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Fifty years of underwater archaeological research on the Egyptian Red Sea coast

Cincuenta años de investigación arqueológica subacuática en la costa egipcia del mar Rojo

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Abstract: Commercial activity on the Egyptian Red Sea coast is known from as early as the Old Kingdom but flourished in the Graeco-Roman period, in particular from the 3rd century BC until the early 3rd century AD. These centuries correspond to the establishment of ports connected to the Nile Valley by routes through the Eastern Desert, which followed the main orientation of dry valleys. According to the classical geographers, six main ports were founded under the Ptolemies and their activities intensified during the Roman period. These facts have led some missions to conduct land excavations at different sites, for example Berenice and Myos Hormos (Quseir el-Qadim). Meanwhile, from 1970 until 2010, many other missions have undertaken underwater surveys and excavations on the Egyptian Red Sea coast in order to expand information on the maritime history of the region.

Key words: Classical geographers, port, shipwreck, Sadana, Quseir.

Resumen: la actividad comercial en la costa egipcia del mar Rojo es conocida desde el Imperio antiguo, aunque florece en época Greco-Romana, en particular entre el siglo III a. C. y el comienzo del siglo III d. C. Estos siglos corresponden al establecimiento de los puertos costeros relacionados con el Valle del Nilo a través de las rutas del Desierto Oriental que seguían los antiguos cauces de ríos secos. Según los geógrafos antiguos, habría hasta seis puertos fundados por los ptolomeos cuyas actividades fueron intensificadas durante el periodo romano. Estas evidencias llevaron a varias misiones arqueológicas a dirigir excavaciones en diversos yacimientos como por ejemplo Berenice y Myos Hormos (Quseir ElQadim). Mientras tanto, desde 1970 hasta 2010, muchas otras misiones emprendieron prospecciones y excavaciones subacuáticas en la costa egipcia del mar Rojo, teniendo como objetivo completar la información de la historia marítima de la región.

Palabras clave: geógrafos clásicos, puerto, pecio, Sadana, Quseir.

Introduction

In antiquity, the Red Sea was considered as the main maritime trade route between the Indian Ocean and Europe. This trade appears to have flourished from the earliest times. The first written proof dates back to the time of King Sahure (2444-2433 BC), 5th dynasty, Old Kingdom, who encouraged trade with the Land of Punt (Vernus/Yoyotte, 1988: 140). In the Middle Kingdom, other trips to Punt were organised, according to textual evidence and excavations in 2006-2007 at Marsa Wadi Gawassis on the Red Sea (Fattovitch/Bard, 2009: 90). During the New Kingdom, the reliefs and the associated texts in the temple of Hatshepsut at Deir el Bahari (1473-1458 B.C.) record a naval expedition to Punt with details of the region (Bard/Fattovitch, 2007: 17). It was, however, from the Ptolemaic and Roman periods, from the 3rd century BC, until the end of the 2nd and beginning of the 3rd centuries AD that this commercial route was at its busiest. These centuries correspond not only with increased trade but also with the establishment of some ports connected to the Nile valley by routes that followed wadis across the Eastern Desert. The detailed and systematic exploration of these coasts during exploratory missions sent by the first Ptolemies led to the identification of the best sites, from a navigational point of view given the restrictions imposed by a sea reputed to be very dangerous, and as regards the land routes that were to link these ports with the Nile valley (Elsayed, 2001).

While the existence of these ports was attested by the classical geographers, they have left very little information regarding the exact location, layout and organisation of these ports. But they were particularly interested in this region (Salles, 1988: 75). Among those authors one might mention:

- Herodotus: visited Egypt in 450 BC and is the first historian to have written of the Red Sea.
- Diodorus of Sicily: visited Egypt in 59 BC and described the Egyptian coasts of the Red Sea in his third book.
- Strabo: the famous geographer, born in Amasia in 54 BC, spent much of his life between Rome and Asia Minor and stayed for several years in Egypt. He wrote a total of 17 books, the 17th being dedicated to Egypt at a time when his friend Ælius Gallus was governor of the country in the reign of Augustus (27 BC-14 AD). It is in this book that Strabo mentions the existence of two gulfs: one called Aelantes, to the north-east (Gulf of Aqaba), at the extremity north of which sat the town of Aelana, while the other, called the Arabian Gulf, to the north-west, on the side of the Gulf of Suez, held the town of Arsinoe at its head. Strabo also cites the names of two ports on the Red Sea: Myos Hormos, opposite which were three islands, two covered with olive trees, and Berenice located in the gulf of Acathartus, presently Foul Bay. He also mentions the name of Ophiodes Island, today Zabargad. In addition, Strabo refers to routes across the Eastern Desert towards the Nile. He mentions two in particular: the first departing from Myos Hormos and reaching Coptos in the Nile valley and the second running from Berenice to Coptos. The Eastern Desert in its entirety is called Isthmus (Ball, 1942: 13, 53, 68).
- Pliny the Elder: born in Como in 23 AD and died in 79 AD during the eruption of Vesuvius. His major work in 36 books is entitled the Natural History. In Book VI, Pliny mentions the Red Sea and the two gulfs located to the north of it. One of these is the Gulf of Suez, then called Heroopolis, and the other is the Gulf of Aqaba, then called Aelantis.
- *The Periplus Maris Erythraei*: this work is considered one of the principal sources of information on the ports of the Red Sea and Indian Ocean. The author's name is unknown; however, it was probably written between 50 and 80 AD by a Greek merchant living in

