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Maritime Archaeology Periodical

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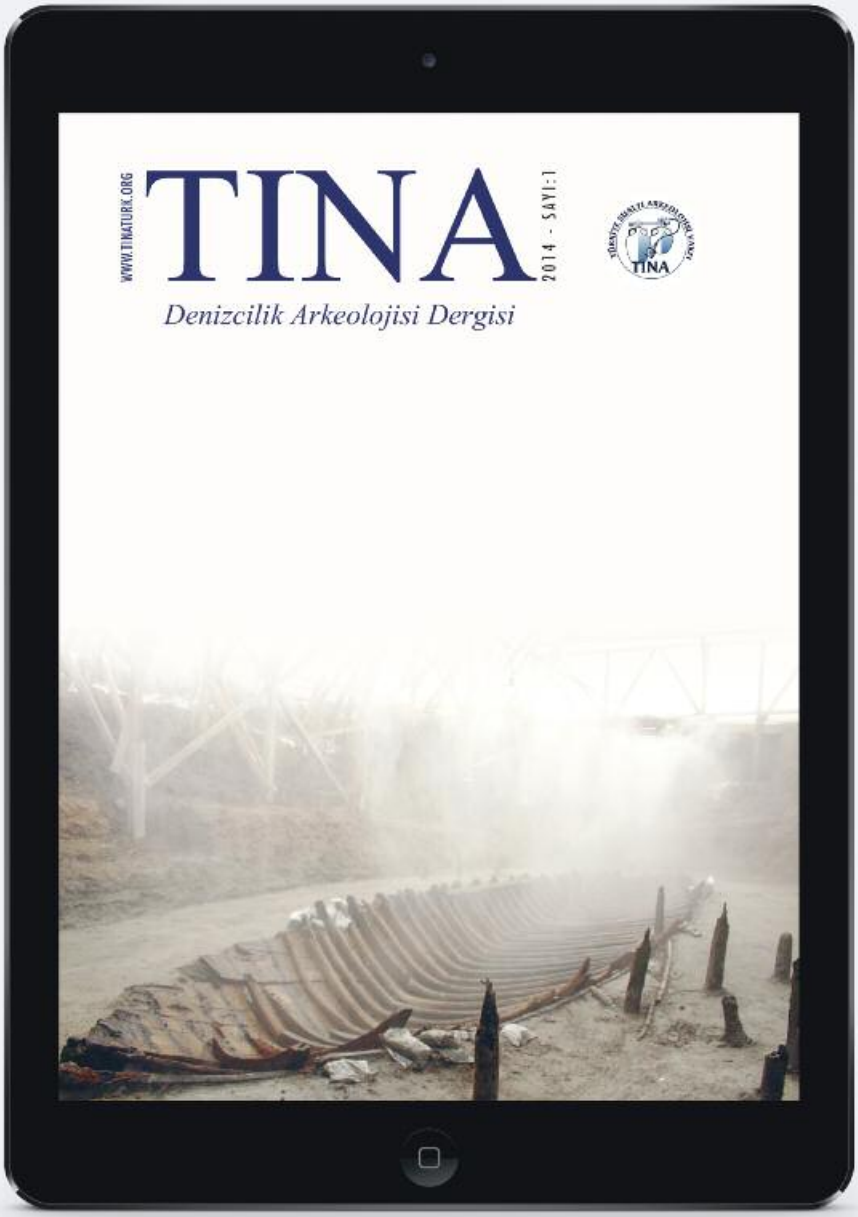

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TINA TURKISH UNDERWATER ARCHAEOLOGY FOUNDATION

FOUNDATION

Founded by a group of maritime-lover businessmen in 1999.

SCOPE

- To make the international society and scientists familiar with our abundant archaeological cultural heritage in Turkey and its seas. With this idea in mind, to make national and international publications, and organize conferences, panels, seminars, forums, symposiums, workshops, fairs, festivities, exhibitions, and artistic activities such as festivals, excursions and meetings.
- To support local and international scientific institutions, museums, and universities involved in activities of surveys, excavations, conservations and exhibitions under the approval and inspection of the Turkish Ministry of Culture and Tourism.
- To perform underwater surveys and excavations in our seas using scientific methods and current technological facilities under the approval and inspection of the Turkish Ministry of Culture and Tourism.
- To identify the archaeological artifacts lying underwater, reporting their whereabouts to relevant authorities for protection.
- To seek cooperation with the museums and institutions involved in the field and support their activities. To ensure enhancement of such museums and cultural activities, and take necessary steps to provide opportunities for new initiatives.
- To take necessary measures to prevent the pollution of our seas which becomes increasingly harder to fight back, ensure that such measures are taken, and cooperate with other institutions in this sense.
- To contribute to the educational and training institutions dealing with our scopes, and provide scholarships for dedicated students.

EXECUTIVE COMMITTEE

TINA MARITIME ARCHAEOLOGY PERIODICAL

PERIODICAL PUBLICATION OF THE TURKISH UNDERWATER ARCHAEOLOGY FOUNDATION

TINA Maritime Archaeology Periodical is published bi-annually during the months of May and November. The papers to be published should be sent 3 months before the publication date. The coverage of TINA Maritime Archaeology Periodical includes primarily the Anatolian shores, the Mediterranean Sea, and the work performed in the field of maritime archaeology from every corner of the world.

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LICENSE HOLDER: Hüsnü Oğuz Aydemir

CHIEF EDITOR: Mehmet Bezdan

Papers sent to TINA Maritime Archaeology Periodical shall be published only if they comply with the format specified on the last page of this issue.

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TINA

Maritime Archaeology Periodical

PRESENTATION

TINA, the Turkish Foundation for Underwater Archaeology, which was founded in 1999 by a group of business people enamoured of the sea and marine environment with a mission to uncover archaeological treasures of Turkey and its seas, exhibit them in order to reach large masses, and introduce them to the world, has started to publish a periodical at the 15th Anniversary of the Foundation.

Our Foundation, which has initially provided support mainly to individuals and institutions involved in scientific surveys and research, and developed collaborations with museums with a focus on how to improve studies in the field of underwater archaeology in Turkey, has become sponsor of several important excavation and survey projects over time. Furthermore, we have organized exhibitions to introduce our rich maritime history, created funds for establishing and improving research centers, published books, and then taking one step further, we presented the TINA Maritime Archaeology Periodical to the scientific world to serve as a scientific source on underwater archaeology.

Founded with full excitement 15 years ago, we still maintain the same excitement and carry on our activities, being the first and only non-governmental organization committed in underwater archaeology in Turkey at present. Similarly, our periodical represents the first in the underwater archaeology in Turkey.

With a historical background of approximately 55 years in Turkey, the underwater archaeology has become an area of important excavations, exhibitions, and publications owing to the archeaological treasures of the Anatolian coastline and inland waters despite limited financial resources and technical impossibilities.

Our Board of Directors uses utmost care when selecting projects that will be funded or carried out by ourselves within plans of a few years, trying to encourage diversity by selecting different regions and variety of domains.

Similarly, we pay attention to publish a selection on a wide range of topics at the TINA Maritime Archaeology Periodical. In this issue, the first article is about a harbour from the "Late Roman Period" uncovered at the Çattepe Mound settlement in which a salvage excavation is being carried out within the Ilısu Dam and HEPP project in the Botan Valley in Southeastern Anatolia. Accompanied with very special photographs, it presents an enchanting archaeological discovery. In addition to this, you will find a wide variety of selections from the Limantepe excavations to the Adrasan shipwreck containing plates, underwater surveys at the inner port of Myndos, discovery of an shipwreck from the Early Bronze Age at Hisarönü, and the Gnalic shipwreck in Croatia that will be introduced in Turkey by an exhibition in the near future.

We wish to express our thanks to all those scientists who have contributed to the present issue of the TINA Maritime Archaeological Periodical with their articles and photographs, the Editorial Board and our Executive Editor and all members of the team. We would like to take this opportunity to thank everybody who have contributed and provided support to the foundation and development of underwater archaeology in Turkey.

Kenan YILMAZ
TINA Turkish Foundation for Underwater Archaeology
Vice President

EDITOR

The second issue of the TINA Maritime Archaeology Periodical which we started to publish 6 months ago is now available…

This issue covers many archaeological studies performed by maritime archaeologists, primarily in Anatolia. The most important archaeological find of the year was the Hisarönü Gulf shipwreck dated to the Bronze Age. The explorations performed by Assist.Prof. Dr. A.Harun ÖZDAŞ will help us obtain invaluable information not only on the Eastern Mediterranean maritime trade but also on the worldwide maritime trade during the Bronze Age. Another important study that was conducted in 2014 was the excavation at the Siirt-Çattepe mound by Assist. Prof. Dr. Haluk Sağlamtimur. The excavation yielded a large castle and a harbour dating to the 4th Century AD, i.e. Late Roman Period on the mound. These data, once again, bring the archaeological merits of the Anatolian geography in inland waters to light. Written resources from the Middle Age refer to five harbours used for river transportation from Diyabakır to Baghdad on the south. The only archaeological evidence available for these five harbours is from the Çattape mound.

Another study in 2014 was the excavation conducted in Adrasan for the shipwreck containing plates. There is no doubt that next year we will have interesting data from this excavation that has been conducted by Assist.Prof. Dr. Harun Özdaş and Assist. Prof. Dr. Hakan Öniz. Another noteworthy article in this issue is the Gnalić Shipwreck, which sank far from Anatolian shores, but has very strong relations with Anatolia. The story and excavation reports of the ship which sank in Gnalić in early November 1583 with its valuable cargo dispatched from Venice to Istanbul were written by Assist. Prof. Irena Radić Rossi and postgraduate Mariangela Nicolardi. TINA Foundation has been intensively working on the exhibition that will be organized in Turkey for introduction of this important shipwreck.

This year was also important for research infrastructure of underwater archaeology. The construction of two important centers for maritime archaeology in Turkey was completed. These centers will provide the opportunity to put major projects on maritime archaeology into practice.

Our objective, as the TINA Maritime Archaeology Periodical, is to become a journal where archaeologists conducting research in any corner of the world can submit their reports. We will give place to excavations, surveys, scientific projects, news, conferences, university curriculums, scientific trainings and new techniques in the field of underwater archaeology. As we did in the first issue, we again invite all our colleagues to contribute to this periodical.

Mehmet Bezdan
Chief Editor and Editor
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A CASTLE AND A RIVER PORT

*HALUK SAĞLAMTİMUR

Fig. 1a: A general view of the Çattepe Mound.

FROM THE LATE ROMAN PERIOD ON THE SHORES OF TIGRIS

Fig. 1b: A general view of the Çattepe Mound.

The excavations on the Siirt-Çattepe Mound, initiated within the context of the Ilısu Dam and HEPP project of 2009, are on-going. The site lies on a natural peninsula at the confluence of Botan and Tigris rivers, near the Çattepe (Tilli/Tili/Til) Village of the Kurtalan District **(Fig. 1a-b-c)**. Owing to its geopolitical position, it is one of the most important archeological sites in the Botan and Tigris Valleys. The height of cultural deposits within the mound ranges from 10 to 15 meters, rising towards the north.[1] However, the construction of a large, still partially intact castle, of the Late Roman Period, has led to heavy damage of the mound[2]. To the north of the settlement, which measures approximately 250 m x 350 m, lies the settlement of *Vicus*[3] from the Late Roman-Early Byzantine Period, an outer city that had been inhabited during the Middle Age, and a cemetery area dating to the Middle Ages.

Finds uncovered from the mound and its vicinity indicate that the site has been inhabited from prehistoric times up to present day. Surface finds include bevelled rim bowls from the Uruk period recovered from different sections of the excavation area as well as pottery from the Halaf and Ubaid Periods. However, there is still no access to these early layers in any part of the mound. At present, a modern village settlement and related buildings, as well as the Late Roman – Early Byzantine and Middle Age layers prevent expanding our excavations to a larger scale to yield earlier periods.

The excavations on the mound yielded buildings dating to the 2nd Millenium BC (Middle Bronze Age) and the Late Roman Period in addition to the Early Bronze Age finds dating to the 3rd Millenium BC, particularly on slopes near Botan. We believe that the thick outer walls on the southeastern part of the Late Roman Period buildings in this section were built for defense purposes. The buildings with stone-paved floors leaning against these thick walls that extend parallel to the Botan River continue in terraces up to the moundtop.

[1] SAĞLAMTİMUR *et al* 2012, 65; SAĞLAMTİMUR *et al* 2013, 130.
[2] LIGHTFOOT 1986, 509-530; ALGAZE 1989a, 254.
[3] VELİBEYOĞLU *et al* 2002, 794. Footnote 25.

* **Assoc.Prof. Haluk Sağlamtimur, Archaeology Department, Faculty of Letters, Ege University, Bornova-İzmir.**

Fig. 2: The Late Roman period walls and harbour on the bank of Tigris River.

The Late Roman Castle on the mound has a wall thickness of about 2.5 meters at some points **(Fig. 2a-b and 3a-b)**. The walls were mainly erected with black basalt stones, partly mixed with white limestone. The remaining fortifications which underwent renovations during different periods reach up to a height of 10-15 meters in some parts. Some of the remaining walls indicate that large size bricks, measuring 39 x 26 cm, were used in upper courses of the basalt walls while a hydrated lime mortar in the form of brickdust mortar was used for interior parts of the walls. The towers and walls particularly on the west overlooking the Tigris River remain intact while the fortification walls on the Botan side have been largely destroyed.

The castle and other finds of Çattepe indicate that the settlement was part of the eastern defense system of the Late Roman Empire, and it was under the cultural and political influence of Iran's Sassanid Empire in the East during the 4th century AD.

So far only 26 m of the base diameter of the tower is visible on the northwestern corner of the castle which actually expands further downwards **(Fig. 4)**. The retaining wall on the lowest portion of the tower was built to provide prevention against the rise of the Tigris River. The 2014 campaign revealed that part of this section, which was filled in a later period, was, in fact, an entrance gate. More detailed information about the entrance gate will be available only after removal of the buildings on the upper layer in coming years.

Fig. 3a: A northern view of the Çattepe Mound and Late Roman period walls.

Fig. 3b: A general view of the Çattepe Mound and Late Roman period walls.

Fig. 4: The northwestern tower of the Late Roman Period castle.

Fig. 5a: A votive stele recovered from the Çattepe Mound and preserved at the Diyarbakır Museum.

Fig. 5b: A detail from the votive stele at the Diyarbakır Museum.

Furthermore, there may be remains of a moat opened for defensive purposes between the castle and the settlement area. The finds recovered from the fields to the north of the settlement indicate that the settlement area during the Late Roman-Early Byzantine Period was not limited with the castle only, but expanded north into a large area.[4] This type of settlement resembles those in Syria during the Late Roman and Byzantine Periods built for military purposes.[5] An altar, recovered from Çattepe in 1989, is now being preserved at the Diyarbakır Museum, is probably from this period **(Fig. 5a- b)**. On the alter, erected for Zeus Olympius by Antonius Domittianus,is a bilingual Aramic-Greek inscription that reads; *"I, Antonius Domittianus, a veteran has erected (this altar) for Zeus Olympios, Lord of the gods out of gratitude."* It is of great importance since it is one of the rare inscriptions in the region during this period.[6]

The castle and other finds of Çattepe indicate that the settlement was part of the eastern defense system of the Late Roman Empire, and it was under the cultural and political influence of Iran's Sassanid Empire in the East during the 4th century AD.

[4] VELİBEYOĞLU *et al* 2002, 794.
[5] VELİBEYOĞLU *et al* 2002, 794.
[6] LIGHTFOOT – HEALEY 1991, 1-7.

Coins discovered during the excavations are mostly dated to the periods of Constantius II (337-361 AD)[7], and Constantius Gallus (351-354 AD) and further also support the fourth century date.[8] Some stone reliefs and rock-carved tombs from the Parthian and Sassanian Periods along the Tigris River to the south of the Botan Valley provide evidence for expansion of their influence into the region.[9]

Çattepe is referred as Tell-Fafan in Arabic sources[10] from the Middle Age.[11] According to these sources, Tell-Fafan's location at the confluence of Botan and Tigris Rivers establish it as one of the important commercial cities and ports of El-Cezire throughout the 10th century AD. The confluence of the rivers is near the mound, where flow of the water naturally increases and makes the river suitable for transport. The excavations partly exposed the buildings of Tell-Fafan in the uppermost layers of Çattepe. A majority of the buildings dating to this period are located between the southern part of the mound and the modern village settlement. Some of the buildings are those currently leaning against the intact walls of the Late Roman fortifications on the right side of the settlement. *In situ* pottery was recovered from these buildings **(Fig. 6)**.

The port building mentioned in Middle Age Arabic sources was unearthed on the shore of the Tigris River to the southwest of the settlement (Fig. 7a –b-c-d). It appears that the port building was built for storage of fresh water during the Late Roman Period. It is likely that this cistern-like structure was built to store water from a diverted stream at a distance since the Tigris River was not flowing nearby the castle during that period. Later, when the flow of the Tigris River diverted closer to the castle, the cistern was converted into a port. The bollards inside the walls used for securing the rafts provide evidence to this claim.

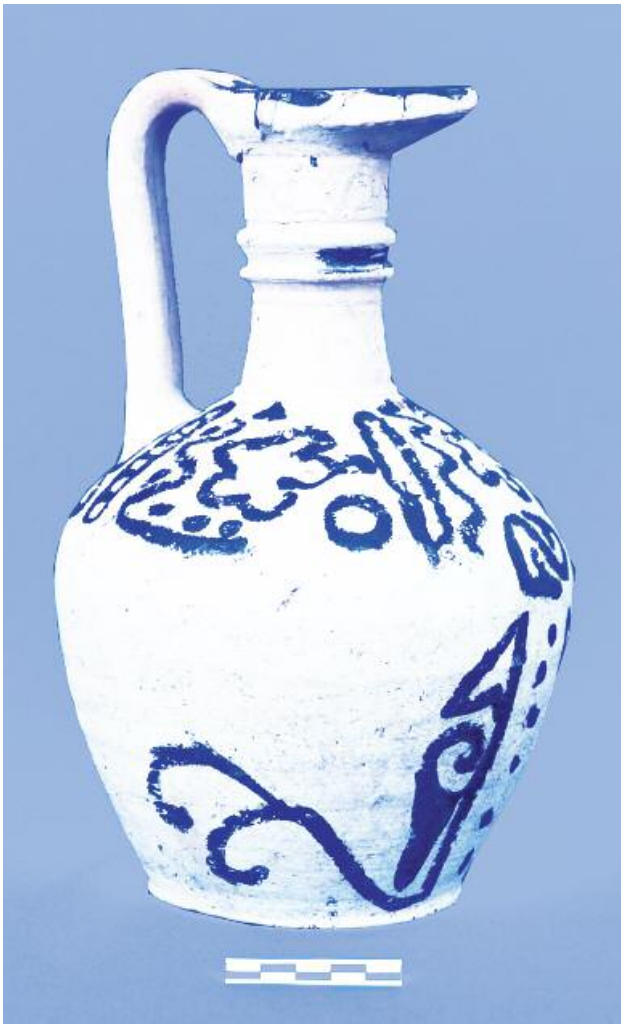

Fig. 6: A bitumen decorated vessel from the city of Tell-Fafan located in the uppermost layer of the Çattepe Mound.

[7] The legends on the coins yielded during the excavations were deciphered by Assoc.Prof. Cumhur Tanrıver and Specialist Mehmet Önder of the Department of Ancient Languages and Cultures, Faculty of Letters, Ege University; I hereby would like thank them for their contribution.
CONSTANTIUS II (337-361 AD), Struck in: 346-350 AD, Obverse: Head right, pearl-diademed, draped Emperor bust, [DN CO]NS TAN-TIVS [PF AVG], Reverse: phoenix standing right on globe, star in right field, FEL TEMP [REPAR] ATIO, (*Felicium Temporum Reparatio* "The restoration of the happy times"), Mintmark: ANS (Antiochian Mint)
CONSTANTIUS II (337-361 AD), Struck in: 341-346 AD, Obverse: Head right, pearl-diademed, Emperor head, [DN]CONSTAN-TIVS P[F AVG], Reverse: in four lines within wreath, VOT / [X] X / [MVLT] / [XXX], Mintmark: [SM] NB, (Nicomedia Mint?)
[8] CONSTANTIUS GALLUS (Caesar M.S. 351-354), Struck in: 351-35 AD, Obverse: Head right, bare-headed draped bust, [DN CONS]TAN-TI-VS NOB [CAES], Reverse: Virtus, shield on left arm, spearing fallen horseman, spear at right hand, left space "r", [FEL TEMP RE]PA[RA-TIO], (*Felicium Temporum Reparatio* "The restoration of the happy times"), Mint illegible.
[9] ALGAZE 1989a, 248-249. Fig. 24, 26.
[10] ÇEVİK 2002, 145-147. A significant part of this report related with the Middle Ages was excerpted from the unpublished doctoral dissertation of Assoc.Prof. Dr. Adnan Çevik, a member of our excavation team.
[11] LIGHTFOOT − HEALEY 1991, 1. The report indicates that Çattepe was an important Roman base on the Tigris River, identifying it as *equites Pafenses*. It is most likely that the name *Pafenses* was transformed into Tell Fafan, the Islamic city during the Middle Age

The stream beds and valleys are important natural habitats for nutritional sources and water since the early periods of the settled life. With the expansion of barter and trade across regions and intense use of valleys, these areas became important, and many settlements were established in the valleys. The Botan Valley, one of the important valleys of the Southeastern Anatolia, has many archaeological remains from different periods, providing evidence for the cultural relationship between the Southeastern Anatolia and Mesopotamia from earlier periods. Undergoing a salvage excavation within the scope of the Ilısu Dam and HEPP project, Çattepe Mound is one of these settlements. It has been inhabited since prehistoric times, and there is a large castle and a harbour dating to the 4th century AD, ie. Late Roman Period on the mound.

Fig. 7a: The harbour building on the Tigris bank.

The 8-10 cm holes on the walls of the port building may be an indication of the fact that the rafts were also fastened to the trees. The port building which was built partly by digging conglomerate deposits on the east and south is accessed via stone staircases after passing through the administrative buildings constructed on the mound's slope **(Fig. 8, Drawing 1).**

Fig. 7b: The harbour building on the Tigris bank.

Fig. 7c: A detailed view of the harbour building on the bank of Tigris.

The staircase is formed by 23 limestone steps, measuring 1.50 m in length x 0.50 m in width and approximately 0.30 m in height. A thick stone wall was erected on the western side of the port building to support the stairs with a brick wall on the eastern side **(Fig. 9)**. The brick wall incorporating the stairs on the east extends down with a slight curve. Similarly, the stairs leading down to the Tigris River make a curve along the wall. The stairs would have been topped by a brick arch, while the last few stairs at the bottom should have been used for handling purposes. A large part of these walls represents underwater section of the port building.

Fig. 7d: A detailed view of the harbour building on the bank of Tigris.

Fig.8: The harbour building.

Fig. 9: A bird's-eye view of the harbour building.

Fig. 10: A detailed view of the brick and stone wall of the harbour building.

The southern wall is approximately 9 m long and 2.60 m thick. The northern wall extends paralel to that wall, however it has been mostly destroyed. Transport vehicles, such as rafts or floats docking, would have safely landed between these walls without any influence of the current of the Tigris River.[12] Also, it is possible to have a larger cargo handling area by extending wood on these two walls with a width of 3.30 m against any rise and tide of water.

Although the western part of the port building, which extended into a large area in this section, has been demolished, it was protected with reinforced walls against the water of Tigris River. Based on the available data, we suggest that the port building is related with the fortification walls erected earlier than the Late Roman Period **(Fig. 10)**. Due to its strategical and geopolitical location, it is reasonable to suggest that the settlement area was also used as a port in earlier periods. Five different ports for river transportation from Diyarbakır/Amed to the south were mentioned in written sources from the Middle Ages. These include Diyarbakır / Amed, Cipas / Hısnkeyfa (Hasankeyf), Tell-Fafan /Çattepe, Ceziret İbn Ömer / Cizre and Mosul – Baghdad ports. Archaeological remains from these ports referred in the written sources have not been unearthed yet, except those in Çattepe **(Fig. 11)**.

[12] To the east of the mound facing the Botan River lies an area dug into the dirt and used to dock and handle shipments by rafts and floats. According to the villagers, the area was in use until the 1960-1970s.

Fig.11: The walls that have been dated to an earlier period than the Late Roman walls.

Fig. 12: The sites of harbours on the Tigris River referred to in written sources.

Muslim geographers regard Tell-Fafan as a city center and the first place where river transportation was initiated on the Tigris River. The transportation which was carried out on the Tigris River by rafts up to Çattepe was replaced by "Sefine", i.e. boats. It is known through several sources that the caravans which travelled on the northern route, particularly during the 10th century AD, conveyed their shipments loaded at the Tell-Fafan port en route to Baghdad through Cizre and Musul, crossing the Tigris River.

One of these sources, Makdisi, describes Tell-Fafan as a city located between the Tigris and Botan Rivers, with old bazaars and adobe houses, where living was inexpensive.[13] The enclosure wall built of large boulders unearthed on the western side of the mound probably belongs to the Islamic city of Tell-Fafan. We believe that they were used during that period by erecting new walls on the remaining parts of the Late Roman-Early Byzantine fortifications. This port city was set on fire ca. 915-916 after a large portion of the population was slaughtered by sword. The excavations yielded evidence of the damage by fire throughout the entire city.

Çattepe is referred to as Tell-Fafan in the Arabic written sources from the Middle Age. According to these sources, it was one of the important trading settlements and harbours of Al-Jazeera throughout the 10th century AD as it was located at the confluence of the Botan and Tigris Rivers.

Written sources indicate that Tell-Fafan, which was an active port during the 10th century AD for transfer of shipments from the cities of Erzen, Bitlis and Ermeniyye, farther north, to Mosul using the Tigris River, failed to maintain its characteristics, and became an ordinary village by the 11th century AD. It became part of a dangerous route for large trade caravans due to presence of bandit groups whose attacks intensified with the Mervani domination in the region after the 11th century. This situation inevitably forced merchants to abandon the route resulting in the city of Tell-Fâfân being downsized to a small village. After the Artuqids started to rule in the region, and Hasankeyf became the capital city, the route leading to the south through Midyat and Nusaybin became central, and thus Çattepe/Tell Fafan was completely abandoned since river transportation had lost its former importance. Thus, lack of any reference to Tell-Fafan in written sources from the 12th and 13rd centuries AD indicates that the settlement and port had likely completely lost their significance during this period. From this date on, Hasankeyf stands as an important port city for river transpotation in the region leading up to Mosul. However, bridges and caravanserais on the Botan river and its tributaries highlight the emphasis given to the region by the Seljuk rulers. These buildings indicate that there was still an intention to keep the strategic roads between Van region and North Mesopotamia, starting from Çattepe, and crossing the Botan Valley under control. The architectural layers on the upper portions of the fortifications facing the Tigris River demonstrate that Çattepe was re-inhabited during the 11th to 14th centuries AD after restoration Türkçe metin: "Çattepe´nin M.S. 11.-14. yüzyılda tadilat geçirdikten sonra tekrar yerleşildiğini göstermektedir". The settlement on the Çattepe Mound lost its strategic importance after the Seljuk Period, and has survived to the present day as a village.

[13] MAKDISI 1987, 125.

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Maritime Archaeology Periodical

UNDERWATER ARCHEOLOGICAL EXCAVATIONS AT LİMAN TEPE IN 2014

HAYAT ERKANAL*, İRFAN TUĞCU**, VASIF ŞAHOĞLU***

Excavations have been carried out at Liman Tepe since 1992, under the direction of Hayat Erkanal (Ankara University), have begun to yield one of the most signigicant settlements of the Bronze Age in Anatolia and the Aegean Region. Terrestrial excavations have been expanded to include underwater excavations, conducted in collaboration with the Haifa University between 2000 and 2007, and since then, within the course of the activities of Ankara University Mustafa V. Koç Research Center for Maritime Archaeology[1] and in collaboration with other interdisciplinary, international organizations.[2] Data from the underwater portion of the excavations suggest that the remains belong to breakwater and harbour facilities of the ancient city Klazomenai during the Archaic and Classical Ages.[3] This is the first underwater excavation of an ancient harbour in Turkey. It has great importance since it demonstrates that underwater archeological studies should not be restricted to shipwrecks. Studying the harbors to which these wrecked ships were originally destined, had they not been sunk, may also provide very important data. A detailed analysis of the remains recovered from the harbours that had potentailly been visited by thousands of boats throughout the period when they were in use informs on various aspects of the settlements utilizing these harbours; aspects ranging from socioeconomic life to temporal changes. This magnificent harbour facility, at Liman Tepe / Klazomenai, also reveals important data about the commercial and political nature of the aforesaid periods.

Fig 1: Aerial view of the ancient and modern harbours showing Liman Tepe / Klazomenai (Photo by Hakan Çetinkaya)

The ancient harbour facility of Liman Tepe / Klazomenai, submerged due to tectonic movements, lies approximately 500 m to the east of the modern Urla Port right across the Karantina Island on the southern shores of the İzmir Bay **(Fig 1)**.

[1] After completing the construction of the new campus of the center in Urla in 2014 with generous contributions of the Vehbi Koç Foundation and TINA, the Ankara University Research Center for Maritime Archaeology (ANKÜSAM) was changed to Ankara University Mustafa V. Koç Resarch Center for Maritime Archaeology.

[2] The land and underwater excavations at Liman Tepe have been carried out by the Ankara University Mustafa V. Koç Resarch Center for Maritime Archaeology within the scope of the İzmir Regional Excavations and Research Project (IRERP). All activities within this scope are supported by the Turkish Republic Ministry of Culture and Tourism, Ankara University Faculty of Languages, History and Geography, Koç Foundation, Turkish Historical Society, Institute for Aegean Prehistory (INSTAP), INSTAP-SCEC, Turkish Foundation for Underwater Archaeology (TINA) and Municipality of Urla.

[3] ERKANAL *et al* 2010; ERKANAL *et al* 2012; ERKANAL – ŞAHOĞLU – TUNCEL 2013; ERKANAL – ŞAHOĞLU – TUĞCU 2014; ERKANAL *et al* 2014.

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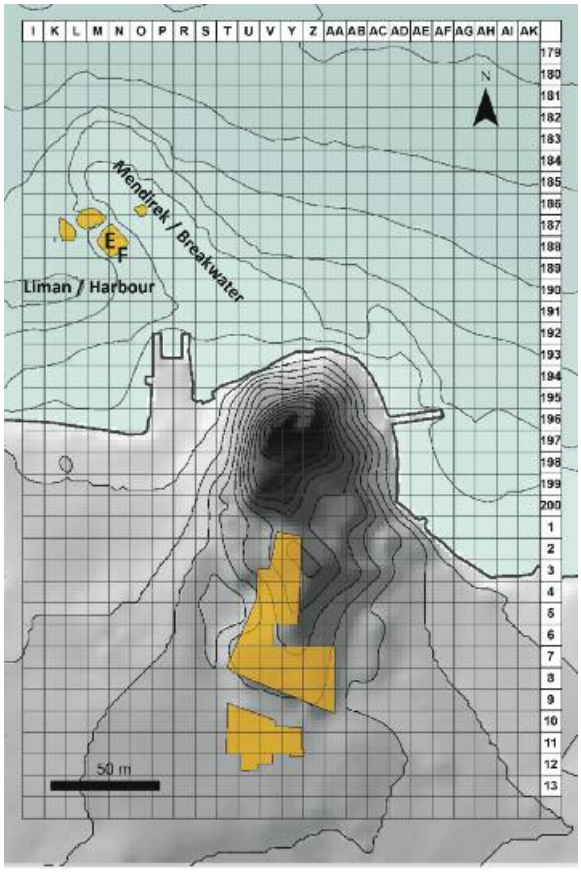

Fig 2: Topographic map of Liman Tepe and underwater excavation sites (Map by Michele Massa)

Fig 3: A photomosaic view of the floor of the Liman Tepe / Klazomenai 6th century harbour.

Excavations were performed in seven different sections of the site including interior and exterior parts of the breakwater over the last 14 years. The objective of the excavations carried out between 2000 and 2007 was to reveal the construction sequence and technical characteristics of the architectural systems (breakwater and pier) making up the harbour, while excavations from 2007 have focused on identifying phases of active use and stratigraphic layering (historical process) of the ancient harbour. Excavations continue in Areas E and F (Fig 2).

The 2014 excavations at the harbour, carried out between July 16th and September 26th, focused on the Area F. The main objective of the 2014 campaign was to examine the layers of the harbour dating from the 6th to the 4th centuries BC[4] and during excavations the floor of the 6th century BC harbour was completely exposed (Fig 3.)

2014 EXCAVATIONS AT THE HARBOUR FLOOR FROM THE 6TH CENTURY BC

Harbour floors may have an almost modern-day garbage-like nature, yielding many kinds of artifacts. The first group of artifacts uncovered from the harbour floor during our excavations was organic remains.

[4] The excavations carried out in front of the breakwater inside the harbour since 2007 are of great importance for revealing stratigraphic layering. The excavations in the future will focus on both expansion towards the east and detailing near the land in the interior and exterior parts of the harbour area.

This group of remains are usually available in restricted amounts in land excavations, but having the advantage of longer durability of organic material in underwater environment, they are abundantly uncovered in underwater excavations. In 2014, as it was in previous years, olive seeds were the most abundantly recovered of the organic remains; numbering into the thousands. Although in lower quantities, other organic finds include nutshells, pine cones, wooden fragments, and animal bones (Fig 4). On one hand, these organic remains provide information about the fauna and flora of the periods during which the harbour was used, while on the other hand they inform about the economic activities of the harbour. A detailed analysis will provide information about the exotic plants or animals brought to the region via the Klazomenai harbour as well as enabling us to conclude about the extent of overseas interactions.

Metal finds and fragments are the second group of remains recovered from the floor. One of the most important metal finds in 2014 was a metal fluke tip of an anchor arm, measuring approximately 13 cm in length, in the form of a funnel (Fig 5). Very similar to the wooden anchor sample with a fluke tip[5] recovered from the Archaic Age harbour during previous excavations, this metal tip is also attached onto a wooden anchor post. The analysis failed since the wooden remains of the anchor were not well-preserved. Based on the size of the fluke tip, we can conclude that it belonged to a small anchor and was probably used for a small boat. Preservation and restoration work has been initiated for the anchor arm tip. In addition to this important find, various metal parts and nails were uncovered during the 2014 campaign among other finds.

[5] ŞAHOĞLU 2010, Fig. 7.
[6] COOK – DUPONT 1998; COOK 1992.

Fig 4: Animal bones recovered from the floor of the Liman Tepe / Klazomenai 6th century harbour.

Fig 5: A metal anchor arm tip of the wooden anchor uncovered at the floor of the Liman Tepe / Klazomenai 6th century harbour.

Ballast stone form another group of finds which were used for stabilizing the ship. The excavations have yielded intense number of ballast stones, particulary in the floor of the harbour dated to the 6th century BC.

Pottery finds represent the most abundant group of finds. Ceramic wares help identify the historical process and provide evidence that the harbour had been in use without interruption from the 6th century BC. Among the various ceramic forms are amphorae, olphe, oinochoai, skyphoi, plate sherds, and rosette and bird bowls. We identified three different paint decorated styles. The first is a sample of an oinochoe dating to the late phase of the wild goat style[6] (Fig 6). There are also pottery samples dating to earlier phases of the wild goat style, i.e. the first and early second quarters of the 6th century BC, during previous excavations. Pottery, in the Fikellura style, is also present (Fig 7). Considered to date between wild goat style and black figure, yet contemporary with both of them to a certain extent, this goup of pottery has been shown to be used during the mid-6th century BC based on stratigraphic data.[7] Amphorae and oinochoai are the most common types of vessels produced in this style. The sample recovered from the harbour floor was an amphora decorated in the fikellura style, which are usually dated to a later period within the development process of this style. Therefore, this sample can be dated to the end of the second or third quarter of the 6th century BC.[8]

Fig 6: Body sherd of a oinochoe decorated in the wild goat style.

Fig 7: Rim of an amphora decorated in the Fikellura style.

[7] SCHIERING 1957, 11,

[8] As already known preservation and restoration of artefacts uncovered during underwater excavations require more than one year to complete. Detailed studies will be carried out upon completion of preservation and restoration works.

Fig. 8: In situ Siana cup.

Fig. 9: Siana cup (kylix) with a centaur decoration on its tondo (before conservation).

Another important artifact recovered is a Siana cup **(Fig 8)**. Although found in fragments, the siana cup (kylix) clearly has a high foot. With a rim diameter of approximately 16 cm, the sample is entirely in black wash. There is a centaur depicted within a rosette decoration around the tondo of the cup **(Fig 9)**. The sample, dated between 575 BC and 560 BC, is of great importance for dating of the harbour floor. All recovered objects from the 2014 excavations will undergo analysis following conservation and restoration procedures. The documentation of the excavated part of the harbour floor was completed (plate 1M), and the site was re-covered until next year's excavations. In 2015, the main objectives will be expansion of the Area F and widening of the excavation of the harbour floor.

