TEXAS A&M UNIVERSITY
ANTH660 – Field School:
Excavation and Recording of a 16th-Century Shipwreck

The Arade 1 Ship
2002 Field Season
Volume 1 - The Site

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Museu de Portimão
Index

Introduction 7

I – History of the Project 8
   Historical Background 8
   Description of the site 12
   The Arade River Shipwrecks 18
   Arade 1 and Arade 2 Shipwrecks 26
      Arade 1 Shipwreck 30
      Arade 2 Shipwreck: CPAS’ Arade 2 Shipwreck 45
      Arade 6 Shipwreck: CPAS’ Arade 2 Shipwreck 46
   The Arade River Artifact Collections 48
   Bibliography 51
## Index of Figures

<table>
<thead>
<tr>
<th>Fig.</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The west coast of Algarve showing Portimão and its surrounding area.</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Mouth of the Arade River in 2002.</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>Fortress of Santa Catarina.</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>Fortress of São João.</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>18\textsuperscript{th}-Century map of the mouth of the Arade River</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>The Arade River mouth after a 1648 map.</td>
<td>12</td>
</tr>
<tr>
<td>7</td>
<td>The Arade River mouth after a 1916 map.</td>
<td>13</td>
</tr>
<tr>
<td>8</td>
<td>The Arade River mouth after a 1934 map.</td>
<td>14</td>
</tr>
<tr>
<td>9</td>
<td>The Arade River mouth after a 1967 map showing the jetties.</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>The Arade River mouth after a 1970 map showing the recharge of Praia da Rocha with the sediments dredged.</td>
<td>15</td>
</tr>
<tr>
<td>11</td>
<td>The Arade River mouth after the dredging works, after a 1970 map.</td>
<td>16</td>
</tr>
<tr>
<td>12</td>
<td>The mouth of the Arade River.</td>
<td>18</td>
</tr>
<tr>
<td>13</td>
<td>The five shipwrecks hit by the dredges (the fifth position is only guessed on top of the image).</td>
<td>19</td>
</tr>
<tr>
<td>14</td>
<td>Reconstruction of the 1970 dredged area.</td>
<td>20</td>
</tr>
<tr>
<td>15</td>
<td>The wooden remains destroyed by the dredges on the commercial harbor.</td>
<td>21</td>
</tr>
<tr>
<td>16</td>
<td>One of the eight guns from Ponta do Altar B site.</td>
<td>22</td>
</tr>
<tr>
<td>17</td>
<td>Shipwreck destroyed in 1982, and the marina’s shipwreck sites.</td>
<td>23</td>
</tr>
<tr>
<td>18</td>
<td>The ten sites found by GEO team.</td>
<td>24</td>
</tr>
<tr>
<td>19</td>
<td>Aspect of the Arade 10 shipwreck during CNANS’ survey.</td>
<td>25</td>
</tr>
<tr>
<td>20</td>
<td>The CPAS shipwrecks.</td>
<td>27</td>
</tr>
<tr>
<td>21</td>
<td>A1, B1, B2, and C areas.</td>
<td>28</td>
</tr>
</tbody>
</table>
Fig. 22  Frame found on B2 area.  29
Fig. 23  Arq. Albuquerque’s sketch of the shipwreck.  31
Fig. 24  Arq. Albuquerque’s sketch of the supposed keelson.  32
Fig. 25  Detail of the fillers between the futtocks.  32
Fig. 26  Detail of the futtocks.  33
Fig. 27  Base of a frame.  33
Fig. 28  The same frame.  34
Fig. 29  Top of the hull preserved in 1970.  34
Fig. 30  Top of the ceiling planking and filler pieces.  35
Fig. 31  Detail of the frames and hull.  36
Fig. 32  Frames lying on the northern area.  36
Fig. 33  Maststep broken through the mortise. Below sits a frame. On the left side we can see a ceiling plank.  37
Fig. 34  Detail of the frame shown on Fig. 33. Picture taken from the below. Northern side of the shipwreck.  37
Fig. 35  Frames showing the treenails, which fastened them to the hull planks.  38
Fig. 36  Jorge Albuquerque measuring and sketching the southern side of the hull.  38
Fig. 37  Dunnage covering the maststep and ceiling (on the north side) still covered by sediments.  39
Fig. 38  Same area after removal of the sediment. A mat covered the dunnage.  39
Fig. 39  Dunnage covered by a mat lying over the ceiling planking on the south side of the hull.  40
Fig. 40  Same area. Picture taken from a different angle.  40
Fig. 41  Same area. Picture taken from a different angle. To the right we can see the ceiling planks.  41
Fig. 42 Same area. Picture taken from a different angle. To the right we can see the ceiling planks.

Fig. 43 Margarida Farrajota observing the upper end of the futtocks.

Fig. 44 Northern side of the hull.

Fig. 45 Margarida Farrajota measuring a frame.

Fig. 46 Diver measuring the northern side of the hull remains.

Fig. 47 Frame measuring 18 x 18 cm on the south side of the hull remains.

Fig. 48 Diver measuring the lower side of the hull remains.

Fig. 49 CPAS’ Arade 2. Map from 1977 showing its possible position.

Fig. 50 FPAS’ Arade 2. Sketch made in the 1970s by Helder Mendes.

Fig. 51 Mr. Cabrita showing a ceramic shard.

Fig. 52 A sounding lead, possibly Roman, whose whereabouts are unknown.

Fig. 53 The second sounding lead, now in Museu de Portimao.

Fig. 54 Plate. Around 21 cm in diameter and 2 cm deep.

Fig. 55 Footed plate. Around 20 cm in diameter and 8 cm high.

Fig. 56 Salt cellar. Around 8 cm high and 6 cm in diameter on its central portion.

