

Arade River Archaeological Complex: Dredges and Archaeology

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Situated on the southern coast of Portugal, the Arade River mouth has been visited and inhabited for over three millennia. Dredging operations, in the first and last decades of the 20th century, brought up the importance of Arade's cultural heritage and triggered a large-scale project of study, survey, and archaeological excavation. This project is conducted by Centro Nacional de Arqueologia Náutica e Subaquática, the Portuguese agency for nautical archaeology, under the direction of Francisco Alves, and with the support of both local and state authorities. This paper is a preliminary assessment of the finds made so far.

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Key words: Portugal, Portuguese seafaring, Portimão, Arade River, 16th century, Arade 1 shipwreck.

First found during dredging operations in 1970, a shipwreck—designated Arade 1—was photographed and inspected by amateur archaeologists during subsequent summers. Since there were very few artefacts, this wreck was eventually forgotten and abandoned. During the following decade the Arade 1 hull decayed, broke flat, and was covered by sediments.

In the summer of 2001 Centro Nacional de Arqueologia Náutica e Subaquática (CNANS), the Portuguese agency for nautical archaeology, invited me to co-direct a project of survey and excavation of several sites on the mouth of the Arade River, near the city of Portimão, in Portugal (Fig. 1). That same year a CNANS team relocated the Arade 1 shipwreck and an agreement was secured with the local municipality and museum for a long-term project of excavation, conservation and study of the Arade River underwater cultural heritage. In 2002 I was invited by CNANS to direct the excavation of the Arade 1 shipwreck with a team of students from Texas A&M University Nautical Archaeology Programme. The field season encompassed the excavation of Arade 1, the search for another shipwreck—designated Arade 6—and the recording of several other contexts previously located at the mouth of the river (Fig. 2). The Texas A&M University team joined a team from CNANS and teams from the Department of Anthropology of

the University of São Paulo, Brazil, and from a local cultural association named Grupo de Estudos Oceânicos (GEO). Together with the excavation of Arade 1, I was asked by CNANS' director Francisco Alves to comb its records and produce a comprehensive report of all archaeological targets of potential interest found or reported since the 1950s. The preliminary results of the excavation of the Arade 1 ship (Figs 3, 4 and 5) are already in press (Castro, forthcoming). This paper stems from the results of my inquiry to assess the history and importance of the Arade River mouth and its many shipwreck sites (Castro, 2002).

Historical background

The mouth of the Arade River has been inhabited since at least the Iron Age. It is believed that during the 6th century BC this area possessed a fairly important harbour, Portus Hanibalis, built by the Carthaginian general Hamilcar, the father of the famous invader Hanibal, either at the very mouth of the Arade River, or in the nearby small inlet of Alvor (Carrapiço *et al.*, 1974: 40). Roman occupation of this area is well documented by the ruins of several Roman rural villas. During the subsequent Arab occupation (from AD 715 to 1250) the village of Silves, a few miles upstream, became an important urban centre, and traffic on the river intensified. In AD

