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The underwater excavation at the Ancient port of Amathus in Cyprus

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The ancient town of Amathus is situated 10 km east of Limassol. The acropolis, now excavated by the French School at Athens, overlooks the sea and from it one can make out very clearly to the east at the foot of the rocky cliff the dark, square shape of the port in the prolongation of a kind of circular basin filled with earth[1] (Fig. 1). Now a field of cultivation, this basin perhaps once belonged to the port complex, as the measurements of electric resistivity taken in 1978 indicated[2]. However, we will confine ourselves here to the study of the structures still under the

Figure 1. Aerial view of the port (photo Ph. Collet).

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water or in contact with it; the study of the inland basin belonging to the domain of terrestrial archaeology. These submerged structures, important parts of which are still visible, are at little depth, between 1 to 6 metres. The lines of dressed stones of the jetties, normally about a metre below the surface, emerge sometimes at very low water.

The references to the port in the ancient authors are few and not very explicit. Only the Pseudo-Skylax of Caryanda (end of 4th century BC), who is particularly dependent on the work of Skylax (end of 6th century BC) mentions the existence of Amathus as a 'desert' port (*erimos*) an epithet corrected by Pierre Aupert to *therinos* (of summer)[3]. If he means a natural shelter, badly protected from the winter winds and only practicable in summer, Pseudo-Skylax is mentioning an establishment certainly previous to the great artificial and enclosed port that we have excavated. On the other hand, if he is referring to an abandoned port, one would suppose that the author had brought up to date his source of information, since, as we shall see below, we have been able to establish from the excavations and the study of the material that the port had been abandoned in the last years of the 4th century or in the earliest years of the 3rd century BC[4].

The excavations were undertaken by the French School at Athens in 1984, at the request of the Director of Antiquities, Cyprus, Dr Vassos Karageorghis, and were financed by the School and privately by a local society looking to the restoration of the port (SALPA). The objects of the excavations were to make an accurate survey of the different structures in the port, to understand the method of construction and to retrace its history before proceeding to an eventual restoration. Two campaigns have already taken place; 4 weeks in the autumn of 1984 with 8 divers and 8 weeks in September/October 1985 with 20 persons[5]. The excavation was directed by Jean-Yves Empereur, assisted in 1985 by Colette Verlinden a member of the School. A third campaign of 6 weeks is scheduled for the autumn of 1986. Various organizations have helped us greatly in our undertaking and we have to thank them sincerely for their assistance which has been invaluable. The CNRS and the French School have given us considerable support with photographic and diving equipment. We are especially grateful to Mr Bambos Ioannou, mayor of the township of Hagios Tychonas—in which is the site of Amathus—and secretary of SALPA. This society through the good offices of Mr Ioannou provided us with the basic infrastructure necessary for this type of excavation, and particularly with a freight container in which to sort the material on the beach, two platforms, three pumps and standing technical assistance. We have been able also, thanks to SALPA, to receive support of the Cypriot army to cut the posidonia roots—the marine algae—which cover a large number of structures, and we have had help from the British base at Acrotiri in the form of compressed air cylinders and two flights over the site from a helicopter, which enabled us to obtain an aerial photographic survey of the port[6]. Another flight was carried out by helicopter from the French Navy on route to Cyprus. Also the School Surveyor–Topographer, Frank Perdrizet was able to make a photo-grammetric survey of the port, beginning in the first campaign which was completed in 1985 after the second expedition (Fig. 2).

The plan of the complex shows the lay-out of the structures on a north–south axis. They consisted of three large moles, with a protection of great blocks of irregular shape on their outside, and on the inner face regular lines of dressed stones[7]. The entrance, only 20 m wide, was set to the south-east, on the opposite side of the prevailing wind. The South Mole which is at an obtuse angle to the West Mole measures about 180 m, that is doubtless a *stade*. The East and West Jetties are preserved, respectively, to a length of 145 and 130 m.

A sondage in 1984 (Fig. 2,a) and 9 sondages in 1985 (Fig. 2, nos 1–9) permitted us to understand better the system of construction and operation of the moles[8].

