EGYPT

ARCHAEOLOGICAL FIELDWORK IN BERENIKE IN 2014 AND 2015:
FROM HELLENISTIC ROCK-CUT INSTALLATIONS TO ABANDONED TEMPLE RUINS

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Abstract: The report brings a comprehensive summary of archaeological fieldwork and survey carried out in Berenike on the Red Sea coast of Egypt and in the Eastern Desert hinterland over the course of two seasons in 2014 and 2015. The completed magnetic map of the site is discussed in some detail, assessing the potential for future excavations. The report covers the most important discoveries of the two seasons, which include fragments of Middle Kingdom Pharaonic stelae, possibly pushing back the foundation of the harbor, archaeological evidence of a rock-cut water-collection system forming part of the Hellenistic-age fortifications and two inscribed stone bases, one of which records a secretary of an aromatics warehouse at Berenike, discovered undisturbed in the courtyard of the Great Temple of Berenike (also called the Serapis Temple). A previously unknown religious(?) complex was discovered on the western outskirts of the site thanks to work with Corona satellite imagery. In turn, analysis of the magnetic mapping of the city revealed an administrative(?) complex in the northern part of the town; the later, 5th and 6th century layers were examined inside a chamber with niche forming part of this complex. Work also continued in the early Roman harbor, uncovering among others a complete timber ship frame, and a collection of garnets in subsidiary buildings in the late Roman temenos located in the entrance to the southwestern bay.

Keywords: Berenike, Red Sea, port/harbor, Hellenistic fort, water storage, city gate, Roman, timber ship frame, graves, Great Temple, frankincense, Middle Kingdom stele, animal/cat cemetery, Eastern Desert survey, magnetic map

From rock-cut Hellenistic water installations to abandoned ruins of the central urban temple, investigations of the Red Sea harbor of Berenike in the 2014 and 2015 season covered the entire spectrum of the known history of the town: from the founding of a fortified landing place in Hellenistic times through the operation of the early Roman imperial harbor, a commercial center on the fringes of the Roman world, to the trade emporium of the 4th–6th centuries AD with its diverse and at times exotic religiosity exemplified by the town's religious establishments.

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Team

Dates of works: 26 December 2013–19 January 2014; 17 December 2014–10 February 2015
On site study season: 22 November–16 December 2014
Qift storeroom post-season studies: 28 January–12 February 2014; 15–26 February 2015

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By that kind of inexplicable archaeological luck that escapes scientific reasoning, investigations of the latest layers of rubble covering the Great Temple of Berenike opened unexpected vistas onto the beginning of occupation of this harbor site. The newly uncovered evidence reaches back approximately 1500 years from the

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presumed founding of the port in the mid 3rd century BC, all the way to the adventurous sailing expeditions of the late Middle Kingdom, undertaken in the short reign of pharaoh Amenemhat IV.

Generous funding from a number of sources, notably from the Honor Frost Foundation, also gave the opportunity for a greater breadth of investigations. Excavations have covered the harbor of Imperial Berenike, that is, Berenike of the early Roman period (1st century BC/1st century AD through the 3rd century AD), which has been the mission's focus for the past few seasons starting from 2009 [*Fig. 1*]. They have also embarked on the exploration of an architectural complex in the northern part of the town, mapped by magnetic prospection, and another complex of unidentified function located beyond the town limits to the west. More information on early Roman Berenike came also from an extension of trenches aimed at tracing the Hellenistic fortifications of the town.

Investigations of Hellenistic age-remains continued in two areas, on the fortifications and in a midden area. The results have yielded enough material and features for a successful research grant application from the National Science Center of Poland (Grant UMO-2015/17/N/HS3/04400). An overall study of the Hellenistic fortifications of Berenike and its place within the Hellenistic army network on the Red Sea and beyond will be implemented over the next three years by Marek Woźniak.

After a few years of preparation, an all-Dutch team headed by Martin Hense and working under the aegis of the larger Berenike Project started exploration of the Great Temple of Berenike, the so-called Serapis Temple of archaeological literature. The project, which has effectively brought back a Dutch partner

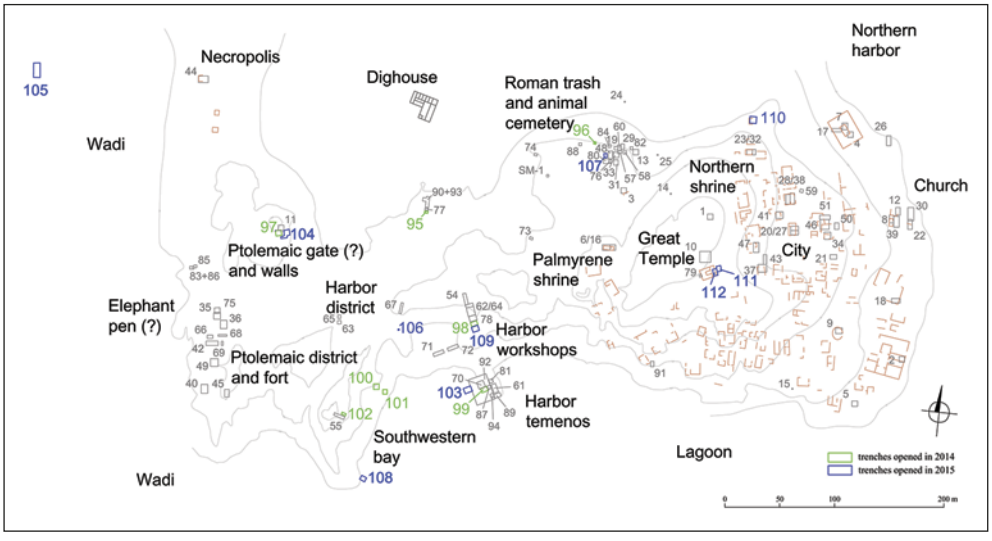

Fig. 1. Site of Berenike with location of archaeological areas and trenches excavated in 2014 (in green) and 2015 (in blue) (Plan B. Wojciechowski updating original documentation plan)

in the excavations of Berenike, aims at reconstructing the appearance of the temple and its building history, supplementing the extant knowledge of the structure from earlier 19th and 20th century digging with new excavations in the temple courtyard. The results will be of significance for understanding the stratigraphy of deposits on the urban site, as well as the role of the sacral building in the urban tissue of Berenike. The first season was necessarily devoted to exploration of late, 4th to 6th century layers, largely corresponding to the destruction and abandonment of the Great Temple, but the finds — mainly inscriptions in Greek, but also Pharaonic stelae, as mentioned already above — have reached back to the times of "Imperial" Berenike and even beyond.