Fig. 57 Creamer. About 15 cm high on the rim and a 10 cm maximum diameter.

Fig. 58 Ewer. About 31 cm high on the rim, and 12 cm at its maximum diameter.

Fig. 59 Ewer. About 23 cm high on the rim, and 11 cm at its maximum diameter.

Fig. 60 The 2002 exhibition at Museu de Portimão.

Fig. 61 Another aspect of the same exhibition.
Introduction

Found during dredging operations in 1970, the Arade 1 shipwreck was photographed and inspected by amateur archaeologists during the subsequent summers. Since there were very few artifacts, this wreck was quickly forgotten and left abandoned. During the decade that followed the Arade 1 hull slowly 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. The Arade 1 shipwreck was located and an agreement was secured with the local municipality (and museum) for a long-term project, designated ProArade. My proposal for the present field school was accepted as part of this larger project.

This report is intended both as an account of the work developed during the 2002 season for CNANS and TAMU/INA, and as a summary of the Arade River archaeological importance to my students and other participants. This is the cause of its unusual length.

The first volume – The Site – is an introduction to the site where the Arade 1 Shipwreck was found, and an history of the previous interventions on the hull remains. The second volume – The Ship – deals with the organization of the field school and the recording of the hull performed during the summer of 2002. The third volume – The Artifacts – is a catalogue of the artifacts found inside the 10 x 10 m area of excavation.

College Station, October 2002
Filipe Castro
I – History of the Project

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 harbor –Portus Hanibalis – built by the Carthaginian general Amilcar – the father of Anibal – either on the very mouth of the Arade River, or on the nearby small inlet of Alvor.\(^1\) Later, a predominantly rural Roman occupation of this area is well documented by the ruins of several Roman rural villas.

![Fig. 1 – The west coast of Algarve showing Portimão and its surrounding area.](image)

During the subsequent Arab occupation of this territory – from AD 715 to 1250 – the village of Silves, a few miles upstream, became an important urban center, and traffic on the Arade River intensified. In AD 966 a fleet of 28 Viking ships was sighted of 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 already taken were rescued.\(^2\)

Portimão was certainly not more than a small settlement, or even just a number of scattered

\(^1\) Carrapicio, Francisco Jose, Palhinha, Jaime Aschemann, Brazio, Jose Manuel, *As Muralhas de Portimão, Subsídeos para o Estudo da Historia Local*. Portimão: Ed. Camara Municipal de Portimão, 1974: 40

houses on the landscape. An account of the conquest of Silves by an anonymous crusader who took part in it in 1189 mentions the destruction of Alvor, where the castle was burned and the entire population – 5,600 people – was put to death, and the burning of a number of country houses at the mouth of the Arade River. There the land was well cultivated, but nobody was in sight at the time of the crusader fleet arrival.³

In the 13th century the Portuguese conquest – the so-called 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 settlement in the mid-13th century, it became a village with about 40 households in 1463, named São Lourenço da Barroza, and possibly dedicated to the fishing of tuna, an ancient activity in the region.⁴ On a curious note, the remains of this early settlement are said to have been exposed on November 1st 1755, after a series of tidal waves – which are said have been over 10 m high, and followed the earthquake that stroke Portugal on that morning – hit the mouth of the river.⁵

Because it was very exposed to pirate incursions, the village was fortified with walls in the second half of the 15th century. By 1615 there were 1802 inhabitants in Portimão, which was only one of five settlements situated nearby: Alvor, Silves, Estombar, and Ferragudo.⁶

Two fortresses were built in the first decades of the 17th century in order to protect the river from constant incursions of Muslims and Protestants. By 1622 the mouth of the Arade River was protected by the fortress of São João on the left margin and the Santa Catarina fortress on the right margin of the river.⁷

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⁷ Ibidem: 37.
In spite of the two small sand banks that divided the river into three channels until the early 20th century, this river was navigable upstream past the city of Silves as late as the 17th century. The 1755 tidal waves are said to have caused major changes in both the course and the shape of these channels. The river course is said to have shifted about 1 Km west after November 1755’s earthquake. In spite of the progressive silting of the river the largest channel – the eastern one – was still 4.8 m deep on the high tide periods 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 artifacts were thrown, abandoned or lost in the river during the more than 25 centuries of documented human activity on this area.

After the first major dredging works, carried out in this area between June and November of 1970, the mouth of the Arade River fell under the attention of beachcombers and artifact
collectors. The sand removed from the river was deposited on the nearby beach, called Praia da Rocha. Since 1970 perhaps thousands of artifacts were found there by tourists, fishermen, local beach restaurant owners, and interested collectors. Some made it to the museum of Portimão, some were lost for lack of conservation treatment, and some were sold in the antique markets.

More important than loose artifacts were however the several hull remains which are reported to have been hit by the dredges in that year. Five or six shipwrecks were exposed during the dredging works in 1970. Then, in 1980, dredging works were responsible for the complete destruction of at least another shipwreck. The decade of the 1990s would witness more dredging works at the Arade River mouth, but this time the sediments were deposited in the sea, making it impossible to know what or how much was destroyed. Finally, dredging for the construction of a sports harbor – which was followed by a team of archaeologists – lead to the destruction of another three shipwrecks that laid buried on the left margin of the river, although of quite recent origin and allegedly of no archaeological interest.

The balance of the dredging interventions on the Arade River estuary in recent times looks quite sad. Mostly when we consider the attitude of the port authorities in the last three decades of the 20th century, ignoring the popular pressure to stop the destruction of the local cultural heritage, and carrying on the destructions arrogantly in total disregard of the press and the local groups of pressure.

