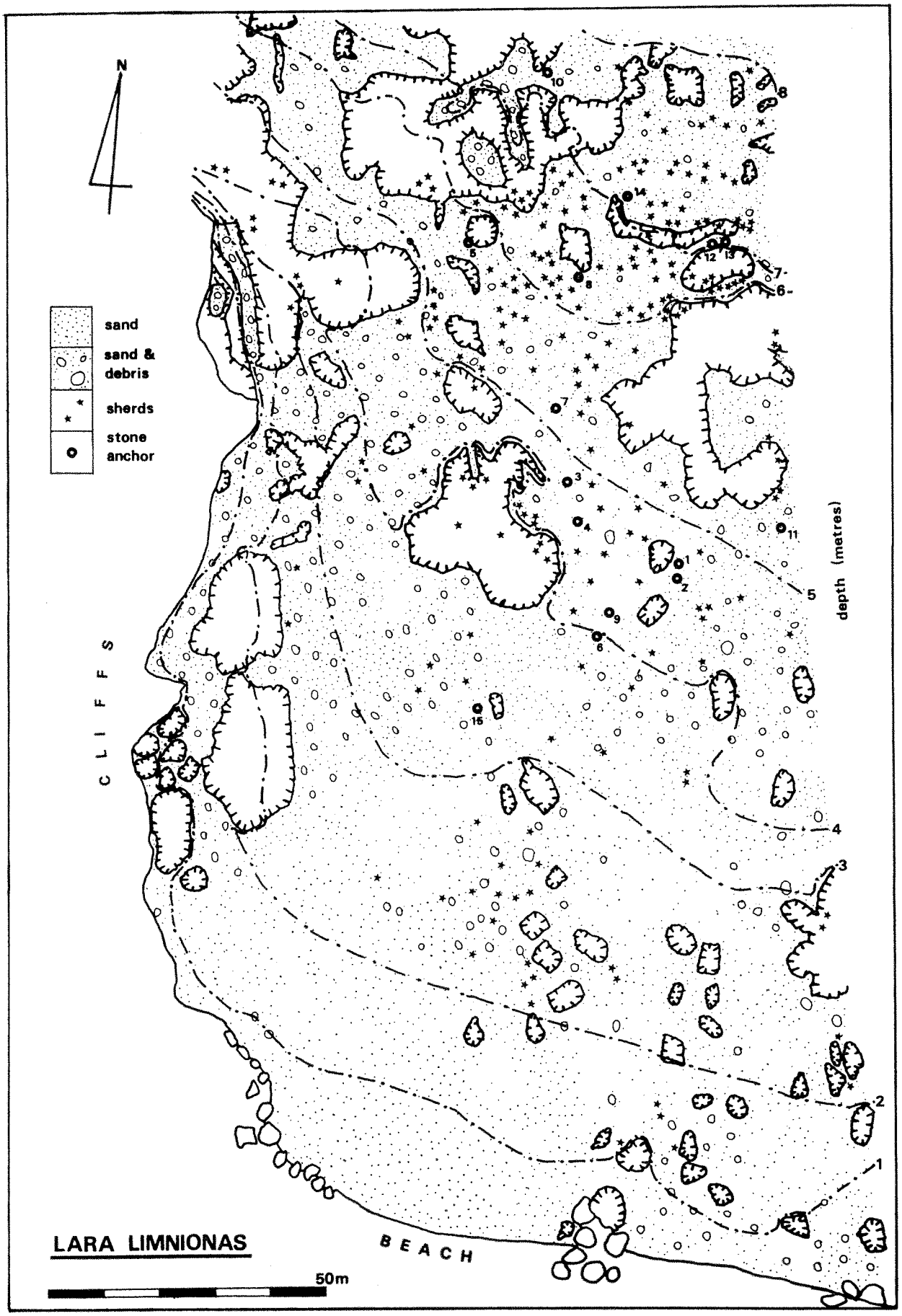


Fig. 8. Distribution of sherds, anchors and sea-bed type in Lara-*Liminonas*. Bare areas represent rock and each star represents five sherds.

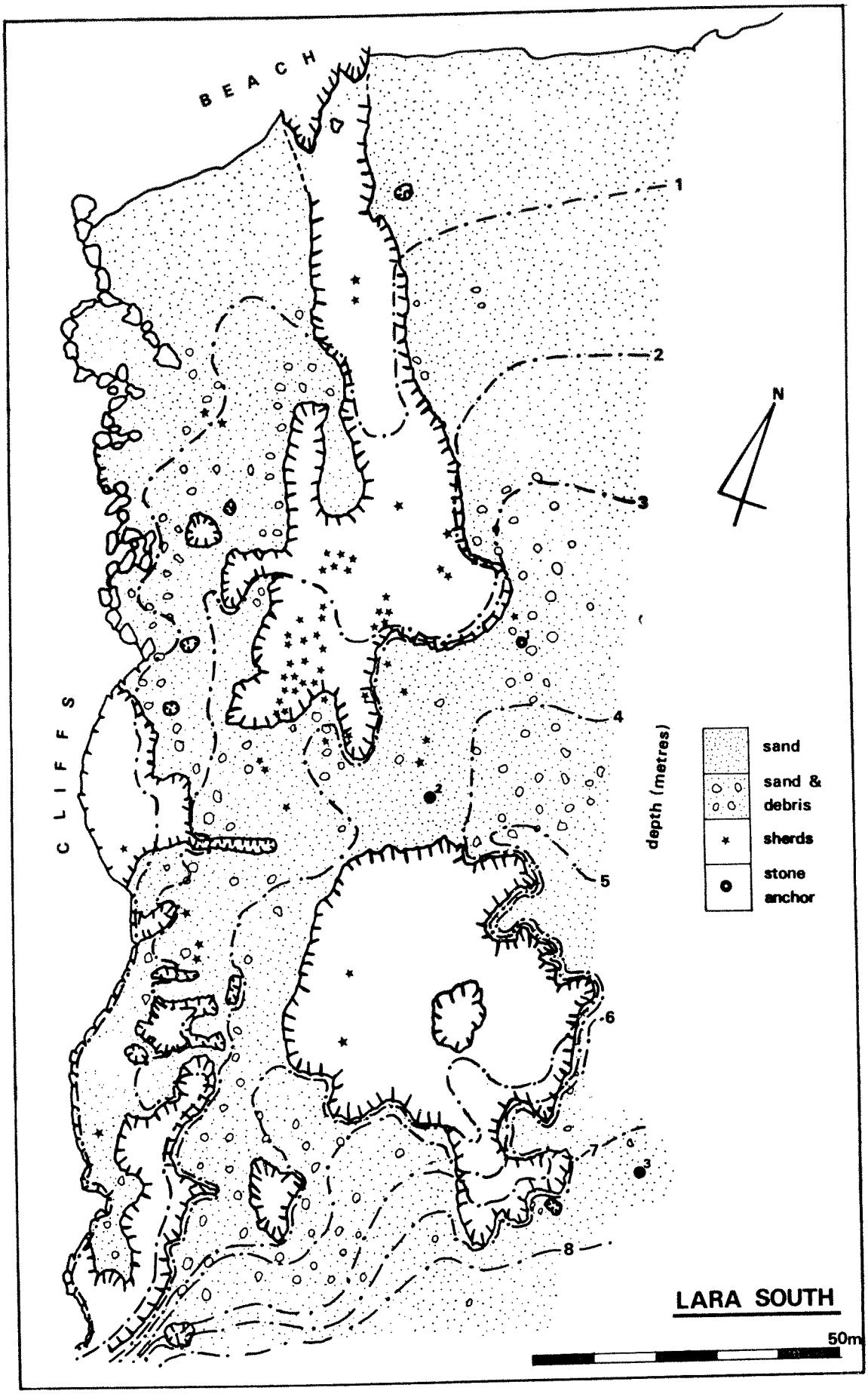


Fig. 9. Lara-*South* showing the distribution of sherds on the sea-bed.

ship between the underwater record and land archaeology. Certainly, the results of this survey provide a good basis to plan future specific survey or excavation work.

The Cyprus Underwater Survey team would like to thank: Dr V. Karageorghis, Director of the Department of Antiquities for his enthusiasm and support, the School District of the village of Kissonerga who let us use their school house, and the Peyia Police Force, especially A. Nicolau. We are also grateful to the following scholars for sharing their own specialised knowledge and experience with us: Dr H. W. Catling, Prof. J. N. Coldstream, Dr D. Michaelides, Dr C. Vita-Finzi, Dr N. C. Flemming, and Dr S. Keay.

Support from the following bodies is gratefully acknowledged-Cydive Ltd., Explorers Club of New York, Gordon Childe and Margary Gift Fund, Institute of Archaeology Students Union, Keith Muckelroy Memorial Fund, Royal Geographical Society, Rolex Watch Company, Royal Society, Simons Design Consultants, University of London Convocation Trust Dunsheath Award, Cyprus Airways, British Sub-Aqua Club Jubilee Trust, Action Public Relations, H. R. H. the Prince of Wales, Fuji Film, Robert Horne Paper Company Ltd, and J. Taylor, Natural History Museum (British Museum).

We are also grateful to the photography department at the Institute of Archaeology, University of London especially S. Laidlaw for his assistance with the post-expedition photography. The 1983 team consisted of the authors with S. Thorpe, J. Heath, J. Stewart, A. Peatfield, C. Hood and J. Wood and in 1984 with the authors (excluding J. Adams) S. Thorpe, L. Twyman, D. Fenton, and A. Alden.

Finally, the authors would like to thank the late Joan du Plat Taylor for her encouragement at the beginning of this project and her love of Cyprus.

C. GIANGRANDE
G. RICHARDS
D. KENNET
J. ADAMS

POTTERY FROM THE CYPRUS UNDERWATER SURVEY, 1983*

(PLATE LVIII)

An underwater archaeological survey of a section the west coast of Cyprus was carried out in the summer of 1983. The survey was organised through the Underwater Research Group of the Institute of Archaeology, London. The project was initiated by Miss Joan Du Plat Taylor, and was organised and led by Ms C. Giangrande; the Field Director was Mr J. Adams (Co-Assistant Director of the Mary Rose Archaeological Project). The present authors undertook responsibility for the study of the recovered ceramic material, the publication of which is completed here at the request of Dr V. Karageorghis, to whom we are most grateful.[1]

The starting point of the survey was the Maa/Coral Bay area of Peyia in the Paphos district. The two bays either side of the Maa peninsular were surveyed first. Disappointingly, but perhaps not surprisingly, almost no archaeological material was found until the Survey reached the small inlet of Keratidhi, the northernmost point of the north bay of Maa. This proved to be rich in material, so it was surveyed intensively, and pottery collected. In the one season it was possible only to survey fully this area; selected points further north were explored, at *Thalassines Spilies*, *Maniki*, *Ayios Yiorgos* (Cape Drepanon), and Lara, from which sample pottery was recovered.

