

Ancient Paphos beneath the Sea: A Survey of the Submerged Structures*

Robert L. Hohlfelder

Introduction

Sometime deep in our collective past, long before the advent of agriculture or urban life, the first mariners took to the seas. Where this grand adventure began is uncertain, as is the identity of the first intrepid explorers who dared to leave the safety of shore to face the rigors and dangers of the deep-water sailing. The seaborne movement of indigenous peoples from Asia to the Australian continent *c.* 40,000 - 50,000 B.C. and the evidence of a maritime obsidian trade from Melos to the Argolid over 10,000 years ago are but two significant events in our incomplete story of sea travel (Flood 1992, 39; Casson 1991, 3). We cannot be sure, however, if either marks a regional beginning of mankind's affair with the sea or is simply a visible milestone along a much older and longer road.

* I wish to thank Professor Vassos Karageorghis for his invitation to participation in the prestigious symposium, "Cyprus and the Sea" and for the opportunity to publish my communication in this volume of the proceedings. It is an honour to join forces with so many old and new friends in this endeavor. While the report bears my name and I am responsible for its content, I do wish to acknowledge my colleague and co-director in the field work reported here, Mr John R. Leonard, whom I have consulted at every turn in all phases of our joint investigation of the ancient harbour of Paphos.

Beginning a project of this importance would not have been possible without the support and encouragement of many individuals, only some of whom I can acknowledge here. Ancient Paphos has been blessed with a series of internationally renowned archaeologists and scholars who have helped to open a window to her past. Their pioneering research and personal kindness in sharing their insights have made these underwater investigations far more relevant and, in many respects, possible. I here publicly thank Drs Michaelides, Karageorghis, Megaw and Daszewski for their studies on life in this port city and their encouragement to discover what secrets may be hidden beneath its sea.

Mr. A. Papageorghiou, former director of the Department of Antiquities, initially gave permission to begin this project; Mr M. Loulloupis supported it as well during his tenure in the same office, and the current director, Dr D. Christou, has kindly permitted its continuance. Mr. J. Bayada, General Manager of the Cyprus Ports Authority and co-sponsor of this symposium, has been helpful in many ways. I particularly commend his personal regard for preserving and honouring the maritime legacy of his country's past.

The various local authorities, particularly Mr T. Herodotou of the Paphos Museum, have been extremely helpful. Ms C. Dobbins of CyDive Ltd. has been enthusiastic and supportive in all ways. She and her team of dive instructors have shared their knowledge of the waters of the Paphos harbour and promontory to the tremendous gain of this investigation.

Dr Stuart Swiny, director of the Cyprus American Archaeological Research Institute in Nicosia, has supported this project in too many ways to detail here. Simply stated, this survey could not have been launched without his help and guidance. I particularly note his patience in tolerating odoriferous diving gear to be spread around his beautiful building to dry.

Professor T. Maslowski of the Department of Classics of the University of Colorado and Ms E. Niesytto of the University of Texas prepared independent translations of Professor Daszewski's article. Their contribution is gratefully acknowledged.

Our survey team members included Mr C. Brandon and Ms K.H. Barth, architects (1991 and 1992); Mr and Mrs Harry Wadsworth, underwater photographers (1992); Mr T. Thomas, archaeological student and diver (1991); Ms N. Nemechek, archaeological student and diver (1991 and 1992); Mr A. Sacorafos, volunteer diver (1991); and Mr N. Demetriou, archaeological diver and representative of the Department of Antiquities (1992), as well as Leonard and the author. No survey team has ever had such talented, affable, and committed members.

Finally I thank my institution, the University of Colorado, and my dean, Charles R. Middleton, for their continuing support of my research. The Council on Research and Creative Work and the Graduate Council on Arts and the Humanities provided generous funding for this project, as did the National Geographic Society and Leica Ltd. for the 1992 season. Without this financial assistance, the survey of the submerged ruins of the Paphos harbour could not have been undertaken.

We can be more certain of Cyprus's role in the maritime affairs of the ancient Eastern Mediterranean and of a reverse corollary as well. As long distance sailing developed and expanded, the island's strategic position assured immediate importance in the new order of things occasioned by this transportation revolution. Conversely, the beginning and expansion of seafaring elsewhere in the Mediterranean profoundly influenced the course of Cypriot history.

One can say with reasonable confidence, for example, that the island's first visitors and settlers must have come by water. The absence of any geological evidence for a recent land bridge from Asia Minor or the Levant dictates that by some means or other—rafts, primitive boats, skin floats—open-water passages did take place, although when such voyages began is far from certain. There is recent archaeological evidence from *Aetokremnos* that hints at the presence of sea hunters on the island as early as 8,500 B.C., well before the beginning of farming and animal husbandry on the island. (Simmons and Reese 1993, 41; Gomez and Pease 1992, 2).

Cyprus was also a frequent destination for ancient mariners who were attracted by its rich abundance of timber and copper and who used it as a way-station for voyages to and from Egypt and the Levantine coast. Ships sailing from the Aegean and points farther west would normally seek landfall in western Cyprus after departing Rhodes or Lycia (Keen 1993, 72). Once again, however, we cannot be certain when this traffic began.

But we can be sure that long before there was a port city, sea travellers sought out the Paphos promontory both as a navigational aid and mooring point (Fig. 1). In the lee of this headland was a naturally protected bay that provided the best anchorage along the whole southwestern coast of the island during the months when most ancient sailing occurred, normally 10 March to 11 November with the period from 27 May to 24 September judged the most safe (Vegetius, *Epitome Rei Militaris* IV.39; cf. Hesiod, *Op.* 666; Murray 1987, 159 and *infra*).

From the Paphos point, it was relatively easy to continue a voyage south to Egypt or to coast along the southern littoral of Cyprus to the area of Kition before embarking on the final sea leg to the Levant, taking full advantage of the favorable wind regime of the normal sailing season (Mahoney 1988, 49). Returning from there or from Egypt by reversing the route was more difficult, but certainly not impossible, even though such a voyage required sailing directly into the prevailing winds (see Demosthenes *Diony.* 30 who comments on an uninterrupted trade between Rhodes and Egypt that persisted even through the winter months; Casson 1971, 297; 1950, 43). Ch. Bakirtzis, for example, argues elsewhere in this volume that the Paphos region played a major role in the grain trade to Constantinople in the early Byzantine era, assuming that cargo ships with grain destined for the capital sailed due north from Alexandria to Agios Georgios at Cape Drepanon before continuing their voyage toward their final destination (Bakirtzis *infra*). Other scholars, however, suggest that grain ships, at least in the Roman era, made the return voyage to the West by following a different course (Radan 1988, 75 and 77; Beebe 1983, 205).