One of these groups, named Grupo de Estudos Oceânicos or GEO as it is generally referred to, has been very vocal in their protests against the destruction of Portimão’s underwater cultural heritage. After the creation, in 1997, of the Centro Nacional de Arqueologia Náutica e Subaquática (CNANS), a state agency for nautical archaeology, the status quo changed substantially in Portugal in what pertains to the protection and study of its underwater cultural heritage. In collaboration with GEO the state archaeologists promoted and organized a campaign of survey and excavation of the Arade shipwrecks, starting in 2000.

Some of the Arade ship remains may have been destroyed forever, and some have yet to be located again. However, others were already located in the survey carried out by the GEO team during 2000 and 2001, which covered an area close to 1,000,000 m².

In the summer of 2001 a team of CNANS and GEO – in which I was included, after an invitation from Dr. Francisco Alves, director of CNANS – initiated the excavation of several sites located by GEO in the previous two years. The results were extremely promising, and another field season was planned for the following year.

Four sites were excavated and recorded during the summer of 2002 by a team gathering divers and archaeologists from four different institutions: the Portuguese Centro Nacional de Arqueologia Náutica e Subaquática (CNANS) and Grupo de Estudos Oceânicos (GEO), the Brazilian Universidade de São Paulo, and the Institute of Nautical Archaeology / Texas A&M University.
Description of the site

As mentioned before, the mouth of the Arade River has changed substantially in time. According to a 12th-Century report the mouth of the river was further out, near Ponta do Altar (see Fig. 1), and the river ran close to the cliffs situated on its left margin. This is confirmed in an 1800 report signed by Baltazer de Azevedo Coutinho, Captain of the Royal Corp of Engineers.

Previously encompassing a few small islets and sandbanks in middle of its present bed, the Arade River ran to the sea through three narrower channels. The earthquake of 1755 is said to have been at least partially responsible for the disappearance of these islets, and the change of the river’s course about one kilometer to the west.

![Fig. 6 – The Arade River mouth after a 1648 map.](image)

As a consequence of the changes in its course, and the silting provoked by the tidal waves

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9 Ibidem: III-4-5.

of 1755, the Arade mouth presented a depth of only 4.80 m on high tide and 2.4 m at the lowest tide in the early 19th century.\textsuperscript{11}

After the changes produced by the 1755 earthquake an accumulation of sand on both margins of the Arade mouth consolidated its new course, and winter floods broke through the SW channel.

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 the best known and more frequented in the whole south of Portugal already by 1910.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{embocadura_arade_praia_rocha_1916.png}
\caption{The Arade River mouth after a 1916 map.\textsuperscript{12}}
\end{figure}

Data from the period 1916-1926 shows that the mouth of the Arade River was very unstable, with depths varying widely, as the main channel path varied.

In 1926 and 1927 the sandbanks were dredged for the first time, as a developing fishing industry, associated to a growth of a young preserve industry, called for better conditions for the vessels entering and leaving the river.

Although impressive – a total of 360.000 m\textsuperscript{3} of sand were dredged and deposited on the


\textsuperscript{12} Gomes, Nelson Augusto, and Weinholtz, Manuel de Bivar, Op. cit.: III-4-17.
bottoms in front of Ponta do Altar promontory – these dredging works were not very successful, as the river quickly re-established its ancient form. By 1936 the river mouth was again shallow and unstable. But the dredging works had another effect: the large sandy stripe that formed Praia da Rocha started to diminish.

![Fig. 8 – The Arade River mouth after a 1934 map.](image)

During the decade of the 1950s two jetties were built to protect and regularize the mouth of the river, and allow the construction of a commercial harbor at Portimão. The construction of the first of two jetties that protect the harbor was started in 1948 and interrupted soon after. Started again in 1951, these long structures were soon ready.

Although the expected regularization of the river bottom was achieved, the construction of these jetties 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 – in the plan (Fig.11) marked “anteporto” – was dredged to a depth of eight meters, and the sand deposited in front of Praia da Rocha, in the hope that this could stop the disappearance of that beach.

This strategy did not work, and in 1970 a large portion of this “anteporto” area was dredged again to a depth of eight meters. This time the sediments – about 830,000 m$^3$ –

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were deposited on the beach (Praia da Rocha).

Fig. 9 – The Arade River mouth after a 1967 map showing the jetties.\textsuperscript{14}

Fig. 10 – The Arade River mouth after a 1970 map showing the recharge of Praia da Rocha with the sediments dredged.\textsuperscript{15}

During the course of these dredging works, in the summer of 1970, five shipwreck hulls are said to have been hit by the dredges. In spite of all the attention given to it by the press, which included the national television, nothing was done on behalf of these shipwrecks, and they were either destroyed or left to rot, as they were exposed on the slope of the dredged area, when the sediment shifted down, to establish a natural bank.

Maintenance of the depths obtained in 1970 forced other dredging campaigns during the decade of the 1980s, starting on that same year.

Other shipwrecks are said to have been hit and partially or totally destroyed, generating further public outcry, which does not seem to have daunted neither the harbor authorities, nor the central government.

A team from the Museu Nacional de Arqueologia, under the direction of Francisco Alves, conducted a survey at the local, but did not find any of the shipwrecks. This action however triggered the interest of the Comissao Nacional Provisoria de Arqueologia Subaquatica, and the shipwrecks were given a certain level of protection as part of Portugal’s cultural heritage by the government.

Subsequent dredging works were conducted with less public outrage, since the sediments were dumped once again off Ponta do Altar, and although there are scattered reports of

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15 Ibidem: III-4-20.
destruction and alleged plundering – curiously attributed to the destroyers themselves, the crews of the Dutch dredging ships contracted for the works – nobody knows exactly what or how much was destroyed.

