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Russian underwater archaeological mission to Alexandria. General report (2003–2015)

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Since 2003 the Centre for Egyptological Studies of the Russian Academy of Sciences (CES RAS) has been conducting underwater archaeological reconnaissance in Alexandria (Egypt). A concession assigned to the CES RAS by the Supreme Council for Antiquities of Egypt includes a vast water area of around 80 km^2. A part of it is occupied by the modern Western port of Alexandria but the remaining area (c. 30 km^2, its depth is up to 40 m) contains numerous traces of submerged port structures and ancient navigation. The work was concentrated at two zones — at the regions of Anfushi and Agami capes. The remains of a massive breakwater, numerous ancient anchors and a cargo of a Hellenistic shipwreck dating from the middle of the 4th–2nd centuries BC were discovered here. In addition, the remains of a shipwreck of the late 18th century (French transport ship 'Le Patriote') were examined, including a sea gun and numerous firearms. The most promising directions of future activities of the CES RAS in Alexandria are considered in the 'Conclusions'.

Keywords: Egyptology, underwater archaeology, ancient shipwrecks, ancient ports and harbours, Graeco-Roman Egypt, Alexandria, Napoleonic wars.

I. Introduction

The Mediterranean coast of Egypt gives few opportunities for creating a well-protected port. The low coast was always abundant in shallows and reefs, while the Delta region presented a real labyrinth of secondary channels and shallow lagoons located between the main branches of the river. At the very end of the 20th century two sunken cities were discovered in Abukir Bay. One of them — Heracleion-Thonis (the 8th century BC) — served as the major Egyptian port which was responsible for collecting customs duties from all foreign ships sailing up the Nile. The city was situated on a lagoon connected with the Canopic Branch of the river by a channel [1]. Another city — Canopus (Canobus) — occupied the western bank at the mouth of the Canopic, westernmost, branch of the Nile. Along with Naucratis, these two cities were the principal ports in Egypt for Greek trade before foundation of Alexandria.

The Alexandria region had much better geographical position for creating a large emporium. These advantages are described in Strabo XVII. I. 6–7, 13. It should be emphasized that the island of Pharos lied just opposite the strip of land between Lake Mareotis and the Mediterranean Sea. It provided thus excellent protection of the coast from dominant northern winds, while relatively soft bedrock allowed building inner harbours. As a result, it was possible to build two ports, which gave a benefit of a choice for navigation depending on the direction of a dominant wind [2]. Alexander the Great founded his homonym capital in 332 BC, but he was not the discoverer of the advantages of this coast. The Rakotis settlement existed here in dynastic times and Pharos were known to Greek sailors at least since the 8th century BC [3]. In the 1st century BC Alexandria was 'the largest emporium of the inhabited world' [4]. Heptastadion divided the port of Alexandria into two interconnected harbours: the Great Harbour (*Megas limen*) [5] to the east and the Harbour of Happy Return (*Eunostos limen*) [6] to the south-west from Pharos. Excavations by Institut Européen d'Archéologie Sous-Marine (IEASM) within the Great Harbour have been conducted since 1996 until today. The remains of port structures and the ruins of public buildings and temples at the depth 1–8 m came to light [7].

Unlike the Great Harbour, which is used now only for fishing and pleasure boats, the main water area of ancient Eunostos is completely utilized by the modern West Port. Today this port is characterized by intensive traffic of merchant ships and accommodates a part of the forces of the Egyptian Navy. Thus, any work in the water area of the port itself seems completely impossible [8]. Fortunately, this conclusion does not apply to the external port structures.

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[1] Goddio 2007.

[2] This principle was quite characteristic of the Ancient Greeks. See: Robert 1960.

[3] Nibbi 1983. Homer *Od*. IV. 354–369. Some of the port structures of the Great Harbour in Alexandria were definitely built in the dynastic period. See: Goddio, Fabre 2010.

[4] Strabo XVII. I. 13.

[5] Μέγας λιμήν, *Magnus portus*.

[6] Εὐνόστος λιμήν.

[7] Goddio 1998.

[8] This conclusion was made after reconnaissance dives in the water area of the port in 2003. See: Belova, Ivanov 2003.

I.1. Concession

The Centre for Egyptological Studies of the Russian Academy of Sciences (CES RAS) obtained a concession from the Supreme Council for Antiquities of the Arab Republic of Egypt (SCA) for reconnaissance of a vast zone extending from the cape of Anfoushi on the east to the cape of Agami on the west. The maximum distance between borders of the concession exceeds 14 km, and its total area approaches to 80 km^2 (fig. 1).

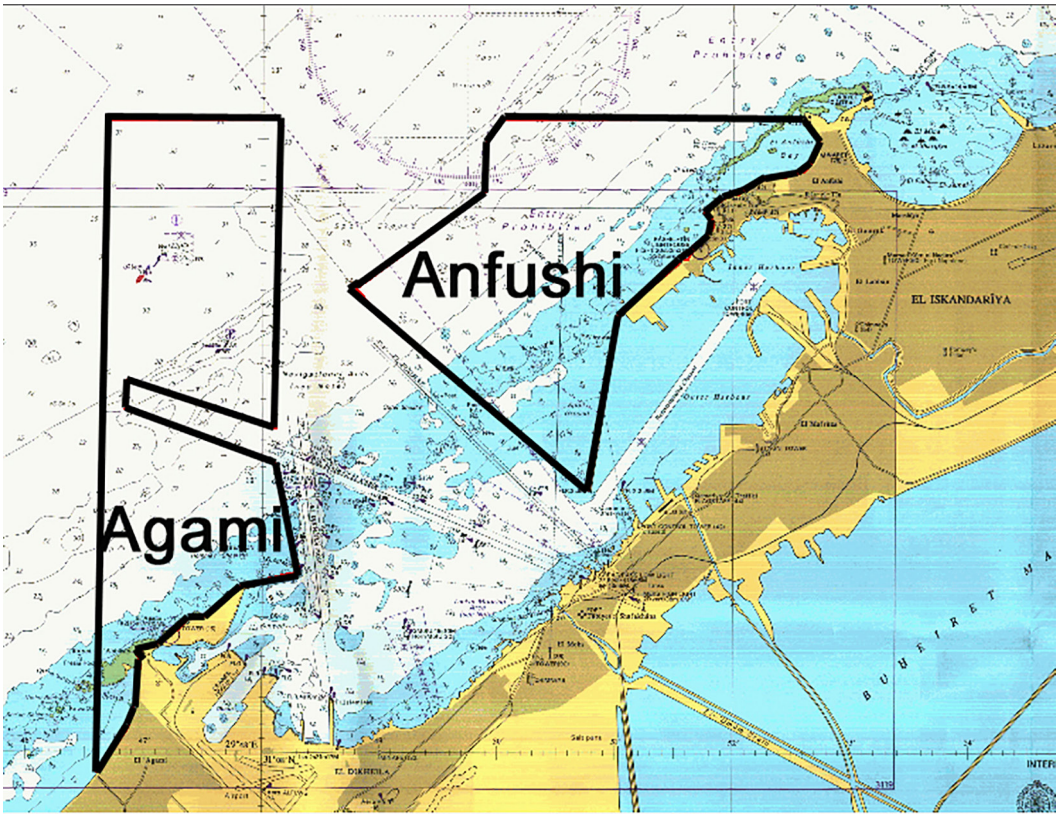

Fig. 1. Working zones of the concession of the CES RAS in Alexandria, Egypt

Excluding the water area of the West Port and channels, a research zone is about 30 km^2 at a depth from 1 to 40 m. A coastal zone is characterized by numerous reefs. The bottom within the shallow waters up to a depth of about 20–25 m is mainly represented by beachrocks which are replaced by sand at a greater depth. Both zones on the fig. 1 correspond to outer roads of the Harbour of Happy Return and contain the remains of important ancient structures built to protect the port from dominant winds.

Meteorological conditions are favourable for underwater research in spring (April — May) and fall (September — October). During the calm the horizontal visibility is about 8–10 m, but it declines a lot in case of a swell. The reconnaissance area is completely exposed to natural phenomena, due to this fact it is not possible to work under bad weather conditions and in case of a heavy swell. The area is controlled by the Egyptian Navy, and thus in case of military training any other activities are prohibited.

Besides the description by Strabo, the Harbour of Happy Return is mentioned in several other classical writings, but they are much less numerous than those devoted to the Great Harbour[9]. Unlike this last one used for the royal and military fleets, *Eunostos* was a port for trade ships. Thus, it became the main Egyptian commercial port that had connections to many countries of the Mediterranean. Strabo describes a navigable channel which was dug to connect the *Eunostos* with Lake Mareotis[10] thus providing an opportunity for shipping goods to and from the Nile valley.

The Alexandria administration controlled trade routes and agriculture which was export oriented and the core region of which was Fayum, a major source of grain supply for the Greeks. The city was inhabited by numerous peoples — Macedonians, Greeks, Jews, Phoenicians, Nubians.

In 1911–1915 G. Jondet discovered the remains of ancient port structures located opposite Anfushi and Ras el-Tin[11]. His work resulted in a chart of submerged ancient structures from the fort of Qait-Bey to the Ras el-Tin peninsula (fig. 2).

G. Jondet's great achievement is that he had collected valuable information before the modern ports were created, although research methods available to him had been quite limited. Most of the observations and measurements were made from the surface, and only in some areas heavy divers, obviously with no experience in archaeology, were employed. Not surprisingly, many of G. Jondet's conclusions turned out to be premature (see below II.1). In addition to the remains of port structures, he discovered foundations of several buildings in the coastal zone of the Ras el-Tin peninsula (fig. 3).