Four sondages were carried out on the outside of the jetties at the corner of the South and West Moles where the blocks of stone are most conspicuous and numerous. (Fig. 2, nos 4–7, Fig. 3). Following the careful examination of the aerial photographs and the plan made in 1984, we were looking for what we thought would be towers or a lighthouse; indeed circular structures appeared clearly in the documents[9]. However, sondages 5 and 6 have shown that such structures do not exist and that it was only a matter of a freak

Figure 3. Aerial view of the south-west corner of the port with sondages 4–7 and 9 (photo Ph. Collet).

carpet of posidonia covering the stones. It was discovered that in fact they belonged to a strong breakwater, protecting the south-west corner of the port, the most exposed to the prevailing winds.

This breakwater consists of enormous blocks of local limestone, thrown pell-mell, one on top of the other. The blocks lying on the sand, however, have a more regular parallelepiped form and are set more carefully. In places a rubble of chips, the debris of the trimming of the stones, fills the gaps between the great blocks but without making regular courses (Fig. 4).

Three sondages carried out in the space between the breakwaters and the line of stones dressed on the inside face of the basin revealed that there was an intermediate zone, narrow on the lateral sides of the port and very large on the south, into which have fallen, here and there, blocks from the breakwaters (Fig. 2, nos 4, 7, 8). It was made up of a thick rubble of stones of medium size, the debris of the stone cutting (Fig. 5). This type of filling of moles was probably carried out *à sec* in antiquity, though it appears that the level was lower than that of the line of dressed stones. However, it is possible that this difference of level was due to the relatively small size of the chip waste, which could be carried

Figure 4. Sondage 5, blocks of the breakwater and rubble of stone-cutting debris (photo G. Réveillac).

more easily by the action of the sea than the enormous dressed stones of the landing place. As was shown by the section of the sondage 8, made inside of the West Jetty along the length of the stones laid as headers (*en boutisse*), the gap left by the stone chips would have been gradually filled with sand, pebbles and gravel, carried by the streams which run into the sea east of the acropolis (Fig. 6). This type of fill is found in sondage 5 as well as in the sondages made inside the basin (a,1 + 3). In sondage 8 the rubble from the stone cutting covers a thick bed of clay, mixed with stones, pebbles and pottery, which runs under the line of headers and makes up the foundations (Fig. 6).

Sondage a, made in 1984, inside the basin along the South Jetty showed that in other places the headers were laid directly on a bed of sand, lying on the virgin mud.

In all, four sondages have been made along the line of dressed stones of the landing place, two inside the basin: sondage a along the South Mole and sondage 1 + 3 at the east end of the same mole and two inside the jetties, sondage 8 on the west and sondage 2 at the south end of the East Mole (Fig. 2, a, 1 + 3, 2,8). This landing place of cut stones was visible around the entire perimeter of the moles, but above all along the South Jetty, where the presence of two courses of long blocks of stone, completely worn away by the sea and marine flora, was discernible. It was only by going down the length of the wall that one was made aware that superimposed as headers in places up to seven courses, were very large blocks up to 3 m long, 0·70 m thick and 0·70 m tall, weighing up to 3 tonnes. The number of courses doubtless varied according to the depth of the water. They were 3 courses high in sondage 8, 5 to 6 along the South Mole (sondage a), 7 at the north corner of the entrance of the port (sondage 2), and at least 7 at the south corner where the base of the jetty (sondage 1 + 3)

Figure 5. Rubble of stone-cutting in sondage 4 (photo G. Réveillac).

has not yet been reached[10]. These limestone blocks which came from nearby quarries, situated on the shore, have at their ends thick tenons for handling (Fig. 7) which allow them to be lifted and placed in position in the water, doubtless by means of a crane, moved in progression along the jetty, as shown by the model, illustrated in Fig. 8 made by the architect of the excavations, Tony Kozelj.