In 1987 Museu Nacional de Arqueologia promoted a survey in the Arade mouth waters, under the direction of Jean-Yves Blot, but none of the sites could be located.\textsuperscript{17}

In the following decade, the 1990s, legislation was issued that protected the Portuguese underwater cultural heritage, and forced the promoters of these type of works to evaluate its impact on the underwater cultural heritage. Moreover, the impunity with which the harbor authorities acted in the previous decades came to an end with the creation in 1997 of the Instituto Português de Arqueologia (IPA), a state agency charged with the coordination of national and local archaeological policies that included a department dedicated to the study and protection of the underwater cultural heritage (CNANS).

In this context the harbor authority was barred from promoting further dredging works before the whole Arade estuary was surveyed and its important heritage recorded. An agreement was reached with the local municipality, CNANS, and a local group, GEO, especially active in the promotion of the regional underwater cultural heritage.

During the summers of 1999 and 2000 the GEO divers surveyed an area of almost one square kilometer in mouth of the Arade River and located a large number of interesting spots, some consisting of only a few amphora shards, and other encompassing extensive hull remains.

In the summer of 2001 I was invited to participate in a closer inspection of the most promising sites located by the GEO team. With the help of one of the 1970 divers, Helder Mendes, one of these sites was immediately identified as one of the shipwrecks hit by the dredges in that year. It was decided to start an excavation of this site, which was called Arade 1.

The hull remains were partially excavated, and a 1/1 accurate drawing was done on perfectly horizontal transparent slates with one square meter each.

During the following winter I was invited by the director of CNANS, Francisco Alves, to complete the excavation and promote the study and publication of this shipwreck. The idea of an INA / Texas A&M University summer school was born from this invitation at that time.

\textsuperscript{17} Alves et. al.,” Sistemas de deteccao geofisica em arqueonautica utilizados em Portugal: os casos do Arade 1, Redoutable e Alfeizerão,” in Geociencias, 5.1: 135 (abstract).
The Arade River Shipwrecks

There are many reports of shipwreck troves in the mouth of the Arade River. As it often happens, some of these reports are vague, others are contradictory, and some refer to sites that have long been destroyed, or simply to guns, iron anchors, or lead stocks that were removed by fishermen and sport divers, probably to end up melted or, in the case of the iron guns, slowly rotting away on the grass of some front yard.

There is no information whether any shipwrecks were hit or destroyed during the 1926 and 1927 dredging works, but it is probable that many artifacts were removed from the Arade River mouth together with the 360,000 m³ of sediments dredged at the time.

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, on the area where now stands the left margin jetty. The gun disappeared before the finders could raise it and there is no trace of it anywhere ever since. Later, two shipwrecks have been reported to the area between the jetties, one on the channel, immediately outside the line between the heads of the structures (Arade 8 ship), and another near the head of the left margin jetty (Arade 7 ship).18

Fig. 12 – The mouth of the Arade River.19

In 1970 the works for enlarging the channel of Portimão’s commercial harbor entailed the dredging of a large amount of sediments. At least five old hulls were hit by the dredge, as the Dutch captain of the dredge told the press after the works were completed, and soon

18 Personal communication of Luis Sacramento to Francisco Alves.


before leaving Portugal. The news of archaeological troves during the dredging works had already spread during the summer, and some local inhabitants went even to the place where the dredged sediments were dumped on the beach – at Praia da Rocha – to try to see any antiques.20

Following an information of the captain of the dredge *Mark* – from the company *Bos & Kalis*, working as a subcontractor of the Sociedade Portuguesa de Dragagens – two rival groups of divers visited the Arade mouth and gathered data about three of shipwreck sites.

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20 See the newspaper cut from *Diario Popular* of June 29, 1972 (in Alves, Francisco, “Acerca dos destrocos de dois navios descobertos durante as dragagens de 1970 na foz do Rio Arade (Ferragudo, Lagoa)”, in *As rotas oceanicas, Secs. XV-XVII*, Lisboa: Ed. Colibri, 1999: 75). Also, Luis Sacramento, a local diver and old collaborator of CNANS, mentioned an iron gun and other artifacts being recovered by the dredges.

21 Map from CNANS’ archives.
It is not sure whether all these three ships had been sighted by the captain of the dredge *Mark*. As a matter of fact, it seems that six ships were exposed a consequence of the dredging works, and not five, as the captain informed.\footnote{22 Helder Mendes, one the divers to visit the sites in 1970, is under the impression the clinker built ship found by his group had not been seen by the dredge crew.}

Then, in 1975, future archaeologist Jean-Yves Blot and a group of sport divers – including

\footnote{23 After several plans and maps in CNANS and GEO archives.}
local diver Luis Sacramento – 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.

In 1980’s dredging works started again. At least one shipwreck (Arade 9) was destroyed in 1982, upstream from the former dredged area, near the commercial harbor (Fig.15).24

An unknown number of pewter ware pieces was found in the dredged sand by a bulldozer operator, and bought by a private amateur archaeologist who was trying to make a small museum at Cascais, in conjunction with the local municipality. This project never saw completion however, and the pewter pieces were later divided between privates and small museums. It is unlikely that these pieces will ever be study together.

![Fig. 15 – The wooden remains destroyed by the dredges on the commercial harbor.](image)

Following the 1982 destructions Dr. Francisco Alves, then director of Lisbon’s Museu Nacional de Arqueologia, brought the Comissao Nacional Provisoria de Arqueologia Subaquatica to propose legislation to protect the Arade shipwrecks. This legislation was approved in February 1984.26

24 Alberto Machado personal communication.
25 Photo: Francisco Alves (CNANS archives).
In 1993, after a report by Luis Sacramento, eight bronze guns dating from the mid-16th century to 1606 were rescued by a team of the Museu Nacional de Arqueologia, possibly corresponding to the 1611 shipwreck of a Spanish vessel named *Nuestra Señora del Socorro*.  