The Late Period ports on the coast of Lake Mareotis were excavated by F. Fakharani[12]. He made a suggestion that installations located in the southern part of the ancient *Eunostos* port could belong to the Kibotos[13], an artificial box-shaped harbor that, according to Strabo, included the ship-sheds[14].

In Ptolemaic and Roman periods the importance of the *Eunostos* port noticeably increased: Egypt was considered one of the main granaries of the ancient world and Diodorus mentioned the Alexandria harbor as the only safe place along the Egyptian coast of the Mediterranean[15].

Besides the port installations, the concession may potentially contain the remains of ancient and medieval fortifications.

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[9] Bernand 1998.

[10] There was an important port on this lake: λιμὴν λιμναῖος.

[11] Jondet 1916: 29–44; 1921: 52.

[12] Fakharani 1991: 25.

[13] 'The box' — Κιβωτός.

[14] Strabo XVII, 792.

[15] Ball 1942: 48.

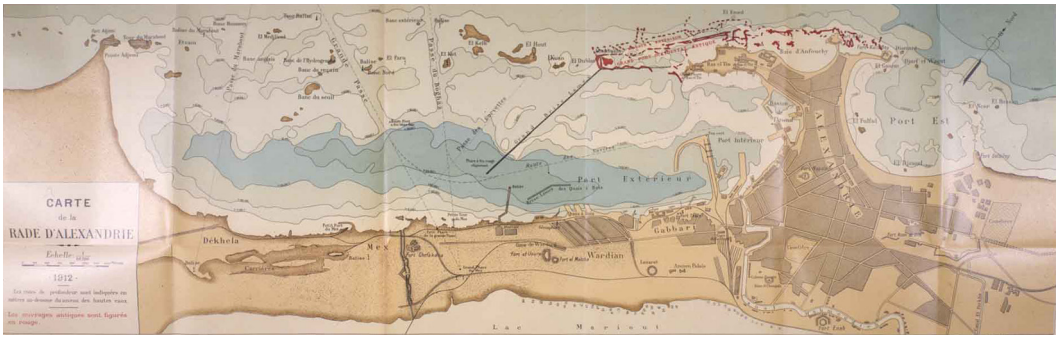


Fig. 2. Chart of submerged ancient structures as per Jondet 1916

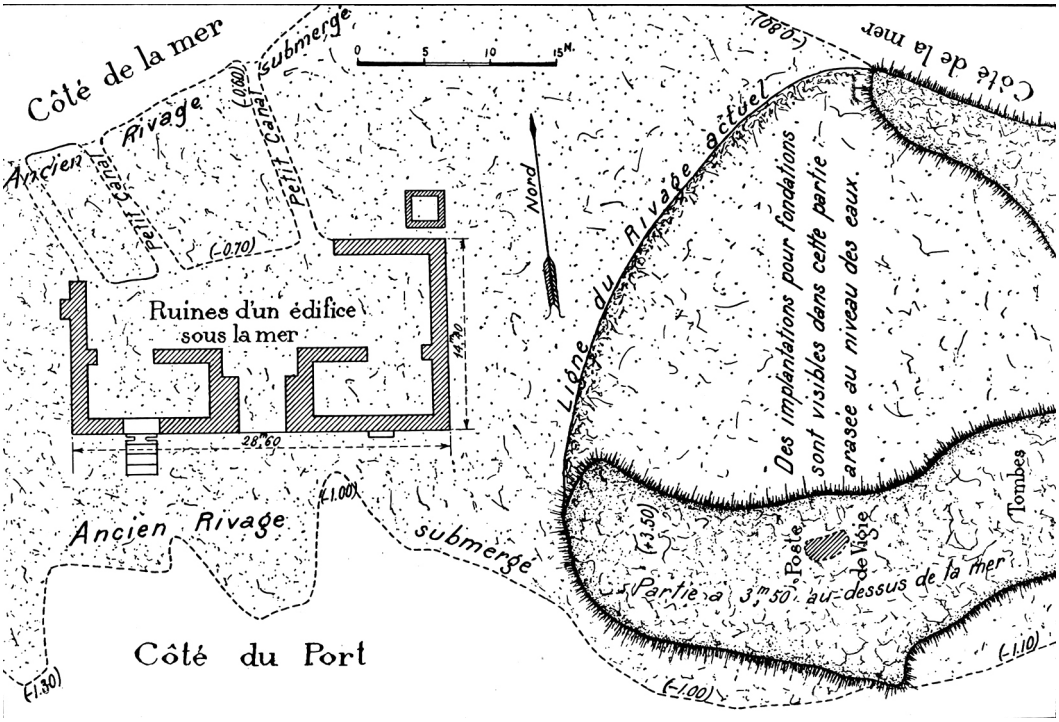


Fig. 3. Plan of the western part of the Ras el-Tin peninsula as per Jondet 1916

I.2. Staff of the expedition (2003–2015)

Dr. Galina A. Belova — Director
Dr. Alexander A. Belov — Deputy Director, archaeologist
Mr. Alexander A. Andrianov — archaeology diver
Mr. Andrey A. Belinsky — Co-Director (2003), archaeologist
Mr. Alexander A. Berezin — archaeologist
Mr. Bernard Boismoreau — chief navigator
Mr. Alexander G. Butenko — chief of diving works
Mrs. Marina Doroshenko — archaeology diver
Dr. Sergey V. Ivanov — Egyptologist, photographer
Dr. Sergey M. Fazlullin — chief of diving works, archaeology diver
Dr. Natalia V. Kharlamova — anthropologis
Dr. Alexey A. Krol — archaeologist
Dr. Sabine Laemmel — pottery specialist
Mr. Andrei G. Markelov — cartographer
Mrs. Inga M. Ponomarenko — chief of diving works
Mr. Andrey A. Prosvirin — archaeology diver
Dr. Alexander V. Vardaniats — archaeology diver

Inspectors of SCA (since 2011 the Ministry of Antiquities, MSA):
Mr. Saad A. Ahmed
Mr. Mohamed Ali
Mr. Atef I. Aly
Mr. Moustafa Dessuki
Mr. Haitham I. M. Abd el-Halim
Mr. Mohamed El-Sayed El-Sayed
Mr. Bessem Ibrahim
Mr. Abd El Hamid Abd El Meguid
Mr. Mohamed E. E. Sultan

The CES RAS would like to thank Dr. Zahi Hawass and Dr. Mamdouh M. G. Al-Damaty, the Ministers of Antiquities; the General Consulate of the Russian Federation in Alexandria, Dr. Mohammed Abd El Maksoud, Dr. Mahmoud Afifi, Dr. Ahmed Abd El Fattah, Dr. Ibragim Darvish; Dr. Magdi El Gandour, Mr. Hany Abu el-Azm and all staff of the Foreign Missions Department of the MSA; Dr. Mohamed M. A. Maguid and all staff of the Underwater Archaeological Department of the MSA in Alexandira, especially Mr. Mohamed El-Sayed, Mr. Ihab Fahmy, Mr. Bassem Ibrahim.

I.3. Survey methods

In the first season an initial prospecting of the sea bottom from the point of view of its geomorphology was carried out to determine the intensity of the impact of seismic processes. During this work, numerous geological faults and sand banks were discovered. They are results of seismic processes (in particular, earthquakes that were responsible for serious destruction in ancient Alexandria).

The expedition was based on a medium-size diving boat operating from the East Port of Alexandria. In the last seasons (2014–2015) a supplementary motorboat was hired for transporting divers from the main boat to diving spots.

Visual methods of underwater reconnaissance played an important role in the mission's work because the ability of using geophysical methods was very limited (see below). In the beggining of the season 2003 an underwater trapeze with a diver was towed by a small motorboat. This technique allowed visually examining extensive territory. Later this method was replaced by reconnaissance with underwater scooters linked to the GPS system that registered the divers' trajectories.

The coastal part of the concession is quite shallow and thus the remains of ancient structures are clearly visible on space photos (fig. 4). These images were included into GIS

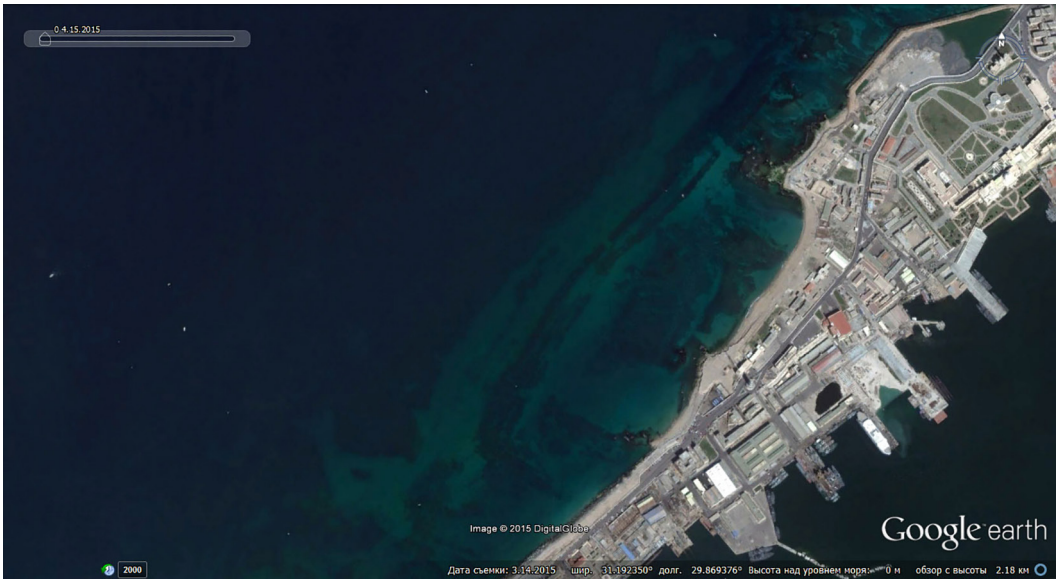


Fig. 4. Anfushi Bay as seen from space. Reefs and the remains of an ancient breakwater are clearly visible. Image © DigitalGlobe / Google Earth 2015

(ArcGIS) created by the CES RAS; it also incorporates historical charts of the port dating to the 17–19th centuries, charts of G. Jondet, modern charts of the port and side-scan sonar charts.

