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An underwater survey of Paros, Greece: 1979
Preliminary report

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Introduction and background

Paros is one of the Cycladic group of islands, situated in the Aegean Sea, which separates Greece from Turkey (Fig. 1; Note 1). The earliest evidence to date for occupation of the island is Early Cycladic material of the third millenium BC, although the nearby island of Saliagos has yielded a Neolithic settlement (Evans & Renfrew, 1968). At least as far back as the Middle Minoan period, builders and traders came to the island to obtain its fine-grained white marble (Dinsmoor, 1975: 3).

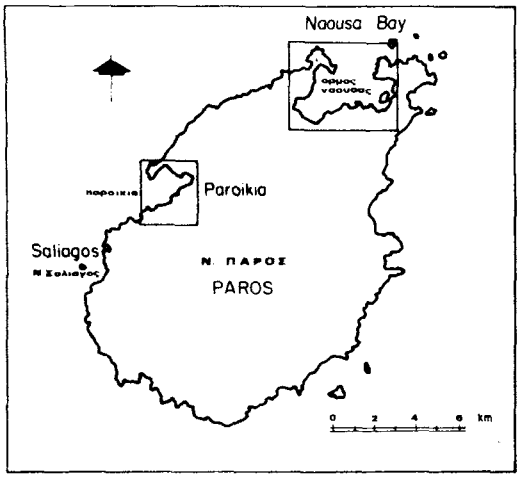

Figure 1. Map of Paros, with names of sites mentioned in text. Map by P. F. Jonston.

Paros, which flourished from the early years of Greek history as a maritime power, founded at the end of the 8th century BC a colony at Thasos and one at the Hellespont. In the middle of the 5th century BC Paros paid the large sum of 30 talents to the Delian League. By 385 BC the island was so prosperous and powerful that it established a new colony at the island of Pharos along the Dalmatian coast.

Later on, Paros was used as a naval base by Romans, Turks, Byzantines, Venetians and the Russians, as attested by various archaeological remains around the island. In antiquity Paros had two renowned harbours, one of which according to Scylax (Periplus 58) was 'closed', i.e. situated within the city-walls. Due to its sheltered harbours and the island's position in the Aegean, along with the marble trade, Paros became a rich maritime power.

All the above prove the archaeological importance of Paros and the necessity for underwater exploration around the island. In 1901 Rubensohn published a survey of ancient Paros which included material on shoreline and submerged features at Paroikia, Drios, Naousa and Philisi Bay (Rubensohn, 1901: 157–222). More recently, Morrison (1968) investigated submerged sites in conjunction with the work on Saliagos, and Photiou conducted a survey of underwater finds limited to the northern end of the island, around the bays of Naousa and Philisi (Photiou, 1973: 1–14). In 1969 and 1974 dredging operations in the port at Paroikia reputedly uncovered fragmentary architectural and statuary marbles; as a result the Greek Archaeological Service banned the operations. In 1976 a budget was allocated to expand and improve Paroikia's port facilities. Landfilling, dredging, wharf construction and expansion were resumed, resulting in the destruction of antiquities. Therefore, it was decided to undertake a systematic project for the salvage of underwater antiquities complementary to the land excavations carried out by the Greek Archaeological Society since 1976.

From 6–11th September 1979, an under-

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water archaeological survey was conducted in the harbours of Paroikia and Nausa by the Department of Underwater Antiquities (DUA), of the Greek Ministry of Culture and Science and by members of the Paros Land Excavation at Koukounaries. The primary objective of the survey was to investigate those areas of archaeological interest most threatened by further construction. The project was directed by George Papathanassopoulos, Ephor of Greek (DUA) and co-directed by Demetrius Schilardi, director of the land excavation at Koukounaries. Diving members of the DUA were Elpida Hadjidaki, archaeologist; Nicos Lianos, architect; Stathis Piskardelis, draftsman; Kostas Kostandopoulos, underwater technician. Diving members of the Land Excavation were Paul Jonston, Ph.D candidate of classical archaeology; Michael Biel and Demetrios Haniotes, graduate students of classical archaeology. E. Hadjidaki and P. Jonston were assistant directors of the underwater project.

Paroikia

A total of three days was spent in the Bay of Paroikia. Investigations were concentrated in the area of the port around the main ferry boat wharf, which is located at the northern end of the bay (Fig. 2). Within the modern port, which is bounded on the west by the ferry boat wharf and on the east by the Vinji wharf, several large architectural marbles and pieces of limestone were located in water ranging in depth from 1 to 6 m (Fig. 3). This area, which was unevenly dredged in the past (Fig. 3 dotted line), is also the site for future dredging. Plans include extension of the deepened area up to the seawall to the south to increase the docking frontage. Vertical and sloping dredging cuts are visible along the sea bottom, which consists of mud in the deepest excavated areas, and shingle in the undisturbed part. Near the shore, several columns and parts of columns were found. At a base depth of 6 m a small unfluted marble colonnette (base diam. 36 cm) with strong entasis was located with its top embedded in the shingle (Fig. 3B). To the northeast of this column the dredge exposed two more marble columns or drums vertically embedded in the soft mud bottom (Fig. 3E). The uppermost

