

# Operating and defending Red Sea harbors and Eastern Desert trails in the Hellenistic and early Roman periods: the case of Berenike



**Abstract:** The Hellenistic road network in the Eastern Desert and Red Sea coast of Egypt has been at the nexus of important archaeological research on several sites in the region in the second half of the 20th century. The work was focused at first on the Roman remains of this network, but with time it became evident that the Romans had made use of a system developed in Hellenistic and even earlier, Pharaonic times. French and Italian investigations at Marsa Gawasis, Gebel Zeit and Wadi al-Jarf contributed data on the marine expeditions of Old Kingdom rulers into the Sinai and Middle Kingdom rulers to the Land of Punt. Key information for the Hellenistic period came from the French exploration of gold mines and fortified features at Samut and the fort at Abbad. Of equal importance was the work of a Dutch–American and then Polish–American team at the Hellenistic and Roman coastal harbor of Berenike Trogydyca. This work uncovered remains of a Hellenistic port-base in the Eastern Desert region of Egypt, giving grounds for broadening a general understanding of the daily functioning, logistics, and functional interdependence of the Hellenistic road network in the region, which enabled in turn a comparison with the Roman counterpart. The present paper considers the functioning of this system based on the author’s work in Berenike.

**Keywords:** Hellenistic Eastern Desert, Red Sea ports/harbors, Berenike, Hellenistic forts, Eastern Desert trade routes

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## INTRODUCTION

Defense, supervision and efficient functioning of trade ports and stations, and centers of exploitation of mineral resources were core military, economic and political issues for every administration. They were frequently located in faraway regions, inhabited by tribal groups not always easy to control. Yet their economic and strategic importance was huge. A case in point is the Eastern Desert with its important passages and mineral resources (Sidebotham, Hense, and Nouwens 2008: 70–84, 151–195, 213–226). Recent research has yielded extensive new data

on, among others, the hundreds of great and small Roman posts constituting a defense and exploitation network in this vast and difficult terrain, from a geographical and climatic, as well as military point of view (Zitterkopf and Sidebotham 1989; Sidebotham 1997b; Cuvigny 2003). The archaeological record for this developed and permanent network, which the Ptolemaic monarchy first introduced (improving upon a Pharaonic concept of temporary ports and wells) and which was a model for the Romans, had been spotty until recently (Sidebotham 2011: 28–31, 55–68).

## BERENIKE TROGODYTIKA

Work at Berenike Trogodytika, one of the main sea harbors in the region, initiated by the Berenike Project (University of Delaware/Polish Centre of Mediterranean Archaeology, University of Warsaw) in 2010, uncovered larger fragments of Hellenistic defensive, industrial and economic remains. Source queries and fieldwork in an international multidisciplinary research environment have allowed for a preliminary reconstruction of the appearance and functioning of the Hellenistic town/base of Berenike and the centers on the inland desert trails connecting Berenike with the Nile Valley.

In the Hellenistic period, Berenike appears to have comprised three districts [Fig. 1]. An industrial and storage area on a rocky plateau in the western part of the site (location of a presumed fort), an anticipated habitation district lying on the fossil-reef peninsula in the eastern part

of the site (where the Roman and late town were later located), and the central region connecting the previous two. This was a wide sandy spit between two marine lagoons, a shallower one to the north and the southern one which was most probably a natural harbor basin. It was occupied by a series of unidentified structures. Extensive remains of processing of turtleshell, semi-precious stones, ostrich eggshell fragments and other material, discovered in a refuse dump that surrounded and later covered some of this architecture, may indicate that we are dealing with a sector of craft workshops.

At least three principal occupation phases have been distinguished with in the remains of the presumed fort, a complex 150 m long and 80 m wide in its developed form. First, there was a small square stone building with at least three corner towers. A huge round cistern may

have been cut into the rocky ground in the southeastern corner. Extending south of this structure was flat ground surrounded by a V-shaped ditch some 2 m deep, uncovered in its southwestern corner (Sidebotham and Wendrich 2002: 24–27; Sidebotham, Hense, and Nouwens 2008: 162–164, Fig. 7.13). It may have been an animal pen, in the initial period for the elephants shipped in from the south and unloaded at Berenike. A cistern partly cut in the rock, at least 2 m by 3 m, in the northwestern part of this area and partly explored archaeologically, can serve to substantiate this idea (Sidebotham 2007: 32–34, Pls 4-1, 4-2, 4-3), whereas the presence of elephants as such is attested by the find of an elephant molar tooth from the northern part of the discussed area (Sidebotham and Wendrich 2002: 41; Sidebotham 2011: 50).

