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PAPHOS HARBOUR, PAST AND PRESENT: THE 1991–1992 UNDERWATER SURVEY

(PLATES XCVIII-C)

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The ancient port city of Nea Paphos has been recognized since at least the Middle Ages as an historically important site on the southern coast of Cyprus. Mediaeval travellers stopping at "Baffo" wrote of scattered columns and crumbling breakwaters. Antiquarians of the nineteenth century, observing the ruins more closely, recorded specific details of ancient construction. In the 1950s and 1960s, modern archaeologists laid out their first trenches, and the full scope of the ancient site began to be realized.

Since then, however, most scholarly attention has focused upon the city site itself, while the adjacent harbour has received only brief comment. Portions of the ancient breakwaters were examined in 1965 by Daszewski, but results of this landmark initial study were not published until 1981, and then in Polish. Though largely submerged, the harbour's remains represent a major portion of the ancient site of Nea Paphos. The circuitous walls of the Hellenistic city once surrounded perhaps both city and harbour alike, with fortified breakwaters enclosing a *limen kleistos*. The mouth of this "closed harbour", flanked by towers, would have served as another of the city's defensible portals.

An impressively constructed city, Nea Paphos continued to flourish in Roman times, for Strabo remarked on its harbor and well-built temples.[1] Over the centuries, however, affected by earthquakes and lack of maintenance, the once-monumental port city fell into ruin. Today, with the onset of modern development, various precincts of the ancient city have suffered increasing commercial pressure, despite efforts by the Governmnt of Cyprus to protect and preserve the site. Recently, as development in Kato Paphos has intensified, the ancient harbour, too, has been targeted for modernization. An underwater survey was therefore undertaken in 1991 and 1992, with the dual intention of producing the first archaeological map of the ancient harbour, and perhaps of being able to assist authorities in identifying and preserving important remains.[2]

Topography and early History

The ancient city of Nea Paphos, founded approximately 16 kilometers west of Palaipaphos, covered an area of more than 90 ha of relatively flat terrain that rises gradually from the coast.[3] (Fig. 1) Two natural prominences overlook the site, located in the city's northwestern and northeastern

1. 14.6.3. See below.

2. Sponsors of the survey included the National Geographic Society, Leika Ltd., and the University of Colorado, Boulder, all of whose generous support the authors would gratefully like to aknowledge. We would further like to express our gratitude to Mr A. Papageorghiou and Mr M. Loulloupis, former Directors of the Department of Antiquities of Cyprus for their initial approval of the project, and to present Director Dr D. Christou, who has kindly ensured its continuance. Numerous other individuals have also assisted the project, to all of whom the authors would like to extend their heartfelt thanks, particularly Dr D. Michaelides, of the University of Cyprus, for generously sharing his notes from as yet unpublished excavations; Mr J. Bayada, Director of Cyprus Ports Authority, for his interest in ancient harbours and information on upcoming harbour renovations; Dr S. Swiny, Director of the Cyprus American Archaeological Research Institute, for his constant support and valued advice; Mr S. Breitstein, of the University of Haifa, who prepared the jetprobing device; Dr T. Maslowski, of the University of Colorado, Boulder, and Ms E. Niesytto, of the University of Texas, Austin, translators of Prof. Daszweski's 1981 report; and finally Mr A.H.S. Megaw, who so kindly welcomed us to archaeology in Paphos. In Paphos itself, we would like to extend our sincere gratitude to the Harbour Police and Mr T. Herodotou, of the Paphos District Museum, for their continued assistance, and to Ms C. Dobbins and her staff at Cydive Ltd., who deserve special recognition and thanks for having provided an efficient base of operations and enthusiastic support at every turn. Members of the survey team, in addition to the authors, included Mr C. Brandon and Ms K.H. Barth (architects), Ms M. Nemechek and Mr T. Thomas (student archaeologists), Mr and Mrs Harry and Helen Wadsworth (underwater photographers), Mr N. Demetriou (archaeological diver, representative of Department of Antiquities) and Mr A. Sacorafos (volunteer diver). To this dedicated team the authors would like to express their deepest appreciation for their tireless effort and constant good spirits, even in the face of Poseidon's occassionl ill-temper. For results of the initial 1991 survey season, cf. R.L. Hohlfelder, J.R. Leonard, "Underwater Explorations at Paphos, Cyprus: The 1991 Preliminary Survey" *ASOR Annual* 51 (1993), 45-62.

3. W.A. Daszewski, "Nicocles and Ptolemy — Remarks on the Early History of Nea Paphos", *RDAC* 1987, 174; compare K. Nicolaou, "Topography of Nea Paphos", *Melanges offerts à Kazimierz Michalowski*, (1966), 567 who estimates the area at 95ha.

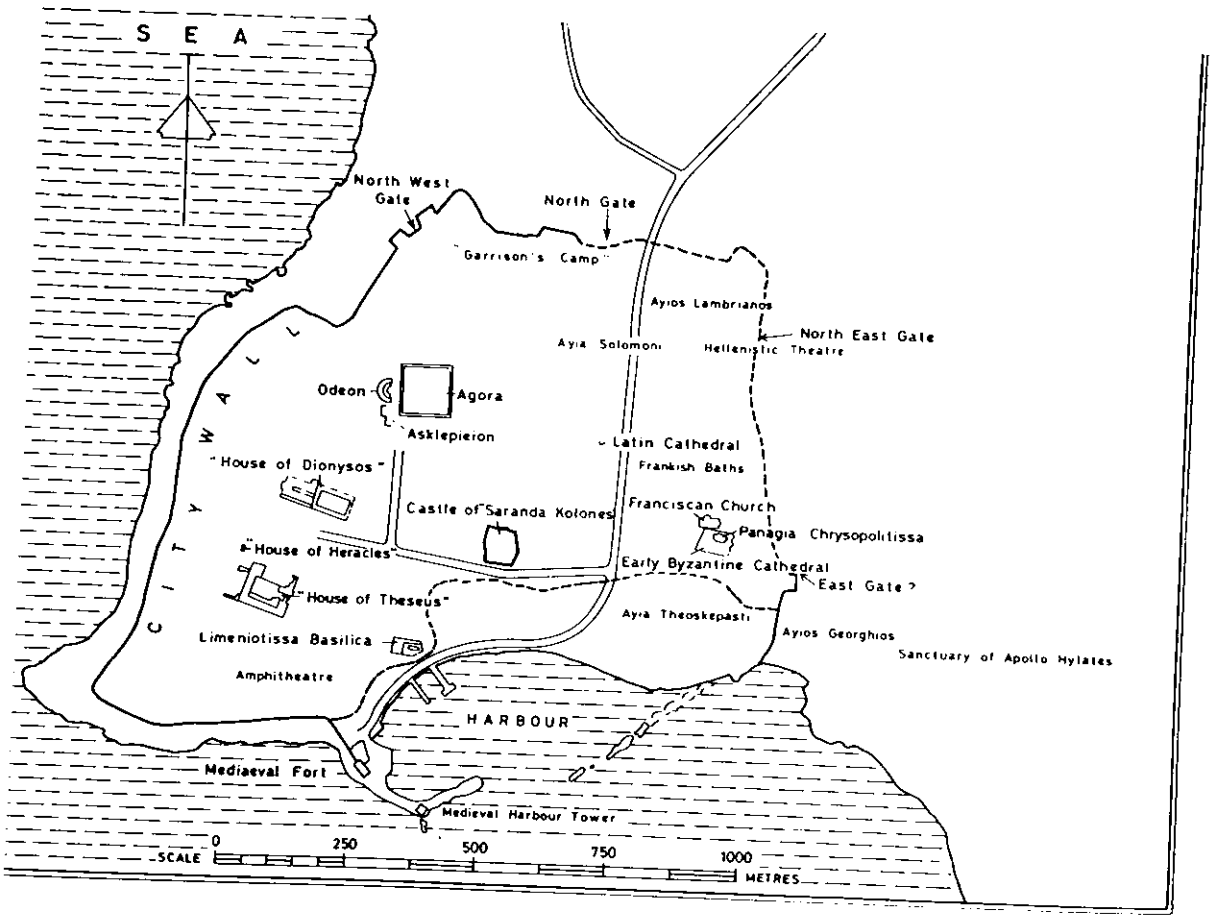

Fig. 1. Map, Nea Paphos. (Reproduced by permission of the Department of Antiquities of Cyprus).