The Survey was attracted to these points as suitable for underwater survey because of a lesson learned at Keratidhi. Keratidhi had archaeological material because it was the only part of the Maa bays with water deep enough to harbour small boats. We therefore looked for other such harbours, still in use today, and found them at *Maniki*, *Ayios Yiorgos* and Lara. The dangerous rocks of *Thalassines Spilies* are on the route into *Maniki*, and its reefs have caught many vessels when they were in sight of safety.

The study of material gathered from underwater survey provides a salutary lesson for any archaeologist. In contrast to material recovered from deep-water wrecks, survey material is usually heavily worn and encrusted by marine life. The problem has been well summed up by Boardman: "I have been sparing of dates in preference to committing such heavily encrusted, plain vases to even vague dates which may be severely inaccurate".[2] Faced with such a problem we have attempted to identify such of the material as we can; the pottery from each site is discussed separately. Finally, we offer some cautious historical conclusions as a general discussion of all the material in relation to the history of the region.

Keratidhi

This small bay, a deep-watered inlet at the northern end of the larger bay to the north of the Maa promontory, was extensively sampled. This permits a reasonably full, if not exhaustive, assessment of the historical usage of this anchorage.

The earliest identifiable pieces recovered are two high loop handles (K023, K085; Pl. LVIII). Handles of this kind are characteristic of the Cypriot pithoid amphora, which makes its appearance in the Archaic period. The examples from the survey seem to be of the latest type, Gjerstad's Plain White pithoid amphora type VII, dated to Cypro-Classical II (400-375 B.C.).[3] Roughly contemporary is an amphora fragment preserving the neck and handles (K046; Pl. LVIII). The Rhodian amphorae from the Kyrenia wreck have the same flanged rim and flat oval handles.[4] The fabric of K046 also seems to be typically Rhodian, i.e. fine, pink to pale orange. Also Rhodian, but with the acute-angled handles and simple rims of the 3rd-1st cent B.C.,[5] are the rim/handle fragments K092 and K084 (Pl. LVIII). A stamp on the latter (Pl. LVIII) has been read (with the help of Virginia Grace) as:

[ΕΠΙ ΧΑΡΜΟ]ΚΛΕΥΣ | ΒΑΔΡΟΜΙΟΥ

According to Miss Grace's researches Harmokleus made amphorae after 240 B.C. Probably this amphora was made *c.* 225 B.C.[6]

---

* Acknowledgements: The Project owes debts of gratitude to many people in Cyprus for their assistance, particularly Mr Takis Herodotou, of the Paphos Museum, the Mayor of Kissonerga, and Police-Sergeant Anastasios Nicolaou of Peyia. The material presented here covers a wide chronological range. We are grateful to the following scholars for sharing their own specialised knowledge and experience with us: Dr Ch. Bakirtzis, Dr H. W. Catling, Prof. J. N. Coldstream, Miss Virginia Grace, Dr J. W. Hayes, Dr Barbara Johnson, Mr A. H. S. Megaw, Dr D. Michaelides, and Mr G. Sanders. We also thank the staff of the Byzantine Archaeological Ephoreia of Iraklion, Crete for their assistance.

Abbreviations:

V. Grace, *Amphoras:* Grace, *Amphoras and the Ancient Wine Trade*. (1979).

Yassi Ada I: G. F. Bass and F. H. van Doorninck, *Yassi Ada* I (1982).

1. This publication is concerned only with the ceramic finds of the Survey. The other finds (though listed in the catalogue), the survey strategy, and geological results are to be published elsewhere by other members of the Survey.
2. R. Garnett and J. Boardman, "Underwater reconnaissance off the island of Chios. 1954", *BSA* 56 (1961), 109.
3. E. Gjerstad, "Pottery Types, Cypro-Geometric to Cypro-Classical", *OpAth* III (1960), 105-22, esp. fig. 15.
4. J. N. Green, E. T. Hall, M. L. Katsev, "Survey of a Greek Shipwreck off Kyrenia, Cyprus", *Archaeometry* 10 (1967), 47, fig. 1.
5. V. Grace, *Amphoras*, figs 22, 31, 36, 62.
6. We are extremely grateful to Miss Grace for having read this stamp, and for sharing her knowledge of amphorae with us.

One of the few pieces of fine ware recovered by the Survey is a fragment of a flat dish, preserving part of the ring foot (K034; Fig. 1). Though severely eroded by the sea, the exposed fabric and traces of red slip surface identify this as a piece of Eastern Sigillata 'A' or 'Pergamene' ware (2nd cent. B.C. — 1st cent. A.D.).[7] The handle and body fragment from another amphora (K096; Pl. LVIII) may be identified as Pseudo-Koan, having double-barrelled handles but a distinctly red fabric.[8] Examples from the Athenian Agora were found in a 1st cent. A.D. context.

Following an apparent chronological hiatus, the next vessels which can be identified are the amphora fragments K031, K059, K067, K069, K101 (Fig. 3). They are characterised by a neck tapering up to a slightly splaying rim; the handles are placed at the narrowest point of the neck, i.e. below the rim, and are set a little askew. The join mark of the neck to the body is clearly visible on the inside. The amphora shape conforms to the Type 2 amphorae found in the Yassi Ada shipwreck.[9] From the coin evidence the wreck is dated to a time after 625 A.D. Parallels for the Yassi Ada Type 2 amphorae have been traced to sites on the Black Sea coast.[10] In the Aegean area similar amphorae are known from 6th-7th cent. A.D. contexts.[11] At the castle of Saranda Kolones in Paphos a similar amphora came from an early 9th cent. A.D. context.[12]

Perhaps also to be dated to the 9th cent. A.D. is the amphora with the Survey's second stamped inscription (K081; Pl. LVIII). The amphora has a narrow tapering neck, with wide flat handles set directly to the mouth. From the body attachment down there are marks of ribbing. The recovered piece preserves only part of the body (one shoulder), but it appears from this that the shoulders sloped gently down to a rather sharp turn to the body. On the top of one of the handles is an oval stamp bearing two letters. These are, set in retrograde fashion, the Greek letters lambda epsilon. A close parallel for this piece is a type from Chersonesos in the Crimea,[13] which Brusic includes among the shapes of his Group I amphorae. These are dated to the 9th cent. A.D. by comparison with those used as building material at Istanbul Mangala. This group is also characterised by graffito and stamped inscriptions, of which "the most frequently used name is LEON in Greek letters".[14] This must be the meaning of our inscription, particularly as the stamps often appear as initials or monograms on the tops of handles.

A somewhat later Byzantine date may be attributed to K103 (very worn), K107 and K110. These seem to conform to Brusic's Group V, and in the case of K103, particularly to the 11th-12th cent. A.D. examples.[15] The excavations at Saranda Kolones provide a parallel for the amphora fragment K073, with its low neck and high-slung handles (Pl. LVIII). The destruction levels of Saranda Kolones (1222 A.D.) produced 'Crusader' amphorae of this shape.[16]

Another apparent chronological gap separates this material from the latest finds recovered from Keratidhi. These sherds come from three distinct groups which can be dated to the late 18th-19th cent. A.D. The largest group consists of 13 fragments, all ring footed bowls (K004, K005, K006, K009, K013, K014, K070, K082, K088, K090a, K090b, K091, and possibly K066; Figs 1-2). This material is well paralleled by the ceramics from the Didymoteichon kilns of the Thrace/Evros region of northern Greece, which were active in the early 19th cent. A.D.[17] Only chemical analysis would confirm whether the Survey bowls are actually from Didymoteichon or from a related kiln.[18] For the moment it seems best to class these bowls as Didymoteichon type. Vases of this distinctive type have now been recognised in Israel and at Chania in Crete;[19] no doubt as this ware becomes better known, an even wider distribution will emerge.

On the interior the bowls have a thick olive green glaze, sometimes laid over a white slip. The exterior is left plain, though in places the glaze has trickled down from the lip onto the outside. The rim is sometimes elaborated to various frilled or 'pie-crust' forms. Amongst the distinguishing characteristics of these bowls are plain circles impressed on the floor of the vase, and around them the marks of tripod stackers. Tripod stackers were used to separate the bowls during the second firing; afterwards, the stackers broke off roughly, leaving either a button of clay adhering to the bowl, or a small unglazed scar (K090b, Pl. LVIII). Numerous examples of these

7. H. S. Robinson, *Athenian Agora V. Pottery of the Roman Period: Chronology* (1959), pl. 60, esp. F2; J. W. Hayes, *Late Roman Pottery* (1972), 8-9.
8. V. Grace, *Amphoras*, fig. 60 middle.
9. *Yassi Ada* I, 157-60, figs 8-4, 8-5, 8-6.
10. *Yassi Ada* I, 163-4.
11. Kythera: J. N. Coldstream and G. Huxley, *Kythera* (1972), pl. 49, fig. 52; Chios: Garnett and Boardman, (*op. cit.*, n. 2), 112, fig. 12 (no. 39).
12. A. H. S. Megaw, "Supplementasy Excavations on a Castle site at Paphos, Cyprus 1970-71", *DOP* 26 (1972), 328 with fig. C, fig. 25, and 340.
13. Z. Brusic, "Byzantine Amphorae (9th-12th Century) from Eastern Adriatic underwater sites", *Archaeologia Jugoslavica* 17 (1976), 37-49, esp. P. VIII, fig. 2.
14. Z. Brusic, *op. cit.*, 44-5.
15. Z. Brusic, *op. cit.*, 41-4.
16. Megaw (*op. cit.*, n. 12) 334 n. 40 with fig. 23; also *RDAC* 1971, 124, fig. 3: 3 and pl. XXXIII: 2.
17. Ch. Bakirtzis, "Didymoteichon: un centre de ceramique post-byzantine", *Balkan Studies* 21 (1980), 147-53. We are grateful to Dr Bakirtzis for having examined these bowls from the Survey and for confirming this identification: personal communication 26/5/84.
18. For the chemical analysis of material from the Didymoteichon kilns, see A. H. S. Megaw and R. E. Jones, *BSA* 78 (1983), 244-5.
19. Israel: Megaw and Jones, *op. cit.*, 238, note 15; Chania: personal communication, M. Hahn.

tripod stackers were recovered in the excavation at Didymoteichon.[20]

The second group (K040, K041, K042, K043, K072, K100) are also ring footed bowls with green glazed interiors (Fig. 2). There is, however, also supplementary decoration of intersecting lines of white slip which underlies the glaze (Pl. LVIII). The origin of this 'slip-painted' ware is at present unknown.[21] Nevertheless it seems to have had a wide distribution: examples have been found in the Athenian Agora, where they are dated to after 1773 A.D.[22] Further examples of these bowls are to be found in Cypriot private collections of folk pottery. Indeed, in Cyprus the slip-painted technique became part of the ceramic tradition; the well-known Lapithos plates are later examples of this, originally Byzantine, ceramic decoration. The Lapithos potters are sadly now dispersed, but at least one, working from the industrial suburb of Nicosia, continues a version of the technique. Slip-painted bowls also form part of the folk pottery tradition of Crete.