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UNDERWATER EXCAVATION OF ADRASAN PLATE WRECK

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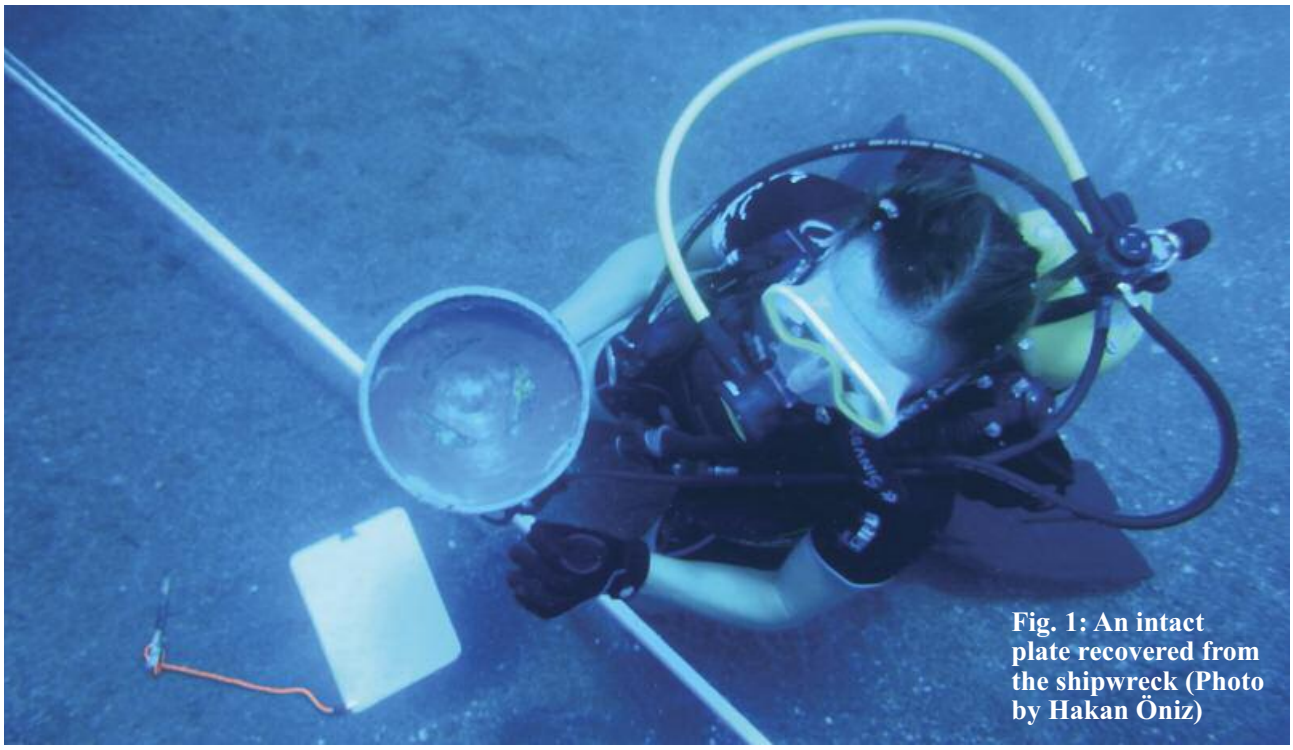

Fig. 1: An intact plate recovered from the shipwreck (Photo by Hakan Öniz)

A shipwreck, containing plates as a primary cargo, was originally identified lying to the west of Adrasan Cove during surveys conducted by the Marine Sciences and Technology Institute of Dokuz Eylül University between 2005 and 2009.

This project was made possible by the sponsorship of TUBITAK (Prj.no.106K054). Later, the same shipwreck was visited by the underwater survey team from Konya Selçuk University. In 2014, the Ministry of Culture and Tourism planned a rescue excavation, with the scientific consultation and participation of both universities, under the direction of the Antalya Museum. A short- term excavation was planned and conducted between 20 August and 5 September due to the ongoing risk of looting of the shipwreck. The Konya Selçuk University research vessel, Selçuk-1, was used during the excavations as a diving platform.

This is the first shipwreck (Fig.1) with plates as a primary cargo excavated in Turkey. Priority was given to mapping the wreck during the initial campaign, with a photomosaic being created after producing a site plan of the wreck. To accomplish these tasks, points of reference were placed on certain sites and stones, then given numbers.

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The distances between these points were measured, and included in the master plan so that the position of the shipwreck could be pinpointed on a topographic map.

A grid system of 2.5 x 2.5 m squares was established over the flat, sandy site (Fig. 2, Fig. 3). Anchors associated with the ship and surface artifacts were recorded in the plan. Most of the artifacts appear on a shallow part of the rocky slope, but the densest area of findings lies between depths of 15m-18 m depth. The finds are scattered for approximately 25 x 5 meters in an area where a group of natural stones and rocks adjoin with a sandy bottom.

First observations and the overall distribution of the findings indicate vessels of the same form and size, with plates often stacked inside one another.

Fig.4: Underwater works at the site.

Initial analysis has revealed that the shipwreck was likely damaged and looted in the past. There were only a few intact, complete plates located.

All of the findings and the plate sherds were raised to the surface using lifting balloons attached to plastic baskets (Fig. 4, Fig. 5), then placed in big buckets containing a mixture of sea and fresh water prepared by the "Maritime Research Center" staff on the Selçuk-1 ship.

Afterwards, the findings were handed over to the Antalya Museum laboratory, where the desalination process continues. The Adrasan shipwreck excavation is significant because it is the first scientific shipwreck excavation that has been carried out with collaboration of two Turkish universities, providing us new and important information about the period in which the plates were produced. All these findings could be dated to 12th-13th century AD, according to our preliminary exams.

The excavations will resume in the summer of 2015.

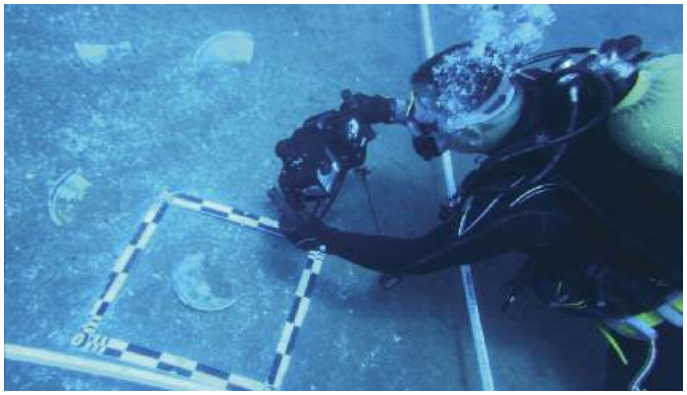

Fig. 2: Video recording by Harun Ozdaş (Photo by Hakan Öniz)

Fig. 3: Launching the 2.5 x 2.5 m grids of into the sea. The grids were then attached to each other on the seafloor.

Fig.5: Excavation of trenches using airlifts

THE SHIPWRECK OF GNALIĆ – MIRROR OF RENAISSANCE WORLD

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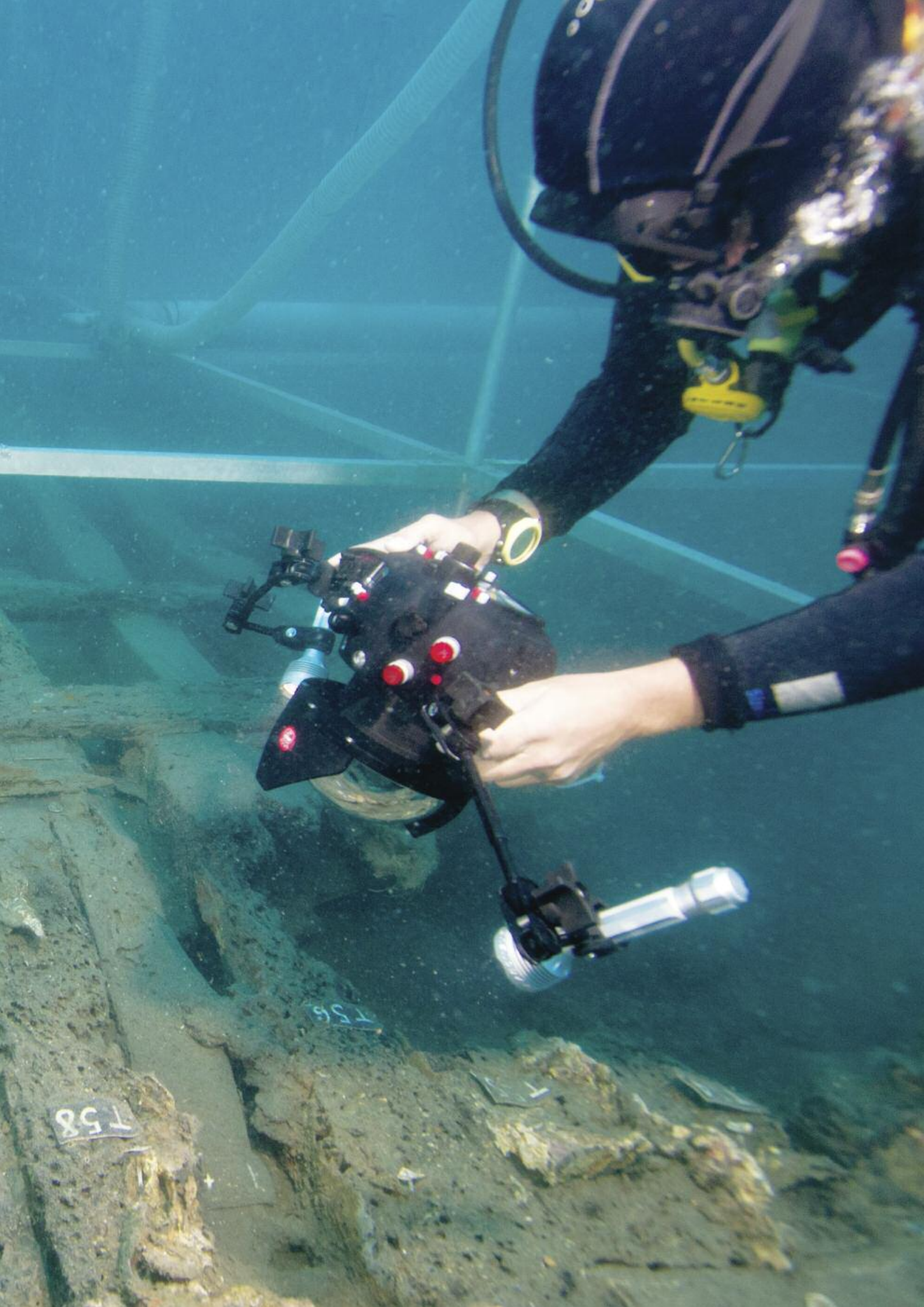
**MARIANGELA NICOLARDI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ABSTRACT

The shipwreck near the islet of Gnalić, not far from the coastal town of Biograd na Moru in Central Dalmatia (Croatia), is one of the most significant post-medieval shipwreck sites in the Mediterranean. Besides the wide range of interesting finds belonging to the ship's equipment and cargo, which raised public interest in the late 1960s, recent archival research has yielded hundreds of documents revealing the exciting history of the ship and its rich political, economic, cultural and historical context. Built in Venice in 1569 for Benedetto da Lezze, Lazzaro Mocenigo and Piero Basadonna, captured by the famous Ottoman corsair Uluç Ali in 1571, and sold to Odoardo da Gagliano in Pera (Constantinople) in 1581, the ship sunk at Gnalić in early November 1583, loaded with precious cargo shipped from Venice to Constantinople. Among many interesting items of various provenance, the ship carried window-panes ordered by Sultan Murad III, and precious gifts from the Venetian Senate intended for the Sultan's mother Nūr Bānū. The Shipwreck of Gnalić – Mirror of Renaissance World project, directed by the University of Zadar, in collaboration with Texas A&M University and other Croatian and foreign institutions, focuses on the systematic interdisciplinary research of the site. It also aims at reconstruction of its comprehensive Late Renaissance context, through the numerous objects found and the various persons involved in its curious and intriguing story.

Fig.2. Position of Gnalić on the map from the Piri Reis' *Book of Navigation*

DISCOVERY OF THE SHIPWRECK AND INITIAL RESEARCH

On 17 September 1967, the Croatian daily press carried the first news of the discovery of a shipwreck near Gnalić, a small island **(Fig. 1)** situated at the south-western end of the Pašman Channel **(Fig. 2),** south of Zadar in Central Dalmatia. Since the early 1960s, local divers and fishermen already knew of its existence, and experienced looters of German and Belgian origin had already smuggled abroad a number of valuable objects. In less than a month after the official discovery, Professor Ivo Petricioli, assisted by the conservators Ksenija Radulić, Sofija Petricioli and Božidar Vilhar, organized the first rescue operation in order to attempt the timely protection of what remained on the seabed **(Figg. 3, 4)**. The amazing finds astonished the professional and general public, and the operation continued through four short-term rescue campaigns, conducted until 1973.[1]

[1] PETRICIOLI – URANIJA 1970; PETRICIOLI 1981.

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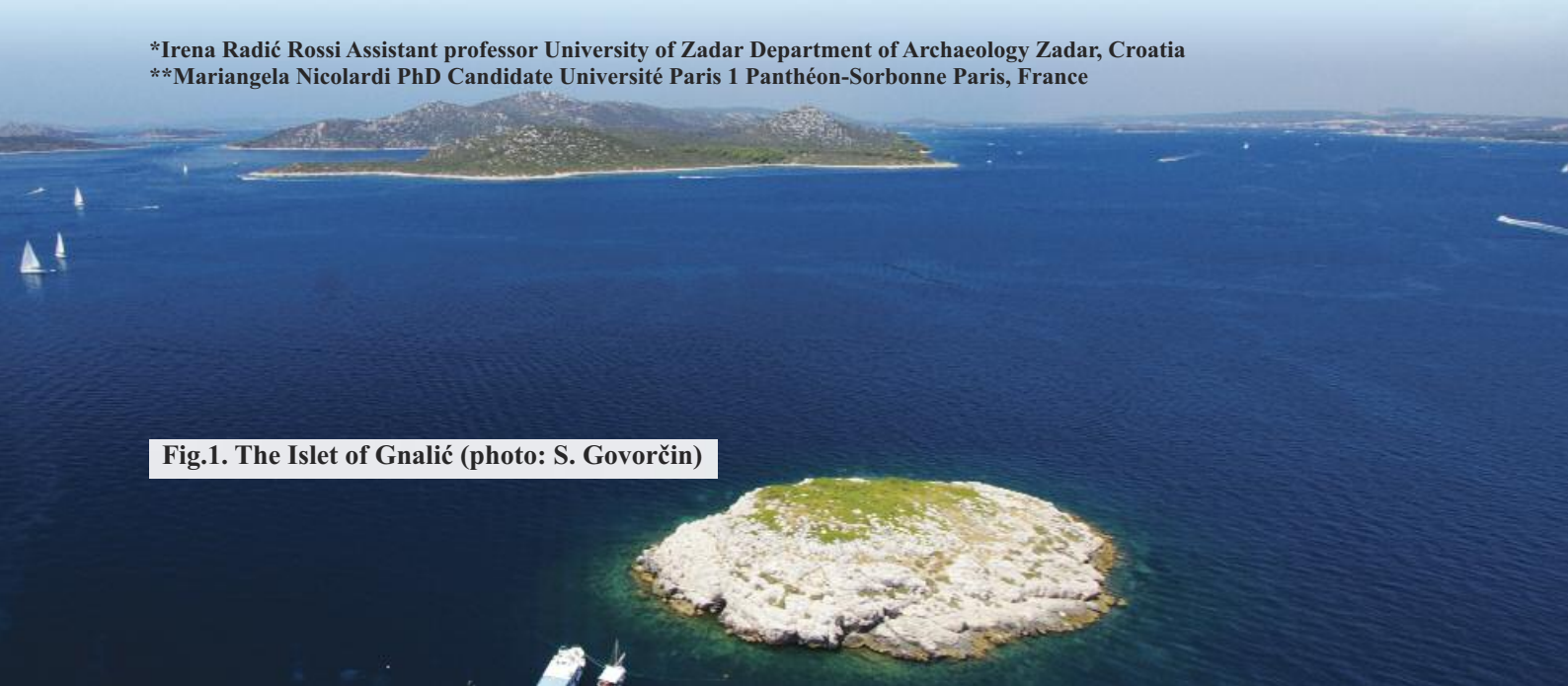


Fig.1. The Islet of Gnalić (photo: S. Govorčin)

Fig.3. Situation in the surface layer of the site in 1967 (photo: Archive of the Local Heritage Museum in Biograd na Moru)

Fig.4. Recovery of the big iron anchor in 1967 (photo: Archive of the Local Heritage Museum in Biograd na Moru)

Despite the poor documentation left after rescuing the shipwreck, the Gnalić operation was a unique enterprise that saved the site for future generations. In the late 1960s and early 1970s the post-mediaeval heritage in Croatia was still out of the archaeological domain, and there was no experience at all in excavating post-mediaeval shipwrecks. The Municipality of Biograd na Moru established the Local Heritage Museum to host the Gnalić collection, but the complexity of the site, the lack of expertise, and inadequate financial support all negatively impacted site operations, forcing postponement of excavation into the future.

The cargo of the ship, composed of raw materials, partially processed products and final products of various origins pointed to a large merchantman of probable Venetian origin. The year marked on the two decorated bronze guns, cast in Venice by Zuane Alberghetti, made it obvious that the ship sunk after 1582 **(Fig. 5)**.

The remains of the wooden cargo containers in the forms of barrels, baskets, boxes and chests were spread all over the site, containing white lead or cerussite ($PbCO_3$), **(Fig. 6)**, cinnabar (HgS) and probably arsenic trisulphide (As_2S_3), as well as small finished products such as razors, thimbles, needles, hawk bells, candle snuffers and spectacles with leather frames **(Fig. 7)**. Elementary liquid mercury (Hg) was probably transported in rounded iron containers. Three types of richly decorated brass chandeliers **(Fig. 8)** were transported in pieces, to be put together after reaching the destination. The partially processed raw materials in the form of metal bars, wire, plates and sheets were mainly made of tin and brass; a mysterious ironclad chest contained three linen shirts, eight woollen caps and a bale of 54 m of richly decorated red silk Damask textile **(Fig. 9)**. Particularly interesting was the abundant cargo of glass, composed of a variety of tableware **(Fig. 10)**, flat mirror glasses and windowpanes, and colourful glass beads. A number of other interesting objects completes the list of the finds **(Figg. 11 – 13)**.

Fig.5. Bronze gun casted in Venice in 1583 by Zuane (Giovanni) Alberghetti (photo: I. Asić)

Although immediately perceived as extremely important, the wooden remains of the ship's hull remained neither excavated nor documented in detail, due to the rescue nature of all the research campaigns. Even the valuable attempt of the Italian scholar Astone Gasparetto to identify the shipwreck in the notary acts conserved in the State Archive of Venice did not stimulate additional research after the first article written on the argument.[2] Gasparetto suggested the identification of the ship as *Gagiana* (*Gaiana* or *Gagliana*), that sailed from Venice in October 1583 and sunk between the town of Biograd na Moru and the island of Murter. At the time, there was no evidence to confirm his presumption, but, on the other hand, nothing testified against it.

Based on the extremely limited evidence, the researchers concluded that the ship sunk in the vertical position, presuming that the keel corresponded to the longitudinal axes of the site. Despite a number of questions that remained unanswered by such an interpretation, the problem remained unsolved for more than four decades.

RESTARTİNG THE PROJECT

In 1996 Zdenko Brusić, a pioneer of underwater archaeology in Croatia and an active participant in the first Gnalić campaign, attempted to revive the excavation of the shipwreck. Unfortunately, his effort was unsuccessful. In 2004, a group of Slovenian, Italian and Austrian experts, under the umbrella of *The Heritage of the Serenissima* project[3], launched the accurate study of the Gnalić finds, which culminated in the comprehensive publication of the glass material by Irena Lazar, Hugh Willmott and Caroline Jackson[4].

The misperception that the research of the shipwreck was completed caused complacency for the long-term protection of the site, and looting continued until recently. Parts of the hull exposed during previous research campaigns remained uncovered in the surface layer of the site, while objects belonging to the ship's equipment and cargo lay scattered all around **(Fig. 14).**

[2] GASPARETO 1973.
[3] GUŠTIN – GELICHI – SPINDLER 2006.
[4] LAZAR – WILLMOTT 2006.

Fig.6.Wooden barrel filled with ingots of white lead ($PbCO_3$)

Fig. 7. Wooden boxes with leather-frame spectacles (photo: I. Asić)

Fig. 8. Brass chandeliers (photo: I. Asić)

Fig. 9. Bale of 56 m of silk damask textile (photo: I. Asić)

A number of organized actions directed towards restarting the project in a systematic way finally succeeded in 2012, with the initial financial support of the Ministry of Culture of the Republic of Croatia sufficient for the first trial campaign. It was conducted under the direction of the Department of Archaeology of the University of Zadar (represented by Irena Radić Rossi), in cooperation with the Centre for Maritime Archaeology and Conservation of the University Texas A&M (represented by Filipe Castro and Peter Fix), and the Local Heritage Museum of Biograd na Moru (represented by the director Draženko Samardžić). The Institute of Nautical Archaeology and the Municipality of Biograd na Moru also supported the action.

The 2012 archaeological trench was excavated through a portion of the site that had already been partially explored during past research campaigns. This decision aimed to verify the existence of additional archaeological material belonging to the ship's equipment and cargo, and to determine the state of the hull in the places where it was already exposed. This season's work confirmed that a significant quantity of artifacts was still present at the site, and that the wooden hull remains, although heavily damaged in the surface layer, were still worthy of being explored **(Fig. 15)**.

Intense systematic research started in 2013, and continued during the following year **(Figg. 16 – 22)**, supported by the Croatian Ministry of Culture, the Municipality of Biograd na Moru, the Municipality of Tkon on the island of Pašman, the University of Zadar and the Texas A&M University. The German Association for the Promotion of Underwater Archaeology (FUWA) greatly contributed to the success of the excavation by providing a number of volunteers and taking over the expenses of the research vessel and part of the scientific team. The exhibition in the Croatian Historical Museum in Zagreb, held from June 2013 until May 2014, significantly contributed to the promotion of the project.[5]

A number of scientific institutions from Croatia and abroad invested expertise and equipment for accomplishing different tasks. For example, the research team of the Department of Geology of the University of Patras (Greece), led by George Papatheodorou, performed the sidescan sonar, magnetometer and sub bottom profiling survey of the site. The research team of the Division for Marine and Environmental Research of the Ruđer Bošković Institute in Zagreb (Croatia), led by Neven Cukrov, measured the concentration of the heavy metals in the water column, sediments and living organisms, and reconstructed the field of currents in order to monitor the effect of any potential contamination of the underwater environment.

[5] JURDANA – FILEP 2013.

Fig.10. Plain goblet decorated with lion head masks (photo: I. Asić)

The research team of the Department of Conservation of the National Museum of Denmark, led by David Gregory, took care of monitoring the degradation of the waterlogged wood, while the representative of the Laboratory of Tree-Ring Research of the University of Arizona, Tomasz Wazny, sampled elements of the hull for the dendrochronological examination.

The main concentration of the finds lies at the depth of 24 to 27 m. Based on the disposition of the surface finds and the results obtained by the sub bottom profiler, we can estimate the overall length of the site to about 55 m, and the width to about 15 m. It seems that the medium thickness of the sandy layer that covers and protects the shipwreck remains does not exceed 1.5 m.

During the 2013 and 2014 research campaigns, the excavation area covered about 80 m^2, revealing finally the exact position of the ship's keel along the northern, i.e. upper side of the site. Obviously, the ship sunk on one side, and not on the bottom in the vertical position, as supposed by previous researchers. The deadwood spotted on the western edge of the archaeological trench indicated the proximity of one of the ship's extremities.

Fig.11.Selection of glazed pottery (photo: I. Asić)

Fig.12. Bronze portable indoors heater (Tur. mangal), (photo: I. Asić)

Based on the old site plans and reports, the western part of the site was partly excavated and interpreted as the bow area, while the eastern part remained mostly unexplored. By the end of the 2014 campaign, it appears that the western extremity could actually represent the stern, but this presumption still waits for final confirmation **(Fig. 23)**.

Understanding the position of the keel led to the understanding of the other features present in the excavated area. A row of big barrels, containing the cinnabar pigment called vermilion, stood over the ballast stones and the ceiling planks. These large barrels were surrounded by a number of small barrels **(Fig. 24)** containing either white lead ingots in the form of truncated cones, or the yellow arsenic trisulphide mineral called orpiment.

Fig.13. Sultanic cipher (Tur. tuğra) on one side of the mangal (photo: I. Asić)

Fig.14. Entirely preserved windowpanes in the surface layer of the site (photo: D. Frka)

The deck beams spotted over the small barrels in the south-eastern extremity of the trench were apparently part of the first deck, which held the piles of windowpanes; this area will be explored during future campaigns.

Among several thousands of small finds raised since 2012, we should single out a nicely preserved seal of the Venetian Doge Nicolò da Ponte **(Figg. 25 – 26)**, which testifies to the presence of the merchandise shipped by the Venetian authorities. In addition, worthy of mentioning are small lead seals **(Fig. 27)** bearing a variety of symbols of persons involved in the production, storage and commerce of wool, cotton and other textiles certainly present in the ship's cargo. Although already known from previous excavations, these newly found seals increase the repertoire of known marks.

HISTORICAL BACKGROUND

Systematic work on the old documentation, inventory of the old finds, and assessment of the conservation issues started in parallel with the renewed intense fieldwork. At the same time, Mariangela Nicolardi and Mauro Bondioli continued Gasparetto's work in the State Archive of Venice, finding the proofs needed to confirm the identification of shipwreck, as well as hundreds of documents to elaborate its complex story. Thanks to the patient examination of the archival resources, we can reconstruct it to unexpected proportions.

Fig.15. Excavating the hull remains in 2012 (photo: M. Brzac)

Fig.16. Windowpanes from the lower layer with traces of arsenic trisulphide (As2S3), (photo: S. Govorčin)

The ship **(Fig. 28)**, of the capacity of 1,200 Venetian barrels (*botti veneziane*), or about 755 tons, was built in Venice in 1569 for Benedetto da Lezze, Lazzaro Mocenigo and Piero Basadonna.[6] After several successful voyages to Cyprus, transporting troops for the Cyprus War, in 1571 it fell into the hands of the Ottomans on its way to Corfu. In the furious battle, fought on July 21, the famous Ottoman corsair Uluç Ali, later the Grand Admiral of the Ottoman fleet, captured the ship. He kept it as his own property for the next ten years, and in 1581 sold it to Odardo da Gagliano, an Ottoman subject settled in Pera (Constantinople), **(Fig. 29)**.[7] As a consequence, the ship became *Gagliana*, also named *grossa* due to its significant capacity. The acquisition of the ship without suitable ordnance in 1581 is probably the reason why Odoardo da Gagliano ordered the guns casted by Alberghetti in 1582.

On 23 May 1583, the ambassador of the Venetian Republic in Constantinople, Giovanni Francesco Moresini, notified the Venetian Senate of a fire which accidentally broke out and destroyed the old harem of Sultan Murad III.

On 16 June 1583 *Gagliana grossa* for the last time arrived in Venice. Two days earlier, on 14 June, Moresini notified the Senate of an order of 5,000 round windowpanes (Ven. *rui*), meant for the renovation of the old Constantinople harem, which he had received from the Grand Vizier Siyavush Pasha the Croat (Tur. Siyavuş Paşa).[8] As his name indicates, the grand vizier, like many other high officials in the Ottoman court, was originally from the Croatian regions under Ottoman rule, and he held the post of grand vizier three times in his political career.

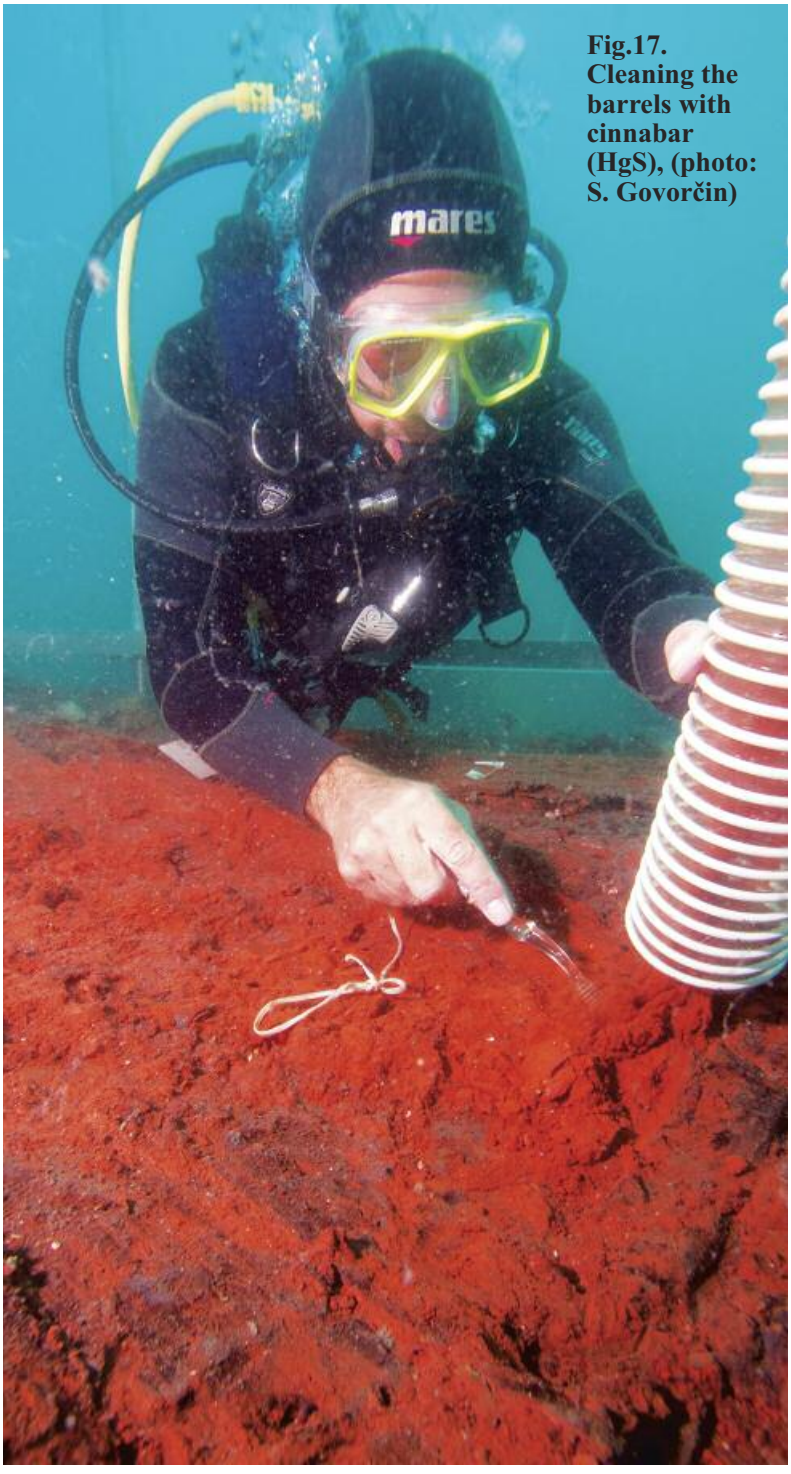


Fig.17. Cleaning the barrels with cinnabar (HgS), (photo: S. Govorčin)

[6] State Archive of Venice (henceforth A.S.Ve.), Senato, Deliberazioni mar, filza 49.
[7] A.S.Ve., Bailo a Costantinopoli, b. 263, c. 89r.
[8] A.S.Ve., Senato, Dispacci degli Ambasciatori e residenti, Costantinopoli, filza 17, c. 275r.

Fig.18.Cleaning the small barrels with ingots of white lead (photo: S. Govorčin)

The Senate's approval came three months later. The ship *Gagliana grossa* was selected to transport the ordered windowpanes, of which Moresini was notified on 24 September 1583.[9] The Venetian patricians decided to use the same ship to send three bales of the finest silk as a gift to the sultan's mother (Tur. Wālide Sultān) Nūr Bānū, the equal co-ruler of the Ottoman Empire during the last nine years of her life (1574-1583). Why the Senate selected the *Gagliana grossa* to carry the windowpanes is a matter of conjecture; it is likely that the loading ended by the end of September, and the ship was prepared to depart for Constantinople. We do not know why the ship's departure was delayed several times, or what led it to Dalmatian waters just before the beginning of the winter ban on sailing, which according to the Senate's decree began on 15 November and ended on 20 January. Perhaps the quantity of loaded goods did not satisfy the ship-owners, or climatic conditions in the autumn of 1583 were unsuitable for a long voyage.

The ship set off shortly before 29 October 1583 **(Fig. 30)**, commanded by Captain Alvise Finardi, an experienced sailor aged 65 at the time, who had already experienced shipwrecks twice in his seafaring career.[10] On 9 November 1583, the heralds of the Venetian Republic declared from the Piazza di Rialto, in the vicinity of the famed homonymous bridge, the horrible news of its sinking near the Dalmatian town of Biograd na Moru.

[9] A.S.Ve., Senato, Deliberazioni Costantinopoli, reg. 6, c. 124v.
[10] A.S.Ve., Miscellanea Gregolin, b. 12 ter-I (letter of Guglielmo Helman); Library of Museo Correr, Venice, Donà dalle Rose, 217, c. 39r; A.S.Ve., Cassiere della Bolla Ducale, Grazie in Maggior Consiglio, filza 16, doc. n. 1; A.S.Ve., Notarile, Atti, b. 6530, cc. 257r-257v.

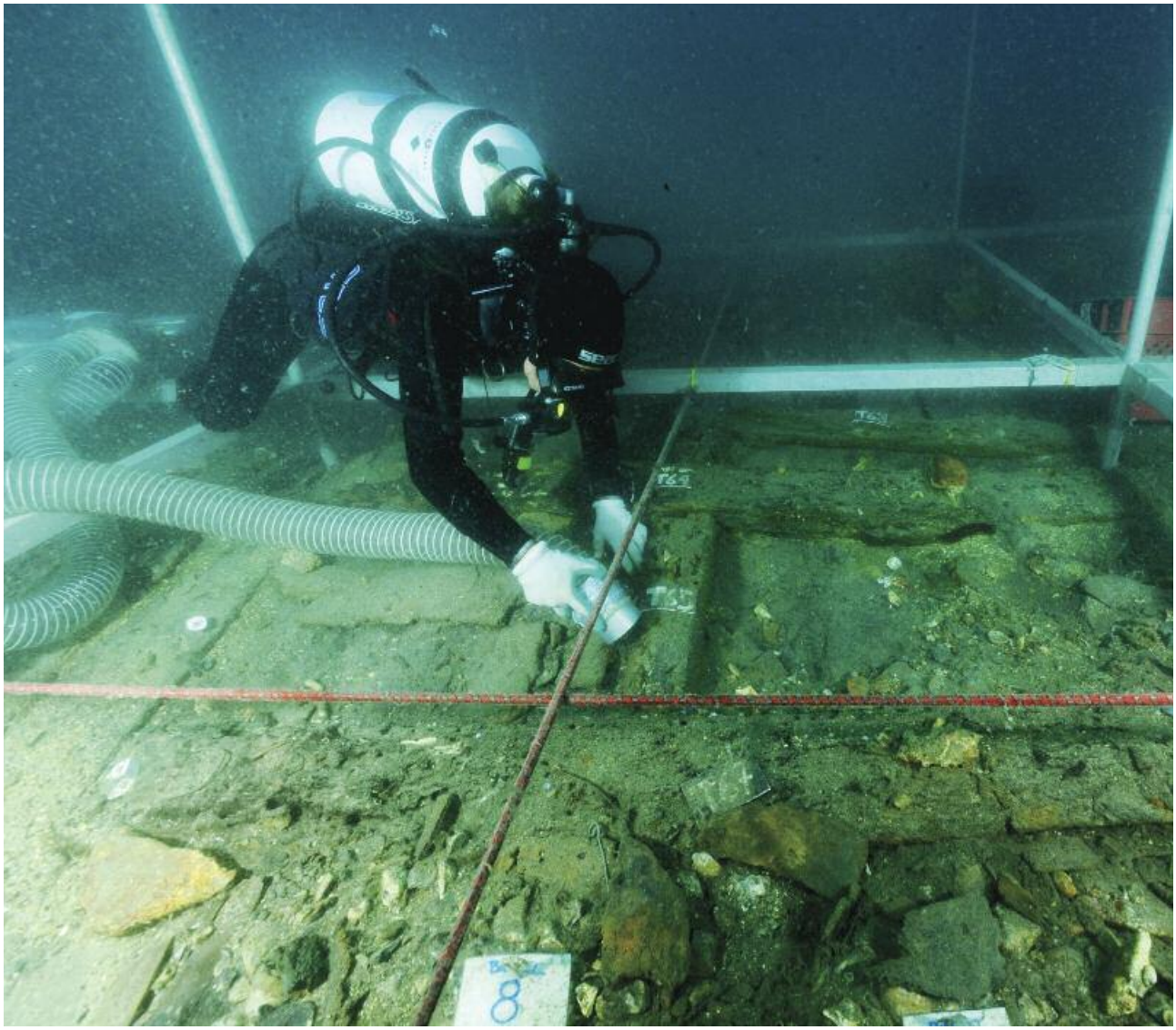


Fig.19.Cleaning the hull remains (photo: S. Govorčin)

Even though one may say that the ship's story ended with its sinking, this was not actually the case. The story continued to rapidly unfold with the objective of urgently salvaging the sunken goods and ship's rigging and gear. A certain Manoli, called 'Fregata', originally from Crete, took on the salvage operation. He diligently salvaged part of the sunken cargo, and on 26 January sought payment for his services in Zadar. He concluded his salvage operation by rescuing jewels of the value of 7,243 golden ducats, for the most part originating from Peru.[11] Guglielmo Helman, a well-known Venetian merchant of Flemish origin, had shipped them to the famous jeweler Antonio Paruta in Constantinople. As we know from later documents, the Venetian Senate resent the 5,000 windowpanes to the Sultan, and part of the jewels safely arrived in Paruta's hands.[12]

[11] A.S.Ve., Notarile, Atti, b. 10670, cc. 97r-98r.
[12] A.S.Ve., Senato, Deliberazioni Costantinopoli, reg. 6, c. 138r; A.S.Ve., Miscellanea Gregolin, b. 12 ter-I.