precincts: the Pharos hill, or *Phanari,* where the modern lighthouse stands today, and the *Fabrica* hill. The topographical feature of greatest significance for the city's maritime history is the southwestern promontory that through the centuries has provided a roadstead in its lee. In antiquity, the two distinct hills, along with any structures erected upon them,[4] would have served as landmarks for ancient mariners approaching the sheltered anchorage.[5]

When the anchorage first was used may never be known, but the presence of a safe mooring and plentiful natural resources, such as copper and timber,[6] probably attracted mariners in the eastern Mediterranean from earliest times. Evidence for prehistoric settlement, including possible Neolithic and later Mycenaean material,[7] has been found in the general area of the site. More recently, Daszewski has reported flint blades within Nea Paphos itself near bedrock in the lowest level beneath the House of Theseus.[8] Further excavation of possible prehistoric levels is necessary, though, before it can be determined positively that the area of later Nea Paphos was occupied before at least the Cypro–Archaic period, for which definitive evidence has

4. Cf. J. Mlynarczyk's discussion of the possible location of the Hellenistic temple of Aphrodite Paphia upon one of these two hills: "Remarks on the Temple of Aphrodite Paphia in Nea Paphos in the Hellenistic Period", *RDAC* 1985, 286–92.
5. Modern structures upon the city's hills are used in the same way; cf. P.J.B. Mahoney, *Mediterranean Pilot, Vol. V,* (1976), 101–2.
6. H. Hauben, "Cyprus and the Ptolemaic Navy, "*RDAC* 1987, 217, notes that the hinterland of Paphos was rich with forests of pine, cedar, and cypress.
7. Neolithic: cf. P. Dikaios, *RDAC* 1936, part 1, 79; Mycenaean: cf. Nicolaou, *op. cit.,* (n. 3), 562.
8. Daszewski, I, (n. 3), 171.

been unearthed.[9]

The anchorage, unlike the adjacent coastal area, was probably used throughout antiquity, serving as a favorite mooring along the southwestern coast of Cyprus. Even before breakwaters were constructed, the small bay provided a safer haven for ships than the exposed roadstead at Palaipaphos. Perhaps this may explain the desire of Nikokles, last of the Kinyrad kings of Palaipaphos, to establish a new city, at a time when reliable access to the sea could mean increased power and prosperity.[10] Though Strabo —and Pausanias after him— attributed the foundation of Nea Paphos to Agapenor, following the fall of Troy, modern historians have long agreed that Nea Paphos was actually established as a planned, urban center in the late fourth century B.C.[11] Daszewski has suggested that Nikokles founded this new economic and political capital for his Paphian kingdom between 321/320 and 316/315 B.C.[12] During the power struggles of Alexander's successors, Nicocles at first supported Ptolemy I of Egypt, while also maintaining aspirations for Paphian independence. He may have been responsible both for establishing the monumental city and initiating construction of the artificial breakwaters to enhance the existing anchorage.

Daszewski has argued convincingly, however, that while Nicocles may have founded the *city* of Nea Paphos, the massive harbour was probably not completed until after his suicide in 310/309 B.C., when Ptolemy undertook to make Nea Paphos his main operational naval base.[13] Nicocles had neither the time, the need, nor the resources necessary to complete a task of such magnitude.[14] Ptolemy, however, recognizing both the importance of Nea Paphos's geographical position —on a direct north-south sea lane to Alexandria— and the advantage of locally accessible supplies, would have taken whatever measures were necessary to equip and secure the city.[15] Remains of walls and towers have been dated to the late fourth century B.C.[16] These defenses, once defining the perimeter of the ancient city, appear to have extended into the sea, enclosing the anchorage in a *limen kleistos*.[17] Such a harbour would have been necessary for the protection of the prized city, and appropriate for the international aspirations of Ptolemy.

Once Nea Paphos had been established, the original city of Palaipaphos did not cease to exist; instead it remained an important religious center widely known for its temple of Aphrodite. Many visitors to the temple probably landed at Nea Paphos, then travelled upon the Via Sacra to the sanctuary.[18] Mitford, however, notes that Palaipaphos was never significantly modernized, instead being allowed gradually to deteriorate.[19] Nea Paphos had become the area's primary center, and from the Roman period onward writers referring to "Paphos" meant the new city, not the old.

Nicocles' dream of an independent Paphian kingdom never materialized, for after his death traditional monarchy in Cyprus steadily declined. In 294 B.C., Ptolemy finally took possession of the entire island.[20] Nea Paphos continued to flourish, though, under Ptolemaic rule, eventually replacing Salamis in the early second century B.C. as the island's central seat of government.[21] This geographical shift in power perhaps occurred because the harbor at Salamis had become silted[22] and Nea Paphos offered greater accessibility by sea to and

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9. For Archaic occupation, cf. J. Deshayes, *Le Necropole de Ktima*, (1963); for discussion of Classical, cf. Daszewski, *op. cit.*, (n. 3), 171–2, and J. Mlynarczyk, "Remarks on the Classical Settlement on the site of Nea Paphos", *Archaeologia Cypria* I (1985), 69–78.
10. On Nicocles as founder of Nea Paphos, cf. T.B. Mitford, *OpAth* 3 (1960), 198, 204f., and Nicolaou, *op. cit.*, (n. 3), 564.
11. Strabo 14.6.3; Paus. 8.5.2. For modern scholarship, cf. Daszewski, *op. cit.*, (n. 3), 171, n. 3.
12. Daszewski, *op. cit.*, (n. 3), 171, 173. For Hellenistic Nea Paphos, cf. also 1980 doctoral thesis of J. Mlynarczyk, cited by Daszwski, *idem.*, 171, n. 11, and J. Mlynarczyk, *Nea Paphos* III. *Nea Paphos in the Hellenistic Period* (1990).
13. *Id.*, 174–5.
14. *Id.*, 175.
15. For Cyprus's strategic importance at this time, cf. F.G. Maier, *Cyprus: From the Earliest Time to the Present Day*, (1968), 46–7; and Hauben, *op. cit.*, (n. 6), 214–6.
16. Nicolaou, *op. cit.*, (n. 6), 572; F.G. Maier, V. Karageorghis, *Paphos: History and Archaeology*, (1984), 231.
17. For more on closed harbours, cf. K. Lehmann–Hartleben, "Die antiken Hafenanlagen des Mittelmeeres", *Klio*, Beiheft 14 (1923), 65–74; and D. J. Blackman, "Ancient Harbors in the Mediterranean, Part 2", *International Journal of Nautical Archaeology*, 11.3 (1982), 194. Nicolaou, *op. cit.*, (n. 3), 567 was the first to suggest that the city's walls also enclosed the harbour.
18. Strabo (14.6.3) refers to an annual procession from Nea Paphos to Palaipaphos.
19. T.B. Mitford, "Roman Cyprus", *Aufstieg und Niedergang der romischen Welt* II 7.2 (1980), 1313.
20. Hauben, *op. cit.*, (n. 6), 224.
21. Mitford, *op. cit.*, (n. 19), 1309.
22. G.F. Hill, *A History of Cyprus*, Vol. I, (1940), 232.

from Alexandria. The capital remained in Nea Paphos through Roman times, until it reverted to Salamis once more in the mid-fourth century A.D.[23] This final transfer of power was probably the result of a series of devastating earthquakes, the last of which demolished both Nea Paphos and coastal neighbours such as Kourion.[24] The harbour facilities of these coastal cities, often founded merely upon the sandy seabed, were especially vulnerable to seismic shocks, as well as to any accompanying tsunamis.[25] The fourth century upheavals that struck Nea Paphos may have finally committed that particular harbour to the decline and extensive decay still to be witnessed centuries later by Mediaeval travellers.[26]

Ancient sources and early travellers

The earliest literary references to Nea Paphos are found in the Augustan geography of Strabo and the possibly contemporary anonymous "Stadiasmus", or "Periplus Maris Magni".[27] Strabo reports that Palaipaphos had a mooring-place (ὕφορμος) and Paphos a harbour (λιμήν).[28] He also credits Sappho with the epithetical description "... Paphos of the spacious harbour ...",[29] but this may be apocryphal, for Nea Paphos had not yet been founded in Sappho's lifetime, during the late seventh to early sixth centuries B.C. The coastal facilities of Palaipaphos could hardly have been described as "spacious", for that was an open anchorage exposed to the elements.