The final group consists of bowls, plates and jugs (K010, K011, K012, K013, K014, K015, K016, K019, K020, K021, K022, K024, K026, K049; Fig. 1). Their all over white glaze and polychrome decoration readily identifies them as late maiolica of the 19th cent. A.D. (Pl. LVIII). They probably come from a West Italian workshop.[23]

Carob Trade at Keratidhi Bay[24]

Prominent amongst the material recovered in the intensive survey of Keratidhi bay was the glazed pottery of the 18th-19th cent. A.D. This late material is of special interest because it is known that the bay was used for a particular kind of trade — the export of carobs.

The primary evidence for this trading activity is provided by the two ruined buildings close to the sea-shore, which Peyia residents remembered being used for the storage of carobs. Similar buildings, used exclusively for storing the ripened carob fruit, are a characteristic feature of Cypriot coastal areas; for example, at Zygi, Pissouri, Latsi, Paphos and Kyrenia. Official records for the Peyia district prove that the Keratidhi buildings had been constructed by the mid-1880's, but they could be older.[25]

The long history of the carob trade of Cyprus is well attested by documentary sources: travellers' accounts, consular reports and government records. From the 15th cent. A.D. visitors to the island refer to the carob tree and its sweet, horn-shaped fruit.[26]

From the 16th cent. A.D. there are frequent references to the export of the carob. From among the many accounts, we quote here from the late 16th cent. writer Cotovicus, both for his vivid description of the carob tree and its fruit, and for his reference to the carob trade.[27]

"The carob is large and spreading with leaves not unlike those of the bay, but broader and scarcely so pointed, evergreen, and giving a grateful shade in summer. It bears a curved fruit which we call siliqua, the Greeks keratia, somewhat longer than a man's finger, and as broad as his thumb, very sweet and pleasant to the taste, not unlike our beans, but with a tougher rind of dusky hue: the seed is bitter and very hard. People take out the seed and munch the rind: they squeeze out of it also a very sweet juice, which makes an excellent condiment. You may see along the shore huge heaps of carobs, piled up like hills, with which at times whole ships are loaded".

The actual shipment of the carobs is further described by other writers. Mariti, for example, records that the ships which came to trade at Kyrenia "especially for carobs, stand out to sea about three miles".[28] That similar practices continued until the present century has been confirmed by Cypriots who participated in the trade.[29] From the beginning of the carob harvest in August (at a date set by law under British rule in order to prevent the picking of unripe fruit), the villagers of the Peyia district brought their carobs by donkey to the Keratidhi stores. Here the carobs were purchased by merchants, who weighed the carobs in sacks and recorded each person's contribution, before the carobs were placed in great heaps inside the storehouses. The ripened fruit could be kept in stores for as long as a year, so immediate export was not necessary. The carobs were collected by large ships, which anchored offshore; small caiques loaded up and ferried the carobs out to them. The carobs were destined for the ports of Europe, the Arab countries and Russia. In England the carob was used for animal fodder and was a major ingredient of "Thorley's Food for Cattle", while the large

20. Bakirtzis, (*op. cit.*, n. 17), 151; Megaw and Jones, (*op. cit.*, n. 18), 244, pl. 29: 3.
21. Bakirtzis, personal communication 26/5/84.
22. A. Frantz, "Turkish Pottery from the Agora", *Hesperia* X (1942), 1-20, figs 20, 22-3 ("drip-painted ware").
23. Bakirtzis, personal communication 26/5/84.
24. The authors are working on a detailed study of the history of the carob trade of Cyprus. We wish to thank all those who have helped us with botanical, agricultural, documentary (travellers' accounts and official records), and ethnographic information. Individual debts will be acknowledged in the fuller publication.
25. We are grateful to the Director and officials of the Dept. of Lands and Surveys and the Land's Office, Paphos for this information.
26. See in C. D. Cobham, *Excerpta Cypria: Materials for a History of Cyprus* (1908), 35 (Capodilistra, visiting the island in 1458), and 36 (Felix Faber, visiting Cyprus in 1480 and 1483 en route to the Holy Land).
27. Cobham, *op. cit.*, 187.
28. G. Mariti, *Travels in the Island of Cyprus* (1769), trans. by C. D. Cobham (1895), 98-9.
29. We are grateful to Mr L. Nicolaides of Paphos for sharing his memories with us.

quantities exported to Russia were consumed by the peasantry.[30]

The decision to build permanent stores at Keratidhi instead of heaping up the carobs in the open air may have an historical explanation. According to a number of British consular reports there was under Ottoman rule a government monopoly of the sale of carobs, which resulted in poor prices and the neglect of the trees.[31] With the removal of this monopoly by the mid-19th cent. the volume of trade is said to have increased, perhaps stimulating investment in the carob trade.

It is perhaps worth drawing attention to the name of the bay — Keratidhi. Similarly named sites are common enough in the Greek world and the root of the word is κέρας - horn. It is possible that the name refers to the shape of the bay, but we offer an alternative suggestion, that the name could be connected with the old Greek word for carobs - κεράτια, and is so named for the function of the bay. Since κεράτια is itself derived from κέρας, referring to the "little horns", the distinctively shaped fruit of the carob, such an idea cannot be proven. There are, however, other places in Cyprus whose names seem to have a carob connection. For example it has also been suggested that the name of the village of Zygi (where carob stores are still in use) refers to the balance on which the carobs were weighed,[32] and there was also a place in the same area known as Cape Caroubière.[33]

In conclusion, the presence of considerable quantities of glazed wares of the 18th and 19th cent. A.D. in Keratidhi bay provides archaeological evidence for its use in these periods. Furthermore, the primary use of this particular bay is attested both by the now ruined carob stores beside the sea-shore and by ethnographic data. This combined evidence illustrates an important aspect of the maritime history of Keratidhi bay, and despite its relatively modern date, it should also be of general interest to archaeologists, so often denied detailed evidence about commodities and mechanisms of trade.

Thalassines Spilies

This rocky and dramatic stretch of the coast lies a little way south of the small anchorage of *Maniki*. The pottery here was discovered in a series of homogeneous masses amidst rocks and reefs, which are hidden several metres below the surface of the sea. The inference must be that these are the remains of wrecks, ships driven onto the rocks in bad weather, while trying to make for *Maniki*. Sample specimens of the pottery were recovered by the Survey.

TS121 (Pl. LVIII) is the lower half of an amphora. The toe in particular may be compared with the amphorae of the Kyrenia shipwreck.[34] The type is Rhodian of the 4th cent. B.C. Traces of shiny black resin were found inside the amphora.

Five other amphorae fragments, which appear to be of one general type, were recovered, mostly from a single, concreted mass. The best preserved fragment, TS117, serves as the type specimen (Fig. 4): an amphora with a concave collared rim and vertical, slightly asymmetrically placed handles. The handles have two vertical grooves and the body is ridged. The shape seems to conform to Ballana amphora type 6.[35] Such amphorae have an extensive distribution in 6th-7th cent. A.D. contexts, on sites from Egypt to the Black Sea, notably from Athens, Constantinople and Chios.[36] The closest comparisons for the Survey example, with its incurving sides, can be found amongst the Type 1 amphorae from the Yassi Ada shipwreck (after 625 A.D.).[37] Furthermore, in Cyprus itself this amphora type has been extensively documented at the major Byzantine settlements.[38]

Maniki

Three sample fragments only were recovered from Maniki. The earliest piece is the Survey's only complete amphora (M138; Pl. LVIII). The shape appears to be Chian, datable by the excavations in the Athenian Agora to the third quarter of the 5th cent B.C.[39] It is also close to Gjerstad's Type VII amphora with knobbed base of Cypro-Classical II

30. The modern trade in carobs differs in several important respects. The carobs are no longer exported directly from many small bays such as Keratidhi, but are rather collected into larger stores. Nor are the carobs now exported in toto; first they are "kibbled" in a grinding machine. Thus the hard seeds are removed and the rest of the carob is variously ground up, more finely for carob powder and more coarsely for animal food. While the carob is still widely used as a sweetener (as in carob syrup and pastelli) and for fodder, more recently the carob has become popular as a chocolate substitute in health foods, and the unappetising seeds are used in making glue and photographic films.
31. Θ. Παπαδοπούλου, Προξενικὰ Ἔγγραφα τοῦ ΙΘ΄ αἰώνος (1980), 83,123.
32. According to J. C. Goodwin, *An Historical Toponymy of Cyprus*, vol. I (4th ed. 1984), 772, Zygi is derived from ζυγόν, a balance or weighing scale. He states that the village was also known as "terazi", which is a version of κεράτια (carobs).
33. R. Hamilton Lang, *Cyprus: Its History, its present resources and future prospects* (1878), 232-4 refers to Cape Caroubière as a source of good quality carobs. It is marked on his map as Carrubière Point, located south of Mari and Tochni.
34. Green *et al.*, (*op. cit.*), n. 4, 47, fig. 1.
35. W. B. Emery and L. P. Kirwan, *The Royal Tombs of Ballana and Qustul* (1938), pl. III.
36. Athens: H. S. Robinson, (*op. cit.*, n. 7), 115, pl. 32 (M333); Constantinople: J. W. Hayes, "Excavations at Sarachane in Istanbul: A Seventh Century Pottery Group", *DOP* 22 (1968), 215; Chios: Garnett and Boardman, (*op. cit.*, n. 2), 111, fig. 14: 24. Boardman also affirms that the type was familiar from the excavations at Emporio.
37. *Yassi Ada* I, 155-7, 163-5, figs 8-1, 8-2, 8-3.
38. The evidence has recently been summarised by J. W. Hayes, "Problèmes de la céramique des VIIème-IXème Siècles, a Salamine et a Chypre", *Salamine de Chypre. Histoire et Archéologie* (1980), 375-88.
39. V. Grace, *Amphoras*, fig. 45, left.

(400-375 B.C.).[40] Gjerstad's typology is, however, of the Cypriot Plain White ware. The fabric of the *Maniki* amphora is worn by sea action so that it has not been possible to determine whether it is a Chian import or a local imitation.

Inside the amphora was found the base of a small, fine pot — perhaps a bowl (M139). Its presence inside the amphora may be fortuitous, but it is possible that it was used as a lid. The third piece from *Maniki* was also complete: a mortarium made from a thick and heavy fabric (M137).