This method of construction is particularly impressive in sondages 1+3 and 2 where two corners of the jetties were uncovered. In sondage 1+3, at the eastern end of the South Mole, the immense blocks are intersected in a very regular fashion in the corner of the north and east faces of the jetty (Fig. 9). The same method was used in the south-west corner of the East Mole (sondage 2) but with only relative success, since the intersection of the blocks was abandoned from the third course (Fig. 10)[11].

This corner whose west side is not in the axis of the landing place (but further west) appears to belong to a great platform, whose extent is not yet known, but which would have formed a kind of reinforcement of the East Mole at the entrance of the port (Fig. 2). Likewise the east face of the South Mole which, over a distance of 10 m makes a return to the south is not in line with the East Mole. It appears to turn towards the east, then to the north, and so would form a kind of basin, whose limits towards the east, we have not yet been able to determine, because of the thick bed of posidonia roots which cover the stones in this place (Fig. 1). The system, complex enough of the entrance to the port is not yet clearly understood; its elucidation will be the principal object of the next excavation.

The discovery of a lead double swallow tail cramp weighing 54 kilos beside the jetty in sondage 1+3 permits one to suppose that at least one course of stones, which were fastened together, has disappeared (the surviving courses have no traces of ties). The number of large stones with tenons which have fallen from the