Stadiasmos provides perhaps one of the most descriptive and tantalizing references to the harbour at Nea Paphos, relating that it was a triple harbour suitable for all winds.[30] Daszewski has suggested various possible functions for three such separate basins within the harbour, including a western military facility, a central accommodation for merchants and passengers, and an eastern basin for fishing boats and shipyards.[31]

Scholars have traditionally accepted the possibility of ancient shipyards within or near the harbour of Nea Paphos,[32] yet evidence for such facilities remains at best scanty and circumstantial. While Herodotus reports that Paphos (in this case, Palaipaphos) supplied Xerxes with a dozen ships,[33] these could just as well have been originally constructed somewhere other than in Cyprus. Ammianus Marcellinus provides the only specific textual evidence for ship-building on the island, reporting in the fourth century that Cyprus could send a ship to sea fully equipped from the island's own resources.[34] Archaeological excavation has produced epigraphical evidence for Nea Paphos itself, including a Hellenistic dedicatory statue, from the temple of Aphrodite in Palaipaphos, and a Hellenistic amphora recovered from the northern necropolis of Nea Paphos.[35] The statue was erected in honour of Pyrgoteles, son of Zoes, a naval architect who built two ships, a *triakonteres* and an *eikoseres*, for Ptolemy Philadelphus (284–245/6 B.C.).[36] The amphora is painted with the declaration, "ΠΡΙΤΙΟΥ ΝΑΥΠΗΓΟΥ", ("[belonging to] Pritios the Shipwright").[37] While this combined evidence suggests at least that certain individuals in

23. Mitford, *op. cit.*, (n. 19), 1309.
24. D. Soren, J.R. Leonard, P. Molinari, "University of Arizona Excavations at Kourion 1984–1987", *RDAC* 1988, 171–8.
25. The ancient harbour at Kourion, like the city itself, must have suffered from the devastating earthquakes of the fourth century, and would have borne the added effect of any tsunamis that may have lashed the coast following the final mid-century shock. Cf. D. Soren. "Earthquake. The Last Days of Kourion", *Studies in Cypriote Archaeology*, (1981), 123, for discussion of epicenter's possible location southwest off the Cypriot coast. Preliminary study and recording of the dilapidated ancient mole at Kourion have been initiated by the present author (JRL).
26. W.A. Daszewski, "Port glowny i przystanie pomocnicze w Nea Paphos w swietle obserwacjii podwodnych", ("The Main Harbor and Auxiliary Anchorages of Nea Paphos in Light of Underwater Observations", *Meander* 6 (1981), 334–5.
27. The date of *Stadiasmos* remains uncertain. Recently Pirazolli, et al., "Historical Enviornmental Changes at Phalasarna Harbor, West Crete", *Geoarchaeology* 7:4 (1992), 375, have argued that *Stadiasmos* may date to as late as the fourth century A.D.
28. 14.6.3. For a recent handbook on ancient sources, cf. P. Wallace, A.G. Orphanides, eds., *Sources for the History of Cyprus*, Vol. I: *Greek and Latin Texts to the Third Century A.D.*, (1990).
29. 1.2.33.
30. 297.
31. Daszewski, *op. cit.*, (n. 26), 334.
32. Nicolaou, *op. cit.*, (n. 3), 564; Maier, Karageorghis, *op. cit.*, (n. 16), 234, 249.
33. 7.195.
34. 14.8.14.
35. Nicolaou, *op. cit.*, (n. 3), 564; Maier, Karageorghis, *op. cit.*, (n. 16), 234.
36. *Orientis Graeci Inscriptiones Selectae* I (1903), nr. 39.
37. "Archaeology in Cyprus, 1951", *JHS* LXXII (1952), 115.

Nea Paphos were involved in ship-building,[38] final determination of the existence and location of Paphian shipyards must await further archaeological discovery.

Writers in later antiquity provide evidence for the numerous earthquakes that affected Nea Paphos. Dio Cassius reports that after an earthquake in 15 B.C., the emperor Augustus granted monetary relief to the ravaged city, and permitted the city to call itself "Augusta".[39] Orosius described destruction to the city in 77 A.D., from which it was again restored.[40] Literary confirmation of the destructive force of fourth century earthquakes is supplied by St. Jerome, who noted about A.D. 390 that Nea Paphos had indeed been reduced to ruins.[41]

Medieval travellers to Paphos have also described the effects of earthquakes upon the ancient harbor. Oliverus Scholasticus reports that after an earthquake in 1222 affecting not only Paphos, but also Limassol and Nicosia, the harbour at Paphos "dried up".[42] Although this description seems to imply that tectonic uplift finally put the ancient harbour out of commission, the accounts of later travellers indicate the harbor's continued operation. Scholasticus may have been referring merely to a portion of the harbour, but Daszweski suggests that any tectonic deformation of the seabed would be observable both inside the harbour and out.[43] While the inner segment of the ancient harbour is indeed now dry land, the seabed just outside the modern harbour entrance —beside the ancient eastern breakwater— lies at a depth of 5–6 metres.[44] Daszewski proposes that earthquakes rupturing the ancient breakwaters, not tectonic uplift, allowed the inner harbour eventually to become sandy dry land.[45] Although localized tectonic tilting should perhaps also be considered,[46] a thorough geological study of the harbour must be undertaken before questions surrounding Scholasticus's description may finally be resolved.

Two other Mediaeval visitors to Paphos commented upon earthquakes: Ludolph von Suchen, who journeyed to Cyprus between 1336 and 1341, noted that Paphos now lay "well-nigh destroyed by frequent earthquakes;"[47] and Felix Faber, who wrote in 1483,

> *How vast this city was, and how stately the churches which stood there, the extent of the ruins and the noble columns of marble which lie prostrate prove. It is now desolate, no longer a city, but a miserable village built over the ruins; on this account the harbor too is abandoned, and ships only enter it when forced to do so, as was our fate. As the city was laid low by an earthquake, so it lies still, and no bishop nor king gives a hand to raise it up again.*[48]

While the accounts of von Suchen and Faber, like that of Scholasticus before them, may overstate the destruction and ineffeciveness of the ancient harbour, certain areas in and around the harbour were indeed becoming silted, marshy, and malarial.[49] Numerous travellers complained of bad air, including Suriano (who visited Paphos in 1484), Huen (1487), Noe (about 1500), Baumgarten (1508), and Le Saige (1518).[50] Their accounts, with the exception of Suriano's, also contain references to extensive deterioration.[51] Not all the ruins observed were necessarily of ancient origin, though, for Le Saige further comments, "On the seashore ... are still two massive towers, and there was once