Fig.20. Discovery of the cinnabar clump (photo: S. Govorčin)

CONCLUSION

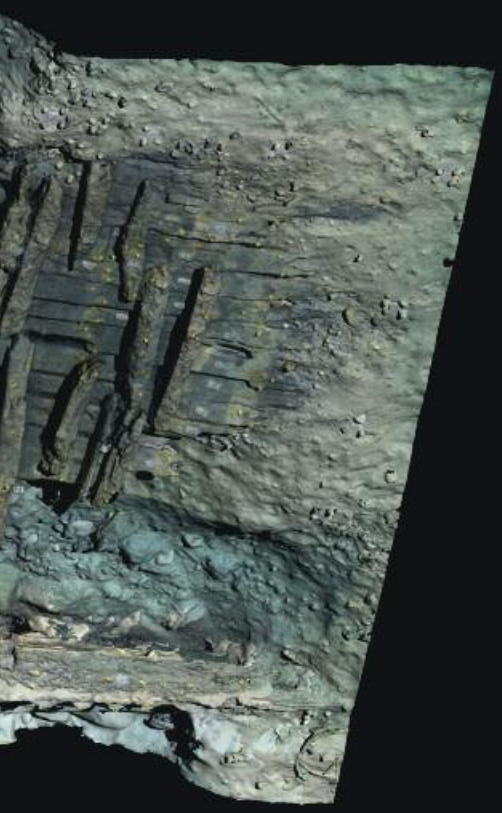
The limited space of this article does not allow us to present all the information recovered from the archaeological context and the written sources, but the short summary of the ship's story clearly shows its huge potential. The diversity of the archaeological finds complemented by the exhaustively researched historical data offers a unique picture of the rich cultural, economic, political and maritime past during the late Renaissance. The crew members and other participants in the events in question hailed from Croatia, Italy, France, Spain, Portugal, England, the Netherlands, Germany, Bohemia, Slovenia, Greece, Malta, Turkey, and even Peru. Therefore, the shipwreck of Gnalić is a microcosm of the intense mutual ties between the states and nations of the Late Renaissance world. **(Fig. 31)**

At one time, the experience of underwater research prompted Ksenija Radulić to underscore the importance of well-planned research work, stressing the importance of conserving finds and emphasizing in particular the significance of their presentation in order to communicate with the public and future generations.

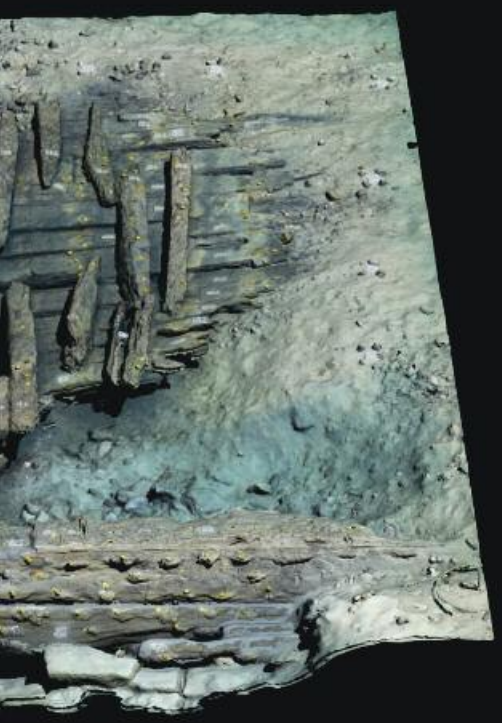
Fig.21.Cinnabar clumps (photo: S. Govorčin)

Fig.22. Photographing the hull remains (photo: S. Govorčin)

Fig.23. Photogrametry of the site by the end of the 2014 excavation campaign (K. Yamafune, R. Torres, S. Govorčin)



Gnalic Project
2014 Field Season



Body View

Fig.24. Photogrametry of the barrels in SE corner of the 2014 trench (R. Torres, K. Yamafune, S. Govorčin)

All of these are subjects of concern in the recently restarted project, which continues the work begun so long before and honors the legacy of the first researchers.

By reflecting the formal reality of the visible world, a mirror facilitates introspection. It is a symbol of awareness, wisdom and creative imagination, and in folk belief, it absorbs the received image that could afterwards return from the deep past or from the great distance. This is precisely what we expect of the shipwreck of Gnalić, which should mirror us the story of the Late Renaissance world.

Fig.25. Seal of the Venetian dodge Nicolò da Ponte, obverse (photo: S. Govorčin)

Fig.26.Seal of the Venetian dodge Nicolò da Ponte, reverse (photo: S. Govorčin)

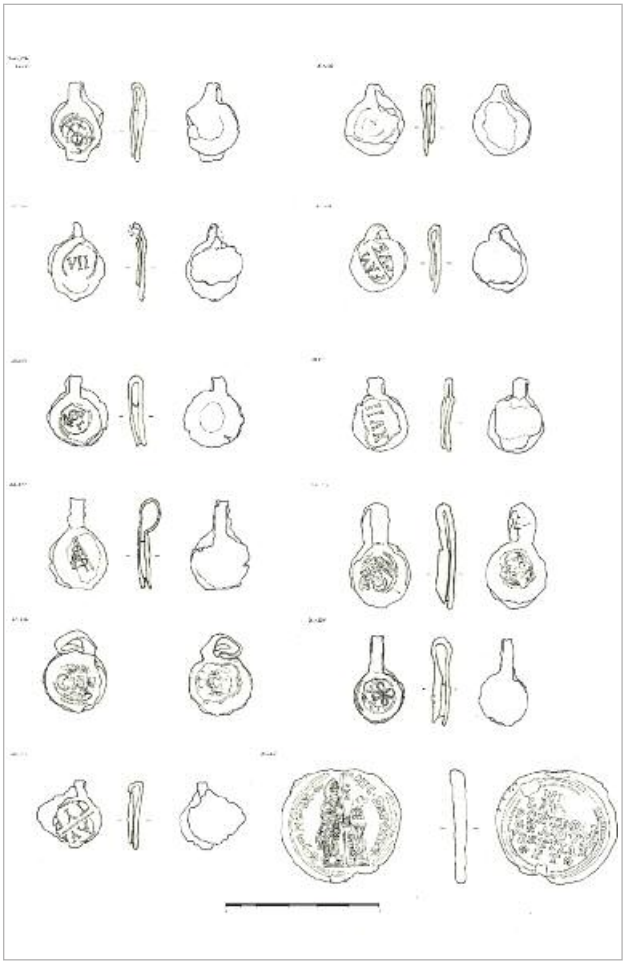


Fig.27. Lead seals for textiles, found during 2014 excavation campaign (drawing: S. Čule)

Fig.28. Representation of round ship on the monumental thumb of Giovanni Urana (Ivan from Vrana) in the church of S. Iseppo in Venice, 16th century (photo: M. Nicolardi)

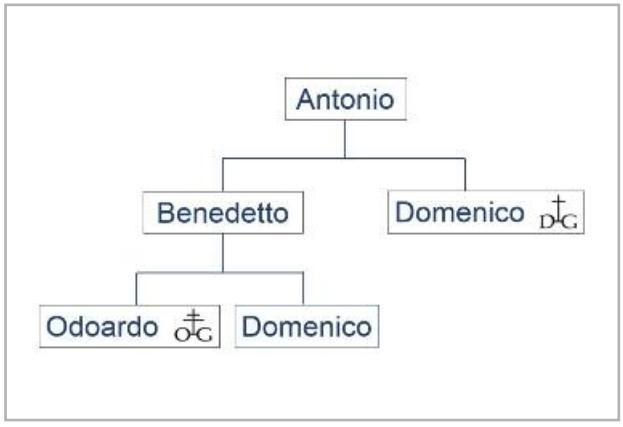


Fig.29. Family tree of da Gagliano family, with the mercantile signs of Odoardo, and his Uncle Domenico (M. Bondioli)

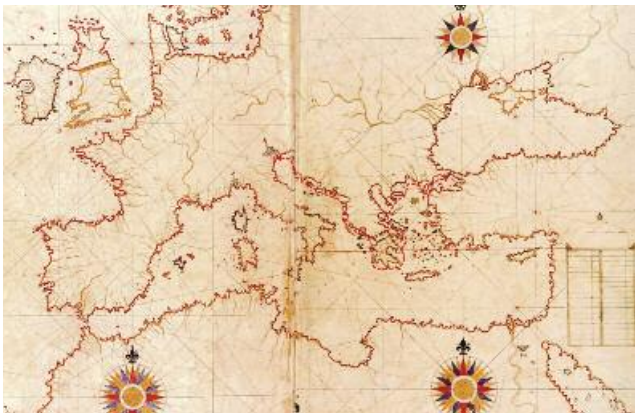


Fig.30. The usual navigation route between Venice and Constantinople, marked on the Piri Reis' map of Mediterranean

Fig.31. Political powers in the late 16th century Europe and Mediterranean

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UNDERWATER EXPLORATION IN 2014 AND DISCOVERY OF HISARÖNÜ BRONZE AGE SHIPWRECK

*A. HARUN ÖZDAŞ

Photo: N. Kızıldağ

Fig. 1. Intact beak-spouted jug, and sherds concreted to bedrock. (photo by H.Özdaş)

The first phase of underwater archaeological survey conducted on behalf of the Institute of Maritime Sciences and Technology, Dokuz Eylül University, with permission from the Turkish Ministry of Culture and Tourism, took place in 2014 and was focused on the southern Aegean coast of Turkey.

All activities in the survey, performed by a team of 12 members with support from the Turkish Ministry of Development, were within the scope of "Turkey's Shipwreck Inventory" project. During the survey, the team dove more than 100 times in 35 different locations, and members were able to identify ten new shipwrecks dating from the Hellenistic to the Byzantine Periods.

The most important discovery was made in Hisarönü Gulf. A beak-spouted pitcher was seen during survey dives of the region in 2011, but it was reported by the diver after the research ship left from the site. According to the diver, the pitcher was completely concreted to the bedrock, and it could not be raised. No other dive could be performed at the site since it was, ironically, the final day of the campaign at sundown. Similarly, we had the opportunity to perform another exploration dive at the site only during the final day in 2014.

Nevertheless, in addition to a beak-spouted pitcher, we found amphorae with belly handles at the site. These artifacts can be dated to the Bronze Age. We also found a single-handled jug, and other small ceramic artifacts distributed on a partially rocky and sandy seabed down to a depth of approximately 40 m. Besides the beak-spouted jug, which is a representative type of Bronze Age pottery found for the first time underwater on the Aegean coast of Anatolia, only a total of 4 belly-handled amphorae (Sheytan Deresi) have been found in the seas up to now.

***Assist.Prof.Dr.A. Harun ÖZDAŞ Vice Director of the Aegean Research Center (EBAMER) and Institute of Marine Sciences and Technology (IMST), Dokuz Eylül University/ IZMIR**

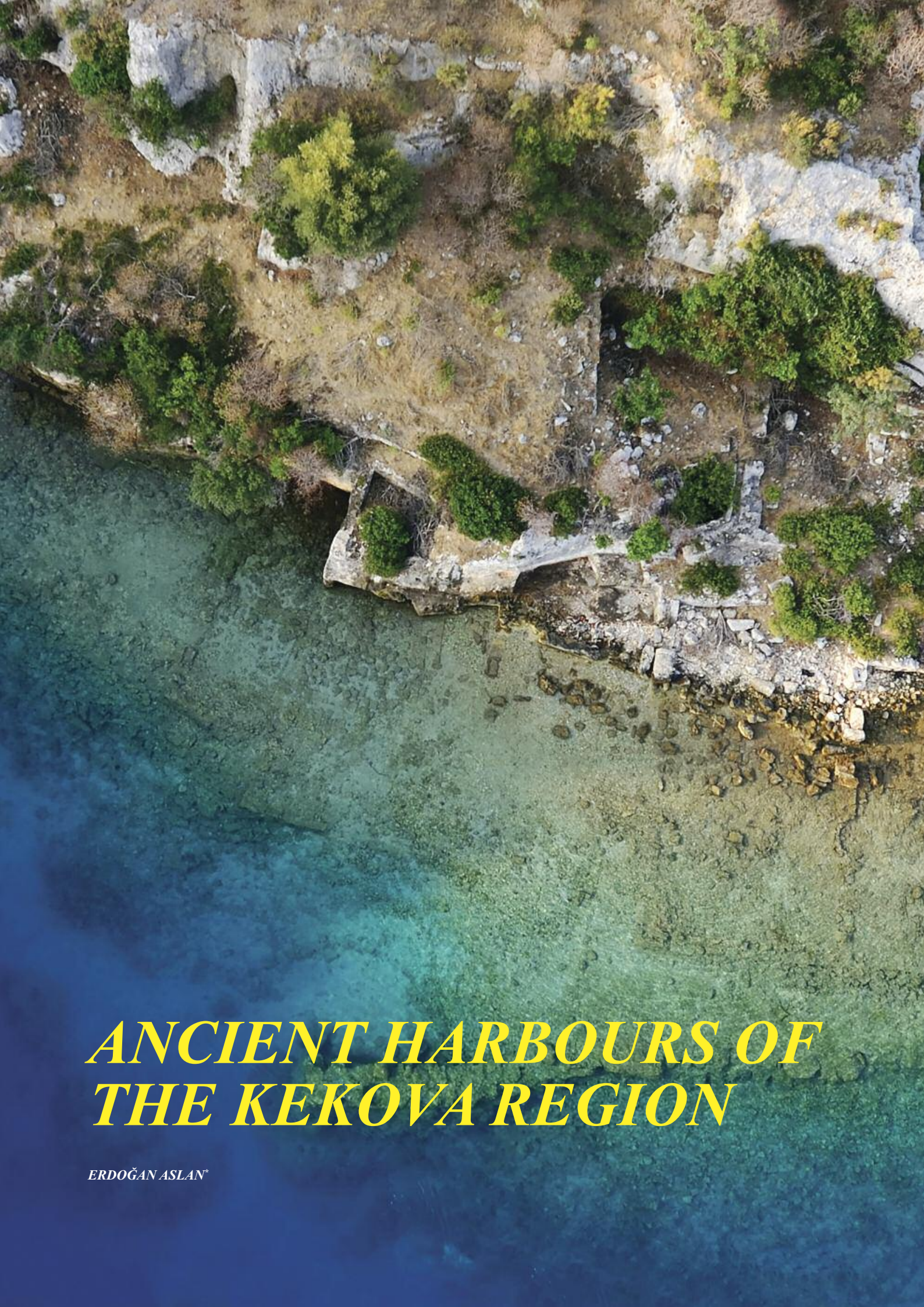
Fig.2. Intact amphora with belly knobs (photo H.Özdaş)

Including this shipwreck, I have had the opportunity to dive and explore a total of three shipwrecks from the Bronze Age, including the 14th century BC Bronze Age shipwreck at Uluburun near Kaş, and the Bronze Age shipwreck at Gelidonya, re-excavated within the scope of 50th Anniversary of Underwater Archaeology, in 2010.

The intact amphora and beak-spouted pitcher recovered from the shipwreck were taken to the Bodrum Underwater Archaeology Museum for preservation, conservation, and curation. All these findings could be dated to the first half of the 2nd millenium BC, according to our preliminary exams. Based on similar ceramic finds displayed at the Knossos palaces in Crete, it is likely that the shipwreck is related to Minoan culture. However, it would not be appropriate to draw a definitive conclusion based solely on the data obtained during the survey. That is why the shipwreck is scheduled for excavation in 2015. If we are able to unearth wooden remains of the ship, it may be recorded as one of the oldest shipwrecks in the literature. Regardless, valuable data on Bronze Age seafaring may be available following the excavation of remains belonging to some of the earliest seamen navigating Anatolian shores.

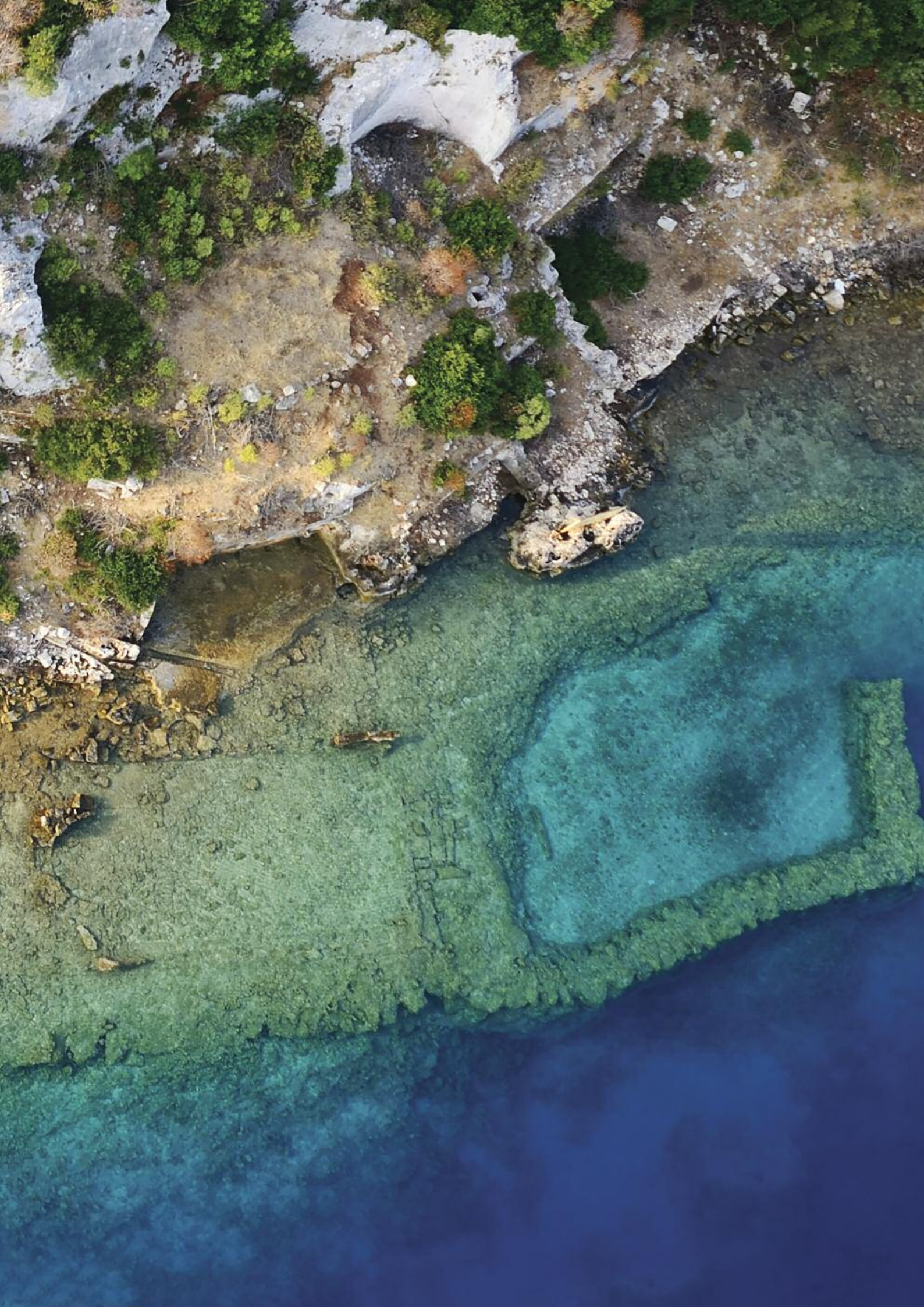
Fig.3. Bodrum School Ship's (STS *Bodrum*) Exploration Team and Crew.

In closing, I would like to thank the contributing scientists and colleagues who worked with me with great devotion and contributed to the success of this project.



ANCIENT HARBOURS OF THE KEKOVA REGION

ERDOĞAN ASLAN*



The Lycian coast, lying at the heart of Mediterranean trades route during antiquity, is mostly mountainous and rocky and offers limited places for vessels to harbour. Strabo describes the Lycian coast as "rugged and difficult, but with exceedingly good, often well-sheltered harbours."[1] There are at least 20 known Lycian harbour settlements. Most of these harbour settlements are referred to in the Periplus of Pseudo-Skylax, which also describes 4th century BC maritime routes, as well as in the Anonymi Stadiasmus Maris Magni, which describes maritime itineraries from later periods.[2]

Two shipwrecks, found at Cape Gelidonya[3] and at Uluburun,[4] prove that the Kekova region and its environs gained significance on the Eastern Mediterranean maritime trade route from the start of overseas trade. The two Late Bronze Age shipwrecks found near Kekova have a particular importance in terms of the commodities they carried since they define volume of the overseas trade achieved during this era.

Kekova, which is located between modern Kaş (Antiphellos) and Demre (Myra-Andriake), is in the province of Antalya and lies between Uluburun and Cape Gelidonya; areas in the Lycian geography that ancient seamen avoided. The Kekova region covers an area of 260 km^2 including Kekova Island, Simena (Kaleköy), Teimiusa (Üçağız), Aperlai (Sıcak Pier), Akvaryum Bay, Gökkaya Bay, İç Island, Toprak Island, Aşırlı Island, Kişnali Island, and many other islands, all of which are part of the "Kekova Special Environmental Protection Area." Both the location and geography of the Kekova region are very suitable for a harbour settlement. Kekova Island is located 4 km west of Andriake Harbour, in Demre District, lends its name to the region and is approximately 7.5 km long and 1.8 km at its widest point. Its mainly steeply-sloped and mountainous structure has an approximate maximum height of 180 m. While the mountainous geography of the island is not suitable for agriculture, it also restricts settlement areas to a great extent. One kilometer to the west of Kekova Island lies the Sıcak Peninsula, which measures 1.6 km in width and 7 km in length.

Both Kekova Island and the Sicak Peninsula run in a northeast-southwest direction and with the mainland on the north, and two more islands at the southwestern entrance to the natural bay called the Akvaryum Bay. There is another natural bay, serving as the harbour of the ancient city of Teimiusa, located between two peninsulas and the mainland to the north. With an access between the two peninsulas, the natural bay runs east-west, measuring 3 km long and 500 m wide. Because the Kekova Region that is surrounded by mountains, overland access is possible only by passing through the town of Üçağız (Teimiusa). The harbour cities or coastal cities located in the Kekova Region are Dolichiste (Kekova Island), Simena (Kaleköy), Teimiusa (Üçağız), and Aperlai (Sıcak İskelesi), which is 5 km to the west of the Kekova Island and is included in the same region (fig. 1-2).

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[1] PEKMAN 2005, *XIV. 3. 2.*
[2] MÜLLER et al 2010, 427; ARSLAN et al 2012, 239.
[3] A Phoenician merchant vessel sunk at Cape Gelidonya dating to 12th century BC. The cargo including copper, tin, lead ingots, terracotta pottery, and variety of small items from various countries, and loom weights indicates that the ship was involved in trade between Egypt, Syria, Palestine, Cyprus, Hittite Empire, Crete, and Greece. For more information see BASS 1986, 85-110.; BASS 1991, 69-82.
[4] It is assumed that it set out to sea from Canaan, took copper from Cyprus, and sunk off the Cape Uluburun near Kaş due to gusty winds. The cargo of Uluburun shipwreck that was dated to the Bronze Age (14th century BC) consisted of 10 tons of copper ingots of Cyprus origin, 1 ton of tin and 150 chunks of glass, in addition to pottery from Mycenae and Cyprus, seals from Egypt and Canaan, jewelry, elephant ivory from Africa, Hippopotamus ivory, a seal that belongs to Nefertiti, the wife of Pharoah Akhenaten of Egypt and many small items from various countries. For more information see BASS 1986, 85-110.

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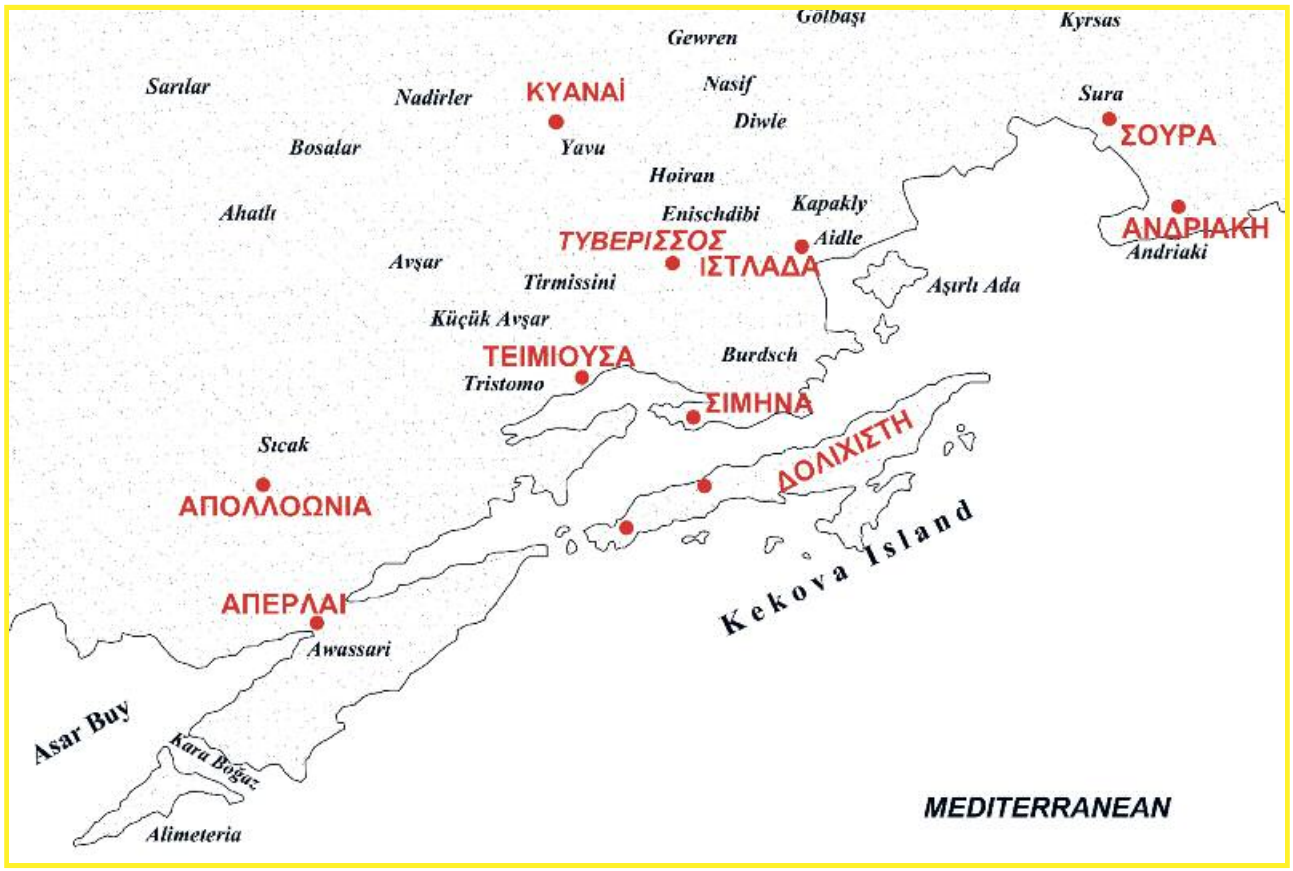

Fig. 1: A General Map of the Kekova Region.

These cities were devastated by an enormous earthquake in AD 141, with coastal structures being partially or entirely submerged.[5] The city was reconstructed by finanical contributions of wealthy Romans and Lycians.[6] However, the region suffered two more earthquakes; one on August, 5 240,[7] and the other in AD 530. According to some sources, the region began to lose its importance. It was completely abandoned following the Arabian attacks during the 7th century.[8]

APERLAI

The ancient Lycian city of Aperlai,[9] presently known as Kuyubelen, is located at the Asar Bay on the northwestern slope of the Sıcak Peninsula.[10]

[5] GUIDOBONİ – COMASTRI - TRAINA 1994, 408.
[6] AKDOĞU-ARCA 2002, 79.
[7] KARAGÖZ 2005, 38.
[8] HOHLFELDER – VANN 1998, 26.
[9] The city of Aperlai is referred to in ancient sources by Plinius, followed by Stadiasmus, Ptolemy, Pseudo-Skylax and Hierocles. And, it was also referred by Fellows, Kiepert during the 19th century, and Forbes, by George Bean in 1955, and by Robert Carter in 1978. Finally surveys were carried out Robert Hohlfelder, Bill Leadbetter and Robert Vann in the city between 1996 and 2002. See HELLENKEMPER – HILD 2004, 443.
[10] The city was also listed among the Byzantine bishopric lists as Aprillae: BEAN 1998, 106.

Fig. 2: A General View of the Kekova Region

The Aperlai city walls have been mostly preserved. Within the Hellenistic city walls, there are two public baths, four churchs, more than 40 cisterns, an agora, and many other unidentified structures, as well as a necropolis with over seventy sarcophagi both inside and outside the city walls. There is also a public bath and many shops/workshops outside the walls (fig. 3).[11]

Since no excavations have been undertaken in the city, our knowledge is informed only by limited surface finds including inscriptions and ruins.

Based on inscriptions found in the vicinity, the city was founded in the late 4th century BC, and was inhabited until the mid 7th century AD.[12]

A large portion of the coastal southern section of the city, approximately 250 m east-west, and 60 m north-south, totalling about 15,000 m^2, was originally founded on a slope, and has since been submerged.

Some of the submerged structures are preserved at the level of the foundation while some others at the level of walls reaching a height of up to 1 m in some places, and some with building blocks scattered around (fig. 4-6).

[11] LEADBETTER – VANN – HOBBS 2002, 325.

[12] KOLB – KUPKE 1992, 54 ; for other explorations in the city please see HELLENKEMPER - HILD 2004, 443.

Fig. 3: A General View of Aperlai.

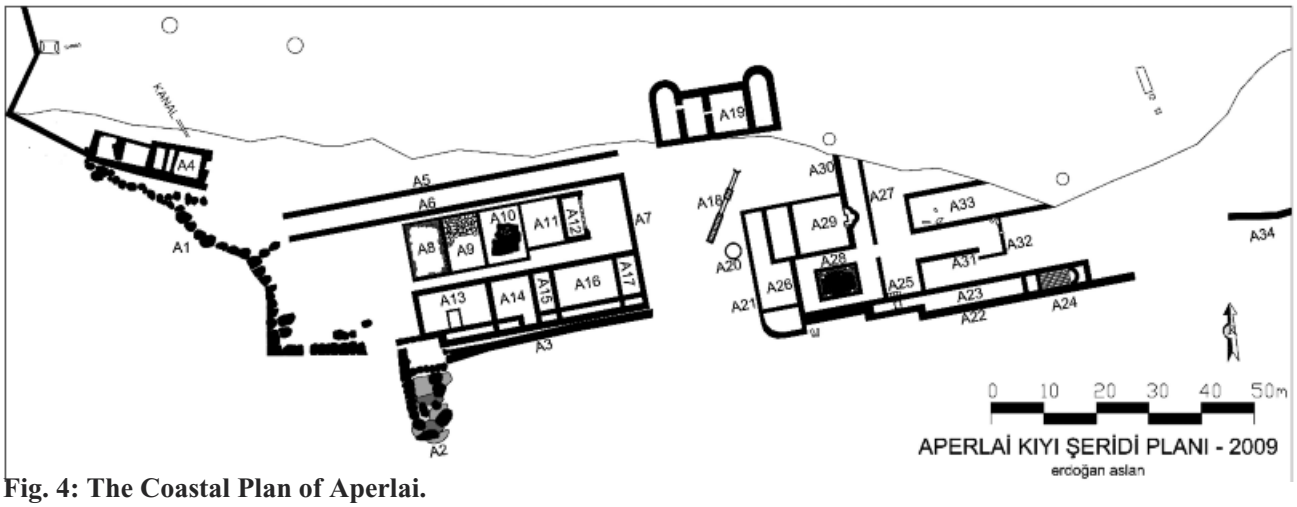

Fig. 4: The Coastal Plan of Aperlai.

The structures near the bedrock cannot be seen in their entirety due to the intense build-up of upper structural and architectural material that migrated down slope. It appears that the breakwater to the south Aperlai, the harbour buildings, many structures in the city, and some of the city walls, were gradually submerged due to the earthquakes and sea level change in the Mediterranean over the centuries.[13]

The city of Aperlai slopes from north to south. The northernmost point of the city is approximately 70 m above the sea level, with a slope on the south towards the sea. This is also true for the submerged parts of the city. The walls of the dock and pier defining the southern borders of the city are submerged extensions of the 700 m long city wall, encompassing the city from land. Sixteen structures, a breakwater, and fourteen main walls can be identified under the water (fig. 4). The submerged structures closer to the present coastline have a shallow depth, and moving away from the coastline, all of the settled areas becomes deeper, reaching to a depth of 8 m with a sharp fall after the last wall on the south. Although an Hippodamian structure with terracing running east-west is observed, based on the existing structures, function and use of these buildings remain unclear due to later use or destruction, allowing for speculations only based on the available information.

Fig.5: A General View of the Aperlai Coastline (1)

[13] KAYAN 1997, 735.

The location and construction type of some buildings in the harbour are important in providing information for their function.

Presence of terracotta plates which were erected using mortar and used as a second row of wall within stone blocks of the outer wall, and absence of an entrance near the ground level in addition to the floor coated again by terracotta plates using mortar in the buildings right behind the breakwater and pier suggest that the area was constructed using water-resistant material for insulation purposes. Considering the function of the above mentioned structures, based on the *Murex trunculus* shells scattered around a 1500 m^2 area at a depth of 0.5 m to the west of the city, we can say that they might have been related with production of purple dye (fig. 7).[14] In addition to the aforementioned structures, there is a church, a chapel building, and many architectural blocks scattered around underwater.[15] Among these blocks, there are column drums and architrave blocks with fascia in various lengths, probably of an important official building or a temple. The connection of the breakwater and quay structures in the harbour that was built by benefiting from the natural bay with the Hellenistic city walls suggests that the harbour was in use since the Hellenistic Period (fig. 8).

KEKOVA ISLAND

Kekova island, is approximately 7.5 km long, and 1.8 km wide at its widest point and lies 1 km to the south of the ancient city of Simena, and 4 km to the west of Andirake harbour. The island runs northeast-southwest, its mainly steep-sloped and mountainous structure has an approximate height of 180 m (fig. 9).

[14] LEADBETTER 2003, 127.
[15] HOHLFELDER – ROBERT – VANN 2000, 207.