Finally, 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. At that time CNANS was accompanying the works and promoted a full survey immediately. Since these remains corresponded to recent ships, probably derelicts, the construction works were only stopped in order to make a quick sketch of the only vessel presenting structural coherence, referenced in this study as Arade 10 (Figs.17 and 19).

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28 Photo: Filipe Castro (CNANS archives).
During the last years of the 1990s other remains have been surveyed and positioned by GEO, a local group of sport divers under the direction of Mr. Alberto Machado, who lead the campaign toward a larger public awareness of Arade’s archaeological richness at the same time. Between 1998 and 2000 GEO’s divers found ten sites of archaeological potential at the Arade’s mouth. These sites have been numbered GEO1 to GEO10, and correspond to ship remains and parts, sometimes found as more or less coherent structures, sometimes as disassembled and scattered on the sea bed. The most interesting of these two areas so far are GEO 5, corresponding to well-preserved remains of a large late 19th century vessel, which was called Arade 13, and GEO 2, where a small plank showing mortise and tenon joinery was found and named optimistically Arade 14.

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29 After several plans and maps in CNANS and GEO archives.
Fig. 18 – The ten sites found by the GEO team.

At the end of the 2002 field season the total number of shipwrecks reported at the Arade River mouth amounted to fourteen.

Fig. 19 – Aspect of the Arade 10 shipwreck during CNANS’ survey.  

Although the whole area of the Arade River mouth in currently under study from an archaeological viewpoint, the scope of the present report is much narrower, pretending to focus solely on the so-called Arade 1 and Arade 2 vessels of 1970.

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31 Photo: Pedro Caleja (CNANS archives).
The Arade 1 and Arade 2 Shipwrecks

In the present report we intend to focus on the Arade 1, Arade 2, and Arade 6 shipwrecks. It looks like the Arade 2 shipwreck of 1970 actually corresponds to two different shipwreck sites. As already mentioned above, during the dredging works of 1970 five hulls are said to have been partially destroyed. Two groups of sport divers visited two different shipwrecks each during in October 1970, and it has been assumed that these are the same two sites.

However, it seems that there were at least six shipwreck sites, and that the first group of divers – from the Centro Portugues de Actividades Subaquaticas (CPAS) – visited indeed the sites of shipwrecks Arade 1 and Arade 2. The second group of divers, however, – from the Federacao Portuguesa de Actividades Subaquaticas (FPAS) – seems to have visited the sites of shipwrecks Arade 1 and Arade 6.

According to the testimonies of Mrs. Margarida Farrajota and Mr. Helder Mendes – who in 1970 were part of the first and the second group of divers respectively – the director of the harbor authority ordered the dredging works to stop upon learning from the captain of the dredge Mark that he had hit two shipwreck sites. Still according to these witnesses, the port authority director called Mr. Jose Farrajota, the local delegate of Junta Nacional de Educação, which was the organism in charge of antiquities in Portugal at the time.

An archaeologist and member of CPAS, Mr. Jose Farrajota visited the site on October 10 and 11 1970 with a team which included his daughter, Margarida Farrajota, Rui de Moura, Fernando Pina, and Jorge Albuquerque – then president of CPAS. Mr. Helder Mendes, a national television director and member of the second diving group of divers – FPAS – was invited to join this team on the first day.

Mr. Farrajota’s team inspected the Arade 1 shipwreck site but could not see the Arade 2 site, for it had been covered with sediments during a recent storm.

Later that week a team from FPAS also carried out a series of independent dives on the Arade 1 site, and found what we now believe to be a sixth shipwreck: Arade 6.

These diving expeditions produced a series of pictures, sketches, and measurements that have been extremely useful thirty years later. On the CPAS expedition Jorge Albuquerque and Fernando Pina took pictures and measurements and produced two good sketches of the Arade 1 vessel. We have six pictures from Jorge Albuquerque, and thirteen from Fernando Pina. Mr. Jose Farrajota wrote a report, and his daughter took extensive notes. On the FPAS expedition, which included Helder Mendes, Ricardo Costa also took pictures – two roles of film, of which we have twelve pictures.

Two years later, Mr. Helder Mendes produced a documentary for national television, which was aired on July 4 1972 under the title The Mysterious Ships of the Arade River.

During the investigations carried out by Dr. Francisco Alves, which included the analysis of

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32 Already an old admirer of both Margarida Farrajota, and Helder Mendes, I am greatly indebted to them for their patience and willingness to search into their memories for the details of this old story.

33 I must thank again Margarida Farrajota, presently president of C.P.A.S., for all the data supplied.

34 In CNANS’s archive, thanks to Helder Mendes and Alberto Machado.

an extensive file existing in CNANS’ archives, and interviewing Mr. Helder Mendes it became clear that the Arade 1 shipwreck site was the same for both groups of divers. However, for the FPAS’ group the Arade 2 shipwreck was a lapstrake built ship presumably located upstream and near the Arade 1 site. For the CPAS group the Arade 2 site was located downstream, near the left jetty, and it was never actually visited since it had been already covered by sediments by October 10 1970, when it was inspected.

There are therefore no doubts that the Arade 1 was a flush laid hull, corresponding to the “position 1” on Fig. 19. As to the Arade 2 shipwreck, Mr. Farrajota marked it clearly near the jetty, in an almost symmetrical position relatively to Arade 1 on the basin dredged. Mr. Helder Mendes, however, is under the impression that it was located upstream from the Arade 1 site, possibly near the position marked on Fig. 20 as site “C”. And he is sure that it was lapstrake built.