The second phase comprises a huge more or less rectangular structure made up of two or three large square inner courtyards, which were built onto the small old *tetrapylon* from the first phase. The complex contained numerous storage areas and presumably workshops, grouped alongside the western and southern outer wall. Two small gates led to it. One of the gates was located east of the old fort, the second led from the west onto the northern of the inner courtyards. At least two large siloses or granaries (approximately 5–10 m by 5 m) and a rock-cut open cistern were located in this courtyard (Sidebotham 2007: 32–36). Considering the size and developed nature of the complex, one should see the second phase as the main occupation phase of the Hellenistic fort, dated most probably to the mid 3rd century AD.

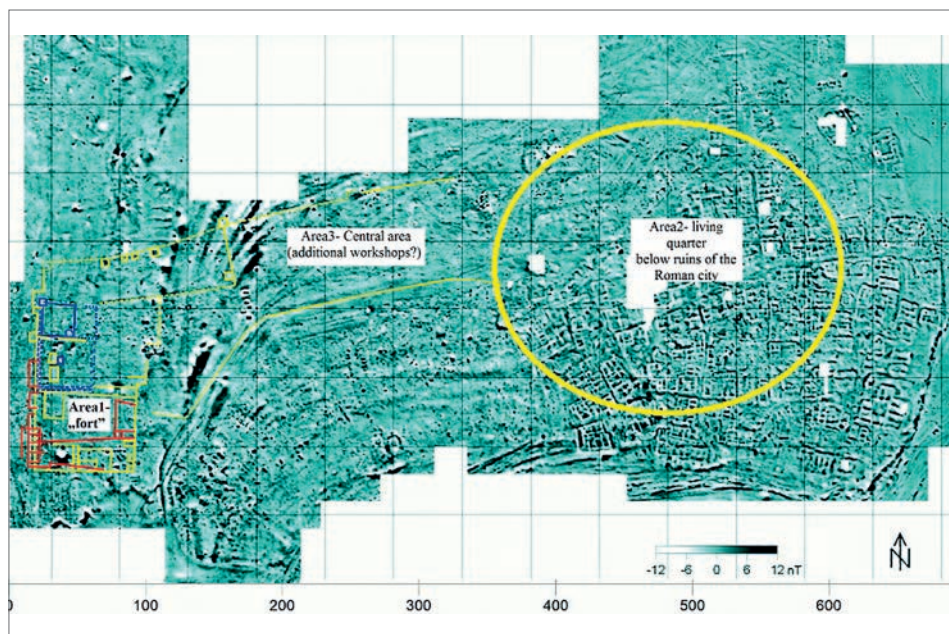


Fig. 1. Magnetic map with Hellenistic structures (PCMA UW–University of Delaware Berenike Project | mapping and processing T. Herbich, D. Świąch and R. Ryndziejewicz; interpretation M. Woźniak)

Fortifications joining the fort with the northern part of the habitation district in the eastern part of the site should be linked to this phase [Fig. 2]. North and northeast of the old fort these fortifications comprised two lines of defense walls with a small fortified gate in the outer northern line. Remains of this wall were uncovered in 2013. They were made of broken stone and reinforced in key places with dressed and undressed blocks of gypsum/anhydrite (Woźniak 2017: 45–46). Based on the archaeological record, it was possible to trace the course of the fortification on the magnetic map of the site, at least in the middle and western parts. In the west, the defenses started from the northern side of the old fort and extended northeast to the northern edge of the fossil reef where the civil town was located. There were two

breaks in the course of this wall, at least one of these marked by a square corner tower (Woźniak 2017: 46–47). The wall was dated to the 3rd century BC. A small fortified gate in the northern outer line functioned briefly, only to be blocked in the mid 3rd century AD. A well was subsequently installed inside the structure, enlarged to include a rock-cut chamber for collecting water and an underground and aboveground installation for its distribution (including two open pools for a minimum of 17,000 liters of water). The Hellenistic domestic architecture that presumably existed since the 3rd century BC has yet to be properly investigated under the thick accumulations of later periods. Some sections of late Hellenistic walls have been located at the bottom of a deep stratigraphic trench in the center of the town (Sidebotham 2007: 56).



Fig. 2. Preserved fragments of the northern line of Berenike fortifications (PCMA UW–University of Delaware Berenike Project | photo S.E. Sidebotham)

Reading the magnetic map of the site, one can also trace some kind of defense wall on the southern side of the sandy spit. There seem to have been square reinforcing towers facing south, onto the lagoon of the port. It may be assumed that it marks the northern extent of the southern lagoon and presumably protected the city from the natural harbor operating there (Woźniak 2017: 47).

The old fort was rebuilt in the second half of the 3rd century AD. The reasons for this are not known, perhaps the first-phase structure had been damaged, but in any case it was extended to the east and west. This third occupation phase of the fort incorporated the walls and units of the preceding phase.