Using geophysical methods was limited because the concession belongs to a military zone. Thus, only surveys by the Hydrographic Department of the Egyptian Navy were allowed. In 2011 the CES RAS in collaboration with the Egyptian Navy carried out lateral sonar prospecting of some selected zones in Anfushi and Agami regions. Klein 3000 side scan sonar along with Odom, dual frequency, single beam echosounder interfaced with an Ashtec RTK (real time kinematic) GPS was used for this purpose. The survey was conducted for a zone with the depth from 20 to 30 m on a sandy bottom as the side-scan sonar is not efficient for distinguishing between limestone natural structures and possible remains of ancient constructions. It covered about 11.8 km^2 of the concession and allowed identifying 75 objects, some of which could belong to submerged structures and ancient shipwrecks (fig. 5–7).

Unfortunately, the first dives proved that these targets are very difficult to locate despite the high precision of the DGPS system. Most probably, the data at the mission's disposal does not include the length of the tow-fish cable or there is a systematic error of other origin.

II. Anfushi region

II.1. Studies of the main breakwater of the Harbour of Happy Return

In 2007 the remains of a long and massive breakwater that was parallel to the coast of the Ras El-Tin peninsula (modern military base) were discovered. They were situated at a distance of approximately 200 m from the coast. Evidently, this was the main ancient breakwater that protected the port of *Eunostos* from a dominating north and north-western swell. The major axis of the construction was north-east — south-west (bearing around 220˚ compass degrees). The breakwater was founded on a reef, the foot of which lies at a depth of 8–10 m. The top part of the breakwater was 1.5–1 m below the water surface.

The breakwater consisted of large limestone blocks, roughly cut and of irregular shape. In general, the blocks were more than 2 m long, 1.5–2 m wide and 0.8–1 meter high. Circular openings of about 10 cm in diameter were found in the edges of many blocks. These openings could serve to facilitate transporting and manipulating the blocks (fig. 8).

The breakwater was formed by two parallel walls constructed 40–60 m apart. Space between them was filled with rubble. Both position and construction of the breakwater completely correspond to the description made by G. Jondet (fig. 9)[16].

The team has studied the exterior and inner walls of the breakwater. Although some blocks are not in place and dispersed around[17], the breakwater has a very good state of preservation.

According to G. Jondet, the breakwater was anchored at the south-west on the Abu Bakar rock, which makes perfect sense from an engineer's point of view (fig. 10)[18]. Surroundings of the El Aramil rock (former Abu Bakar) were studied by the team, but no evidence was found for the remains of the structure as the blocks in the area were too badly eroded to judge on their origin.

[16] Jondet 1916: 20–22.

[17] This phenomenon is more distinct in the south-western part of the structure.

[18] Jondet 1921: pl. I. A map of the 15th century shows a fortification tower (a lighthouse?) on one of the Anfushi islands (Abu Bakar?).

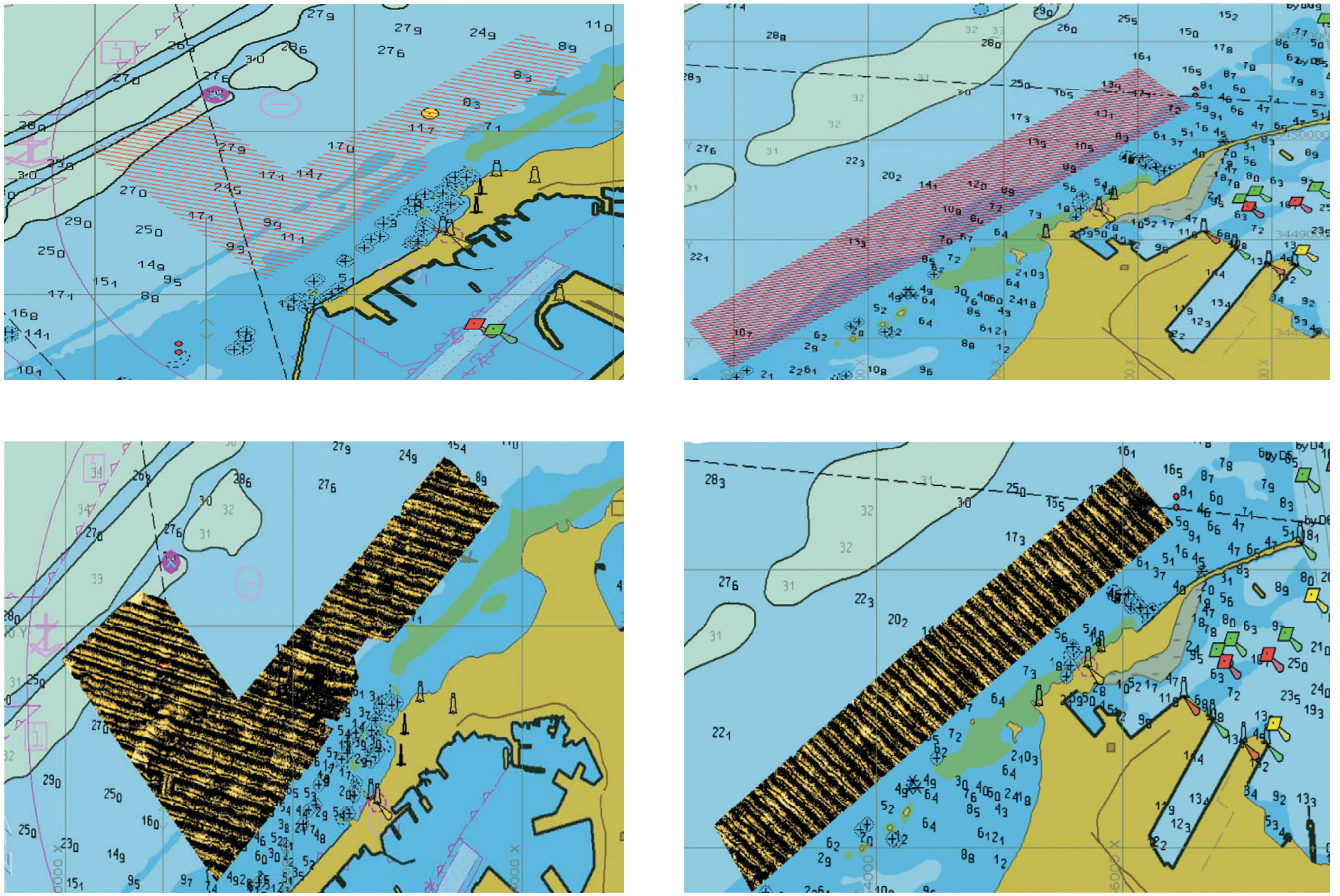


Fig. 5. Areas covered by a side-scan survey in 2013 (left — Anfushi, right — Agami). From a report of the Hydrographic Department of the Egyptian Navy