Working within the framework of the larger Berenike Project are two teams, which also managed to spend time in the field in the course of these two seasons. One is the Wadi Khashab Project headed by Piotr Osypiński (Patrimonium Foundation, Poznań). The other is an architectural survey of the ancient remains in Wadi Nugrus, field-directed by Jean-Louis Rivard. The Berenike team also continued the Eastern Desert survey supervised by Steven E. Sidebotham, exploring new sites and verifying informants' data on antiquities from the region.

Specialists studying diverse aspects of ancient material culture as well as bioarchaeologists continued and developed their respective study areas: pottery, glass, worked bone/horn industry, worked stone, beadwork, terracotta oil lamps, metal finds, coins, textiles. The floral and faunal remains were studied as well. Off-site epigraphic consultation on the inscriptions found in the Great Temple was provided by Prof. Roger Bagnall and Dr. Rodney Ast. A project, involving Monika Więch, Michał Krueger and Iwona Zych, was initiated to study the chemical signatures of the clay used for production of the oil lamps from the Berenike assemblage.

MAGNETIC PROSPECTION AND SITE TOPOGRAPHY SURVEY

The extended effort of the doubled geophysics team supervised off-field by Tomasz Herbich (Institute of Archaeology and Ethnology, Polish Academy of Sciences) filled in most remaining gaps in the magnetic map of the site. Overall, it can be said after the 2014 season that Berenike is the only site in the Eastern Desert of Egypt to have been surveyed so thoroughly and one of just five in all of Egypt (after Tell el-Balamun, Qantir, Tell Dhaba and Bawit) to have such full magnetic coverage. The only areas where some additional prospection is needed are the two mounds of the late necropolis at the southwestern entrance to the town.

The prospection was carried out in installments of a week to two weeks every season from 2008 (with an earlier season in 1999/2000), altogether some 75 days of actual fieldwork to cover roughly 28 hectares (Zych and Herbich 2015). Two Geoscan Research fluxgate gradiometers FM 256 with 0.1 nT resolution and 0.1 second measuring time were used in the course of this project. The survey grid measured 0.5 m by 0.125 m (measurement along lines spaced 0.5 m, every 0.125 m on

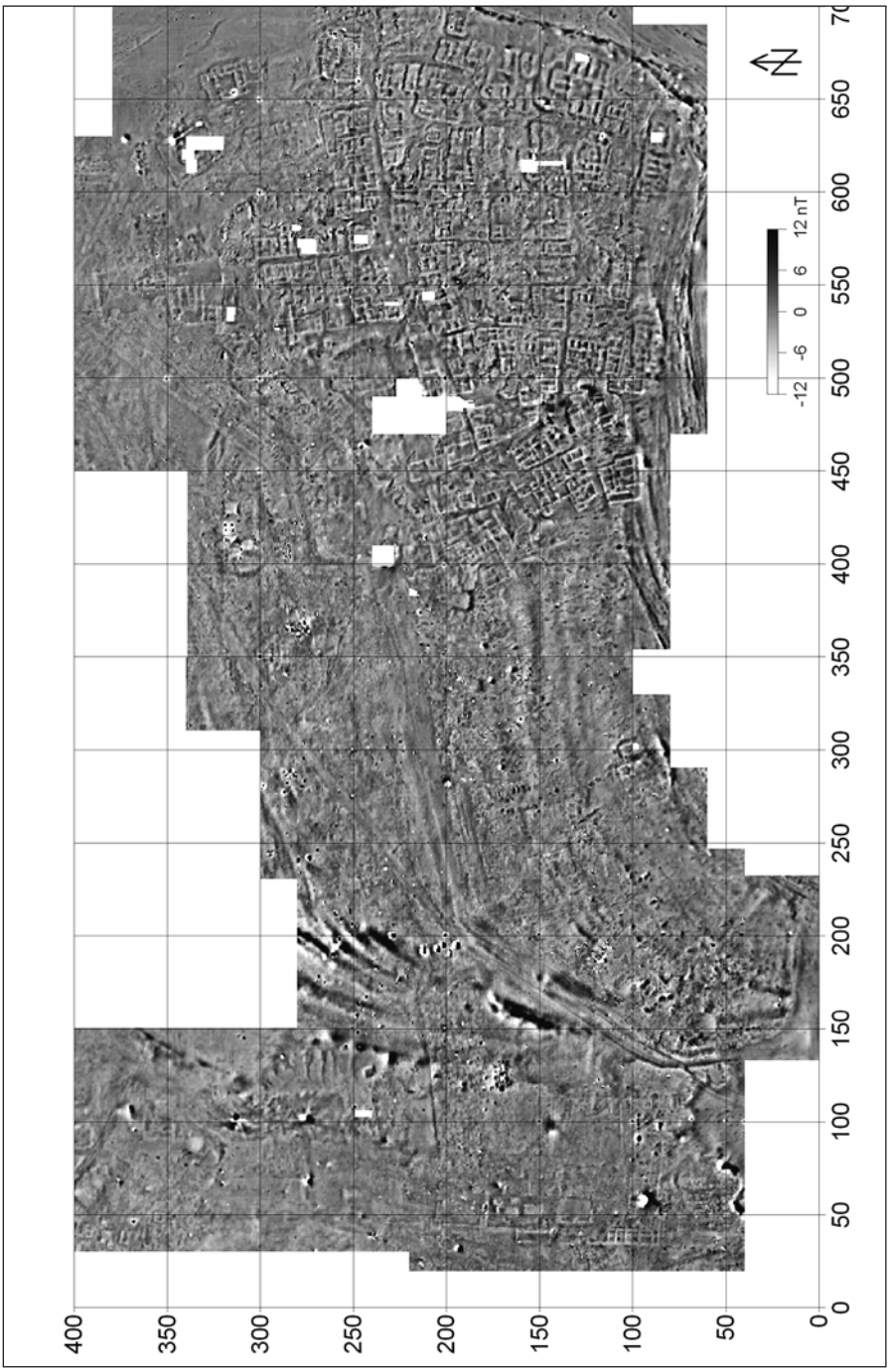

Fig. 2. Magnetic map of the site after the 2015 season (Processing T. Herbich)

each line). The measuring mode was either zigzag or parallel depending on the area. The position of the probes was corrected after each square. Preliminary processing of survey results was done with Geoplot 3.0 software by Geoscan Research.