Fig. 6: The Underwater Remains of a Building in Aperlai

Fig. 7: The Underwater Remains of a Building in Aperlai

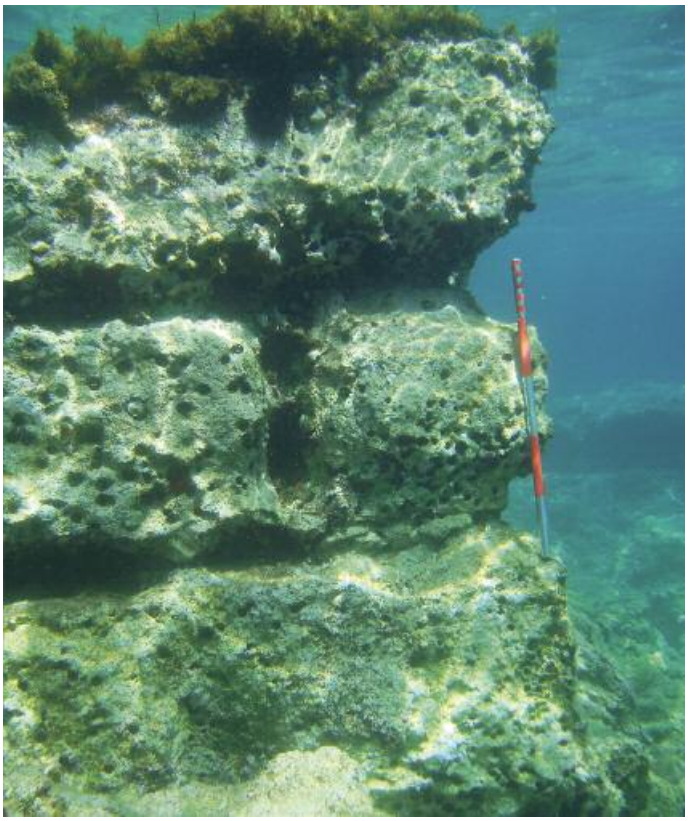

Fig. 8 The Underwater Remains of A Hellenistic Period Wall in Aperlai

While the mountainous geography of the island is not suitable for agriculture, it also confines settlement to a great extent. However, since the western end of the island is relatively flat and more suitable for settlement, this part served as the main settlement area. There are remains of many buildings and ruins of a large church from late periods in this area.[16] On this part of the island, a 150 m long and 60 m wide natural bay facing north and named "Tersane Koyu" serves as a natural harbour providing connection of the settlement with the mainland (fig. 10).

In the western part of the bay, building foundations carved into the bedrock and four cisterns of various sizes can be observed. The harbour pier is submerged approximately 2 m due to seismic activity, activity that also had an important impact in the region, as well as on the walls of the harbour structures that can still be seen at the foundation level. There are five submerged rectangular adjoining rooms with openings allowing access to both each other and the pier the parallel quay behind the quay wall that runs north-south (fig. 11).

[16] PESCHLOW 2001, 197-208.

Fig. 9: The Settlements of Kekova Island

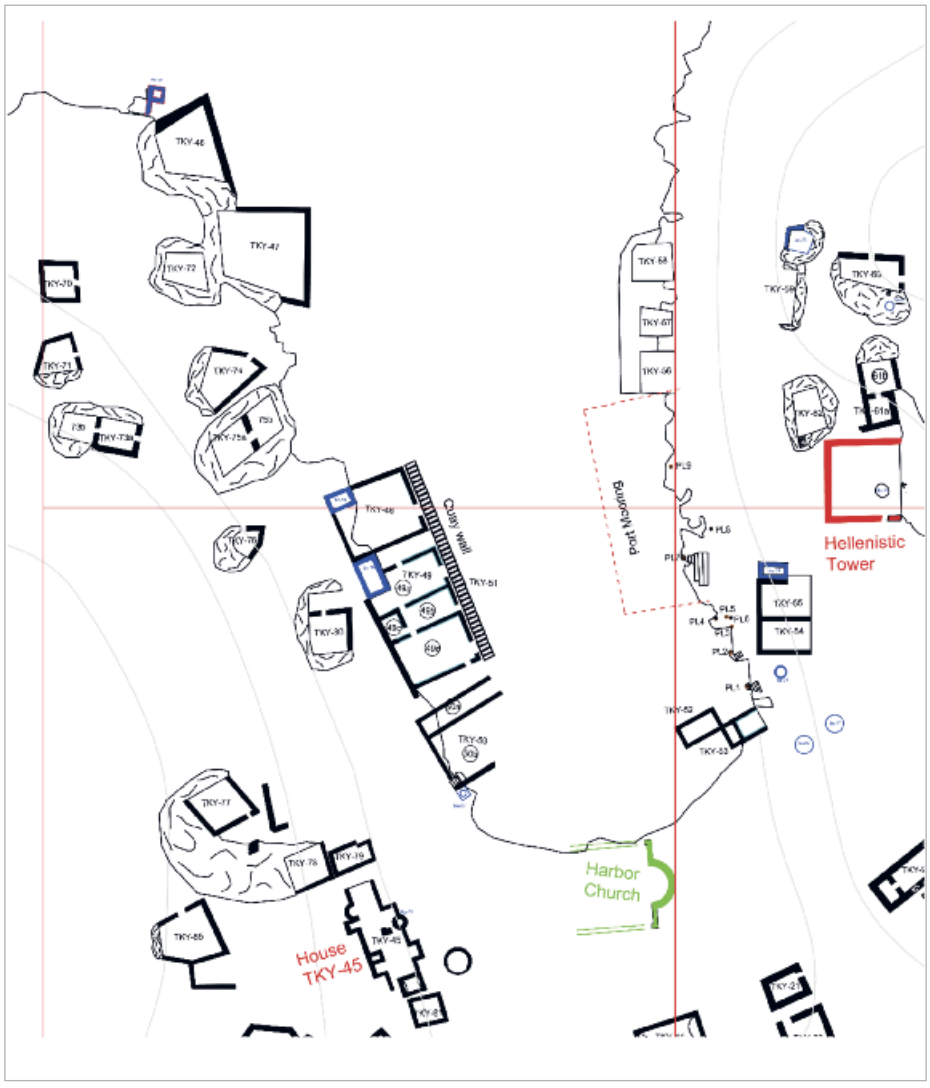

Fig. 10: The Harbour Area Plan at the Tersane Cove, Kekova Island.

Behind these structures lie upper level buildings and cisterns. To the north of these buildings there are two more buildings and a cistern at the port's exit. Although the western, northern and southern walls of the structures that were carved into the bedrock are currently above the water, remaining parts have been submerged, and the beam holes on the wall suggest two story buildings (fig.12). To the south of the bay, again under the water, there are two more rectangular buildings, and a church building, of which some parts of the apse are still intact. To the east of the harbour built there are a total of nine bollards carved into the bedrock and mooring rings indicating that it was used as an anchoring area. These mooring rings and bollards should have been part of the second level that was used during the second period after the coastal buildings were submerged due to the earthquakes in the region (fig. 10).

Five more rooms again carved into the bedrock are seen with only the eastern wall above the sea. The floor and other walls of the rooms being preserved at foundation level can be observed underwater (fig. 13). Behind this area lie two cisterns and three rectangular structures on an upper level. The access to the upper buildings and cisterns from the bollards are provided by stairs carved into the bedrock. Based on all these data, the quay, cisterns, mooring rings, bollards and other harbour constructions were part of a small scale harbour complex area. This area might have been used as an organized harbour starting with the Late Classical Period through the Byzantine Period.

Fig. 11: An Aerial Photograph from the Tersane Cove, Kekova Island.

The second settlement area of the island is approximately 1 km to the east, lying on a steep sloped coastline on the north side of the island. This settlement area is approximately 1 km long and it is a coastal settlement formed by terracing of a dip slope. Also seen are many one or two-story structures with floors and southern walls carved into the bedrock in an arrangement of up to six terraces on top of each other starting from the coastline and extending upslope. The wooden beam holes of the structure's roofs and second floors are observed, and facades of some of the structures built with cut stone blocks and rubble have survived. On the western part of the island where the coastal structures begin, there is a submerged breakwater and harbour area structures behind the breakwater (fig. 14). There are five bollards to the west of the breakwater as well as a natural bay starting at the eastern end of the breakwater and two more bollards in this area. The only area that constitutes a visible harbour or a breakwater in the 1 km long settlement to the north of the island is in this section. In addition to the harbour area in this section, two churches located to the east are also of great importance in providing information about the late period settlement and dating.

The breakwater in this area is the only one located in the northern settlement zone of Kekova Island. With an isodomic wall, it has been submerged to 2 m depth, and all of its building blocks have survived in-situ. With a wall thickness of 2 m, it has an L-shape measuring 69 m in length. Since the westerly winds are the prevailing winds in the region, the western section was built with more protective features, leaving a 7 m opening for entrance between the western wing of the breakwater and the coast (fig. 15).

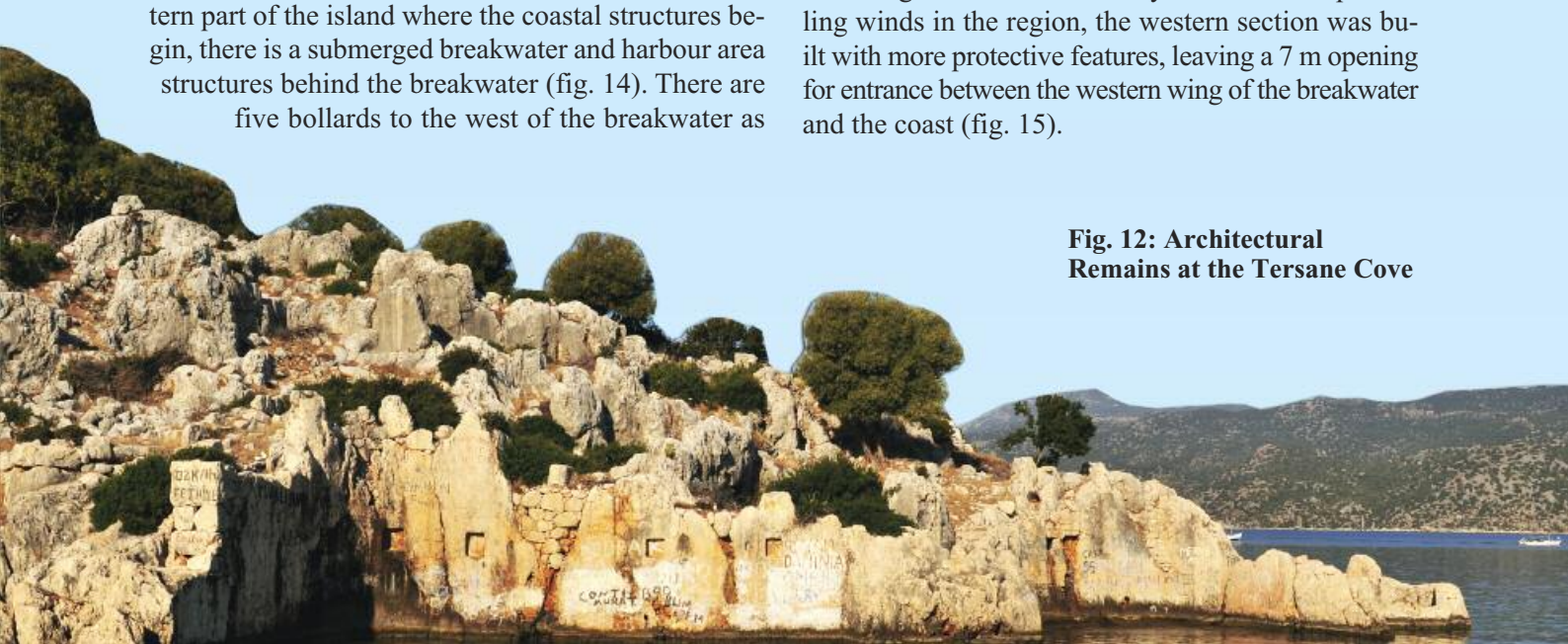

Fig. 12: Architectural Remains at the Tersane Cove

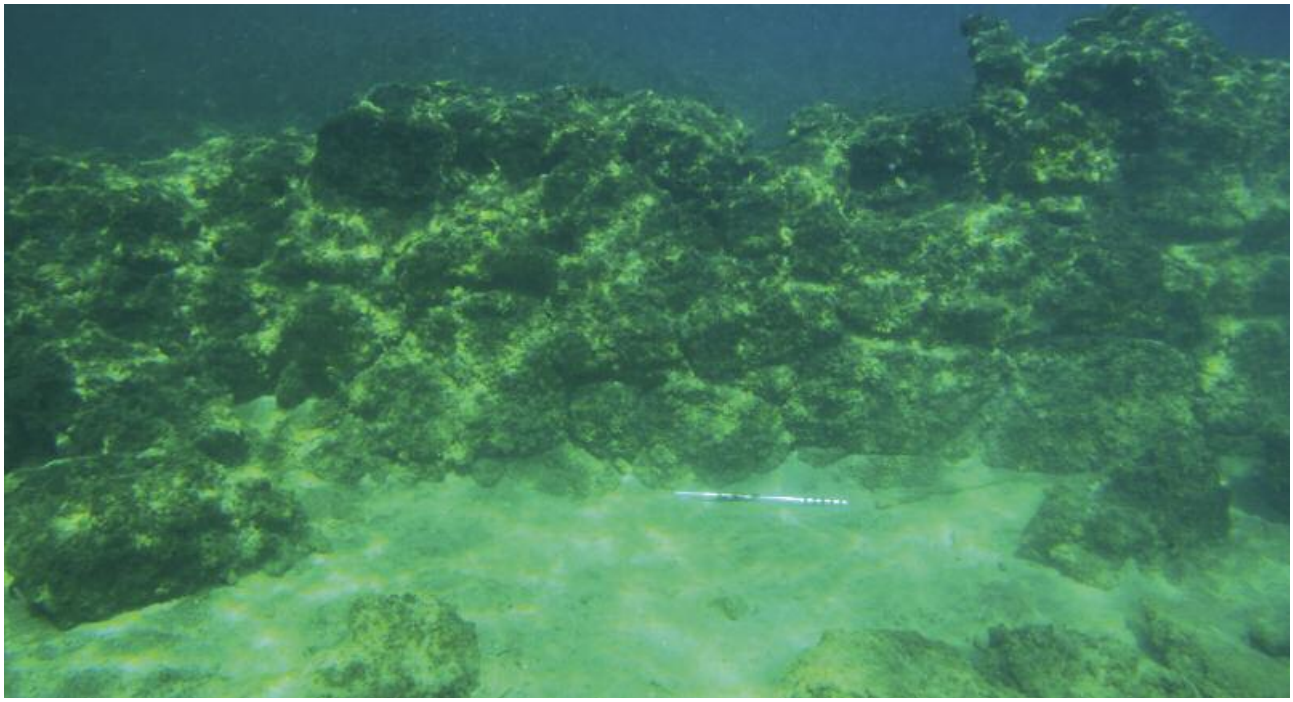

Fig. 13: Underwater Architectural Remains at the Tersane Cove, Kekova Island.

The breakwater wall is approximately 8 m high on the east side of the ridge and 4 m high on the west side. Although the inner part of the breakwater has a depth of approximately 4 m, the outer part reaches to a depth of 18 m with a sharp declination of the slope it is situated on (fig. 16).

It appears that the breakwater was submerged due to tectonic activity as a result of earthquakesand lost its function (fig. 17).[17] A church was built during the late period on the area between the two harbours on the eastern and western ends of the breakwater. Independent single-room structures were built with floors and southern walls carved into the bedrock on the slope to the back of the harbour.

Fig. 14: Architectural Remains from the Northern Settlement, Kekova Island.

[17] KAYAN et al 1997, 735.

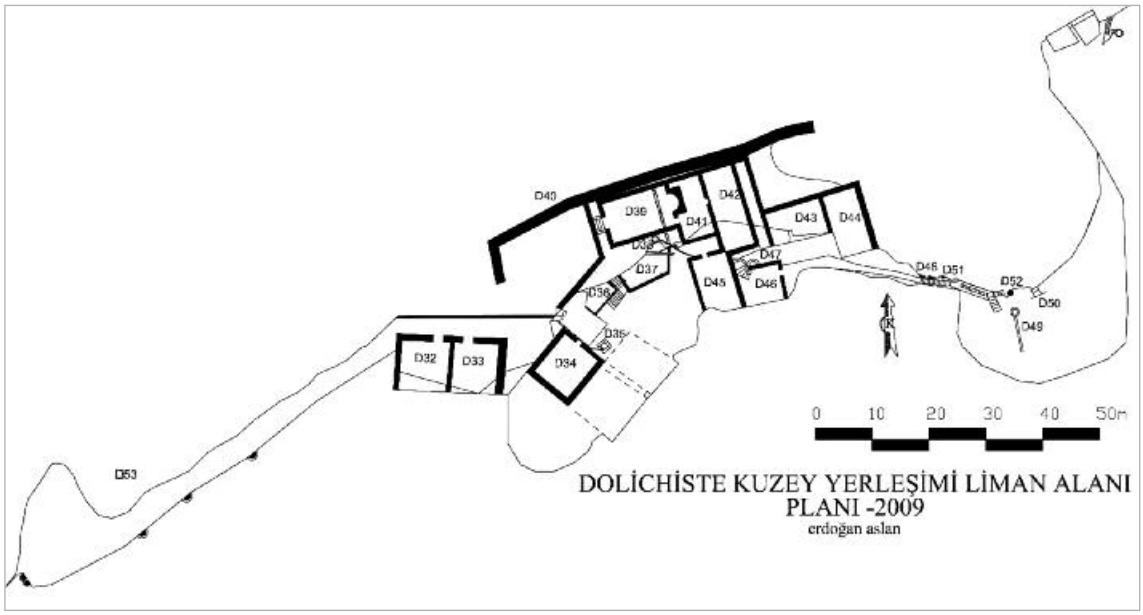

Fig. 15: The Harbour Area Plan of the Northern Settlement, Kekova Island

SIMENA

Ancient Simena, presently called Kale, was one harbour town of the Kekova Region, and it is located 1 km to the north of Kekova island, and 9 km to the west of Andriake Harbour. With a history dating back to the 4th century BC, the city is located between Kekova island and Teimiusa (Trisdomo-Üçağız). It was founded on a 1200 m long and 600 m wide rocky peninsula that runs northeast-southwest at the entrance of the naturally formed Teimiusa harbour (fig. 2).

The city harbour and buildings of the so called harbour quarter are located on a relatively flat area. Based both on the buildings that are currently above the sea level, and underwater wall remains, it appears that this area was a peninsula attached to the mainland.

Due to tectonic plate movements associated with earthquakes, the area was submerged and became an island (fig. 18-19).

Fig. 16 An Aerial Photograph of the he Harbour Area of the Northern Settlement, Kekova Island

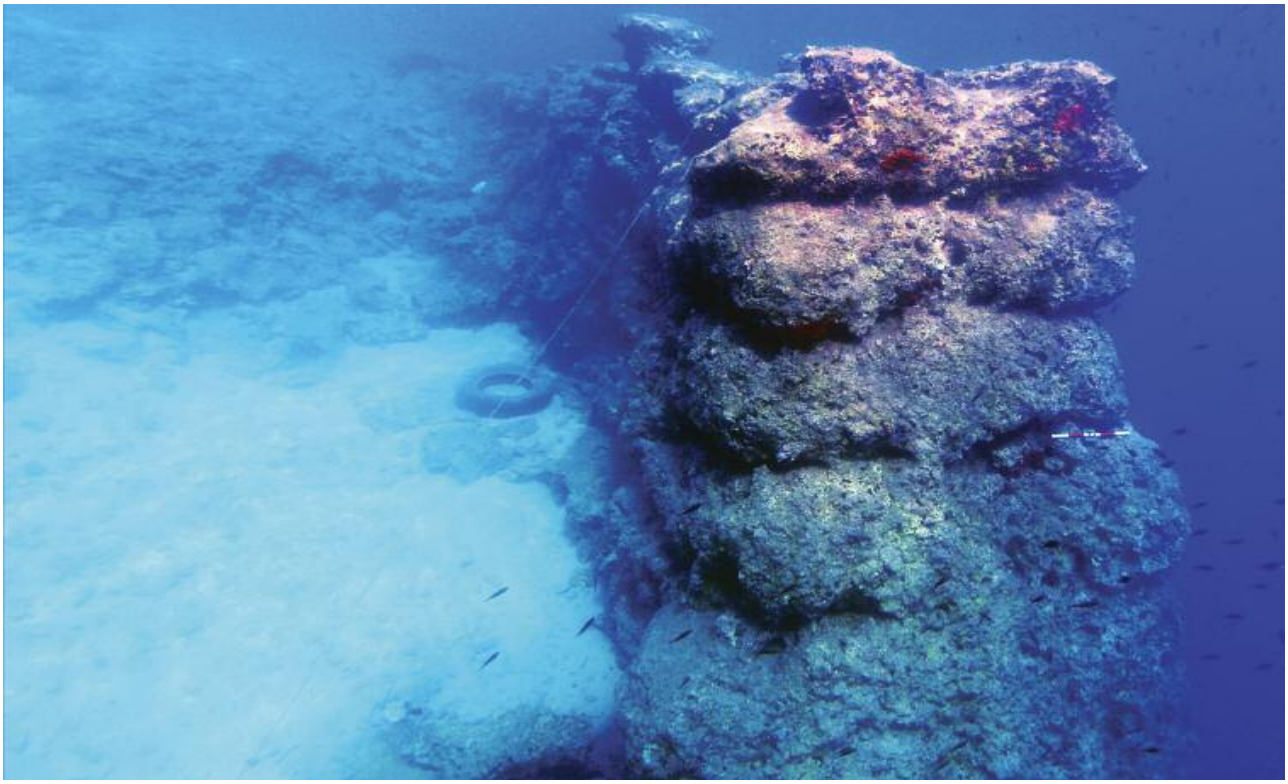

Fig. 17 An Underwater Photograph of the Harbour Breakwater of the Northern Settlement, Kekova Island.

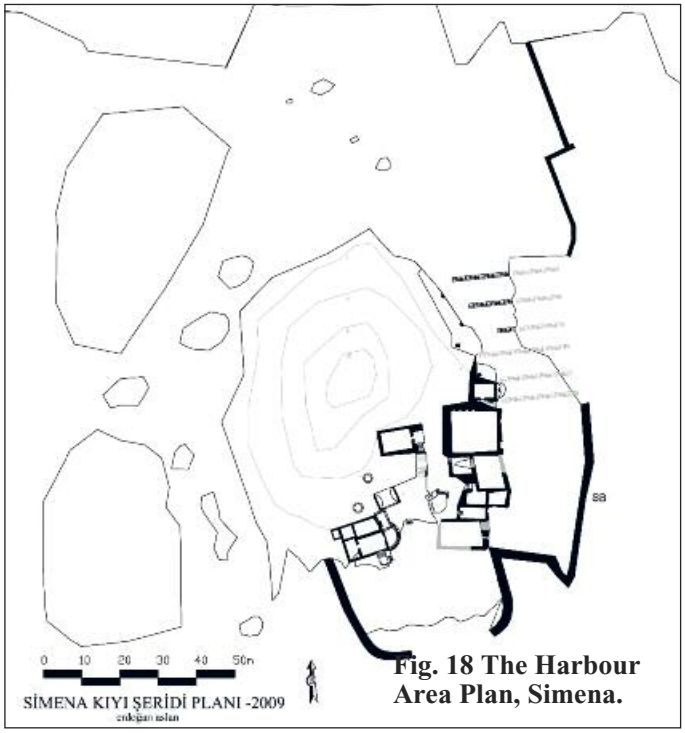

Fig. 18 The Harbour Area Plan, Simena.

Being examined within the scope of maritime history of the region during antiquity, the city of Simena has many submerged buildings on coastal areas and on the island by the harbour, and structures of the harbour complex (fig. 20). Among these structures is a harbour breakwater consisting of two opposite arms to the south of the island. At present, both arms of the breakwater, each with isodomic walls, are 2 m under water (fig. 21).

The western arm of the breakwater, built of cut stones, runs northwest-southeast approximately 30 m from the mainland, and then makes a curve in the east direction, and continues for another 10 m; its total length is 40 m, and it has a width of 2 m. The eastern arm of the breakwater starts after a 21 m long opening, which is the harbour entrance, from the western arm of the breakwater towards the east. The eastern arm also runs northwest-southeast for 15 m, making a curve towards the west, and after 8 m it reaches to a total length of 23 m.

Fig. 19 A General View of the Harbour Settlement From Northeast, Simena.

The width of the eastern arm is also approximately 2 m. However, the east arm of the breakwater connects not with the mainland, but the wall encompassing south-western part of the peninsula of the Antiquity which, at present, is an island, partly forming "Limen Kleistos" (fig. 18).[18]

Both arms of the breakwater collapsed and submerged due to earthquakes. The upper portion of the breakwater is approximately 1.80 m deep underwater while lower portion is 5.50 m deep. Both arms of the breakwater were found in-situ, and all blocks have survived to the present day. The wall height of the breakwater was found 3.40 m from the seabed. The entrance to the harbour is 21 m wide at the breakwater, and when it is measured from the entrance to the mainland, it is 24 m long, and 40 m wide, and the harbour basin covers an area of approximately 960 m^2.

There are four cisterns with large volumes, and ten rooms carved into the bedrock on the island surrounding Simena Harbour. All structures except for the building with five rooms behind the western breakwater have a single room with independent entrances, and some of them near the shore are partly underwater. Along the coastline and on the eastern side of the island, there are five bollards carved into the bedrock.

[18] Limen Kleistos; the structure combining the harbour walls with the city walls. (THEODOULOU – MEMOS 2007, 253–260.)

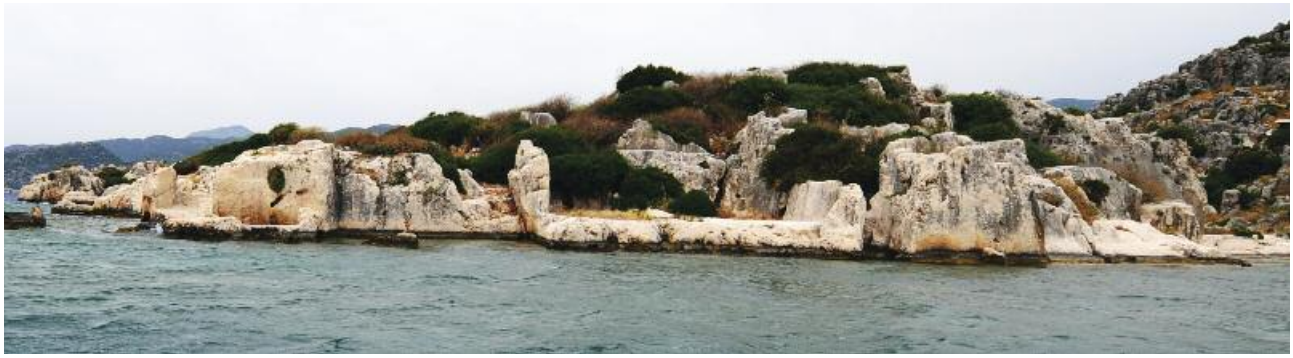

Fig. 20 A View of the Harbour Settlement from the East, Simena.

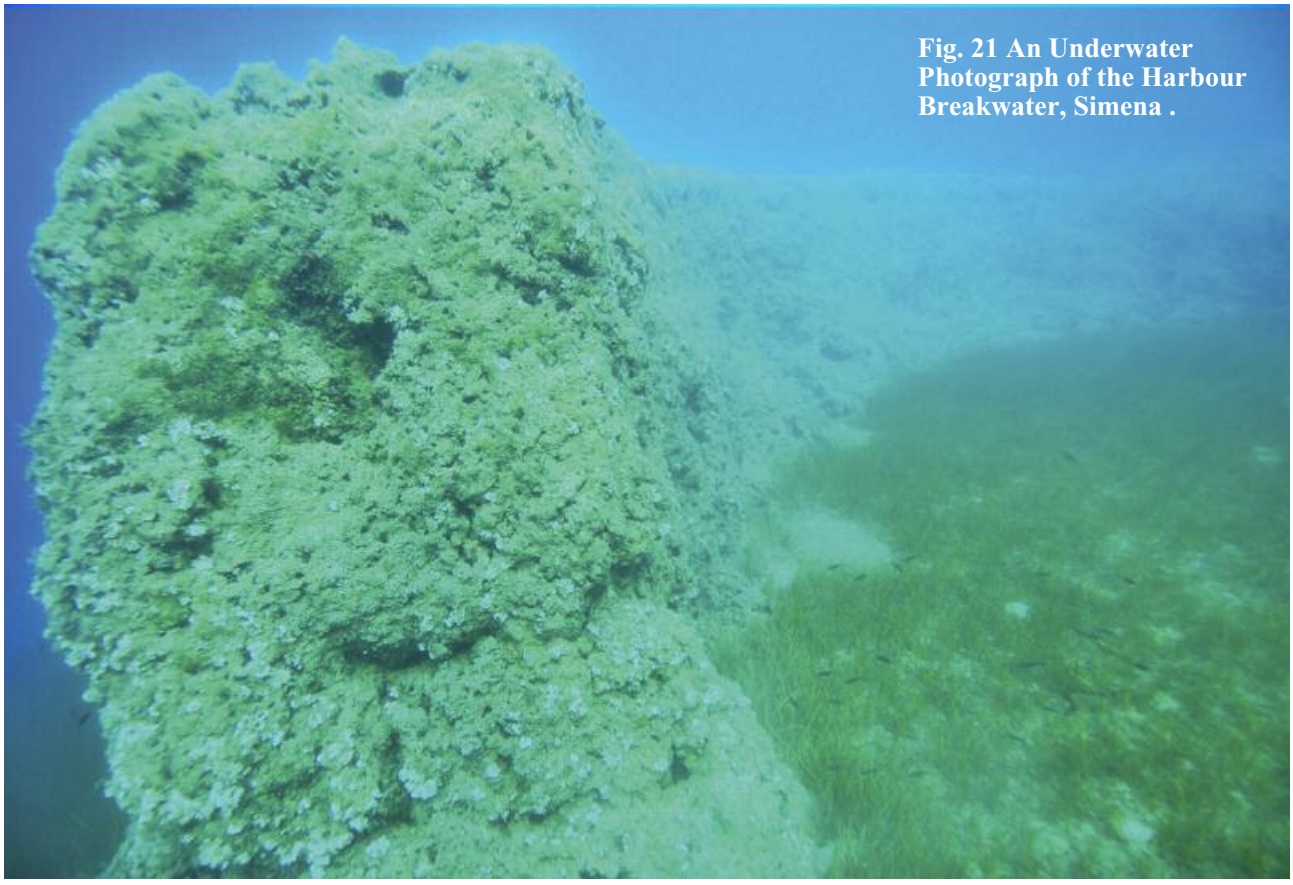

Fig. 21 An Underwater Photograph of the Harbour Breakwater, Simena .

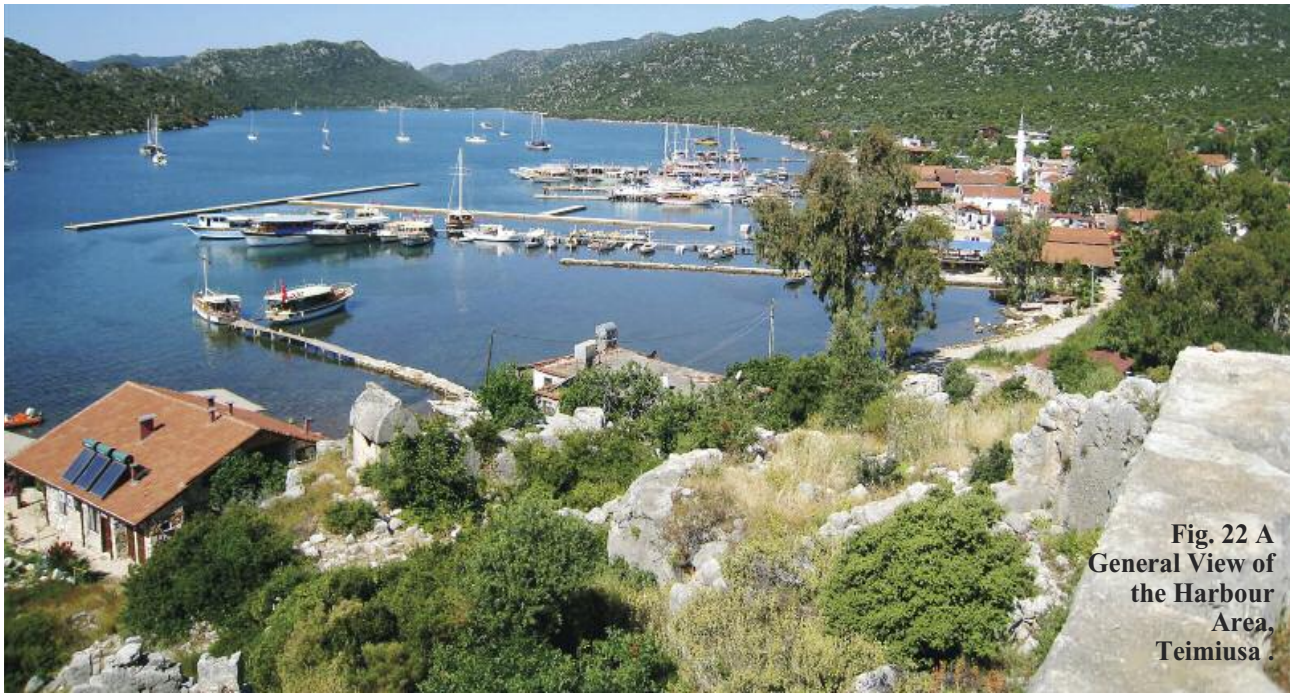

Fig. 22 A General View of the Harbour Area, Teimiusa .

There are also three underwater walls parallel to each other, extending towards these bollards in the direction where they are facing the sea.

All these data show that the harbour breakwater of the Simena city consisted of two arms that are completely man-made, using no natural formation. It contained cisterns with large volumes for supplying fresh water to berthed ships, and single-room structures that served as offices for harbour management and trade activities. The area where the bollards and the walls extending towards these bollards on the east serve as slipways for ship maintenance.

It appears that the harbour facilities with annexes from the late periods is a small-scale harbour complex which was in use from the Classical Period to the Byzantine Period, before falling from use.

TEIMIUSA

The city is located in the present coastal town of Üçağız, which is a sheltered, natural bay. It is the only city that can directly benefit from its hinterland in the Kekova Region since Üçağız is accessible via a land route.

On the other hand, Teimiusa, also serving as a harbour of the ancient cities of Kyaneai and Tyberissos had a special status both for the Kekova Region and the cities in its hinterland starting from the 7th to 6th centuries BC until the Late Byzantine Period. Names of seamen and merchants from various city-states are found inscribed on tombs and the presence of imported earthenware document the importance of the city in terms of maritime trade beginning from the early periods.[19]

The city which was initially founded on a rocky slope, probably for security purposes, underwent unplanned changes expanding from the center to the periphery on the same slope due to increased population with an increase in maritime trade and preference of manufacturers and merchants from other towns to settle near the town center. It is not a well-arranged harbour complex. Due to assumed tectonic activity, the modern landfill at the mouth of the stream mouth to create a parking lot construction, and more modern small quays built in this area, data on the harbour are very scarce. In fact, 1 m of the upper parts of the doorjambs and lintels of some building remains along the coast line can be easily identified above the water surface, which shows the intensity of the fill (fig. 22-25).

The early period coastal walls of the submerged part of the city, the platform, and the rooms that were made by carving the bedrock, probably belonged to a submerged quay building. However, the intense fill and the turbid water in this area do not allow a thorough understanding of the harbour complex. An underwater excavation would definitely help to answer questions related to this arrangement.

Fig. 23 A Detail from the Coastal Structures, Teimiusa.

[19] ZIMMERMANN et al 2000, 335.

The cosmopolitan population and production facilities intended for trade show the importance of the Teimusa harbour city in terms of maritime trade, although data related to the Teimiusa harbour and the harbour structures are very limited. We understand that the good quality of grain and salted fish produced at the farm settlements in the hinterland of the city were exported, and some pottery was imported based on the samples recovered.[20] The four large-scale salted fish production facilities found in the city, that are unique for Anatolia, suggest that salted fish, which have a high economic value and are known to be produced only at very few centers during the Antiquity, were produced in large quantities for export. The income from the production items of high economic value is also reflected in the quality of material used and the workmanship observed in the structures of the city. The fact that the two churches located in the city, dated to the 6th and 7th centuries BC, are on the pilgrimage path to Myra, an important pilgrimage center during the Byzantine Period, must have had an important impact on the city as well.

Arable land and big cities in the hinterland of the Kekova Region, suggest to us that Teimusa is the second largest harbour city after the Andriake Harbour. The location of the city, its structures and trade volume suggest that the city was independent compared to other large trade harbours in the region. However, inscriptions on some sarcophagi uncovered in Teimiusa state that fines should be paid either to Kyaneai or to Myra, which seems to invalidate the proposed independent status of the city.[21]

[20] ZIMMERMANN et al 2003, 288.
[21] BEAN 2001, 124.

Fig. 24 A Detail from the Coastal Structures, Teimiusa.

Fig. 25 A Detail from the Coastal Structures, Teimiusa.