This other west to east passage, taken by St. Paul (*Acts* 27) and Mark the Deacon (*Vita Porph.* 34) and various other travellers in antiquity, may have been more predictable and perhaps even shorter in time, if not in distance, under certain weather conditions. It poten-



Fig. 1

tially was safer, owing to diminished time on the open sea beyond easy sailing distance from land.

This route involved coasting from south to north along the eastern Mediterranean shore, taking advantage of the longshore current that parallels this littoral and the offshore and onshore winds of night and day that permitted sailing in dogleg fashion up the coast. At some point south of Antioch (unless that was a port of call), as the current turned east, so did the ancient mariners who then skirted Cape Andreas. After clearing this point, they were more likely to favour Anatolia's southern coast, which was richly endowed with natural harbours, than to scud along Cyprus's northern shore which offered only limited safe moorings. It was by such a route, for example, that the "Isis" reached the Anatolian littoral and the port city of Myra on the Lycian coast, after an abortive attempt at sailing north from Alexandria past the western coast of Cyprus (Casson 1950, 46).

Such were the usual patterns of sailing in the eastern Mediterranean and Cyprus's role in this scheme from the beginning of seafaring through late antiquity and beyond, although during extreme moments, such as famine or war, any variation from the norm was possible. Except in such times of dire exigencies, however, Paphos probably saw more merchantmen heading west to east and north to south. But the port's long distance maritime traffic was never exclusively in any one direction. Certainly the export of the agricultural and mineral products of Cyprus to the west probably was always by the most direct route, even if such traffic had to sail into unfavourable winds. Mariners leaving Paphos for points in Anatolia, the Aegean or farther west, may have had to wait in harbour until wind conditions, which, as any sailor knows, can be capricious and can deviate from normal pat-

terns at any time of the year, had temporarily shifted so the voyage at least began with a following wind (cf. *Acts* 28:13 where the captain of St. Paul's ship did just that at Rhegium). They may well have had to beat a north-northeast course, owing to the prevailing north-west winds, only to reach landfall in Asia Minor in Pamphylia far east of their ultimate destinations.

A Brief History of the Harbour of Paphos

The date of the earliest settlement of the Paphos promontory and the surrounding coastal area is still uncertain, but recent evidence suggests Bronze Age and possibly even Neolithic occupation (Nicolaou 1966, 562; Daszewski 1987, 171). Such an early date would not be inconsistent with traditional lore for the founding of Paphos. Agapenor, King of Tegea, supposedly founded the city and erected a temple at Palaepaphos, after storms had altered his travel plans to return home, following his service at Troy, and forced an unscheduled visit to Aphrodite's island. Recent scholarship, however, has offered a much later date for any substantial settlement at this site, sometime in the years immediately following the death of Alexander (323 B.C.). Nicocles, a local king, and not the heroic Greek marauder and pirate, now is seen as the city's founder (Nicolaou 1966, 564; Daszewski 1987, 171).

It is uncertain, however, if Nicocles undertook to enhance the site's natural roadstead by building two breakwaters from the shore to create and enclose a basin within the already protected bay. He may have, but the expenditure of money and energy necessary to augment what nature had already provided might have been daunting and beyond both his resources and ambitions. It might be that the construction of the artificial harbour, or its completion, may have had to wait until a change of political leaders (Daszewski 1987, 174).

Sometime after 312 B.C. Ptolemy became interested in the new city in western Cyprus and shortly thereafter took control of the port. His engineers most probably finished and expanded whatever Nicocles may have accomplished in the sea. The Egyptian king is the probable author of the ambitious building program that saw the completion of the construction of an artificial harbour with fortifications standing on the breakwaters, a *limen kleistos*. Such a facility would have assumed immediate and paramount significance in the Hellenistic world of the Eastern Mediterranean. The desirability of an all-weather and protected harbour installation in such a strategic location on the sea lanes to and from his kingdom would have enhanced his international position and fostered his aspirations in the tumultuous decades after Alexander's premature demise and the subsequent dismemberment of his empire by his successor (Hauben 1987, 214).

Not too much is known of the fate of Paphos in the maritime affairs of the ever changing arena of the Hellenistic world, where political boundaries and alliances shifted with bewildering frequency. Literary evidence is meager, and while archaeological data may await the marine archaeologist in the waters covering its harbours and anchorages, no underwater excavations have yet been undertaken to tap this potential archive.

It seems that after a flurry of importance in the early Hellenistic era, Paphos became less significant as a maritime centre in the subsequent geopolitical shifts of the Mediterranean world. In the second century B.C., however, this situation changed again. The polit-

ical capital of the island was transferred at that time from Salamis to Paphos. The former port's misfortune, the silting up of its harbour, inadvertently occasioned a new prominence for its rival on the southwestern coast.

Once Pompey had cleared the seas of pirates in 67 B.C. and brought the Seleucid Kingdom under Roman domination a few years later, Cyprus's importance in the Mediterranean diminished. Rome's strategic concerns were elsewhere, and the island could be easily taken for granted (Mitford 1980). It appears that it was. Although Paphos retained its role as a provincial capital after the Romans annexed the island in 58 B.C., in no other way was it destined to play any significant political role in the new world order that evolved following the battle of Actium in 31 B.C. and the end of Rome's civil wars.

Like Cyprus itself, this port city seems to have thrived economically, if not politically, under the benign neglect that characterized Roman imperial rule. The impressive terrestrial excavations provide ample testimony to the wealth of Paphos during the quiescent, prosperous centuries of Roman control (Maier and Karageorghis 1984).

But little is known of the fate of the harbour installations during Roman times. Strabo confirmed their continuing existence in the first century B.C. (14.6.3) The anonymous *Stadiasmos* or *Periplus Maris Magni* (297), the date of which is unclear with estimates running from the late Republic through the fourth century A.D., designated Paphos as having "a triple harbour safe in all winds", which probably meant that the enclosed basin was an all-weather facility that was divided into three distinct anchorages, each with its own function. An international emporium, a facility for local trade, and a shipyard are three possibilities for the individual components of the Roman harbour, although this assignment is speculative at this time (*contra* Daszewski 1981, 333-34 who suggested a military harbour as one of the three basins, an unlikely possibility in the Roman Empire).