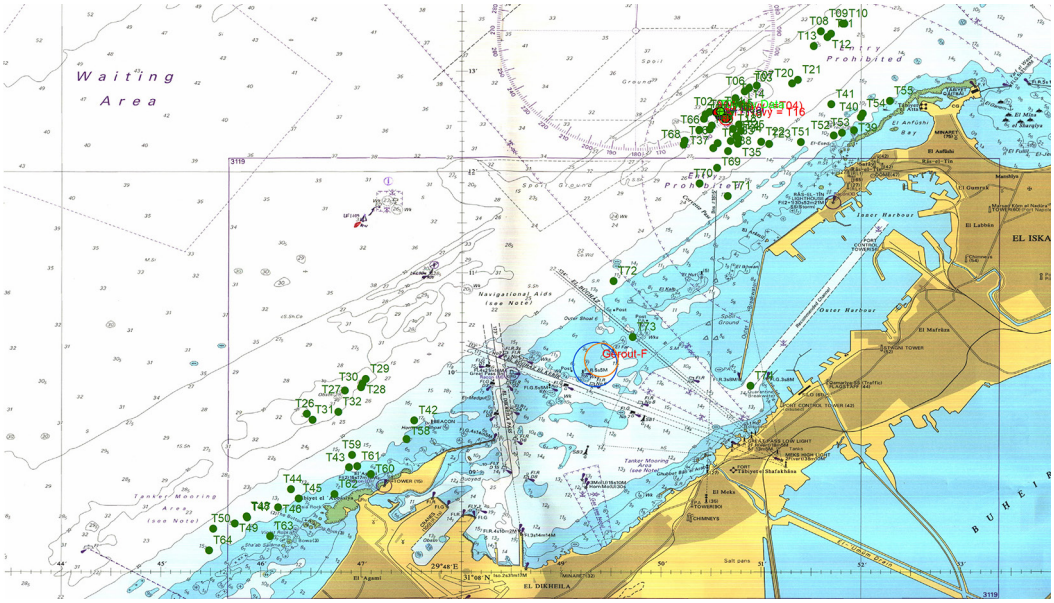


Fig. 6. Side-scan targets (green circles) from surveys of 2011 and 2013

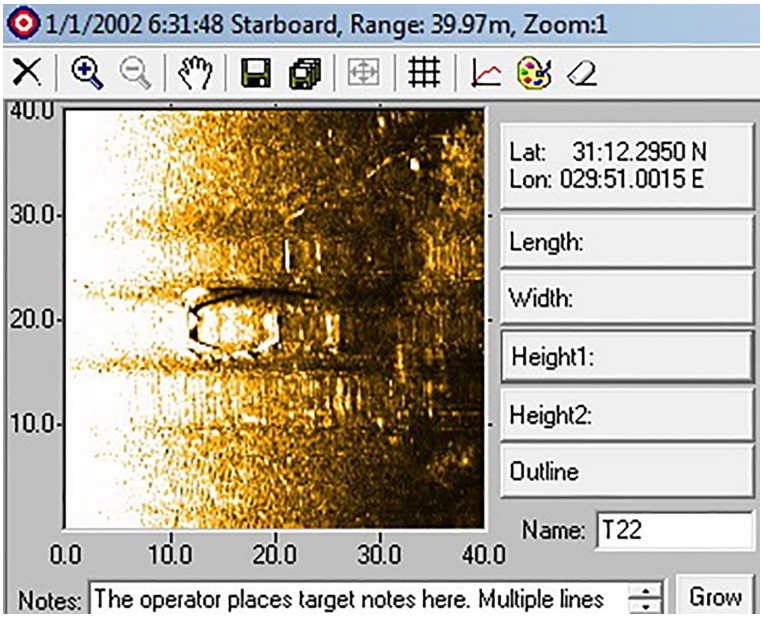
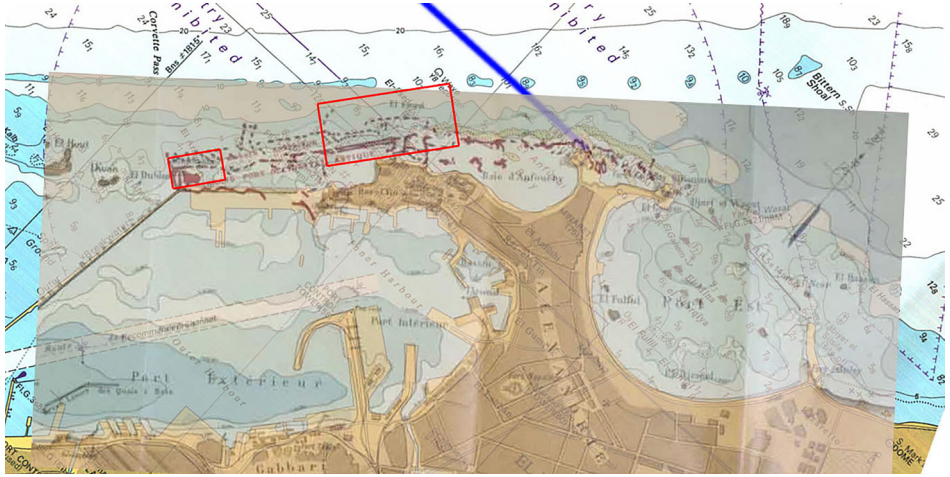


Fig. 7. Side-scan survey target T 22 from the region of Anfushi



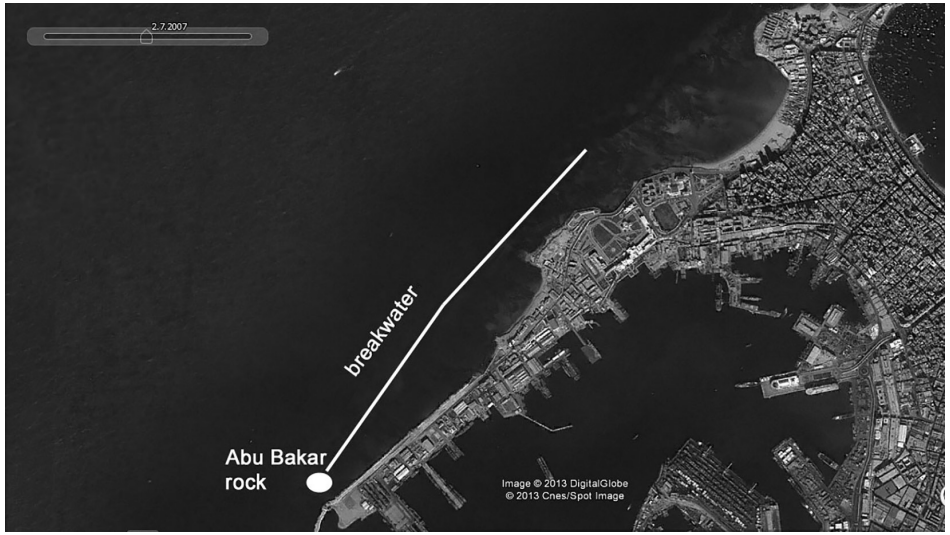


Fig. 8 (upper left). Circular openings in limestone blocks composing the breakwater. Photo from the CES RAS archive

Fig. 9 (upper right). Areas of visual underwater survey of the CES RAS in 2007 (red squares) and position of ancient structures described by G. Jondet (1916). Collage by A. A. Belov

Fig. 10 (lower). Schema of the main breakwater that protected the harbour of *Eunostos* from a swell. Chart from the GIS of the CES RAS (2015)

It may be noted that 50–80 m seaward from the breakwater a submerged ridge was discovered; it is parallel to the shore and formed by calcareous rocks. These were damaged in the course of seismic movements and thus have an appearance of cubic blocks. Although looking very similar to an artificial construction, these geological fractures are quite recognizable by the exact coincidence of the edges between the fallen 'blocks'[19].

In 2014 the CES RAS planned to chart the breakwater from the coast by a method of tachometry. Divers were supposed to stand on the top of the breakwater holding long poles with a prism, and their positions would have been taken with a total station. However, the permission from the Egyptian Navy to install a total station on the shore was never granted.

II.2. Reconnaissance of the first line of the reefs closing the Anfushi Bay

In 2014 several reconnaissance dives were carried out in this region, but they revealed no traces of ancient navigation (fig. 11). Most probably, these reefs were a part of the coast of Pharos in antiquity, and thus this area does not seem very promising for further exploration.

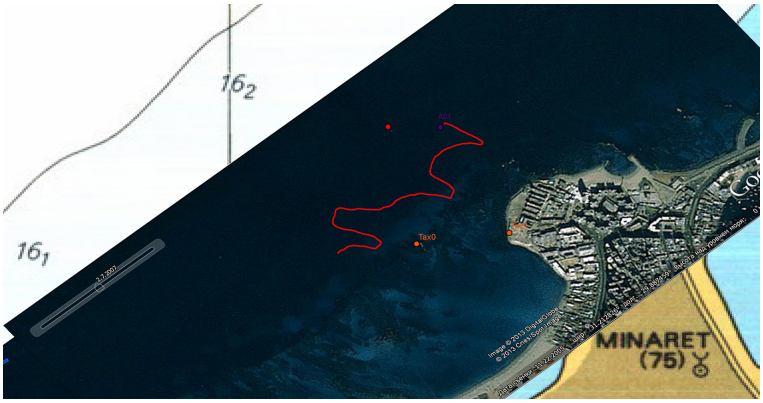


Fig. 11. Track of a diver following a line of reefs closing the Anfushi Bay (red line). Chart from the GIS of the CES RAS (2015)

II.3. Reconnaissance of the second line of submerged reefs in Anfushi region

The second line of submerged reefs in the Anfushi region is located at a distance of about 1 km from the shoreline and is parallel to it. The top of the reef is situated at a depth of about 9–12 m, while its foot lies 18.5–19 m below the water surface. The foot of the reef was explored starting from the north-west border of the concession and up to the Corvette Pass on a modern chart, which makes a distance of about 4.5 km. Several dives were aimed at the reconnaissance of a deeper region at the seaward side of the reef extending up to an isobath of about 20 m (fig. 12).

[19] Cf. Papatheodorou et al. 2015.

Fig. 12. Reconnaissance of the second line of submerged reefs in the Anfushi region. Areas covered by the survey are indicated by a blue line. Chart from the GIS of the CES RAS (2015)

In contrast to the first line of reefs, this region shows numerous traces of ancient navigation. At the point F01 (31.200407 N; 29.851828 E) a Roman lead anchor stock (90 × 10 × 4 cm) and a lead reinforcement collar from the same anchor (45.5 × 9 × 8 cm) were found (fig. 13–14). These artifacts can be dated between the middle of the 2nd century BC and the end of the 3rd century AD.

A limestone stock from a Greek type wooden anchor was discovered at the point F 03 (31.198748 N; 29.849712 E). Its dimensions are 231 × 35 × 17 cm (fig. 15–16). The latest known examples of such anchor stocks are dated to the middle of the 4th century BC. The weight of this anchor stock is 320 kg.

Three more ancient anchors were found in 2015 around the point R12 (31.216012 N; 29.870572 E). An anchor stock F23 (its length is 148 cm, width — 42 cm, thickness — 7 cm) probably belonged to a Roman wooden anchor. Partially covered with sediment, it was discovered at a depth of 17.7 m in a crevice of the reef. Nearby a Byzantine iron anchor measuring 226+ × 132 × 12–15 cm was found. Another anchor discovered nearby (31.216330 N; 29.869970 E) belongs to a type that was in common use on medieval galleys (four-fluked grapnel).

In 2014 an accumulation of rifles and pistols dating to the middle of the 19th century was discovered at the point F04 (31.191753 N; 29.840533 E) (fig. 17–18). These objects may be a part of cargo of the French transport vessel ‘Le Patriote’ (see below).

In 2015 many more flint rifles dating to the first half of 19th century, most of them two-barrel fowling pieces, were discovered in the region of the reef at the point 31.189750 N and 29.837920 E.