Lara Limnionas

Limnionas, the bay north of the Lara promontory, was rich in pottery and stone anchors. Only two pottery samples, however, were taken up in the Survey. LL136 is an amphora neck preserving the attachments of two high-slung handles (Fig. 4). Examples of this type of amphora have been discovered in the destruction levels of the crusader castle of Saranda Kolones at Paphos, which was destroyed in 1222 A.D.[41] The early 13th cent. A.D. date for this amphora type is further confirmed by finds at the Athenian Agora and elsewhere.[42]

The second piece is a fragment of a 'tulip' shaped bowl (LL135; Fig. 4). The fabric is orange, but the distinguishing feature is the mica dusting of the surfaces. Mica dusted ware has been found in 7th cent. A.D. contexts at Sarachane in Istanbul.[43] This fragment was found among the rocks where the remains of the wreck were beached near the shore. For the moment, it offers the only (tentative) indication for the date of the wreck.

Historical Conclusions

The Survey began work at Maa (in the Peyia district of Paphos), at least partly in the hope of finding material related to the major sites in the region. As well as the Mycenaean site of Maa-*Palaeokastro*, there is the Archaic-Classical site at Kerati (on the north side of the bay).[44] It may come as some surprise that no material of those periods was identified at Keratidhi bay. Part of the reason may refer to the relative "visibility" of ceramic material from different periods, given the special circumstances of underwater survey. For example, characteristic prehistoric sherds (from the Neolithic, Bronze and Early Iron Ages) are identified primarily by the treatment of their surfaces, which in the sea are inevitably the first parts destroyed by erosion. The amphorae of later periods, by contrast, are identified by shape, and as larger vessels can survive a greater degree of erosion.

The material that was recovered, not only from Keratidhi, but also from the other sites, falls into four broad chronological groups: *1*) the Hellenistic/early Roman periods; *2*) the late Roman/early Byzantine period; *3*) the Crusader/mid Byzantine period; *4*) the late Ottoman period. Underwater exploration elsewhere in the Eastern Mediterranean has tended to produce broadly similar results: an apparent concentration of material within the periods outlined above — at Chios,[45] and elsewhere in Cyprus.[46] It should be recalled that the Kyrenia wreck is early Hellenistic. The wrecks located and excavated off the coast of Asia Minor also highlight these periods. As well as the 7th cent. A.D. wreck,[47] there were two other wrecks discovered at Yassi Ada:[48] one Roman and one Ottoman.[49] The "Glass Wreck" at Serçe Liman is 11th cent. A.D.[50] The evidence consistently points to these periods as relative high points of maritime activity in the Eastern Mediterranean, and the times of greatest communication.

The grouping of material from the Survey bears relation to the land-based archaeological record.[51] The Hellenistic and Roman occupation of Paphos was extensive. The focus of settlement in the Peyia district then seems to have been at *Ayios Yiorgos*, on Cape Drepanon. The presence there of an early Christian basilica also stresses its importance as an early Byzantine centre. During this long period of peace the general conditions that then prevailed were no doubt conducive to trade and the access of small harbours such as Keratidhi and *Maniki*, which would have served the more isolated rural settlements which farmed the coastal areas. Communication via small boats travelling up and down the coast may have been easier than overland methods. This was all disturbed by the Arab invasions, and there is some evidence for a general shift of settlement further inland.[52] Paphos was again the main centre of occupation in the Crusader period, and the presence of

40 Gjerstad, (*op. cit.*, n. 3), fig. 16: 3.
41. Megaw, (*op. cit.*, n. 12), 323-43, esp. 334 and fig. 27.
42. (Megaw, *op. cit.*, n. 12), 323, n. 1 and 334, n. 40.
43. J. W. Hayes, (*op. cit.*, n. 36), 212. Hayes also refers to another mica dusted ware from 15th-16th cent. A.D. Istanbul, but this is described as having a deep brown fabric. We are grateful to Dr Hayes for drawing our attention to the Sarachane material.
44. Information provided by Mr S. Hadjisavvas.
45. Garnett and Boardman, (*op. cit.*, n. 2).
46. Hala Sultan Tekke, Salamis, and Cape Andreas.
47. *Yassi Ada* I.
48. G. F. Bass and F. H. van Doorninck, "A Fourth Century Shipwreck at Yassi Ada", *AJA* 75 (1971), 27-37.
49. The ceramic material associated with this, as yet unexcavated, wreck looks similar to the late material from Keratidhi. cf. Bass and Doorninck, (*op. cit.*, n. 48), pl. 3, figs 39 and 40.
50. G. F. Bass, "The Million Piece Glass Puzzle", *Archaeology* 37,4 (July/August 1984), 42-7.
51. The unexpected absence of Bronze Age material at Keratidhi may be explained by Karageorghis' hypothesis of an interruption of communication between the Mycenaean settlers of Maa and their Greek homeland — *RDAC* 1982, 93.
52. H. W. Catling, "An Early Byzantine Pottery Factory at Dhiorios in Cyprus", *Levant* 4 (1972), 1-82.

contemporary material at the sites explored by the Survey is probably indicative of a certain level of peace and prosperity. Within this analysis Lara is more problematic. On land the area is relatively unexplored. Nevertheless Megaw did discover evidence of Hellenistic and Roman occupation on the peninsular.[53] The fragmentary wreck discovered by the Survey off the northern side of the peninsular is probably the same as that reported by Hadjisavvas.[54] The original dating of this wreck was given as late Roman early Christian; this suggestion appears to be corroborated by the Survey's findings.

The material reviewed so far from the Survey is of types of pottery that are characteristic of their periods. It would be dangerous to formulate theories of any direct contact between the bays concerned and any main centres of origin or trade. Rather they are indicative of general high levels of maritime activity, which was able to penetrate these relatively obscure coastal areas. The same should be true of the Ottoman finds from Keratidhi. Moreover, we are fortunate in having additional information, historical and ethnographic, for maritime activity, in this case relating to the carob trade at Keratidhi.

The material from the exploration of the coastal area covered by this Survey is in many ways problematic. Nevertheless, it does seem to be consistent with the history of the region, as drawn from other archaeological and historical sources. The additional information that it provides about the interaction of land and sea illustrates the potential usefulness of underwater survey. It should be seen as complementary to coastal land survey, an integral part of archaeological investigation.[55]

CATALOGUE OF FINDS

The Catalogue presented below lists all the finds from the Survey. The non-ceramic finds are not discussed. We have retained the original find numbers, so that the pieces can be easily identified should anyone wish to consult the material for comparative purposes. The finds are stored in Paphos Museum.

The numbers are prefaced by the following letter codes: K - Keratidhi; TS - Thalassines Spilies; M - Maniki; LL - Lara Limnionas; CL - Corallia Bay; L - Lara; YN - Yeronisos Island; AY - Ayios Yiorgios.

The catalogue entries are arranged as follows: Identification of the vessel, and date/type (if any).
Description of the piece as preserved.
The fabric and decoration (if any).
Measurements.
Bibliography for comparison if we have identified the type/date.

K 001 Stone anchor.

K 002a Amphora: (no i.d.) Neck sherd, neck to shoulder transition. Fine pink fabric with grey core. Ht. pres. 8.2cm.; D. neck 8.5-8.7cm.

K 002b Amphora: Rhodian. Body sherd. Fine pink fabric. Ht. pres. 10.9cm.

K 002c Cooking pot, with rounded base and flaring lower body: (no i.d.). Sherd, part of base and lower body. Coarse red fabric, discoloured to black; many inclusions; traces of thin brown glaze on inside. Ht. pres. 6.2cm.

K 003 Amphora: Rhodian, 2nd-1st cent. B.C. Shoulder fragment, preserving turn to neck, and mark of handle attachment. Fine pink fabric. D. neck *c.* 10cm.

K 004 (Fig. 1). Carinated bowl; ledged rim and frilled lip: Didymoteichon. Rim and upper body sherd. Fine brown to orange fabric; thin mottled green glaze on inside, spilling over rim onto exterior surface. Ht. pres. 6.3cm.
Bibl.: Ch. Bakirtzis, *Balkan Studies* 21 (1980), 147-53.

K 005 (Fig. 1). Carinated bowl with ring foot: Didymoteichon. Sherd, base and lower body; marks of tripod stacker. Fine pale orange fabric; cream slip with thin green overglaze on inside, spilling over rim onto exterior surface. Ht. pres. 5.4cm.; D. foot 7.3cm.
Bibl.: see K 004.

K 006 Carinated bowl with ring foot: Didymoteichon. Sherd, base and lower body; impressed circles on floor, and marks of tripod stacker. Fine orange fabric; thick, mottled green glaze on inside only. Ht. pres. 5cm.; D. foot 8.4cms.
Bibl.: see K 004.

K 007 Amphora: Rhodian. Handle fragment with oval section. Fine, pink fabric, partly discoloured to red. L. pres. 25.6cm.

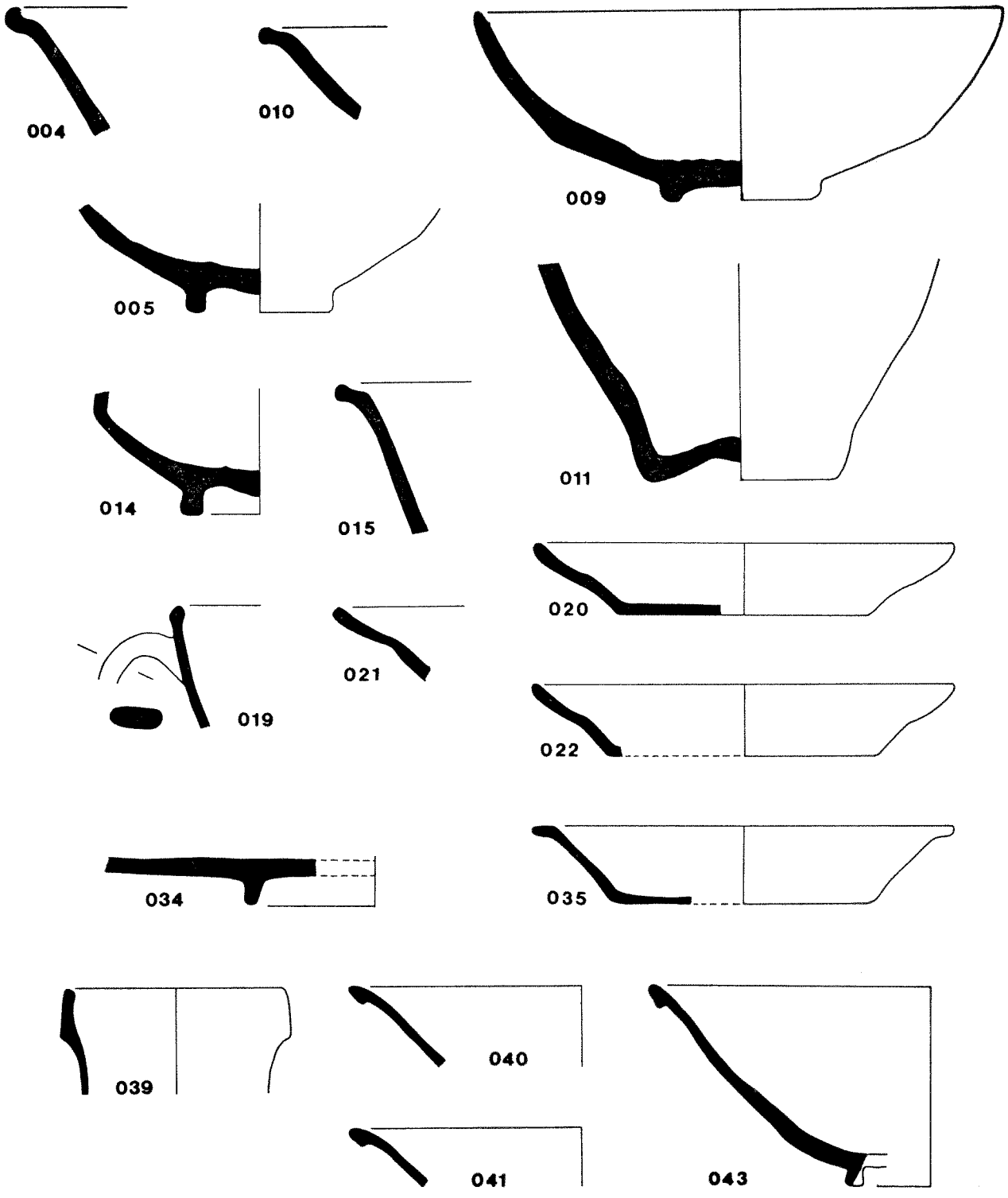
K 008 Amphora: Rhodian, 4th cent. B.C. Handle and small section of rim at handle attachment; faint traces of stamp on handle. Fine, dark pink fabric, discoloured to reddish-brown. Ht. pres. 24.5cm.; D. rim *c.* 14cm.