Two specialists (Dawid Święch and Robert Ryndziewicz) in the 2014 season covered close to 4.5 hectares of the urban remains on the promontory, enhancing the original site topography plan prepared in 1994 based on the lay of the land (Aldsworth, Sidebotham, and Wendrich 1995) [***Fig. 2***]. In 2015, Święch's mapping elucidated the northern edges of the site, showing where the habitable fringes were in historical times. The low-intensity undisturbed spaces at the north (to either side of the white area at top left of the map, which marks the unexplored part under the modern storeroom) indicate areas of marshy ground, very much like the modern *sabkha* to the east of the town, which did not encourage occupation. This soil deposit by silting processes taking place in the northern wadi and it was well advanced already by the early Roman period when rubbish was being dumped in this part of the site. The extent of these activities can now be traced and it remains to be determined where the actual waterline was in the early and the late Roman periods. (The high-intensity anomalies curving across this part of the site and under the modern camp are definitely not man-made and should be interpreted as natural features, possibly reflecting reef formation processes determining the original landscape in the area millennia ago). On the western side, the magnetic prospection confirmed that the necropolis occupying a raised spur of bedrock at the northwestern limits of the site (presumed to be of late Roman date) had not moved down the eastern flank of this ridge. This further proves that in the late Roman period the ground to the north of the site must have still been too wet and marsh-like for use.

The accuracy of the original surveying was demonstrated when the plan was superimposed on the results of the magnetic mapping. The geophysical results have added detail invisible on the ground surface [see ***Fig. 2***]. The network of major streets and side alleys has been supplemented with architecture and features that can be analyzed separately in a tentative reconstruction of the overall town plan, as well as be used as guidance in locating areas for future archaeological research, as was the case with trench BE15-110 in the 2015 season. The structures and urban layout seen now in an overall picture provided by the magnetic map should help in revising current thinking about the urban plan of late (and early) Roman Berenike. For instance, the sparseness of architecture in the northeastern part of the town (where the American–Dutch project had excavated earlier), when considered in the context of a suggestion of a bay cutting deep into the city on the north (Sidebotham 2008: 313–314), may be evidence of a more waterlogged, perhaps insular type of ground relief in this part of the city in late antiquity. In the area west of the Great Temple and the Shrine of the Palmyrenes, the mapping shows extant architecture on the western slopes of the urban mound. The blurred image seen on the magnetic map is due to disturbances in the near-surface layers caused by the government bulldozing of the site in the 1970s in preparation for army construction. It shows the extent of the

mound top that was leveled at that time; fortunately, the blurring of the image does not detract much from the interpretation of the layout as the architecture outlines here are still evident. A provisional analysis of these remains suggests that housing density falls off gradually toward the northwest, corresponding to the gentle drop-off of the topography in the direction of the early Roman trash dumps.

A digitized version of the site plan was produced for the central and southwestern part of the site, collating topographic surveys since 2010 and verifying positively the accuracy of the original mapping. The 1994 plan was superimposed on the new digital version and correlated with the magnetic site map [see ***Fig. 1***], providing an essential tool for further excavations and study of the archaeological results.

HELLENISTIC-PERIOD REMAINS

Following the successful identification of the only significant Ptolemaic urban defenses known from Egypt (Sidebotham and Zych 2012a: 31–32; Sidebotham et al. 2015; Woźniak and Rądkowska 2014), trench BE14-97 (extended in the following year by trench BE15-104, see ***Fig. 1***) was positioned directly next to an old trench (BE95-11), which had revealed remains previously interpreted as being of an industrial nature (brick kiln), dated by material from the Ptolemaic period (Sidebotham 1998: 101–108). Minute analysis of the magnetic map just south of the old trench (BE96-11) indicated the presence of a rectangular structure aligned with the putative line of defenses found between the robbed part of a fort in BE12-83/85/86 and the wall in BE13-90/93.

The extended trench was excavated over the course of two seasons and while the excavations need to be completed, the uncovered remains can be described as a rectangular rock-cut shaft opening into a network of subterranean chambers and a corridor running off for 6–7 m to the east and northeast [***Fig. 4***]. The shaft is roughly 4 m by 8 m and its known depth is 2.50 m with the sand fill at the bottom going down another meter at the very least. It dates to the 3rd century BC. The sand deposits and residue seen in the corridor, as well as lime deposits on the walls of the shaft, suggestive of water storage, indicate that the complex may have been an underground water-collecting installation. In some ways it resembles in appearance, if not in function or length, *qanats/foggaras* found in southern Libya, Egypt's Western Desert, elsewhere in the Middle East and Central Asia (see English 1968; Wilson 2008: 290–293; Grewe 2008: 322–324; see also Woźniak forthcoming). There were footholds for climbing up to the surface, cut in the rock and stone walls in the southeastern corner of the shaft. However, the entire complex — the vertical rectangular shaft with tunnels radiating from it — resembles an early Hellenistic one in (Berenike) Euesperides (Benghazi), in Libya; similar installations also appear in late Roman Republican times and during the early Roman Principate (Wilson 2008: 288).

A stone counterweight, strongly reminiscent of a simple type of ship anchor, found in the fill, matched with a socket in the masonry wall above the bedrock level on the eastern side, possibly used to mount a wooden counterbeam, could argue

further in favor of a water-lifting device being in operation here, drawing water to fill a large pool situated to the south of this installation. The pool, the full outline of which is not known yet, but which could have held at least 10,000 liters of water, was in use at the latest in the 2nd century BC, as indicated by a set of Hellenistic bowls and cooking pots found on the bottom [*Fig. 13*], along with a sizeable ssemblage of edible mollusk shells. The pool and the shaft were also connected in a way which has yet to be studied and understood in full, with a water-overflow system of pools/basins(?) connected by pipes formed of amphora necks set rim to rim [*Fig. 3*].