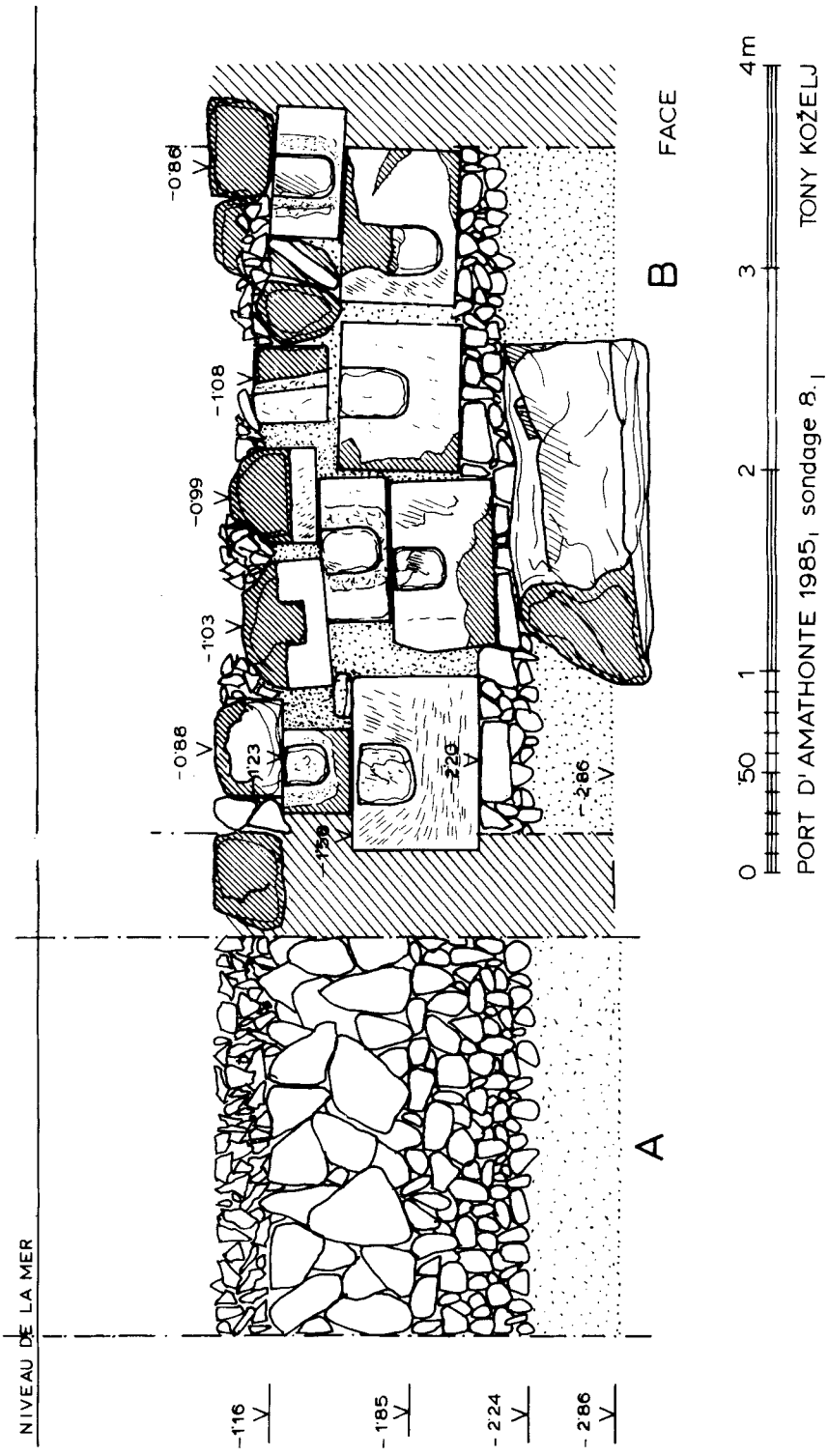

Figure 6. North and east sections of sondage 8 (T. Koželj).

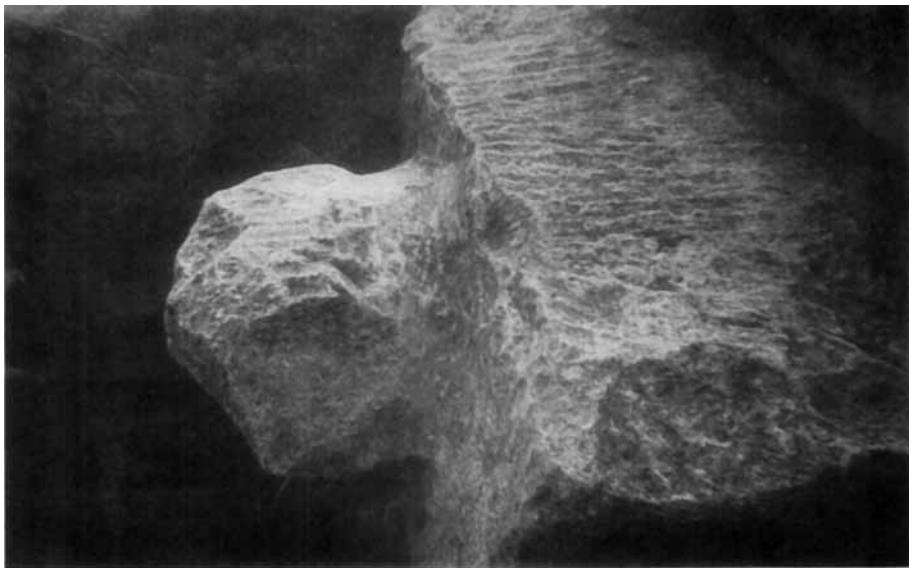

Figure 7. Detail of tenon at end of one of the great blocks (headers) of the landing place (photo G. Réveillac).