Dio Cassius spoke of an earthquake that devastated the city in 15 B.C., occasioning relief efforts from Augustus himself that surely would have included repairs to any damage the harbour may have suffered (54.23.7-8). Orosius recorded another tectonic destruction of the city in A.D. 77 (7.9.11). It too may have had some impact on the maritime facilities. Much later in time, St. Jerome noted around A.D. 390 that the city was in a ruinous state (*Vita S. Hilarionis*, 42 = *PL*, col. 52). Again his reference is not specific to the harbour installations, but one can safely assume that they had been diminished by the same neglect or natural damage the port itself had suffered. In particular, these marine facilities would have been most vulnerable to the series of earthquakes that struck western Cyprus in that century along with any accompanying tsunamis (Soren 1981, 123; Soren and Lane 1981, 181; Jensen 1985, 307; Soren *et al.* 1988). Perhaps the subsidence of the ancient breakwaters occurred then, if they had not fallen from service earlier.

It seems likely that the damage wrought by these tectonic paroxysms contributed to the transfer of the mantle of provincial leadership from Paphos back to Salamis in the same century (Mitford 1980, 1321 and 1376; Jensen 1985, 307, n.5). With this loss of status, and the economic ramifications it may have had, one era had ended for Nicocles's city and another one had begun.

Early Harbour Explorations and Visitations

Many, who visited Paphos over the centuries and recorded their impressions, made general observations about the harbour, although no one has left a detailed statement about

its configuration or the nature of the early facilities. Visitors from the Middle Ages or early modern era, including Oliverus Scholasticus, Ludolph von Suchen, Felix Faber, Pero Tafur, Affagart, Drummond, Ascanio Savorgnano, Pococke, Ali Bey, Le Saige, Bruyn, and others, consistently spoke of the ruinous state of the harbour and the silting up of the basin, along with its bad air from the marshes that existed within the confines of the larger ancient installation (Leonard and Hohlfelder 1994, 368-70). All these elements had made Paphos an unsafe or undesirable anchorage for anything but the smallest boats.

Accounts in the 19th and 20th centuries are a bit more useful, but only slightly. Turner, visiting in 1815, remarked on columns in the water. Jeffrey in 1918 commented on the ruined state of a harbour that had not been repaired for centuries. He also noted that dredging had begun in 1910 to address the problem of silting (Leonard and Hohlfelder 1994, 370). Hogarth, who visited Paphos in 1888, provided the first account that one might call archaeological in its bent. He observed:

Within the city the most interesting remains are those of the northern breakwater formed like the (city) wall of a rough cemented core, and faced with massive blocks clamped together with metal. This is probably of early origin, for the existence of such a work must have been essential at all times to the security of the harbour; at its base stands a castle which appears to be of Turkish construction. The harbour itself is spacious and sheltered, and much frequented by small craft at this day; it is however, only shallow, and being bottomed with solid rock, cannot be readily improved (Hogarth 1889, 7).

More recently, Nicolaou, Maier, Megaw, Michaelides, and Karageorghis have added important observations and evidence for our understanding of the Paphos harbour complex which can only be noted here (for details see Hohlfelder and Leonard 1993, 49-50).

But for the study of the submerged structures of the ancient installations, there are two works that deserve particular mention. One, a report by an amateur group of British military divers and sappers, was colourfully called "Operation Aphrodite". This training exercise with an archaeological focus was conducted in 1959 and 1961. It recovered numerous artifacts from the harbour and the waters of the surrounding coastlines, including a charming little marble Aphrodite now in the Paphos Museum.

Although "Operation Aphrodite" never was published, it is available at the Department of Antiquities and has been consulted and cited by various scholars, travel guidebook writers, and popular historians. This survey may be the source of the claim that a c. 4km. ancient seawall or breakwater extends from the Paphos harbour to the off-shore islets known as the *Moulia* Rocks.

This breakwater, which arguably would have been the longest one known from antiquity and as such might have been worthy of mention, received no notice in any extant ancient literary source. For good reason, for it did not exist. Efforts by our team to find traces of it have so far failed. Nor has the staff of the local dive shop in Paphos, CyDive, which served as our logistical base during our survey, ever seen anything that might fit such a description, although they dive daily in these waters. A misreading of aerial photographs, an ignorance of how beachrock can fracture in what appears to be almost manmade rectangular shapes, and an overzealousness might account for the fabrication of what would have been an "engineering wonder of the ancient world", had it ever been built. It remains very difficult in any science to prove a negative, in this case a nonexistent c. 4km. break-

water, but it is our hope that perhaps with a concerted and continuing effort, this myth may be exposed and exorcised from local tourist publications, where it still appears (Keshishian 1961).

A much more serious effort, and one that forever will be the archaeological *editio princeps* for scholars who study the harbour installations of Paphos, was published by Professor Daszewski in 1981, based on research done in 1965 before the modern harbour had undergone extensive renovations (Daszewski 1981). So much more was visible then, particularly on the western breakwater, that his observations are invaluable. Although his report appeared without maps or photographs, it remains the seminal study on the ancient port.

The 1991-1992 Survey of the Submerged Structures

In May, 1991 and October, 1992, a small team of marine archaeologists, divers, and architects from the United States, Britain, and Cyprus undertook a survey of the submerged ancient structures in the harbour of Paphos (Hohlfelder 1992; Hohlfelder and Leonard 1993; Leonard and Hohlfelder 1994). Their goal was to record extant remains and to identify locations where underwater excavations might yield valuable information about the maritime life and activities of this important emporium of antiquity. This exploration, conducted under the aegis of the Department of Antiquities of the Republic of Cyprus and the Cyprus American Archaeological Research Institute, continued and expanded previous investigations conducted by the British military divers between 1959 and 1961 and by Professor W. A. Daszewski in 1965 and later.

A harbour, then or now, always reflects and manifests the needs of the society that builds it. Consequently, the face of the original Paphian maritime facility changed over time, both to accommodate different Roman and Byzantine interests and in response to the sea's relentless assault on any and all manmade coastal structures. Today, only traces of the various incarnations of the ancient harbour survive beneath the sea. These remains were the focus of our attention.

The western breakwater is now completely obscured by a modern quay constructed on its remains, one that reached its present configuration in the 1980s (Fig. 2). Far less of this ancient structure is visible today than was the case in 1965. Then, the modern breakwater was much narrower than it is now, perhaps no wider than the ancient structure had been, c. 10-15m. according to Daszewski's estimate. It was surmounted by a modern seawall of c. 4.5m., which he surmised might have approximated the height of the original Hellenistic one (Daszewski 1981, 330). He estimated the length of this structure to have been either 210m. or 235m., but noted its original length in antiquity might have been as great as 270-280m., if a secondary spur wall, that ran south from the axis of the main breakwater for a distance of 50 or 70m., was included in the total (cf. Daszewski 1966, 330 and Daszewski 1987, 174 n. 39).