The installation was protected by a wall with pylons or towers, encompassing a kind of gatehouse that seems to have led over

Fig. 3. Truncated amphora necks set rim to rim, forming part of an overflow system; scale=20 cm (Photo S.E. Sidebotham)

Fig. 4. Rectangular rock-cut shaft with a network of subterranean chambers (opposite sides) and corridor (top right corner); view looking east-southwest (Photo S.E. Sidebotham)

Fig. 5. Amphorae in situ in the sand-filled shaft used as a subterranean gatehouse chamber; scale=50 cm (Photo S.E. Sidebotham)

Fig. 6. Pits of early Roman graves in trench BE15-104, against the background of an earlier water-overflow installation found in this trench; view looking southeast (Photo S.E. Sidebotham)

the shaft. Indeed, the shaft seems to have been filled in quickly to a level leaving only about the top 2 m of its height including the stone masonry superstructure above and around it. Cornerstones on one side where the wall was preserved, level with a putative threshold in the gateway pierced in this wall, suggest a wooden(?) floor that could have covered a cellar-like space underneath. In this phase, the space was used to store a number of large amphorae. These Rhodian amphora are of early Ptolemaic date, indicating that the water-related function of the shaft did not last for long. One of the amphorae, found intact, was still sealed with a stopper; inside there were some small fish bones, basil and herbs, possibly the remains of some kind of fish sauce. The word ANTIOXOY ("of/belonging to Antiochus") was preserved written on the shoulder in black ink [***Fig. 5***]. A cooking pot and a stamped amphora handle of early Hellenistic date were also found in the fill.

In early Roman times, as indicated by the stratigraphy of the remains, the shaft, gatehouses and masonry water tank, as well as the entire water installation were abandoned and forgotten. However, the ruins offered a good location for burials of which a number dating from this general period have been discovered across the western fringes of the Berenike site. Added to the female burial in BE96-11 (Sidebotham 2016: 622 with earlier references) are four new skeletal interments, one discovered in 2014 and three in 2015 [***Fig. 6***]. Three of these were male burials, one a female one. They did not follow one orientation nor was the position of the body always the same: supine in the case of one male and a tall female, on the right side in the case of an older man. The woman had a fragmentary amphora base covering her face and a regularly shaped stone placed on her womb. The older male preserved traces of a long robe or shroud in which he had been buried and several dozen beads of glass and semi-precious stone (amethyst and agate), some of which were of Indian origin and which appeared to form two long strings around his neck. An iron ring with key was suspended on one of these strings. A similar iron ring with key was preserved

Fig. 7. Female burial from trench BE15-104; scale=20 cm (Photo S.E. Sidebotham)

on the small finger of another male. The burials were made in pits hollowed out in the ground, ovoid in shape and deep enough to hold the bodies. The pits seem to have been positioned wherever the softness of the underlying surface allowed for easy digging. The burials were made in the early 1st century AD as indicated by a study of the stratigraphy in the trench. There is every reason to think that at this time the underlying structures were little more than stubs of ruined walls sticking out in a wasteland of salt-crusted sand.

The location of the Hellenistic trash dump identified in an earlier season (BE11-77) was explored further in a directly adjacent trench BE14-95. Pottery was in abundance as were all finds categories expected from a domestic refuse dump. The ceramics, including a few stamped amphora handles, were dated to the 3rd–2nd century BC (R. Tomber, personal communication); they comprised a few fragments of Rhodian and Koan-made amphorae, but mostly Egyptian imitations of Aegean types. The rubbish yielded a fragment of a fine Ptolemaic terracotta of a slave(?) carrying a basket on his shoulder, a penis made of bone, presumably from a statuette of the likes of Amon-Min, and a small pendant of blue glass made in the image of the god Bes, as well as numerous beads including small cowries that constituted the beadwork ornamentation of some object or robe. Another noteworthy find was the longitudinal half of a mini alabastron.

Other finds from the trench included a fair quantity of pig bones, adding to the already extensive evidence for the presence of this animal in the diet of Berenike residents/visitors in the early Roman period. Pork is usually associated with the culinary habits of peoples from the Mediterranean and with the Roman army (see King 1999: 181–183; Thomas and Stallibrass 2008: 11; Thomas 2008: 34, 35, Table 3.1, 36, 37, 38 and Fig. 3.5, 40, Fig. 3.8, 42–43 and Fig. 3-12; Derreumaux et al. 2008: 64, Fig. 4.15, 65; Cavallo, Kooistra, and Dütting 2008: 72 and Fig. 5.2, 73 and Table 5.1; Sidebotham 2011: 76). A camel bone recorded in this context (assuming no later contamination) could attest to the use of camels already in the Ptolemaic period (an early date for the introduction and widespread use of the camel in Egypt has been disputed, see Sidebotham 2011: 28 in general, 79 for the Roman period in Berenike).

EARLY ROMAN RUBBISH DUMP AND ANIMAL CEMETERY

To date, the material culture of the handlers of early Roman cosmopolitan trade in Berenike has been evidenced almost exclusively by the extensive array of finds recorded from the trash dumps spreading out on the northern fringes of the low-lying open area that opened behind, that is, to the north of the city proper and the harbor in the southwestern bay. Another trench dug in this already well-tested area, BE14-96, yielded a similar set of finds: some ostraca and papyri, plaster jar stoppers, ceramics, a plethora of both organic and inorganic artifacts and ecofacts: textiles, matting, basketry, rope, as well as animal bones (including a dog burial) and botanical remains. Vessels included an exquisite thin-walled mould-blown beaker

of blue glass. Among the several dozens of beads was a set of small red seed beads still on their original string; also present was a Bes pendant made of glass paste. The excavation produced one of the best preserved wooden brailing rings ever documented from the site.