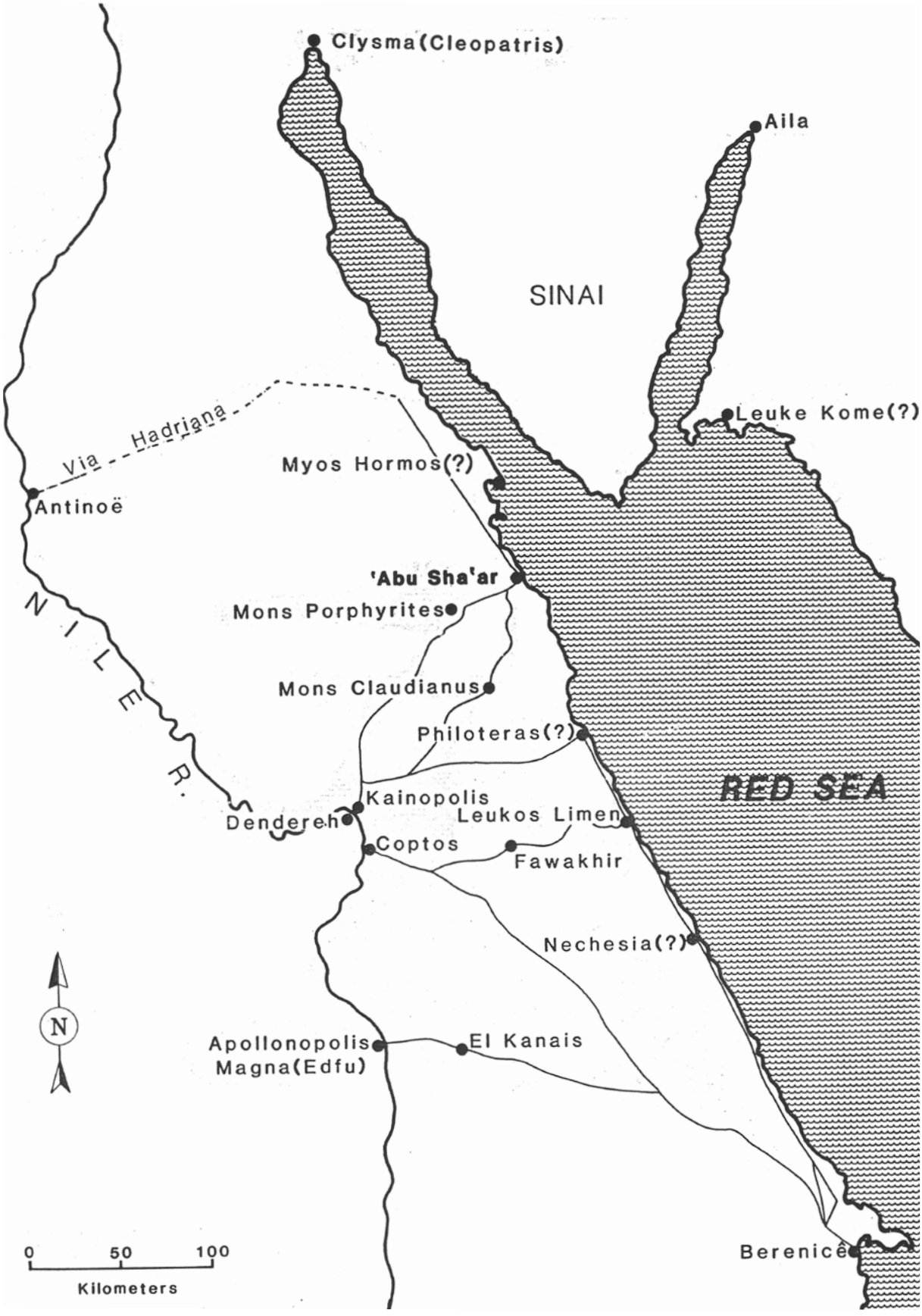

Figure 1. Ancient ports on the Egyptian Red Sea littoral (after Sidebotham, 1992: 13).

Egypt and most likely at Alexandria. He indicates two main navigation routes from the Red Sea ports of Egypt. The first follows the African littoral while the other, after leaving the Red Sea, turns eastwards to India. The book in question is composed of 66 short chapters, in which are described the coasts of the Red Sea and of Africa beyond the straits of Bab el-Mandeb, the south and west littoral of the Indian peninsula, to its frontiers, and it notes the ports and suitable sites for boats to anchor and engage in small-scale trade. Some 28 principal ports are mentioned:

- Two for the Egyptian Red Sea,
- Nine for Africa and beyond Bab el-Mandeb down the east coast of the continent,
- Six for the region of Arabia including the east coast of the Red Sea,
- Two for the Arabian Gulf,
- One for the Makra coast,
- Seven for India,
- One for China.

The great majority of these ports are accurately described (Casson, 1989: 5).

– Claudius Ptolemy: a famous astronomer and cosmographer, appears some 60 years after the *Periplus*. He was born in Pelusium in Egypt, or perhaps at Ptolemais in the Thebaid. His outstanding work is the Geography in eight books. Ptolemy dedicated Book IV to Africa and Chapter 4 is a sort of travel journal of the Red Sea in which he correctly locates the entrance to Bab el-Mandeb (Kammerer, 1929: 35).

Arab geographers, such as El-Idrisi around 1154, also wrote about the geography of the Red Sea. Lastly, travellers of the modern era from the 16th century onwards have also discussed the Red Sea and its ancient ports. The first was Juan de Castro in 1541, who talked of the ancient port of Berenice: thereafter, Jean-Baptiste D'Anville in the 18th century, Giovanni Belzoni in 1818, Wilkinson in 1835 and Gollinescheff in 1890 (Couyat, 1910).

According to the classical geographers, there were six main ports on the Egyptian coast of the Red Sea: Arsinoe, Myos Hormos, Philoteras, Leukos Limen, Nechesia and Berenice (Fig. 1). Most of these were founded under the Ptolemies and saw an increase in activity under the Romans. At the same time, it is difficult to be precise, given the often contradictory documents that the ancient geographers have left us, of the location of the principal ports that are mentioned in the written works.

Throughout the centuries that followed, the ports on Egypt's Red Sea coast remained at the heart of maritime trade between East and West. In the recent period, however, they have found themselves within a military zone and it is only very lately that this area has opened up to archaeological excavations. Several missions on different archaeological sites from 1976 at Marsa Gawasis until now have been undertaken on land, including those of Delaware University from 1994 until 2014 at Berenice and Southampton University at Myos Hormos (Quseir el-Qadim) from 1999 until 2003.

One must also imagine the intensity of maritime traffic in the ancient periods. The currents, the permanent north wind, and the reefs lying just below the surface of the sea, will have caused havoc with shipping, and numerous wrecks must be spread across the bottom of the Red Sea. And yet there have not been many such finds and no archaeological campaigns have been conducted in a systematic manner in order to search for these ancient shipwrecks. One of the main reasons for this has been the fact that these zones were often under military control and thus not easily accessible (Elsayed, 2012).