A third witness, Mr. Luis Sacramento, a local diver and an old time friend of Dr. Alves, claims that Mr. Albuquerque’s Arade 2 site had several guns, one of which – in bronze – was last seen on the deck of one of the dredges.36

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36 Mr. Luis Sacramento personal communication.

37 CNANS archives.
Fig. 21 – A1, B1, B2, and C areas.  

38 CNANS archive.
In spite of the sketches made at the time, and the pictures taken, thirty years later it was very difficult to make full sense of them.

In the summer of 2001 a joint survey carried on by CNANS and the GEO group, with the help of Mr. Helder Mendes, lead to the discovery of several ship remains near the Arade 1 shipwreck area marked on CPAS report of 1970 (Fig. 20). The areas defined on this survey were designated as A1, B1, B2, and C, and several trenches were opened around them during the 2001 field season. Area A1 yielded the remains of a ship’s hull, and its excavation started immediately under the direction of Dr. Francisco Alves, carried out by a joint CNANS / GEO team. On area B2 a frame from a lapstrake hull was found (Fig. 22) together with some lapstrake planking.

We know now that the A1 vessel is the Arade 1 shipwreck, but so far failed to find the Arade 6, lapstrake-built, shipwreck.

![Fig. 22 – Frame found on B2 area.](image)

39 Photo: Francisco Alves (CNANS archive).
**Arade 1 Shipwreck**

As mentioned above, all we know about the 1970 Arade 1 shipwreck we learned from the reports, pictures and sketches produced by the CPAS and FPAS teams. Fortunately for us, these teams were composed of passionate and skilled divers. Their attitude towards the archaeological remains was very professional, and the ship remains were recorded in a non-intrusive fashion.

The report issued by CPAS was signed by civil engineer, archaeologist, and sport diver Jose Farrajota, and contained a detailed description of the shipwreck with two sketches and a scantling list. Further documents in CPAS archives contained important data, such as the portions of the shipwreck represented in each one of the nineteen pictures taken, or a map with the precise location of the Arade 1 shipwreck from alignments taken on the coast.

The information gathered by the team from FPAS was also very important. Mr. Helder Mendes is an historian, journalist, and television director who filmed a series of over 50 documentaries about the sea in the 1960s and 1970s – under the titles *Segredos do mar*, and *A terra, o mar e a gente*.

Jorge Albuquerque, an architect and a pioneer of sport diving in Portugal, was the author of the two sketches in Mr. Farrajota’s report (Figs. 18 and 19). In these sketches the Arade 1 vessel shows a full, flush laid hull, with a small keel and a large keelson, or a large mast step.

The pictures show a shipwreck built with flush laid planks fastened with treenails to the frames. On top of the upper ceiling strake there is a row of filler pieces in between the frames. These filler pieces are rounded on the inner edges, forming a smooth 90° curve, flush with the ceiling. This curve is continued between the filler pieces by smaller curves, which are propped against the inner face of the futtocks (Fig. 23).

This report describes the Arade 1 shipwreck hanging from the upper part of the embankment created by the dredging works, and filled with 1 to 1.5 m of sediment. The frames were 13 x 16 cm in section, the room and space between 16 and 35 cm. The hull planking was 5 cm thick and varied between 25 and 34 cm in width. The ceiling covered both the lower part of the hull, and its sides – the sketch showing no stringers – and was terminated with a series of filler pieces that closed the room between futtocks, as shown in FPAS’ pictures (Figs. 19 and 23).

As already mentioned above, there was a large keelson – or mast step – preserved at least along 5 m. It was surmounted a rather small keel in the sketch by Mr. Albuquerque. According to the report a large part of the ship was torn apart by the dredge and laid scattered on the seabed. It is possible that the falling sediment quickly covered this part of the ship during the following weeks, as the embankment, originally cut at a 1/6 inclination, re-arranged itself into a more stable slope.
A wood sample taken by Mr. Helder Mendes was sent to Groningen, in the Netherlands, and was dated by radiocarbon to the 13\textsuperscript{th} century. As this date is not calibrated, and we do not know exactly where the wood sample was taken, this date must be taken very carefully.

\textsuperscript{40} Report from C.P.A.S., a diving club founded by Arq. Albuquerque. CNANS’ archives.
Fig. 24 – Arq. Albuquerque’s sketch of the supposed keelson. 41

Fig. 25 – Detail of the fillers between futtocks. 42

41 Report from CPAS, a diving club founded by Mr. Albuquerque. CNANS’ archives.
42 Photo: Ricardo Costa (CNANS archives).
Fig. 26 – Detail of the futtocks.  

Fig. 27 – Base of a frame.

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43 Photo: Ricardo Costa (CNANS archives).

44 Photo: Ricardo Costa (CNANS archives).
Another sample – probably from the planking – was sent by Mr. Farrajota to Laboratorio Nacional de Engenharia Civil, for species identification, and was found to be from a tree of the oak family (*Quercus sp.*).

The pictures taken by the FPAS team show a very interesting feature. It seems that the upper ceiling strake is a stringer, thicker than the one that lies below it (Fig.30).

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45 Photo: Ricardo Costa (CNANS archives).

46 Photo: Ricardo Costa (CNANS archives).
The pictures taken by the CPAS team were given to us by Dr. Margarita Farrajota, the director of that diving club. She is the daughter of Engineer José Farrajota, who led the 1970 official survey, and took part in it. Dr. Farrajota kindly let me see her notes, taken at the time. She also took on the work of assigning captions to each one of the 18 pictures lent to us, based upon her notes and sketches, placing them on the hull remains as they were seen at the time.