The presence of a dog burial in the lower levels of this trench demonstrated the extent of the animal cemetery located in and around trench BE12-80 (Sidebotham et al. 2015: 316ff.; Sidebotham and Zych 2012a: 38 and Fig. 23). The trench continued to be explored in the 2014 season (BE14-80) and was extended northward in 2015 (BE15-107) in an effort to learn more about its horizontal spread. A thorough analysis of the stratigraphy, which is underway, will provide a more informed picture of the lay of the land in this area at the start of deposition of trash in the early Roman period. Earlier excavations as well as data from the bottom deposits of trench BE11-76 had intimated the presence of Ptolemaic-age architecture of some kind. The Project's excavation of the Hellenistic fortifications in trenches further to the west, coupled with a tentative interpretation of anomalies traced on the magnetic map of the northern outskirts of the site and running through the early Roman rubbish dumps toward the city proper, also suggest that the early Roman trash started to be deposited in a wasteland of abandoned ruins some two to three hundred years old at the time.

In fact, the ruins were regularly worked for building material and soft spots in the otherwise salt-encrusted ground used for burials. A review of the loose bone material recorded from all the rubbish trenches excavated so far by the American–Polish

Fig. 8. Animal cemetery in trench BE15-107; scale=10 cm (Photo S.E. Sidebotham)

project indicated a fair share of human bones, supporting evidence for human burials in the area (from the 1st century AD, e.g., Sidebotham 2008: note 7 on page 308; Sidebotham 2014: 622). Human burials continued through the end of the town's existence, as indicated by the cairn grave of an adolescent (Sidebotham et al. 2015: 316 and Fig. 12), admittedly without datable archaeological finds, but holding much resemblance to 5th century tombs of this kind, of which there are many in the Eastern Desert.

The specificity of the burials in this area is that it was an animal cemetery (although animal burials have been found elsewhere in the town area, see, e.g., Zych 2010). Many of the bodies had been covered with broken pieces of pottery or inserted into damaged jars and small amphorae, which served as makeshift coffins. The current excavations have added to the number of burials known, most of these being felines of fairly young age or mother cats with kittens. Dogs, mostly young, had a fair representation as well. Adding local color to this cemetery are the burials of a baboon and a few white vervet monkeys,[1] two with iron collars around their necks, one even furnished with beadwork. Previous finds of a cat with a collar as well as the overall evaluation of the age and health condition of the animals at death suggest considerable care and emotional bonding on the part of the owners.

Interestingly, the trash continued to be deposited in and around the animal burials, and the burials were made in extant layers of rubbish. Trench BE14-80 also contained at least one pit with sheep/goat bones that were evidently refuse and not burials, thus constituting evidence of a culinary event.

EARLY ROMAN HARBOR

In the early Roman harbor area inside the southwestern bay work continued in the eastern and southern parts of the bay. Trenches BE14-98 and BE15-109 extended the line of trenches running south from the top of the ridge that ensconces the harbor in the bay on the north and west. These trenches had, in previous seasons, contained remains of ship timbers and ropes (Sidebotham and Zych 2010: 19–21 and Figs 43–50; 2012a: 32–33 and Fig. 6; 2012b: 147–151 and Figs 14–19). Excavation in BE14-98 documented a ship timber that had been badly charred, but whose original shape remained intact. It was likely part of a ship frame. The convex part of the timber was 1.70 m long while the concave side measured 1.58–1.69 m in length. It tapered towards one end, but the maximum width and height were 0.11–0.12 m by 0.15–0.16 m. A number of rectangular-shaped holes pierced the timber; no doubt these originally accommodated timbers placed perpendicular to it (the piece was preserved in the field and carefully lifted for transport to the storeroom where it was studied and documented in detail; a reconstruction drawing shows the possible position of the timber in a hypothetical

[1] The authors would like to thank Hélène Cuvigny (personal communication) for drawing attention to the fact that the white rather than the green vervets (two species difficult to distinguish in the bone material) were more likely to have been brought to Berenike as sailors' pets. The species was native to East Africa, trade relations with which are confirmed in the *Periplus Maris Erythraei*, a sailing and trading guide from the AD 60s, perhaps written by a resident of Berenike.

ship frame) [*Fig. 9*]. A comparative study of the way this timber frame was formed will indicate whether it represented the Roman shipbuilding tradition. The wood was identified by the archaeobotanist Jarosław Zieliński as cedar, which could imply its Mediterranean origins. The contextual dating of this piece is in the 1st/2nd century AD. Lying beside this frame were two fragments of rope, both made of palm fiber: one was 3.10 m long and 7 cm in diameter, the other 0.78 m long and 3 cm in diameter. There were also fair amounts of obsidian flakes and date pips, a wooden pulley preserved intact and, at the western end of the trench, extensive quantities of fine powdered charcoal.

The same charred deposit had been noted in trenches north of BE14-98 in previous seasons (Sidebotham and Zych 2010; 2012a; 2012b). At that time the tentative interpretation was that this may have represented a charcoal-making facility where recycled ship timbers were converted into charcoal. However, given the carbonized condition of the timbers found thus far, perhaps a more likely scenario is that a fire, accidentally ignited, destroyed this part of the harbor, which included a warehouse containing these ship timbers. New evidence from trench BE15-109 yielded more of the powdered charcoal, no more wooden ship parts, and instead evidence of bundles of acacia firewood consumed by the fire, and plenty of matting and basketry discarded after use. Additional evidence, which had already