Figure 2. Part of the Sharm el-Sheikh shipwreck cargo (after Raban, 1971: 150).

Underwater archaeological discoveries on the Egyptian Red Sea coast

We should mention that the underwater surveys were generally conducted opposite the above mentioned archaeological sites, the period from 1968 until 2010 witnessed numerous other missions engaged in surveying and underwater excavation on the Egyptian Red Sea coast in order to expand our knowledge and to fill in the gaps in the maritime history and archaeology of the region (Elsayed, 2012).

The Association for Underwater Research in Israel (AURI)

A group of Israeli archaeologists conducted a survey between 1968-1973 on the eastern coast of south Sinai during the Israeli occupation of the peninsula. They discovered about 20 underwater archaeological sites: only three of them were excavated under the direction of the underwater archaeologist Avnar Raban. The first site was the shipwreck of Sharm el-Sheikh, dating to the 17th century and excavated from 1968-1970. The second was the Mercury shipwreck in 1971 and the third was the Na'ama Bay shipwreck in 1973.

The Sharm el-Sheikh shipwreck

It was discovered in 1968, at a depth of 8 m and 80 m from the shore, by two amateur divers searching for seashells. The AURI sent a research group, which recorded hundreds of small vessels, mostly jugs and bottles. In 1969, a salvage expedition was organised over six weeks to protect the site from damage. As a result of this, the remains of the ship were revealed and more than 1000 items of pottery of different types (Fig. 2), and 20 different Turkish pipes dating to the 17th century were rescued[1]. The hull of the shipwreck was documented; it represents the bottom of the vessel (50 m long × 13 m wide)

The Mercury-carrier shipwreck

Five km north-east of Sharm el-Sheikh, the mercury-carrier shipwreck was discovered by a Swiss tourist, Sapp Winkler. At a depth of 30 m, he saw huge spherical jars and several bronze bowls. The AURI was involved to relocate the site and arrange a research project. It was not a well preserved wreck. The jars were found scattered on a very steep slope and most of the cargo and the ship were covered and incorporated into the rock. In 1972 a salvage excavation was mounted to gather a maximum of objects while causing a minimum of damage. Once the site was documented and mapping completed, pottery vessels, a fragment of glass and part of a wooden beam were lifted. During the excavation, small liquid bubbles were found, a sample of which was taken to the surface and proved to be pure mercury[2]. More of this material was also found in the bottom of some of the bronze bowls, hence the name the mercury-carrier. The main cargo was mercury, which was on its way to gold[3] mines in Arabia or Africa (Raban, 1973: 179-183). Two metal anchors of the ship were found. After studying the artefacts, the shipwreck was dated to the late 14th or early 15th century AD (Raban, 1990: 303-305).

The Na'ama Bay shipwreck

Other shipwrecks have been discovered by the AURI, including the Na'ama Bay shipwreck. It was found 2 km north of Sharm el-Sheikh, between 12 to 20 m deep and dates to between the 12th and 14th century.

Another shipwreck, known as the Lone Mushroom from the 17th century, was situated 7 nautical miles west of Ras Mohamed, at 20 m depth. Neither was well preserved (Raban, 1990: 299-302).

Lastly, between 1967 and 1974, a survey was conducted around the island of Jezirat Fara'un, in the gulf of Aqaba, both in the water and on the island. The search revealed two stone jetties near the shore, a concentration of pottery at the west at a depth of between 7 and 9 m, and a small harbour on the west side of the island (Flinder, 1977: 127-139).

Amphorae of Fury Shoal, Ras Banas – Berenice

In November 1991, an Italian photographer, Pierfranco Dilenge, was enjoying a cruise when he made the marvellous discovery of a shipwreck in the area of Ras Banas at Satayeh reef during a

[1] In 1978 after the peace agreement, the finds from the Sinai coasts returned to the Egyptian antiquities service (http://www.antiquities.org.il/article_eng.aspx?sec_id=27&subj_id=232 [Accessed: February 24th 2015]
[2] The main mercury mines were in Teima, northern Hijaz, and in Cyprus.
[3] The mercury was used as a melting and purifying agent in the gold manufacturing process.

night dive, in the region of Berenice[4]. This place is a complex of reefs and stony coral outcrops known as Fury Shoal[5] with a variety of different reef formations. The discovery site was at the bottom of a small sheltered area about 7 to 10 m deep and the amphorae lay more or less grouped together at the foot of the reef on a sandy bottom. Two brothers from Milano, named Bicciato, obtained authorisation to work on the site. It was a Roman shipwreck and the keel was buried in the sand. The amphorae were Dressel 2-4 type of the 1st century AD. The concretions on some held them fixed to the bottom while others had spectacular stone coral formations. This vessel may have been transporting wine across the Red Sea, perhaps destined for India (Mouton, 1996: 94-95).