K 009 (Fig. 1). Carinated bowl with wavy rim and ring foot: Didymoteichon type. Complete profile; complete base and half of rim and body; impressed circles on floor and marks of tripod stacker. Pale orange fabric; thick, mottled green glaze on inside, spilling over rim onto exterior surface. Ht. 9.3cm.; D. rim 26cm.; D. foot 8cm.
Bibl.: see K 004.

K 010 (Fig. 1). Shallow bowl with ledge rim: Late maiolica. Two non-joining rim sherds (= K 026). Pale yellow fabric; crackled white glaze all over; two narrow concentric bands in purple around inside of ledge, below which are irregular festoons in brown, blue and green. Ht. pres. 4.5cm.; D. rim *c.* 26cm.

K 011 (Fig. 1). Jar with deeply concave base and flaring sides: (no i.d.). Base and lower body. Dull orange fabric.

53. A. H. S. Megaw, *ARDA* 1954, 16; *ArchRep* (1955), 30.
54. M. Fortin, "The Fortification Wall at Lara", *RDAC* 1978, 58-67.
55. Our results may be compared to those of land surveys in the Paphos area: S. Hadjisavvas, "The archaeological survey of Paphos. A preliminary report", *RDAC* 1977, 222-31; D. Baird, "Survey in the Dhrousha area of western Cyprus", *Levant* XVI (1984), 63-5; D. Baird, "Survey in Peyia village territory, 1983", *RDAC* 1985, 340-9.



(Scale 1: 3)

Fig. 1
KERATIDHI BAY

Ht. pres. 9.5cm.; D. base 9.5cm.

K 012 Fragment of iron anchor.

K 013 Bowl with ring foot: Didymoteichon type. Base and lower body; impressed circle on floor. Fine orange fabric; cream slip on inside with mottled green overglaze, spilling over rim onto exterior surface. Ht. pres. 3.2cm.; D. foot 7.6cm.
Bibl.: see K 004.

K 014 (Fig. 1). Carinated bowl with ring foot: Didymoteichon type. Base and lower body; impressed circle on floor and mark of tripod stacker. Dull pink-brown fabric; thick, mottled green glaze on inside, spilling over rim onto exterior surface. Ht. pres. 6.2cm.; D. foot 7.8cm.
Bibl.: see K 004.

K 015 (Fig. 1). Bowl with ledge rim: Late Maiolica. Rim sherd. Pale yellow fabric; crackled white glaze all over; two concentric narrow bands of purple on inside of ledge, below which are irregular festoons in brown, blue and green; traces of purple bands on outside. Ht. pres. 7.4cm.; D. rim *c.* 32cm.

K 016 Plate: ? Venetian Maiolica 16th cent. A.D. Rim sherd. Fine, pale orange fabric; thick white glaze all over. Ht. pres. 3.8cm.; D. rim *c.* 10cm.

K 017 Amphora: (no i.d.). Complete handle, oval section. Orange to brown fabric with many small inclusions. L. handle 16cm.

K 018 Amphora: (no i.d.). Upper part of handle preserving attachment at neck. Fine, pink fabric. L. pres. handle 14cm.; D. neck *c.* 12.5cm.

K 019 (Fig. 1). Jug with trefoil mouth: Late Maiolica. Rim and part of strap handle. Fine orange fabric; thick white glaze all over; one mauve splash on outside. Ht. pres. 6.1cm.; W. mouth 15cm.

K 020 (Fig. 1). Dish: late Maiolica. Sherd, complete profile. Orange to pale yellow fabric; white glaze all over; narrow mauve band around inside of rim, second band above waist ridge, and petaloid blobs. Ht. 3.6cm.; D. rim 21cm.; D. base 12.4cm.

K 021 (Fig. 1). Dish with wavy rim: late maiolica. Sherd, rim to turn for base. Pale yellow fabric; crackled white glaze all over. Ht. 3.6cm.; D. rim 22cm.

K 022 (Fig. 1). Dish: late Maiolica. Sherd, complete profile. Orange fabric; mottled white glaze all over; mauve band on inside of rim and above interior ridge; between the bands interlocking quirks in blue, each separated by three mauve blobs. Ht. 3.6cm.; D. rim 21cm.; D. base 13cm.

K 023 Amphora: Cypriot pithoid type with loop handles, Cypro-Classical II. Handle, rounded section. Beige fabric discoloured to brown. L. handle 29.4cm.
Bibl.: Gjerstad, E., *Op. Ath.* III (1960), 105-22, fig. 15 (Plain White pithoid amphora, type VII).

K 024 Jug with trefoil mouth: late Maiolica. Rim and part of strap handle. Fine orange fabric; crackled white glaze all over; mauve splash on outside. Ht. pres. 5.3cm.; W. mouth 13cm.

K 025 Amphora: Rhodian, ? 3rd-2nd cent. B.C. Handle and shoulder fragment. Fine pink fabric, discoloured to red. Ht. pres. 36cm.; L. pres. handle 24.4cm.

K 026 (= K 010).

K 027 Void.

K 028 Mortarium: ? Roman. Complete base and part of lower body, very worn. Pink-orange fabric with many inclusions. Ht. pres. 2.7cm.; D. base 25.8cm.

K 029 Amphora: ? Roman. Rim, neck and two opposed flat strap handles. Pink to orange fabric with many inclusions; very porous. Ht. pres. 15.4cm.; D. rim 12.4cm.

K 030 Void.

K 031 Amphora with conical neck with flaring rim; handle slightly askew: Yassi Ada type 2, 6th-9th cent. A.D. type. Part of rim; neck and one handle with oval section. Brown fabric. Ht. pres. 18.3cm.; D. rim 7cm.
Bibl.: *Yassi Ada* I, 157-60, figs 8-4, 8-5, 8-6.

K 032 Amphora: (no i.d.). Handle fragment, flattened oval section. Brick-red fabric. L. pres. 9.5cm.

K 033 Clay rectangular slab with hollows on two adjacent sides: (no i.d.). Coarse greyish-pink fabric. 18.4×24.4×2.6/3.4cm.

K 034 (Fig. 1). Dish with ring foot: Pergamene ware (Eastern Sigillata A), 1st cent. B.C. Sherd, floor and foot. Fine, pale orange fabric; traces of thick red slip preserved in angle of the foot. Ht. pres. 2.3cm.; D. foot 13cm.
Bibl.: Robinson, H., *Athenian Agora* V: group F, pl. 60: F2.

K 035 (Fig. 1). Cooking dish with rounded base, flaring sides and flat rim: type known as late as 18th cent. A.D. Complete profile. Coarse brown fabric, discoloured to black, with many inclusions. Ht. 3.8cm.; D. rim 21cm.; D. base 13cm.

K 036 Cooking bowl with straight sides and one strap handle: (no i.d.). Three sherds, preserving rim and handle. Coarse dark orange fabric with many large inclusions. Ht. pres. 15.6cm.; D. rim 27cm.

K 037 Body sherd with horizontal ribbing: (no i.d.). Coarse grey fabric. 7.8×5.4cm.

K 038 Narrow necked vessel with overhanging rim: (no i.d.). Sherd, preserving complete rim and neck. Buff fabric. Ht. pres. 8.1cm.; D. rim 6cm.

K 039 (Fig. 1). Amphora: (no i.d.). Rim sherd. Dull orange fabric. Ht. pres. 5.2cm.; D. rim *c.* 11cm.

K 040 (Fig. 1). Bowl (probably carinated with ring foot): Slip painted and glazed, 18th-19th cent. A.D. Rim sherd. Fine orange-brown fabric; white slip trickles overlaid with green glaze on interior. Ht. pres. 4cm.; D. rim *c.* 23cm.

K 041 (Fig. 1). Bowl (probably carinated with ring foot): Slip painted and glazed, 18th-19th cent. A.D. Rim sherd. Fine orange-brown fabric; white slip trickles overlaid with green glaze on interior. Ht. pres. 2.9cm.; D. rim *c.* 23cm. (? possibly same vase as K 040).

K 042 Bowl with ring foot: Slip painted and plazed, 18th-19th cent. A.D. Sherd, complete profile; tiny section of rim, whole base and lower body; marks of tripod stacker. Orange to brown fabric; white slip trickles overlaid with green glaze on interior; traces of green glaze on foot. Ht. 6.5cm.; D. foot 6.2cm.