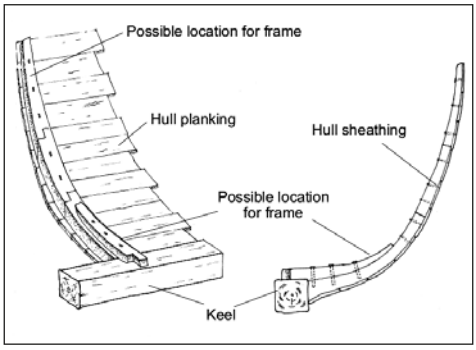

Fig. 9. Timber ship frame; scale=20 cm
(Photo S.E. Sidebotham; reconstruction drawing J.K. Rądkowska)

started to appear at the western edge of trench BE14-98, consisting of burnt shells, which are thus treated to produce lime, provided a key to interpreting these remains, when considered in the light of ethnographic data on Omani seafaring presented by Eric Staples at the 50th Seminar for Arabian Studies in London.[2] After long periods of sailing, the trip from Oman to East Africa, for example, it is necessary to scrape the old bonging of the wooden hulls, which no longer affords the waterproofing protection it is meant to provide, and to paint the hull anew. The substance used to waterproof a hull is made of animal fat, usually goat or sheep, although shark fat has been known to be used, with lime, which can be extracted from burning marine shells. This is done on the beach, practically without much preparation. In Berenike, it seems that such painting of the hulls could have been done in the area of the sheds, which stood on higher ground and may have provided some protection for the fires needed to cook the animal fat. The powdered charcoal would then constitute the leftover waste from extensive burning of acacia firewood needed for the processes involved. Large pithoi found in trench BE11-72, just a few meters downwind from the deposit of ashes and lime, contained a whitish substance that, while it was not identified chemically, looked like lime and could well have been the bonging substance used for waterproofing ship hulls.

Fig. 10. Pinctada radiata shells left as waste in early Roman deposits within the harbor bay (trench BE15-109); scale=20 cm (Photo S.E. Sidebotham)

Should this interpretation prove to be accurate, then boats and ships could have been pulled up on the beach in this natural landing place at the end of a long lagoon that stretched into the wadi mouth on the south. Somewhere in the vicinity of trenches BE11-71 and BE11-72 [see ***Fig. 1***], the old bonging would be stripped from the hulls, any damage identified and repairs made, and the bonging applied. The warehouses along the ridge coming down into the harbor on the east would have contained the necessary supplies and shipping paraphernalia for use in ship repair, as well as dismantled boat parts.

A sectioned and excavated area in the northwestern corner of BE15-109 revealed large bivalve shells (at least one matching pair), very likely of one of the pearl oyster

[2] The film "Voice of the Ocean" about Omani seafaring, directed by David Willis, funded by the Omani Ministry of Awqaf and Religious Affairs and produced by Abdulrahman al-Salimi and Eric Staples, was previewed during the Seminar as the MBI Al Jaber Public Lecture on Saturday, July 30, 2016..

Pinctada radiata species, that had been deliberately placed in the positions in which they had been excavated [***Fig. 10***]. The shell was originally distributed throughout the Indo-Pacific and was harvested for the pearls, but also for its edible muscle and nacreous shell. A number of other artifacts and pottery that would not have been at home in an industrial/workshop area (segmented gold-in-glass beads, for example, see Then-Obłuska 2015: 753) suggests that the flimsy shelters built on this side of the Berenike bay were used by merchants or ship agents (possibly of Indo-Pacific origin) for their purposes rather than simple sailors and harbor workers.

Deep excavations in this same sectioned area in BE15-109 recorded no activity in this part of the harbor prior to the early Roman period (1st–2nd centuries AD). In addition, excavations in this trench and in adjacent ones in previous seasons recorded no activity in this part of the harbor after the 2nd century AD.

In this context one may wonder to what extent the early Roman harbor in the southwestern bay was actually the official commercial harbor of Berenike. No work has been done so far on the eastern part of this harbor, beyond the ridge with the warehouses and it is possible that it is there that the more official part of the harbor was located, nearer to the city. One may also wonder whether all sailing ships were treated in the western part of the bay where the Project has excavated or whether it were just the small South Arabian craft, should the ethnographic parallel be carried further still. These smaller vessels may well have serviced the brisk local trade in South Arabian commodities in the 2nd and 3rd century as attested by an abundance in Berenike of the South Arabian Organic ware, of Hadramauti royal graffiti on select sherds, the Mesopotamian so-called torpedo jars, black vesicular basalt from Yemen and the tantalizing bronze figurines and stone altars from the Late Temple in the harbor (see Sidebotham 2014; Sidebotham et al. 2015: 306ff. and Fig. 8; Rądkowska and Zych forthcoming).

Going one step further, one may wonder to what extent the Berenike–Hadramaut leg of the sea journey to India was actually worked by the elusive South Arabian intermediaries. It would justify a more substantive presence of their sailing boats in the port of Berenike, where these boats would surely have been serviced regularly before the return journey. Berenike officialdom may have been Roman in the cultural sense, if not by origin, and would have catered to the needs of the wealthy Imperial merchants coming from the north and from the Egyptian interior. However, the ship captains and sailors working the southern maritime routes would have represented a range of indigenous peoples and cultures from regions situated to the south and southeast.

Excavation in the western part of the harbor bay, started in 2009 with trench BE09-55 near the highest point of the ridge surrounding the bay and continued in the 2014 and 2015 seasons, provided more data on the functioning of the harbor, but without any conclusive evidence for a specific interpretation. A number of walls preserved in trench BE14-100 were of unknown function, probably related to piers, wharfs or administrative buildings within the harbor. Charred material and some copper alloy slag suggested small-scale metallurgical activities taking place in open courtyards. Beryls and pieces of what

appeared to be peridot were also recorded from this area. Probes in the southeastern and northwestern corners of the trench revealed nothing. Interestingly, the presumed wall that the magnetic mapping of this area traced directly across the trench proved to be a cut for a stone wall, the empty space filled with strongly concreted salt and sand once the building stone had been removed. Analogous instances all over the site suggest that the salvaging of building stone must have occurred before and during the early Roman period. Thus, the structure to which this wall belonged and which can easily be traced on the magnetic map should be seen as preceding this phase, possibly belonging to the late Ptolemaic period or very early in the early Roman phase. Excavation of trench BE14-101 exploring a corner room in the same building that located the courtyards from trench BE14-100 and just a few meters away from the Ptolemaic and early Roman shoreline identified in trench BE11-71, uncovered a fragment of an iron ring and an early Roman amphora handle with a hieroglyphic stamp. The ceramics were mostly early Roman period amphora sherds, one of which was a neck/shoulder fragment with graffito in red paint depicting the Greek letters ΟΘ. Two pieces of wall plaster 8–9 mm thick and painted red suggested a high status room or rooms in a building perhaps associated with some administrative function. Secondary use of the abandoned structure sometime in the 2nd century AD was evident here.