There is no way today to confirm his figures, for the new breakwater and quay cover what he saw. His estimates of the width of the mole, 10-15m. in his 1981 report or 5-15m. in his 1987 article, are a bit less than the actual width (c. 20-25m.) of the submerged section of the other breakwater, the tip or *terminus* of the eastern one (see Figs 3 and 4), but this difference is not significant (cf. Daszewski 1981, 330 and 1987, 174 n. 39). Regardless



Fig. 2

of which of his estimates was closer to its actual size, the structure would have been extremely narrow for a primary breakwater exposed to the brunt of heavy storm seas. It would not easily have spoiled or baffled incoming waves or contributed much to an anchorage reputed to be "safe in all winds".

The modern one, on the other hand, is much wider (c. 50m. although its configuration is irregular) and has a dedicated exterior component of rubble c. 22-24m. in width (see Fig. 2). It is sufficiently wide to dissipate storm surge and wave attack and to safeguard the boats in today's harbour without the benefit of a seawall, which was removed when the rubble berm was put into place. The rocks of this sloping face are still in movement, shifting in storm seas until they find a snug fit with one another. The pockets that are naturally formed between the rocks also dissipate the energy of incoming waves. In short, the present breakwater incorporates the best technology of today to address the challenges posed by the sea.

While such technical knowledge may not have been available to Nicocles's or Ptolemy's builders, it was to the Roman engineers who followed. In particular, those engineers who might have been called upon to repair any earthquake damage following the 15 B.C. or A.D. 77 disasters would have had access to a very sophisticated tradition of harbour construction, as we now know from the remarkable revelations from the Caesarea Maritima underwater excavations in Israel, currently directed by Avner Raban (Raban 1989).

It seems likely that the narrow breakwater remains that Daszewski observed dated back to the original Hellenistic harbour. If so, as he has accurately noted, there would have had to have been a high seawall at least equal to the one that existed in 1965 (c. 4.5m.) to pre-

vent waves from overtopping the breakwater and rendering the enclosed basin unsafe. It might have taken even a taller one to accomplish this task.

In the Paphos Museum is a fragment of a stone relief that was found locally. It depicts a water deity who sits before a seven-course wall with crenellations (Michaelides, however, claims the structure is a fountain-oral communication). It is possible, but not certain, that the wall seen here was the ancient city wall and/or its extension onto the breakwater, where it served both as a fortification and the second line of defense against incoming waves.

Whether or not this representation depicts the actual city wall on the western breakwater, such an installation did exist in antiquity, and perhaps traces of it still remain on the modern western breakwater. Ancient *spolia* are now built into the Medieval Castle and the so-called Frankish Fort, both of which still stand on the modern breakwater (see Fig. 3 and 8). The largest stones in both structures (c. 2.5×1×.08m.) probably were not moved far before their reuse. If they were found on the breakwater itself, or were still *in situ* when both later structures were erected, they could easily have been from the ancient wall that surmounted the original breakwater.

A fortification wall that also served as seawall that was composed of seven courses of these stones (per the representation) would have been c. 5.8m. high, taller than the modern counterpart that Daszewski noted in his 1981 report (4.5m.). Of course, even more courses would have enhanced its defensive capabilities against both human attackers and storm seas. Given the narrowness of the ancient breakwater and the force of winter storms, it is indeed likely that c. 5.8m. might well have been the minimum height of this installation.

The spur Daszewski mentioned is now largely obliterated by the rubble exterior face of the modern breakwater, although portions of it are still visible underwater (see Fig. 3; Daszewski 1981, 331; 1987, 174 n. 39). Its role in the harbour design is unclear. Its positioning, adjacent to the ancient harbour mouth (to be discussed below), suggests it may have been a wave and current deflector, intended to provide additional protection to the harbour entrance (Daszewski 1966, 331). It could have been an original element of the Hellenistic harbour, but it seems even more likely that it represented a repair or modification from a later date, perhaps after one of the earthquakes dating from the Roman occupation. We know from evidence from other Roman harbour sites that the master builders of that age took various steps to protect entrance channels from currents and waves (Oleson and Branton 1992, 56). Perhaps this is one more example of their experiments.

Daszewski did not mention the remains of a submerged building at the *terminus* of the ancient western breakwater which this survey discovered (see Figs 3 and 6). It marks what may have been the ancient harbour mouth which was not in the same position as the modern entrance channel. (Today's channel was actually dredged through sections of the ancient eastern breakwater). All that remains today of this structure is a considerable mound of unarticulated large blocks which, by their size and position adjacent to the entrance, suggest a fortification tower.

A companion tower may well have stood on the other side of the harbour entrance c. 41.4m. away at the seaward end of the submerged portion of the other breakwater, at that structure's widest point, c. 25.0m. (cf. an earlier estimate of the harbour entrance, c. 52-