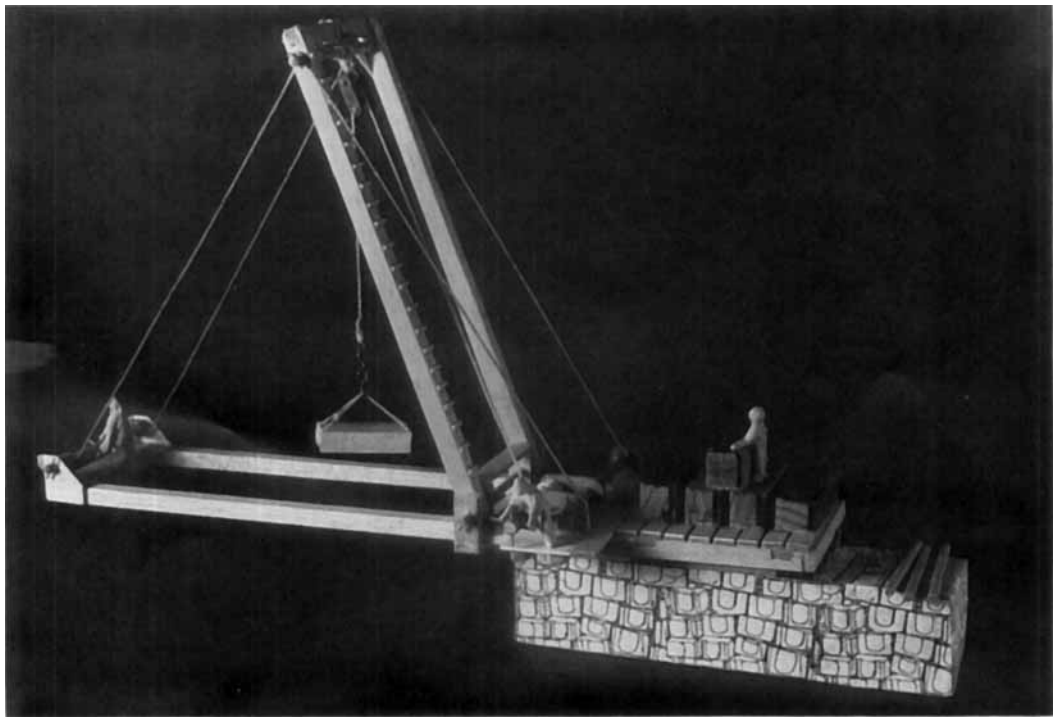

Figure 8. Reconstitution of the method of building the landing place (model T. Koželj, photo Ph. Collet).

Figure 9. Intersection of blocks at north-east corner of the South Mole, sondage 1 + 3 (photo Ph. Collet).

Figure 10. Headers inside the south-west corner of the East Mole, sondage 2 (photo Ph. Collet).

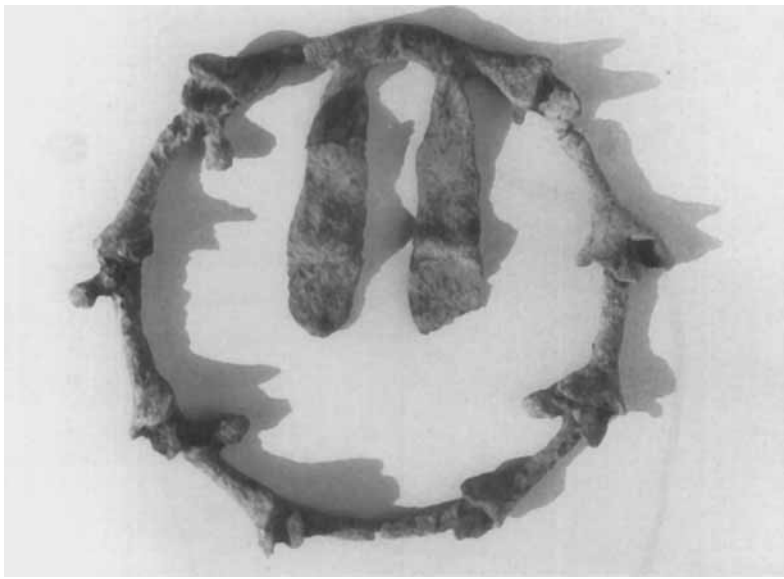

Figure 11. Metal crown of the Hellenistic period (Photo G. Réveillac).

moles being relatively small and the other lead fastenings having disappeared, one can suppose that the blocks were removed to be reused and that the metal was retrieved at various times after the port was abandoned, notably when the level of the water had fallen considerably, that is to say, as we shall see below, during the Roman and Early Christian periods[12].

The non-ceramic material coming from the excavations was particularly scarce, which appears significant enough for an estimation of the duration of use of the port.

Mention will only be made of the find of a small Hellenistic metal crown (Fig. 11) and a wooden comb, later in date, both found in the mixed level in the upper part of sondage 5. Apart from some earlier residual fragments, the pottery is remarkably homogeneous: it dates from the end of the 4th or the beginning of the 3rd century BC. It is characterized by an abundant local production, including numerous wasters. To be mentioned is a series of thickly ribbed open vases with incurved feet, specimens of which have been found on the acropolis in a destruction level, dated 310–300 BC, associated perhaps with the taking of Cyprus from Ptolemy I by Demetrius Poliorketes[13]. In the imported wares are Attic and also 'mushroom lip' amphoras, probably Rhodian the date of which corresponds with the local ceramic.