The third trench, BE14-102, continued in 2015, was located directly next to BE09-55 and yielded in quick succession two finely carved ring intaglios. The first (8–9 mm in diameter, 3 mm thick) depicts a horseman riding a stepping horse and holding a whip in hand, possibly a victor in an equestrian event. It is of 1st century AD date. The stone is a green chromium chalcedony, the surface probably heat-treated (J.A. Harrell, L. Thoresen and G. Platz, personal communication). The other, cut in carnelian, is an oval-shaped cabochon (L. 2.54 cm, W. 1.87 cm, Th. 0.42 cm) with an engraved figure of a standing draped woman, most likely a deity [***Fig. 12***]. The head is block-like without facial features, the hand stretched forward is unrealistically forked and may have held an object; the rendering of the body is in a style reminiscent of Ptolemaic sculpting of the last centuries BC. Excavation of lower-lying deposits within this trench revealed industrial activities including numerous remains of crucibles with copper alloy metals still adhering to them; one would expect this where ships would have constantly docked to undergo repairs and maintenance. The contextual dating of these layers goes back to the Ptolemaic period, and the metallurgical activities in question could well correspond in time with the large building from trenches BE14-100 and BE14-101.

Excavations in trench BE15-108 at the extreme southwestern portion of the southwestern harbor [see ***Fig. 1***] documented many long iron nails and fixtures. These, together with evidence of heavy burning, suggested the presence of a furnace/workshop for making these metal items somewhere nearby, yet no structures of any kind were observed.

There was also a 1 m by 1 m probe (BE15-106) excavated in the northwestern part of the harbor bay to recover additional archaeobotanical remains for study.

HARBOR TEMENOS

Pre-temple levels were reached inside the late temple, excavated since the 2010 season (Sidebotham and Zych 2010: 15–19; Sidebotham 2011: 266–267; Sidebotham and Zych 2012a: 33–36; 2012b: 141–147; Rądkowska, Sidebotham, and Zych 2013; Sidebotham 2014: 602–609; Sidebotham et al. 2015).

Several installations consisting of small fires and remains of food: fish stew(?) in pots and large clam shells associated with charcoal, were uncovered scattered all over the area marked off by the walls of the temple. Interpretation of these finds remains elusive. It may represent some form of ritual preparations for furnishing the late Roman temple with its first set of floors and installations.

The founding of the coral pit was traced. Once the huge chunk of coral was removed, the underlying intercalated layers resembled deposits that could have been left by a periodically welling spring. Should this be confirmed by specialist examination in the future, it could explain the sanctity of the shaft with the coral head lasting several centuries, until the very last days of Berenike. Southwest of the coral was a pit paved with small stones and with a small anepigraphic stone marker.

The general area of the temenos (approximately 25 m by 35 m) was cleared, revealing more evidence (beads and an oil-lamp fragment) confirming occupation in the 4th–5th century AD. The lying walls of the Square Feature (see Zych et al. 2014)

Fig. 11. Founding of the coral pit (in the center of the photo) among nondescript stone features and traces of ritual(?) activities predating the building of the temple; scale=50 cm (Photo S.E. Sidebotham)