The location of the town and its fortifications, taking advantage of the natural setting of reefs and lagoons in this part of the coast, secured the position against potential attack from both land and sea. The southern lagoon became in a way an inner harbor of the military part/base. This ensured security for what was the main operational *raison d'être* of the center, that is, the organization of expeditions moving out south, unloading of animals and goods brought back, supplies for the expeditions as well as for the fort and its garrison etc., most of which would have been carried out by sea (Königliche Museen zu Berlin 1895–1912: 452; Desanges 1978: 297–298; Sidebotham 2011: 48–49).

## HELLENISTIC URBAN CENTERS ON THE RED SEA

Very little can be said of the appearance, fortification systems or exact location for that matter of other cities from the Ptolemaic age on the western Red Sea coast (Cohen 2006: 305–344; Sidebotham 2011: 178–187). It is fair to assume that, much like Berenike, the towns of Ptolemaic foundation would be found in the direct neighborhood of the location of their Roman counterparts (Whitcomb 1996; Peacock and Blue 2006; 2007). They would have had good access to the sea or to one of the many now silted up lagoons, offering a safe haven from high waves. Like Berenike, they would have probably been fortified. Despite years of research, none of these assumptions have been confirmed by any archaeological discoveries of substance.

The most important of the Ptolemaic Red Sea ports, apart from the northernmost Clysmā/Kleopatris/Arsinoe located

at the head of the Gulf of Suez and linked to the Nile Delta by a canal dug by the Achaemenid Darius the Great and refurbished by Ptolemy II (Roeder 1959: 122; Fraser 1972/I: 177; Cohen 2006: 308), were Myos Hormos (Quseir al-Qadim), Nechesia (Marsa Nakari) (Seeger and Sidebotham 2005), and Ptolemais Theron, which has not been satisfactorily located but which may lie near the modern village of Adobone near Aqiq in Sudan (Seeger et al. 2006).

The narrow rocky headland at Marsa Nakari, squeezed between the mouths of two wadis washed by the sea, immediately brings to mind the western part of Berenike [Fig. 3]. The remains of Roman Nechesia demonstrate a similar general regularity of plan as the “fort” of Berenike and is surrounded by strong fortifications (Sidebotham, Hense, and Nouwens 2008: 166–167, Pl. 7.15). The Ptolemaic

pottery sherds and coins recorded from the site could indicate Roman reuse of the ruins of Hellenistic Nechesia to build a fortified center (although fortifications are rare in the architecture of Roman Red Sea ports).

The defenses of Ptolemais Theron as briefly described by Strabo (16.4.7) appear to be very much like the fortifications of Berenike, being situated on a promontory closed off by a system of walls and a moat. It probably had access to the sea, although not through a sea lagoon as at Berenike, but through one of the now silted up distributaries of a huge estuary in which it was located.

Certain regularities of Ptolemaic strategy in establishing such cities/ports/bases can be determined based on the three cases mentioned above. One such regularity is a headland location easy to

fortify and defend, another the defense walls protecting the locations on the landward side. Access to the sea had to be ensured to allow for shipping in supplies as well as reinforcements, if called for.

The army posts provided a strong and sufficient base for Ptolemaic trade and exploration with the south and southeast, that is, eastern Africa and South Arabia. These were mighty fortresses considering the conditions in the region, hard to storm both from the sea and from the land, practically invincible when the main threat were the nomadic Trogodytai from the Eastern Desert, forming small irregular bands of brigands with no siege techniques to breach fortifications, or perhaps the pirates from the other side of the Red Sea, the Nabataean or other Arab tribes. The bases were interconnected via well-run sea connections and from at least the 1st century BC they were also connected with the Nile Valley via the north channel (Stela from Pithom 24, Desanges 1978: 263–264).

The weakness in this chain of transport was the further transfer of goods brought by the increasingly substantial expeditions from the south and, from the 2nd century, also from the east. These goods were sent to the nearest or the most convenient harbor. In an extreme case, they could be moved to Arsinoe/Cleopatra and sent by the inland canal to the Nile (but this route was cut off when the channel silted up quickly). However, animals such as elephants, valuable and highly sensitive to the inconvenience of maritime transport, and obtained with such expenditure of effort, needed to reach their destination by the shortest route possible. The best case scenario was assembling the animals in one place and