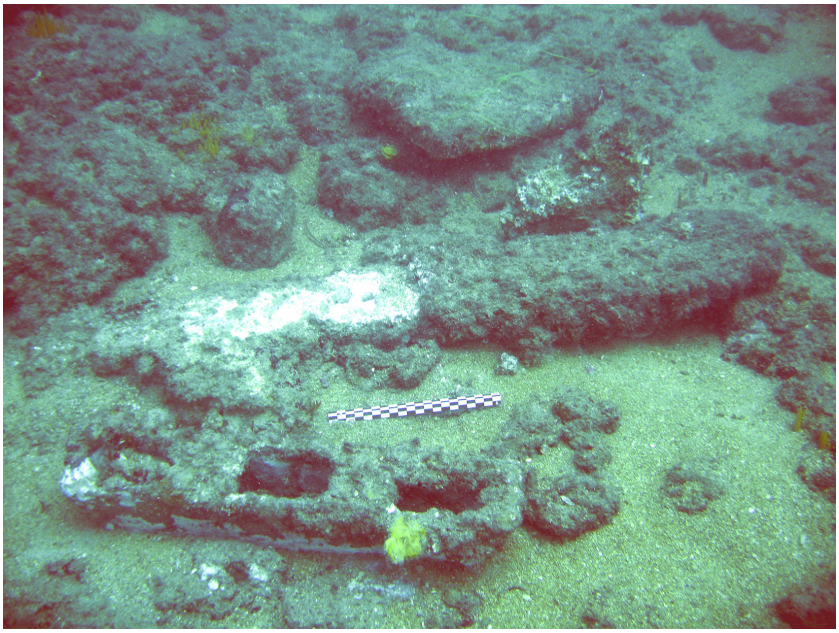


Fig. 13. A Roman lead anchor stock and a lead reinforcement collar *in situ*. Photo from the CES RAS archive

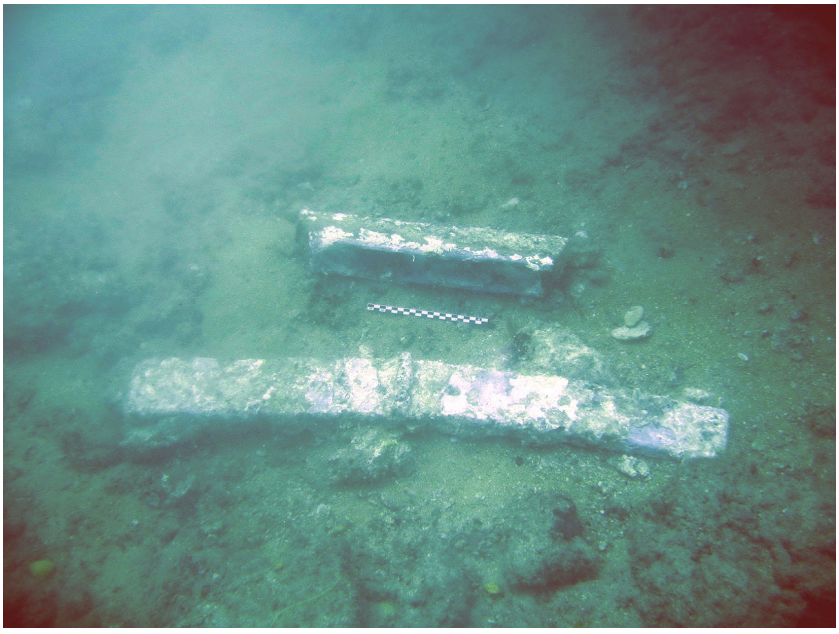


Fig. 14. A Roman lead anchor stock and a lead reinforcement collar after cleaning. Photo from the CES RAS archive

Fig. 15. A limestone stock of the Greek type from a wooden anchor at the time of its discovery. Photo from the CES RAS archive

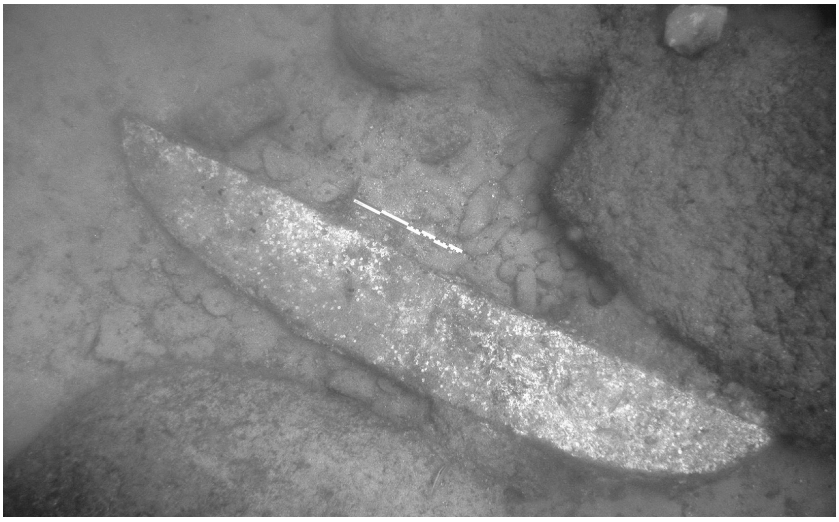


Fig. 16. A limestone stock of the Greek type from a wooden anchor after cleaning. Photo from the CES RAS archive

Fig. 17. Pistols and rifles discovered at the foot of the sea reef along the peninsula of Ras el Tin. Photo by S. A. Ahmed

Fig. 18. One of the pistols discovered at the point F04. Photo by S. A. Ahmed

II.4. Reconnaissance of shoals at the entry to the modern West Port of Alexandria (ancient Harbour of Happy Return)

Shipwreck of the French transport vessel 'Le Patriote' (1798)

French explorer M. Guérout discovered the remains of 'Le Patriote' in the region of the El Far Shoal (reef) in 1986. This zone had been thoroughly examined by our mission, and after a series of dives the remains of the cargo and armament of the ship were found (fig. 19)[20].

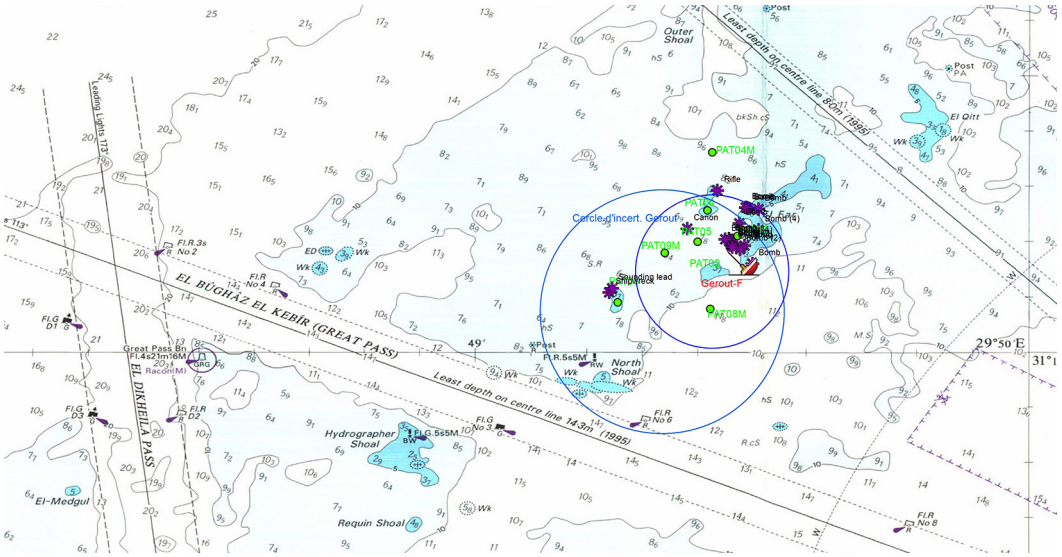


Fig. 19. Location of the 'Le Patriote' shipwreck at the entrance to the West Port of Alexandria. Chart from the GIS of the CES RAS (2015)

Three-masted French transport ship 'Le Patriote' (former 'Saint-Augustin') sailing from Marseille wrecked on the 3rd of July 1798 while trying to enter the West Port of Alexandria. The ship had three decks and was armed with two guns. Its tonnage was 560 t. A considerable part of the ship's cargo consisted of instruments for scientists who accompanied Napoleon Bonaparte in his Egyptian venture. Some of these instruments were found and recovered by the expedition of M. Guérout.

A gun from a ship was discovered at the point F08 (31.17038 N; 29.82305 E), on the sandy bottom at the western side of the reef at a depth of 9.5 m (fig. 20). The piece is made of cast iron and measures 140 cm in length; inner diameter of the barrel is approximately 10–11 cm. The gun was covered with a thick layer of concretions and marine vegetation.

[20] Searching for the ship was hindered by the facts that GPS systems had not been in use in 1986 and precision of the old method of positioning had not been high. We would like to express our gratitude to M. Guérout who was eager to help.

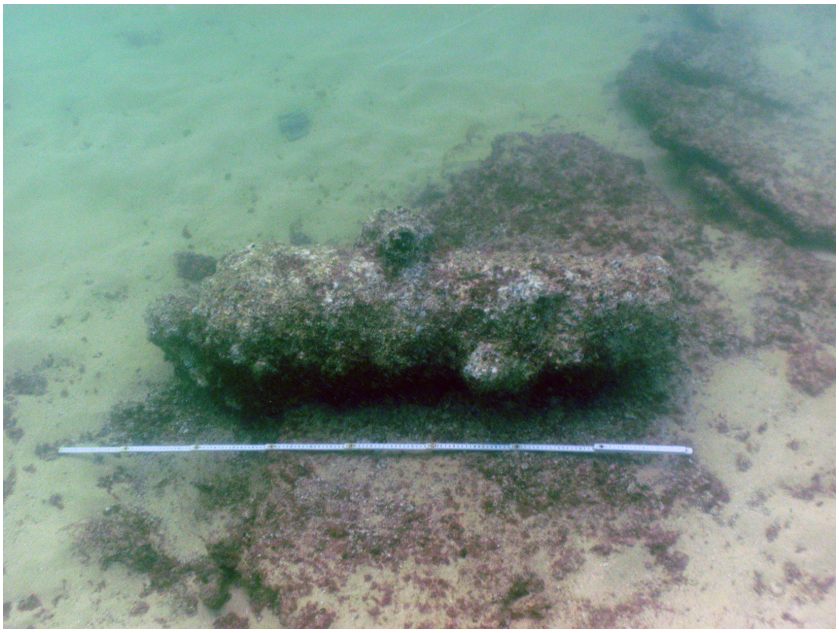


Fig. 20. Sea gun discovered at the western side of the reef. Photo from the CES RAS archive

It is probable that the gun is a part of armament of 'Le Patriote' as the ship was initially armed with two guns and one of them was lifted by M. Guérout. Judging from a drawing of this gun, both pieces belong to the same type and their dimensions are also equal (fig. 21).