5. CONCLUSION

Four harbour cities and five harbours that belong to these cities were identified in the Kekova region; a region lying at the center of a dangerous maritime route between Cape Gelidonya and Patara at Central Lycia where westerly winds, exposed rocky shores, and capes prevail on the maritime trade network from Egypt to Rome. When the harbour areas of these cities are considered in terms of history, function and volume, Teimiusa ranks number one. In fact, the city is the only one to have taken advantage of the arable land in its hinterland, and again the only city in a scale to be able to host large merchant vessels in its harbour.

On the other hand, Teimiusa[22] which was also the harbour of Kyaneai and Tyberissos, had an important position both for the Kekova region and the cities situated at its hinterland starting from the late 7th century BC until Late Byzantine times. Names of seamen and merchants from various city-states inscribed on the tombs (documented as citizens of Aperlai, Telmessos, Kandyba, Selge, Nikomedia, Puteoli, Askalon and Caesarea Maritima)[23] and the presence of imported earthenware document the importance of the city in terms of maritime trade starting in the early periods.[24] The Tyberissos – Teimiusa sympoliteia which is believed to be one of the sympoliteias[25] created in the 1st century BC in Lycia[26], is evidence that the city of Kyaneai, which was in the hinterland at the beginning developed with maritime trade, and political centers, were moved to the coast particularly during the Hellenistic period.[27]

The harbour of Aperlai was built in a natural bay protected from the westerly winds by a short breakwater. Despite limited fresh-water resources and arable land, the harbour ranks second among other harbours in the region with the harbour basin serving the boats and the production workshops for maritime trade. Historically the city that was founded as a coastal settlement and harbour of Apollonia city during the 4th century BC, and became part of a sympoliteia with Aperlai, Apollonia, Isinda, and Simena in the 1st century BC. Protected by solid city walls from the Hellenistic Period, the city reflects an economically strong harbour city. The reason why it could survive from the 4th century BC until the 7th century AD is related with exporting industrial products such as the purple dye and the fish sauce produced in the harbour facilities to foreign markets through larger ports in the region.[28]

The Simena Harbour can be ranked third compared to other harbours of the region in terms of its function, history and volume. The earliest settlement in the city belongs to the Dynastic Period with later residential buildings situated on the northern rocky slope dating to the Classical Period. There are Hellenistic city walls, various buildings from the Roman Period and a Byzantine fortress settlement on the same hill.[29] The city was mentioned by Pseudo-Skylax describing the 4th century BC maritime routes, and Stadiasmus Maris Magni describing itineraries of the Late period, and it was associated with Apollonia, Isinda and the region's center Aperlai in 1st century AD for being part of the Lycian League. The city was founded on a mountainous peninsula, its harbour and structures that may be defined as harbour structures are situated on a relatively plain area at the coast. Compared to Teimiusa and Aperlai harbours, the city harbour has a smaller basin, possibly allowing a limited boat traffic; enough to meet the requirements of the city.

The harbours situated at Kekova Island are the most disadvantageous in the region. While the mountainous geography of the island does not allow easy cultivation, it also confines settlement. No archaeological finds dating to the antiquity are available except for a military tower from the Hellenistic Period. However, presence of many structures from the Roman and Byzantine Periods in the settlement demonstrate uninterrupted inhabitation from the Hellenistic Period to the Late Byzantine Period. Since Kekova island is accessible only by the sea, its harbours are of particular importance. Nevertheless, the harbours of the island have the least militarily protected harbour basins with a relatively small capacity in relation to other harbors of the region.

The harbours of the Kekova region indicate that all were either small or middle scale harbours and used for trading among each other and with cities outside the region.

The local people were cosmopolitan, mainly seamen, and involved in trade, farming and manufacturing. They had a local network for dispatch of imported goods from the Andriake port to the local markets, and dispatch of locally produced goods to foreign markets.[30] Since similar projects focus on large-scale harbours, this type of study focusing on small coastal trade subsidizing larger harbours are mostly overlooked and underrated. In fact, these small harbours were involved in transportation of products both from the coasts and from the hinterland of Lycia (for instance purple dye production in Aperlai, salted fish, grains and olive oil production in Teimiusa) to the nearest harbours, and then to the larger harbours for international trade, as well as transportation of imported goodsfor access to local markets.[31]

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[22] KOLB-KUPKE 1992, 45.
[23] ZIMMERMANN 2000, 338; HILD – HELLENKEMPER 2004, 895.
[24] ZIMMERMANN 2000, 335.
[25] "The term sympoliteia is ancient political terminology, and basically defined, it is a political treaty composed by multiple cities for various purposes. One of the major reasons for being part of such a unity is the survival of smaller cities by accepting the protectorate of another city or cities. Becoming part of the Lycian League was through unification under a sympoliteia. As the sympoliteia jurisdiction expanded, the military, transportation, communication and administration techniques improved, thus they earned the right to be part of the Lycian League." TÜNER ÖNEN et al 2007, 38.
[26] ZIMMERMANN et al 1992, 126; TÜNER ÖNEN et al 2007, 41.
[27] KOLB-KUPKE 1992, 45.
[28] HOHLFELDER – VANN 2000, 132.
[29] HILD - HELLENKEMPER 2004, 848.
[30] ASLAN et al 2010, 257; ÇEVİK – BULUT et al 2010, 23.
[31] See: ZIMMERMANN et al 1992, 201.

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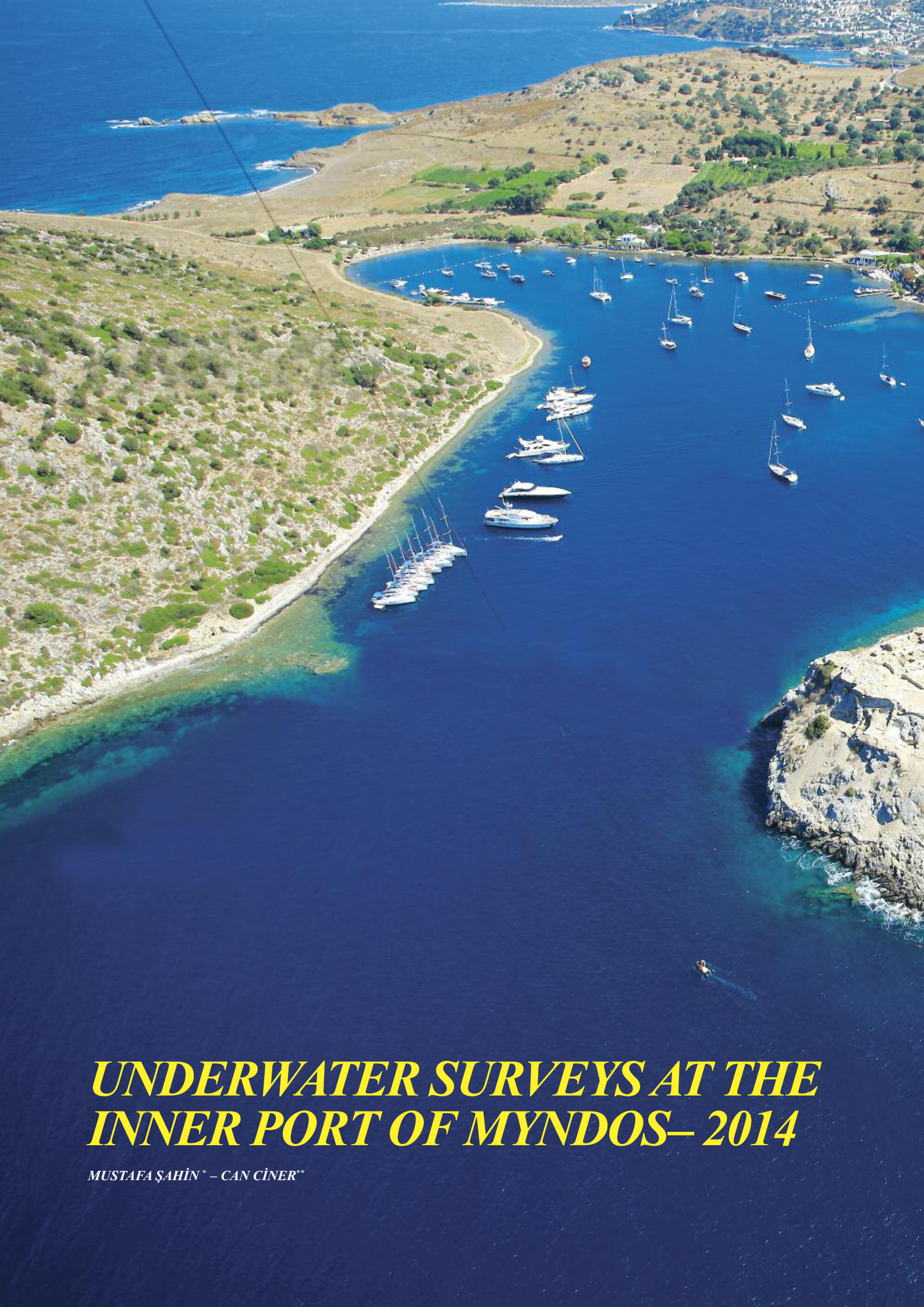

UNDERWATER SURVEYS AT THE INNER PORT OF MYNDOS– 2014

MUSTAFA ŞAHİN * – CAN CİNER***

Underwater explorations that were initiated in the ports and nearby shores of the Carian region's coastal town of Myndos in 2005, are ongoing[1]. Based on survey undertaken in 2012, and contrary to common belief, it was found that there was a second harbor to the west of the town[2]. The goal of underwater surveys performed between August 3, 2014 and August 10, 2014 was to find out whether there was a third harbor to the south of the Kocadağ peninsula[3].

[1] ŞAHİN *et al* 2006, 176. Picture 9; ŞAHİN *et al* 2008; DUMANKAYA 2013; ŞAHİN *et al* 2014, 64.
[2] ŞAHİN *et al* 2014, 64
[3] During the 2005 survey we assumed the presence of an ancient port in this area, however we found no evidence. Please also see ŞAHİN 2007, 299 Picture 14.

In addition, the sea floor was surveyed in all hoarbors to determine the period(s) in which they were used and to discern the scale of maritime trade, based on pottery sherds. This is a preliminary report of the data from these surveys.

Strabo, being among the first to mention the Myndos harbor, refers to it as a "Limen Kleistos (*Λιμήν Κλειστος*)" style harbor.[4] The city walls located on the east side of Myndos stretched out to contain Asar Island, thus a defensive line was generated encompassing the entire harbor basin. The breakwater across the port gate and on the eastern bank of Kocadağ extending into the sea indicates that the port entrance was secured by the chain or by the tower[5]. There is a flat platform on Asar island, formed by carving the bedrock at the port entrance. It is assumed that the hollow spots on the bedrock were used to secure the chains closing the port-entrance,[6] but the width of the hollowed spots are also consistent with the size of an extant tower structure. In other words, the chain closing the entrance to the port might have been secured not directly to the bedrock, but to the tower built on the bedrock platform as Vitruvius decsribed.[7]

Fig. 1: View of the entrance of the Myndos harbor from the south.

Survey dives were performed in the inner port at Myndos to assess and document its current status. The extent of any possible future excavation, restoration, and reconstruction of the breakwater were considered after documenting the size of foundation remains and distribution of debris through various dives at the northern underwater extension from the Asar Island and its southern counterpart extension from Kocadag where the breakwater foundation is located. The breakwater located at the port entrance extends northeast-southwest 155 m between Asar island and Kocadag, and the distance between the breakwater and Asar Island is 117 m **(Fig. 1)**. Built on a mortared basin, the breakwater is 37.50 m long, and 27.88 m wide **(Fig. 2-3)**. The mortared basin was supported by an embankment extending with a 45° angle down to a depth of 19 m. It appears that many rock blocks falling from the breakwater due to natural and man-made disturbance, are scattered around the seabed.[8] The central section was left open for port entrance. But the exact dimensions of the opening are unclear. Therefore, the present remains will be assessed in their entirety during future surveys, and compared to contemporary examples. Although we may not be able to comment about how the harbor was closed to general access during a war or a siege, one of the probable methods was sealing it by chains, known to be used during the Byzantine period.

[4] STRABON XIV, 2, 15.
[5] DUMANKAYA 2013, 67.
[6] DUMANKAYA 2013, 69.
[7] VITRUVIUS, 5, 12: "*If they are naturally well situated, and have rocks or long promontories jutting out, which from the shape of the place, form curves or angles, they are of the greatest utility; because, in that case, nothing more is necessary than to construct porticos and arsenals round them, or passages to the markets; and then erect a tower on each side, wherefrom chains may be suspended across by means of machinery*."
[8] DUMANKAYA 2013, 70.

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Fig. 2: The remains of a breakwater on the shores of Kocadağ at the entrance to the ancient port. It is almost 50 cm below the water surface.

Fig.3: The remains of a breakwater on the shores of Kocadağ at the entrance to the ancient port. A general view from the north.

Fig. 4: A Syro-Palestinian amphora unearthed intact on the sea floor that may be dated to the Late Roman-Early Byzantine Period .

We hope to discover evidence of technical equipment related with this sealing method of the harbor under the sediment layer or the rubble. Future excavations will help us understand the construction techniques of the breakwater. During a dive, a Syro-palestinian amphora that could be dated to the Late Roman-Early Byzantine Periods was observed on the architectural rubble, and documented by photography **(Fig. 4)**.

Divings on the eastern side of Asar island showed that the coastlines of the island and the mainland were connected through walls made by using monoblock stones, defending the harbor against external attacks **(Fig. 5)**.

Besides architectural remains, underwater surveys were performed both in the East Port and the West Port, and their bottom structures were examined. A few dives were performed in the East Port starting from the south to the north following a straight line from the deepest point to obtain information on surface finds, current seabed structure, and underwater visibility **(Fig. 6)**. Based on the information obtained during these dives; the seabed is entirely covered with a sediment layer. The deepest point inside the harbor was 12,7 m. Visibility was ppor in this section compared to others due to sedimentation disturnace, but it did not prevent the basic survey.

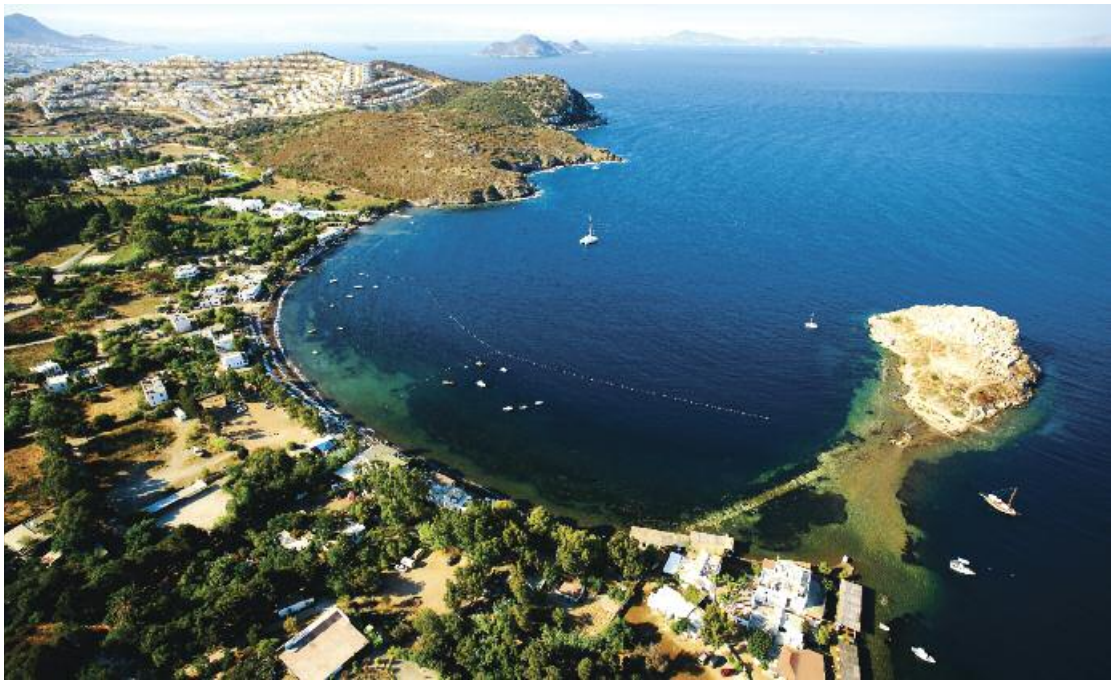

Fig. 5: A view of the fortification linking Tavşan Island with the mainland from the north.

Fig.6: Underwater survey areas during the 2014 campaign.

Building remains were observed at one of the exploration points in the East Port, possibly of a pier built of large cut stones extending 55 m in southwest direction from the coast **(fig. 7-9)**. Rubble width of the building measured 18 m. Pot sherds from various periods were found at separate locations inside the harbor during the exploration dives **(fig. 10-12)**.

The Myndos port continues to be a shelter for boats even today as there is dense boat traffic to this popular touristic location. Dragged anchor scars of anchored boats can be seen on the seabed when diving.

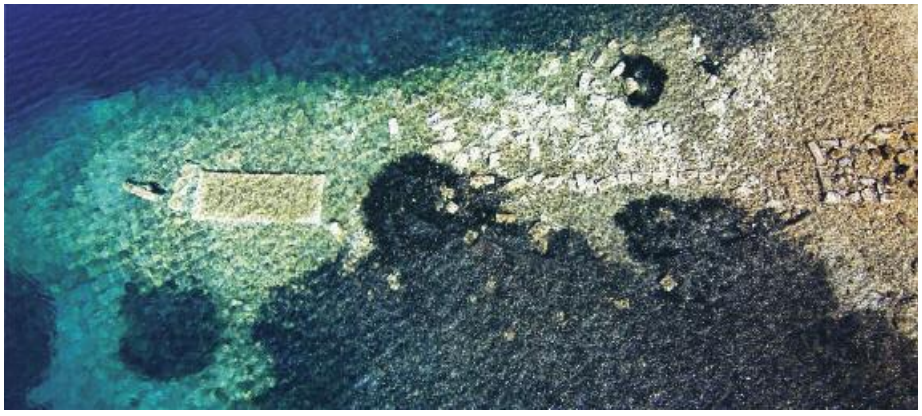

Fig. 7: A top view of the stone pier in the ancient port

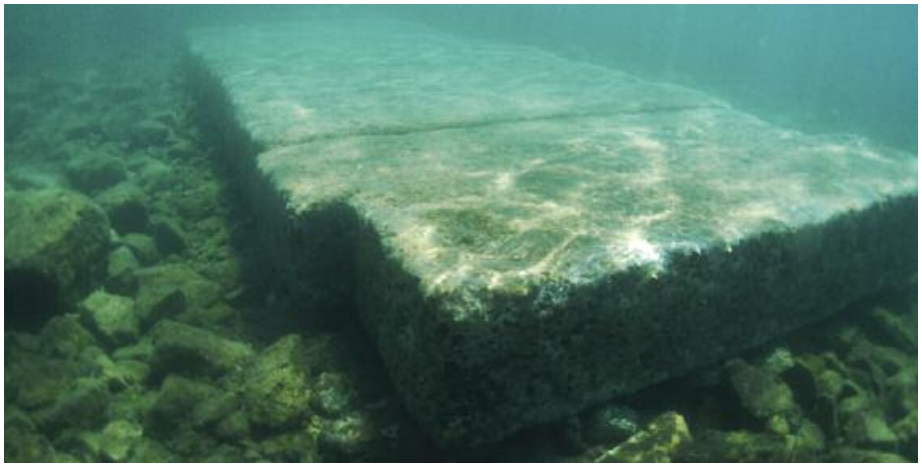

Fig. 8: A detail from the stone pier in the ancient port.

Fig. 9: A detail from the stone pier in the ancient port.

Most of the ceramicwares have little or no signs of destruction or wear. Since it is very hard for the artefacts to stay on the seabed this way, it is assumed that the dragged anchors must have brought these artefacts to the surface of the seabed from their once buried locations. The terracotta finds are mostly late period vessels dating from the 8th to the 14th century AD. However, due to the limitation of survey, the vessels were only photographed in situ, and no analysis was performed to have any descriptive information such as nature of paste, type of clay used **(Fig. 10-12)**. Therefore, no conclusion can be reached on dating or source of the ceramic finds.

We are aware that the seabed floor contains a variety of artifacts as does the land. The finds to be unearthed from the seabed during an harbor excavation are of importance for providing information on trade relations of the explored settlement with various regions, the extent of trade in general, the variety in trade products, and the economic tone of the period. Harbor excavations, including those at Yenikapı, Samos, Sebastos, and Portus, as well as those ongoing at Limantepe, provide good examples of the type of information that may be obtained.

In particularly, the ancient Yenikapı Harbor contains a deposition of sherds large enough to cover tens of square yards.[9] This deposition layer has provided substantial information, with coins recovered from the harbor floor contributing to the dating process.[10]

Thanks to various finds dated between the mid-sixth century BC and the 6th century AD at Samos harbor excavations[11], it became possible to trace the maritime power and trade capacity of ancient Samos.

Considering there is little information in ancient historical sources on the city of Myndos, our knowledge is somewhat limited about the city. It is, threfore, important to evaluate any and every kind of source that can provide historical information on the city. Thus, any data obtained by identifying and excvating harbor structures are of vital importance. We will be able to see the status of the assemblage density with soundings at a few specific spots on the seabed inside the port that will be performed during future explorations, and find out whether more extensive work is required. Underwater excavation will be planned at the harbor in case the outcome is positive. Considering the smaller size of the inner port, it is assumed that the cost of a potential excavation in that section would not be very high and could be performed without need for a large excavation team that could run concurrent with the ongoing land excavations.

Fig. 10: A sample of the sherds recovered from the sea floor.

Fig. 11: An almost intact vessel recovered from the sea floor.

[9] PERİNÇEK 2010, 206-207.
[10] GÖKYILDIRIM-ÖZTOPBAŞ-TAN 2007, 305.
[11] SIMOSSI 1991, 284-287.

Finally, we would like to briefly mention the underwater survey performed at "Şampanya Koyu," located to the south of the Kocadag peninsula **(Fig. 6)**.[12] During our survey in 2005, we had assumed that this bay could be the harbor that belonged to the first settlement of Myndos as it is located right across Çavuş Island although it faced the open sea.[13] However, during our dives to find any ruins suggestive of the presence of a historical harbor, we could not find any evidence except for regular cut building blocks on the seabed **(fig. 13)**.[14] We believe that random finds of building blocks on the seabed belonged to the city walls from the time of Mausolus used to encompass the peninsula. Although infrequent, sherds were found at this section on the seabed that could have been displaced from the mainland by waves or fallen from boats. Therefore, for now we do not want to take these sherds into consideration for determining chronology and trade relations.

[12] ŞAHİN 2007, 304 Picture 10.
[13] ŞAHİN 2007, 299 Picture 14; ŞAHİN et al. 2008, 4 Picture 11.
[14] Also see ŞAHİN et al. 2008, 9 Picture 11.

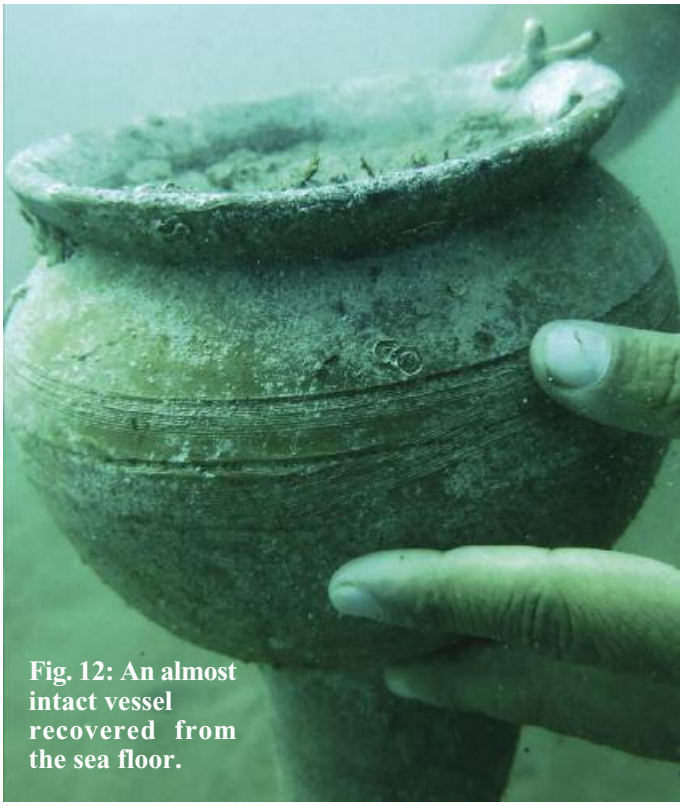

Fig. 12: An almost intact vessel recovered from the sea floor.

Fig. 13: The architectural blocks on the sea floor of the Şampanya Bay.

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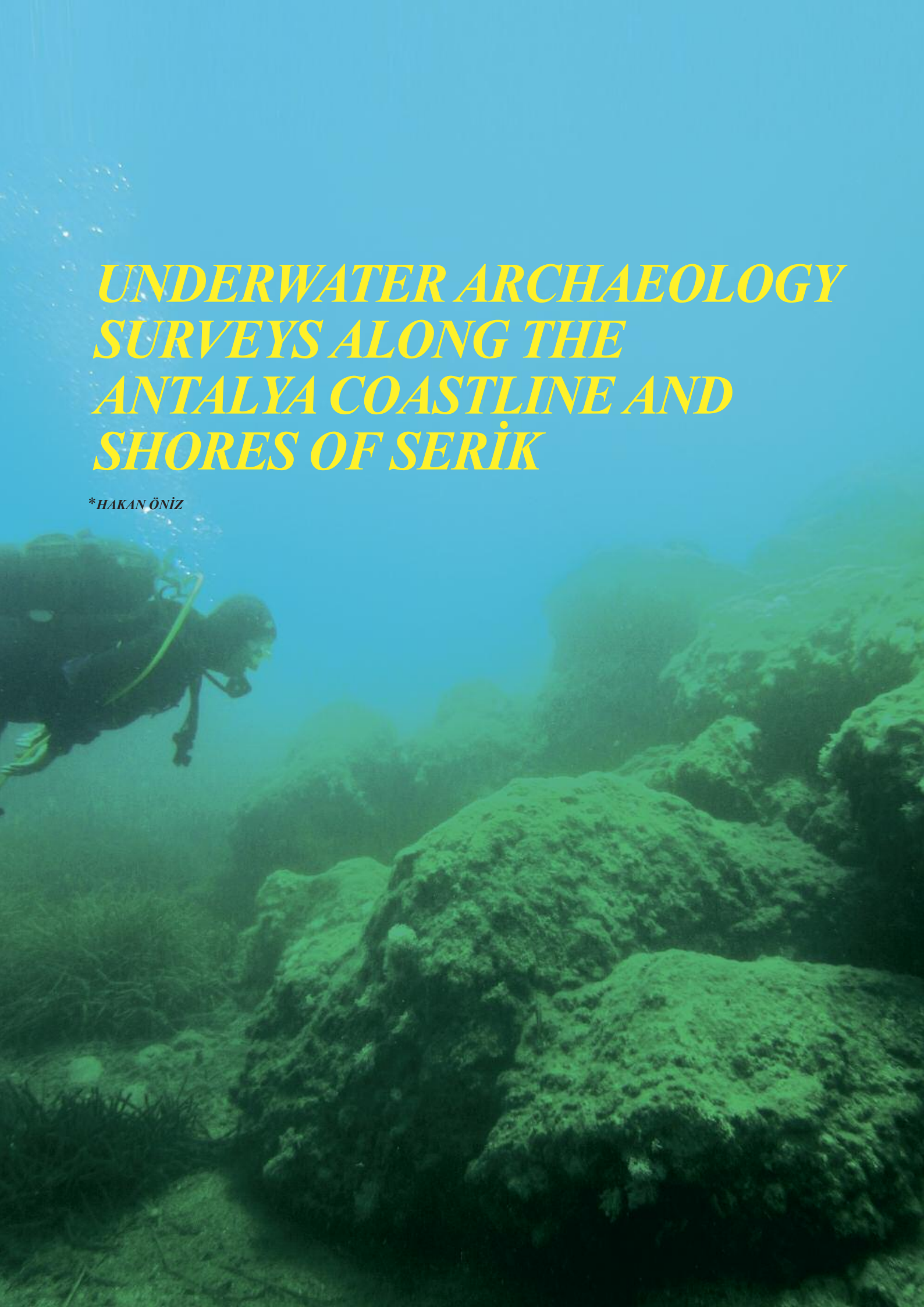
UNDERWATER ARCHAEOLOGY SURVEYS ALONG THE ANTALYA COASTLINE AND SHORES OF SERİK

*HAKAN ÖNİZ



Coastal archaeological surveys were conducted along the Antalya coastline between July and August of 2014 with the permission of General Directorate of Cultural Heritage and Museums of the Turkish Ministry of Culture and Tourism, and with contributions from the Suna-İnan Kıraç Research Institute on Mediterranean Civilizations, and the municipalities of Serik, Alanya and Gazipaşa. The goal of these surveys was to complete inventory work of Antalyan underwater cultural heritage and conduct preliminary identifications of shipwrecks and ancient ports. During the surveys, we used the vessel Selçuk 1 of Selçuk University first of its kind in our country as special underwater archaeology ship with Turkish flag which is ready to serv 12 month of the year.

Several underwater survey techniques were used during our activities. The survey included potential areas such as shoals, capes, rocky shorelines and harbours as well as natural shelters where boats might have sunk. Ancient coastal settlements, man-made harbours, and outfalls, were also included in the surveyed areas. Furthermore, dives were planned based on sonar images. When appropriate, potential sites were screened using the towed diver method. We also employed underwater surveying methods aided by electronic equipment such as multi-beam; recording of GPS coordinates of acquired images; magnetometer survey; and assessment of sonar images captured by a remote operated vehicle (ROV) in deeper waters. Hummingbird and Garmin fishfinders and GPS unites were used for transfer of GPS coordinates with different devices onto sea maps and satellite imagery. However, multi-beam sonar system used with Triton 1 boat has enabled us to implement our activities more efficiently, therefore use of the side scan sonar was not needed. Neither was the ROVt used during the 2014 campaign, since we usually surveyed shallow waters; less than 30 m deep.

SURVEY SITES

SHORELINES OF MANAVGAT DISTRICT

The western shoreline of the Manavgat District was included in the survey programme for 2014, covering select areas from the stream mouth of the Manavgat (Melas) brook to Köprüçay, which represents the western border of the district. Part of the area, with depths of 10 to 20 meters was explored in the east-west axis in the same area. We explored the mouth, internal and external parts of the Manavgat brook using sonar, skin diving and scuba diving methods, with no finds due to silty deposits.

We conducted dives for the sarcophagi in front of the Side Ancient Harbour, which were uncovered in 2012 and published in the first issue of this newsletter.[1] No negative change was observed at the site of the sarcophagi, which are believed to have been used as embankment material to reinforce the breakwater during the 4th or 5th century AD. However, the vegetation on the sarchopagi which was partly removed in 2012, overtook again. Other sites along the Manavgat shoreline were explored with research on these sites ongoing.

SHORELINES OF ALANYA DISTRICT

The first survey site in the Alanya shoreline was İncekum, lying between the towns of Okurcalar and Avsallar. Another site was the area between the Red Tower in Alanya Castle and the shipyard. Survey efforts were focused on identification of the assumed harbour through skin diving, scuba diving, and sonar systems. Sketches were made of the underwater remains in front of the Red Tower at the eastern entrance of the castle, as well as those remains in the Shipyard-Red Tower axis **(Fig. 1)**. The underwater exploration in the region yielded an abundant number of potsherds.

[1] ÖNİZ 2014, 63.

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Fig. 1. Breakwater embankment to the south of the Alanya Shipyard.

Fig.3. Iron anchor discovered at Gazipaşa / Roman Period – Illustration.

These sherds were taken to form a study collection and have been tentatively dated to the Seljuk and Ottoman Periods **(Fig. 2)**. We also discovered a shipwreck loaded with amphorae in another region.

SHORELINES OF GAZIPAŞA DISTRICT

The survey included Güney Village, Macar Village, the harbour of the Ancient City of Selinus, Kaladran, Gazipaşa, and Hal harbour, as well as the ancient city of Antiochia Ad Cragum in cooperation with Prof. Dr. Michael Hoff, the Project Director. Exploration revealed the presence of various remains from the Bronze Age through the Ottoman period **(Figs.3-4)**. Research of these findings are also ongoing.

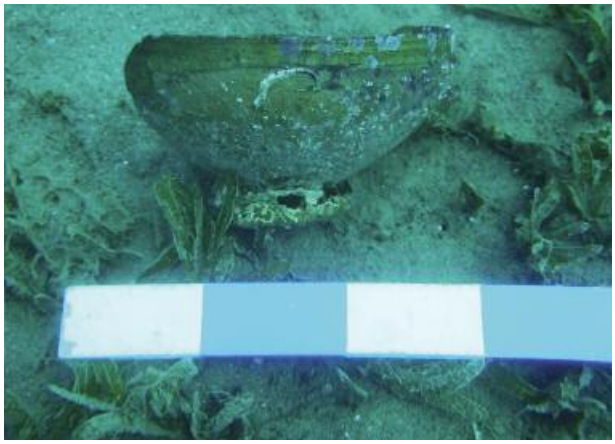

Fig. 2. A vessel uncovered in the Alanya Harbour / Seljuk Period.

Fig. 4. An anchor stock of a wooden anchor, 6th century BC / Now preserved at the Museum of Alanya.

Fig.5. Cape Gelidonya – Plate

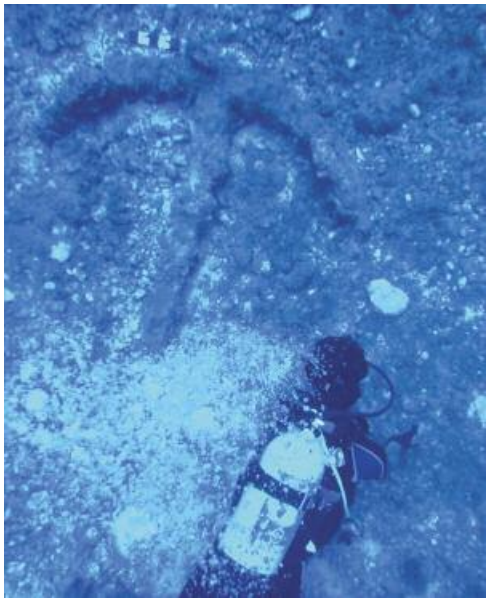

Fig.6. Iron anchor and diver at Cape Gelidonya.

SHORELINES OF KUMLUCA DISTRICT

We surveyed the eastern and western bays of the Adrasan Çavuşköy region, the Gelidonya Beş Adalar region and the area excluding the Cape Gelidonya Shipwreck which has been excavated by Prof. Bass and his team. The explorations also revealed various remains from the Bronze Age to the Ottoman Period **(Figs. 5-6)**, and scientific studies on these findings are still ongoing.

SHORELINES OF SERIK DISTRICT AND RELATED FINDINGS

There are six streams, the primary being the Köprüçay (Eurymedon), which drain from the shores of the Serik District. These streams convey alluvial deposits from inland areas to the shores. Additionally, the shoals of the Belek and Kadriye areas, representing a major part of the Serik shoreline, have a predominately sandy bottom. Along the shorelines are clusters of sand dunes in parts. The onshore and offshore movements of sand results in filling of the seafloor. Therefore, none of the underwater surveys in this region yielded a significant outcome. Regardless, sonar images were acquired from a depth of 10 to 20 meters in east-west axis of the Serik shorelines **(Fig. 7)**.

Some ancient writers (Thukydides, Plutarkos, Diodoros, Phanademos, Epheros) describe a naval war between a Persian fleet, under the command of Tithraustes, and an Athenian fleet, under the command of Kimon, in the delta of the Köprüçay River.[2] Surveys in the vicinity of Köprüçay did not reveal any remains of this naval battle or ground war, which was assumed to have taken place at the 5th century BC (411 BC in some records, and 468 BC in others[3]). Soundings and inspection of metal remains with detectors are required to be able to identify such historical activities in this type of sandy seafloors. We did not attempt to use these methods since they were not included in our work permission. These techniques will probably provide better results in identifying more remains in the future.

[2] ASLAN 2008: 50; PLUTARKOS 2009: 120, 121
[3] ASLAN 2008; PLUTARKOS 2009

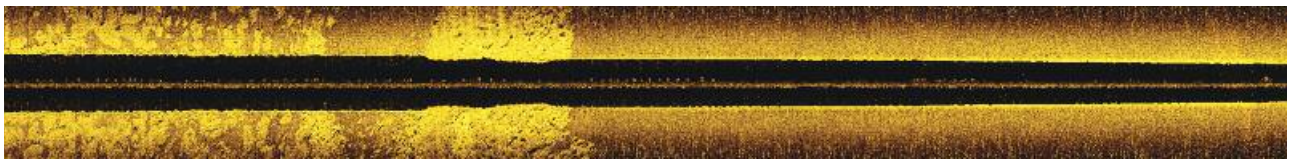

Fig 7. A sonar image from Serik.