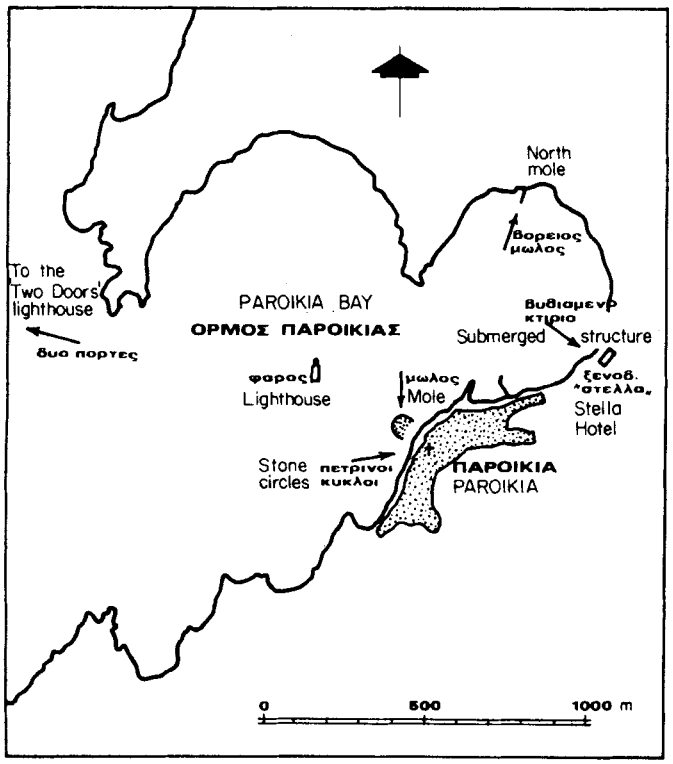


Figure 2. Map of Bay of Paroikia, with sites mentioned in text. Features not drawn to scale. Map by P. F. Jonston.

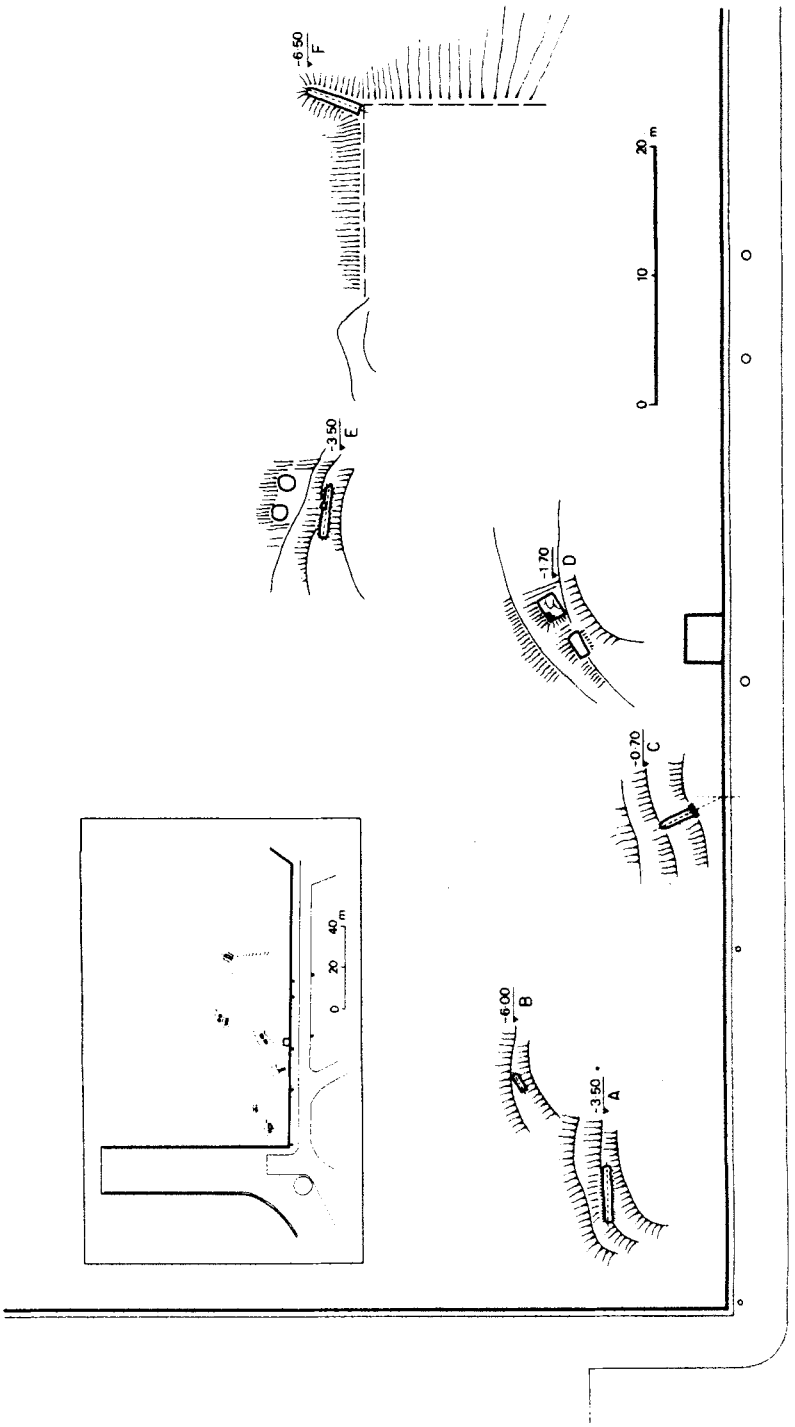


Figure 3. Map of port area in Paroikia. Map by Nicos Lianos.