Numerous bombs of Napoleonic times (more than two dozens) are dispersed on the reef and seem to belong to the cargo of 'Le Patriote'[21]. Their diameter is around 25 cm, and most probably they were intended for mortars of Napoleon's land corpus (fig. 22).

Small fragments of copper sheathing of the hull, probably belonging to 'Le Patriote', were found on the El Far reef (fig. 23).

On the northern side of the reef (point F22, 31.17153 N; 29.82396 E) a buttstock of a flint rifle, probably of a short carbine of marine type, was found (fig. 24).

Shipwreck of an ancient Greek merchantman

About 250 m to the north from a modern navigation sign delimiting El Bughaz El Kebir passage, the remains of a cargo of an ancient wrecked ship were discovered. These were scattered on the north-western side of the El Far reef at a depth of 8–10 m. Numerous fragments of amphoras and other vessels covered the seaward side of the reef and were also found inside crevices of its surface (fig. 25). All vessels[22] studied so far were incomplete and heavily covered with concretions.

[21] The bombs are eaten by marine corrosion and not a danger.

[22] The ceramology report that follows was prepared by S. Laemmel.

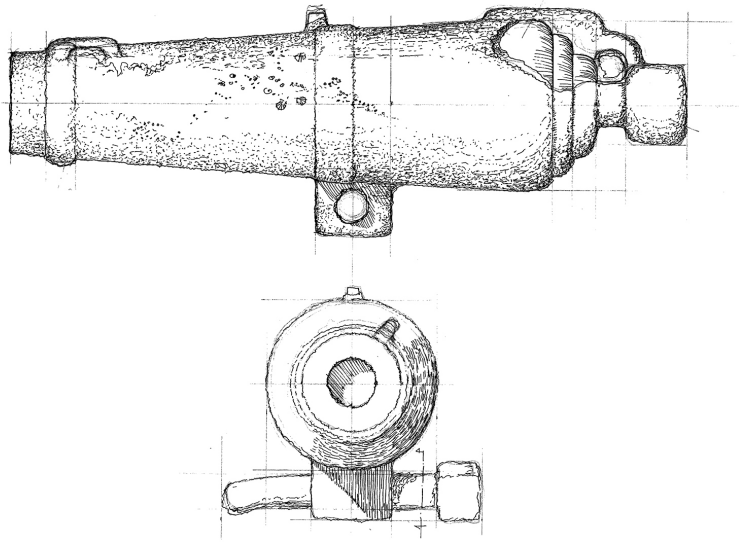


Fig. 21. Gun from ‘Le Patriote’ lifted from the sea by the expedition of M. Guérout in 1986. Drawing by J.-M. Gassend, courtesy of M. Guérout

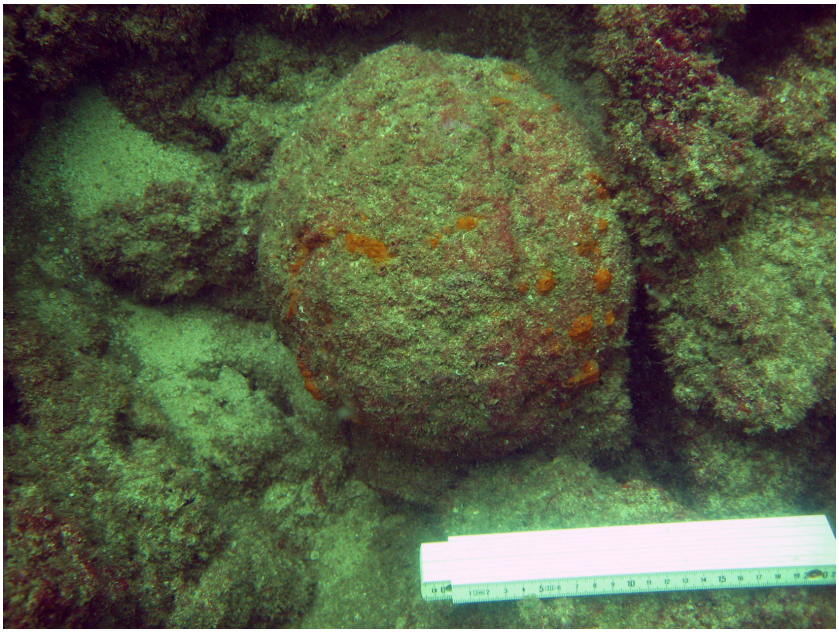


Fig. 22. Mortar bombs from the cargo of ‘Le Patriote’. Photo from the CES RAS archive

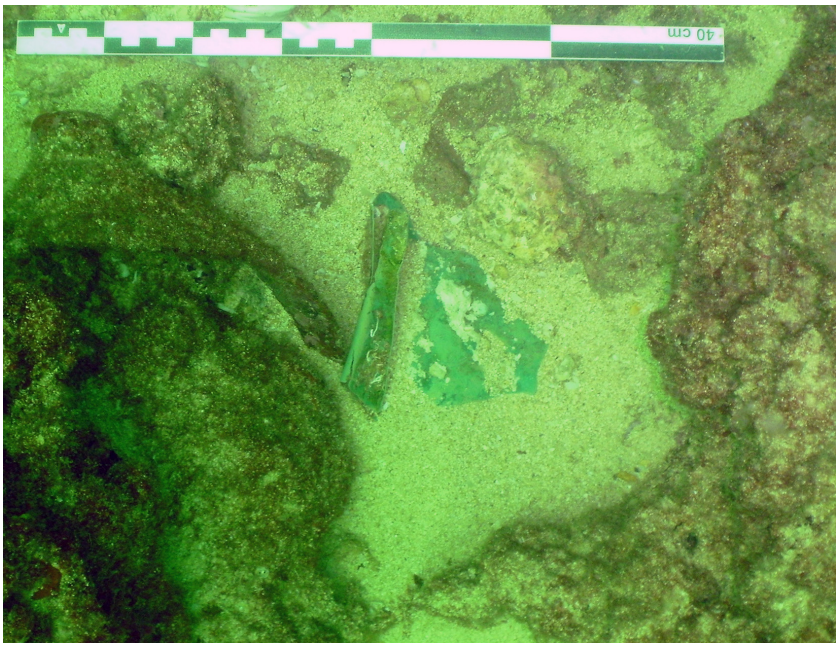


Fig. 23. Piece of copper sheathing of a hull, probably from ‘Le Patriote’. Photo from the CES RAS archive

Fig. 24. Buttstock of a flint rifle (find F22). Photo from the CES RAS archive

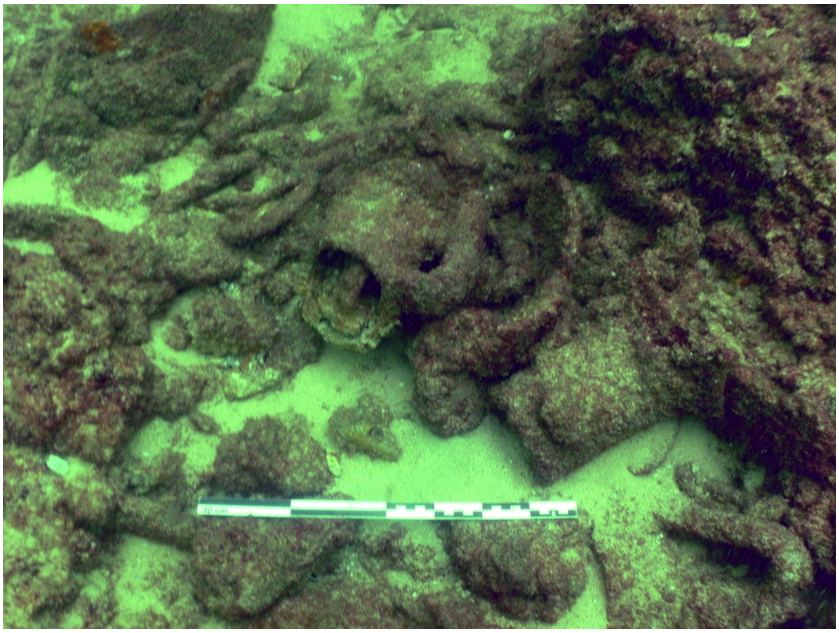


Fig. 25. Ceramics on the north-western slope of the reef at the point PAT03. Photo from the CES RAS archive

The wreck site is scattered with numerous pottery fragments, but so far no complete profile was recognized. All of the fragments that were apparent on the reefs' surface and on the sand are from imported East Greek amphorae exclusively, and these must have constituted the bulk of the ship's cargo. So far only four representative fragments were brought back to the surface for study. The assemblage fits a date between the mid 4th and the 2nd century BC, i. e. in the first part of the Ptolemaic period.