The mission of the Institute of Nautical Archaeology-INA Egypt

The shipwrecks survey of 1994

INA-Egypt, an American mission, conducted a survey in 1994 on the Egyptian Red Sea coast and excavated a 17th century shipwreck from 1995 to 1998. Because of the threat to the sunken

Figure 3. Different types of juglets at 24 m depth (photo, Mohamed Elsayed).

[4] Berenice, is the southernmost of the Egyptian Red Sea ports, it was founded by Ptolemy II in the early 3rd century BC and named it after his mother. Strabo(17.1.45), Pliny the Elder (NH 6.26.123) and the Nicanor ostraca archive suggest peak activity in late 1st century BC- 1st century AD. It became the homeport of the Roman fleets heading south towards the coasts of Africa and in the direction of Eudaimon, present-day Aden, which was the main trade centre on the Indies route and end-point of caravans coming from the east (Sidbotham, 1992: 20-21).

[5] In 2010 Southampton University and Alexandria University with cooperation of SCA conducted a scientific survey of this region.

heritage through the dramatic increase of sport diving, the INA-Egypt decided to undertake a survey of the Red Sea coast in order to record all information on what can be considered as a non-renewable resource before it was lost forever (Haldane, 2000a; 2000b). For five weeks in 1994, the mission reported wreck sites and anchorages during an official survey in an area between Quseir in the south and Hurgada in the north (about 200 km long), as well as in south Sinai. Seventeen of the sites produced archaeological material. The most significant of these sites date to the Ottoman period. The first site of the survey was the modern harbour of Quseir, which provided a collection of late 17th and early 18th century clay pipes, cups and jars from a depth of 5 m. The second was Quseir el-Qadim located 8 km north of the modern city of Quseir. An iron anchor dated to the 18th century was recorded on the south side of the harbour.

Other important sites were investigated at Marsa Gasus (Spy Harbour) and Marsa Gawasis (Harbour of Spies). The first site produced only the broken base of jar, a 3 metre-long iron anchor and a smaller iron grapnel anchor. The second site produced nothing despite the Pharaonic remains on land discovered by Dr Abd Elmonem Abd Elhalim Sayed in 1978. Both sites have a sandy bottom, so a remote sensing survey was more productive than a visual survey. The survey continued to the north at Hurgada where local divers had reported many wrecks in the area. A keg amphora trapped on the seabed by a hard coral layer around its base was recorded. Another survey was conducted in front of the fortress of Abu Sha'ar, 20 km north of Hurgada. Excavations were led by Steven Sidebotham of the University of Delaware but nothing was found. The most important discovery reported by Egyptian sport divers was the 17th century shipwreck at Sadana Island to the south of Hurgada.

Sharm el-Sheikh was the last part of this survey. Here we explored Tiran Island and visited the reported site of a shipwreck, where only some pottery was found, similar to the local wares which had been found in Quseir harbour. Some other sites were located that had been recorded by Avner Raban and other Israeli archaeologists in 1970, such as Na'ama Bay, Sharm

Figure 4. One metres high storage jars or zilla moved from the shipwreck at 24 m depth (photo, Mohamed Elsayed).