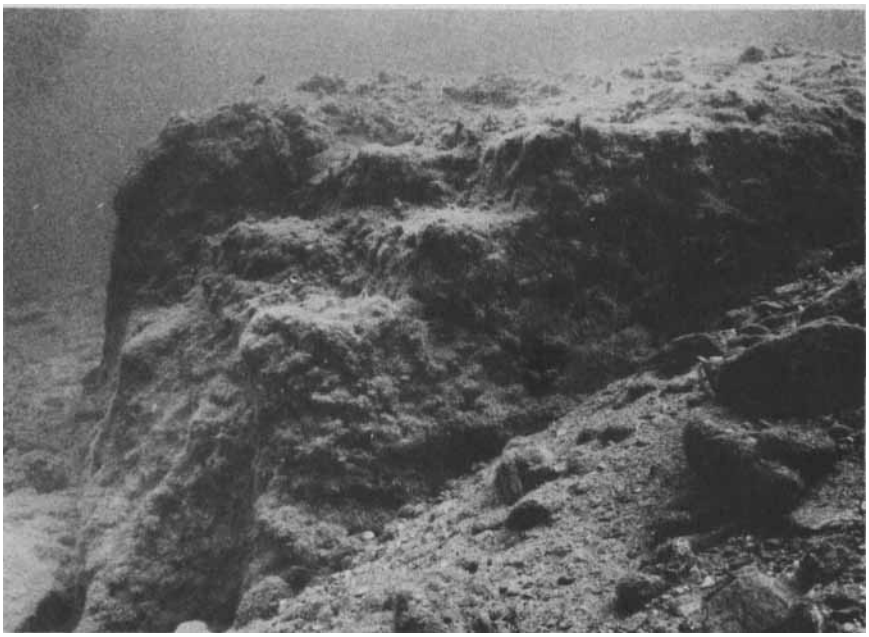


Figure 4. Architectural marble with stepped cutting. Photo courtesy of the Department of Underwater Antiquities.

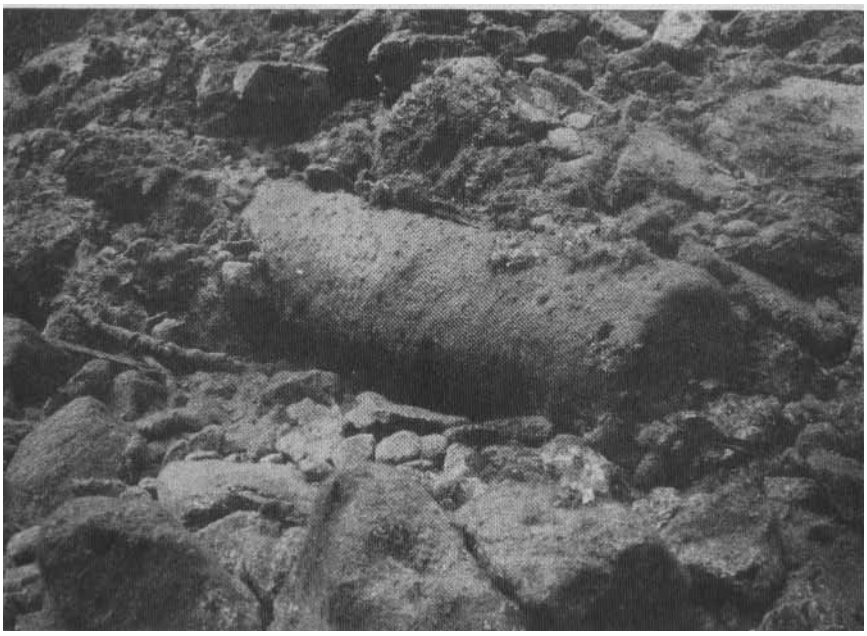


Figure 5. Marble colonnette incorporated into base of lighthouse. Photo courtesy of the Department of Underwater Antiquities.

surface of these columns were partly damaged and no clamp holes were found. The columns are 1·30 m in diameter and 2·80 m apart on centres. Nearby, and possibly in association with the columns are two long rectilinear marble slabs, one leaning against the other (Fig. 3E). The larger of these is 3·10 m long, and is moulded on its upper surface perpendicular to the long axis. Deep gouge marks on the latter piece indicate that the dredge bucket moved it from its original position to its present location. Another large marble column was situated to the east, lying on its side in the soft mud at a base depth of 6·50 m (Fig. 3F). The exposed length of this unfluted monolith is 4·35 m; the lower diameter is 1·75 m. Southeast of this feature, near the quayside, are two additional architectural marbles (Fig. 3D). The larger of these, which measures 1·69 m long, by 1·35 m wide, has on its northwest corner a complex double stepped cutting (Fig. 4).