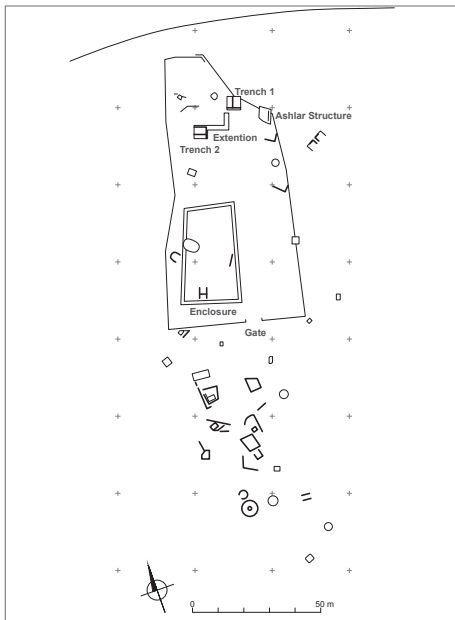


Fig. 3. Marsa Nakari archaeological site (After Seeger 2001: 80, Fig. 2; digitizing M. Momot)

then walking them to one of the cities in the Nile Valley (the first one possible downstream from the First Nile Cataract, that is, Syene or Edfu) (Casson 1993: 252–254). Sailing the Red Sea was fast, but highly dangerous due to reefs and strong winds (Sidebotham 2011: 51); it was economically more feasible to reduce the risk to a minimum (also for cargo ships). Seasonal wind direction and strength made sailing the heavy animal transport ships north of Berenike impossible. It appears that the leg of the journey from Berenike to Myos Hormos and especially to Clysma was plied only by small vessels, sailing their way to windward with great effort (Casson 1989: 284; Nappo 2010: 342–346).

Rock-cut inscriptions and graffiti at places along the trails cutting across the Eastern Desert (Bernard 1972: 44–54; Sidebotham and Zitterkopf 1995: 49, Fig. 17;

Bagnall et al. 1996; Yoyotte and Charvet 1997: 253; Wilfong 2000: 26, 81; Sidebotham 2011: 29, 42, 50–51) [Fig. 4], as well as archaeological finds showcase the roads up which the animals imported from Africa as well as African, Arabian and later also Indian goods were sent from Berenike, Nechesia and Myos Hormos to the Nile Valley. The main route started from Apollonopolis Magna (Edfu) and ran across the desert mountains to branch at Abu Rahal between the forts of Samut and Kanais, the southern one reaching Berenike (Sidebotham and Zitterkopf 1995: 45–48; 1996: 357–371; Sidebotham 1997a: 385–387), the northern Nechesia (Sidebotham 1997a: 388–390; 1999: 364–368). The other one, most likely the oldest of these routes, connected Myos Hormos, a port established just south of the old Pharaonic harbor of Marsa Gawasis, with Koptos in the Nile



Fig. 4. Communication routes in the Eastern Desert of Egypt in the Greco-Roman period (After Redon 2018: Fig. 1 | processing S. Rempel)



Valley. It ran through Wadi Hammamat, which offered a convenient passage from deep antiquity, perhaps even the prehistoric period, to modern times as the numerous graffiti of travelers from different ages demonstrate (Coyat and Montet 1912; Goyon 1957; Bernand 1972; Meyer 1999; Peden 2001: 345). One of the oldest known maps, the so-called “Turin Papyrus” from the reign of Ramesses IV (1163–1156 BC) also refers to this route (Harrell and Brown 1992a; 1992b; Sidebotham, Hense, and Nouwens 2008: 64–66), showing three wadis with wells, quarries and mining settlements.

The third road, the southernmost and also the least investigated route, would have passed from Berenike, or more likely from an undiscovered harbor near the Islamic port of Aidab, to Syene,<sup>1</sup> making its way southeast of Wadi al-Hudi, past the huge Ptolemaic fort at Abraç, and then toward the coast, either northeast of Berenike (which would be strange, however) or straight southeast.

Caravans starting from the heavily fortified port/bases had to pass through inhospitable rocky mountains, which required precise logistical planning as well as maintaining relations with groups inhabiting this region. Written sources indicate

that the caravans sent from the Nile Valley in the early Hellenistic period, to supply the mining settlements and the military stations in the Eastern Desert, for example, as well as the expeditions of exploration were organized and commanded by high-ranking military commanders most probably designated by royal order (Diod. Sic. 3.18.4; Fraser 1972/II: 308–309, 370–374; Desanges 1978: 297–298; Sidebotham 2011: 44, 51). It would indicate a military rather than private initiative in this respect with the convoys being run by soldiers, most often experienced mercenaries filling the double role of crew and escort, hence reducing their overall number. Neither would they have been frequent. The ports were supplied mainly from the sea (perhaps with the exception of small cattle transports). The bigger ground transports from the Nile Valley, leading animals that were difficult to keep and larger quantities of goods, and sometimes also collecting the mined precious metals from the mining centers, were presumably even rarer. They were probably planned at the end of a specific activity of the expeditions, presumably only once during a season. They were prepared, carried out and escorted by strong army units<sup>2</sup> (because of considerable numbers taking

1 This appears to be the road taken by Arab troops sent to conquer Upper Egypt, who set out for Aswan from the port of Aidab founded specifically for the disembarking of this army (see Power 2012: 97–100, maps 3, 4).