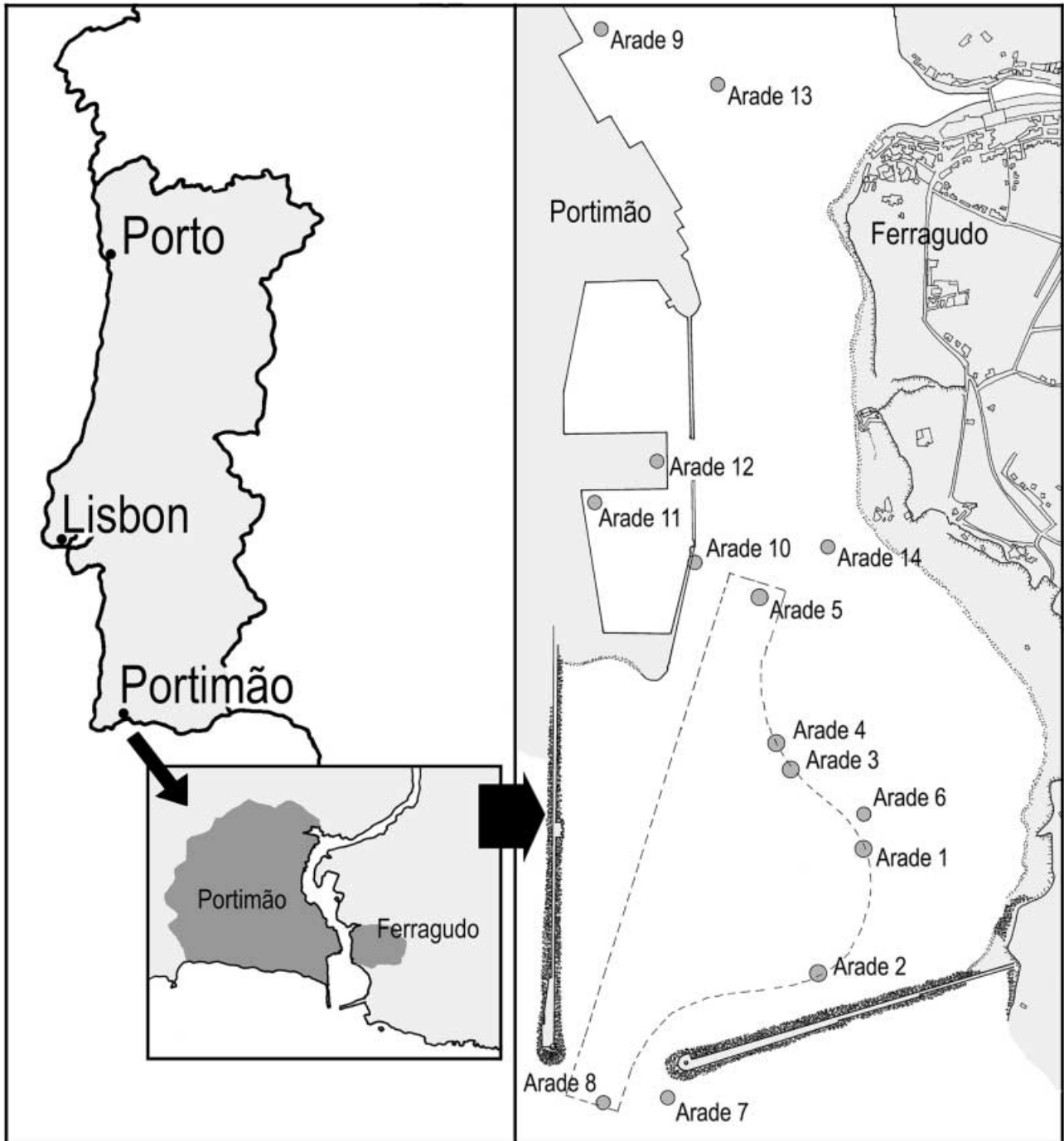


Figure 1. Portimão and the Arade River mouth. (Filipe Castro)

966 a fleet of 28 Viking ships was sighted off the coast of Portugal. A Muslim fleet left Seville as soon as possible and engaged the 'infidels' in the Arade River. According to the chronicler many Vikings were killed and many vessels sunk. The remaining enemies fled, and the Arab prisoners that had been taken were rescued (Coelho, 1989: 129–30).

Portimão was then a small settlement, or even just a number of scattered houses. An account of the conquest of the nearby city of Silves in 1189 by an anonymous crusader, who took part, mentions the destruction of Alvor, a small village in the vicinity of Portimão, where the castle was burned and the entire population (estimated at 560) put to death. A number of country houses



Figure 2. Mouth of the Arade River in 2002. (Filipe Castro)

at the mouth of the Arade River were also burned (Matos, 1999). In the 13th century the Portuguese conquest (*reconquista*) of the southern portion of today's Portugal, named Algarve, brought new settlements and new settlers to the mouth of the Arade. From a small hamlet in the mid 13th century grew a village with about 40 households in 1463, named São Lourenço da Barroza, and possibly dependent on the fishing of tuna, an ancient activity in the region (Loureiro, 1909, vol. 4: 186). On a curious note, the remains