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38. Maier and Karageorghis note that Pyrgoteles may not have been a Paphian or even a Cypriot citizen: *op. cit.*, (n. 16), 234.
39. 54.23.7–8.
40. 7.9.11.
41. *Vita S. Hilarionis*, 42 (PL. col. 52).
42. *Historia Damiatina*, in J.G. von Ekhart, *Corpus Historicum Medii Aevi, sive Scriptores Res in Orbe Universo*, II (Leipzig 1723), col. 1450; cf. also R. de Coggeshall, *Chronicon Anglicanum* in Martene and Durand, *Amplissima Collectio*, V (Paris 1729), 194; Ogerius Panis and Marchisius Scriba, *Annales Genuenses*, in R. Rohricht, ed., *Testimonia Minora de Quinto Bello Sacro*, (1882), 240; L. de Mas Latrie, *Chroniques d'Amadi et de Strambaldi* (1891), 115; for more on Byzantine and Medieval Paphos, and the 1222 earthquake, cf. A.H.S. Megaw, "Reflections on Byzantine Paphos", ΚΑΘΗΓΗΤΡΙΑ, *Essays Presented to Joan Hussey*, (1988); J. Rosser, "The Lusignan Castle at Paphos Called Saranda Kolones", *Western Cyprus: Connections*, (*SIMA* LXXVII), (1987).
43. Daszewski, *op. cit.*, (n. 26), 334.
44. The shallowest depth upon the remains of the ancient eastern breakwater's seaward end is more than 3 meters.
45. Daszewski, *op. cit.*, (n. 26), 334–5.
46. This could perhaps explain the inner harbor being dry and the seaward ends of the ancient eastern and western breakwaters being so deeply submerged.
47. C.D. Cobham, *Excerpta Cypria*, (1908), 18.
48. *Id.*, 45.
49. A dying stream east of the harbour may also have contributed to the marshy, malarial enviornment; cf. Daszewski, *op. cit.*, (n. 26), 335. A.H.S. Megaw (personal communication, 1991) reports that a marsh still existed in the 1960s in the eastern portion of the ancient harbour.
50. Cobham, *op. cit.*, (n. 47), 49, 51, 53, 55, 61, respectively.
51. *Idem.*, (except Suriano, p. 49).

a strong castle".[52] Mediaeval structures erected beside the harbour, or built directly upon the ancient breakwaters, may already have appeared ruinous in the sixteenth century, if not earlier. These may have been lumped together with ancient remains under the collective term "ruins" by the casual observer.

Evidence for the ancient harbour's continued use through the period of the fifteenth to eighteenth centuries is provided by travellers such as Pero Tafur (who stopped at Paphos in 1435), Affagart (1534), and Drummond (1745, 1750). All of these observers noted vessels sheltering at Paphos.[53] In the mid-sixteenth century, Ascanio Savorgnano, a Venetian engineer, reported optimistically that while the harbour was presently not of much use, it could be improved to hold from 60 to 200 galleys.[54] More than a century later De Bruyn observed — in what may be the earliest known reference (1683) to the Moulia Rocks, a familiar feature of the Paphian coastline — "opposite the entrance of the harbor there are two little rocks".[55] In 1738, the topography of Paphos, and the harbourworks themselves, were further described by Pococke:

> *To the west of town there is a point of land, and the old port was to the southeast of it, in an angle made by a small promontory, and was sheltered by piers built out into the sea, some remains of which are still to be seen.*[56]

With the arrival of the nineteenth century, there is again testimony to the increasing siltation problem in the ancient harbour. Ali Bey, in 1806, observed that the harbour was "small and blocked with sand, so that only the smallest boats can enter".[57]

Antiquarians and Archaeology

During the nineteenth and early twentieth centuries, the ancient harbour at Paphos came under the closer scrutiny of keen-eyed antiquarians. Turner, an Englishman who visited the site in 1815, may perhaps be credited with the earliest recorded underwater observation in the harbour. While describing grey granite columns encountered on a hill one hundred paces north of the port, he writes, "as we were bathing in the port, we found two of these under the water".[58] Turner also provides an important glimpse of the ancient harbour's condition and use in the early part of the century:

> *The bay is large, but the port very unsafe, as the mole remains only in part to the east and west, and not at all to the south, which is thus left quite open; to this port, bad as it is, vessels frequently resort to the advantage of smuggling corn; there were two small Idriote vessels anchored in it while we were there.*[59]

A century later, in 1918, Jeffrey as well comments upon the condition of the harbourworks, reporting that at present the "little port" of Paphos and its seawall are "much ruined" and have "not been touched in the way of repair since probably the thirteenth or fourteenth centuries".[60] While Jeffrey's account is the first in three hundred years (since that of Le Saige) to mention possible Mediaeval repairs or improvements to the ancient harbour, no specific details are included that might prove useful to a study of the harbour's constructional phases. Jeffrey does reveal, however, that the insidious problem of siltation finally was addressed in 1910, when the harbour was dredged "for the purposes of modern commerce".[61]

Archaeological investigation of the ancient harbor at Paphos commenced with a visit to the site by D.G. Hogarth, who in 1888 made an "archaeological journey" through Cyprus. Hogarth, paying greater attention to detail than his predecessors, notes:

> *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*

52. *Id.*, 61.
53. *Id.*, 33, 67, 291 respectively.
54. *Discriptione delle cose di Cipro* (transl. by H. Luke, 1932), 25, cited in Maier, Karageorghis, *op. cit.*, (n. 16), 344, n. 48.
55. Cobham, *op. cit.*, (n. 47), 241.
56. *Id.*, 263.
57. *Id.*, 408.
58. *Id.*, 442. One cannot help wondering whether columns from *Saranda Kolones* ended up in the harbour because, at the time of Turner's visit, the sea extended nearer to the site of the castle; cf. below, and n. 69.
59. *Id.*, 442.
60. G. Jeffrey, *A Description of the Historic Monuments of Cyprus*, (1918), 405.
61. *Idem.*

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 readily be improved.[62]

The metal clamps mentioned in the account are a curious feature, for no clamps can be seen today upon the ancient breakwaters, despite the survival of many of the massive blocks. Even traces of cuttings, intended for clamps now gone, are not in evidence. Perhaps the clamped blocks now lie buried beneath modern improvements.

The first purportedly archaeological underwater survey of the ancient harbour and surrounding area was conducted betwn 1959 and 1961 by the British Army. While the project, known as "Operation Aphrodite", was essentially a training exercise for underwater sappers, nevertheless, it did recover historically significant artifacts, including numerous fragments of ancient and Mediaeval pottery and several cannons.[63]

One of Operation Aphrodite's more remarkable goals was the location of the "legendary lost harbour of Paphos".[64] Citing local lore, the team apparently hoped to discover the remains of an enormous breakwater extending from the preserved western mole of Paphos harbour south-southeast to the Moulia Rocks, a distance of approximately 4km.[65] No evidence for this lengthy breakwater is presented in the operation's final reports, and the existence of such a structure during ancient times seems highly unlikely. Not only would a harbour of such magnitude have been the largest in the ancient world, but the massive breakwater would have also been extremely difficult and costly to maintain. The "legend" of this gigantic harbour has been sustained, however, largely due to the depiction of the fanciful mole in a popular guidebook.[66]

Topographical features of the ancient site were again the focus of Nicolaou's landmark 1966 study, in which he documented meticulously the remains of Nea Paphos, and provided the first map showing the line of the original city walls and breakwaters.[67] This fundamental site plan forms the basis for many of the sketch maps included in subsequent studies of the ancient city.[68] Nicolaou, in describing the coastline of Paphos, was also the first archaeologist to suggest that the modern harbour's topography differs from that of the ancient harbour, which extended further inland toward the mound of *Saranda Kolones* castle.[69] Although Nicolaou does not discuss the basis for this assumption, he probably included the eastern marsh, which he describes as occupying a large part of the ancient harbour,[70] and the low sandy terrain seaward of *Saranda Kolones* in his assessment of the ancient basin's internal area (Fig. 1). In describing the harbourworks themselves, Nicolaou reports the preserved lengths of the eastern and western breakwaters as 350m. and 170m. respectively. Furthermore, he reveals that he could find no trace of Hogarth's "metal clamps".[71]

Architectural evidence supporting Nicolaou's argument for a larger original bay has been subsequently discovered by Michaelides, who in 1981 and 1987 uncovered the remains of ancient sea walls and a tower.[72] The earlier discovery was made in the eastern section of the ancient harbour's now-silted basin, where Michaelides found two preserved lengths of inner sea wall, the first dating to the Hellenistic period and the second to mid to late Roman times. The Hellenistic wall stands approximately 150m. from the modern shoreline, and the Roman about 140m. The later excavation in the western section of the harbour —beneath the modern Customs House— revealed another section of apparently original sea wall, and an associated Roman tower. These remains represent not only suc-

62. D.G. Hogarth, *Devia Cypria*, (1889), 7.

63. Reports of Operation Aphrodite may be found in the archives of the Department of Antiquities of Cyprus. Recently, a brief reference to another underwater survey off the coast of Kato Paphos, conducted in 1969 and directed by G. Niemeyer, in P. Åström's, *Who's Who in Cypriot Archaeology*, (1971), 61, was brought to the authors' attention by S. C. Fox. At the time of writing, no further information was available on this obscure survey.