The first four fragments in the catalogue below come from the site of the ancient wreck, and the fifth vessel is a stray find. From a cursory survey of the wreck, nearly all of the amphorae seem to relate to the broad type represented by AP15_001 and AP15_002 (fig. 26–27). The neck is of medium length, slightly bulging, and the rim is rounded and thickened. The large handles are oval in section and rise only slightly above the point of their attachment to the upper part of the neck in a soft arched curve.

The fabrics of these two amphorae are very similar to one another, and, although the shapes present minor variations, it may be safely assumed that they originated from the same production centre. So far only one other amphora type, illustrated by AP15_003 (fig. 28), was recorded. It has a similarly long, but straighter neck and a long, folded rim. The handles are large, oval in section and reach down from nearly a third of the way down the neck. Amphora bases appeared to have been less frequent than rim fragments throughout the wreck site, and only one single type was identified so far (fig. 29). It consists in a bulbous toe with a shallow depression under the base. Its fabric is identical to that of AP15_001 and can thus be linked to this rim type. Most likely, all these fragments belong to a Rhodian production.

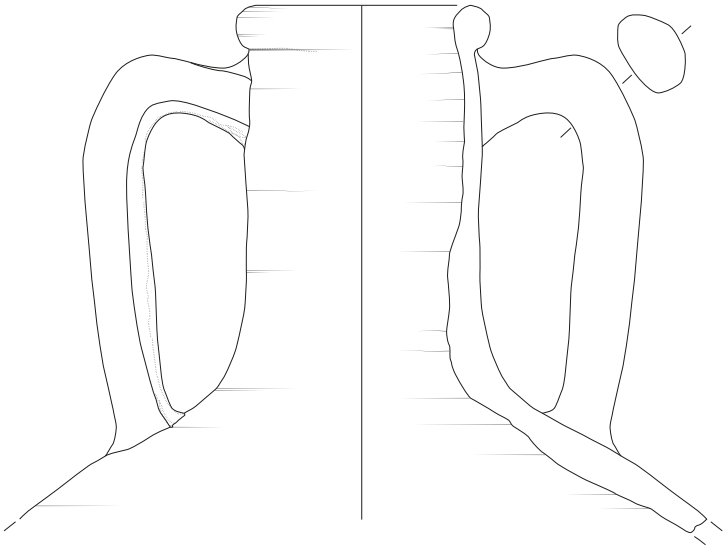


Fig. 26. Fragment of the East Greek amphora AP15_001. Drawing by S. Laemmel

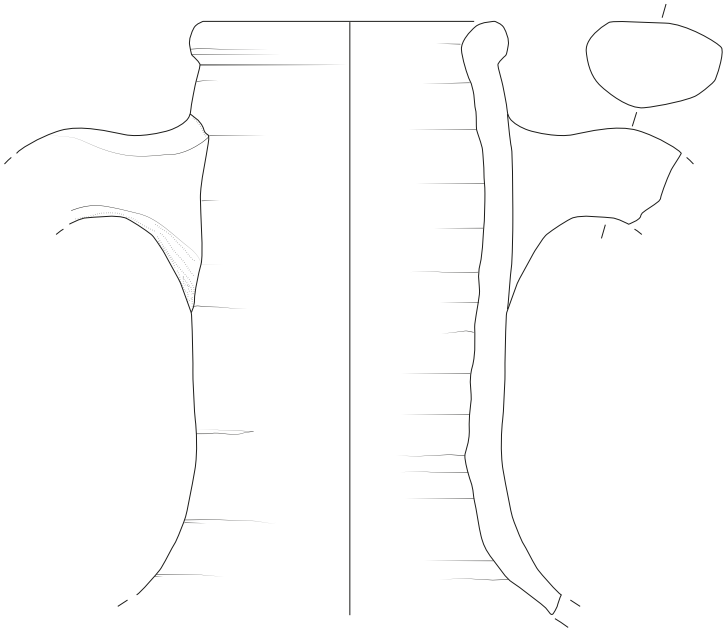


Fig. 27. Fragment of the East Greek amphora AP15_002. Drawing by S. Laemmel

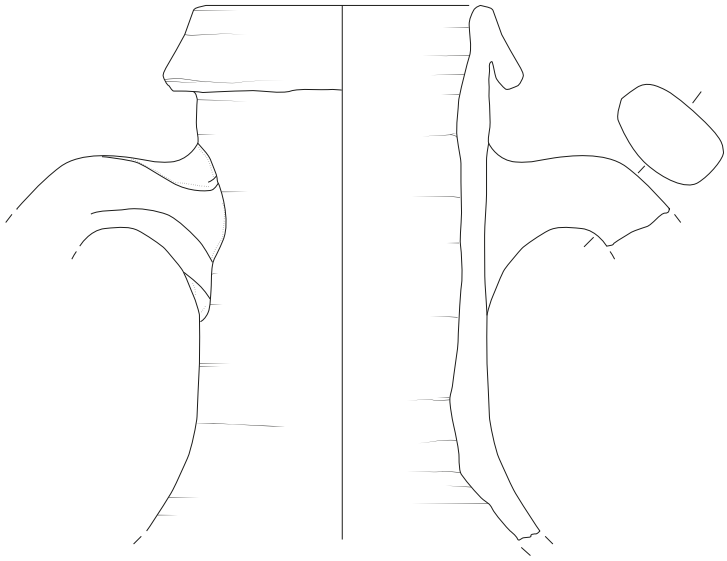


Fig. 28. Fragment of the East Greek amphora AP15_003. Drawing by S. Laemmel

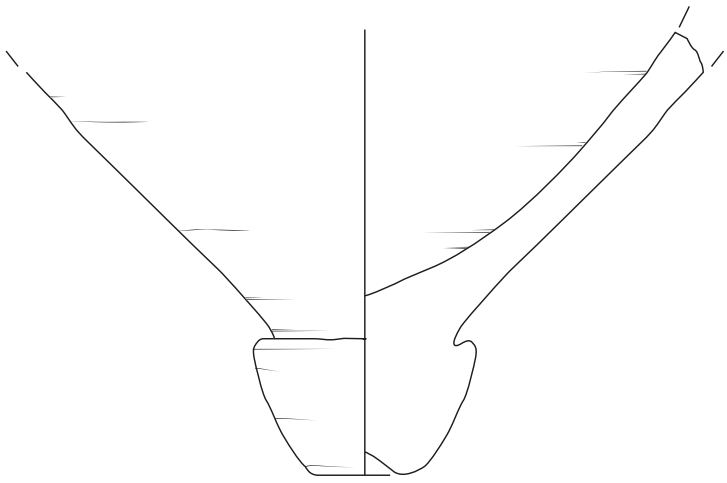


Fig. 29. Fragment of the East Greek amphora AP15_004. Drawing by S. Laemmel

After the first half of the 3rd century BC typical Rhodian amphorae are characterised by a long neck with thickened rim and angular handles rising high above their upper attachment to the neck and bending at a sharp angle [23]. Earlier 3rd century BC examples, however, have shorter necks and typically bent handles, very similar to those of the examples discussed here [24].

The base AP15_0004 (see fig. 29) is made of the same, or of a closely related, fabric to that of the fragments with rounded rim (see fig. 26–27). The shape is also known from Rhodian amphorae, notably in association with folded rims, similar to that of AP15_003 (see fig. 28). This latter type is well dated to the end of the first quarter of the 3rd century BC by two examples with stamped handles [25].

Besides their occurrence on Rhodian types, folded rims, such as that of AP15_003, are also evidenced on other southeast Aegean imports, such as Knidian and other contemporary south Aegean productions [26]. However, the fact that the fabric of this sherd differs only slightly from that of the other fragments discussed here does not justify ascribing a totally different provenance for it.

While the morphology of all of our amphorae are suited to a Rhodian origin, their fabrics are not obviously Rhodian, except for their hardness, fineness and lack of mica [27]. Mica is indeed rarely attested in Rhodian clays, but limestone, which could not be identified here, is commonly reported on products from the island.

The four-handled jar made of Nile silt fabric is certainly much later and date from the Late Roman (Byzantine) period to the Ummeyad and Abassid periods (fig. 30). Its fabric is very similar to that of Roman and Late Roman Nile silt cooking wares, and the profile of its rim compares well with a two-handled cooking pot fragment from Tell el-Fadda in North Sinai [28].

Catalogue:

1. AP15_001: amphora thickened round rim
Preservation: rim (100 %), neck and handles
Dimensions: d. top of rim 10.6 cm
Fabric: hard and dense homogeneous beige-red imported fabric, no core, fine sand, very fine limestone, air holes are few and very small, buff-brown surface, uncoated
Surface treatment: uncoated

2. AP15_002: amphora thickened round rim
Preservation: rim (100 %), neck and handles
Dimensions: d. top of rim 10.0 cm
Fabric: hard, dense homogeneous brown-beige imported fabric, black core in places, fine sand, very few and small air holes, brown surface
Surface treatment: uncoated

[23] E. g. Monachov 2005: 78, fig. 4.2; Berlin 1997: 46–47, Dor 6. 45. 1.
[24] Grace 1986.
[25] Monachov 2005: 86, fig. 9.1–9.2.
[26] Lawall et al. 2010: 383, pl. 295 (124–125).
[27] Whitbread 1995: 59–67.
[28] Vogt 1997: 11, fig. 4 (8), with further references.