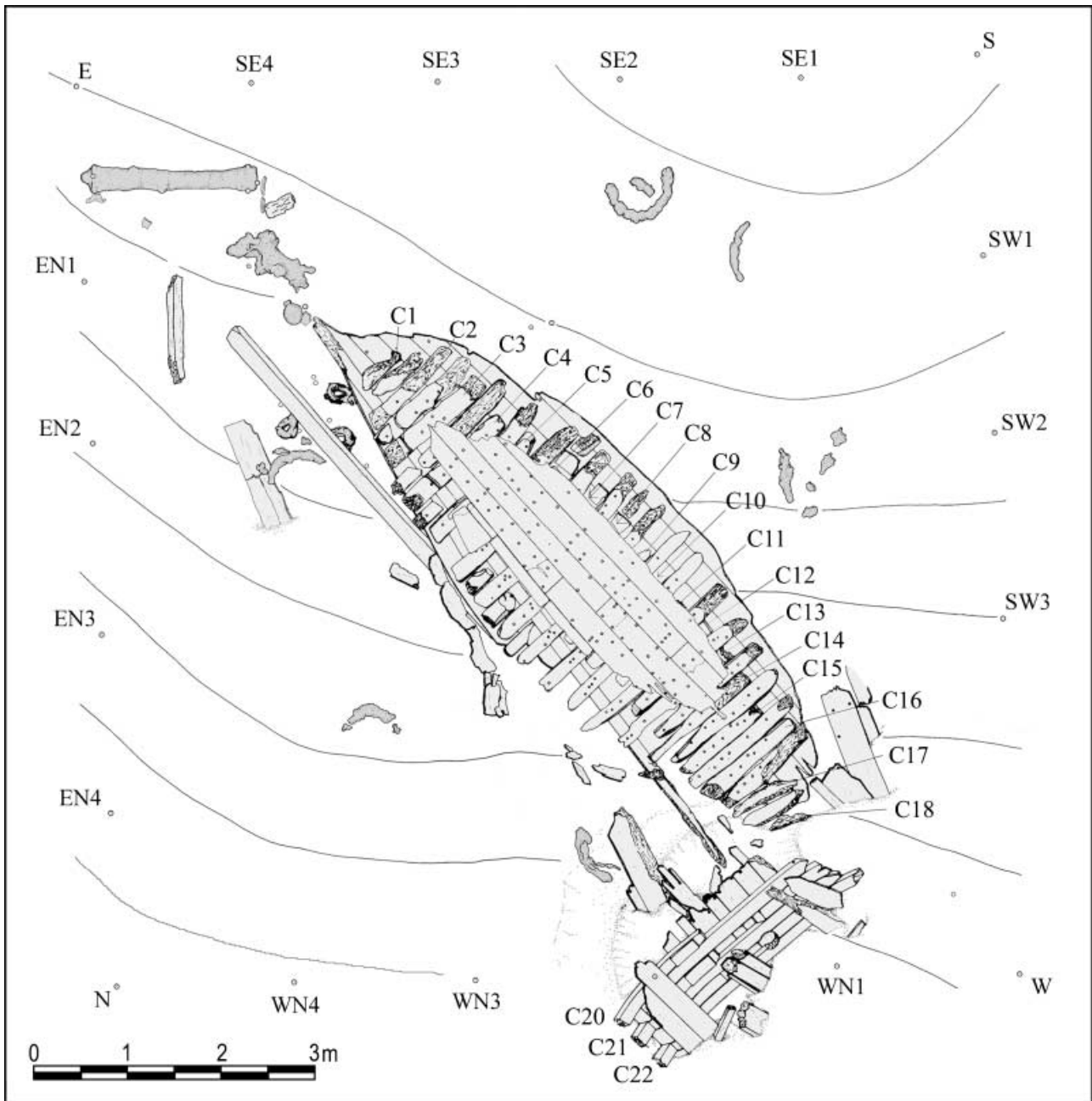


Figure 3. Arade 1 ship. (Filipe Castro)

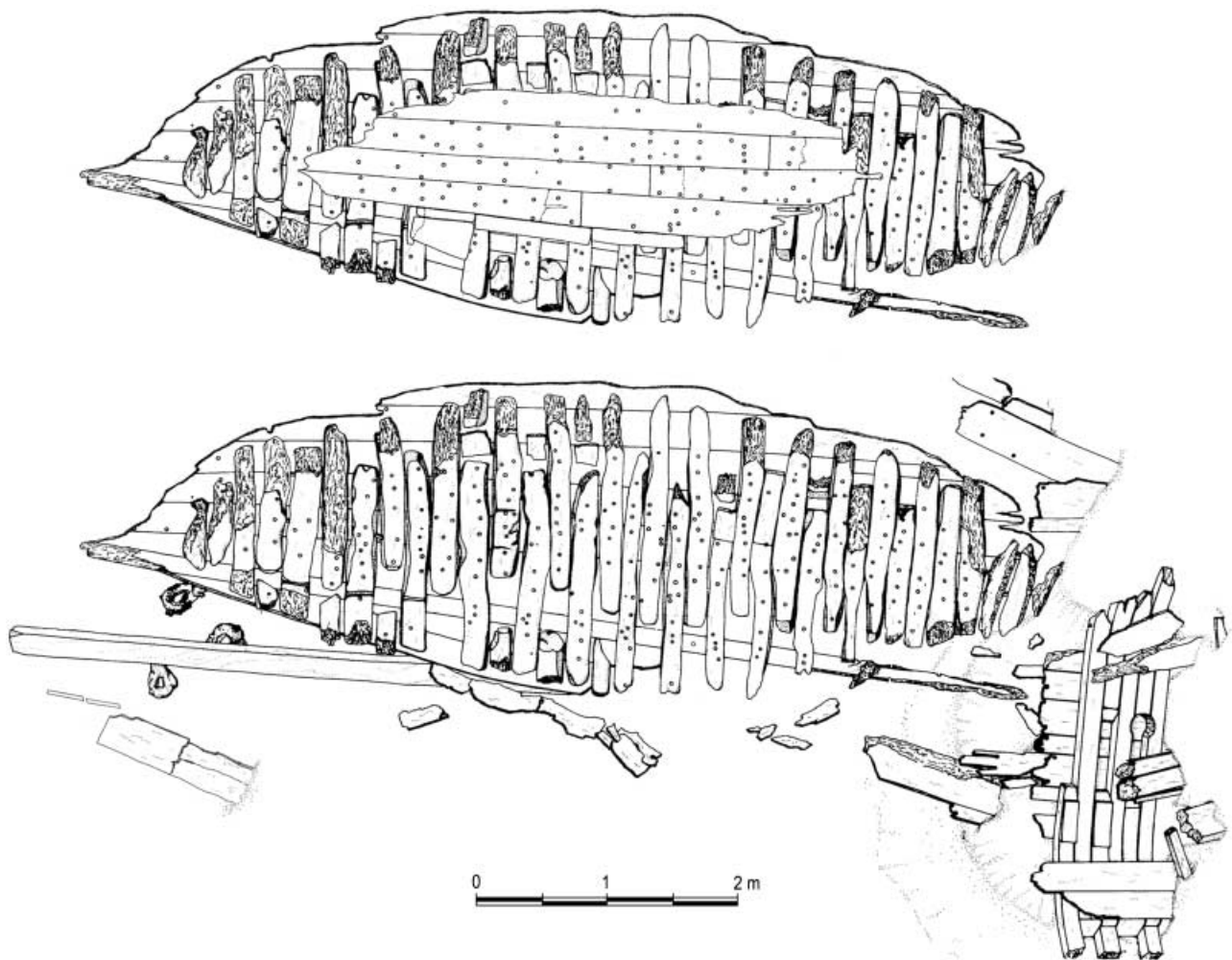


Figure 4. Arade 1 ship: ceiling and frames. (Filipe Castro)

of this early settlement are said to have been exposed on 1 November 1755, after a series of tidal waves, said to have been over 10 m high, which followed the earthquake that struck Portugal that morning, hit the mouth of the river. Because it was very exposed to pirate incursions, the new village was fortified with walls in the second half of the 15th century. By 1615 there were 1802 inhabitants in Portimão, and there were four other settlements nearby: Alvor, Silves, Estombar, and Ferragudo (Carrapiço *et al.*, 1974: 26). Two fortresses were built in the first decades of the 17th century in order to protect the river from incursions by both Muslim and Protestant pirates. By 1622 the mouth of the Arade River was protected by the fortresses of São João on the left bank and Santa Catarina on the right bank (Carrapiço *et al.*, 1974: 37).