64. *Idem*, Section 2, p.1, of 1959–60 report.

65. *Idem*, Section 3, p. 2. A former fisherman, interviewed in Paphos by Nicolaou, *op. cit.*, (n. 3), 578, n. 44, reports that a dark line is visible in the water, but that this merely represents an abrupt downward slope of the seabed.

66. K. Keshishian, *Romantic Cyprus*, 16th edition, (1987), opp. p. 136.

67. Nicolaou, *op. cit.*, (n. 3), fig. 3, p. 568.

68. For ex., Maier, Karageorghis, *op. cit.*, (n. 16), fig. 208, p. 227, reproduced herein as Fig. 1.

69. Nicolaou, *op. cit.*, (n. 3), 567.

70. *Idem.*

71. *Id.*, 578, n. 41.

72. D. Michaelides, Personal Communication, 1991; cf. also Megaw, *op. cit.*, (n. 42), 143.

cessive phases of renovation in the gradually silting harbour, but perhaps also a Paphian response to turbulent times in the third century A.D.[73]

Daszewski, based upon his 1965 survey of the harbour,[74] provides his own estimates for the preserved lengths of the ancient breakwaters. His dimensions are different from those of Nicolaou: for the western mole, either 210m. or 235m.,[75] and for the eastern, either 400m. or 480m.[76] Daszewski estimates that originlly the ancient western breakwater extended 270–280m. in length, and the eastern perhaps more than 500m.[77] He also describes a secondary spur wall, preserved to a length of either 70m. or 50m.,[78] projecting in a seawardly direction from the exterior face of the western breakwater. Daszewski and Nicolaou had the unique opportunity in the mid-1960s to observe topographical features of the ancient harbour that can no longer be examined, such as the marshy ground near the eastern breakwater, and the unobstructed western breakwater and spur wall, now largely buried beneath modern rubble. In addition to measuring and describing the ancient harbourworks, Daszewski hypothesized on their original appearance, considered possible interpretations of the Stadiasmos reference, and described an internal tripartite division of the ancient harbour into separate basins, each with a specialized function.[79] Despite its limitations, such as variant dimensions and the lack of explanatory site plans and illustrations, Daszewski's study of the ancient harbour stands as the point of departure for all subsequent research.

The 1991–1992 underwater survey

Underwater survey of the harbour at Paphos was conducted in two brief campaigns in May, 1991 and October, 1992. The survey was undertaken both to produce a site plan of the harbour's submerged ancient remains and to provide data for designing future research. While the submerged remains constituted the focus of the study, the topography of the silted portion of th ancient harbour was also considered for possible future fieldwork. With modern structures already encroaching upon land-based remains, such as those studied briefly in the path of the bulldozer by Michaelides, the survey was designed to identify, examine and record the ancient harbour's submerged features before these too could be further modified or buried completely. In addition to the main harbour, the survey team also intended to examine preliminarily possible outlying anchorages, such as those to the east and west of the ancient city. Finally, it was hoped that the question of an ancient breakwater extending from Paphos harbour to the Moulia Rocks could at last be resolved through an investigation of the intervening seabed.

Initial survey in 1991 was unfortunately hindered by rough seas that both limited the work within the harbour and prevented diving in the exposed outer anchorages. Nevertheless, preliminary mapping of submerged remains was accomplished in the entrance of the modern harbour, as well as just outside the eastern and western breakwaters. Architectural features, such as walls, marble columns, and concentrations of large ashlar blocks, were demarcated with buoys, then located from shore with a theodolite. Though turbulence and poor visibility limited photographic recording, detailed sketches of remains in the vicinity of each buoy were produced. Measurements of smaller features were taken underwater using standard meter tapes, while the breakwaters' overall dimensions were derived from the final site plan. In some cases, a probing rod powered by compressed air was employed to determine the extent of architectural remains beneath the sandy seabed. On shore, the eastern Roman seawall discovered by Michaelides was relocated and examined behind the modern Daphnis Hotel Apartments. The present western breakwater was also investigated for indications of original construction and secondary use of ancient blocks.

The survey continued in October, 1992, during which time the seas remained absolutely flat and water visibility ranged from at least 15 to 20m. This second campaign was undertaken using more

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73. Cf. Hill, *op. cit.*, (n. 22), 243; and Maier, *op. cit.*, (n. 15), 54.
74. Daszewski, *op. cit.*, (n. 26).
75. In separate reports Daszewski provides conflicting figures: 210m. in 1981: *op. cit.*, (n. 26), 330; and 235m. in 1987: *op. cit.*, (n. 3), 174, n. 39; cf. also below, notes 76, 78. An English translation of Daszewski's 1981 survey report is now available in the library of the Cyprus American Archaeological Research Institute, Nicosia.
76. 400m.: *op. cit.*, (n. 26), 331; 480m.: *op. cit.*, (n. 3), 174, n. 39.
77. *Id.*, 330.
78. 70cm.: *op. cit.*, (n. 26), 331; 50m.: *op. cit.*, (n. 3), 174, n. 39.
79. Cf. above, and n. 31.

sophisticated surveying equipment, provided by Leika Ltd., which allowed the entire area of the ancient harbour to be mapped more accurately in just four days. The clarity of the water permitted extensive photographic recording of submerged architectural features. With the bulk of the campaign's work having been accomplished in the first few days, the remainder of the two-week season was spent in examination of particular features of the submerged remains, such as possible towers and the ancient harbour mouth. The eastern breakwater was also investigated —as the western had been previously— for evidence of original construction and material reuse. Finally, time and weather at last permitted cursory exploration of outlying anchorages and the area of the Moulia Rocks.

The combined efforts of two brief seasons of underwater survey have resulted in a greater understanding of the ancient harbor's original layout, method of construction, and perhaps even appearance. The main eastern breakwater of the ancient harbour seems originally to have followed the same alignment as the present eastern breakwater. While a number of the large amorphous stones —now to be seen projecting from the sea along the battered eastern breakwater— may represent post-antique augmentation, much of the visible breakwater appears to be formed of original ancient stone, perhaps repositioned following the gradual collapse of the mole. Today, therefore, it would seem that the eastern breakwater is composed of a jumbled mass of ancient and possibly modern stones, with only a few ancient blocks still in position (Pl. XCVIII: 1).

The original Hellenistic breakwaters were constructed of ashlar blocks, perhaps in header and stretcher configuration. Squared blocks, previously noted by Daszewski,[80] were observed on the inside of the eastern breakwater near the widest gap in the debris. These blocks range from (0.57–1.80m. x 0.45–0.65m.); their thicknesses could not be determined. Furthermore, what may be an original stretcher block, still *in situ,* was also discovered half-buried in the sand at the very bottom of the outer face of the eastern breakwater. Two smaller squared stones rest upon the larger block's upper surface, and may also be *in situ* (Pl. XCVIII: 2).

A secondary method of construction is apparently represented by large upended sections of concreted rubble, which were observed amongst the debris of the eastern breakwater. In some cases, this rubble —comprised of small stones generally uniform in size— is bonded together with cement; while in others, it appears to have been naturally concreted by the sea through the intervening centuries. If these observations are correct, then at least two phases of ancient construction may be represented in ruins on the eastern breakwater: original construction of ashlar masonry either with or wihout a rubble core, and the later use of cemented rubble, probably also in the wall's core.