Two courses of a badly damaged wall, built of thin irregularly shaped slabs (length *c.* 1·5 m) also were surveyed in the southwest corner of the port area (Fig. 3A). In addition, several small worked marbles both intact and fragmentary, as well as large amounts of pottery dating from the Roman, Byzantine and Ottoman periods were recorded scattered throughout the port area. It is as yet unclear which of the marbles are *in situ*. The marble columns and especially the architectural blocks closely resemble a cargo of unfinished marbles from an AD 200 shipwreck found off Punto Scifo, near Crotone, Italy (Pensabene, 1978: 105–118, esp. figs 9, 10). It is uncertain whether the examples from Paros, if representing a similar situation, were awaiting transhipment from a dock on board a ship, or whether they belonged to a marble building erected next to the water. Recent scholarship has recognized the importance of Parian marble workshops which were actually engaged in the production of marble buildings, locally to be dismantled and shipped overseas to sanctuaries of the Greek mainland [see Gruben (1972: 28–9) and Holtzman (*B.C.H. Supplement* 4: 304)].

Reports from the local harbour police and the inhabitants indicated that material from the dredged area had been dumped in the harbour channel near the lighthouse (Fig. 2). As a result, a circular survey was conducted around the lighthouse for a distance of 100 m. A small marble colonnette, similar in size to the examples in the port area was found incorporated into the northwest side of the lighthouse base, at a depth of 5·00 m (Fig. 5). Two square marble bases, 60 cm each side, were recorded nearby, along with several irregularly broken marble blocks. Around the base of the lighthouse and on the north side of the harbour channel numerous heaps of rubblestones also were examined as presumed dumps from the dredging operations in the harbour basin. One of these reputedly contained an inscribed marble, although this could not be located. Time limitations precluded an investigation of the region of the 'Two Doors', where Paroikians had reported fragments of marble statuary had been discarded in deep water by the dredges.

Moles

Two moles were investigated in the Bay of Paroikia. The larger of these, to the southwest, begins approximately 75 m offshore of the Byzantine church of Agios Konstantinos, at the southwest end of the bay (Fig. 2).

In plan the structure is a massive tongue-shaped projection, built of large rubblestones laid so as to present a smooth surface both on the top and on the sloping sides (Fig. 6). In section the mole is in the form of a ramp; as the water depth increases to the north, some of the stones of the upper surface, which is approximately level, are larger and flatter than others and may represent part of the original paving. A roughly circular depression, 2 m wide by 1 m deep, is visible near the centre of the mole. A small amount of coarseware pottery was discovered in the rubblestone interstices, but it was too badly abraded to provide any evidence for dating the construction. The top of the mole varies from 2 to 3 m below present sea level. If this upper surface was originally 1 m above sea level when built, then a 3 to 4 m sea level change may be proposed from the original date of construction to the present. This is corroborated by Morrison, who suggested a 3 to 5·5 m sea level change for the site of Saliagos from the Neolithic period (Morrison *op. cit.*: 96–97, fig. 24, and Fig. 1 here). The top of