2 A papyrus dated to the year 223 BC records a payment of two talents and 1860 drachmae to 231 people in remuneration of a three-month expedition to acquire elephants; neither the origins nor function of these people has been given (Sidebotham 2011: 46). Neither is it clear that these men constituted the full crew of an expedition or only the part responsible for a specific stage in the activities. A graffito left by three Greeks from Crete on one of the statue of Ramesses II in Abu Simbel described them as members of such an expedition, although without giving their specialty (Sidebotham 2011: 48). They could have been mercenaries or experts in some field (sailors, constructors of some kind, but rather not animal handlers). These would rather have been Indians or local hunters from the Trogodytai or other tribes, inhabiting the region where the hunt was taking place.

part in the expedition, not to mention the number of animals) and presumably much bigger and fully self-sufficient where supplies are concerned.

Naturally, supplies prepared for the road in Berenike, for example (most likely brought by sea) may have been augmented with whatever was needed, especially drinking water, along the way. The small mountain wells were sufficient for the small caravans headed for the mining settlements in the mountains. The big caravans must have aimed for cisterns located at specific points along the caravan road, slowly filled in from the small wells and holding appropriately large quantities of water ready to be used at once. Strabo (17.1.45) and Pliny the Elder (*HN* 6.102–3, 168) reported Ptolemy II Philadelphos ordering the preparation of a series of *hydremata* to ensure water supply on the trail. Strabo talks of cisterns being built on commission from the king, whereas Pliny even mentions a few place names, adding that it took 12 days for the caravan to reach the Nile from Berenike (Cohen 2006: 320). Both, however, mistake the destination in the Nile Valley, assuming it was Koptos, as in their times (Bagnall 1976: 35), instead of Apollonopolis Magna/Edfu situated 64 km south of Koptos (Cohen 2006: 320; Sidebotham 2011: 42). Reaching Koptos from the Red Sea, whether from Berenike or Nechesia, would have taken no more than 10 days presumably. The sandstone stela from Bir Jayyan is proof for the Edfu road and suggests that at least some of the stations were established already in the reign of Ptolemy II (Sidebotham and Wendrich 1995: 361) [Fig. 5]. This 12-line

text in Greek, founded by Rodion from Ptolemais, mentions a *hydrema* built on the spot, that is, 461 stadia from the Nile, in 257 BC at the order of Philadelphos (Bagnall et al. 1996; Cohen 2006: 321; Sidebotham 2011: 29).

Field surveys and archaeological testing from the early 1990s (by the Berenike Project and Ifao expedition among others) have located and in some cases even excavated a few sites and features connected with the operation of Hellenistic trails between Berenike and Nechesia on the Red Sea coast and in the Nile Valley. These were either large forts or small complexes. The large forts presented a massive regular core (with or without corner towers), occasionally with an outer wall circuit enclosing a larger and irregular space and following the ground topography. The small complexes did not have strong fortifications, relying on a circuit wall for safety. They consisted of a few small chambers attached to the outer



Fig. 5. Greek inscription on a stela from Bir Jayyan (After Sidebotham and Zitterkopf 1996: 384, Fig. 21.7)

wall, and a set of wells with one or a few large cisterns. A special case in this second group are the small forts very similar to the later Roman *praesidia*, which were presumably manned by small garrisons and which were positioned at important points along the trail or at key well localities.

The large forts included Abraq, Kanais, and Samut with its regular layout [Fig. 6] along with the slightly smaller Samut Nord (Redon and Faucher 2015; Redon 2018). As for the small complexes, one should mention the small fortified *hydreumata* (or rather protected from being engulfed by the sand) at Abbad, Abu Rahal, Abu Midrik, Rod al-Legah, Seyrig, Umm Gariya, and Abu Hegilig South, possibly also Rod Umm al-Faraj and el-Dweig [Fig. 7]. The small fort in Abu Greiya (Kainon Hydreuma/Vetus Hydreuma), one of the two “lower” forts there, might constitute a special instance of the small complex [Fig. 8]. The importance of the locality and the fort itself is confirmed by the early Roman investment there, enlarging the fort itself and adding four other forts of different size in its immediate vicinity (Sidebotham, Hense, and Nouwens 2008: 319–321). An observation tower was also constructed at this time in the foreground of these forts.