The discovery of cemented rubble recalls Hogarth's 1888 description of the ancient western ("northern") breakwater: a rough cemented core faced with massive blocks.[81] This cemented rubble on the eastern and western breakwaters may be indicative of Roman repair,[82] necessitated by the destructive earthquakes recorded in antiquity. If, on the other hand, the rubble witnessed by Hogarth was not in fact cemented, but merely weathered and naturally concreted, then both this rubble (Hogarth's) and the uncemented rubble upon the eastern breakwater may be evidence of the original Hellenistic phase of the ancient harbour, completed before cement was introduced. The whole question is further complicated, though, by Hogarth's note that the rubble he observed upon the harbour breakwater was similar to that of "the wall", which we may interpret as meaning the city wall. While little is known of the city wall's construction,[83] it may also have originally been constructed by one particular method (either solid ashlar masonry, or facing blocks with a rubble core), then later repaired by Roman engineers using cement, again perhaps in response to earthquakes or third-century marauders.[84] Further study, particularly excavation, may be able to resolve this question of various construction techniques and phases.

On the western side of the harbour, the ancient breakwater and associated spur wall lie largely buried beneath the modern western breakwater and

80. Daszewski, *op. cit.*, (n. 26), 331.

81. Cf. above, and n. 62.

82. For cemented rubble as a characteristic of Roman harbour construction, cf. Blackman, *op. cit.*, (n. 17), 197.

83. Nicolaou, *op. cit.*, (n. 3), does not describe construction details of the city wall's remains, already scanty at the time of his fundamental study.

84. Cf. above, n. 73.

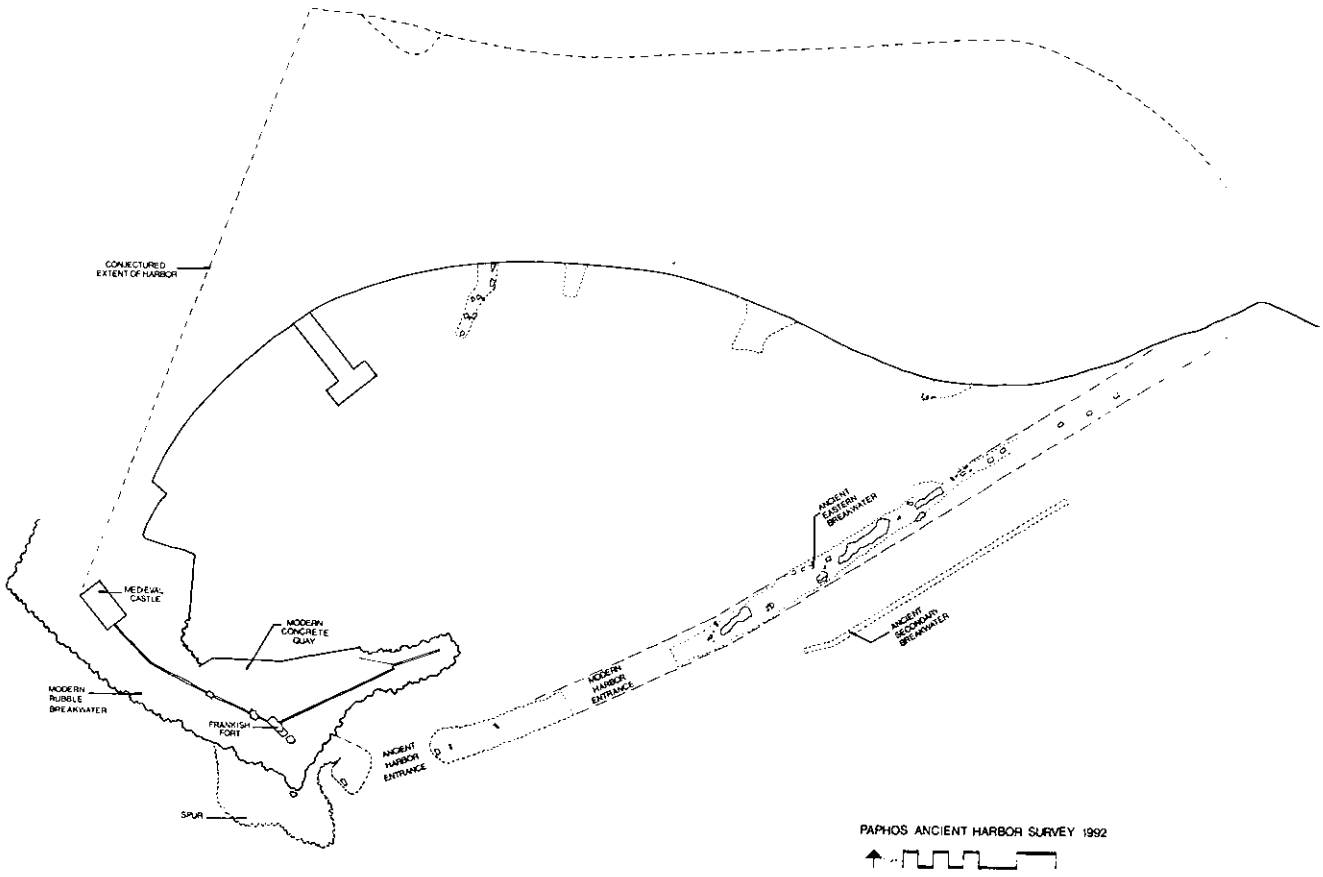

Fig. 2. Site Plan, Ancient Harbour; 1991–1992 Underwater Survey. (Barth).

quay (Pl. XCIX: 1). The seaward end of the ancient breakwater remains exposed, however, protruding for a distance of approximately 35m. from beneath the outer face of the modern breakwater —at a point just east of the angle in which stands the ruined mediaeval fort (Fig. 2). Slightly to the west, the submerged remains of the ancient spur wall project southward from the "elbow" in the modern mole. In the mid–1960s, Daszewski observed the ruined fort standing upon the juncture of the ancient breakwater and spur wall.

Due to modern rebuilding, the overall lengths of the ancient western breakwater and spur wall can no longer be distinguished. Nevertheless, Daszeski's figure of 50m. for the spur wall seems probable, while 235m. for the breakwater would be a minimum dimension, the total length depending on where the breakwater began in antiquity. Without further evidence, Daszewski's estimate of 270–280m. seems appropriate. Width measurements for the two breakwaters could not be taken, and, again, Daszewski's estimates of original dimensions — gauged at a time when more of the harbourworks were exposed— should probably be accepted: 10–15m. for the western breakwater, 5–10m. for the eastern.[85]

The submerged remains of the western breakwater and spur wall consist of sloping mounds of irregularly shaped rubble mixed with occasional squared blocks (Pl. XCIX: 2). Average dimensions for the larger blocks, found almost exclusively upon the spur wall, range from (1.80–2.70m. x 1.60–2.70m. x 0.85–1.15m.). Smaller blocks, observed upon both the spur wall and the western break-

85. Daszewski, *op. cit.*, (n. 26), 330–1. Note that the breakwaters' extant remains are wider than Daszewski's estimates for original widths; this seems reasonable, as a certain degree of spread must have occurred during the breakwaters' deterioration and eventual collapse. For example, cf. below, discussion of submerged end of eastern breakwater.

water, range from (0.32–0.45m. x 0.20–0.22m. x 0.16–0.21m.). Water depth over the surviving spur wall and western breakwater is approximately 3m. The depth of the seabed surrounding the spur wall ranges from 4.50–5.90m. While all the submerged remains themselves are generally free from Poseidon grass, which grows thickly elsewhere on the seabed, individual stones are covered with a thin layer of sea growth.

Examination of the western breakwater above sea level has resulted in the discovery of ancient header blocks perhaps still *in situ* between the restored medieval castle and the natural promontory (Pl. C: 1). More than seven individual blocks can be identified in this series, each measuring (0.40m. x 0.20–0.25m. x *ca.* 1.20+m.) (Pl. C: 2). The ends of the blocks are obscured beneath overlying rubble. Blocks of similar dimensions can also be seen in the lowest foundation course of the castle, while larger blocks, (2.00–2.50m. x *ca.* 1.00+m. x 0.75–0.80m.), are incorporated into the ruins of the small fort (Pl. C: 3). These blocks appear to be ancient *spolia* used secondarily in mediaeval times.