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47 Photo: Ricardo Costa (CNANS archives).
Fig. 31 – Detail of the frames and hull. 48

Fig. 32 – Frames lying on the northern area. 49

48 Photo: Fernando Pina (CPAS archives).
49 Photo: Fernando Pina (CPAS archives).
Fig. 33 – Maststep broken through the mortise. Below sits a frame. On the left side we can see a ceiling plank.  

Fig. 34 – Detail of the frame shown on Fig. 33. Picture taken from the below. Northern side of the shipwreck.

50 Photo: Fernando Pina (CPAS archives).
51 Photo: Fernando Pina (CPAS archives).
Fig. 35 – Frames showing the treenails, which fastened them to the hull planks.  

Fig. 36 – Jorge Albuquerque measuring and sketching the southern side of the hull.  

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52 Photo: Fernando Pina (CPAS archives).

53 Photo: Fernando Pina (CPAS archives).
Fig. 37 – Dunnage covering the maststep and ceiling (on the north side) still covered by sediments.

Fig. 38 – Same area after removal of the sediment. A mat covered the dunnage.

54 Photo: Fernando Pina (CPAS archives).
55 Photo: Fernando Pina (CPAS archives).
Fig. 39 – Dunnage covered by a mat lying over the ceiling planking on the south side of the hull.  

Fig. 40 – Same area. Picture taken from a different angle.

56 Photo: Fernando Pina (CPAS archives).

57 Photo: Fernando Pina (CPAS archives).
Fig. 41 – Same area. Picture taken from a different angle. To the right we can see the ceiling planks.  

Fig. 42 – Same area. Picture taken from a different angle. To the right we can see the ceiling planks.

58 Photo: Fernando Pina (CPAS archives).
59 Photo: Fernando Pina (CPAS archives).
Fig. 43 – Margarida Farrajota observing the upper end of the futtocks.  

Fig. 44 – Northern side of the hull.  

60 Photo: Jorge Albuquerque (CPAS archives).  
61 Photo: Jorge Albuquerque (CPAS archives).
Fig. 45 – Margarida Farrajota measuring a frame. 62

Fig. 46 – Diver measuring the northern side of the hull remains. 63

62 Photo: Jorge Albuquerque (CPAS archives).
63 Photo: Jorge Albuquerque (CPAS archives).
Fig. 47 – Frame measuring 18 x 18 cm on the south side of the hull remains.  

Fig. 48 – Diver measuring the lower side of the hull remains.

64 Photo: Jorge Albuquerque (CPAS archives).
65 Photo: Jorge Albuquerque (CPAS archives).
**Arade 2 Shipwreck: CPAS’ Arade 2 Shipwreck**

Although we know that the captain of the dredge *Mark* dived on this shipwreck – from which the gun seen aboard the dredge by locals is said to have come\(^6\) – it had been completely covered by a SW storm when the team from CPAS visited the site, and there is no information on this ship.

Mr. Alberto Machado found an interesting clue for the localization of this shipwreck on a map with the water depths taken in 1977, long after the dredging works of 1970. Close to the place where CPAS’ report placed the Arade 2 shipwreck, this map shows a rather pronounced mound projecting from the natural embankment. Future surveys may unveil the position of this ship.

![Fig. 49 – CPAS’ Arade 2. Map from 1977 showing its possible position.\(^6\)](image)

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\(^6\) Luis Sacramento personal communication to Dr. Alves.

\(^6\) From GEO archives.
**Arade 6 Shipwreck: FPAS' Arade 2 Shipwreck**

This ship is perhaps the most interesting of all the wrecks reported found in the Arade mouth. Built lapstrake according to the reports, it was immediately reported as a Viking ship, and was the reason why sketches, pictures, and wooden samples ended up in Roskilde.

A sketch made at the time by Helder Mendes shows a vessel deeply embedded in the silt with a depth in hold over 2 m half chewed by the dredge, and hanging on the slope.

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**Fig. 50 – F.P.A.S.’ Arade 2. Sketch made in the 1970s by Helder Mendes.**
It is hard to say how accurate these sketches are. For example, it should be mentioned that the lapstrake planking is represented inverted in Mr. Mendes’ sketch.

A wood sample taken by Helder Mendes was sent to Groningen, in the Netherlands, and was dated by radiocarbon to the mid-16th century. Corrected with the calibration curves in present use, this date corresponds to a mid-17th century shipwreck.  

The Arade River Artifact Collections

The Arade collections are well outside the scope of this report. Given the importance and number of the artifacts found, however, I decided to include a short note for my students information.

As a result of the recharge of the nearby beaches with sediments from the Arade River mouth, many artifacts were found on these beaches after the 1970 dredging work. Since then, both locals and tourists have engaged in year-round, more or less intense search activity on the beaches of Rocha and Alvor, and no one will ever know how many things have been found, kept, sold, or lost for lack of conservation treatment.

Several artifacts have also been reported found in the waters in front of the Ponta do Altar promontory, probably from the 1926 and 1927 deposit of sediments.

In the 1980s a local restaurant owner, Mr. Cabrita, reported many finds in the press (Fig. 51). When contacted by both Lisbon’s Museu Nacional de Arqueologia and the local municipality, however, he proved to be somewhat reluctant to handle all his collections. Although parts of Mr. Cabrita’s artifact collection eventually made it to museums, others are not likely to be seen again, probably lost to private collectors (Fig. 52).

Among the most interesting artifacts found in the 1980s and early 1990s were two sounding

70 Photo: Francisco Alves (CNANS Archive).
leads, discovered in sediments from the mouth of the Arade River. Possibly Roman, these two sounding leads were found by the same person on a nearby beach named Praia dos Careanos.