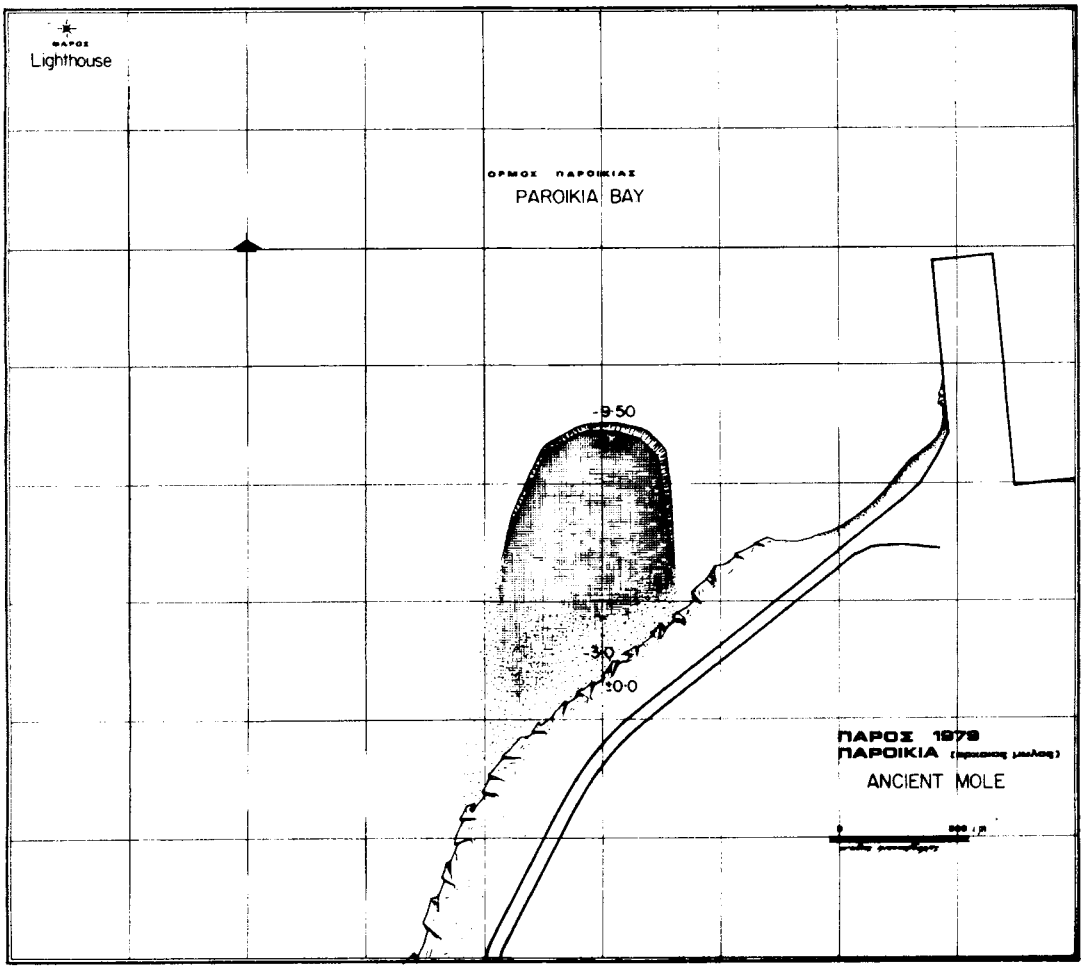


Figure 6. Tongue-shaped mole off Agios Konstantinos. Plan by Stathis Piskardelis.

another mole at the north end of the Bay of Paroikia (Fig. 2) is also from 2 to 3 m below modern sea level. Approximately 100 m long, this mole consists of large rubblestones carefully and regularly set forming a flat surface. In section the structure is 9 m wide at the base and 6 m wide at the top, with sloping sides. Near the middle of this mole, for which no evidence for dating could be found, a circular depression was observed similar to that noted on the larger tongue-shaped mole to the south.

Stone circles

South of the large mole at Agios Konstantinos, approximately 50 m offshore, a discrete group of four stone circles was briefly inspected (Fig. 2). Due to time limitations, these could not be fully surveyed and mapped; only the largest example was measured and roughly sketched (Fig. 7). It comprizes an outer circle of rubblestones one course high, with an outside diameter of 7·8 m. Within this is another circle of bigger rubblestones, piled two to three stones deep. In the centre of the inner circle at the highest point lies a smooth rounded stone, ovoid in shape and considerably larger than any of the others. The inner circle is connected on the south to the outer by a group of small smooth stones. The depth of this stone circle is 4 to 5 m below sea level; it and the other examples are separated from one another by approximately 10 to 15 m of sandy bottom with

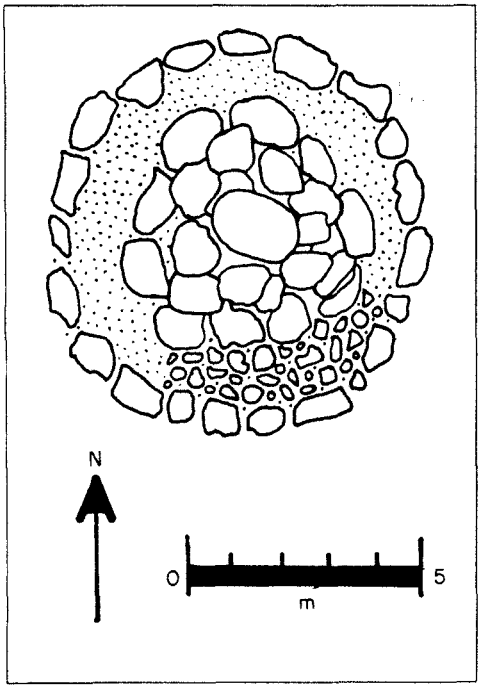


Figure 7. Stone circle off Agios Konstantinos. Features not drawn to exact scale. Sketch by P. F. Jonston.

Posidonia weed (eel grass). None of the various suggestions made concerning the original purpose of these features (windmill or lighthouse foundations, bomb craters, or grave circles) are especially convincing. The water depth and the proximity of the circles argues against their being circular foundations for windmills or lighthouses, or for that matter grave circles, since they would have been underwater even in antiquity if the proposed local sea level change is accurate. Nor would there by any reason to place so many lighthouses so close together. Only further survey and excavation, hopefully to be carried out in future seasons, may clarify these enigmatic cairn-like features.

Building

In his 1901 publication Rubensohn included the plan of a complex multi-roomed building submerged in Paroikia, 'on the inside of the Bay, near the coast and at the Shoreline' (Rubensohn, 1901: 191–2, and fig., p. 191). Rubensohn considered this building, the remains of which consisted of from one to two courses of gneiss and hard limestone bonded with mortar and puozolana, to be either a Roman house, workshop or storage magazine. During the 1979 survey remains of a building with two courses of masonry extant were briefly investigated 1 m offshore at a depth of 50 cm below sea level between the easternmost harbour mole and the last turn of the artificial wall at the Hotel Stella (Fig. 2). Although dense *Posidonia* weed and time limitations prevented a full survey of this structure, it is expected that work in future seasons will clarify the possible association of this building with Rubensohn's structure. Other submerged features noted by Rubensohn (1901: ibid.), including walls and moles in the water off Agios Konstantinos, could not be located in 1979. This is due presumably to the 1977 landfilling operation, which extended the shoreline out into the sea at this point for a distance of 10 m.

It should also be mentioned that many of the shops, offices and houses in modern Paroikia exhibit intact amphoras encrusted with sea growth ranging in date from the Classical period to Roman Imperial times. An effort was made during the 1979 survey in Paroikia to begin photographing and cataloguing as many of these as possible, and to determine their find-spots and to establish a systematic file so that a shipwreck survey may be carried out in the future.