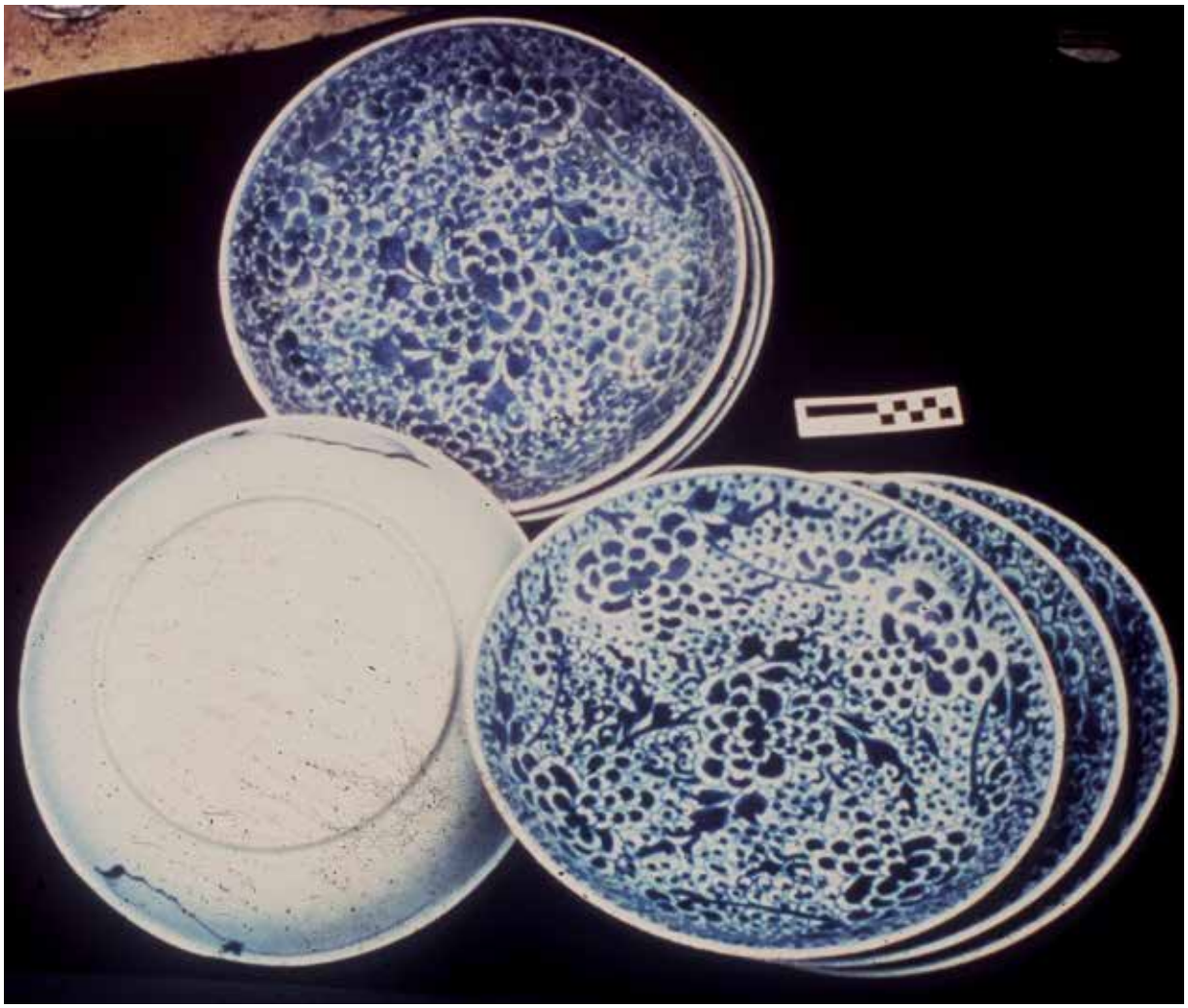

Figure 5. Porcelain dishes from the Sadana shipwreck (photo, INA 1995).

el-Moya and Sharm el-Sheikh, which is now the military harbour for the area. Potsherds were found in the first two coves, and while seeking the exact location of the 17th century shipwreck at Sharm el-Sheikh discovered by Avnar Raban, some broken jars, discarded ballast stones, a clay pipe and scraps of porcelain were found.