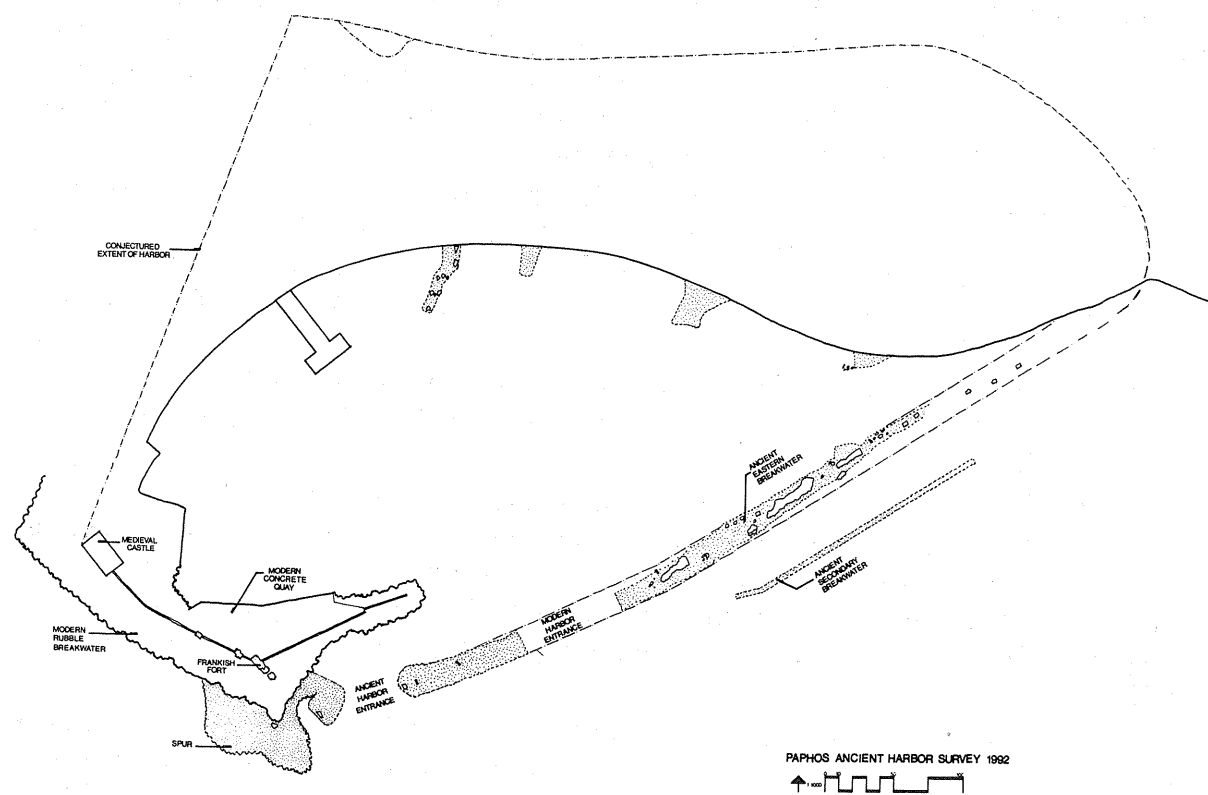


Fig. 3

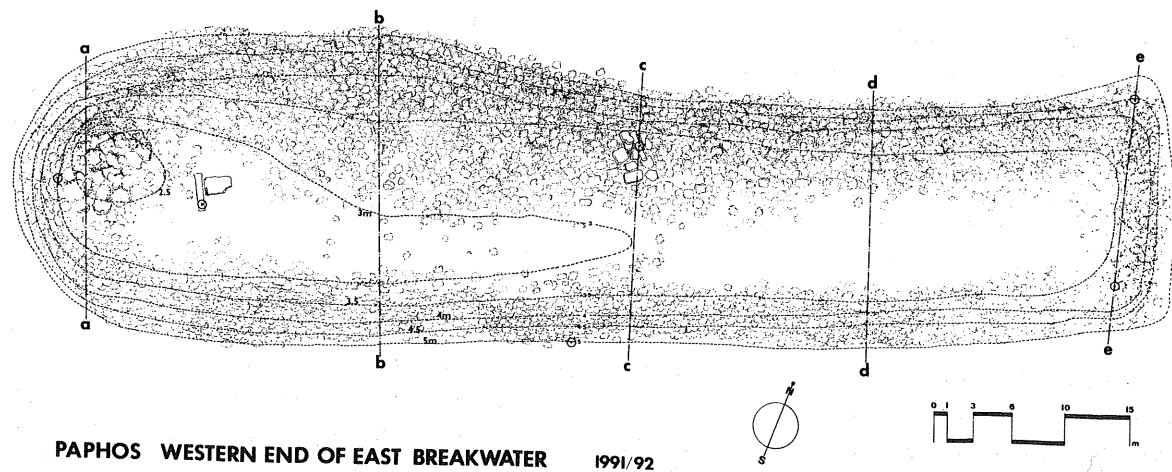


Fig. 4

55m. in Hohlfelder 1992, 255; Figs 3 and 4). The greater breakwater width at this particular location might be explained by the presence of some installation that might have stood there in antiquity. Large blocks and other architectural elements, like columns, dot this area, further supporting the conjecture of the former existence of some building. When all factors are considered, a tower is a most likely possibility.

Both of the proposed towers not only guarded the harbour entrance but also most likely stood at the end of the city's fortification walls that extended out from land. A chain or a boom could have been raised or lowered into position between them to close the harbour during times of danger. The security afforded by a *limen kleistos* would have been absolutely necessary in the troubled times in which the harbour was first constructed, although the need to maintain elaborate defensive systems would have evaporated with the coming of the Roman Empire and following the Augustan repairs to the port and its harbour in 15 B.C.

In addition to their defensive roles, both buildings might have had other functions as well, perhaps housing some administrative officials charged with fee collections or harbour tolls. And, since both would have been fairly large structures, they would have been easily recognizable landmarks for incoming ships, although neither submerged site contains the volume of rubble or is large enough to suggest that one of the towers itself doubled as a light house.

But both would have been excellent navigational aids. A captain rounding the Paphos headland could have sailed to a point where the towers were in line with whatever ancient public building stood on the Pharos Hill, either a temple or a lighthouse, and waited for a south or southeast wind, likely in the late afternoon at Paphos in the summer months. Even with a following wind driving his ship toward the entrance channel, it is not likely that he would routinely have sailed directly into any harbour with such a narrow mouth, although most captains would have had the necessary seamanship required to accomplish such a task if called upon. It simply was more normal for an incoming ship to drop its sails outside, but near, the entrance and wait for tugs, powered by oarsmen, or stevedores on the breakwaters to pull it into a berth. Smaller coastal craft, like the Kyrenia ship, could also have made the final portion of the journey under their own oar power.

The rest of the submerged portion of the eastern breakwater, *c.* 94m. in length, does not contain any other visible evidence of any other ancient structures beyond another small concentration of blocks and building elements about midway along its inner face (Figs 3 and 4). It seems likely that most of the cut blocks that may once have stood here, for example as elements of the original city wall, were removed at some point in the past. Ruined structures on breakwaters have always made readily accessible "quarries" for retrieving cut stones. They could be lifted easily from such a place and loaded onto barges for transport and reuse elsewhere.

It is also worth noting the depths of water covering the submerged section of the ancient eastern breakwater, for they provide some clue as to the degree of subsidence since the structure fell out of service. As one moves shoreward from the *terminus*, where the tower may have stood, the depth of water increases from *c.* 2m. to *c.* 4m. (Fig. 5). Perhaps the actual slumping of the structures falls within these brackets, although it is too early to say with certainty.