Naousa

The 1979 survey of the Bay of Naousa, which is located at the northern end of Paros, was restricted to two days (Figs 1, 8). During this period, the sites of five shipwrecks were briefly investigated and photographed. All five exhibited signs of heavy looting. Three were found near Agios Ioannis, all apparently modern (Fig. 8). The smallest appears to be a small, lightly built caique, with frames and strakes extant below the waterline. Nearby is another wooden vessel, in a similar state of preservation, but constructed of heavier timbers. The sternpost is still *in situ*, mortized into the keel; only ballast and a small whetstone were readily visible between and on top of the frames. No interior ceiling planking was preserved on either of these vessels. The third wreck is metal-hulled and framed, with a ballast of thin yellow bricks still *in situ* against the ceiling in places. This

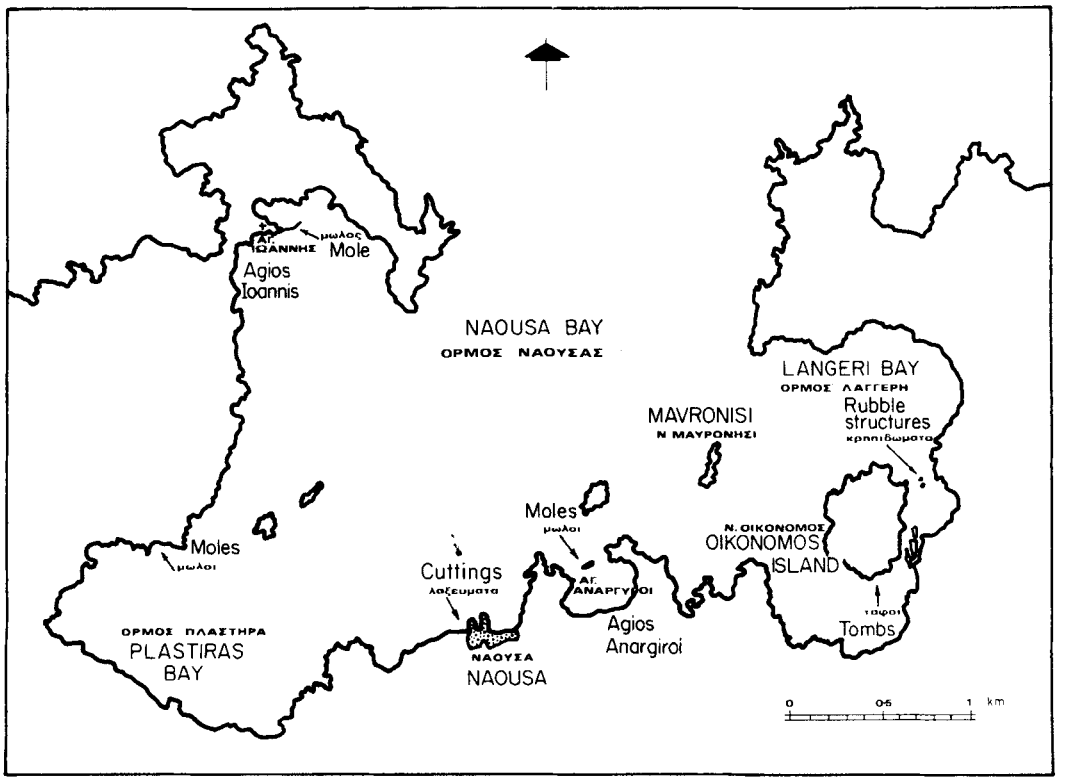


Figure 8. Bay of Naousa. Map by P. F. Jonston.

wreck may perhaps be associated with a vessel reported by Naousans to have sunk in this vicinity during World War II.

The other two wreck sites are located near Mavronisi Island, on the eastern side of the bay (Fig. 8). The first comprizes a widely scattered group of amphoras, heavily concreted into a coral reef (Fig. 9). Comparative material from the excavations at the Athenian Agora indicates that the amphoras from this site are Koan, of the 1st century BC (Grace, 1961: fig. 56, right). Only a few intact examples were seen deeply embedded in the coral; representative samples were photographed *in situ* and recovered for further analysis. Neither wood nor any other sort of artefacts were seen. The condition of the second wreck is similar to that of the first, in that the pottery is scattered in small heavily concreted groups over a wide area of coral reef. No intact amphoras were observed and only one neck was sufficiently preserved to be photographed (Fig. 10). It is tentatively identified as Roman. No samples could be retrieved due to the heavy concretion.

Moles

Three moles were examined in the Bay of Naousa. Two of them are in the southwest corner of the bay, on the northern side of Plastiras Bay not far from Koukounaries (Fig. 8; Schilardi, 1980).