Underwater survey just outside the harbour has revealed two large architectural features previously unreported. A long wall, 199m. long x 5m. wide, was discovered running parallel to the eastern breakwater, separated from the main breakwater by a distance of about 30m. (Fig. 2). This external subsidiary breakwater is composed of large blocks lying jumbled upon each other, though generally with their long axes perpendicular to the line of the wall. Average dimensions for the blocks range from (1.80–2.70m. x 0.90–1.40m. x 0.70–1.00m.). The southwestern end of this subsidiary mole angles inwardly toward the main breakwater, for a distance of approximately 20m. Water depth above the external wall ranges from 4.00–4.40m.

The second large, previously undetected, feature is another mound of building debris, 95m. long x 18m. wide, which appears to represent the end of the ancient eastern breakwater (Fig. 2).[86] This mound, composed of rubble and squared blocks similar in size to those recorded for the submerged spur wall and ancient western breakwater, follows the same alignment exhibited by the rest of the eastern breakwater. A gap more than 30m. wide, between the mound and the "end" of the *present* eastern breakwater, appears to be a dredging scar from the creation or deepening of the modern entrance channel. The ancient eastern breakwater, therefore, appears to have been severed. If this assumption is correct, the originial breakwater's original length would have been *ca.* 600m., considerably longer than previous estimates. Two columns were found lying atop this mound: one of unknown material, 2.45m. long x 0.36m. in diameter; the other of whitish marble, 2.75m. long x 0.50m. in diameter. The marble column has a slightly flared base, 0.60m. in diameter, and appears identical to columns now standing outside the Paphos District Archaeological Museum. The columns at the museum were originally recovered from the harbour during dredging operations.[87] Water depth above the mound ranges from 3.50–4.50m.[88]

Smaller features of the ancient harbour recorded during the survey include two possible towers, located upon the submerged ends of the eastern and western breakwaters, and several concentrations of architectural debris encountered inside the harbor along the modern sea wall (Fig. 2). The presence of the two possible towers was indicated by the marked difference in the size of blocks lying upon the ends of the ancient breakwaters. The western tower is composed of large blocks, ranging from (1.36–2.51m. long x 0.92–1.94m. wide x 0.51–1.74m. high). Water depth above the western tower is 2.20m.

The eastern tower is less distinctive than the western, for its blocks are not as large, ranging from (0.90–1.40m. x 0.74–0.95m. x 0.40–0.60m.). There are also a great number of smaller blocks in the concentration, similar in dimension to those observed upon the spur wall and western breakwater. This eastern tower was initially recognized because the long mound with which it is associated widens on the end from 18m. to 22m.

Between the concentrations of rubble representing eastern and western towers, there exists a distinctive *ca.* 41.40m. gap, completely free of ar-

86. Cf. above, discussion of breakwaters' original widths, and n. 85.

87. Fr. records of Paphos Museum.

88. Cf. above, discussion of possible seismic disturbance of seabed, and n. 44.

chitectural debris, which appears originally to have been the mouth of the ancient harbour.[89] The depth within the channel is 4.60m. While a south-southeastern orientation may not at first seem suitable for a harbour mouth where winds commonly blow from the west and south, the deflective spur projecting from the ancient western breakwater would have provided the necessary protection. Daszewski notes that, in addition, the spur wall may have protected the less stoutly constructed eastern breakwater.[90] The scale of the large blocks and rubble forming the spur wall indicates that this subsidiary feature was designed to baffle the greatest western and southwestern forces, thereby 1) reducing damage to the ends of the breakwaters, 2) deflecting current- and wave-borne sand away from the harbour mouth, and 3) allowing somewhat protected access to the harbour from the south-southeast. Such an arrangement would have facilitated entrance to the harbor by ancient sailing ships difficult to tack.[91] With such a protected entrance, the harbour of Nea Paphos would indeed have deserved Stadiasmos's description as "suitable for all winds".

Within the harbour two concentrations of architectural debris, located at the base of the modern sea wall, may represent divisions between the three internal basins originally described by Daszewski.[92] These remains, consisting of rubble and squared blocks, probably continue beneath the modern street toward the original shore of the ancient harbour. The blocks observed in these areas are generally smaller, reaching an average dimension of no more than (1.10m. x 0.53m.). Thicknesses of the blocks were not recorded.

While Daszewski may have been the first to discuss the existence and possible functions of three internal basins in the ancient harbour, the earliest actual record of remains, indicating such a tripartite division, is found among the reports of Operation Aphrodite. A sketch labelled "Figure 1" shows two dashed lines extending perpendicularly to the shoreline within the area of the harbour.[93] The main eastern breakwater is likewise demarcated by a dashed line. These lines are clearly intended to represent man-made constructions, for they are labelled, "Old Jetties, submerged".[94] Even taking into account the schematic nature of the figure, these "jetties" appear to be located exactly where architectural remains can still be seen today in the water. It seems likely that evidence for these divisions may have been even more obvious in the late 1950s than it was several years later when Daszewski noted in the same area "a few stone blocks".[95] Unfortunately, no further mention of the jetties can be found in the British reports. Archaeological exacavation seems the only avenue to further information on these significant structures.

Conclusions

With the completion of two seasons of underwater survey, the design and function of the ancient harbour at Nea Paphos can begin to be realized (Fig. 3). The two main eastern and western breakwaters, apparently built to extend the line of the city walls around the harbour, are supplemented by two smaller, possibly later, auxiliary structures, an eastern external breakwater and a western protective spur wall. The function of the external breakwater should probably be connected to the gradual siltation of the ancient harbour. While large-scale, protracted siltation may have been initiated by seismic destruction of the breakwaters during Roman times, as Daszewski has suggested, the harbour at Nea Paphos, like other ancient harbours, must have already begun suffering from siltation as soon as its breakwaters were constructed in the late fourth century B.C. The greatest amount of silt appears to have been deposited in the eastern part of the harbor, an area where sand continues to be trapped today behind the main eastern break-

89. The width of the ancient mouth was remeasured in 1992 and amended from the previously reported measurement of 40m.; cf. Hohlfelder, Leonard, *op. cit.*, (n. 2).

90. Daszewski appears to identify the location of the ancient harbour mouth with that of the modern harbour entrance, *op. cit.*, (n. 26), 330ff.

91. While some ancient captains may have elected to coast into the harbour under full or partial sail, there also may have been ancient tugboats serving Nea Paphos. These auxiliary craft would have been powered by rowers, thus being able to maneuver quickly around the harbour, greeting new arrivals and escorting them into their proper berth. For use of tugboats in ancient harbours, cf. Lionel Casson, *Ships and Seamanship in the Ancient World*, (1971), 395–7, and pl. 193.