The Sadana Island shipwreck

As mentioned before, the Sadana Island shipwreck was discovered in 1994 south of Hurgada during the INA survey with help from some Egyptian sport divers who wanted to protect the shipwreck from looters. An unknown group had dived on the wreck in 1991 and worked illegally without permission from the Supreme Council of Antiquities, leaving concrete blocks and white plastic labels behind. One of the Egyptian sport divers described the location of the site. There then followed three days of diving by the INA to determine the extent and the nature of the shipwreck. It was excavated in 1995 with the cooperation of SCA to protect the artefacts from dispersal and destruction and to provide archaeologist with a crucial link to the first and oldest worldwide trade network. Complete records of a previously undocumented hull type were gathered in an attempt to understand its technological origins and its social context (Haldane, 1996; 1994: 1-4).

The shipwreck site covers 50 × 25 m along the sandy sloping base of a coral reef at a depth of between 27 and 42 m (Haldane, 1996c: 853-863). A stack of three grapnel anchors 4 m long marked the bow, 30 large storage jars called in Arabic *zilla* (Fig. 4) dominated the centre of the site and, in the stern, a large pile of small earthenware water jars and water pipe bowls. More than 320 porcelain objects were recorded and raised in 1995, representing a special class of export wares created by kiln centres in China for the Middle Eastern market (Fig. 5). Twenty different object types were noted, 140 dishes measuring 34.4 cm and 37.8 cm in diameter, in addition a variety of plates, cups, small and large bowls and a single triangular-section bead were documented. More than 100 *kullal* (Juglets) were excavated (Fig. 3), 20 types of them are similar thin, grey/brown fabric. Those raised represent only 10% of the existing *kullal*. One small section of the area showed that there are at least five layers of juglets over a field approximately 7 × 6 m. More than 160 earthenware objects were excavated in 1995, including tobacco pipes, a *kursi* (charcoal holder of a water pipe) glazed and unglazed bowls, spouted containers with small mouths, transport amphorae, bottles, pitchers, and *kullal* with a filter at the junction between neck and body. More than 10 different shapes and decorative types of *kullal* were discovered in 1995 and these *kullal* bear strong similarities to those excavated from the Sharm el-Sheikh shipwreck discovered by Avnar Raban in 1970. Other finds include some copper objects and three types of glass bottles, two of which fall into the category of case bottles.

Beside these discoveries, the wreck presented a rich variety of organic remains, such as wooden jars and bottle stoppers, as well as an amount of charcoal, coconuts, aromatic resin, pepper, coriander and coffee. These products are among the most frequently cited spices in Ottoman archival documents. They served not only as spices but also as medicines.

Concerning the hull, we must mention that the shipwreck construction shared some features with the Sharm El-Sheikh wreck discovered by Raban in 1970, but it was an undocumented tradition. Thus, the ship is extremely important, because it was not built according to standard European methods. The seasons of 1996 and 1998 were devoted to the study of the hull. Many questions were asked about the origin of the construction of the ship. Was it Indian or Egyptian? It is not European, as it does not resemble Dutch, Portuguese, or English ships active in the Indian Ocean. It is even unlike what is known of Indian Ocean sewn ships of the time. Also, the wood is not a reliable indicator of the origin. The excavations were stopped definitively after the season of 1998 because of the budget. The excavation should be continued in order to explore the nature of the ship, its cargo and its crew, and to ensure that this part of Egypt's nautical heritage will be correctly investigated and preserved.

Lastly, all artefacts discovered in the Sadana Island shipwreck were transported to Alexandria's Maritime Museum where a new laboratory for wet objects is being prepared with the assistance of the Supreme Council for Antiquities. After restoration the artefacts were conserved in the Maritime Museum (Haldane, 1995; 1996a; 1996b; 1996c; 1997a; 1997b; 1999; Haldane, 1998).

Quseir shipwreck

The history of this discovery begins in 1995 during the excavation season on Sadana Island shipwreck[6]. Mark Maurice, then a member of Subex Diving centre at Hurgada and Quseir, announced that he had located the remains of a wreck at Quseir[7] at a depth of 65 metres, saying that a very

[6] In 1995 the mission obtained some information about a poorly preserved roman period wreck in the deep water in the same harbor of Quseir Al-Qadim.