None of the known sites, apart from Samut, Samut Nord and Abbad investigated by the French team in recent years (Brun et al. 2013; Redon and Faucher 2015), have been excavated archaeologically, hence their dating is based on material from surface surveys (Sidebotham and Zitterkopf 1996: 361–377). It is uncertain therefore how many of these are actually of early Hellenistic origin (as was surely

the case of Kanais and the *hydreuma* at Bir Jayyan) (Sidebotham and Zitterkopf 1996: 361–364), the others being late Hellenistic and early Roman, intended as support and security for the increasingly private trade (Fraser 1972/I: 175, II: 295, n. 334; Sidebotham 2011: 34). Military protection of the mining centers in the Eastern Desert and the caravans transporting products imported through the Red Sea ports is mentioned in an inscription from Koptos, dedicated to Ptolemy VIII Euergetes II and his sister-wife Ceopatra III by Soterichos son of Ikadion, strategos of the Thebaid, a Cretan, during the king’s reign in October 130 BC (Bernand 1977: 253–261). The presence of garrisons of this type for an earlier period (presumably only in key locations) is confirmed by an inscription from the Paneion in Kanais (Bernand 1972: 44–46; Sidebotham 2011: 29). The forts in Samut and Samut Nord also seem to have been raised for this particular purpose, the location lying at the core of a large gold-mining center.

Substantial fortifications and a strategic location of the Hellenistic port bases, such as Berenike, Nechesia, and presumably also Ptolemais Theron (manned mainly by soldiers, one may presume) (Casson 1993: 252), secured these centers, reducing the need for additional forts and military outposts in the immediate surroundings. The military nature of these caravans and the participation of large groups of well-trained and equipped soldiers also ensured security en route, eliminating the necessity of locating many garrisoned forts along the way.

The fort of Abraq is the furthest south of the fortified complexes discussed here, and the most enigmatic of

them [Fig. 6:c]. The outer dimensions are 161.50 m E-W by 98.50 m N-S, the thickness of the walls reaching 1.30 m. The walls follow the edge of a terrace on the slope of a steep hill rising 50 m above the bottom of Wadi Sunta (Sidebotham and Zitterkopf 1996: 372–374; Sidebotham, Hense, and Nouwens 2008: 352–353). For the sake of comparison,

one of the largest Roman forts in the region, at Abu Shar (north of modern Hurghada) is only 77.50 m by 64 m (Sidebotham, Hense, and Nouwens 2008: 55). But Abu Shar was the location of barracks for about 200 legionaries, whereas the huge circuit at Abraç was almost empty (that is, without any stone structures within), more like a medieval castle



Fig. 6. Forts in the Eastern Desert: from left, Bir Samut, Kanais, Abraç (After Redon 2018: Fig. 10 and Bing Maps)



Fig. 7. Small fortified hydremata in the Eastern Desert along the Edfu road (After Redon 2018: Fig. 10 and Sidebotham, Gates-Foster, and Rivard 2019)

than a Roman fort in this sense. The only structure on the plateau, situated in its center, is a stone compound almost square in plan (32–33 m E–W by 29–33 m N–S), without towers, surrounded by outer walls 0.92–1.20 m thick and partitioned inside by walls about 0.70 m thick. Inside is a large square courtyard surrounded on four sides by 26 rooms of different size. This massive structure was in itself defensive, hence must have served as an inner fort containing the garrison quarters and iron rations. The other stores and possibly also workshops and other structures, would have been located in the numerous rooms attached to the inside of the circuit walls. There was only one entrance to the fortress, with a square tower, accessed by an easily defended zigzagging path on the slope (Sidebotham and Zitterkopf 1996: 372–374; Sidebotham, Hense, and Nouwens 2008: 352–353).

The fort at Kanais resembles to a certain extent, both in character and construction, the Abraç fortress (Side-

botham, Hense, and Nouwens 2008: Pl.13.2; Sidebotham 2011: 29–30), but clearly smaller and less massive. Inside the walls are two square structures built of stone and a large circular structure interpreted as a well or cistern. Other wells were located in the vicinity of the fort (Bonneau 1993: 61–62; Sidebotham and Zitterkopf 1995: 45–49).

The Hellenistic forts in the Eastern Desert mountains are usually connected with the operation of the land routes connecting the Red Sea harbors with the Nile Valley, but upon closer analysis of their location and construction one may have a few other observations as well. Firstly, two out of three forts were actually midway on the trails and only Abraç stood on a naturally defended hill. Secondly, at least two of these forts, at Kanais and Samut (along with the smaller fort at Samut Nord) (Sidebotham 2011: 29–30) are at the heart of gold-bearing regions (a similar center is found also at al-Illeigha, see Sidebotham, Hense, and Nouwens 2008: 353, but it is about 45 km