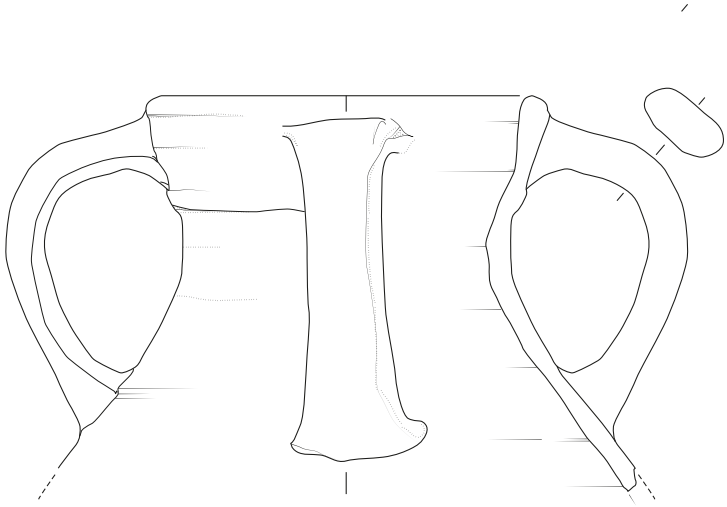


Fig. 30. Fragment of a four-handled jar or cooking pot AP15_005. Drawing by S. Laemmel

3. AP15_003: amphora folded rim
Preservation: rim (100 %), neck and handles
Dimensions: d. top of rim 10.3 cm
Fabric: hard, dense homogeneous red-brown imported fabric, no core, silt-size sand, very small air holes, beige-buff surface
Surface treatment: uncoated

4. AP15_004: amphora bulbous toe
Preservation: base (100 %)
Dimensions: d. max. toe 5.5 cm
Fabric: like AP15_001
Surface: uncoated

5. AP15_005: four-handled jar (cooking pot).
Preservation: rim (100 %), neck and handles
Dimensions: d. top of rim 12.5 cm
Fabric: hard, dense Nile silt fabric, fine sand, mica, no or very few vegetal tempering, dark grey to black core, brown surface
Surface: uncoated
Deposits: probable soot traces on rim

At the bottom of the reef, on its north slope two, large conglomerates of ceramics were discovered (31.16858 N; 29.82079 E). In this area an ancient sounding lead was also found (fig. 31–32). It is 117 mm in diameter, 104 mm high and weights 5.05 kg.

Fig. 31. Ancient sounding lead F07. Photo from the CES RAS archive

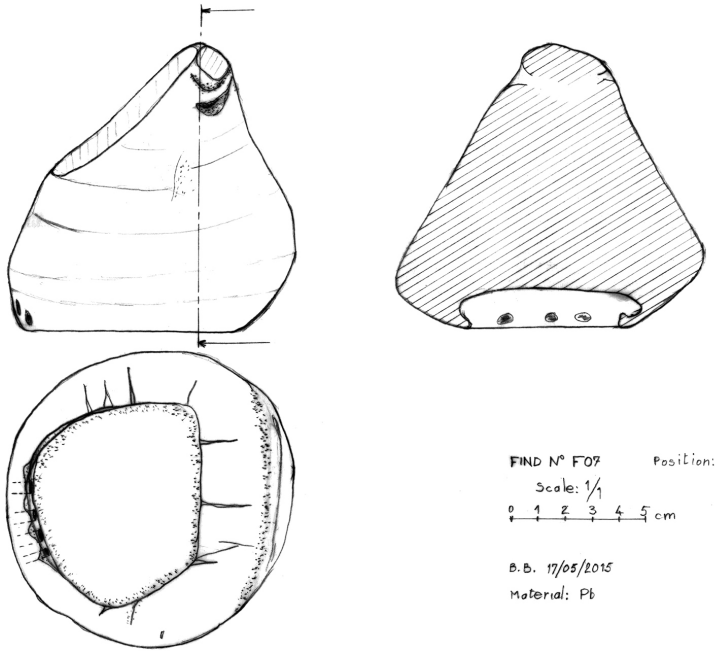


Fig. 32. Ancient sounding lead F07. Drawing by B. Boismoreau

III. Agami region

In this region a reconnaissance of reefs was conducted. A series of dives revealed the remains of port structures (fig. 33). Large limestone blocks were organized to form a breakwater extending from the south-west to the north-east. This ancient breakwater is parallel to the modern one and situated approximately 200 m away from the shore. In antiquity it must have protected the harbor from the north-western swell. This conclusion is confirmed by the finds of two stone anchors in the vicinity of the modern breakwater of Agami.

Exploration of this part of the concession, potentially promising, is hindered by the great distance from the East Port of Alexandria from where the expedition's diving boat is obliged to operate.

Fig. 33. The remains of ancient port facilities near the Agami cape as seen from space.
Image © DigitalGlobe / Google Earth 2016

IV. Research perspectives

The concession of the CES RAS in Alexandria has a considerable area and a good potential for underwater archaeology. However, the research is hindered by intensive navigation at the approaches to the modern West Port and frequent maneuvers of the Egyptian Navy. Moreover, the work depends on weather, and in case of a strong wind and swell diving operations must be suspended.

For now there is no technical solution for charting the ancient breakwater in Ras el-Tin region because application of the coast-based method (total station) was not authorized by the Navy. Thus, there are two major directions for our future research in Alexandria.

The second line of submerged reefs at a depth of 15–20 m contains numerous traces of ancient navigation that are represented by anchors of different eras and navigation instruments like sounding leads. An area seaward of the reefs was not completely explored, but even the first dives resulted in that many artifacts of this kind came to light, including those dating back to the Antiquity (fig. 34).

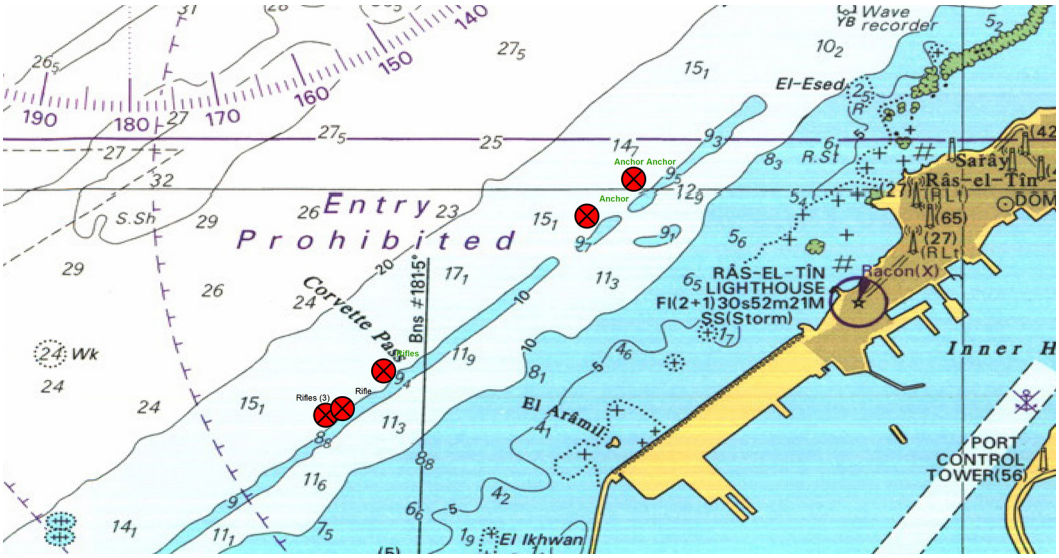


Fig. 34. Anchors found during reconnaissance dives at the second line of submerged reefs in the region of Anfushi

Fifty anchors were found at the territory of the concession of the Centre des Études Alexandrines (CEAlex) that adjoins our concession from the east[29]. They belong to different types and show a pattern in their topographic distribution: later anchors come from deeper waters. Even more anchors were found by the Greek mission working to the east from the Silsileh Peninsula[30].

Another potentially promising direction of our future work in Alexandria is the search for ancient shipwrecks that may be found in a zone seaward from the second line of submerged reefs. The port of Alexandria was very difficult for the entry of ships. Flavius Josephus (37–100 AD) describes it in the following terms:

[29] Empereur, Soukiassian 2015.

[30] Tzalas 2015.

The port of Alexandria is difficult for ships to approach even in peace-time, the entrance being narrow and diverted by submerged rocks which preclude direct passage[31].

The CEAlex discovered several shipwrecks near the entry to the Great Harbour[32].

Even inside the harbor ships were not completely safe. Space for a maneuver was limited, and the reefs were not far away on leeward. If one takes into account imperfection of rigging of a classical period ship, it is easy to imagine the risks connected with a fresh wind or squall. A following passage from Philo of Alexandria (13–50 AD) can be cited in this respect:

It happens quite often that many have crossed dangerous seas and without troubles have completed a long voyage with the wind astern and suddenly they wreck in the port in the very moment when they were ready to cast anchor[33].

These risks are archaeologically confirmed by the finds of several shipwrecks inside the Great Harbour[34].

In conclusion, our further underwater research of the area around the capes of Anfushi and Agami might cast more light on position of roads of the port of *Eunostos* and on the ships that sailed to this port in Antiquity.

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Г. А. Белова, С. В. Иванов, А. А. Белов, С. Лэммель

Начиная с 2003 г. Центр египтологических исследований РАН (ЦЕИ РАН) проводит подводно-археологические разведки в Александрии (АРЕ) на обширной акватории, закрепленной за ним Верховным советом древностей Египта. В пределах концессии находятся современный Западный порт Александрии и районы судового хода. За вычетом этих зон площадь района разведок составляет около 30 км^2 на глубинах до 40 м. В ходе работ, преимущественно в районах мысов Анфуши и Агами, обнаружены остатки древних портовых структур (волноломы), многочисленных античных якорей, а также груза корабля, затонувшего в эллинистическое время, в середине IV — II в. до н. э. Кроме того, были изучены остатки потерпевшего крушение судна конца XVIII в. (французского транспортного корабля «Патриот»), обнаружено огнестрельное оружие того же периода. В конце отчета представлены перспективные направления дальнейшей работы ЦЕИ РАН в Александрии.

Ключевые слова: египтология, подводная археология, древние кораблекрушения, древние порты, Александрия, греко-римский период, наполеоновские войны.

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