It is likely that the ancient city of Aspendos had access to the sea through the Köprüçay. The city is 13,4 km from the sea through the river. Based on the length (259 m) and arch height (9 m) of the Köprüpazar Bridge, which was built during the Roman Period and then reconstructed during the Seljuk Period (13th century), it can be speculated that the Köprüçay was larger and suitable for river navigation during those times. At present, its widest point is 100 m while the narrowest point is 30 m. The entrance of the river is still used for shelter by shallow fishing boats. However, at present it is difficult for boats with a draft greater than 70 to 80 cm to enter and exist. Based on available information and ancient records, it appears that the mouth of Köprüçay might have been used as a safe haven. In that case, it can be assumed that large tonnage boats used to anchor/berth in the mouth of the river (inside or outside) while small tonnage boats loaded/unloaded, and navigated up to the city of Aspendos. Since no information is available about the depth of the river during the Roman Period, no speculation can be made on how far these large tonnage trading boats could have sailed in the river. However, battleships might have made it up to the bridge since the draft of these ships, biremes or triremes with two or three banks of oars, was usually less than 1 meter. Thus, the bridge should also have been used for controlling battleships **(Fig. 8)**.

The distance between the center of Aspendos and bank of the river is 500 meters. The pier of the city might be here. However, this possibility was not surveyed by the team. The Roman Bridge is 2,7 km from Aspendos, and 10,7 km from the sea. An embankment, probably man-made, is 600 meters from the bridge in the direction of Aspendos. Construction date of the embankment is unknown and untested. At present, the embarkment does not allow any navigation in the river to Aspendos. If this embankment was also present when Aspendos was inhabited, it can be assumed that the boats could reach no further than the backside of the bridge, and then land transport was likely used for the remaining 2 km distance.

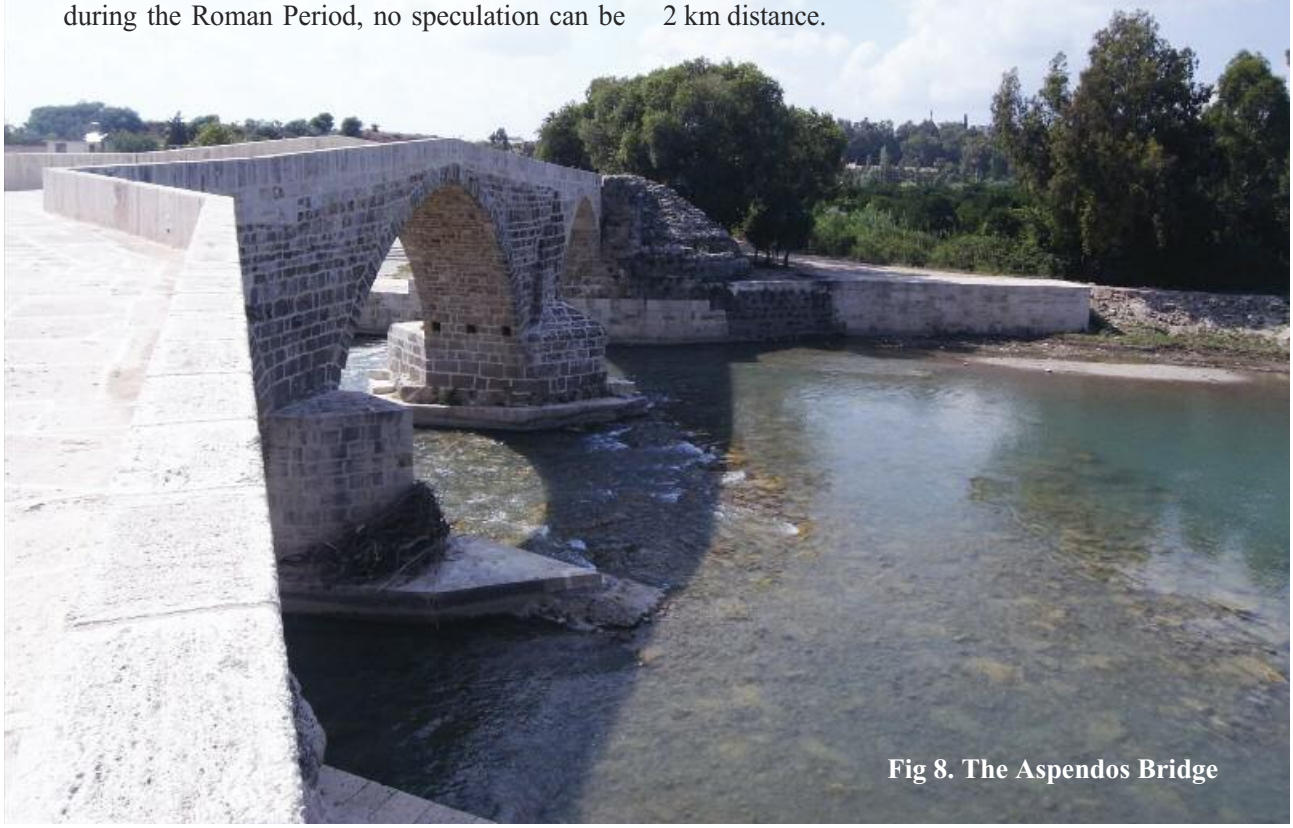

Fig 8. The Aspendos Bridge

There are wall remains from early periods between the bridge and the embankment that might be related with a pier building **(Fig. 9)**.

No remains of ancient buildings were found during the surveys in the sandfill layer at the confluence of Köprüçay with the sea and its vicinity. One of the possible reasons for failure to uncover any ancient remains is that the architectural remains might have been obscured by sand or vegetation while possible migration of the river may be another. The eastern mouth of the river yielded an area of soil embankment including ceramic artefacts concentrated in a particular section, of which most are dated to the Roman Period. This deposit area, of about 300 m^2, is not consistent with the local soil and sand in the mouth of the river. It is likely that this deposit was relocated from another place of archaeological cultural deposits to have been used as embankment against flooding. There is a small pier built of local stones in the same region, which was probably in use until recent periods. Determination of potential areas that have received transferred soil to be used for embankments is important, as removal of soil from any cultural deposits may lead to problems in the archaeological identification process, as well as damaging the historic fabric of the region.

Fig. 9. The area between the Aspendos Bridge and embankment

CONCLUSION

Every year, for 15 years depending on the resources, either short- or long-term explorations have been conducted along the 640 km long coastline. The inauguration of the Selçuk 1 ship **(Fig. 10)** of Selçuk University and the center at Kemer, has allowed to accomplish optimum results from our activities during the summer of 2014. Despite all these efforts, only about 10% of the Antalya coastline has been surveyed thus far. Moreover, these surveys were carried out in shallow waters while we have not conducted any survey at depths greater than 30 m with exception of a few limited sonar surveys. Furthermore, it is difficult to perform a dive survey, particularly in areas with a sandy seafloor because the level of sandy seafloor rises or falls with seasonal factors, exposing or obscuring any potential remains from time to time. For example, ceramic artefacts uncovered in 2014 were not identified in the Alanya Harbour in 2012. Another important factor is the growth of vegetation, especially *Caulerpa Taxifolia* and similar plants, which are called killer algae, that rapidly cover seabottom features. Strong roots of some algae species directly attach onto the architectural remain (e.g., marble sarcophagus), both obscuring the item and damaging the form and fabric of the item. Therefore, no sarchopagus is illustrated in the detailed underwater drawing in the book by Paul Knoblauch et al. on the Side Harbour, published in 1977 by the Turkish Historical Society.[4] However, our team uncovered 32 fragments of sarcophagi in 2011 at the same place, which suggests to us that potential architectural elements may not have been completely detected. On the other hand, the coastline of Antalya Kıyıları is the best surveyed coastline among the 8333 km long coastline. In order to be able to have a complete inventory of the underwater heritage in all coastlines of our country, we need more graduate and doctoral students to enroll in the underwater archaeology department of our universities and they should be provided with more job opportunities by museums and universities.

Fig. 10. Selçuk 1 Boat

[4] KNOBLAUCH 1977

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ISTANBUL UNIVERSITY YENIKAPI SHIPWRECKS PROJECT 2014: POST-EXCAVATION DOCUMENTATION AND CONSERVATION

UFUK KOCABAŞ

Following a ceaseless working pace, and completion of all the related documentation, archaeologists and workers from Istanbul University have excavated 27 shipwrecks unearthed during the Yenikapı Salvage Excavations between 2005 and 2013. Our team will be analysing a total of 27 shipwrecks, but also took a great responsibility in the field following the Istanbul Archaeology Museums who carried out the excavations. Our team focused on the post-excavation documentation, conservation-restoration, and analysis works at the I.U.Yenikapı Shipwrecks Research Center in 2014[1].

The wooden ship components have unidentifiable assembly details when *in situ* and are dismantled for detailed documentation leading to digital reconstructions as part of the Post-Excavation Documentation Work.

Fig.1 Digital drawing of the Yenikapı 20 trade ship

[1] Istanbul University Yenikapı Shipwrecks Project 2014 team: Associate Prof. Ufuk Kocabaş (Project Leader); Assistant Prof. Işıl Özsait-Kocabaş; Research Assistants, Taner Güler, Evren Türkmenoğlu, Namık Kılıç; Experts, Hakan Kahraman, Mehmet Sağır, Gökçe Turan; Technician Kaya Ukuş; Master Students, Seray Akdağ, Can Ciner; IU Trainees, Sadık Atar, Yılmaz Bahadır Işık, Abdullah Çifter, Yasemin Özer, Mısra Kaya, Gizem Şen, Hilal Sümeyye Güler; and IU Trainees in summer, Temel Yılmaz, Betül Engin, Cem Akgün, Pınar Terkeş, Aykut Aslan, Taner Özgür, Zinnat Vildan Çelikdemir, Meryem Çakar, Seda Kartal, Ayşe Selin Kaşıkçı, Ece Alkaç, Tuğçe Gürbüz (Işık University), Uğur Gündüz (Işık University), Muratcan Özmeral (Işık University), Bengisu Derebaşı (ODTÜ Architecture).

Fig.2: Detail shots of shipwreck elements

The entire Yenikapı 3 shipwreck was digitally documented using a 3D technique by Ayşegül Çetiner. The Yenikapı 6 shipwreck was digitally recorded by Ph.D. candidate Can Ciner. Three dimensional drawings of the Yenikapı 27 shipwreck are planned to be completed by the end of 2014 by Research Assistant and Ph.D. candidate, Evren Türkmenoğlu. The drawings of the Yenikapı 20 shipwreck are carried on by Research Assistant, and Ph.D. candidate Taner Güler. After drawing all wooden components, each was documented by detailed photographs, some of which were used to create photo-mosaics.

Scaled research models were prepared by Assistant Professor Dr. Işıl Özsat-Kocabaş in the Ship Conservation and Reconstruction Laboratory of Istanbul University based on the available data to gain a better understanding of shipwreck's construction features, and prepare a reconstruction of each wreck.

Corroded nails leave stains on wooden components that must be removed by mechanical and chemical means prior to Polyethylene glycol (PEG) conservation treatment. Research Assistant and Ph.D. candidate Namık Kılıç of Underwater Cultural Heritage Conservation Department at Istanbul University (IU), along with other specialists and trainees from IU, worked year-round to clean the waterlogged timbers.

Students of the department also contributed to the cleaning process during their summer school in 2014. Within this framework, areas stained by iron corrosion on timbers of shipwrecks Yenikapı 6, Yenikapı 7, Yenikapı 9, Yenikapı 15 and Yenikapı 30 were also cleaned by mechanical methods and a chemical mixture consisting of 5% disodium EDTA (ethylenediaminetetraacetic acid) and 5% oxalic acid.

Conservation of the ship timbers was the second phase of conservation-restoration work. PEG and Kauramin (melamine formaldehyde) are used for conservation of the Yenikapı shipwrecks.

Ship elements with a high risk of deterioration and those made from non-durable wood such as sycamore, are treated with Kauramin to prevent further deterioration.

Fig.3
A group of fragments from the Yenikapı 36 galley shipwreck following conservation work.

Conservation of most of the framing elements of Yenikapı 8, Yenikapı 9, Yenikapı 26, Yenikapı 36, Yenikapı 16 galleys, and the ribs and keel of Yenikapı 3 shipwreck were undertaken using the Kauramin method during the 2014 project period. The Yenikapı Shipwrecks Research Center has became the second laboratory, after Germany's RGZM Conservation Laboratory, to implement this method successfully.

Ship timbers in relatively good condition are being conserved using a freeze drying method after pre-absorption of 45% PEG 2000. For this purpose, PEG concentration was continuously increased on Yenikapı 2, Yenikapı 3, Yenikapı 6, Yenikapı 7, Yenikapı 12 and Yenikapı 30 shipwrecks during the 2014 project period. The PEG absorption process on the Yenikapı 1 shipwreck was terminated when it reached a 45% concentration.

Another important step of the work done in 2014 was the analyses. All the wood type/species identification of shipwreck timbers were completed by Prof. Dr. Ünal Akkemik, the Head of Forest Botanics Department of Istanbul University. Akkemik studied more than three thousand wood samples and will prepare the results as a monograph for publication in 2015. The analysis for the amount of sulphur contained in the wood samples was carried out by the Research Assistant and PhD student Gökçe Kılıç in 2014.

Research and analyses of shipbuilding technology from the Medieval Age, conservation, and restoration work of shipwrecks unearthed from the Yenikapı excavation site will continue in the future.

TINA
Maritime Archaeology Periodical

CONSERVATION OF WATERLOGGED WOOD FROM ÇAMALTI BURNU I WRECK COMPLETED

*NAMIK KILIÇ

The excavation of the 13th Century AD shipwreck located at Cape Çamalti to the northwest of the Marmara Island, was performed under the scientific supervision of Prof. Dr. Nergis Günsenin between 1998–2004. The conservation of the shipwreck wood, which is believed to be the first performed by a Turkish university, was initiated and completed by a team under the supervision of Assoc. Prof. Dr. Ufuk Kocabaş, Department Head of Conservation and Restoration of Artefacts, and Research Assistant - Ph.D. candidate Namık Kılıç, and delivered to the authorities of the Bandirma Museum.

Wood samples, not exceeding 1 – 1.5 g, were taken from the Çamalti Burnu 1 shipwreck in order to determine the amount of water in the wood of the ship.

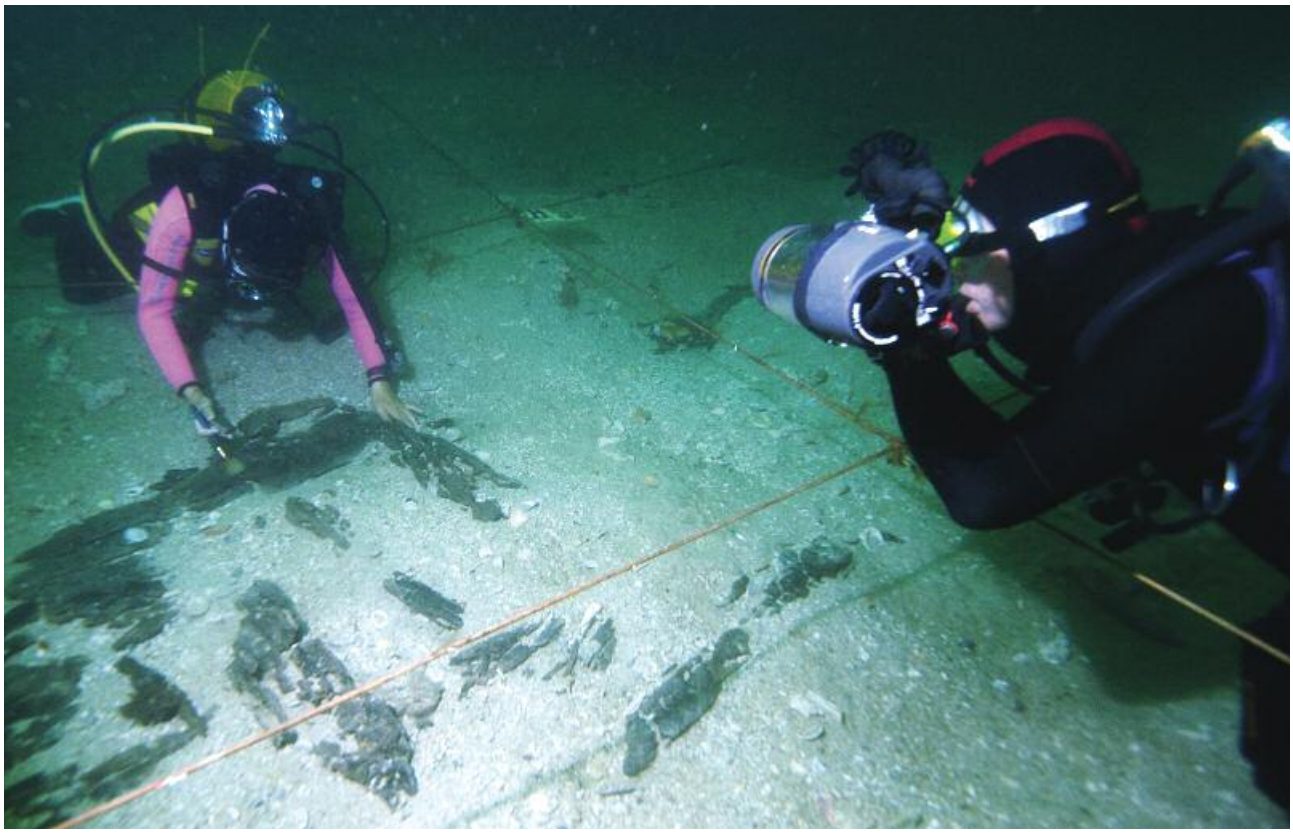

Fig. 1: Recovery of timbers from Çamalti Burnu I Shipwreck (Photo by Recep Dönmez)

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Fig. 2: Removal of iron compounds in wood fragments from Çamalti Burnu I Shipwreck.

According to these analyses, the amount of water in the timbers (Umax) was between 620–880%. Waterlogged wood is often classed according to the amount of water is contains: Class I: over 400 percent water, Class II: 185-400 percent water and Class III: less than 185 percent. Based on this, classification of the wood from Çamalti Burnu I Shipwreck was considered as Class I, and conservation procedure was carried out based on this parameter.

Polyethylene Glycole (PEG) 2000 was used for conservation of the wood; employing pre-impregnation and freeze-drying (lyophilisation) methods. During the examinations before conservation, stains of iron from iron nails used during the assembly of ship components and corrosion were observed. PEG used in the conservation process of shipwreck is an electrolyte carrying an effective ion that reacts with the iron used on wood assembly elements. Following the reaction after the PEG impregnation procedure, the oxidation of the sulphur was shown to be catalyzed by iron species. To avoid any damage to timbers during this process, corroded areas were cleaned with a solution of 5% disodium EDTA (ethylenediaminetetraacetic acid), and 5% oxalic acid. The timbers were then subjected to a desalination procedure. The PEG conservation process began on May 2, 2009, initially with a 5% concentration. During this process a chemical material called Exocite 1012 was added at a ratio of 1/1000 to eliminate any bacterial formation in the solution. The concentration of PEG 2000 was increased by increments of 5% PEG. The increment procedure was completed when the PEG concentration of the solution reached 45% on November 11, 2013. The impregnation procedure was completed on May 7, 2014 after analyses confirmed that PEG was entirely impregnated by the wood.

Following the PEG impregnation procedure, the process of dehydration was performed by a freeze-drier used for the first time in Turkey by the Istanbul University scientists at the Ship Conservation and Reconstruction Laboratory. Expansion of the water in the wood cells due to freeze was avoided by pre-impregnation PEG before *lyophilisation* (freeze-drying process). The conservation of the timbers from the Çamalti Burnu I Shipwreck was carried out by a team from Istanbul University under the supervision of Namık Kılıç using a freeze-drier. Also known as sublimation, freeze-drier primarily reaches to the freezing point of PEG solution, and then eliminates the solidified water in the timber through vaporization.

Fig. 3: Placing the wood fragments from the Çamalti Burnu I Shipwreck into the freeze-drier.

Fig. 4: Bonding procedure for timber components

Fig. 5-6: Images of a frame fragment from Çamalti Burnu I Shipwreck before and after the conservation

Fig. 7-8: Before and after the conservation

Since the method does not result in any surface-tension, no shrinkage, cracks or dimensional deformity was observed following the procedure. The timbers looked very natural even after the procedure. Finally, the wood fragments from the excavation were bonded using hot melt adhesive.

After the conservation procedure was completed, wood fragments were taken into a humidity controlled warehouse, and then delivered to the Bandirma Museum which houses the entire assemblage of artefacts from the Çamalti Burnu I Shipwreck.

TINA
Maritime Archaeology Periodical

EXPERIMENTAL ARCHAEOLOGY: CYCLADIC BOATS REVIVING PROJECT

*OSMAN. ERKURT

The Cyclades are an archipelago, aligned from north to south in the center of the Aegean Sea. Finds unearthed during excavations on mainland Greece, the Cyclades archipelago, Crete, and Western Anatolia, demonstrate that Aegean Sea civilisations were always related to the encompassing mainlands and further that Cyclades culture was dominant 4500 years before. Boats were the only means of transport for establishing a commercial or transportation link between the islands, and between the island and the mainland.

General information on boats known as "Cycladic Boats" in literature were obtained from contemporary rock embossments and depictions of Cycladic pans **(Fig. 1)**. In addition, lead and ceramic boat models also give an idea on Cycladic art **(Fig. 2a-b-c)**.

Many finds suggesting parts of Aegean region were related with each other, made of material such as obsidian, ceramic, and metal, suggests the intensity of commercial activity that occured during this period. Finds excavated from Anatolia are the most ancient examples of this trade.

Fig. 1. Cycladic Pans, Early Cycladic II period. Keros-Syros 2800-2300BC.

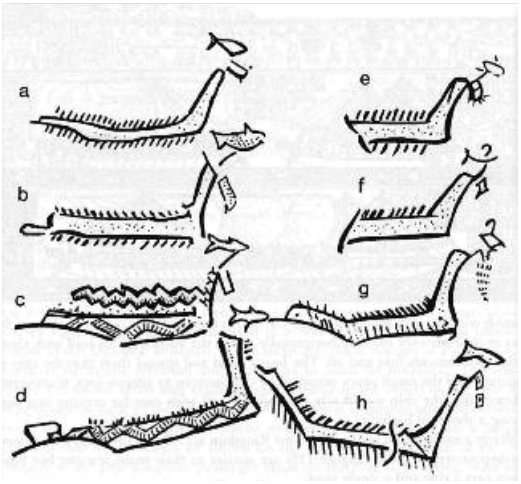

Fig. 2a. Archaeological data, boat depictions on Cycladic Frying Pans Keros-Siros 2800-2200BC

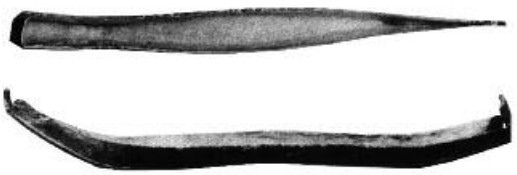

Fig. 2b.Lead boat model, Naxos 3000BC.

Fig. 2c.Clay boat model Heraklion Crete 3000BC.

Archaeologist Osman Erkurt, President of 360 Degrees Historical Research Group

A trip plan was made for navigating between the islands, and the mainland, through the ancient routes of the period, after building Cycladic commercial boats in various sizes based on this information, and by following archaeological discipline. Through this project we aimed to explore the boats of this maritime trade line, and not to explore how and when people used to navigate to and from Cyclades. All these explorations are expected to give us the opportunity to access information on maritime and navigation during Early Bronze Age.

In addition to the fact that Aegean Sea islands are characteristically formed close to each other and this is convenient in terms of navigation, it also simplifies transportation and trade between the mainland and the islands. The most significant feature known of Cycladic boats used for transportation and trade between Cyclades and West Anatolian shores are that they were assembled by stitching the wooden components together using vegetative fibers. The re-production, maritime navigation on ancient routes, and exploration of loading capacities of Cycladic boats through the methods of experimental archaeology is important in terms of accessing information on Early Bronze Age seamanship. The idea that Cycladic boats are thought to be the most ancient boats cruising in the Aegean Sea raises many questions. These queries are gathered in four groups, after browsing through all articles and opinions on this subject.

1- DESCRIPTION OF CYCLADIC BOAT CONSTRUCTION TECHNOLOGY

Although it was suggested that a typical Cycladic boat was made of a hollowed out tree trunk, this suggestion seems to be invalid. We support the notion that the construction of the boat should have involved many pieces, instead of a monoxylon (dugout canoe/boat), considering both the Aegean regional flora, and the length of time it takes to build, and use these boats (this kind of a tree would grow in approximately 1000 years, and be used 80 years, consequently the source material would disappear rapidly).

Taking into account that a log with a length of 20 m, and a width of 2 m, can only be found in eastern Mediterranean cedar woods, might support our thought that it should involve a technique that utilizes multiple pieces. White fir of the genus *Pinus*, and spruce of the genus *Picea* (consisting of long and smooth fibers) were probably preferred for the construction of this type of boats.

The assumption that the wooden beams of these boats were stitched or sewn together using vegetative fibers as seen in most ancient construction techniques, has gained favor **(Fig. 3)**.

Fig. 3 Puncturing and stitching the hull.

2-BOAT DIMENSIONS

Based particularly on the assumption that the shorter lines seen on Cycladic frying pan depictions are oars, and taking into account the standard distance between oarsmen (90 cm.), the total boat length probably was between 15 and 20 m. The width of these boats, with oars being the sole means of propulsion, and considering the common typology, should be 1/10 of the hull length (i.e. approximately 2 m).

3-BOAT DESIGNS

Analysis of the iconographic figures of the period, leads us to identify the bow and the stern of the boats. The fish depiction observed on Cycladic frying pans, is commonly understood as the traveling direction of the boat. According to another opinion, the lower part of the boat is the bow. Overall design indicates that bows and sterns of the boats were identical in terms of plan view. It suggests that boats could have safely traveled in either directions. The ribbon-like depiction on iconographic figures indicates the wind direction.

4-PROPULSION

Based on available iconographic data propulsion was by oars. According to general view, the short lines on the Cycladic frying pan depictions, that are believed to be oars, are of a paddle[1] type. Paddles depend more on the force derived from the combination of shoulders and arms and are, therefore, require more effort; paddling becomes exhausting when used over longer distances. Absence of any evidence for sailing in the contemporary iconographic information suggests that there was no other driving force available except paddling. Considering these queries, assumptions, and near-accurate finds, we constructed a few boats following the experimental archeology principles.

METHODOLOGY: EXPERIMENTAL ARCHAEOLOGY AND PRACTICE-BASED RESEARCH

We collected all the data available on the construction technologies of the most ancient boats known in the Aegean seas along with maritime data, and then started the construction within the limits of the experimental archaeology discipline. All the data were primarily discussed with marine engineers, resulting in modelling of the vessels and determination of the construction material . Based on these, pines, which are abundant in the Aegean flora, were preferred owing to their lightweight nature, resinousness, and ability to become waterlogged (assuring watertightness of the hull). Stitches the main element of joining components, were twisted at a thickness of 10 - 12 mm, and sisal [2] which is a very robust plant was selected as the construction material.

Metal fastenings were not used in Cycladic frying pan boats. Ten millimeter wide pegs drenched in molten pine resin were used on both ends of cover boards for assembly. The boats' aging process will be observed for one year, then juniper tree tar will be applied on the stitchings that hold the boat together. Three boats will be constructed; one 14 m long and two 19 m long each Sewing and joining methods were tried on wide, flexible planks. Creation of a 7 m long prototype was undertaken and suggested methods would be suitable for the construction of larger boats.

Both the production and navigation experience of the 7 m long prototype, which was very important for testing, enabled us to observe many details.

Fig. 4. Seamed flat-bottom of the boat.

[1] Oars for canoeing.
[2] Some sort of vegetative fibre

It was suggestive of the experience we expect in the construction of larger boats. First the construction of the 14 m long boat was completed. Then the boat was launched and tests were performed at sea. Based on the technical results obtained, the two longer boats (19 m) length were constructed.

"Shell first, sew next" as the most ancient boat construction technique known, was used in the construction of the Cycladic boats. The process that necessitated a multi-piece construction was resumed primarily by placing the keel on the cradle, fastening of the stem and the sternpost, and laying the first row of planks (garboards) of the flat-bottomed **(Fig. 4)** boat, then more strakes **(Fig. 5)** were fastened by following the same process, by bending. Later on, the decking and the board of the boat, which are the horizontal props, were fastened in two parts. The construction was joined to the boat shell again by stiching and wooden dowelling technique. Rower seats, which are part of this construction type, are excellent supporting elements. Holes that were made along the waterline for the sewing the starkes together were plugged up by wooden dowels. Also, a thick putty consisting of the mixture of tallow, wood charcoal dust and goat hair was applied by hand on the exterior of the craft. The putty was also useful for travelling faster.

Paddles, which are tools to provide the main driving force, were made of pine. Paddles with larger blades, and knobbed shafts, as seen in Egyptian iconographic figures were preferred. These boats travel with the help of paddles, and have a light and fragile structure. Therefore they were launched by placing a greasy slipway underneath them as in the ancient periods, and by pulling them by human force down to the water. Then trials for adaptibility to the sea and rowing began.

Fig. 5. Garboards

CONCLUSIONS

The applicability and sturdiness of the shell-first system and the sewing system were observed with this project. A rigid construction was obtained through waterlogged hull planks, and stitching after submerging in water. Replacing the worn or snapped stitching is easy. During a trial of drilling holes where the stitching passes through was performed with an ancient bow drill, and a bronze drill bit, a 10 mm hole was drilled in 4 minutes.

We saw that the boat's flat-bottom, and the side sytrakes fit together in angular way, providing an ease of construction. The construction of one 7 m prototype, one 14 m boat, and two 19 m boats took four and a half months. There were no problems in launching the boats using a greasy slipway. The tallow applied on the lower hull was convenient for launching, but was soon consumed by fishes. Therefore, it has to be applied frequently. Owing to its flat-bottom the boat rolls slightly despite its load. This form creates a vacuum effect. Only a 5 to 10 degree rolling was observed on the boat when the usual weight carried in addition to the crew are in the boat. Since the pine and sisal ropes used in boat construction expand when subjected to submersion in water, there was no leakage problem.

Considering 2792 holes were drilled on the waterline of the 14 m long boat this is an important result. Since these boats do not take on excessive water or capsize, they maintain their buoyancy and do not sink. Based on observations during our experiments it is possible to easily discharge bilge water and continue traveling. Since the paddles are short, it is very important to paddle briskly and rhythmically. This influences the speed and maneuverability of the boat. Over longer distances, starboard paddlers should switch seats with the port side crew. The reason for that is because these are paddles, and they are shorter compared to regular oars, and they are maneuvered by shoulder force, not by total body weight.

Boat speed depends on many variables, mainly the wind direction, and wave action. Considering all boats, sailing or not, used to travel with the help of tailwinds during Ancient Age, this is also the case for Cycladic Boats. When the tailwind force is 4 Beaufort[3] or more, capsizing risk increases. When the wind force is between 2 and 4 on Beaufort scale, the vibration observed on longer boats is measured as middle scale. As a conclusion these boats, considering their form and freeboard height, can stably maneuver with a wind speed between 2 and 4 Beaufort and 0.5 to 1 m wave height.

There is a single rudder blade attached to the stern post of the boat. (Fig. 6) The steersman is positioned at the helm of the boat, and uses the rudder as if he woulds an oar and shouts commands to oarsmen about the maneuvers of the boat. The boat length has to be calculated accurately by the helmsman for making full turns in the starboard or port direction.

After the completion of the planned voyages between Aegean Isles with these boats (Fig. 7) the available data will be verified and information on the Early Bronze Age seamanship will be made public.

[3] Wind force measurement unit

Fig. 6. Stern post rudder blade.

Fig. 7. General view of the boat.

BOATS	14 M BOAT	19 M BOAT
Length	14 m	19 m
Beam	1.89 m	2.40 m
Board height	0.58 m	0.76 m
Weight	1670 kg	2220 kg
Number of oars	18	26
Number of waterline holes	2792	3156
Number of board holes	2598	2096
Rope length	593 m	893 m

Table 1. Technical data on boats.

Cycladic Boats Reviving Project, is an experimental archaeology project carried out by the Ankara University Research Center for Maritime Archaeology with the co-operation of 360 Degrees Historical Research Group. The project was financially supported by the Coordination Unit of Scientific Research Projects, Ankara University.

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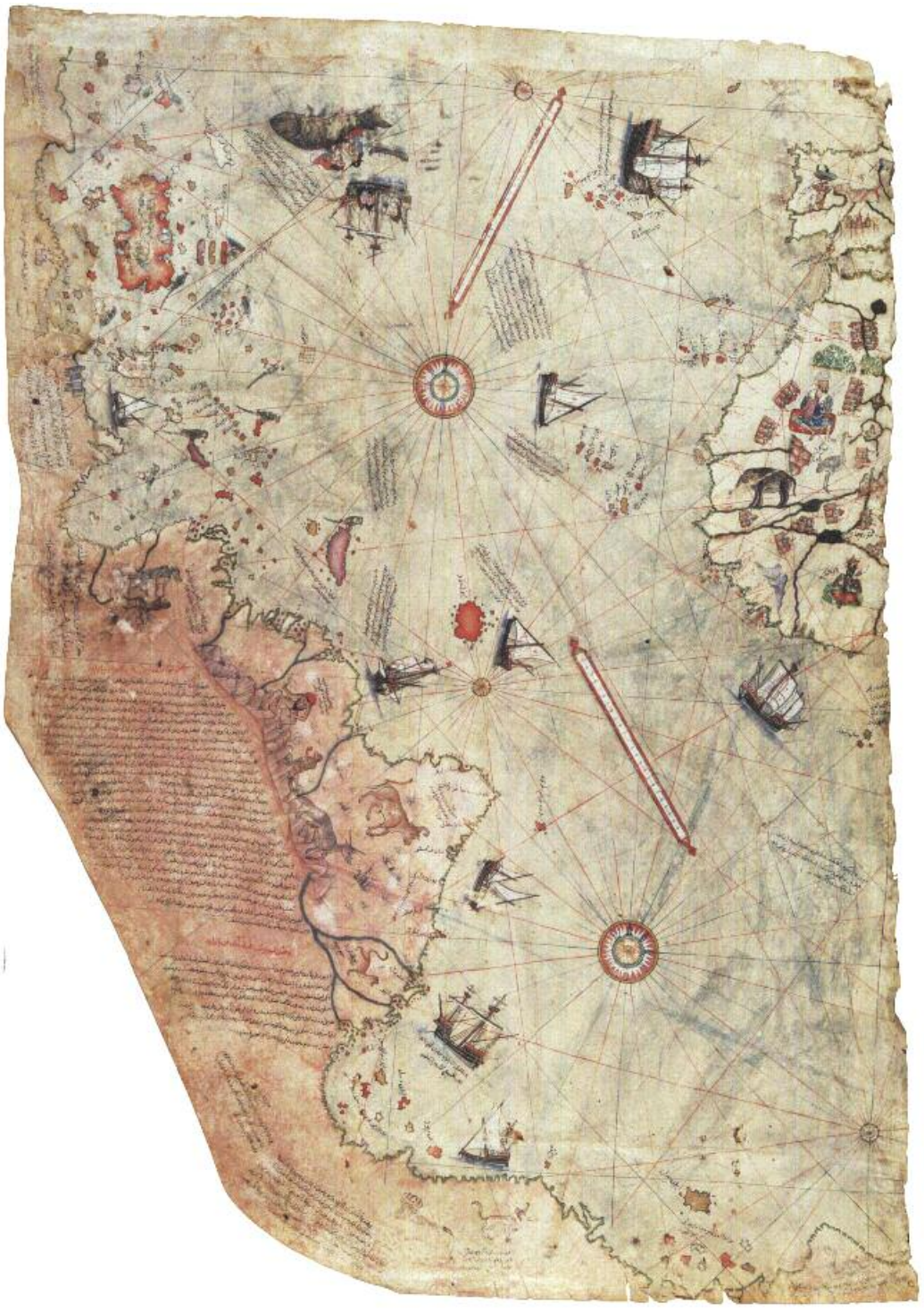

AN OTTOMAN SAILOR IN THE AGE OF DISCOVERY

PİRİ REİS

İDRİS BOSTAN*

The world renowned seaman Piri Reis, known for his documentary work of the Mediterranean Sea and the two most comprehensive "New World" maps during the Age of Geographical Exploration, was born to a seafaring family, circa 1470, in Gelibolu. He was raised by his uncle, Kemal Reis, who was a famous marine ghazi.[1] His father was el-Hac Mehmed, and his grandfather was Ali Reis.