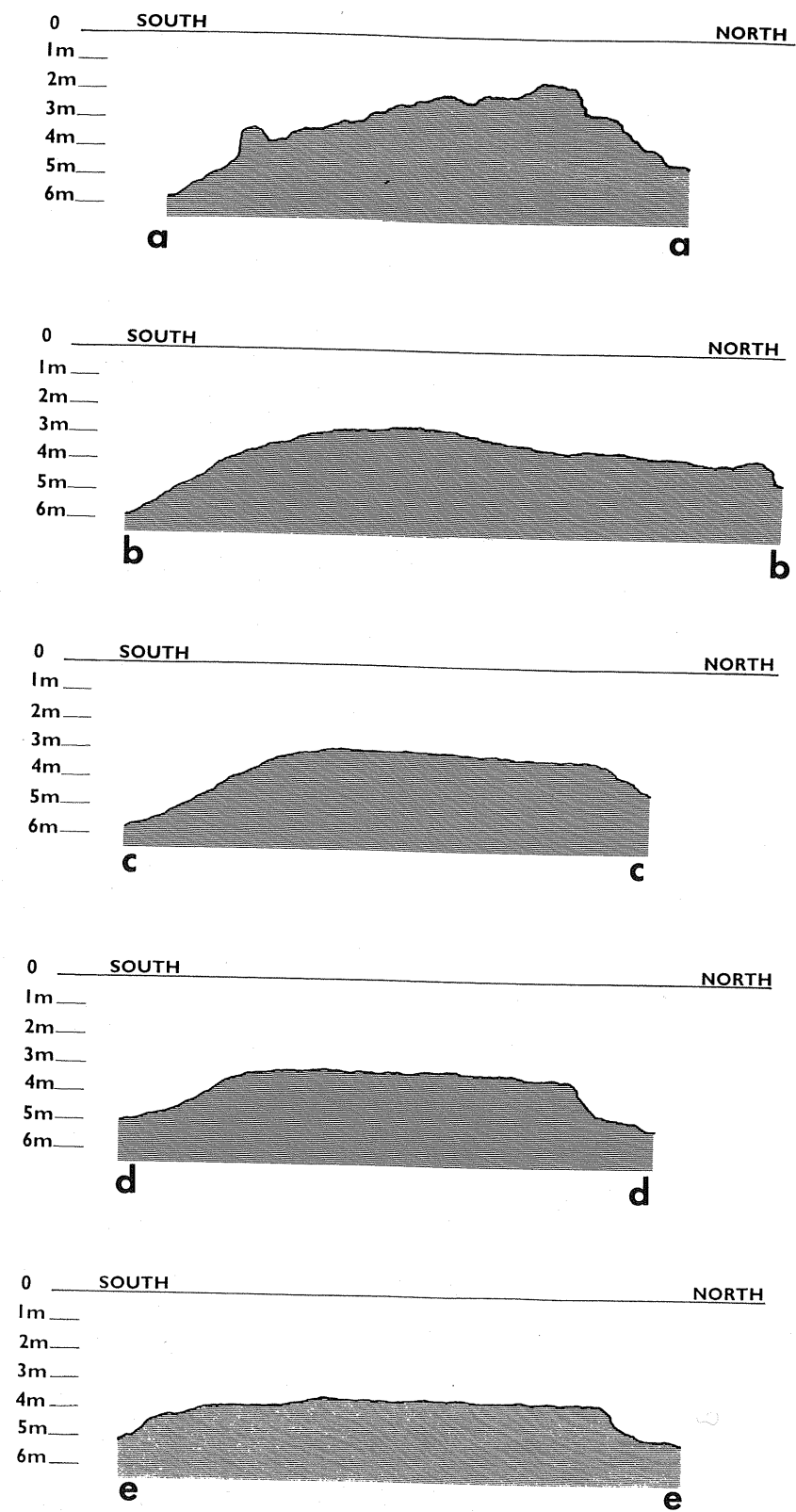


Fig. 5

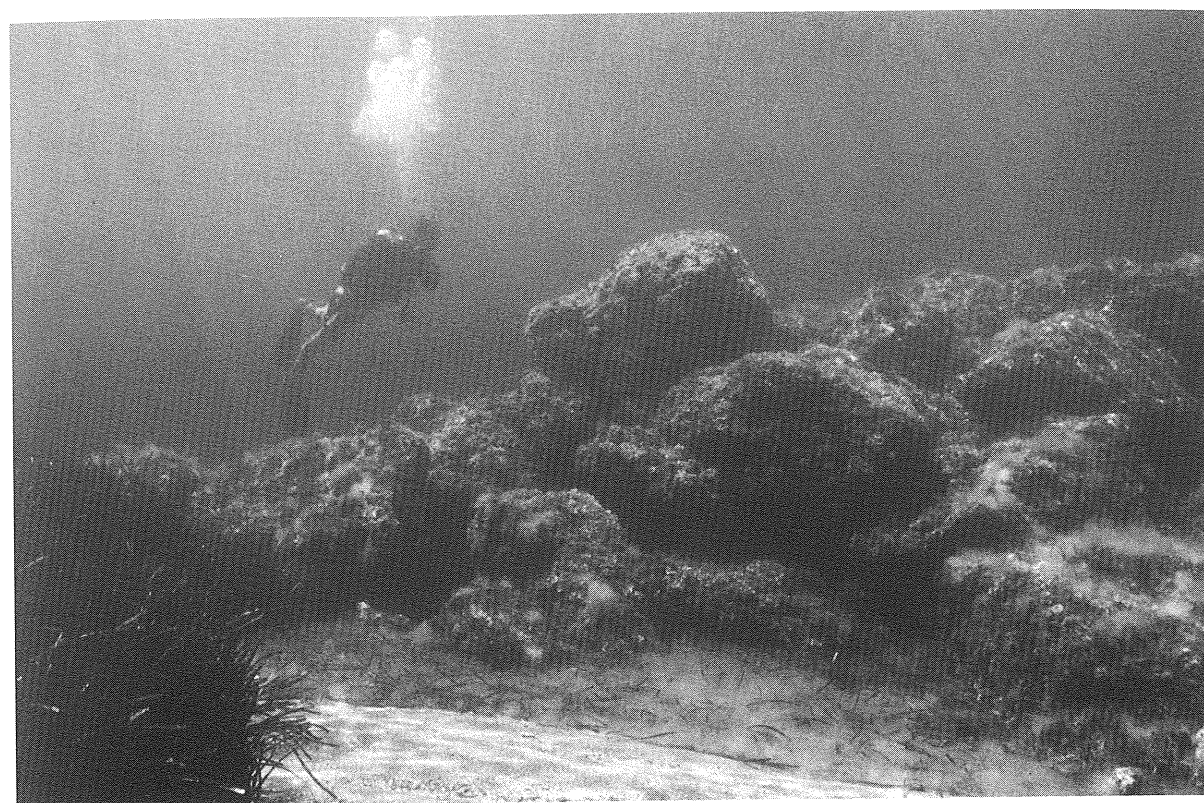


Fig. 6

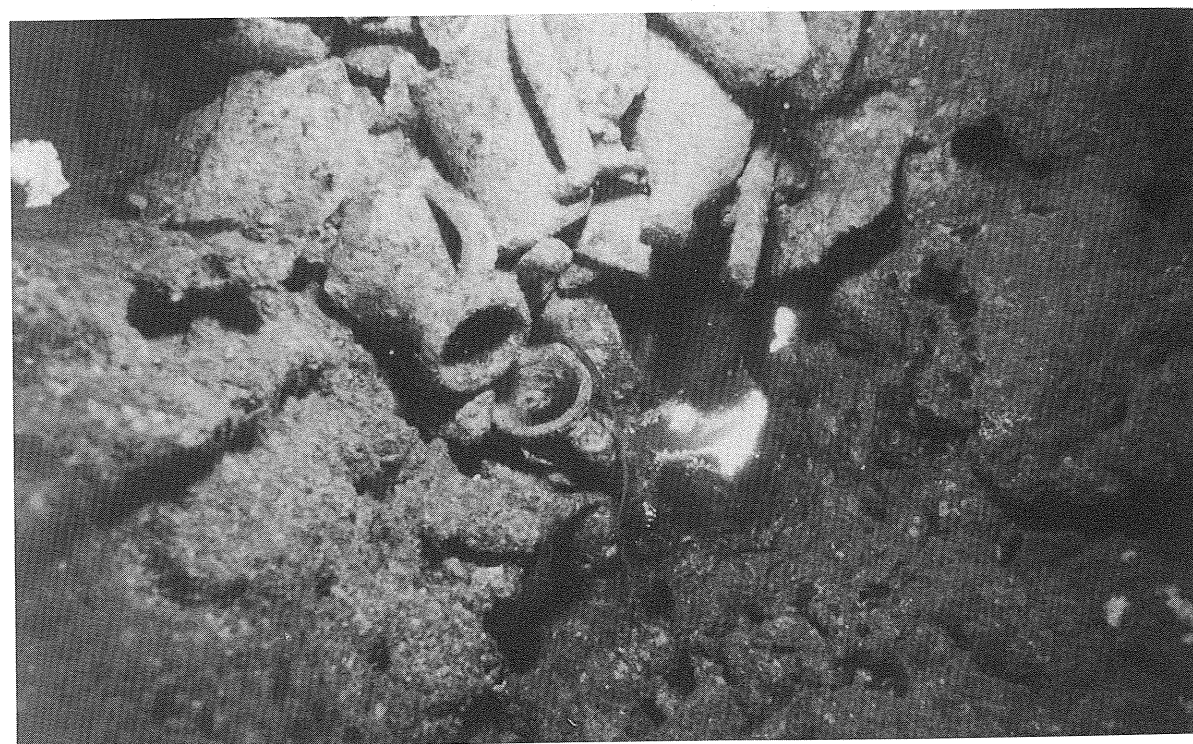


Fig. 7



Fig. 8

A simple visual observation of this underwater section did not and cannot provide an explanation for why this submergence occurred. The ancient structure may now be below the sea because of tectonic activity, liquefaction of the underlying sediments over the centuries, or a combination of the two. Only excavations and geological surveys may be able to answer this important question.

Including this submerged section of the eastern breakwater, our total estimate of its length from shore (although the precise location of the Hellenistic shoreline is far from certain) is c. 600m., considerably longer than all previous estimates which may not have included the segment underwater (cf. Daszewski 1981, 330). The long portion of the breakwater that is awash or above water is a confusing array of tumbled blocks and stones. Some of them may have been placed in antiquity, while others provided testimony to more recent efforts to renovate what is now a very battered and almost useless structure. Blocks, possibly from its Hellenistic origins, are still visible on the inner face; another small section of blocks, including a stretcher, has been found on the outer side of the breakwater. There also are segments of concreted rubble visible scattered along the course of the structure. One here is reminded of Hogarth's report on the visible ancient city wall late in the 19th century, although no blocks with clamp indentations have yet been seen. Perhaps traces of a similar construction existed at one time on this breakwater, not an unlikely possibility if the original harbour had been a *limen kleistos*.

Seaward of the eastern breakwater is another submerged wall running for a distance of c. 199m., paralleling the axis of the main one except for a slight jog to the southwest at its

terminus (see Fig. 3). Its average width is no greater than 5m., and it is composed of blocks that average 1.0-2.7×0.9-1.4×0.7-1.0m. in size. The irregular top surface of this structure is c. 4.0m. below msl. As in the case of the submerged *terminus* of the main eastern breakwater, this depth may represent the total subsidence of this mole since antiquity.