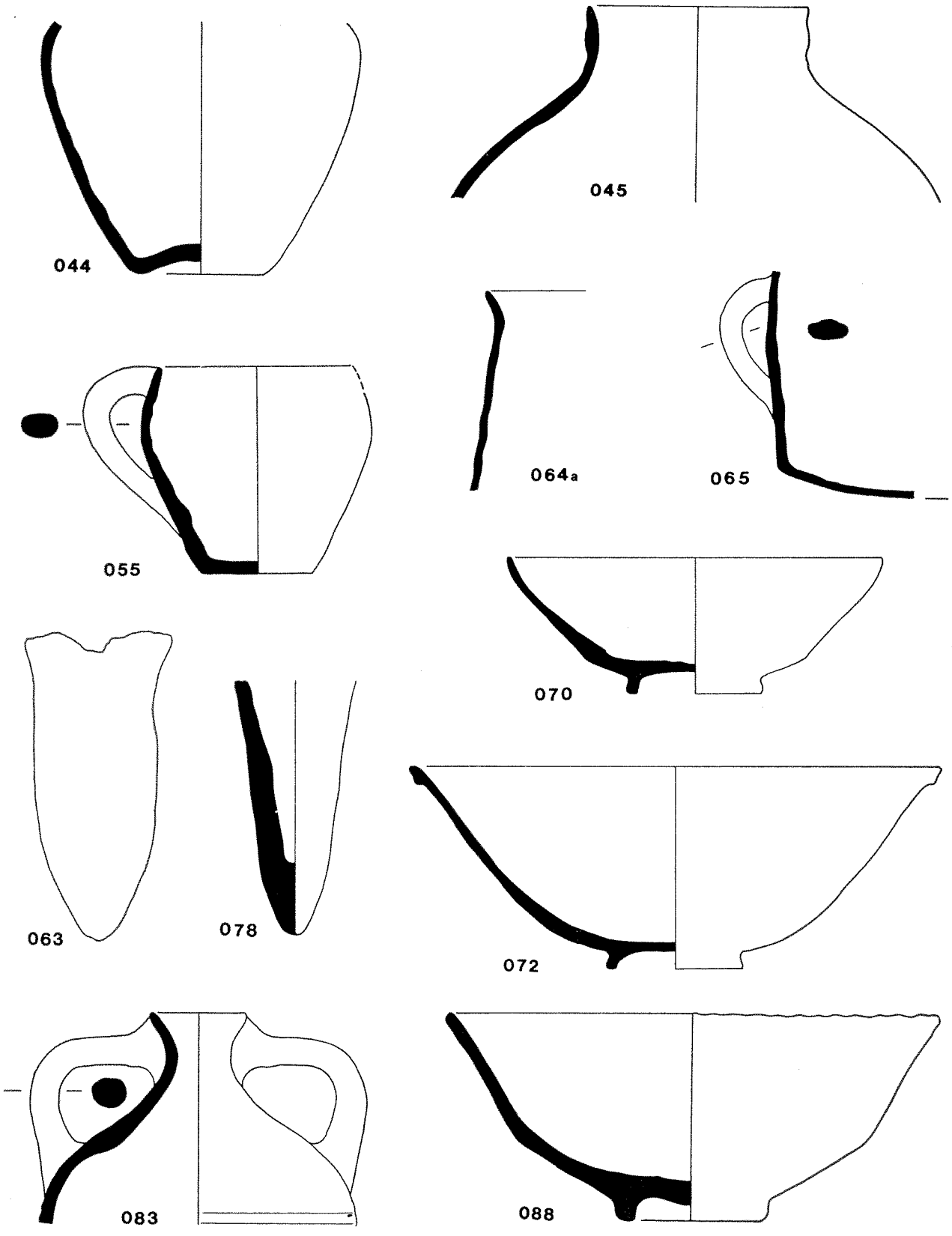
K 043 (Fig. 1). Carinated bowl with ring foot: Slip painted and glazed, 18th-19th cent. A.D. Sherd, complete profile; preserving quarter of rim down to small part of foot. Fine orange fabric; white slip trickles overlaid with yellow glaze on interior. Ht. pres. 9.8cm.; D. rim 28cm.; D. D. foot *c.* 8cm.

K 044 (Fig. 2). Jar with convex profile and deeply concave base: (no i.d.). Whole base and part of lower body. Coarse dark red fabric. Ht. pres 13.4cm.; D. base 6.6cm.

K 045 (Fig. 2). Collar necked jar: (no i.d.). Half of rim and neck, part of shoulder. Coarse orange to red fabric. Ht. pres. 10.6cm.; D. rim 11.7cm.

K 046 (Pl. LVIII). Amphora: Rhodian, 1st half 4th cent. B.C. Complete neck and rim with two handles and shoulder attachments. Fine pink to pale orange fabric. Ht. pres. 29cm.; D. rim 10cm.
Bibl.: Katzev, M., *Archaeometry* 10 (1967); 47, fig. 1; Grace. V., *Amphoras*, fig. 42, right.

K 047 Conical fragment, ? spout/neck: (no i.d.). Sherd. Pink to red fabric. Ht. pres. 8.2cm.; D. 2/3cm. (narrow end),



(Scale 1: 3)

Fig. 2
KERATIDHI BAY

5.9/6.5 (wide end).

48 Plate: blue and white porcelain with chinoiserie decoration, ? 19th cent. Turkish. Rim sherd. Soft white porcelain, thick white glaze all over with chinoiserie decoration in blue on inside. D. rim *c.* 20cm.

49 Plate: ? late Maiolica. Floor sherd. Soft cream fabric; traces of white glaze all over. D. base *c.* 14cm.

50 Amphora: (no i.d.) Sherd, part of neck and stub of handle (very worn). Fine orange fabric. Ht. pres. 5.7cm.;

51 Small jar with vertical ring handle: ? Roman. Body sherd with ring handle. Coarse red to brown fabric. Ht. pres. 6.9cm.

52 Body sherd of large vessel: (no i.d.) Coarse grey fabric. 5.8×4.5cm.; th. 0.9/1.1cm.

53 Mortarium. Part of base and lower body (very worn). Soft pink fabric with many small inclusions. Ht. pres. 2cm.; D. base *c.* 12cm.

054 Body sherd of large vessel: (no i.d.). Light brown fabric with band of three horizontal ridges. Max. l. 10.4cm.; th. 0.8cm.

055 (Fig. 2). One handled cup/jug with convex profile: ? late Roman. Complete base and lower body; upper body preserved only at handle. Coarse orange to brown fabric. Ht. 10.8cm.; D. rim *c.* 10cm.; D. base 5.9cm.

056 Plate?: (no i.d.). Rim sherd. Fine pink fabric; traces of cream slip overlaid with yellowish glaze. D. rim *c.* 21cm.

057 Amphora with straight sided body and wide, rounded base: ? Byzantine. Base and lower body. Reddish-brown fabric. Ht. pres. 44.5cm.; D. max. pres. 36.5cm.; th. 2.4cm.

058 Amphora with conical body: ? Byzantine. Large body sherd. Orange to red fabric. Ht. pres. 28.3cm.; D. max. pres. 36cm.

059 Amphora with conical neck: Yassi Ada type 2, 6th-9th cent. A.D. Complete neck and shoulder with two handles; worn rim. Greyish-pink fabric. Ht. pres. 16.3cm.; D. rim 6.3cm.
Bibl.: see K 031.

060 Mortarium. Complete base. Red fabric with many inclusions. Ht. pres. 3.5cm.; D. base 12.4cm.

061 Amphora: (no i.d.). Handle with lower body attachment; flat oval handle section. Orange to red fabric. L. pres. 24.5cm.

062 Amphora: (no i.d.). Handle fragment with neck attachment; two deep vertical grooves down one side of handle. Pale orange to red fabric. L. pres. 7.8cm.

063 (Fig. 2). Amphora?, solid peg base: (no i.d.). Orange to red-brown fabric. Ht. pres. 15.9cm.; D. max. 8cm. (upper edge).

064a (Fig. 2). Cooking pot: (no i.d.). Rim sherd. Coarse orange-brown fabric, discoloured to black; many small inclusions. Ht. pres. 10.4cm.; D. rim *c.* 20cm.

064b ? Cooking pot, strap handle: (no i.d.). Handle fragment. Coarse brown fabric, many inclusions. L. pres. 6.5cm.

065 (Fig. 2). Cooking pot with rounded base: ? 7th cent. A.D. Base, lower body and one handle. Coarse, orange fabric, discoloured to brown on outside; many small inclusions. Ht. pres. 11.5cm.; D. base 27cm.
Bibl.: similar to *Yassi Ada* I, 179, P58; but the well-known Siphniot cooking pots ("tsoukali"), made from at least the ? 17th cent. to the present day, share the same basic shape. This highlights the difficulty of dating domestic vessels on typological criteria.

K 066 Bowl with flat rim; ? Didymoteichon type. Body sherd preserving turn to rim. Fine orange fabric; cream slip with green overglaze on inside. Ht. pres. 5.4cm.;
Bibl.: see K 004.

K 067 Amphora with conical neck: Yassi Ada type 2, 6th-9th cent. A.D. Part of rim, neck and shoulder with one handle. Orange fabric. Ht. pres. 15.5cm.; D. rim *c.* 6cm.
Bibl.: see K 031.

K 068 Jar with vertical handle: (no i.d.). Handle with body attachment. Coarse orange fabric. L. pres. 9cm.

K 069 Amphora with conical neck: Yassi Ada type 2, 6th-9th cent. A.D. Rim, neck and part of shoulder with two handles, slightly askew. Orange fabric, discoloured to red. Ht. pres. 17.6cm.; D. rim 5.8cm.
Bibl.: see K 031.

K 070 (Fig. 2). Carinated bowl with ring foot: Didymoteichon type. Complete profile, whole of base and lower body, part of rim; impressed circles on floor. Fine light brown fabric; brown glaze on inside, partially discoloured to metallic lustre; possible traces of reddish brown slip under glaze. Ht. 7.1cm.; D. rim 19.6cm.; D. foot 7.1cm.
Bibl.: see K 004.

K 071 Amphora: ? Rhodian, 2nd-1st cent. B.C. Part of shoulder and stub of handle. Fine pink to pale orange fabric. Ht. pres. 4cm.
Bibl.: Grace, V., *Amphoras*, figs 31, 36.

K 072 (Fig. 2). Bowl with ring foot: Slip painted and glazed, 18th-19th cent. A.D. Complete profile, whole base and part of body up to rim. Fine orange fabric; trickles of white slip on inside overlaid with green glaze. Ht. 10.7cm.; D. rim 28cm.; D. base 7.2cm.

K 073 (Pl. LVIII). Amphora with low neck and high-slung handles: Crusader type, *c.* 1200 A.D. One handle and part of body; horizontal ridging around body. Fine orange fabric. Ht. pres. 28.2cm.
Bibl.: Megaw, A.H.S., *DOP* 26 (1972), 334, fig. 23.

K 074 Amphora: (no i.d.) Handle fragment, round section. Orange fabric discoloured to red. L. pres. 4.2cm.

K 075 Amphora: (no i.d.). Part of rim, neck and shoulder with one complete handle. Orange, discoloured to red. Ht. pres. 12.2.

K 076 Jar/Amphora with vertical ring handle: ? late Roman. Body sherd with handle. Orange fabric. Ht. pres. 11.6cm.

K 077 Cooking pot with rounded base and concave sides; black resin lumps inside: (no i.d., but cf. bibl.). Part of base and lower body. Coarse orange brown (exterior), blue grey (interior), many inclusions. Ht. pres. 10.7cm.; D. base 20cm.
Bibl.: *Yassi Ada* I, 178, P56 (for a resin deposit in a cooking pot).