Before beginning work for the state in 1495, Piri Reis also served as a marine ghazi in the Mediterranean Sea; mainly on the fortresses and coastline of Spain and Venice. Among his known activities in the region are the invasion of a fortress near Mallorca, invasion of Pianosa island near Corsica, and laying siege to Panteleria island to the south of Malta. In his book of navigation *Kitâb-ı Bahriye,* Piri Reis explained that during his *ghaza* (holy wars) in the Mediterranean, he and his crew seized three commercial barges near Üçadalar/İzledare to the southeast of Tulon, and seven barges off Valencia and sold them in Tunisia. His emphasis on the fact that he wintered with Kemal Reis on the Tunisian coast and in the Bicâye port of Algeria, and set to sea from there in summer, suggests that Kemal Reis and Piri Reis used North Africa as a base even before the Barbaros brothers.

Obeying Bayezid II's order, he brought the income of the *waqf* that were originally sent to Haremeyn to Alexandria after he and Kemal Reis became state's officers in 1495.[2] He played an important role during the battles against the Knights of Rhodes on his way back from Egypt. He took part, with his galley, in the Ottoman Mora campaigns and became useful during the invasions of fortresses at İnebahtı, Moton, Koron and Anavarin (1499-1501).[3]

Piri Reis successfully served in campaigns for protection of muslims in North Africa and Andalucia (1506). He, along with other ship's captains, probably escorted the ships commissioned to carry Andalucian muslims. Later, he accompanied his uncle with a fleet carrying troops, ammunition, and cannons to Egypt in order to support Mamluks against the Portuguese. It was a turning point in his life when Kemal Reis lost his life in the sinking of his ship in heavy storms in the Aegean Sea during another such dispatch to Egypt (1510).

With his galley, Piri Reis joined the fleet of Yavuz Sultan Selim during his Egyptian campaign on its way to Alexandria giving the sultan support from the sea. In the mean time, he presented his New World Map, dated 1513 to the sultan in Cairo where he arrived via the Nile River (1517). During his voyage, he carefully analyzed the itinerary between Alexandria and Cairo, and drew a map of the Nile River and its tributaries in detail for the *Kitâb-ı Bahriye*. Later, he withdrew to Gallipolli to complete the first compilation of *Kitab-ı Bahriye* that he named *Eşkâl-i Cezâyir ve Sevâhil-i Bahr-i Sefid* (1521).

Piri Reis took part in the campaigns of Kanuni Sultan Süleyman to Belgrade (1521) and Rhodes (1522), and he took İbrahim Pasha, the Grand Vizier, with him on his way from Egypt to Rhodes in 1524. During that time, Piri Reis had the opportunity to present a transcript of his book, *Kitâb-ı Bahriye*, to the Grand Vizier. With the Vizier's encouragement, he presented a copy of his book's second version in 1526, and offered his second New World map in 1528 to Kanuni Sultan Süleyman. The cartographer took part in the battles of Corfu (1537) and Preveze (1538) in the Armada of Barbaros Hayreddin Pasha. These victories were indicators of Ottoman dominance of the Mediterranean Sea.

PIRI REIS AND INDIAN OCEAN CAPTAINCY

The mid-16th century was a time when Kanuni did not recognize any limitation to his own imperial powers to enforce access to the Indian Ocean. His opposition, coming from Portugal, had reached the heart of the Islamic world from the west side of Europe as if retaliating against the Ottomans, who were, at the time, launching expeditions against the countries carrying the banner of Christianity.

[1] *Ghazi* is a term referring to a Muslim fighter against non-Muslims.
[2] A *wagf* is an endowment made by a Muslim to a religious, education, or charitable cause.
[3] İdris Bostan, "Keşifler Çağının Osmanlı Denizcisi: Piri Reis ve Yeni Dünya Haritası",*Pîrî Reis'ten Önce ve Sonra: Topkapı Sarayı'nda Haritalar*, İstanbul 2013, p. 10-11; İdris Bostan, "Piri Reis", *Diyanet İslam Ansiklopedisi*, vol. 34, p. 283.

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The Christian sailors purpose was to gain control over the Red Sea and the Persian Gulf, and divert the trade route to the ocean, as well as destroying Medina and Mecca, sacred places for Muslims, in order to strike a final blow against the Muslims.[4]

As Ottoman influence became dominant in the Mediterranean region, they were in need of putting a seaman in charge of the naval fleet who would be able to sail to the Indian Ocean and defend the Islamic holy places against their Christian adversaries. Piri Reis was appointed as the Admiral of the Ottoman Fleet in the Indian Ocean in 1547. Thus, a new era began allowing him experience in, and exposure to, the Indian Ocean.[5]

As the premier activity of his Admirality, Piri Reis set sail from Suez with the Armada in his command, consisting of 60 ships, to take Aden, which was the only Ottoman base in the Indian Ocean until captured by rebels (1548). First he harbored at the Moha port of Yemen, and after embarkation of support troops, he seized three Portuguese ships near Aden, and took 120 seamen prisoners.

After he laid siege on Aden both from land and sea, a Portuguese fleet that entered the harbour retreated after noticing the presence of the fleet of Piri Reis. Aden was recaptured following the operation by land troops (February 1549). Piri Reis was rewarded by the Sultan upon conquest of Aden.

The second campaign of Piri Reis in the waters of the Indian Ocean was at Hormuz Island, which was the most important Portuguese base in the Persian Gulf. Piri Reis set out from Suez with a fleet of 30 vessels in 1552, passed through the Bâbü'l-mendeb Strait and arrived in the Indian Ocean. He then sailed by Aden, Şihr and Zufar harbours and laid siege on the Maskat fortress. He took Jean de Lisbao, the fortress commander, and 128 Portuguese prisoners. Later, the Portuguese fortified the important and strategic Maskat Fortress of the Arabian Sea by building two more fortresses, St. John (Celali) and Fort Capital (Mirani), at the harbour gate in order to defend it better against the Ottomans.

Piri Reis laid siege on the Portugal dominated Hormuz in September 1552 with a fleet consisting of 24 galleys, and four barges under his command. Although he invaded almost the entire island, he could not seize the Portuguese citadel defended by D. Alvaro de Noronha.

Against the threat of a Portuguese fleet's arrival, the Ottoman captain decided to lift the siege, and sailed to Qeshm Island, sacking the island and capturing a huge war booty.

Then he set out for Basra. Word had spread to Basra that Piri Reis made this decision because he was bribed with gold and jewelry; an accusation made by Kubad Paşa, the Governor of Basra, to Istanbul. Yet, the arrival of a Portuguese fleet in Hormuz shortly thereafter proves the charges against him were incorrect. In fact, the imperial order received by Piri Reis had warned him to get additional war materials in Basra before laying siege on Hormuz, since he was already short of gunpowder and had lost a ship loaded with guns and ammunition off Aden.

THE DEATH OF PIRI REIS

Piri Reis, who left his own fleet in the Persian Gulf for risk of confinement to the Persian Gulf by the Portuguese Armada, put out to sea with three galleys for Suez. One of the ships run ashore en route, so he arrived in Suez with only two galleys, then traveled to Cairo by land.

[4] Bostan, Keşifler Çağının Osmanlı Denizcisi: Piri Reis/An Ottoman Seaman of the Age of Discovery, p. 12.
[5] Cengiz Orhonlu, "Hind Captainship and Piri Reis", *Belleten*, 134 (1970): 235-254.

As Daniele Barbarigo (1550-1553), the Venetian Consul to Alexandria mentioned, he was accused of leaving his fleet of 22 galleys unattended in the Persian Gulf. When Kubad Pasha's letters of accusation were added to the previous complaints against Piri Reis, he was executed in Egypt during the Semiz Ali Pasha's governorship by order of Kanuni Sultan Süleyman,[6] who at the time was in Aleppo for his Persian campaign (November-December 1553).[7]

A REVIEW ON TWO "NEW WORLD" MAPS DATED 1513 AND 1528

Piri Reis is renowned for the two "New World" maps drawn in 1513 and 1528, and his guide book for the Mediterranean Sea, *Kitâb-ı Bahriye*. Therefore, it may be fitting to describe Piri Reis as the "Cartographer of the Age of Explorations" and his map as the "Map of the New World." In fact, Piri Reis never referred to his map of 1513 as a "world map" in the legends and marginal notes of the map, nor in his *Kitâb-ı Bahriye*, but described his work as a "hartı" (map).

In his first "New World" Map of 1513, he might have attempted to portray the latest geographical discoveries in the eastern part of Central and South America, along with the coasts of Spain, Portugal and West Africa which he pictured in his mind as a whole in an age of discovery from an Ottoman perspective.[8]

The missing fragments on the right side of the 1513 leather map might have been torn or damaged due to humidity or other reasons. Although it has been asserted that Piri Reis' map consisted of two or more parts that would complete the work to an entire global map, such a missing part has not yet come to light. In fact, Piri Reis complains in the *Kitâb-ı Bahriye* that detailed map drawing of very large areas on leather was not feasible, which is why maps of self-contained regions were drawn. Hence, the maps such as Mürsiyeli İbrahim, el-Hâc Ebu'l-Hasan, Atlas-ı Hümâyun, Ali Macar Reis book of Maps, and Seyyid Nuh's book of Maps, all drawn by Ottoman cartographers, and the ones drawn by Europeans are regional maps.

Fig.1: Corfu in Kitab-ı Bahriye.

Absence of a standard form of cartography and frame in the first map, which are normally seen in other contemporary maps, suggests that it was simply a draft work of a curious seaman such as Piri Reis, rather than a professional cartographer.

Hence, the second map that he drew 15 years later (1528), illustrating the North Atlantic Ocean and the coasts of the North and Central America is perfect, but again, with no frame. The present frames were installed afterwards at the paint atelier of the palace.[9]

When Piri Reis was drawing his New World Map in 1513, he used both early exploration maps of the Europeans from Spain and Portugal and early maps from the geographical works of the Islamic geographers.

[6] Maria Pia Pedani, "Reports of Venetian Consuls in Alexandria (1554-1664)", Alexandrie Ottomane 1, (ed. M. Tuchscherer- M. P. Pedani), *Études Alexandrines*, 19 (2011): 54, 76.
[7] Since Seydi Ali Reis was appointed to the Admirality of the Naval Fleet in the Indian Ocean on December 2, 1553, it seems possible that Piri Reis was executed at that time (C. Orhonlu, "Seydi Ali Reis", *TED*, 1 (1970): 42.
[8] Topkapı Palace Museum's Library, Revan.-mükerrer, nr. 1633.
[9] Topkapı Palace Museum's Library, Hazine, nr. 1824.

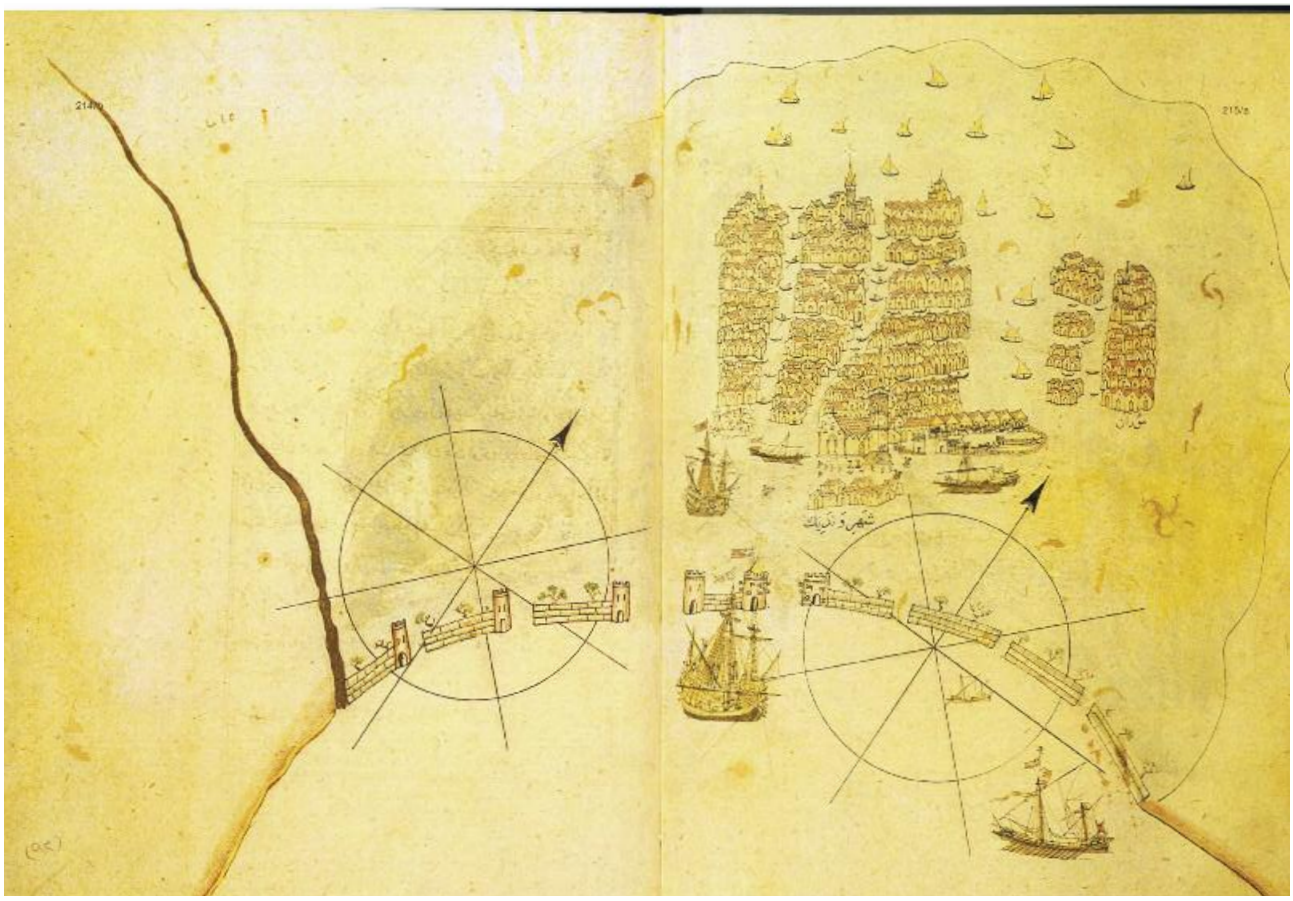

Fig.2: Venice in Kitab-ı Bahriye.

In his remarks, he explains the sources used for his map and in the introduction of his book, *Kitâb-ı Bahriye*, he explains that he made use of almost twenty world maps and *mappamundi*.

Among those used were; Ptolemy's "*Geographia,*" the maps from eight Islamic cartographic works that he called "Ca'feriyye",[10] an Arabic map of India, four maps made by the Portuguese cartographers depicting the Sindh, Indian Ocean, and Chinese seas, and Christopher Colombus' map used during his exploration of American continents.[11] The two maps of Piri Reis are of particular importance since they are among the earliest maps of the New World available which also helped introduction of Spanish and Portuguese seamen's geographic discoveries to the Ottoman world.

ADRIATIC SEA COASTS IN THE KITAB-I BAHRIYE

The present Adriatic Sea was known as the "Gulf of Venice" during the Ottoman period. Although this term was improved by the Venetian State, and was used to define different places throughout the centuries, its borders expanded in time to the limits of Ancona, Otranto and Avlona **(Fig. 3)**, and then to Ayamavra and Korfu **(Fig. 1)** in 15th century. The term "Gulf of Venice" in Piri Reis' *Kitâb-ı Bahriye* was only used for the region of sea from Korcula island in upper Dubrovnik to the city of Venice.

[10] In his work named *Menâzırü'l-avâlim* when Ottoman geographer Âşık Mehmed referred to Batlamius' work, he used the term "Ca'ferâyâ" (Ed. M. Ak, Ankara 2007, II, 276) which is similar to Piri Reis' "ca'feriyye" and this term is later commonly used and it means "coğrafya (geography)".

[11] G. C. McIntosh, *The Piri Reis Map of 1513*, Athens 2000, p. 73.

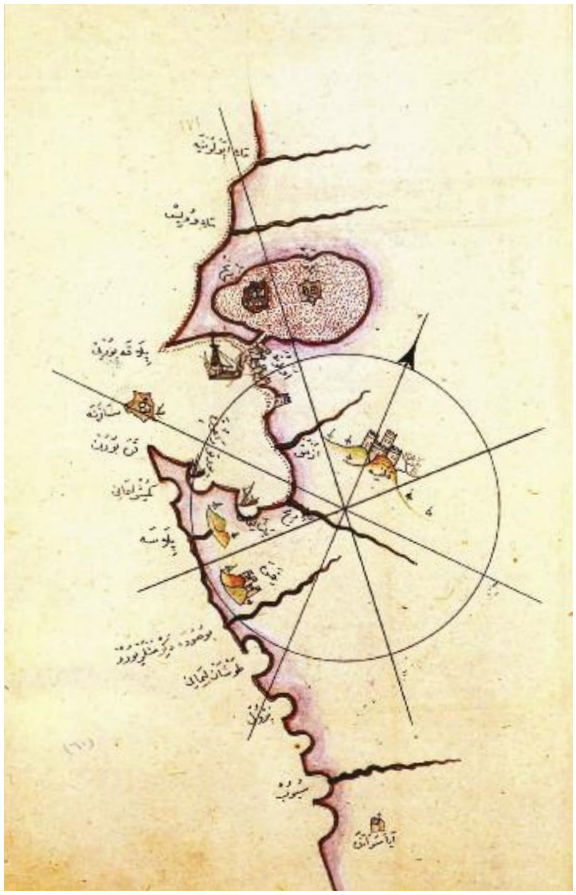

Fig.3: Vlorë Coast in Kitab-ı Bahriye.

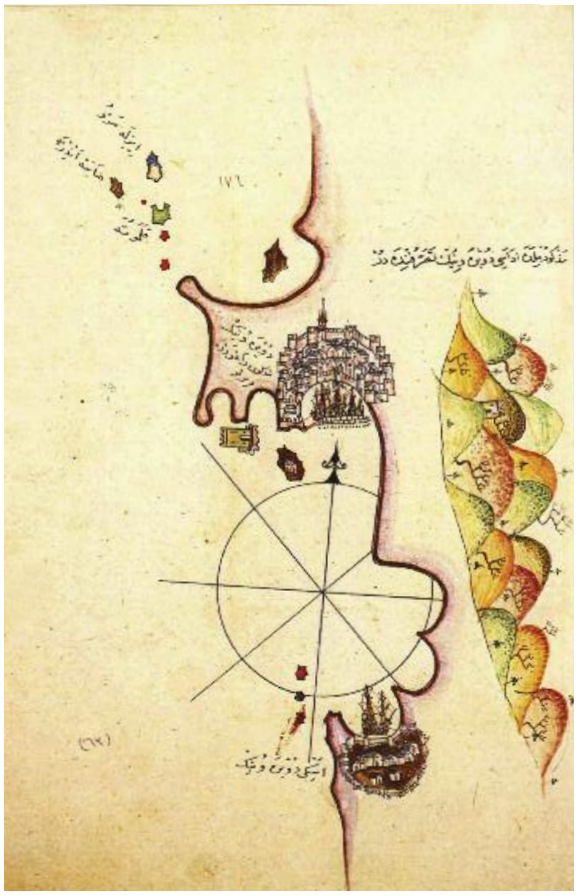

Fig.4: Dubrovnik in Kitab-ı Bahriye.

When Piri Reis described the fortresses in this region, he identified them as located in the "Gulf of Venice." For regions south from Venice to Ancona and Otranto, he did not use this term.[12]

The notable fortresses and harbours referred in detail in *Kitâb-ı Bahriye* are in order of importance: Raguza i.e Dubrovnik, then (Fig. 4) Korcula, Lissa/Vis, Lesina/Hvar, Sibenik, Zadar, Zapuntel/Molat, Sam Paro/Skadra, Demato, Ezni/Rab, Premode, Pago/Pag, Vake/Krk, Karso/Cres, Uniye, Pranse/Poreç, Umago, Perano, İzle, Moye, Reşti/Trieste, Kavorlo and finally Venice. Thus, Piri Reis, who reached Venice by the North Adriatic Sea, provided geographical and historical information about the city. He detailed Venice, or the San Marko Republic, its location, the foundation of the city, and its administrative system. He described Venice as having a history as a fishing community that prospered and made a name in trade, and that their country was not that of nobleness.

As Piri Reis followed the Italian coastline southward, he recorded information on the political borders, and the regions under the dominance of Venice, the Papacy, the Spanish states, and the neighbouring independent states in the peninsula. He gives detailed information, primarily on Venice, then the important cities such as Ravenna, Ancona, Brindisi and Otranto, and the fortresses, harbours and small settlements between these cities.

[12] İdris Bostan, *Adriyatik'te Korsanlık, Osmanlılar, Uskoklar, Venedikliler (1575-1620)*, İstanbul 2009, p. 23. Katib Çelebi stated that the Corfu island was the key to the Venice Gulf which he called The Gulf Sea (*Tuhfetü'l-kibâr fi esfâri'l-bihâr*, Ed. İ. Bostan, Ankara 2008, p. 64-65)

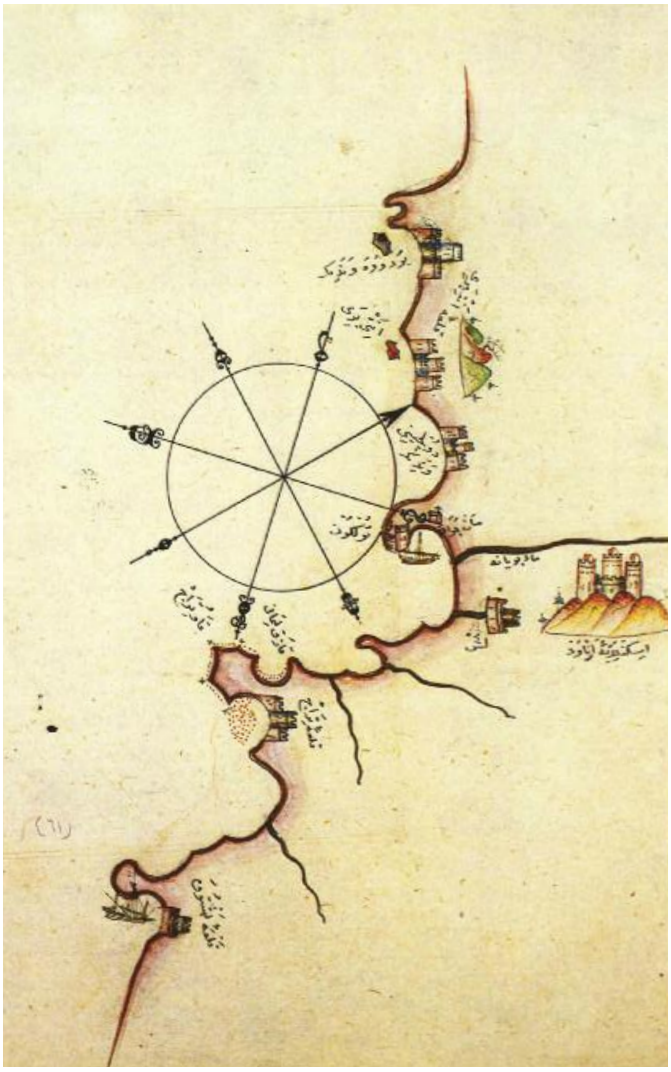

Fig.5: Durrës, Alexandria/Shkod ër, Ulcinj and Budva coasts in Kitab-ı Bahriye

Piri Reis also provides illustrations of these places in his book, which are valuable for maritime history and geography. He personally saw the fortresses, cities, and harbours **(Fig.5)** and wrote about the bays, gulfs, towers, and overlooking fortresses in detail so that the reader could envision these features while reading. For example, when giving information about Venice **(Fig. 2)** he explains, "The city of Venice can be accessed via four straits. The strait immediately across from the city is called the Santa Libete Strait. Ships pass through the bastions on both sides of the strait. Piles are driven onto the sandbars on the sea side of these bastions. Navigating vessels can not travel beyond these sandbars. Instead they should follow the center line between the piles. Some ships rest beyond these piles. They tie their mooring lines to piles, it is a sheltered port. They anchor seaward. Large carracks can not enter the strait due to shoals. Cogs are smaller and can sail through and can get near the city"[13].

Studies on the resources of *Kitâb-ı Bahriye* (Book of Navigation) suggest that Piri Reis used the information from Italian, Catalan and Portuguese portolan charts and Italian Book of Islands that passed around sailors as well as his own observations.

[13] Piri Reis, *Kitâb-ı Bahriye*, (Ed. F. Kurdoğlu- H. Alpagot), Ankara 1935, p. 422-427.

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THE CARTOGRAPHER OF SULEIMAN THE MAGNIFICIENT PIRI REIS EXHIBITIONS

CROATIA - SLOVENIA

The 500th anniversary of the **Piri Reis World Map (1513)** was included in the Celebration of Anniversaries during UNESCO's General Conference held in Paris between October 25 and November 10, 2011. Several national and international activities were planned for 2013 under the coordination of the Ministry of Culture and Tourism. One of the planned activities was the Piri Reis Exhibitions in Croatia, and Slovenia, which were sponsored, and coordinated by TINA (The Turkish Foundation for Underwater Archaeology). The exhibitions were organized with the support of our Ambassador in Zagreb, Burak Özügergin, and our Ambassador in Ljubljana, Serra Kaleli. Transportation was provided courtesy of Turkish Airlines.

The rationale behind chosing Croatia for the exhibition is that *Kitab-ı Bahriye* (the Book of Navigation) is an important work of Piri Reis that contains many portolan charts (harbour maps) of coastal cities and islands of Croatia, and during recent years, the era of Sultan Suleiman the Magnificient is a popular topic in Croatia. Therefore, the name of the exhibition was "Piri Reis, the Cartographer of Sultan Suleiman the Magnificent".

The exhibition included a large replica of the 1513 map on a tile panel made by Sevim Ersoy Artistic Hands Workshop artists, as well as several 16th century navigational instruments used to determine direction and position, replicas of the Kitab-ı Bahriye, engravings representing the Croatian coast, and large posters.

Portraits of Suleiman the Magnificient, Barbarossa Hayreddin Pasha and Piri Reis, maps from the 16th century Ottoman Empire, information about the Ottoman Armada are also among the objects included in the exhibition.

Ali Rıza İşipek worked as the curator of the exhibitions that took place in the cities of Zagreb, Rijeka, Porec, Dubrovnik, Zadar and Sibenik. The exhibitions were held in some of the most important museums of the host cities thanks to the efforts of our Zagreb Embassy and many Croatians filiates who appreciated the benefits of such a traveling exhibit.

The first exhibition opened on June 5, 2013 in the coastal town of Rijeka, in an ancient government building currently used as the "Maritime and History Museum." The exhibition in Rijeka continued until September 2, 2013. Porec, another coastal town of Croatia, hosted the second exhibition at the Porec City Museum. The third exhibition was opened in the Technical Museum in Zagreb, the capital city of Croatia, on October 2nd, 2013. The Piri Reis Exhibition was as successful in gaining public interest in Zagreb as it did in the other cities. The final exhibition was opened at the Ethnographic Museum of the historic city of Dubrovnik. This magnificient building is located inside the historical fortress, and was originally built as a wheat silo during the 16th century, which made it particulary spectacular since it hosted the exhibition of its contemporary theme.

In line with the requests made to TINA by several Croatian authorities, scientists, and art lovers for displaying the exhibition in their own cities and museums, the exhibitions, originally planned for only four museums, were updated to also be displayed in the cities of Zadar and Sibenik in 2014. The Zadar exhibition was organized in the Knezeva Palace under the coordination of the Zadar Museum. The Deputy Governor of Zadar emphasized in his speech how the Piri Reis Exhibition helped enhance the amity between the Turkish and Croatian people and also provided an opportunity to have an understanding of a common culture.

After the final exhibition in Croatia, the Piri Reis exhibition was sent to Slovenia, another Adriatic country. The Piri Reis Exhibition in Piran was opened by the Prime Minister of Slovenia, Alenka Bratusek, and our ambassador in Ljubljana, Serra Kaleli. Before the opening of the exhibition in the capital city of Ljubljana, Osman Erkurt, president of the 360° Research Group, and Associate Professor Serim Paker gave lectures on "Experimental Archaeology, and Projects in Turkey" during the conference organized by TINA.

PİRİ REİS THE SUNNY FACE OF THE ALPS ON THE SHORES OF SLOVENIA

SERRA KALELİ
AMBASSADOR OF THE REPUBLIC OF TURKEY IN LJUBLJANA

Slovenia, renown with its forests, high hills and valleys at the skirt of the Alps, is also a Mediterranean country with 50 km long coastline on the northeastern corner of the Adriatic Sea. Slovenians describe their country as the 'sunny side of the Alps' with reference to their beautiful shores.

Piri Reis drew and described the shores of Slovenia 500 years ago in his famous book *Kitab-ı Bahriye.* He described the cities of Piran, Izola and Koper, as well as the castles, ports, areas where both big vessels and small boats could anchor , the rocky shoreline, the shallow waters, and places appropriate places marine navigation.

In March of this year, we commemorated our great sailor and cartographer Piri Reis in the city of Piran. A city renown for its salt flats on the shores of Slovenia.

Alenka Bratušek, Former Prime Minister of Slovenia.

The Piri Reis exhibition, which was brought to Slovenia by the initiative and contribution of Mr. Oğuz Aydemir, the President of TINA, in collaboration with Mr. Franco Juri, the Director of the Maritime Museum of Piran, and was officially opened on March 7 at the Maritime Museum of Piran by the Slovenian Prime Minister, Alenka Bratusek. During his speech in the opening ceremony, the Prime Minister Bratusek referred to the positive contribution of cultural contacts to relationships between countries, indicating that the exhibition would strengthen and reinforce the relationship between Slovenia and Turkey.

Since Piran is an important touristic destination, was visited by many foreign tourists, as well as native Slovenians. The exhibition ran through June and reached a wide media coverage. Seminars on experimental underwater archeology in Turkey, held before the exhibitions in Ljubljana and Portorož, by the 360 Degrees Historical Research Group in collaboration with TINA, also aroused substantial interest.

I should emphasize that the exhibition and seminars were a great contribution to our current excellent relationships with Slovenia in terms of cultural activities, and on the occasions of these exhibitions we had the opportunity to promote our country, people and scientists in Slovenia. The exhiibions also helped provide further archival information to Slovenians from centuries ago about their own history and geography.

As stated in a publication about the exhibitions by the highest circulated periodical in Slovenia, *Delo*, We are happy to welcome Piri Reis again in Slovenia; five hundred years later and we, as the Turkish Embassy in Ljubljana, are proud to be involved in this esteemed project. I would like to extend our thanks to Mr. Aydemir and all other contributors.

PİRİ REİS THE FOURTH DIMENSION OF CARTOGRAPHY

BURAK ÖZÜGERGİN
AMBASSADOR OF THE REPUBLIC OF TURKEY IN ZAGREB

At present, some may believe that maps printed on paper or parchment paper are antiquated. However, we should keep in mind that e-maps, which are open to immediate, online access, would not be available if not for the former print versions. Whenever you want to get the world under your thumb, getting a well-crafted map in front of you is one of the easiest way to do it.

Cartography and maps exist to ease our life in present day just like they did five centuries ago during the era of Piri Reis. Maps make our labyrinthine world more understandable, enduring to reunite us with loved ones, whether the maps are printed on paper or illuminated on a small screen.

Cartography can be considered as a communication art. Maps are created to convey something to the user through visual aids,and ultimately to help guide the user to a destination. Therefore, if someone asks me what makes a good map, I would answer, I should be drawn to it and it should provide clear information.

With these criteria in mind, the brilliance of Piri Reis' maps, and works in general, can be better appreciated. Piri Reis achieved to scale not only the third dimension, but the fourth dimension (i.e. *time*), on a single sheet or the leaves of a book. Now it is easy to appreciate the Mediterranean Sea that has caressed the cheeks of our Anatolia for ages, however it was really a tremendous success to have given this opportunity to humanity 500 years ago. Piri Reis' refererencing his resources in his works deserves admiration even today, considering the present scientific standards.

The details in Piri Reis'work are some of the aspects that attracted the attention of visitors of the exhibitions of his works displayed in various cities within Croatia. Piri Reis described to his audience the methods used look-outs in the watch towers to inform the public whether the approaching ship was a friend or foe. Further, he added details such as, which villages produced pine oil and where to find the cleanest water resources.

We, at the Turkish Embassy in Zagreb, were proud to be involved in the activities that have contributed to the promotion of the Piri Reis exhibitions, and thus of our country, Croatia. These exhibitions not only helped to introduce a cultural treasure to Croatians, but also shed light on the history of our own country, located in one of the most beautiful corners of the Adriatic Sea. In fact, through these exhibitions, we have provided a historical mirror as a gift to Croatians.

I would like to take this opportunity to congratulate all members of TINA, mainly the President, Oğuz Aydemir, who made these exhibitions possible. It would ceratinly be difficult to find a better way to cherish the memory of our great explorers and sailors.

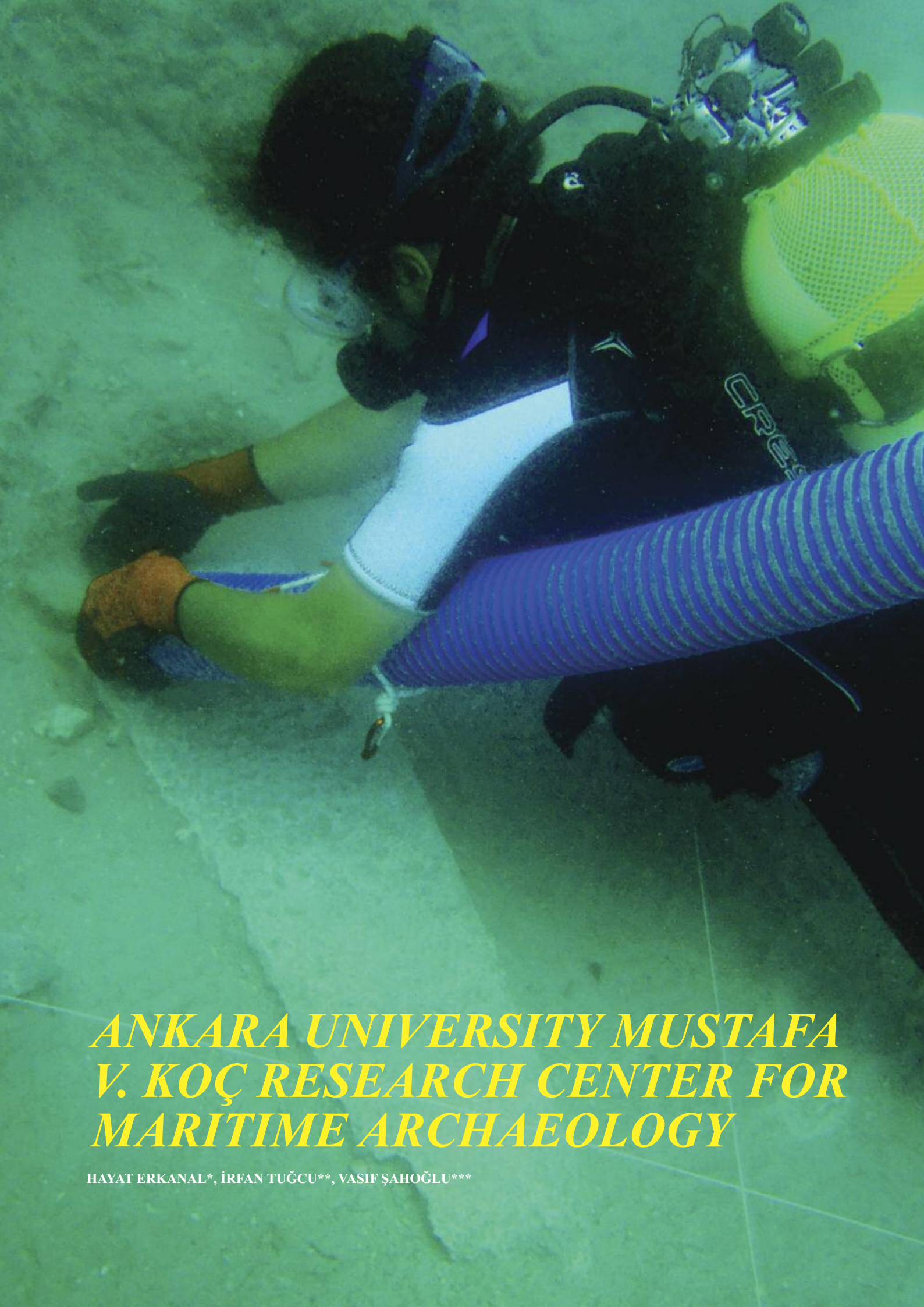
THE MOMENT

At Cape Gelidonya, in 1960, George Bass carried out the first archaeological excavation of an ancient Mediterranean shipwreck not knowing that this would launch him on a pioneering career in underwater archaeology. This career change was partly due to a Turkish sponge diver, Kemal Aras, in addition to discovering the Bronze Age Cape Gelidonya site, had also found a large mound of 7th century Byzantine amphoras of a shipwreck at Yassi Ada.