In spite of the two small sandbanks that divided the river into three channels until the early

20th century, the river was navigable upstream past the city of Silves as late as the 17th century. The November 1755 earthquake and tidal waves are said to have caused major changes in both the course and the shape of these channels. The river course may have shifted about 1 km west. But in spite of progressive silting the largest channel—the eastern one—was still 4.8 m deep at high tide as late as the 18th century. All these centuries of occupation and maritime activity made the mouth of the Arade River an enormous garbage dump. Many artefacts were thrown, abandoned or lost in the river during more than 25 centuries of documented human activity in this area. In the beginning of the 20th century the beauty of the landscape and the amenity of the climate brought the first families to spend holidays at Praia da Rocha, which was by 1910 the best-known and most-frequented resort in the whole south of Portugal.

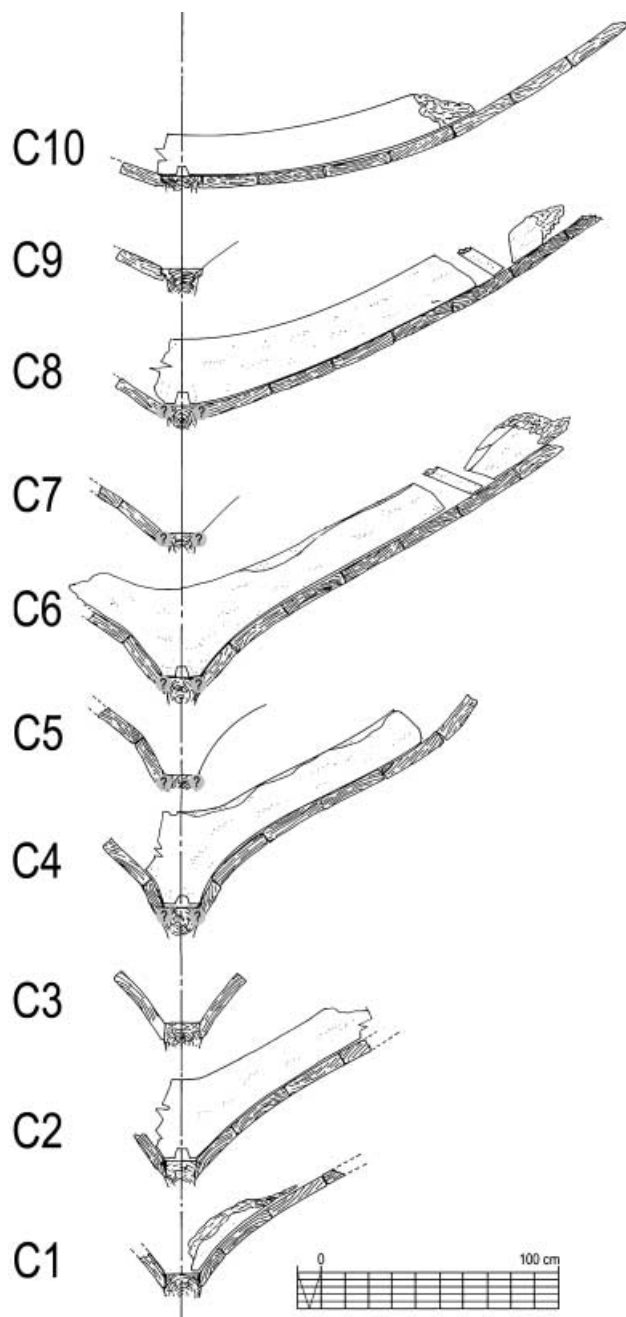


Figure 5. Arade 1 ship: frame sections. (Filipe Castro)

Dredges and shipwrecks

Data from 1916–26 shows that the mouth of the Arade River was very unstable, with depths varying widely, as the main channel path varied (Fig. 6A). In 1926 and 1927 the sandbanks were dredged for the first time, as a developing fishing industry, associated with a growth of a young canning industry, called for better conditions for

vessels entering and leaving the river. Although impressive—a total of 360,000 m³ of sand were dredged and deposited on the sea bed in front of Ponta do Altar promontory—these dredging works were not very successful, as the river quickly re-established its ancient path, and by 1936 the river mouth was again shallow and unstable. But the dredging works had another effect: the large sandy strip that formed Praia da Rocha started to diminish.

During the 1950s two jetties were built to protect and regularise the mouth of the river, and allow the construction of a commercial harbour at Portimão (Fig. 6B). The construction of the first jetty was started in 1948 and interrupted soon after. Started again in 1951, these structures were soon ready but although the expected regularisation of the river bottom was achieved, their construction may have impeded the natural shift of sediments along the coast, and furthered the disappearance of sand in Praia da Rocha, situated immediately to the west. In 1968 an area inside the jetties was dredged to a depth of 8 m, and the sand deposited at a shallow depth in front of Praia da Rocha, in the hope that this could stop the disappearance of the beach. But it continued to erode and between June and November of 1970 a large portion of the harbour area was dredged again to a depth of 8 m. This time the sediments (c.830,000 m³) were deposited on the beach (Fig. 6C). As a result the mouth of the Arade River attracted the attention of beachcombers: perhaps thousands of artefacts were found at Praia da Rocha by tourists, fishermen, owners of local beach restaurants, and interested collectors. Some made it to the museum of Portimão, some were lost for lack of conservation treatment, and some were sold in flea markets. More important than loose artefacts, however, were the five or six shipwrecks reported to have been hit by the dredgers and exposed in that year.