It was clearly an auxiliary construction, built after the main breakwater was in place and intended to correct some deficiency in the original one. Its position suggests it might have been added during some repair effort, perhaps to shield a series of channels cut through the massif of the main breakwater in an effort to address the persistent problem of the silting of the basin. Scouring channels might have been added to allow current to exit the harbour without deposition of sand and silt. If so, it might have been intended to provide protection for these channels from south-southeast storms. It may well have accomplished this task without ever breaching the surface. Definitive answers on its date, function and position relative to ancient sea level, however, must await excavation at some future date.

Agenda

This survey of the submerged structures of the Paphos harbour has yielded some valuable information to be added to the data from previous investigations and observations. What is now necessary is a programme of underwater excavations at select locations abutting the submerged structures:

1. near the proposed towers at the *termini* of both breakwaters.
2. across the submerged mound of the eastern breakwater.
3. at several points along both faces of the eastern breakwater.
4. at several points along the subsidiary breakwater.
5. in the suspected breach channels in the eastern breakwater.

Data from these probes would be invaluable in attempting to better understand the history and life of the ancient harbour of Paphos. In addition, additional work needs to be done on land to compliment studies already conducted by Professor Michaelides at various points along the inner seawall of the ancient harbour complex (Fig. 3). The wall should be accurately traced in so far as is now possible, and additional sondages are necessary along its face to recover a better chronology of its use and reuse over the long history of the port. A ground-penetrating radar survey of the silted ancient harbour basin for traces of ancient structures, particularly any ancient jetties or quays that may have divided the basin into the three components mentioned in the *Stadiasmos*, should be undertaken as well. A complete geological survey of the land features of the harbour installations and the submerged structures as well should be undertaken to address the issue of when and how subsidence occurred and when the harbour fell from use.