92. Cf. above, and n. 31.

93. Operation Aphrodite, *op. cit.*, (n. 63), 1959–1960 Report, Sect. 2, fig. 1.

94. *Idem.*

95. Daszewski, *op. cit.*, (n. 26), 333.

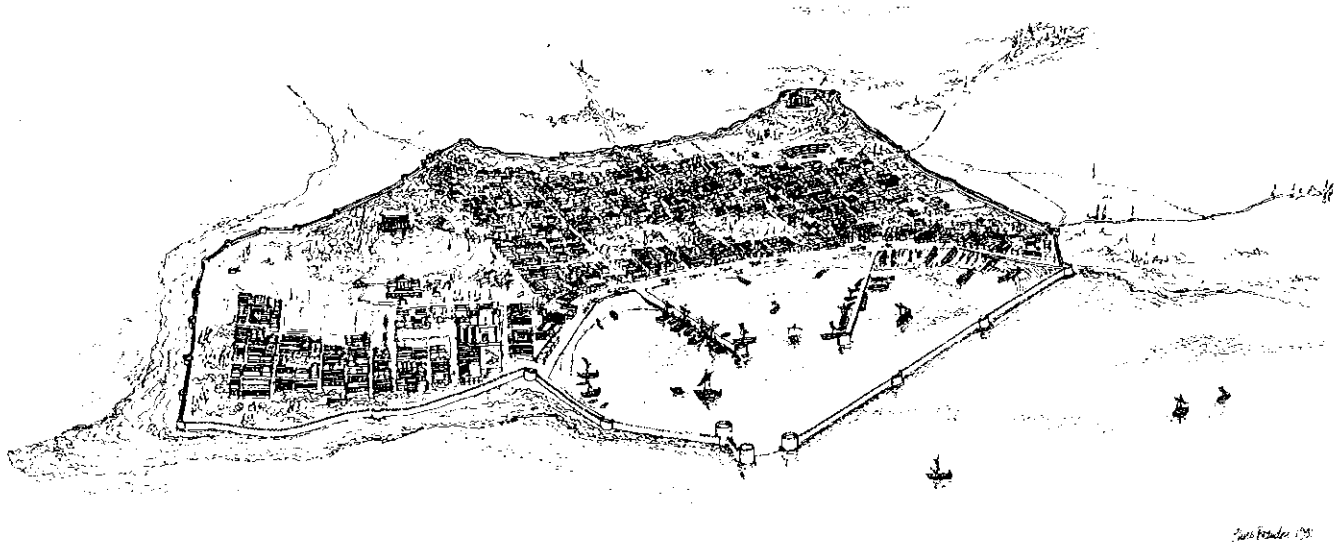

Fig. 3. Artistic interpretation, ancient harbour, without exterior eastern breakwater and columns beside harbour entrance; view to north. (Brandon).

water. Water depth ranges there from 0.30–1.50m. One solution to this persistent problem would have been to install outflow channels through the main eastern breakwater, thereby allowing the sandy water —flowing clockwise from the mouth around the interior of the harbour— to exit once more into the open sea.[96] The external eastern breakwater may have been designed to protect such outflow channels.

An alternative function of the external breakwater could have been the protection of a vulnerable area of the main eastern breakwater,[97] but this seems less likely, for the predominant winds and high seas in the Paphos area originate from the west-northwest, striking the western harbourworks first. The ancient eastern breakwater, standing in the lee of the western breakwater and spur wall, would have been subjected to less pressure from violent seas, and would probably not have needed additional outside protection. The function of the external eastern breakwater seems rather to have been the protection of openings in the main breakwater. While one of these openings could have been a secondary harbour entrance,[98] located behind the protective safety of the external breakwater, no evidence of a gap wide enough to have served such a purpose has been found. Furthermore, not only would siltation still have been a problem —rendering the water too shallow for such an eastern entrance— but the main and external breakwaters are positioned too closely together to have allowed safe maneuvering between them by ancient ships. Siltation posed such a problem in ancient harbours that engineers were often required to take drastic corrective measures in harbours not originally equipped with circulation systems. The construction of the protective external breakwater, perhaps intended to shield outflow channels in the main breakwater, could have been part of just such a system —installed either at the time the harbour was originally founded, or later in the Roman period.

The purpose of the second auxiliary feature, the western spur wall, seems to have been the pro-

96. Such outflow channels are also found in the original breakwaters at Caesarea Maritima; cf. R.L. Hohlfelder, *et al.*, "Sebastos: Herod's Harbor at Caesarea Maritima", *Biblical Archaeologist* 46.3 (1983), 137.

97. A parallel for such a protective secondary breakwater may also be found at Caesarea Maritima, where an external wall was erected to shield a vulnerable point in the main breakwater; cf. J.P. Oleson, "Area E; Subsidiary Breakwater" in A. Raban, *The Harbors of Caesarea Maritima, Vol. I: The Site and Excavations*, (1989), 120–4.

98. Daszewski, *op. cit.*, (n. 26), 331, suggests the existence of an additional passage into the ancient harbour, located approximately in the middle of the eastern breakwater. He apparently bases this conclusion upon a narrow gap still to be observed in the remains of the eastern breakwater.

tection of the ancient harbour mouth —a monumental entrance flanked by defensive towers. Additional evidence is required, though, before it can be determined whether the protective spur wall was an original design feature, or a later improvement to the exposed mouth. Geologic study, including mortar analysis, may also aid in disentangling the harbours's Hellenistic, Roman, and possibly Mediaeval phases. The "piers" witnessed by Pococke in 1738 were probably the battered remains of ancient breakwaters, but some renovation to the harbourworks during the Middle Ages remains a possibility. By 1815, when Turner observed the harbour entirely open to the south, the seaward ends of the ancient breakwaters appear to have finally collapsed into shapeless submerged mounds of building debris, still to be seen today on the seabed outside the modern harbour entrance.

The original heights of the ancient breakwaters at Nea Paphos must remain largely conjectural. The sparsity of remains in the case of the eastern external breakwater suggests that that particular wall was never intended to project above sea level, instead providing sub-surface deflective protection.[99] The western spur wall, however, probably did extend above the surface of the sea to provide maximum protection for the harbour mouth. Daszewski has suggested that the height of the main western breakwater would probably have been at least as high as the 1965 seawall, which he calculated at 4.50m. above sea level; that of the eastern breakwater could have been somewhat lower due to its more protected position.[100] While this seems plausible, no evidence has yet been found to support Daszewski's further hypotheses that the western breakwater was wider in its foundation than in its upper course, and that the eastern breakwater had vertical sides.[101] The discovery of submerged columns during the 1991–1992 survey, however, does provide some evidence for decorative details of the ancient harbour's appearance: at some point probably later in the harbour's history, a series of columns, perhaps a colonnade, appears to have stood upon the eastern breakwater near the harbour mouth.

The possible tripartite division of the ancient harbour's internal area is a feature of the harbour's construction that deserves particular attention in future studies. While definitive evidence has yet to be found for the actual construction of the jetties or quays that divided the harbour, it seems likely that they were designed to allow the circulation of sea water within the harbour. The use of internal divisions, whether or not they were provided with circulation channels, may have contributed to the extensive siltation visible today along the inner shoreline of the ancient harbour. Further study, though, particularly excavation, is required before the existence, function, and long-term effect of separate internal basins may be positively determined.

Brief exploration of outlying anchorages, east of the eastern breakwater and west of the ancient city's promontory, has revealed ceramic evidence confirming Daszewski's suggestion that these sites were used in antiquity as moorings. The extent to which these anchorages were used will never be known, for an indeterminable amount of material culture has undoubtedly been removed or buried by the sea —or collected by souvenir hunters. While occasional use of these exposed outer anchorages appears likely, Stadiasmos's description of a "tripartite harbour" probably does not refer both to a main tripartite harbour and to a triple arrangement comprising the main harbour and two outlying anchorages, as Daszewski seems to imply.[102] Instead, the simpler interpretation seems more probable: three internal basins within the harbour itself. Stadiasmos's further description, "suitable for all winds", stems perhaps from the unique configuration of the harbor's protected mouth.

Ancient authors do not refer to the "legendary" colossal harbour at Nea Paphos, an unlikely omission for a port city that served such an important role duing the Hellenistic and Roman periods. As archaeological evidence is also lacking for a massive breakwater extending to the Moulia Rocks, perhaps this remarkable and enduring notion can finally be laid to rest.[103]

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99. An original sub-surface height seems probable, even allowing for some change in sea level since antiquity. For recent discussion of sea level change, cf. D.J. Stanley, *et. al.*, "Nile Delta", *National Geographic Research & Exploration* 8/1 (1992), 34, 47.

100. Daszewski, *op. cit.*, (n. 26), 330.

101. *Id.*, 330–1.

102. *Id.*, 332.

103. Cf. Renos G. Lavithis, *Paphos, Land of Aphrodite*, 5th edition (1992), 28, for another recent guidebook reference to the supposed greater harbour discovered by Operation Aphrodite.

Future study of the ancient harbour at Paphos must focus upon important questions still surrounding the harbour's date of foundation, phases of development, and methods of construction. Excavation, in particular, may be able to provide evidence for channels in the eastern breakwater, to confirm the location of the ancient harbour mouth, and to establish the existence of internal jetties or quays. Only preservation of ancient remains and further study conducted both on shore and in the sea will permit us finally to understand and appreciate the monumental harbour of Nea Paphos. Perhaps through cooperation between the archaeological community and port authorities this venerable port city can continue to play a significant role in the cultural heritage of Cyprus.