Maintenance of the depths obtained in 1970 forced other dredging campaigns starting in 1980, which were responsible for the complete destruction of at least one other shipwreck. The 1990s witnessed more dredging of the river mouth, but this time the sediments were deposited at sea, making it impossible to know what or how much was destroyed. Finally, dredging for the construction of a yacht marina—which was watched by a team of archaeologists—led to the destruction of another three shipwrecks buried on the left bank of the river, although of quite

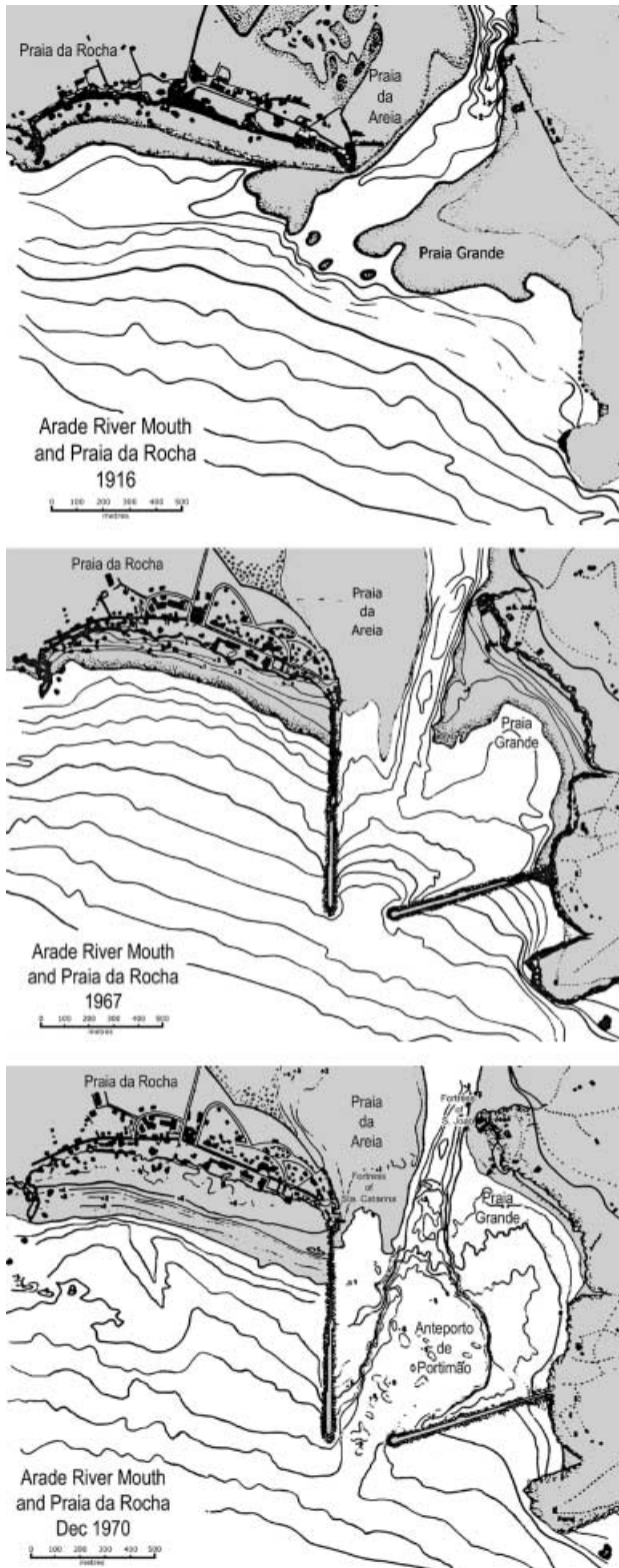


Figure 6. The Arade River mouth in 1916 (top), in 1967 (middle), and after the 1970 dredging works (bottom). (after Gomes and Weinholtz, 1971)

recent origin and allegedly of poor archaeological interest.

Public outcry

There is no information whether any shipwrecks were hit or destroyed during the 1926 and 1927 dredging works, but it is probable that many artefacts were removed from the Arade River mouth together with the 360,000 m³ of sediment. In the late 1950s or early 1960s a bronze gun was found by divers of Grupo Desportivo da Sacor at the entrance of the river, near the east jetty. The gun disappeared soon after the announcement of its discovery, before the finders could raise it, and there has been no trace of it since.

Public outcry started after the 1970 dredging works may have exposed six different hulls (Fig. 1). The captain of the dredge *Mark* from the company Bos & Kalis, working as a subcontractor of the Sociedade Portuguesa de Dragagens, reported five (Arade 1 to 5), and subsequent inspections by two different diving groups showed a sixth site (Arade 6). In spite of all the attention given to this event by the media, including national television, nothing was done on behalf of these ships until a decade later, and they were either destroyed or left to rot where they were exposed on the slope of the dredged area. Between 1970 and 1972, shipwrecks Arade 1, 2 and 6 were visited by teams from two Lisbon diving clubs (Centro Português de Actividades Subaquáticas and Federação Portuguesa de Actividades Subaquáticas) and several pictures and at least two accurate sketches of the Arade 1 hull were made. I am told that there also exist pictures of Arade 6 in a private collection, but it has not been possible to access them.