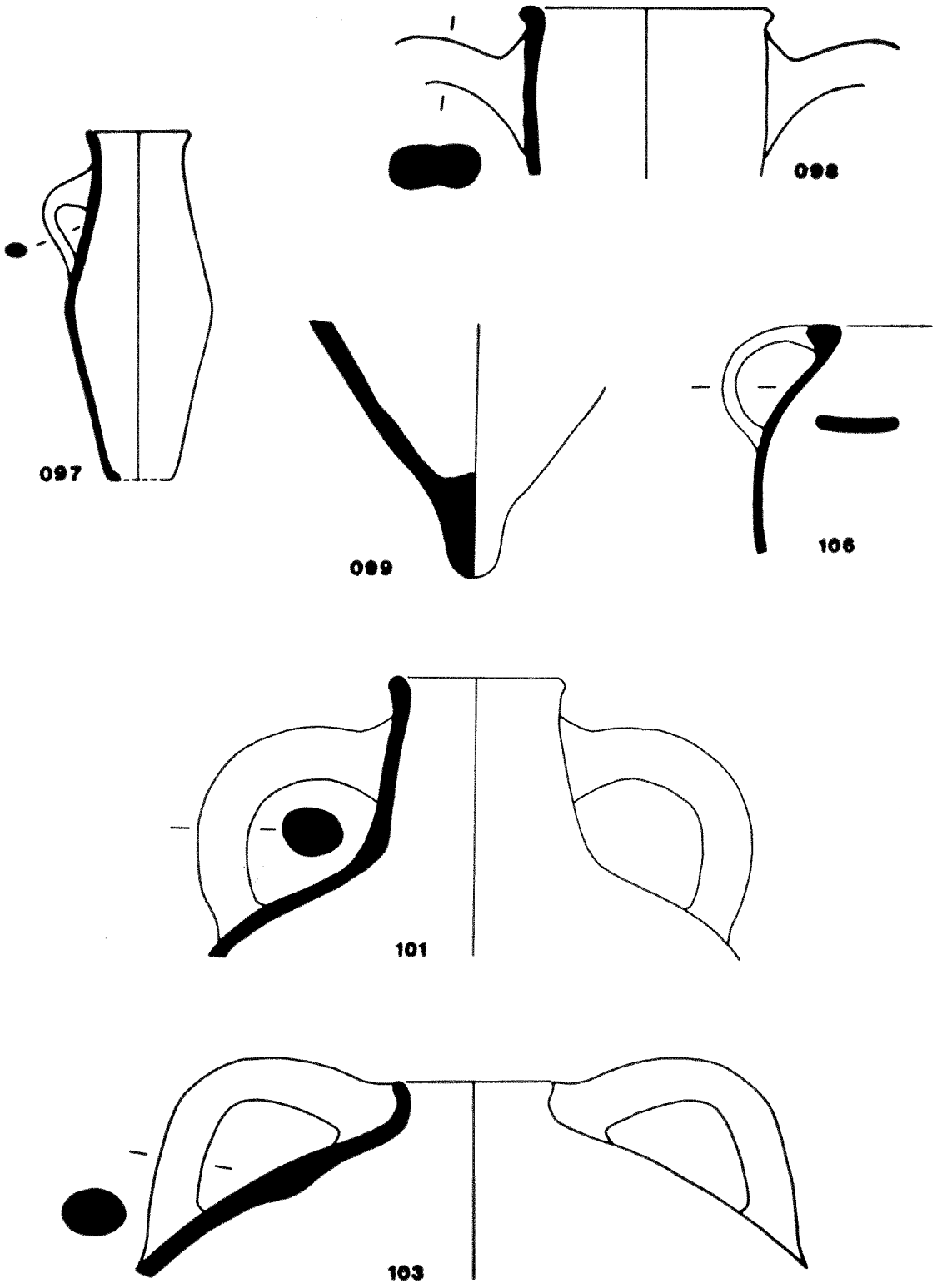
K 078 (Fig. 2). Amphora, conical peg base, hollow: (no. i.d.). Peg base. Orange, discoloured to red. Ht. pres. 13.3cm.; D. max. pres. 6.5cm.

K 079 Amphora: (no i.d.). Part of rim, neck, shoulder and upper handle from rim. Dark brown fabric. Ht. 8.7cm.; D. rim 7cm.

K 080 Clay ring: (no i.d.). One third circumference. Blue-grey fabric. D. ext. 9cm.; W. 2cm.; th. 1.2/1.7cm.

K 081 (Pl. LVIII). Amphora with conical neck and wide flat handles from rim to shoulder: 9th-12th cent. A.D. type. Complete rim, neck, part of shoulder and both handles; oval stamp on one handle, retrograde AE; horizontal ridging from shoulder down. Light brown fabric. Ht. pres. 22.1cm.; D. rim 8.7cm.
Bibl.: Z. Brusic, *Archaeologia Jugoslavica* 17 (1976), 38, 45 with P. VIII, fig. 2.

K 082 Bowl with straight sides: Didymoteichon type. Rim sherd. Light brown fabric; thick green glaze on inside



(Scale 1: 3)

Fig. 3
KERATIDHI BAY

and around rim; band of stamped rectangular impressions below rim on outside. Ht. pres. 4cm.; D. rim *c.* 17cm. Bibl.: Ch. Bakirtzis, *Balkan Studies* 21 (1980), pl. 4: 5 (for stamped rectangular impressions).

K 083 (Fig. 2). Amphora: (no i.d.). Rim, neck and shoulder with two handles from rim. Orange fabric. Ht. pres. 11.3cm.; D. rim 5cm.

K 084 (Pl. LVIII). Amphora: Rhodian, *c.* 225 B.C. One handle with neck attachment and part of rim; stamp on handle reads [ΕΠΙ ΧΑΡΜΟ]ΚΛΕΥΣ | ΒΑΔΡΟΜΙΟΥ. Fine pink to pale orange fabric. Ht. pres. 9.1cm.; D. rim *c.* 12cm.
Bibl.: V. Grace, *Amphoras*, figs 22, 31, 36, 62.

K 085 (Pl. LVIII). Amphora with loop handles: Cypro-Classical II. Complete handle. Coarse brown fabric. L. 22.5cm. Bibl.: Gjerstad, E., *Op. Ath.* III (1960), fig. 15 (Plain White type VII, Cypriot pithoid amphora).

K 086 Thin green stone. L. 11.2cm.

K 087 Modern drainpipe.

K 088 (Fig. 2). Carinated bowl with ring foot and frilled lip: Didymoteichon type. Almost complete. Fine pale orange fabric; thick green glaze on inside, trickling over rim onto exterior surface; impressed circle on floor, and marks of tripod stacker. Ht. 10.8cm.; D. rim 26cm.; D. foot 8cm. Bibl.: see K 004

K 089 Amphora: ? Byzantine. Shoulder with one complete handle; horizontal ridging around the shoulder. Orange fabric. Ht. pres. 13.5cm.; D. neck 6cm.

K 090a Bowl with ledge rim and frilled lip: Didymoteichon type. Rim sherd. Fine orange fabric; dark green glaze on inside, trickling over rim to exterior surface. Ht. pres. 7.3cm.; D. rim 26.5cm. Bibl.: see K 004.

K 090b (Pl. LVIII). Bowl with ring foot: Didymoteichon type, Whole base, part of lower body; impressed circle on floor, and mark of tripod stacker. Orange fabric; light green glaze on inside. Ht. pres. 4.2cm.; D. foot 8.5cm.
Bibl.: see K 004.

K 091 Carinated bowl with ring foot: Didymoteichon type. Whole base and lower body; impressed circle on floor. Fine orange fabric; pale green glaze on inside. Ht. pres. 10cm.; D. foot 9.6cm.
Bibl.: see K 004.

K 092 Amphora: Rhodian, 2nd cent. B.C. Handle with neck attachment. Pink to pale orange clay. L. pres. 24.5cm. Bibl.: see K 084.

K 093 Mortarium. Fragment of base of lower body. Pink fabric with many large inclusions. Ht. pres. 3.1cm.; D. base *c.* 21cm.

K 094 Rectangular stone anchor with three holes.

K 095 ? Figurine: (no i.d.). Neck and shoulder, hollow. Coarse pink to light brown fabric. Ht. pres. 7cm.; D. neck 7cm. W. 15cm.

K 096 (Pl. LVIII). Amphora with double barreled handle: Koan/Pseudo-Koan, 1st cent. A.D. Handle and part of shoulder. Dark red fabric. Ht. pres. 26.5cm.
Bibl.: Grace, V., *Amphoras*, fig. 60, middle.

K 097 (Fig. 3). Biconical flask with small vertical handle: (no i.d.). Complete, except for hole in base and chip from rim. Coarse brown fabric with many small inclusions. Ht. 16.4cm.; D. rim 4.8cm.; D. base 3cm. (function at time of finding: octopus' home).

K 098 (Fig. 3). Amphora with double barreled handle: Koan/Pseudo-Koan, 1st cent. A.D. Part of rim, neck and handle. Dark red fabric. Ht. pres. 8c .; D. rim *c.* 12cm.
Bibl.: Grace, V., *Amphoras*, figs 56-8.

K 099 (Fig. 3). Amphora with small peg base: ? Rhodian. Lower body with small peg base. Pink to pale oraoge, discoloured brown. Ht. pres. 12cm.

K 100 Bowl with ring foot: Slip painted and glazed, 18th-19th. cent. A.D. Part of base and body to small section of rim. Fine orange-brown fabric; trickles of white slip overlaid with yellow glaze. Ht. 10cm.; D. foot 6cm.

K 101 (Fig. 3). Amphora with conical neck: Yassi Ada type 2, 6th-9th cent A.D. Rim, neck and two handles, slightly askew; part of shoulder. Orange fabric. Ht. pres. 13.4cm.; D. rim 8.4cm.
Bibl.: see K 031.

K 102 Closed necked vessel: (no i.d.). Whole neck, part of shoulder. Brick red fabric. Ht. pres. 6.8.; D. neck 3.6/4cm.

K 103 (Fig. 3). Amphora with low neck and arching handles: 9th-12th cent. A.D. Rim, neck, part of shoulder, and one handle; very worn. Pale orange fabric. Ht. pres. 10.6cm.; D. rim 7.5cm.
Bibl.: Brusic, Z., *Archaeologia Jugoslavica* 17 (1976), Group Vb, esp. P. VIII: figs 1,5.

K 104 Bowl: ? related to Didymoteichon type. Body sherd. Coarse red-brown fabric with metallic glaze on inside. 10.3×16.3.

K 105 ? Tile fragment. Coarse orange fabric. 19.8×15cm.

K 106 (Fig. 3). Cooking pot: (no i.d.). Three fragments, preserving part of rim and wide strap handle. Coarse brown brown fabric with many inclusions. Ht. pres. 10.8cm.; D. rim 28cm.