It could be then that the construction of the port was connected with the taking of Cyprus, either by Ptolemy I or Demetrius Poliorketes, impelled both of them to assure themselves of a harbour safe and well-sited for their fleet. This would explain the size of the enterprise, the evident haste of its execution and the narrowness (20 m) of the entrance, and would give a purpose military rather than commercial to this impressive port establishment. For natural causes, lack of drainage or political reasons, as the homogeneity of the ceramic and the scarcity of non-ceramic material shows, the port was abandoned very soon after its construction, if it was ever finished. These questions remain open for the present but we hope that the third campaign of excavation will provide an answer to them.

Two sondages were made in the middle of the basin along the two lines of large stones visible in the aerial photographs (Fig. 2, nos 10, 11). They allowed us to comprehend that the water level had fallen considerably in a period following the abandonment of the port; in effect we have before us a strand composed of great slabs of 'beach rock', under which were found a few

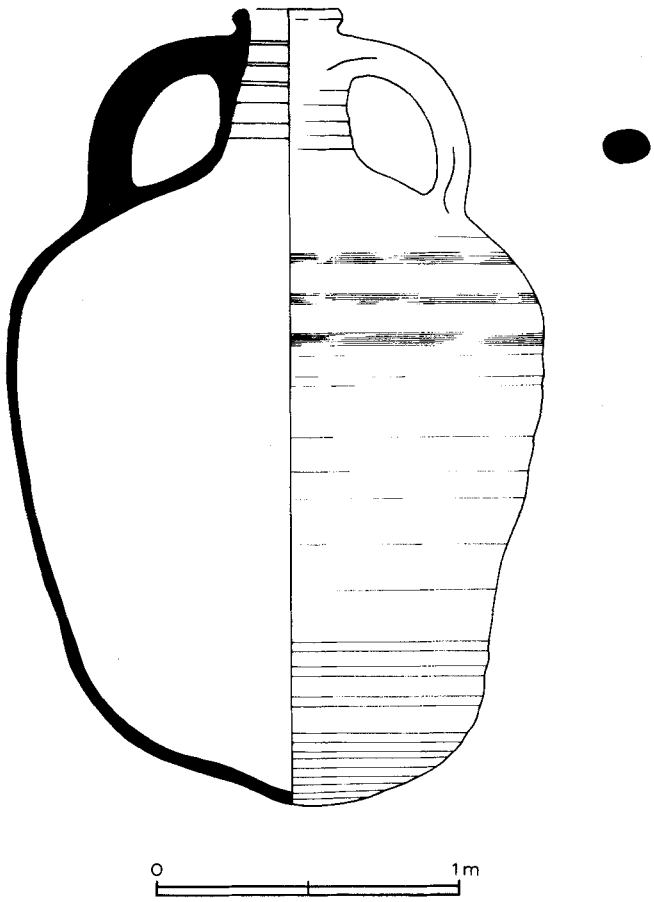

Figure 12. Amphora from well 3 (S. Hartmann).

atypical abraded sherds dating probably from the High Empire[14]. Near one of these slabs was found an uninscribed funerary cippus of a type current at Amathus. The latest inscribed examples date from the 3rd century AD[15].

This strand of 'beach rock' can be associated with a series of six wells, three of which were found inside the basin of the port (Fig. 2, nos 1–6, in circles). Wells 1 and 2, entirely submerged, were excavated in 1984, while well 3 beside the beach was the object in 1985 of an excavation, half terrestrial, half submarine[14].

Wells 1 and 2, square in form, were much alike in their courses, included reused blocks, coming from the lower town or the acropolis, which rested on a line of wooden beams; numerous shells of land snails were collected and fresh water appeared still to gush out from the bottom. They were filled, like well 3, with pottery and stones at the end of the 6th or the beginning of the 7th century AD, that is to say at the time of the Arab invasions. This local ceramic, grey in colour, consists of a great number of amphoras for oil and wine, but also of other new forms of cooking pots and table ware which provide an excellent sample of the pottery existing at the time (Fig. 12).