Later in the 1970s, another two shipwrecks were located by sport divers in the area between the jetties, one near the head of the left bank jetty (Arade 7), and one on the channel, immediately outside the line between the heads of the jetties (Arade 8) (pers. comm. Luis Sacramento to Francisco Alves). In 1975 a group of sport divers found and made a preliminary sketch of a group of five iron guns off Praia dos Caneiros, at Ponta do Altar. Because of another group of guns found nearby some years later, this site is known as Ponta do Altar A and has been tentatively dated to the 18th century.¹ In the early 1980s other shipwrecks were possibly hit and partially or totally destroyed by dredging works, generating further public outcry, which does not seem to



Figure 7. One of the eight guns from the Ponta do Altar B site. (Filipe Castro)

have daunted either the harbour authorities or central government. In 1982 dredging destroyed at least one wooden structure, possibly a shipwreck (Arade 9) (pers. comm. Alberto Machado). Media interest in the cultural heritage of the Arade river mouth did not fade during the 1980s, since a steady stream of artefacts surfaced through the actions of beachcombers in Praia da Rocha, and other beaches covered with the sediments dredged in the 1970s and 1980s (Alves, 1999: 75).

In the mid 1980s a team from the Museu Nacional de Arqueologia conducted a survey in the area but did not find any of the 1970 shipwrecks. However, this initiative triggered the interest of government officials, and the shipwrecks were granted legal protection as part of Portugal's cultural heritage (Alves, 1992: 135). In 1993, after a report by local diver Luis Sacramento, eight bronze guns dating from the mid-16th century to 1606 were rescued at the mouth of the river, outside the jetties, by a team from Museu Nacional de Arqueologia (Fig. 7). This site was designated Ponta do Altar B and may correspond to the 1611 shipwreck of a Spanish vessel named *Nuestra Señora del Socorro* (Alves, 1992). Subsequent dredging works in the 1990s were conducted with less public outrage, since the sediments

were dumped once again off Ponta do Altar, and although there were rumours of destruction and allegations of plundering nobody knows exactly what or how much was actually destroyed.

In the last two decades a dedicated and active local group, Grupo de Estudos Oceânicos (GEO), has championed the fight to protect and study Portimão's underwater cultural heritage with competence and determination, but it was not until after the creation of CNANS in 1997 that a comprehensive project for the study and protection of Arade's underwater cultural heritage was launched. In the late 1990s legislation was issued to protect the Portuguese underwater cultural heritage and force promoters to evaluate the impact of coastal and harbour works on potential archaeological sites. In 1998 the remains of three ships presumably dating to the 19th or early 20th centuries were found during the construction of the marina of Portimão (Arade 10, 11 and 12). At that time CNANS was monitoring the works and promoted a full survey of the sites. Since these remains corresponded to recent ships, probably derelicts, the construction of the marina was only stopped while a quick assessment was carried out on the one vessel presenting structural coherence (Arade 10).

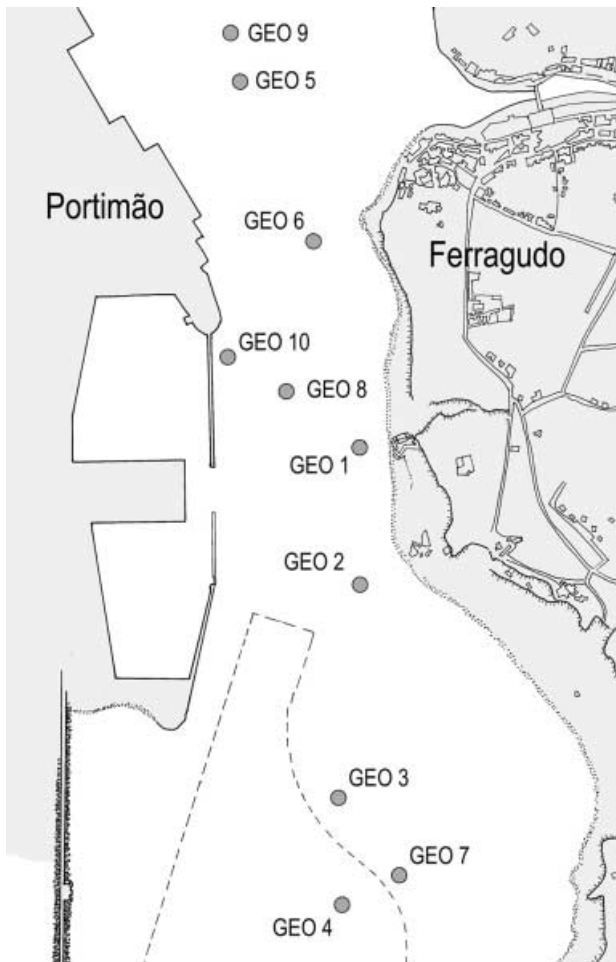


Figure 8. Positions of sites GEO 1 to GEO 10. (Filipe Castro)

During the summers of 1999 and 2000 surveys carried out by GEO divers over an area of almost 1 km², under the direction of Alberto Machado, led to the location of another ten sites of archaeological potential in the study area (Fig. 8). Numbered GEO1 to GEO10, these correspond to ship remains and ship parts, sometimes more or less coherent structures, sometimes disassembled and scattered on the sea-bed (Machado, 2000). Since 2000 CNANS has organised a long-term project in co-operation with a group of local beachcombers and is promoting the survey of local beaches with metal detectors, positioning every artefact with a total station GPS, and depositing all finds in the local museum for conservation. With the co-operation of the local harbour authority José Sousa, one of the organisers of this project, is now analysing the records of the dredging campaigns and trying to match the areas dredged in the river with the respective areas of sediment deposit on the nearby beaches.