[7] Given the depth of the Red Sea and the difficulty in finding shipwrecks, specially of the Roman period, the only two recognised of this era remain those of Fury Shoal and of Quseir

thin layer of coral covered the whole cargo and he provided a photo of the wreck and a drawing of the neck of a Campanian amphora type dating to the 1st century AD. In February 1996, the INA-Egypt visited the wreck and noted that the ship had struck the reef on the southern side of the marsa. Its cargo of amphorae was somewhat scattered by the difference in level of the reef, but the largest part of this cargo was intact and held in the sediment. It is possible that this vessel sank on its outbound voyage towards India and that it belonged to one of the fleets launched by Augustus[8] to take power and control of trade in the Indian Ocean.

In 2000, INA-Egypt undertook a few dives in preparation to excavate the site, however, because of the depth; the wreck could only be excavated using much specialised diving equipment including trimix breathing gas (helium, oxygen and nitrogen) and thus well-trained archaeologists. When used at a depth of 65 metres, compressed air will only allow a diver to work for a very short time each day, about five to seven minutes per diver once a day. INA-Egypt concluded that it could not excavate the wreck in such conditions. Since 1996, a British company has expressed interest in supporting the Quseir shipwreck excavation project, but it pulled out because of financial and technical constraints (Haldane, 2000b).

The mission of In Situ Archéologie Itinérante and the SCA (Supreme Council of Antiquities)

In 2001 the French group In-Situ, in cooperation with the Department of Underwater Antiquities, undertook a survey in the southern part of Egypt's Red Sea coast, from south of Safaga until Marsa Alam (230 km) in search of ancient shipwrecks. They conducted land and underwater surveys in several sites, starting from Marsa Gawassis (Harbour of Spies), 20 km south of Safaga, Marsa Gassus (Spy Harbour), Myos Hormos/Quseir Al-Qadim, Mangrove Bay south of Quseir, Marsa Gabel Elroussas (10 km north of Marsa Alam), Marsa Nakari (20 km south of Marsa Alam), Marsa el-Nabaa el-Soghayar (30 km north of Marsa Alam), Marsa Shagra, Marsa Wadi Assila, and the exterior of Marsa Alam port. The 15 days of survey revealed interesting results in two sites, the first one is outside the port of Marsa Alam, where we discovered two amphorae at a depth of 15 metres that it could not be identified because of coral concretions. The second site was at Marsa Shagra, at 32 metres depth in the south of the bay, where an iron anchor from the 18th century AD was found. However, the survey area needs more investigation, especially using sophisticated material, like side scan sonar and sub-bottom profiler.

The mission of Southampton University, Alexandria University-CMA and SCA

In 2010, the underwater survey conducted by Southampton University in cooperation with Alexandria University-Centre for Maritime Archaeology (CMA) and the Supreme council of Antiquity (SCA) from Marsa Alam to Ras Banas revealed very interesting results. The aims were to discover ancient shipwrecks from the Roman period and to document all the discoveries. Three interesting sites were documented. The first site was Fury Shoal, which was discovered in 1991. There were some scattered Dressel 2-4 type amphorae and some Egyptian amphorae at a depth of 8 metres. The second site was Abou Fandira, where some Dressel 2-4 type amphorae and 2 iron anchors were discovered. The last site was Sernaka Island, where some archaeological evidence was discovered, like a stone anchor and a *pithos* type amphora[9].

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[8] Augustus sent 120 ships in one year to sail from Myos Hormos («Port of the Mouse», now Quseir el-Qadim) on the Red Sea directly to India.

[9] A report in arabic were written about this survey in 2010 by the General Department of Underwater Antiquities.

All of these discoveries showed the importance of the region and we must plan for a longer mission to document the underwater archaeological heritage, which is threatened by sports divers.

Conclusion

These missions have not yet provided full enough results in order to come to definitive conclusions except the INA mission on the Sadana shipwreck. Most of the shipwrecks that have been discovered date no farther back than the 17th century and there are only two known wrecks from the Roman era, those of Fury Shoal and of Quseir, and these were discovered by diving enthusiasts. They will, nonetheless, help to increase our knowledge of the flourishing trade of the early 1st century. A study of these shipwrecks and finds which have been discovered along the Red Sea coast might suggest that there are still wrecks to be discovered, while respecting a general plan for the survey and excavation of the Egyptian coast of the Red Sea. There is much more to be discovered about this crucial sea that provides a link from the Indian Ocean via river and canal to the Mediterranean Sea.

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