K 107 Amphora: ? 9th-12th cent. A.D. Part of neck and shoulder with stub of handle; horizontal ridging on lower shoulder. Orange fabric, discoloured to red. Ht. pres. 15cm.

K 108 Cooking pot with horizontal lug handle: (no i.d.). Body sherd with handle. Coarse dark brown fabric with many inclusions. Ht. pres. 8.4cm.

K 109 Amphora with collared rim and grooved handles: Yassi Ada type 1, 6th-7th cent. A.D Complete rim and neck, stub of one handle. Beige to brown fabric. Ht. pres. 12.5cm.; D. rim 6.8cm.
Bibl.: *Yassi Ada* I, 155-7, 163-5, figs 8-1, 8-2, 8-3.

K 110 Amphora with low neck and arching handles: ? 9th-12th cent. A.D. (similar to K 107). Part of rim, neck, shoulder with one handle; horizontal ridging on shoulder. Orange fabric. Ht. pres. 18.1cm.; D. rim *c.* 10cm.

K 111 Piece of iron.

K 112 Rough stone anchor with one hole.

TS 113 Amphora: (no. i.d.). Body sherd. Coarse orange to brick red fabric. 12.2×11.4.

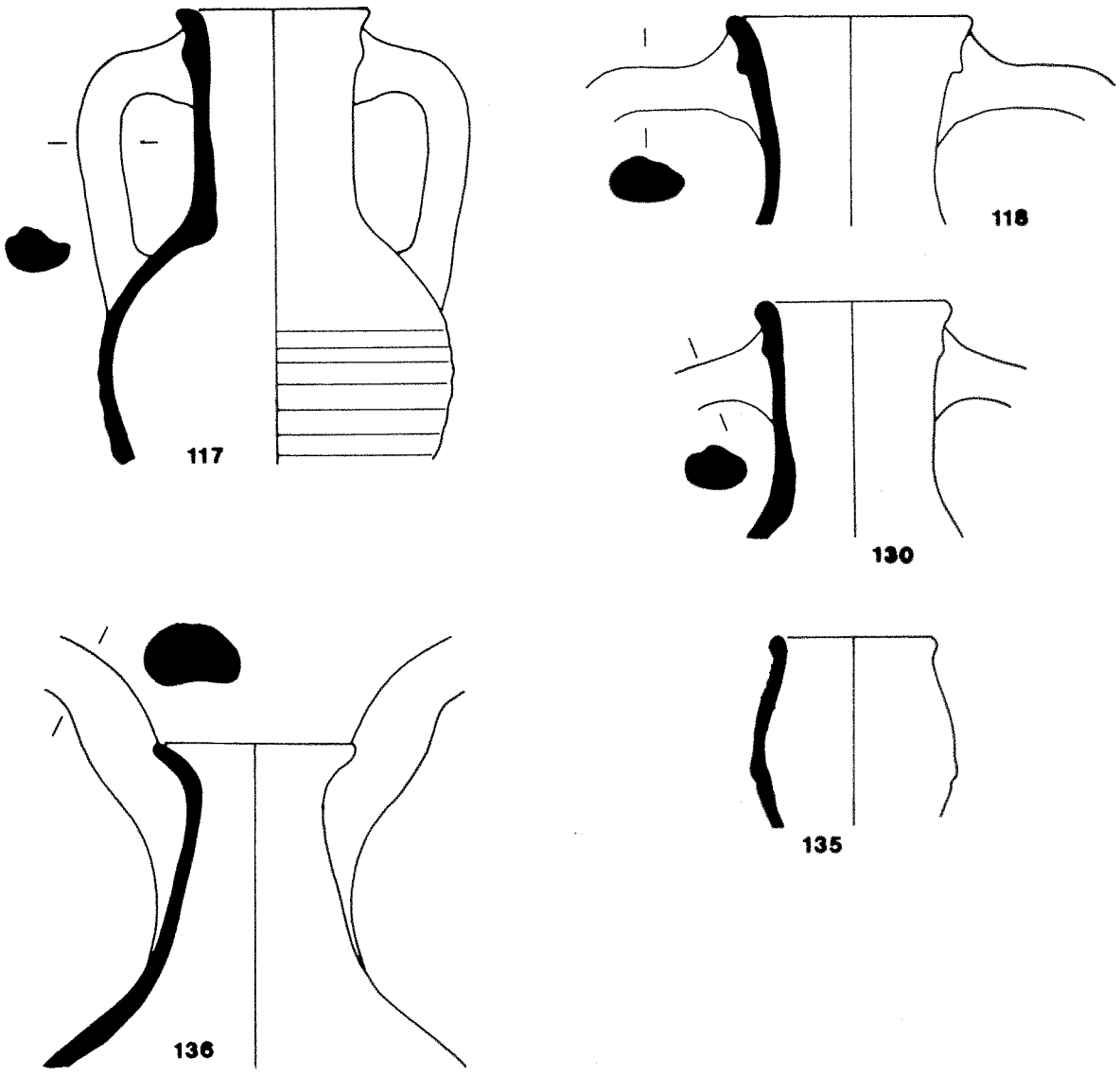
TS 114 Amphora with grooved handle: Yassi Ada type 1, 6th-7th cent. A.D. Fragment of handle. Orange to red-brown fabric. L. pres. 8.8cm.
Bibl.: see K 109.

TS 115a Amphora: Yassi Ada type 1, 6th-7th cent. A.D. Body sherd with horizontal ridging. Red-brown fabric. 4.2× 3.8cm.
Bibl.: see K 109.

TS 115b Amphora: Yassi Ada type 1, 6th-7th cent. A.D. Part of rim and handle stub. Orange fabric. Ht. pres. 4cm.; D. rim *c.* 11cm.
Bibl.: see K 109.

TS 116 Jar: (no i.d.). Base and lower body. Coarse orange to red fabric. Ht. pres. 12.9cm.; D. base 8cm.

TS 117 (Fig. 4). Amphora with collared rim and grooved handles: Yassi Ada type 1, 6th-7th cent. A.D. Rim to shoulder, one handle slightly askew, and part of lower body; horizontal ridging around body. Orange, discoloured to brick red fabric. Ht. pres. 18.8cm.; D. rim 8cm.
Bibl.: see K 109.



(Scale 1: 3)

Fig. 4

THALASSINES SPILIES (117, 118, 130), LARA LIMNIONAS (135, 136)

TS 118 (Fig. 4). Amphora, as TS 117: Yassi Ada type 1, 6th-7th cent. A.D. Complete rim and neck with stubs of both handles. Orange to brick red fabric. Ht. pres. 8.8cm.; D. rim 9.5/10.2cm.
Bibl.: see K 109.

TS 119 Amphora: (no i.d.). ? Shoulder fragment. Coarse orange to brown fabric. Ht. pres. 12cm.

TS 120 Amphora, as TS 117: Yassi Ada type 1, 6th-7th cent. A.D. Rim with handle stubs, slightly askew. Orange to red fabric. Ht. pres. 6cm.; D. rim 7.5/8.2cm.
Bibl.: see K 109.

TS 121 (Pl. LVIII). Amphora: Rhodian, early 4th cent. B.C. Whole of conical lower body with concave, collared base. Orange fabric, discoloured to brown; interior preserves resin coating. Ht. pres. 49.3cm.

TS 122 Amphora, as TS 117: Yassi Ada type 1, 6th-7th cent. A.D. Rim and neck, one complete handle with shoulder attachment, and stub of second handle. Orange fabric. Ht. pres. 15.2cm.; D. rim 8.8/9.2cm.
Bibl.: see K 109.

K 123 Amphora: (no i.d.). Part of handle and shoulder attachment. Orange to red fabric. Ht. pres. 16.8cm.

K 124 Amphora: (no i.d.). Body sherd, horizontal ridging. Coarse orange fabric. 11.1×12.7.

K 125 ? Amphora.

K 126 ? Amphora.

K 127 Bowl with ring foot: (no i.d.). Base and part of lower body. Coarse pale orange, discoloured to red. Ht. pres. 2.4cm.; D. foot 7cm.

K 128 Body sherd with horizontal ring handle: (no i.d.). Coarse orange to brick red fabric. Ht. pres. 5.3cm.

TS 129 Amphora, as TS 117: Yassi Ada type 1, 6th-7th cent. A.D. Rim and neck, one complete handle with shoulder attachment, stub of second handle. Orange to brick red fabric. Ht. pres. 13.1cm.; D. rim 7.6cm.
Bibl.: see K 109.

TS 130 (Fig. 4). Amphora, as TS 117: Yassi Ada type 1, 6th-7th cent. A.D. Half of rim and neck, stub of one handle. Orange, discoloured to brick red. Ht. pres. 9.8cm.; D. rim 8.2cm.
Bibl.: see K 109.

LL 131 Wooden peg.

LL 132 Bronze nail.

LL 133 Bronze nail.

LL 134 Bronze nail.

LL 135 (Fig. 4). Tulip bowl: ? Roman. Rim to lower body, base not preserved; horizontal groove on lower body. Orange-red fabric, with mica dusting in and out. Ht. pres. 7.8cm.; D. rim 7cm.

LL 136 (Fig. 4). Amphora with high swung handles: Crusader type, *c.* 1200 A.D. Rim and neck with upper part of both handles. Fine orange fabric. Ht. pres. 18cm.; D. rim 8.4cm.
Bibl.: A.H.S. Megaw, *DOP* 26 (1972), 334 and fig. 27.

M 137 Mortarium. Complete; thick overhanging rim, ridging on enterior. Coarse orange. Ht. 10.6cm.; D. rim 31cm.; D. base 15cm.

M 138 (Pl. LVIII). Amphora: ?Chian. Complete; Pale orange, discoloured to brown, micaceous. Ht. 65.5cm.; D. rim 10.7cm.
Bibl.: V. Grace, *Amphoras*, fig. 45 right.

M 139 Bowl: found inside M 138, presumed same date. Base and lower body; raised foot, flat below. Orange to greyish brown (interior). Ht. pres. 2.7cm.; D. base 5.7cm.

LL 140 Rectangular, dressed stone.

CL 141 Surface sherds: (no i.d.).

CL 142 Sherds from transect D in bay: (no i.d.).

K 143 Surface sherds from Keratidhi peninsula: Classical to Roman.

YN 144 Surface sherds and flint chips: (no i.d.).

M 145 Surface sherds: Hellenistic to Late Roman.

L 146 Surface sherds: Byzantine or later.

AY 147 Amphora: ? Hellenistic. Neck with peg base of a second amphora concreted inside. Brick red fabric. Ht. pres. 14.4cm.

AY 148 Amphora: ? Hellenistic. Part of rim to shoulder with one complete handle. Brick red fabric. Ht. pres. 25.2.

C. E. MORRIS
A. A. D. PEATFIELD