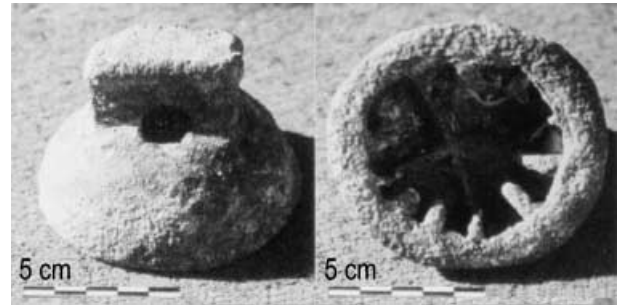


Figure 9. Sounding lead found at Praia da Rocha by the owner of a local restaurant. (Filipe Castro)

There is also formidable work going on to try to make sense of the many reports of artefact finds at the mouth of the Arade River and nearby beaches. As often happens, some of these reports are vague, others are contradictory, and some refer to sites that have long been destroyed. There are stories of coins, amphoras, elephant tusks, guns, iron anchors, lead stocks, and even an astrolabe. Most of these artefacts were removed by fishermen or sport divers and ended up in living rooms of beach houses; lead stocks may have been melted to make diving weights; iron guns rotted away on the grass of a front yard. An old lead weight was photographed in the early 1990s at a local restaurant and has since been lost (Fig. 9). A set of pewter artefacts has been analysed by two history students (Casella *et al.*, 1984). Some of them were retrieved from a pile of sediment by a bulldozer operator in the early 1980s. Unfortunately some of these pewter pieces were eventually lost (Fig. 10).

The ships

So far 16 sites of potential archaeological interest have been identified. Since the Arade River project started only a few years ago only a small number have been surveyed and recorded. The full inventory of all artefacts retrieved from the bottom of the estuary or among the deposits of sediment from the dredging works is not yet finished and the area outside the jetties has not yet been surveyed with remote sensing equipment. However, it is clear that the importance of the cultural heritage still preserved at the mouth of the Arade River deserves all the attention and energy of both local and central administration. The most interesting sites investigated so far are the shipwrecks Arade 1 and 6, and the areas GEO 5, corresponding to well-preserved remains of a large late-19th century vessel, designated Arade 13, and GEO 2, where a small plank showing mortise-and-tenon

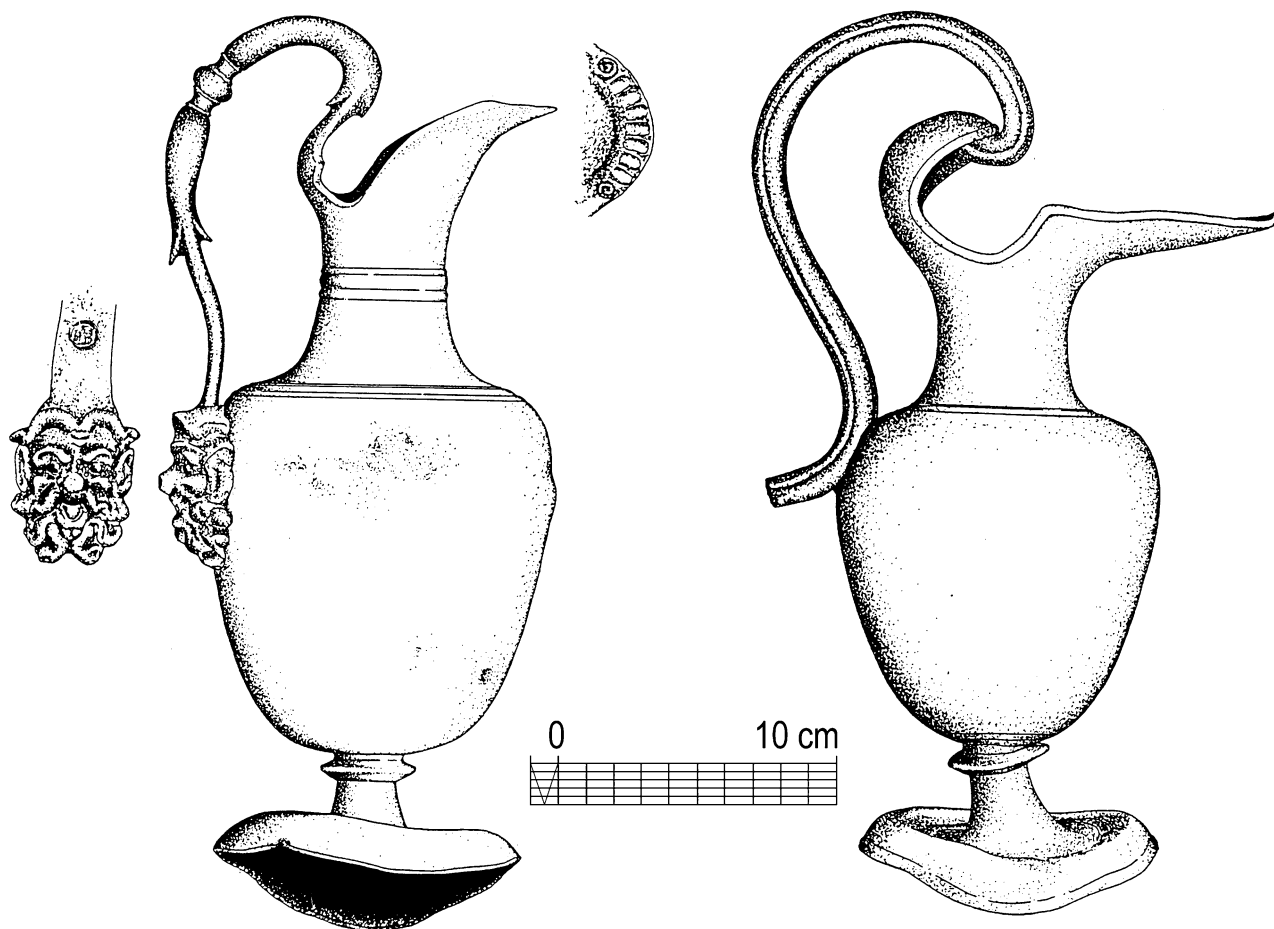


Figure 10. Ewers found in a sediment pile at Ferragudo. (Miguel Lacerda)

joinery was found and optimistically designated Arade 14. Table 1 lists all the sites.