Fig. 8. Lower forts in Wadi Abu Greiya: 1 – first Roman fort with Hellenistic core (1a); 2 – second Roman fort (After Bing Maps)

away from Abraq). Thirdly, the crew of the Kanais fort was rather small to judge by the inscription from the Paneion mentioning as few as 15 names (Bernand 1972: 46–54; Yoyotte and Charvet 1997: 254; Sidebotham 2011: 29–30). Naturally, these need not have been all the soldiers of the garrison, merely those participating in a religious *thiasos*, but even so, if the garrison counted several dozen men, it would still be unable to patrol the whole trail or undertake preventive action on a wider scale in the region. Finally, there are routes, like the one from Myos Hormos to Koptos, without any fort along the way and isolated Hellenistic centers, like Abu Gerida and Umm Howeitat al-Qibli (Sidebotham, Hense, and Nouwens 2008: 223 and 225), composed of enclosures on hills but without the central core structure or citadel.<sup>3</sup>

The strong fortifications of the Hellenistic mountain forts allowed even small garrisons of mercenary soldiers to provide effective protection for supplies stored within the enclosure. The observations made above could indicate that their main role was securing the output of precious metals (chiefly gold) mined locally and, perhaps also, the supply and maintenance of these production centers. They may have acted as refugia for those fleeing brigand bands or raiding nomads, which could help to explain the size of some of these complexes. The water and food supply function for cara-

vans along the trails connecting the Nile Valley and the Red Sea would have been an important, but auxilliary function. Abraq must be seen in this context as an exception to the rule, perhaps a border fortress with a garrison bigger than the crew manning Kanais or Samut.

The dating and development of Ptolemaic forts in the Eastern Desert deserves note as well. The regular plan of the fort in Samut brings to mind the four-towered Hellenistic *tetrapyrgia* and the Pharaonic rectangular fort in Wadi al-Hudi from the Middle Kingdom (Sidebotham, Hense, and Nouwens 2008: 279–282). Sidebotham believes this plan to be typical of the oldest Hellenistic army complexes in this region (an assumption apparently confirmed by the results of excavations in the small Hellenistic *tetrapyrgion* in Berenike) (Woźniak and Rądkowska 2014: 516–523). The larger fort in Samut is an example of this kind of complex. From the start it was associated with a large gold-mining center operating from the times of Ptolemy I and perhaps also earlier (Redon and Faucher 2015: 19). French research at the fort has placed its construction at the very beginning of the 3rd century BC, even before the founding of Berenike Trogodytika and the operation of the Red Sea–Nile Valley route initiated by Ptolemy II Philadelphos (Brun et al. 2013: 115; Redon and Faucher 2015: 19). Thus its link to the

3 These centers, which are also better investigated, are located further to the north, in the much safer (from a deep antiquity) vicinity of Wadi Hammamat. The system of collecting the output may have been different there, without the need to gather it in one place for safe-keeping before it would be sent to the Nile Valley. Umm Howeitat al-Qibli is almost directly on the Red Sea coast, between Myos Hormos and Nechesia, and could have sent its output straight down to one of the ports as required.

Berenike route was secondary. For some reason, possibly because of its sufficient size and the considerable density of settlement around the main fort and the northern one, it was never surrounded by an additional outer line of defenses.

Water was more important than security for the army caravans en route. Beside the water they carried with them, small groups took water from small unfortified mountain wells dug directly in the wadi sands (like the Bedouin do today) (Sidebotham, Hense, and Nouwens 2008: 310–315). Most wells could not supply larger groups on a come-and-go basis, hence the larger expeditions had to use cisterns, filled from these wells by the personnel there over longer stretches of time. One example of such a well and cistern complex is Abu Midriq on the Berenike–Edfu road. It is a small enclosure, 24 m by 26 m, without towers and with just a few small rooms attached to the inside face of the wall. Inside the enclosure were two large circular cisterns, one 4.30 m, the other 4.10 m in diameter. Both had walls coated thickly with waterproof plaster and reached a depth of approximately 3 m, becoming slightly narrower at the bottom (Sidebotham 2011: 104). The efficiency of this small hydreuma has been calculated by Sidebotham at about 44,000 liters in each of the cisterns/basins, thus together they could offer 88,000 liters of water to the passing caravans.

The Ptolemaic defense system of Red Sea harbors and the related communication routes and exploitation centers survived into the Roman period despite being increasingly neglected from the end of the 3rd century BC and affected

by a declining climate. Romans penetrating into the Red Sea region in the AD 30s encountered mainly ruins of the once secure Ptolemaic strongholds. Fortifications dismantled practically down to the last stone provided the building material needed for the new Roman towns (Woźniak and Rądkowska 2014: 516–520; Woźniak 2017: 43–47). It must have been the reason why Strabo saw nothing but a shallow bay for small boats at Berenike in the early 1st century AD (17.1.45). However, the absence of advanced artificial harbor infrastructure did not hinder trade, considering that by the middle of the century the nautical guide, *Periplus Maris Erythraei*, indicated Berenike as one of the most important trading outposts in the region (Sidebotham, Hense, and Nouwens 2008: 334; Sidebotham 2011: 104).