Well 3, which also rests on a wooden foundation differs from the others by its elongated rectangular form and by the opening of 1 m by 0·50 m which it has at the base of the west wall (Fig. 13). A kind of vertical 'sabre cut' in the section of the north wall allows one to suppose two phases of construction (Fig. 13). The presence of round bits of wood and pieces of plank at different levels in the east part of the north and

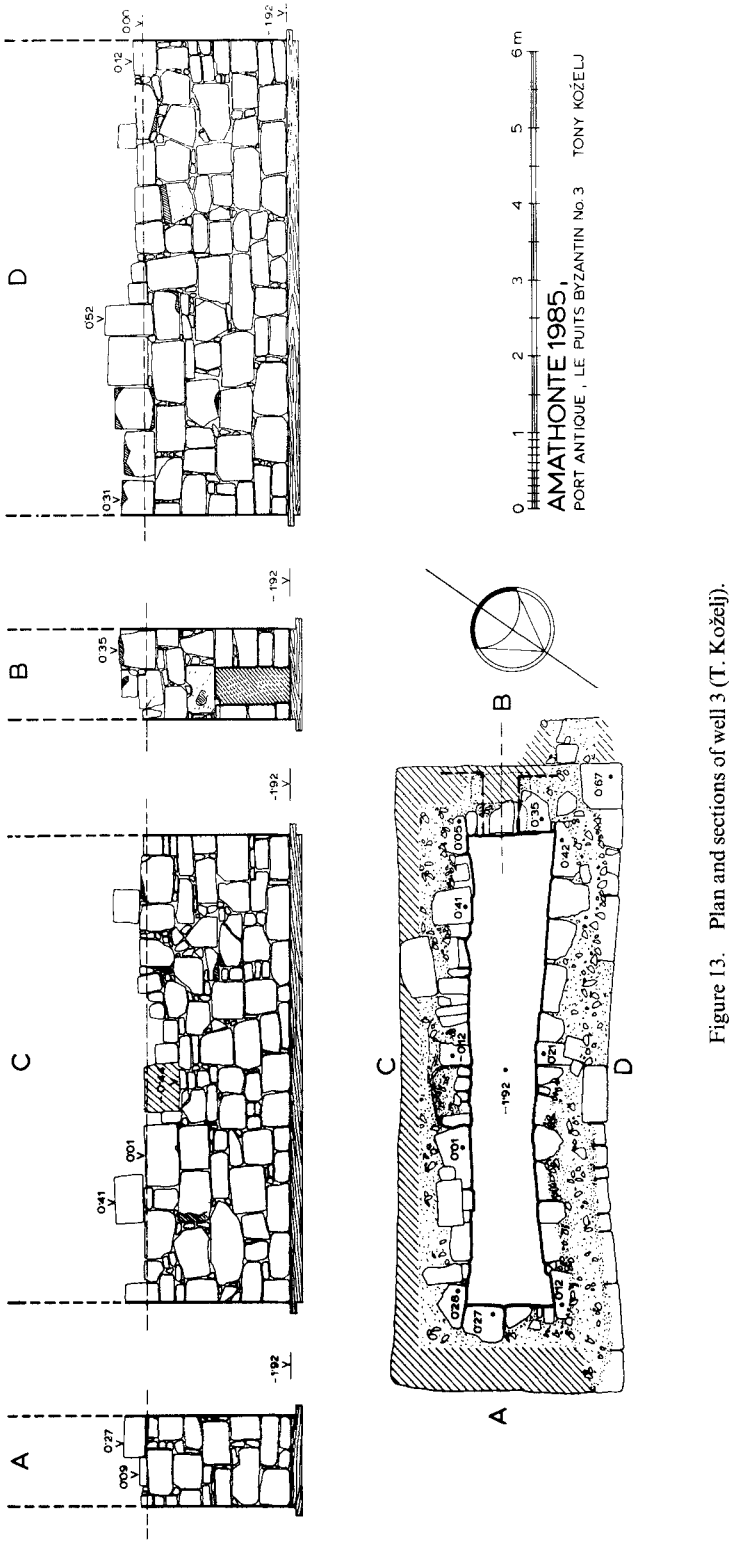

Figure 13. Plan and sections of well 3 (T. Koželj).