Fig. 52 - A sounding lead, possibly Roman, whose whereabouts are unknown.71

Fig. 53 - The second sounding lead, now in Museu de Portimao.72

Many pieces of pewter ware are reported found at the Arade River mouth, but it is difficult to point out the provenience of each of these before a serious investigation of the past takes place. In an internal CNANS report João Pedro Cardoso has inventoried 16 different

71 Photo: Filipe Castro at Mr. Cabrita’s restaurant (CNANS archive).
72 José Sousa personal communication.
objects of pewter with many different proveniences. Some have disappeared and some are deposited in museums, both national and regional. The dispersal of this collection has made it difficult to study and publish them.\footnote{I am indebted to João Pedro Cardoso for all the information he supplied me, which included a copy of the extremely rare report by Gabriella Maria Casela and Isabel Maria Santos da Silva Almeida cited below.}

However, one particular set of artifacts has been catalogued by two students in the 1980s.\footnote{Casella, G.M., Almeida, I.M.S. da S., and Lacerda, M., Trabalho de Investigação sobre peças de Estanho encontradas na Foz do Rio Arade (Portimão), Paper for the course of Introdução aos Estudos de Arqueologia e da História de Arte at the Faculdade de Letras of the Universidade de Lisboa, teacher Luís Manuel Teixeira, June 1984.} These include a collection of eight pieces found by the operator of a bulldozer working on a pile of sediments at the left margin of the river. These pewter pieces were bought by a private and deposited in a regional museum – Museu do Mar de Cascais – for a number of years. Unfortunately this collection was later separated and several pieces were sold. For their beauty and uncommon shapes, drawings of five of these pewters by Miguel Lacerda – at the time a collaborator of Museu do mar de Cascais – are presented below (Figs. 56 to 62).\footnote{Ibidem.}

Also included is a drawing by Miguel Lacerda of a pewter plate whose provenience in the Arade River bottom I could not find (Fig. 54).\footnote{Ibidem.}

\begin{figure}
\centering
\begin{tabular}{cc}
\includegraphics[width=2.5in]{fig54.png} & \includegraphics[width=2.5in]{fig55.png} \\
\textbf{Fig. 54} - Plate. Around 21 cm in diameter and 2 cm deep.\footnote{Ibidem, No. 833.} & \textbf{Fig. 55} - Footed plate. Around 20 cm in diameter and 8 cm high.\footnote{Ibidem, No. 832.}
\end{tabular}
\end{figure}

After many unsuccessful efforts and attempts to sensitize known collectors as well as local and national authorities, in the late 1990s CNANS' director Francisco Alves managed to convince the Portuguese government to issue legislation regulating the use of metal detectors.
Fig. 56 – Salt cellar. Around 8 cm high and 6 cm in diameter on its central portion.79

Fig. 57 – Creamer. About 15 cm high on the rim and a 10 cm maximum diameter.80

Fig. 58 – Ewer. About 31 cm high on the rim, and 12 cm at its maximum diameter.81

Fig. 59 – Ewer. About 23 cm high on the rim, and 11 cm at its maximum diameter.82

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79 Ibidem, No. 831.
80 Ibidem, No. 830.
81 Ibidem, No. 828.
After the publication of the law regulating the use of metal detectors, Dr. Alves was approached by a group of local citizens that seized the opportunity and created a private program to survey the beaches where sediments from the Arade River had been deposited. Following an extremely well planned project, the citizen group surveyed the beaches around the Arade River mouth and retrieved – after their positions were carefully recorded – an impressive amount of small artifacts.

Both competent and passionate, this group of people transformed a weekend hobby into a well-managed systematic survey of the beaches around the Arade mouth that has already produced hundreds of artifacts of major interest.

Among these are pottery shards and pewter, copper, bronze, and lead objects, as well as several large collections of coins.

Several of these coins were found in small areas and bear close dates, corresponding perhaps to coherent collections provenient from shipwreck sites.

The first was composed of about 50 coins bearing the names of João I of Portugal (1385-1433) and Henrique de Trastâmara of Spain (1366-1379), and was found at Praia dos Careanos. It is presumed to have been dredged in 1982/83.

The second was composed of about 30 coins bearing the name of Edward III of England (1327-1377). It was found in the sediments deposited on the left margin, near Ferragudo. It was probably dredged in the early 1990s.

The third was composed of 18 denarii from Domitian (81-96), Trajan (98-117), Hadrian (117-138), and Antoninus Pius (138-161). It was also found in the sediments deposited on the left margin, near Ferragudo, and it is believed to have been dredged in the early 1990s.

The fourth was dated roughly to the 3rd century AD and was composed of around 100 coins found at Praia dos Careanos, probably dredged in 1982/83.

Finally, the fifth collection of coins, composed of between 500 and 1,000 coins, was dated to the 1st century BC or 1st century AD. It was also found at Praia dos Careanos, and was probably dredged from the river bottom in 1982/83.

All these artifacts have been deposited in Museu de Portimão, one of the institutions sponsoring this project.

During the summer of 2002 the museum opened an exhibition showing part of its already impressive collection of artifacts (Figs. 61 and 62). This was a very important move in the struggle to raise the interest of the local population in their own submerged cultural heritage. More important, it showed the commitment of the local politicians in the preservation of the Arade underwater cultural heritage, which has been abandoned for too long.

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82 Ibidem, No. 825.
83 I am extremely indebted to José Sousa for all the information he supplied me about the marvelous work developed by his group.
Fig. 60 - The 2002 exhibition at Museu de Portimão.  

Fig. 61 - Another aspect of the same exhibition.

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84 Photo: Filipe Castro.
85 Photo: Filipe Castro.
Bibliografia