The bay northwest of the site, marked now by several shoals littered with pottery from ancient shipwrecks, and the whole region of the *Moulia* Rocks, where other large concentrations of pottery signal another location where ancient ships foundered, should be examined carefully (see Fig. 7). While it is unlikely that any traces of hulls will be uncovered, some statistical sampling of the pottery finds in both areas could be very informative.

This agenda is a full one, but it should be undertaken in the near future, before the rapid development of the Paphos area overtakes a unique window to the ancient past. This ancient port served, as it was, as one of the major *emporía* and transit points in the eastern Mediterranean for centuries. A fuller disclosure of its maritime past, a story which is still largely untold, will enrich not only the history of Cyprus but also that of the entire Mediterranean world. It is a task worth undertaking.

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Η ΑΡΧΑΙΑ ΠΑΦΟΣ ΚΑΤΩ ΑΠΟ ΤΗ ΘΑΛΑΣΣΑ:
ΕΠΙΣΚΟΠΗΣΗ ΤΩΝ ΒΥΘΙΣΜΕΝΩΝ ΚΑΤΑΣΚΕΥΩΝ

(Περίληψη)

Το Μάιο του 1991 και τον Οκτώβριο του 1992 μια μικρή ομάδα από αρχαιολόγους, δύτες και αρχιτέκτονες από τις Ηνωμένες Πολιτείες, τη Βρετανία και την Κύπρο, ανέλαβαν μια επισκόπηση των βυθισμένων αρχαίων κατασκευών στο λιμάνι της Πάφου. Στόχος τους ήταν να καταγράψουν τα σωζόμενα υπολείμματα και να προσδιορίσουν θέσεις, όπου υποβρύχιες ανασκαφές θα μπορούσαν να αποδώσουν πολύτιμες πληροφορίες για τη ναυτιλιακή ζωή και τις δραστηριότητες αυτού του σημαντικού κέντρου εμπορίου της Αρχαιότητας. Αυτή η εξερεύνηση, που έγινε κάτω από την αιγίδα του Τμήματος Αρχαιοτήτων της Κυπριακής Δημοκρατίας και του Αμερικανικού Ινστιτούτου Κυπριακών Αρχαιολογικών Ερευνών, διεύρυνε τις προηγούμενες έρευνες που έγιναν από μια ερασιτεχνική ομάδα Βρεττανών δυτών του στρατού, μεταξύ του 1959 και του 1961, και από τον καθηγητή W.A. Daszewski το 1965*.

Το αρχαίο λιμενικό συγκρότημα, όπως το αντίστοιχο σύγχρονό του, βρισκόταν στην υπήνεμη πλευρά του ακρωτηρίου της Πάφου, μια προέκταση δηλ. της ξηράς η οποία δημιουργούσε ένα μεγάλο φυσικό αγκυροβόλιο που έλκυε πάντα την προσοχή των ναυτικών. Προς το τέλος του 4ου αι. π.Χ. κατασκευάστηκαν από μηχανικούς της εποχής δύο κυματοθραύστες από την ακτή για να ορίσουν και να περικλείσουν μια λεκάνη μέσα στον ήδη προστατευόμενο κόλπο. Με αυτές τις κατασκευές, ένας ανοιχτός όρμος ακαθόριστης παλαιότητας, έγινε λιμάνι κατάλληλο για όλες τις καιρικές συνθήκες, το οποίο απέκτησε άμεση γεωπολιτική σπουδαιότητα στον ελληνιστικό κόσμο της Ανατολικής Μεσογείου.

Ένα λιμάνι τότε ή τώρα, πάντοτε φανερώνει τις ανάγκες της κοινωνίας που το κατασκεύασε. Συνεπώς, η όψη των αρχικών λιμενικών διευκολύνσεων της Πάφου άλλαξε με την πάροδο του χρόνου για να εξυπηρετήσει διαφορετικά ρωμαϊκά και βυζαντινά συμφέροντα και να αντιμετωπίσει την αμείλικτη επίθεση της θάλασσας ενάντια στις ανθρώπινες παράκτιες κατασκευές. Σήμερα, μόνο ίχνη από τις ποικίλες κατασκευές του αρχαίου λιμανιού διατηρούνται κάτω από τη θάλασσα.

Ο δυτικός κυματοθραύστης κρύβεται σχεδόν ολοκληρωτικά κάτω από το σύγχρονο μόλο, ο οποίος κατασκευάστηκε πάνω στα ερείπιά του. Πολύ μικρότερο τμήμα της αρχαίας κατασκευής είναι ορατό σήμερα από ό,τι ήταν το 1965, όταν έγινε η επισκόπηση από τον καθηγητή Daszewski. Τα πιο σπουδαία και αξιοπρόσεκτα ερείπια, που είναι ακόμα ορατά κάτω από τη θάλασσα στην εγγύς περιοχή, είναι: τα ερείπια ενός πιθανού αντερείσματος που εξέτρεπε τα ρεύματα ή τα κύματα που ξεχείλιζαν νότια από τον κύριο κυματοθραύστη· τα ερείπια ενός πύργου-φυλακίου που γειτνίαζε και όριζε το στόμιο του λιμανιού· και ένα βυθισμένο τμήμα του ανατολικού κυματοθραύστη, που διακρίνεται από ένα πύργο στο άκρο του προς τη θάλασσα, ο οποίος σχεδιάστηκε για να ελέγχει την πρόσβαση στην κλειστή

* Τα αποτελέσματα της Βρετανικής στρατιωτικής επισκόπησης, που χαρακτηριστικά ονομάζεται «Επιχείρηση Αφροδίτη», ποτέ δε δημοσιεύτηκαν. Η μελέτη του καθηγητή Daszewski εμφανίστηκε πολλά χρόνια μετά από την επί τόπου εργασία, αλλά δυστυχώς χωρίς λεπτομερή σχέδια ή φωτογραφίες. Βλέπε "Port glowny i przystanie pomocnicze w Nea Paphos w swietle obserwacji podwodnej. (Το κύριο λιμάνι και βοηθητικά αγκυροβόλια της Νέας Πάφου υπό το φως υποβρυχίων παρατηρήσεων)", *Meander* 6 (1981), 327-36. Δύο άρθρα του συγγραφέα και του John R. Leonard, ο οποίος υπηρέτησε ως συνδιευθυντής κατά τις περιόδους εργασίας 1991 και 1992, είναι υπό εκτύπωση στο *RDAC* και στην Επετηρίδα της Αμερικανικής Σχολής Ανατολικών Ερευνών.