The larger consists of little more than a badly damaged irregularly shaped pile of rubblestones, one stone high, measuring 74 by 51·20 m (Fig. 11). At its eastern end there is an amorphous depression with a sandy bottom, analogous to those found in Paroikia. Fragments of Byzantine and Ottoman pottery were recovered from between the stones. Approximately 10 m to the south is another shorter mole, unconnected to the land. Both moles lie in from 1 to 2 m of water, indicating that when in use only very shallow draft vessels would have been able to approach this natural sandy

Figure 9. First century BC Koan amphora neck, from wreck near Mavronisi Island. Photo courtesy of the Department of Underwater Antiquities.

bay. The third mole closes off a small anchorage in the northeast corner of Naousa Bay, near the church of Agios Ioannis (Fig. 8). It is in the form of a dogleg with sloping sides 102 m long by 10 m wide on its upper surface (Fig. 12). The water depth varies from 1 m at the base to 2·50 m at the eastern end. A roughly circular depression of dimensions similar to those found elsewhere locally (see *supra*) is located at the approximate midpoint of the structure. Near this feature a flat rounded stone was found with a hole partially bored through its centre; possibly an unfinished anchor or a base of some sort. If an anchor stone, it might help to explain the presence of the depressions as convenient spots into which an anchor might be placed to moor a vessel beside the mole. No evidence for dating the mole at Agios Ioannis was seen in the 1979 survey. Taken together the three moles provide evidence that as in Paroikia, a sea level rise of some three or more metres has taken place at the northern end of the island.

Harbour installations of a different sort were investigated northeast of Oikonomos Island, where a Geometric settlement has been discovered (Praktika, 1975: 205–9, fig. 3), at the south end of Langeri Bay (Fig. 8). These consist of two rubblestone 'islands' midway between Oikonomos Island and the opposite shore. The example to the north incorporates at its northern end a stone circle, one course high, with a sandy bottom (Fig. 13). Photiou identified these structures, which are roughly 20 m long and separated from one another by 30 to 40 m of sandy bottom, as docks or jetties for ships (Photiou, 1973: 8–9, fig. 5), and associated them with long rock-cut channels in the small bay to the southeast. These artificial 'islands', however, the tops of which are 1·6 to 2 m below sea level, are not connected to either nearby shore. Therefore, Photiou's hypothesis would require the additional costly step of trans-shipment of materials from the 'islands' to the shore. Another explanation might be that

Figure 10. Inverted amphora neck from Roman wreck near Mavronisi Island. Knife is 27 cm long. Photo courtesy of the Department of Underwater Antiquities.

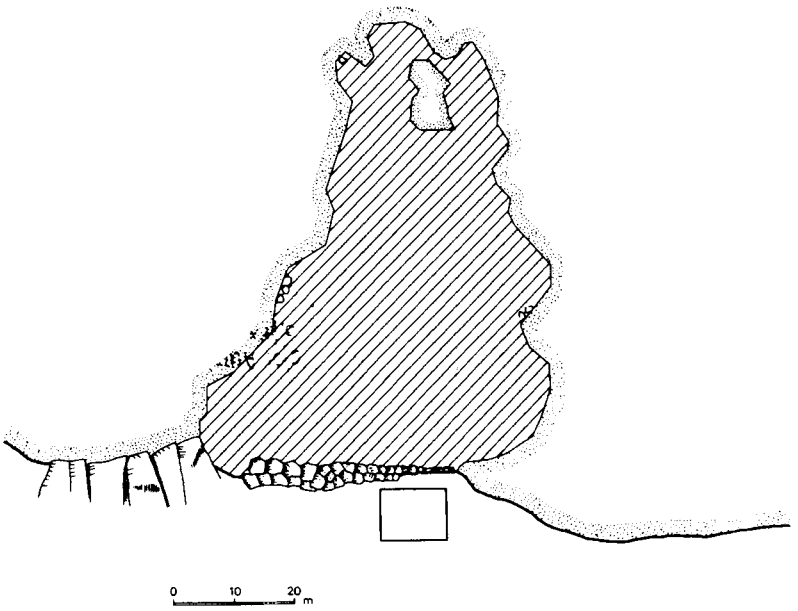
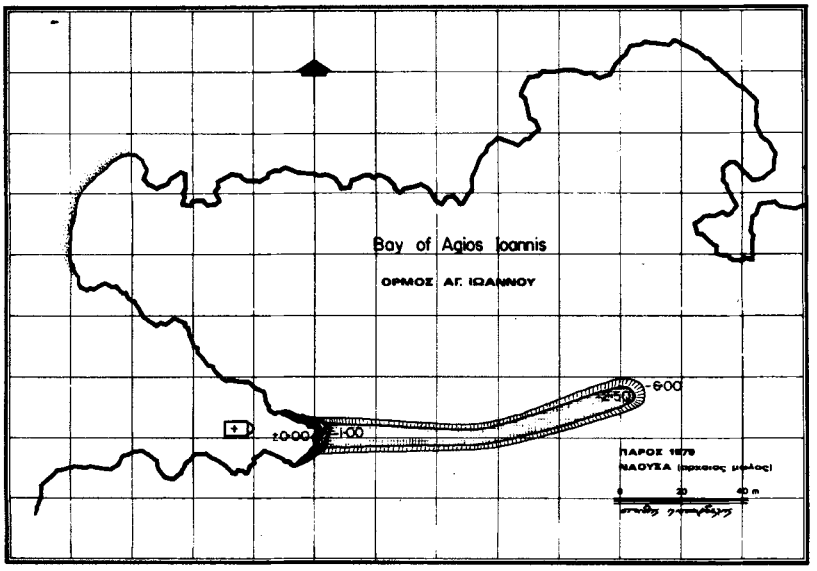


Figure 11. Mole at Plastiras Bay. Plan by Nicos Lianos.