south walls suggests the existence of a wooden ladder, perhaps an explanation of the enlargement of the well in the second phase. Would the opening in the east wall have been made at this time and the well transformed into a cistern? The question for the present remains open. We will mention, however, that pottery anterior to the final filling of the wells at the end of the 6th or beginning of the 7th century was found in digging inside the opening in the west wall. Among these sherds of the 2nd to 3rd century of our era was a fragment of the handle of a *'Pseudo-Cos en cloche'* amphora.

Without going too far, we can conclude in the present state of our researches that there was a considerable lowering of the water level and an advance of the shore line at a time still undetermined at the beginning of our era. Perhaps these changes are to be related to important earth movements which took place in the Amathus region at the time and could have been caused by tectonic variations[15]. This retreat of the sea had permitted the construction of these wells which would have been filled in for reasons still unknown at the end of the 6th or the beginning of the 7th century AD. Perhaps their water had become brackish as a result of the return of the sea.

If the artificial port of Amathus appears to have been the object of the inordinate ambition of enterprising but not always fortunate conquerors, the extent and mightiness of these remains are none the less impressive. It would be regrettable if after the departure of the archaeologists that these waters should remain undisturbed and recover their 'desert' character which was attributed to them by the Pseudo-Skylax. Their extraordinary state of preservation deserves a systematic dredging, followed by a permanent drainage of the basin, which would transform one of the most unexpected and most spectacular monuments of Cyprus.

Notes

[1] For the excavations, see Rapports sur les travaux de la mission de l'Ecole à Amathonte in *BCH* beginning of 1976.
[2] *BCH* **103** (1979): 726–8, 759–61.
[3] Aupert, P. & Hellmann, M-Chr., *Testimonia I. Etudes Chypriotes IV* (1984): 14. Paris 1984; other reference to the presence or absence of a port at Amathus pp. 24, 51–3, 79, 80, 82, 92.
[4] See *infra*, p. 010.
[5] Preliminary reports published in *BCH* **109** (1985): 984–9 and in the Annual Report of the Department of Antiquities Cyprus (1984): 53–4.
[6] An underwater video film is in course of production.
[7] A sketch of the jetties was published by P. Aupert in 1979, see *BCH* **103** (1979): 728, fig. 1 bis.
[8] Sondage 9 could not actually be carried out because of the posidonia roots which covered the blocks in this place and have not been entirely removed.
[9] See *BCH* **109** (1985): 985, fig. 32; 986, fig. 33.
[10] Concerning the courses which have disappeared, see *infra* pp. 6, 10.
[11] In this sondage, which it should be recalled, was carried out inside the corner of the mole, the rubble from the stone cuttings resembled that found in sondages 4, 7 and 8.
[12] Dr V. Karageorghis has told us of the existence of another swallow tail cramp in the Limassol Museum.
[13] See P. Marchetti *BCH* **102** (1978): 946, 948 for an illustration of a bowl of this type, also *BCH* **101** (1977): 793, fig. 25.
[14] For studies already carried out on the 'beach rock' of Amathus, see Bousquet, B. & Péchoux, P.-Y Géographie du site d'Amathonte *BCH* **102** (1978): 962–9 and Auper & Hellmann op. cit. pp. 124, 134, 138–40, 142, 144.
[15] See Aupert, P. & Masson, O. *BCH* **103** (1979): 361–89 and Aupert, P. *BCH* **104** (1980): 237–258.
[16] For wells 1 and 2, see *BCH* **109** (1985): 988–9.
[17] For the earth movements, see the evidence of Etienne de Lusignan in Aupert and Hellmann op. cit. p. 51.