The Romans could dismantle the old and presumably already ruined fortifications of Berenike to the ground because they had a completely different strategy for the defense of the city and surrounding territory. They used the Hellenistic system only in the mountains to secure the routes linking the harbors with the Nile Valley (Sidebotham 2011: 28–31). The old network of small fortified cisterns was developed to astonishing proportions (Lewis 1995; Cuvigny 2003; 2005: 135–154; Sidebotham 2011: 129–136). Changes were necessary not only because of the volume of traffic along the mountain routes in the early Roman period, but also because of modified structure. Dozens of merchant caravans now passed to the harbors on the Red Sea coast, chiefly Berenike and Myos Hormos, augmenting the regular supply chain. The traffic was

continuous, intensifying twice a year, in the late spring and early summer, when the ships were readied to sail south and then again in the late autumn and early winter when vessels returned laden with imported goods (*PME* 24; Bernard 1972; Bülow-Jacobsen et al. 1995; De Romanis 1996: 203–251; Sidebotham 2011: 89).

The residents of the ports in the Roman period faced much the same day-to-day problems as their Hellenistic predecessors, but the solutions were different, not the least due to more difficult climatic conditions. Water supply was among the most important issues, especially in face of the booming Roman trade and growing population residing permanently in the Roman ports of Myos Hormos, Nehesia and Berenike. The Romans approached the situation

with typical breadth of vision and practicality (Sidebotham 2011: 87–124). The Berenike Project team has located, surveyed and also tested archaeologically three fortified *praesidia/hydreuma* in the neighborhood of Berenike (Sidebotham 1995: 85–93; Sidebotham and Zitterkopf 1996: 386–391; Sidebotham 2000: 359–365; Sidebotham and Barnard 2000). These were regular outposts, defended similarly to the large garrison forts of the Eastern Desert, their most important feature (covering most of the inner area of these complexes) was a huge well. The upper part of this well was usually dug in moving sand in the form of a huge funnel, often with a ramp or steps leading down to the stone well head. This stone parapet protected a narrow shaft that was sunk



Fig. 9. Large Roman fort in Wadi Kalalat (After Bing Maps)



down sometimes a few dozen to several dozen meters. The *praesidia* were also furnished with well sweeps and water wheels bringing water from great depths and filling troughs and cisterns. Barracks for the staff and security of these complexes were built against the inside face of the circuit walls in most cases. The biggest complex of the kind in the Berenike plain was the so-called “great” *praesidium* in Kalalat [Fig. 9]. It was located where Wadi Kalalat opens into the plain (Sidebotham 1995: 85–93; Sidebotham and Zitterkopf 1996: 386–391; Sidebotham and Barnard 2000).

These complexes, presumably defended by small army detachments, were not meant as a fully-fledged defense network around Berenike and its neighborhood. The Roman strategy appears to have been the securing of the mountain routes with dozens of garrisons of various size guarding the roads, quarries and mining centers. The coastal plain was secured likewise with a ring of forts situated on the border with the mountains and sometimes also slightly inside the most important wadis. These garrison forts were established in the early Roman period, for example, on the ridge above Wadi Shenshef (Sidebotham and Zitterkopf 1996: 395–399) and the ensemble of forts at the mouth of Wadi Abu Greiya (Sidebotham 1995: 86; Sidebotham and Zitterkopf 1996: 369) consisting of two garrison forts (including one that incorporated an earlier Hellenistic complex) and three observation outposts on a high ridge inside the wadi and the lower mountain slopes. A small observation tower was also constructed on an artificially higher mound in the

foreground of the set of forts. A small fort/*praesidium* was located also in Wadi Lahma. The soldiers stationed in these ports were a kind of outer circle of defense and control. The second ring was composed of the crews of the small *praesidia* at Kalalat and Siket, and the third line of defense may have been a unit stationed in the city itself (supervising the supply and distribution of water on the spot).

The city as a result did not need any fortifications. It grew with the population, occupying gradually all the convenient places near the mineral sources and wells etc. in the mountain wadis. The Roman settlers were interested in harvesting all the riches of the Eastern Desert and therefore the thriving trade passing through the Red Sea ports and on the mountain roads was merely a part of this extensive wave of activities. The holistic approach to control of the mountain region also facilitated a growing network of roads connecting the many settlements, wells and mining centers. The Eastern Desert with its mountain trails was incorporated into the Roman imperial road network (Sidebotham 2011: 125–127) and the roads were monitored at key points by army units, continuously patrolled and supervised (Fink 1971; Gichon 1989; Austin and Rankov 1995: 177–180; Sidebotham 2011: 151) by small detachments manning the many early Roman observation towers. The methodical approach of Roman authorities to the exploitation of the Eastern Desert mountains and the Red Sea harbors contributed to a flourishing of early Roman settlement in the region on a scale unmatched either before or after (Sidebotham 2011: 125).

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