In 1961 Bass returned to Turkey with a team of archaeologists and students, and over the next three years carried out more than 3500 dives, mapping and excavating the site down to bedrock. From this well preserved amphora mound the team raised over 100 globular amphorae, a portion of the complete cargo, for more detailed analysis.

In 1980, during routine analyses of the jars, the discovery of graffiti on many of the raised amphoras led to another expedition to Yassi Ada with a goal of raising the 570 amphoras still on the site. By that time I had left teaching physics and was working full time with Bass' Institute of Nautical Archaeology (INA) as their photographer. All of these underwater activities presented great opportunities for photography, leading years later, to the creation of my own website. I called it *amphoras.com* !

The photograph: Donald Frey (INA Archive)



ANKARA UNIVERSITY MUSTAFA V. KOÇ RESEARCH CENTER FOR MARITIME ARCHAEOLOGY

HAYAT ERKANAL*, İRFAN TUĞCU**, VASIF ŞAHOĞLU***

Anatolia has a very special geography, melting different cultures in a pot, hosting, rejuvenating and developing them rather than acting only as a corridor between them. Turkey hosts very rich terrestrial and underwater cultural heritages. In recent years, there is a remarkable increase in the number of underwater archaeological projects in Turkey.

Turkey, in a sense, is the birthplace of underwater archaeology. The Bodrum Museum of Underwater Archaeology has become one of the world renowned museums in its field, particularly as a result of excavations and surveys at shipwreck sites from various periods performed by the Institute of Nautical Archeology (INA). Among all other national institutions, a leading and important project has been conducted within the scope of the İzmir Region Excavations and Research Project (IRERP)[1] on behalf of the Ankara University. IRERP is an ongoing wide scale research and excavation project, launched in 1992 in order to develop a cultural inventory of İzmir and its environs. Liman Tepe, which has been excavated within the scope of this project, is located in the Urla District of the İzmir Province, and it is the first settlement in Turkey where a harbor site excavation was launched. Cultural remains were identified in the sea to the north of Liman Tepe ruins by aerial photography in 1995. Since then, land excavations and underwater excavations have been carried out concurrently[2] **(Fig. 1)**.

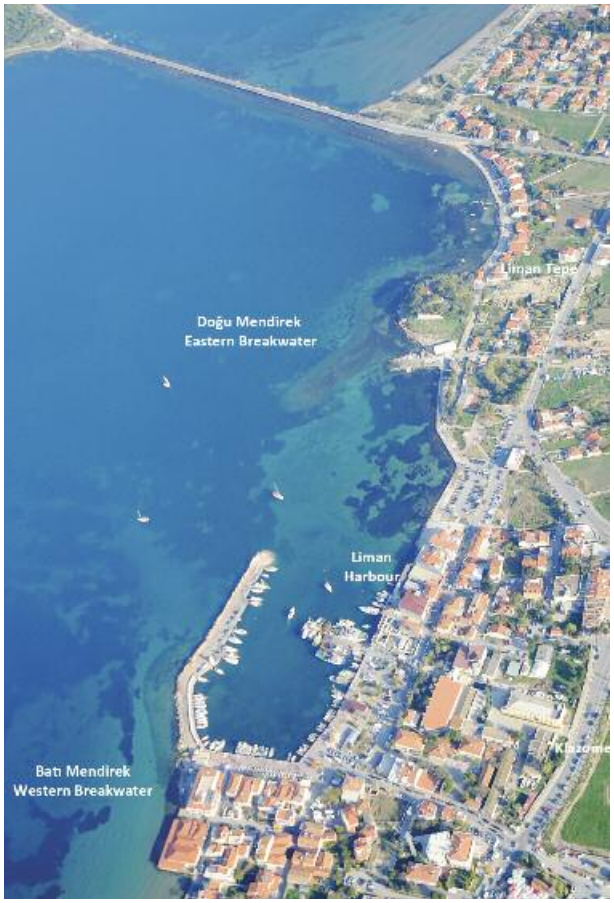


Fig. 1: An aerial photograph showing Liman Tepe / Klazomenai land and underwater excavations (Photo by: Hakan Çetinkaya)

Archaic and Classic Age remains were unearthed during Liman Tepe / Klazomenai harbor excavations conducted in cooperation with the Haifa University between 2000 and 2007, carried out under the direction of Ankara University starting in 2007 **(Fig 2-4).** Due to the need for a specific policy, and institutional guarantee for a larger scale underwater archaeological research, an institution was founded by Ankara University in 2006.

The Ankara University Research Center for Maritime Archaeology (ANKÜSAM) was established in 2006 in order to manage this resulting process effectively; identify, define, investigate, publish, and preserve underwater cultural and biological entities in an interdisciplinary framework.

[1] İzmir Region Excavations and Research Project (IRERP) has been materially and non-materially supported by the Turkish Ministry of Culture and Tourism ı, DÖSİMM, Ankara University Institute for Aegean Prehistory (INSTAP), Faculty of Letters, History and Geography of Ankara University, INSTAP – SCEC, Urla Municipality and the Turkish Foundation for Underwater Arkeology (TİNA), Koç Foundation, Turkish Historical Society, TÜBİTAK, Çeşme Rotary Club and Paparazzi - Çeşme. For further information on IRERP please visit http://ankusam.ankara.edu.tr.

[2] ERKANAL 1999; ERKANAL *et al* 2010; ERKANAL *et al* 2012; ERKANAL – ŞAHOĞLU – TUĞCU 2014; ERKANAL *et al* 2014; ERKANAL – ŞAHOĞLU 2012; GOODMANN *et al* 2008; GOODMANN *et al* 2009; ŞAHOĞLU 2010; ŞAHOĞLU 2011.

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Fig. 2: A sherd with "wild goat" motif unearthed during the Liman Tepe underwater excavations.

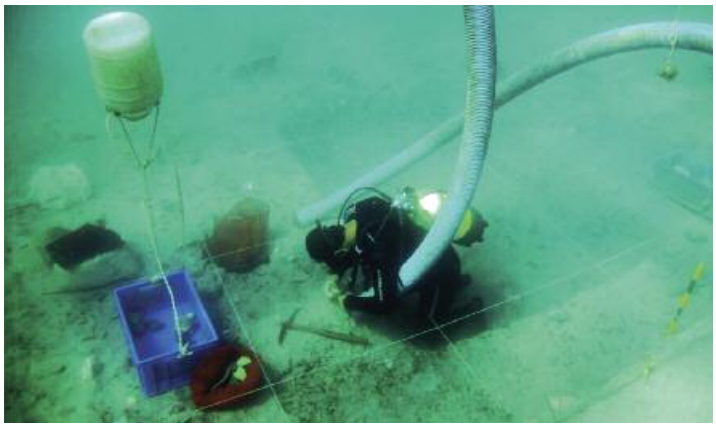

Fig. 4: A view from the Liman Tepe underwater excavations.

Fig. 3: Fragment of a stone weight of a wooden anchor unearthed during the Liman Tepe underwater excavations.

Further goals were to determine the connection of coastal settlements with the sea in a regional and overall scale; train qualified personnel in this scope, create new job opportunites for them, and contribute to the establishment of national and international policies in the light of such studies.

TRAINING ACTIVITIES

Since its foundation, training has been the most important activities of the center where archaeological excavation projects were performed both in the sea and the land. Based on this, approximately sixty students from various archaeology departments completed their training. In addition to the training programs for archaeology students, we also launced training programs on an institutional level. Some ministry personnel were trained as part of a protocol with the Turkish Ministry of Culture and Tourism. The training program is ongoing, under the coordination of the center[3].

EXCAVATIONS AND SURVEYS

Survey projects at regional level is another objective for the founding of the center. We hoped to conduct surveys on harbour settlements under the coordination of the center. The first site is Liman Tepe that has been excavated under the direction of Prof. Dr. Hayat Erkanal since 1992.

[3] For further details, please see present volume.

As a result of both land and underwater excavations performed since 2000, it has turned out that the site was one of the impressive harbour cities of the Aegean Region particularly during the Bronze Ages[4] **(Fig. 5).**

A second harbour settlement has been excavated by the center is Çeşme - Bağlararası, another town dating to the Bronze Age. Providing important information particularly on the relationship of Anatolia with Crete / Minoan culture, the site has been excavated under the direction of Prof. Dr. Vasıf Şahoğlu since 2009 [5] **(Fig. 6).**

A third harbour site excavated by the center is the ancient city of Erythrai, one of the most significant harbour cities of Anatolia during the Archaic and Classic Ages. In addition to excavations and restoration work conducted on land under the direction of Assoc. Prof. Dr. Ayşe Gül Akalın Orbay, underwater survey and documentation activities have also been initiated, and the scope of these endeavors will be expanded in coming years.

Another underwater project initiated by the center was in the ancient city of Teos, Seferihisar. The excavation was initiated at the harbour within the framework of the terrestrail excavations conducted under the direction of Prof. Dr. Musa Kadıoğlu. More comprehensive studies will be launched in upcoming years.

GEOMORPHOLOGICAL STUDIES

Another area of interest to be carried out under the coordination of the center is geomorphological studies. A bathymetric map of the area between the modern Urla harbour and Karantina Island was drawn during the geomorphological studies undertaken jointly with McMaster University (Canada) since 2006. From 2014, underwater mapping activities were initiated using Iver2, an AUV, and magnetometer, in addition to current geomorphological studies[6] **(Fig. 7)**. These activities may help detect the course of change in the shoreline in the region as well as traces of shipwrecks and prehistoric settlements under the seabed. Within the scope of these geomorphological actitivites, samples are taken using coring techniques and the environmental changes the region has undergone over times can be discerned **(Fig. 8).**

[4] ERKANAL 2001; ERKANAL 2008; ERKANAL – ŞAHOĞLU 2012; ŞAHOĞLU 2008.
[5] ŞAHOĞLU 2007; ŞAHOĞLU 2012; ERKANAL – KESKİN 2009; ŞAHOĞLU – ERKANAL – ÇAYIR-BÖYÜKULUSOY 2011; ŞAHOĞLU *et al* 2014.
[6] The AUV included in the project was developed by project partners OceanServer Technology Inc., of Fall River, Massachusetts, USA (http://www.ocean-server.com/), and the Magnetometer was provided by Marine Magnetics Corp., of Markham, Canada (http://www.marinemagnetics.com/.

Fig. 5: An aerial photograph of the prehistoric settlement at Liman Tepe (Photo by: Hakan Çetinkaya)

Fig. 6: An aerial photograph of the Bronze Age settlement at Çeşme - Bağlararası (Photo by: Hakan Çetinkaya)

Fig. 7: AUV and magnetometer used during the underwater mapping activities in 2014 at Liman Tepe.

EXPERIMENTAL ARCHAEOLOGY ACTIVITIES

The center is also involved in experimental archaeological projects in relation to the sea and navigation. Following the Uluburun II and Kybele projects, carried out in collaboration with the 360° Research Group, the "Cycladic Boats Re-animation Project" supported by the Coordination Unit of the Scientific Research Projects, Ankara University, was completed in 2012, completely under the guidance of the center. Within the framework of this project, which aimed to revive the boats used to establish relationships between the cultures of the Agean Sea between 2700 and 2400 BC, three boats were constructed based partly on comparative data. With this project, the boats that were introduced to the archaeological world received particular attention **(Fig. 9-10).**

Fig.8: A view from the sampling during the geomorphological underwater studies at Liman Tepe.

Fig. 9: A "Cycladic Boat" re-animated within the context of experimental archaeology studies.

In 2012, two 19 meter-long boats were tested for short travels. Sinking simulation of the boats was performed. One of the Cycladic Boat samples was displayed in an exhibition, which was very important for representation of our country, and entitled "Across - The Cyclades and Western Anatolia During the 3rd Millenium BC" that was organized jointly by the Sabancı University Sakıp Sabancı Museum (SSM), Ankara University Research Center for Maritime Archaeology, the National Archaeological Museum of Athens, and the N. P. Goulandris Foundation Museum of Cycladic Art in 2011. Beginning in 1992, with Liman Tepe land excavations, the center is now undertaking the main coordination of national and international interdisciplinary projects, it has become obligatory for the Center to expand its infrastructure facilities.[7]

In 2009, the Municipality of Urla assigned about 11.000 square meters of land in Urla / Çeşmealtı to Ankara University to build a campus. The architectural projects of the campus were designed by Mahmut and Belgin USLU of Ekin Proje.

[7] In addition to the ongoing annual support by the Ministry of Culture and Tourism and the Ankara University, our supporters are in particular Mr. Mustafa Koç and Koç Foundation, and the Municipality of Urla, the former Mayor Mr. M. Selçuk Karaosmanoğlu, present mayor Mrs. Sibel Uyar, the Executive Board of the Turkish Foundation for Underwater Archaeology (TİNA) and Mr. Oğuz Aydemir and many other individuals and institutions.

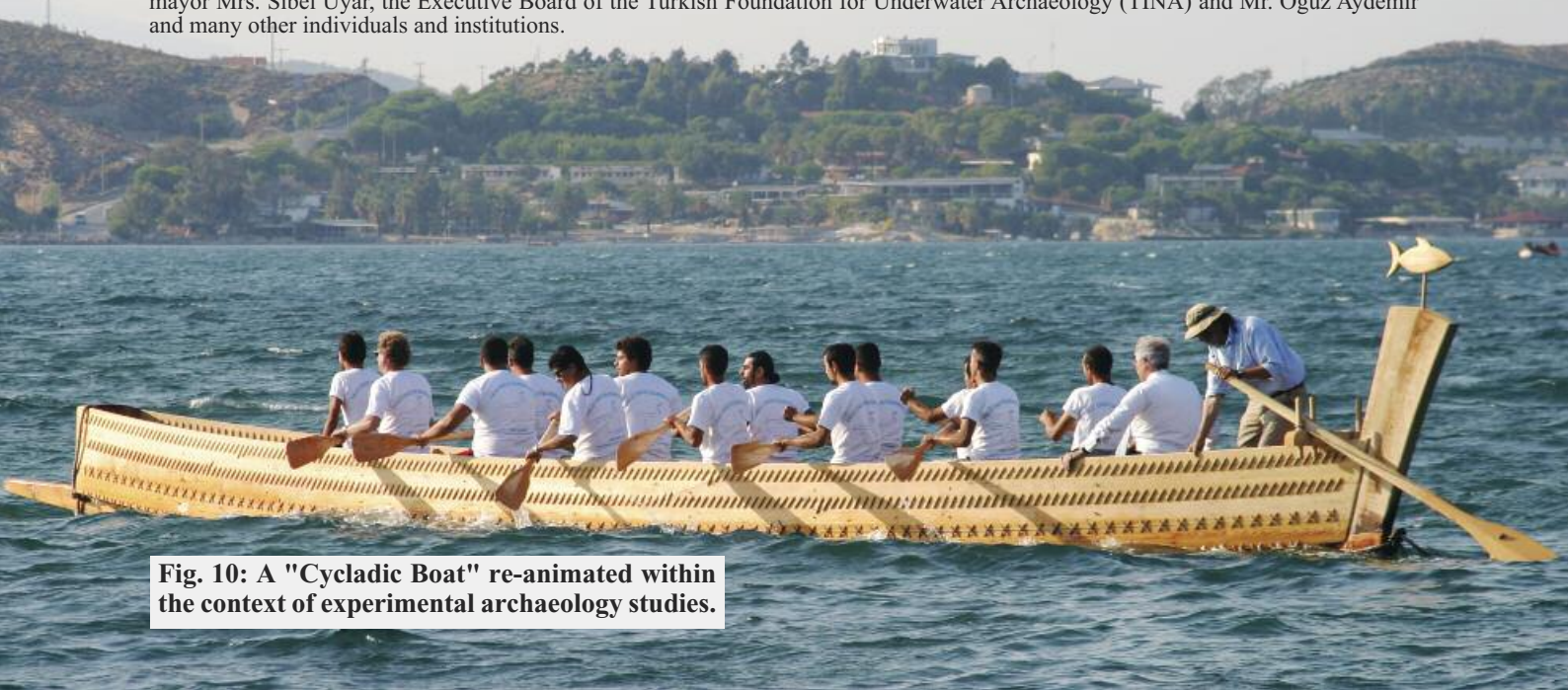

Fig. 10: A "Cycladic Boat" re-animated within the context of experimental archaeology studies.

Fig. 11: An aerial photograph of the Ankara University Mustafa V. Koç Research Center for Maritime Archaeology (Photo by: Vasıf Şahoğlu)

Fig. 12: An aerial photograph of the Ankara University Mustafa V. Koç Research Center for Maritime Archaeology (Photo by: Vasıf Şahoğlu)

Following the construction of the new campus, with valuable financial support by Koç Foundation and TINA, the construction area was named the Ankara University Mustafa V. Koç Research Center for Maritime Archaeology **(Fig. 11-12).** The campus area covering about 1000 square meters of land consists of five different units. The main building includes administration offices, a conference hall, and a library. The second unit consists of the restoration laboratory; necessary for underwater artifact studies as well as a storage area. The third unit is a dormitory with a maximum accomodation capacity of 30 people, built for accomodation of researchers participating in projects developed by the center. Two units include a guest house, with five rooms, and a lodging building. Open exhibition areas are integrated into the campus.

Fig. 13: A group photo of the national and international scientists and students who participated in projects carried out under the coordination of the center in 2014.

The restoration laboratory, which comprises one of the main elements of the new campus, is designed to serve also for other underwater archaeological projects that are carried out independently from the Center. The laboratory is expected to start fully functioning in 2015.

The objective of the library is to become a key reference site in this field. The conference hall was built to be accessible for activities of other institutions as well. The Center, with its campus facilities was founded with the goal of providing service to the entire region of İzmir and its environs. One of the most important features of the campus is exhibition areas. Approximately 4000 square meters of the campus area was designed as temporary and permanent exhibition area. Events will be organized in these areas to raise awareness and consciousness about maritime arcaheology.

The Ankara University Mustafa V. Koç Research Center for Maritime Archaeology, when all units become operational, will continue its scientific activities with an aim to contribute to the study of Anatolian archaeology with a focus on maritime archaeology at regional and even at national level through library and laboratory facilities and by hosting scientific studies, symposiums, congresses and meetings for national and international interdisciplinary activities in the field of maritime archaeology in coming years **(Fig. 13).**

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THE UNDERWATER RESEARCH AND APPLICATION CENTER OF SELÇUK UNIVERSITY IS NOW AT SERVICE AT KEMER, ANTALYA

CEYDA ÖZTOSUN

The construction of the main building of the Underwater Research and Application Center of Selçuk University at Kemer, Antalya, was completed on 15 May 2014 and the center was opened one month later, on 17 June 2014, by Dr. Hakkı Gökbel, the Rector of Selçuk University. Built on land assigned by the municipality of Kemer, the construction of the building was completed with the support of Turkish Foundation for Underwater Archaeology (TİNA), the District Governship of Kemer, the Municipality of Kemer, and local private sector companies. The opening ceremony took place with participation of Recep Yüksel, the Deputy Governor of Antalya; Dr. Hasan Kürşat Güleş, the Vice Rector of Selçuk University; Bayram Ali Köse, the District Governor of Kemer; Mustafa Gül, the Mayor of Kemer; İbrahim Acar, the Head of the Antalya Provincial Directorate of Culture and Tourism; Oğuz Aydemir, the President of TINA; representatives of Antalya Naval District Command and Antalya Coast Guard Command, and many guests.

By permit of the Turkish Ministry of Culture and Tourism, the center is available for archaeological underwater research activities in the region of Antalya, and meets the requirements of the Antalya, Side, and Alanya Museums. Thus far, the facilities have been used by the Adrasan Shipwreck excavation team, Master's and Doctoral Program students of the Department of Underwater Archaeology of Selçuk University, the Erasmus program, and other international training programs. It is also the current coordination center of the UNESCO Underwater Archaeology UniTwin Network.

The center is engaged in activities in the sub-fields of underwater cultural heritage, underwater archaeology, boat and ship archaeology, marine archaeology, coastal and port archaeology, as well having permission to conduct excavations and surveys. The building will be used for several joint projects, training programs and scientific meetings in collaboration with national and international organizations within this scope. The Underwater Research and Application Center building currently features four offices, a 40 occupant capacity meeting room, a conservation laboratory, the Ahmet Adil Tırpan Library, eight guest rooms, a dormitory for students, a kitchen, outdoor areas, storage, and other social facilities.

Fig. 1: The underwater excavations at Liman Tepe.

TRAINING PROGRAMS AT THE ANKARA UNIVERSITY MUSTAFA V. KOÇ RESEARCH CENTER FOR MARITIME ARCHAEOLOGY

HAYAT ERKANAL, İRFAN TUĞCU**, VASIF ŞAHOĞLU****

Anatolia, shaping cultures throughout the historical process, was also the center of various cultures. Surrounded by the sea from three sides, Turkey has a cultural diversity expressed as much underwater as on land. The number of underwater projects has increased during the last 15 years, and have provided important outcomes.

One of these projects, the Liman Tepe / Klazomenai underwater excavations, is currently being conducted under the supervision of Prof. Dr. Hayat Erkanal and continuing within the course of the activities of Ankara University Mustafa V. Koç Research Center for Maritime Archaeology. The Liman Tepe underwater excavations started in 2000, and after 14 years both the outcomes and the organizational structure of the excavations are of utmost importance.

The Ankara University Research Center for Maritime Archaeology (ANKÜSAM) was founded in 2006 within the body of Ankara University due to the lack of a national organizational structure for our underwater cultural heritage[1]. ANKÜSAM was founded in order to promote a specific policy with an aim to identify, define, investigate, display, conserve, and publish underwater cultural heritage and biologic diversity on a diachronic, interdisciplinary platform, and establish the relationship of coastal settlements with the sea both at the local and national levels; train qualified personnel and provide employment; and contribute to the introduction of national and international policies in that sense. The center is also involved in experimental archaeological projects in collaboration with the 360° Research Group for a better understanding of the past.

Fig. 2: A figurine recovered during the Liman Tepe underwater excavations.

Organizing training programs is one of the major objectives in order to have qualified personnel. So, the first step was to establish a training program for university students who want to take part in the Liman Tepe underwater excavations; the first of which started in 2006. Approximately 60 students completed the training program between 2006 and 2014 **(Fig 1-2).** The training has become part of the annual excavation campaign and is focused on improving student's technical skills for working under the water (Fig 1), assesment of underwater environmentss, and improving drawing and photography skills for documenting underwater sites **(Fig 2).** Each student makes approximately of 100 dives during the 3-month training program; increasing diving experience, buoyancy control, and their ability to use necessary equipment. A second program organized by the center was an institution-based training program designed to train personnel at the Ministry of Culture and Tourism. The basis of the training program was established by a protocol signed between the Ministry of Culture and Tourism and the Ankara University Research Center for Maritime Archaeology.

[1] Following the construction of the new Urla campus in 2014, it is referred as Ankara University Mustafa V. Koç Research Center for Maritime Archaeology.

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The objective of this protocol was to increase the number of personnel familiar with diving skills and a basic level of archaeological knowledge for activities to be held within the ministry, the body responsible for promoting cultural policy within Turkey. The first institutional training program was carried out in 2011. Twenty-four members of the Ministry personnel took a 1-star diver training course during two 15-day training programs held in August and October of 2011. The following year, they completed the 2-star diver course.

The most important objective was to improve participant's underwater experience **(Fig. 3).** Diving is not a year-round activity, therefore, we organized additional training programs to improve their experience in order to overcome this disadvantage. Training programs, held in 2014, for Ministry personnel who have completed the 2-star diver course focused on increasing their overal time spent underwater.

Accordingly, 10 members of the Ministry personnel have participated in a 20-day training program to enhance their diving and underwater excavation experiences in September, 2014 and succesfully completed the program for underwater buoyancy, excavation and documentation **(Fig. 4).** As one of the leading objectives of the center, the training program will go on both at the student level and the institutional level.

Fig. 3: A view of documentation activities within the scope of the training program organized by the center.

Fig. 4: A group photo of the personnel who participated in the 2014 training program.

LIMEN: CULTURAL PORTS FROM AEGEAN TO THE BLACK SEA

IŞIL ÖZSAİT-KOCABAŞ, TANER GÜLER

Recent discovery of world's largest shipwreck collection in Istanbul's Yenikapı district, where the medieval Theodosian Harbor was once situated, inspires other projects as well. A project entitled "LIMEN: Cultural Ports from Aegean to the Black Sea" has been carried out in scope of "Black Sea Basin Joint Operational Program 2007-2013" that funded by the European Union. While various institutions from Greece, Bulgaria, Romania, Ukraine and Georgia has been participating the project activities, Turkey is represented by Istanbul University's Division of Conservation of Marine Archaeological Objects and Koç University's Department of Archaeology and History of Art. The main objective of the project is to contribute local development through the cultural tourism in the Black Sea region. The cultural heritage in relation with the medieval ports is the selected theme of the project. As one of the most important cultural center of the region; Istanbul has been assigned as the first "Cultural Port of the Black Sea" and will be hosted several project activities in the upcoming months. Activities include training courses and workshops on sustainable cultural tourism, production of informative material for the cultural heritage, placement of informative signs public spaces, photographic exhibitions, production of a documentary film, edition of touristic guides and leaflets, web portal design, implementation of Küçükyalı Archaeological Park Project, an onboard Symposium focusing on the promotion of the cultural tourism and cruise tourism of the main ports around Black Sea and construction of a replica of a medieval ship based on a shipwreck (YK12) found during the archaeological salvage excavations in Yenikapı.

Among the project activities, the construction of the Yenikapı (YK) 12 shipwreck deserves a special attention. Yenikapı 12 is one of the best preserved 9th century merchant ship with its cargo still on board. The 10 meters long ship is considered to be used in the coastal trade and sank during a violent storm in Theodosian Harbor. The reconstruction of the ship will no doubt draw attention to the rich maritime history of the city and provide a great opportunity to witness 1000 years old maritime practices.

The LIMEN project is expected to raise awareness about cultural heritage and help to develop a cultural tourism network in the Black Sea region.

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Research Assistant Taner Güler. Istanbul University Department of Conservation Marine Archaeological Objects

THE INTERNATIONAL SYMPOSIUM ON PREVENTIVE CONSERVATION, JUNE 9-10, 2014 AT İSTANBUL UNIVERSITY

*NAMIK KILIÇ

The International Symposium on Preventive Conservation was organized under the auspices of the Presidency of the Republic Of Turkey between 9-10 June, 2014 at İstanbul University. Mr. Kasım Yekeler was the symposium's general coordinator on behalf of the President, while Associate Professor Ufuk Kocabaş, of Istanbul University, was the Secretary. The symposium consisted of 6 session held over two day and included a scientific advising council consisting of members from the Department of Conservation and Restoration Artefects, Istanbul University; the Department of Conservation and Restoration of Artworks, Mimar Sinan Fine Arts University; the Vocational School for National Palaces and Historical Buildings, Yıldız Technical University; the Prime Ministry General Directorate of State Archives; the Istanbul Restoration and Conservation Central Laboratory of the General Directorate of Cultural Heritage and Museums; the Department of Manuscript Conservation and Archives of Manuscript Institution of Turkey; the Directorate of Restoration and Technical Practices, Department of National Palaces, the Grand National Assembly of Turkey; and the RIJK Museum Conservation & Research Department.

Fig.1: İÜ Prof.Dr. Cemil Bilsel Konferans Salonu (Fotoğraf: İÜ Arşivi)

Many invited scientists contributed presentations at the international symposium, organized under the auspices of the Presidency of the Republic Of Turkey. The initial session of the syposium, "Preventive Conservation," took place on Monday, June 9 and focused on defining the term *preventive conservation* and the importance of ideal conditions required in our museums. The first day of the symposium concluded with the second session titled "On-Site Conservation", describing the ideal conservation practices which should be performed at the excavation site. Presentations on Tuesday, June 10 included reports on international institution's conservation work during the third session titled "International Organizations on Conservation." During the 4th session, "Risk Analysis, Security, and Pest Control," presentations focused on evaluations of the topic with sample cases. The fifth session started with "Documentary and Registration" and concluded with informative presentations on how documentation and registration work should be performed. The final session was made up of presentations explaining sample practices in the field of "Packaging, Transportation and Storage." The symposium finished the day with a closing speech by Ufuk Kocabaş.

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Department of Conservation and Restoration
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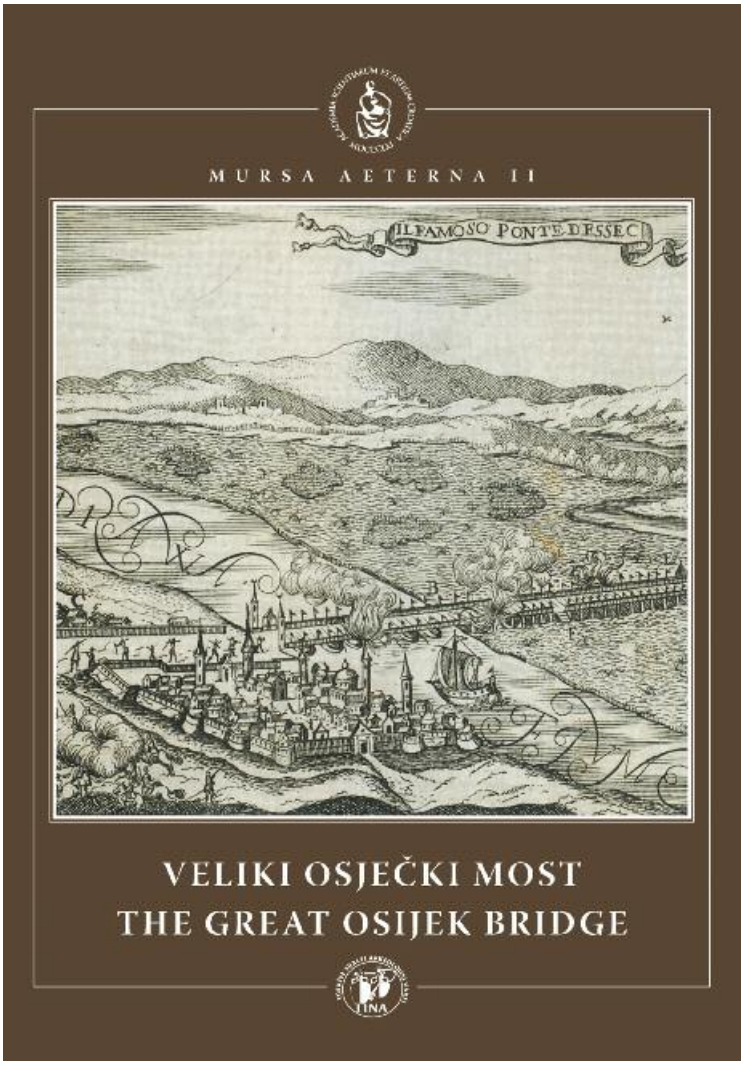

The Turkish Institute of Nautical Archaeology (TINA), and specifically, me personally, feel privileged to be able to count ourselves among the many institutions and researchers that made this volume possible.

Our cooperative efforts in Croatia began with the International Centre for Underwater Archaeology in Zadar. Together, we organized a conference on Suleiman the Magnificent's bridge in Osijek, held in Istanbul in October 2013. Following the conference, a reprint of a 16th-century gravure on ceramic tiles depicting the Ottoman army crossing the Osijek bridge by was donated to the Museum of Slavonia in Osijek. Supporting the publication of this volume was a natural next step for us.

As we celebrate our common heritage and promote cultural relations between the Republics of Croatia and Turkey, we look forward to many other opportunities to pass our common heritage on to future generations.

Oğuz AYDEMİR
TINA Turkish Foundation for Underwater Archaeology Chairman of the Board

TINA MARITIME ARCHAEOLOGY PERIODICAL

PERIODICAL OF TURKISH UNDERWATER ARCHAEOLOGY FOUNDATION

TINA periodical is published twice a year, in May and in November. The articles you wish to publish must be sent in 3 months prior the printing date. TINA will publish maritime archaeology work from all over the world, mainly on the Anatolian and Mediterranean shores.

Publication guidelines

Articles should be presented as Word files.

Font size is 11 for texts and figures; and 9 for abstracts, footnotes, catalog and bibliography, and font type is Times New Roman overall.

Footnotes should be numbered in the order in which they appear in the text and be placed at the bottom of each page and numerical continuity followed throughout the article.

Titles within the text must begin with bold miniscules.

Use of punctuation:

Abbreviation of figure “fig.” inscriptions within text should be cited in parentheses as (fig. 1); a space should be placed between the inscription “fig.” and the number to follow; if consecutive figures are mentioned, then a dash should be placed between the two numbers without space before or after the dash, (e.g., fig. 3-5). If the figures are not consecutive, then a comma and a space should be placed after each number except the last one (e.g., fig. 5, 8, 14).

In the bibliography and abbreviations section, if the author has two last names, a dash should be placed between the two names without spaces (e.g., ÖZSOY-SADIK); if an article has multiple authors, a space, a dash, then a space again should be placed after each name, and then the other name should follow (e.g., ALTAN – ERCAN).

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Bibliography order should follow last names as listed in alphabetical order.

Words originating from extinct languages should be written in italic form.

Bibliography (for books):

Green, J., *A Technical Handbook*, London 2004

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Bass, G., Van Doorninck, F. H., "A Fourth-Century Shipwreck at Yassı Ada", *AJA*, Vol. 75, No. 1, January 1971, 27-37.

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GREEN 2004, 19.

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BASS – VAN DOORNICK 1971, 32, Pl. 2, Fig. 8.

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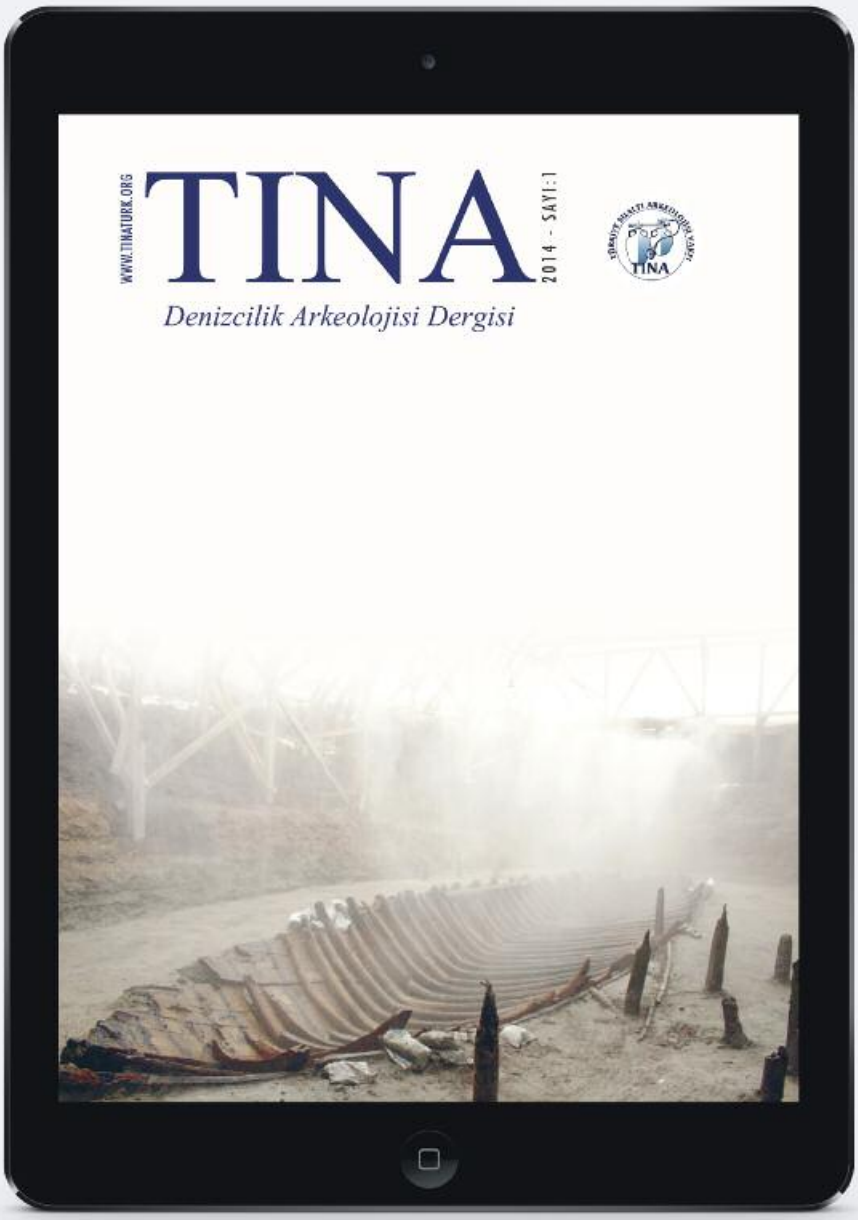

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