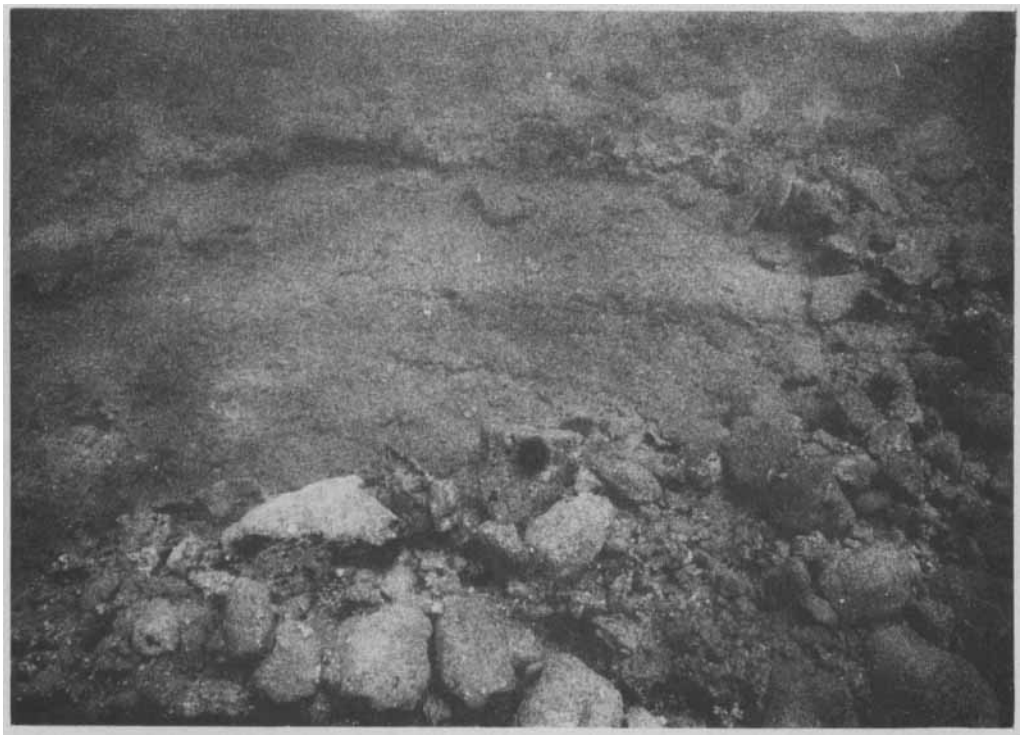


Figure 13. Stone circle at northern end of rubble 'island' at Oikonomos Island. Photo courtesy of the Department of Underwater Antiquities.

Figure 14. Submerged cist grave. Photo by P. F. Jonston.

these constructions could represent defensive installations where men could be stationed, or a halfway point to which chains could be stretched between the opposite shores to prevent hostile ships from entering the bay. This theory, however, does not account for the presence of two such islands (Photiou, 1973 10); no substructures could be located during the present survey although substantial quantities of Byzantine amphora fragments were visible along the eastern shoreline, by the small church of Zoodohos Pigi.

Cist graves

South of Oikonomos Island, a group of three cist graves was found in from 1 to 2 m of water, 15 m from the shore (Schilardi, 1973: 263–64, fig. 9). All three are constructed of thin stone slabs vertically set into the sandy bottom, with long side slabs and shorter stones at either end (Fig. 14). These are probably to be associated with the well known circular precinct on Oikonomos (Photiou, 1973: 5–8; Schilardi, 1975: 93–4). In combination with the stone 'islands' to the north they offer evidence that the proposed sea level change of at least 3 m was relatively uniform throughout the Bay of Naousa.

Conclusions

The areas briefly outlined above represent only a small fraction of the extant features along the shores and beneath the waters of Paros. The accounts of local fishermen and the large quantities of amphoras on display in Paroikia and Naousa attest to the quantity and quality of shipwrecks in the region, yet to be investigated. There is space here only to mention the extensive and complex series of rock cuttings which remain to be systematically surveyed and analysed on and off the coast of Paros at Pounda, Kolymbithres, Naousa, Agioi Anargiroi, Hellenika, Zoodochos Pigi, Santa Maria, Philizi, Ambelas, Drios and Aliki. The third major harbour of Paros at Drios, as well as numerous smaller inlets and bays scattered around the island also remain to be explored. However, on account of the pending port expansion at Paroikia, the region between the ferry wharf and the Vingi wharf is of the highest priority for future seasons.

Acknowledgements

Logistical and financial support for the 1979 survey was furnished by the Greek Department of Underwater Antiquities and by the Paros Excavations; their assistance is gratefully acknowledged. Thanks are also owed to the harbour police of Paroikia and Naousa, who set aside and patrolled areas in both towns for the equipment of the survey team. We are also greatly indebted to the Parians who generously shared their extensive knowledge of the local waters, including Dr Kebabis, mayor of Paroikia; Judge Ol. Alifieris, and fishermen Michaelis and Vangelis Gylos of Paroikia.

Note

[1] At the request of Mr George Papathanassopoulos, Ephor of the Department of Underwater Antiquities, the locations of the wreck sites are only generally indicated. Further information may be obtained from the Department of Underwater Antiquities, Odos Omirou 58, Athens, Kolonaki, Greece.

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