Conclusion

There is concern that the government elected in 2005 may focus its attention on tax cuts and balanced budgets, and that the short-term interests of private investors may be allowed to outweigh public interest and the protection of underwater cultural heritage by relaxing the application of environmental and heritage laws to private developers or harbour authorities. In this context it is not sure whether the massive dredging works planned to be carried out within the next few-years will be preceded by the extensive surveys suggested by common sense and required by law.

Acknowledgements

I wish to thank Francisco Alves, director of CNANS, for entrusting me with the organisation of the information gathered by CNANS on the Arade River mouth shipwrecks. The list of shipwrecks presented in this paper results largely from a meeting

However, the commitment of the local authorities, the excellent work of the municipality and the Museu de Portimão and the growing awareness of the public are positive indicators making it increasingly difficult for distant politicians and bureaucrats to impose short-term profit-based plans. Therefore, the importance of the Arade River mouth, well attested by its historical record, its known shipwrecks, and its amazing collection of scattered artefacts, seems to have finally caught the attention of the general public and the local politicians as an asset for tourism—the main industry of the Algarve region—and for Portimão's own survival as a civilised city. The next decade will hopefully bring new discoveries and new studies of this rich and extensive archaeological complex.

Table 1. *Arade River Shipwrecks*

Designation	Found	Recent Work	Date	Characteristics/finds
Arade 1	Found by captain of dredge <i>Mark</i> in 1970, visited by two teams of sport divers. Report made by CPAS divers and many pictures taken.	Relocated 2001 by CNANS team. Excavated summer 2002 by TAMU/INA team. Disassembled and recovered 2003 by CNANS team, directed by Dr Eric Rieth. Currently subject of thesis at Sorbonne University (Paris 1) by Vanessa Loureiro, supervised by Dr Rieth	Late 16th or early 17th c. (C14)	Local oak (<i>Quercus faginea</i>); lack of artefacts suggests that this was a derelict (Figs. 3, 4 and 5).
Arade 2	Found by captain of dredge <i>Mark</i> in 1970. Already re-covered after storm when visited by sport divers, so no record.			Said to have had bronze guns, one taken by captain of dredge to Netherlands. Its location suggests that bronze gun found in 1950s may have been part of this site.
Arade 3	Found by captain of dredge <i>Mark</i> in 1970. Never visited by sport divers.	May have been partly removed and scattered along the bottom of the river, accounting for the many broken ship timbers located by GEO team 1999–2000		
Arade 4	Ditto	Ditto		
Arade 5	Ditto	Ditto		
Arade 6	Found by sport divers near Arade 1.	Main hull not yet located	Frame C14 dated to early 17th c.	Clinker/lapstrake built
Arade 7	Found by sport divers near the east jetty.	Not yet surveyed		Iron guns
Arade 8	Found by sport divers at the entrance of the river mouth, between jetties.	Not yet surveyed		Iron guns
Arade 9	Probably one of the sites visited by Robert Marx in the 1970s and tentatively identified as Roman or Punic (pers. comm. R. Marx). Destroyed by the dredging operations in the early 1980s.	Dredged far below keel level and all timber removed, so can never be certainly identified.	2nd c. BC (pers. comm. Alberto Machado)	Amphoras
Arade 10	Covered by the Marina de Portimão. Said to be modern.	Surveyed by professional archaeologists during work on marina.	Late 19th or early 20th century? Derelicts.	
Arade 11	Ditto	Ditto	Ditto	
Arade 12	Ditto	Ditto	Ditto	
Arade 13 / GEO 5	Large, well preserved ship, deeply buried in sediment.	Awaiting a survey already planned	Late 18th or 19th century	Copper-alloy fastenings
Arade 14 / GEO 2	Small plank with mortise and tenon joints, the first found on the Portuguese coast (v. similar to joints of magnificent Roman extended logboat found recently on River Lima, N Portugal).	Will be carefully surveyed in the near future		
Ponta do Altar A	Shallow, extensively salvaged		Late 17th or even 18th centuries	Iron guns
Ponta do Altar B	Shipwreck	The extension of the site will certainly justify further investigation in the near future.	Early 17th century, possibly 1611	Bronzeguns

held at the excavation headquarters in July 2002. I wish to thank its participants for their valuable input: Maria Luísa Blot, Pedro Caleja, João Pedro Cardoso and Alberto Machado. I must also thank Margarida Farrajota (CPAS) and Helder Mendes (FPAS) for making available their notes and pictures, and Robert F. Marx for all his information about his activity in Portugal in the 1970s. The project sponsors were immensely helpful: the Municipality of Portimão, the Museum of Portimão and the harbour authority for the grants and facilities. Marina de Portimão for the tanks and diving belts. I must also thank the teams from GEO and University of S. Paulo and their directors: Alberto Machado (GEO) and Gilson Rambelli (USP).

Note

1. Hand-written notes from a 1975 survey by Jean-Yves Blot and Luis Sacramento, on file at CNANS' archives.

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Cover inset: a scientist recording sediment levels on a shipwreck site near Kinlochbervie, Scotland, UK (JNA 35.1: 19) (Photo: Philip Robertson).

Design: patia cross-section (Drawing: Eric Kentley)



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