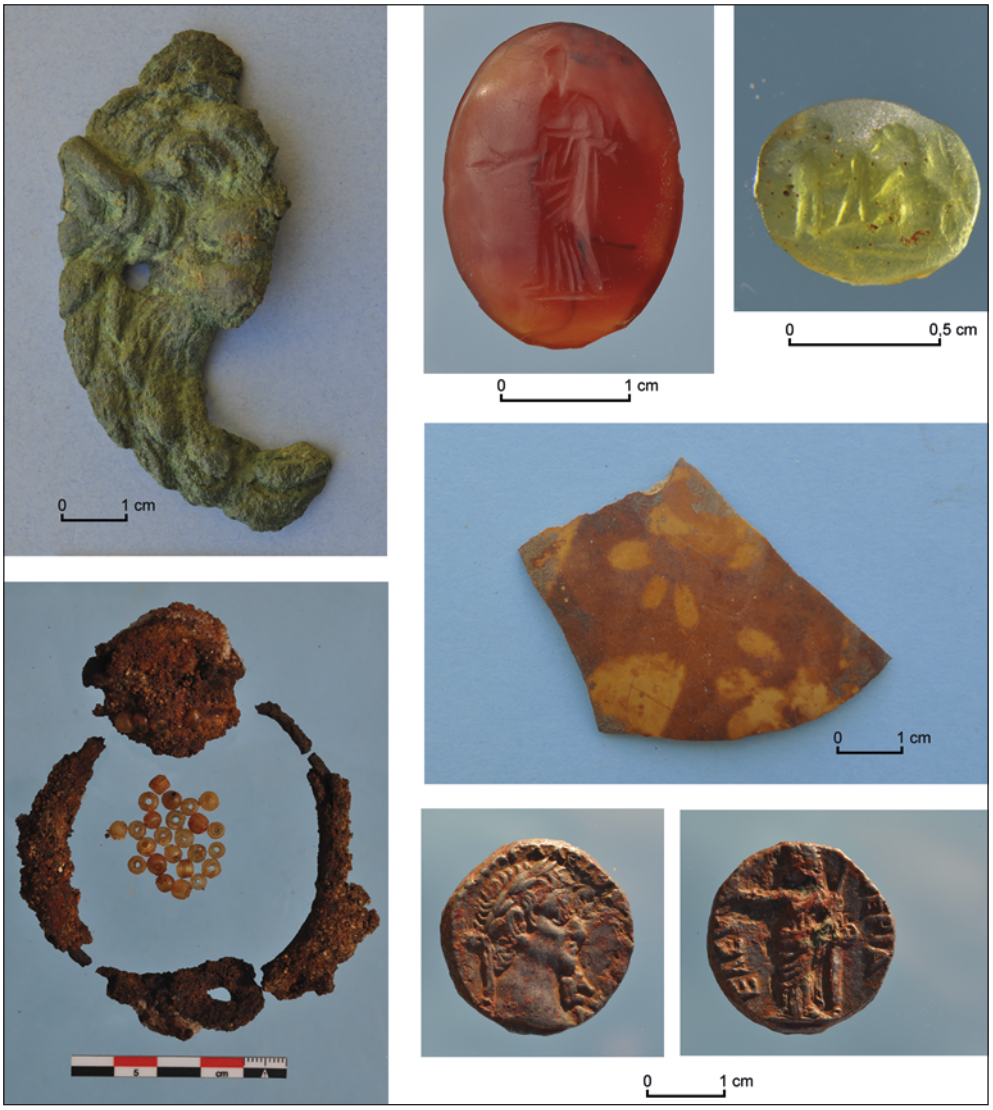

Fig. 12. Selection of finds: (clockwise from bottom left) iron collar decorated with beads (early Roman; BE15-107/013/001); bronze lion's protome from the Great Temple (late Roman; BE15-111/009/001); two intaglios (Ptolemaic/Roman and early Roman, BE15-102/039/001 and BE15-999/08); painted ostrich eggshell (BE15-111/021/001); bronze coin of Roman emperor Caligula (Photos S.E. Sidebotham, K. Braulińska)

were cleaned and recorded as a photometric image. Excavation concentrated in front of the complex (trench BE14-99) clearing the collapsed blocks on either side of a central open space corresponding to the doorway. An iron pivot was noted in the latest threshold. The excavation around the Square Feature will be completed once the collapsed stone wall blocks are lifted and removed. It is already clear from previous work in nearby trenches BE13-87 and BE12/13-81 that remains of an

Fig. 13. Selection of finds: (clockwise from bottom left) offering vessel with its 'lid' (trench BE15-110); set of Hellenistic vessels (trench BE15-104); fine pottery; collection of garnets (trench BE15-103); brailing rings (BE15-110/003/002 and BE15-110/003/0042); wooden dowels (BE15-111) (Photos S.E. Sidebotham, K. Braulińska)

architectural complex involving a stone pavement and large coral-head walls, as well as pits with ritual offerings, including a complete ibex horn, exist below the latest horizon corresponding to the 5th century occupation of the temenos.

Trench BE15-103, located a couple of meters west of the collapsed west wall of the Square Feature, aimed to test a magnetic anomaly that looked like a possible entrance to the island temenos. The edifice that was uncovered, of 4th–5th century AD date, had walls built of fossilized coral heads, same as in contemporary late Roman structures elsewhere on the site. Its function could not be ascertained. The building would have formed part of a complex surrounding the late harbor temple, serving perhaps as a work area or store. One should keep in mind, however, that when the late temple and the structures around it were used, they were an isolated outpost in the silted up and deserted bay that had once been the landing place of Berenike. Of particular interest was a find of 40 raw garnets, which must have come from India [***Fig. 13***]. Since garnets were exports from south Asia, these semi-precious stones are one indication of a vibrant trade with that part of the world in late Roman times, something already known from the results of excavations conducted at Berenike in earlier seasons. They may also point to the nature of the cult and/or the people who visited the late Roman "Temple of the Lotuses".

"GREAT TEMPLE" OF BERENIKE

During previous years the Berenike Project had chosen not to work in the area of the so-called Serapis Temple (Sidebotham 2014: 614–616) located at the highest part of the site in the center of the ancient ruins. The Italian adventurer Giovanni Belzoni, who discovered Berenike in 1818, and subsequent European and American visitors throughout the 19th century reported clearing at least parts, if not the entirety, of this structure. On careful re-reading of the reports of the 19th century visitors, as well as clearing of one of the side rooms following damages related to a bout of illicit digging at the site before the start of the current Polish–American project, it became apparent that the "clearing" of the temple may have been rather haphazard and incomplete. Trenches BE15-111 and BE15-112 were placed in and at the eastern entrance to the temple, taking into consideration the cleaning and testing done by the Project in 2011 and the data emerging from an analysis of the magnetic map of the area [see ***Figs 1, 2***].

Archaeological evidence in the form of the top of a wine bottle with a cork still in it, a fragment of 19th century porcelain and two metal buttons indicated that the early adventurers had excavated in the areas chosen for investigation, but it quickly became evident that they had not dug very deeply and had not been particularly thorough in their examination.

The work in and at the eastern entrance of the temple concentrated on clearing modern backfill from the temple vestibule to the level of the collapsed ceiling which had not been moved by the earlier explorers owing to the hugeness of the ceiling slabs. The tumble has been documented in detail, uncovering in the process a part of the stone temple ceiling emblazoned with incised stars; these had likely been painted,

but any pigment has since disappeared. The doorway leading into the vestibule was cleared, showing that it had been blocked in the late period, that is, in the 4th–6th century. Cowry shells of a kind known from the other late temples in Berenike were found in the entrance, suggesting that they had been strung and hung in the apparently blocked doorway. A very similar situation had been observed earlier in the entrance to the late Roman temple in the southwestern harbor (Rądkowska, Sidebotham, and Zych 2014: 224–225 and Fig. 14). Finds included a piece of ostrich eggshell painted with an elaborate pattern of rosettes in reverse coloring, again reflecting typical late religiosity in Berenike (decorated ostrich eggshells occurred in cult contexts in other shrines from the 4th and 5th century) [*Fig. 12*]. The walls of the temple entrance at this height (presumably about 2–3 m above the original floor) were carved with incised and painted lotus and papyrus plants [*Fig. 14*] on the southern side of the door and a standing figure of a female deity (Isis?) on the northern side of the door.

Of greatest interest, however, was the rubble littering the area just outside the entrance, on the northern side. It yielded huge fragments of thick marble revetment, both light grey/white and light green in color, obviously imported to adorn some of the temple walls, a great deal of timber (cedar and acacia from roofing of some kind or furniture), small fragments of what would have been a very large statue in white marble, and an extensive number of highly fragmented inscribed blocks and shaped stones (steles). These were mostly smaller dedications in Greek, for example, an inscription carved during the joint reigns of Septimius Severus and Caracalla (late 2nd–early 3rd century AD), and a fragment from the reign of Septimius

Fig. 14. Surviving decoration of the courtyard facade of the Great Temple; scale=20 cm (Photo S.E. Sidebotham)

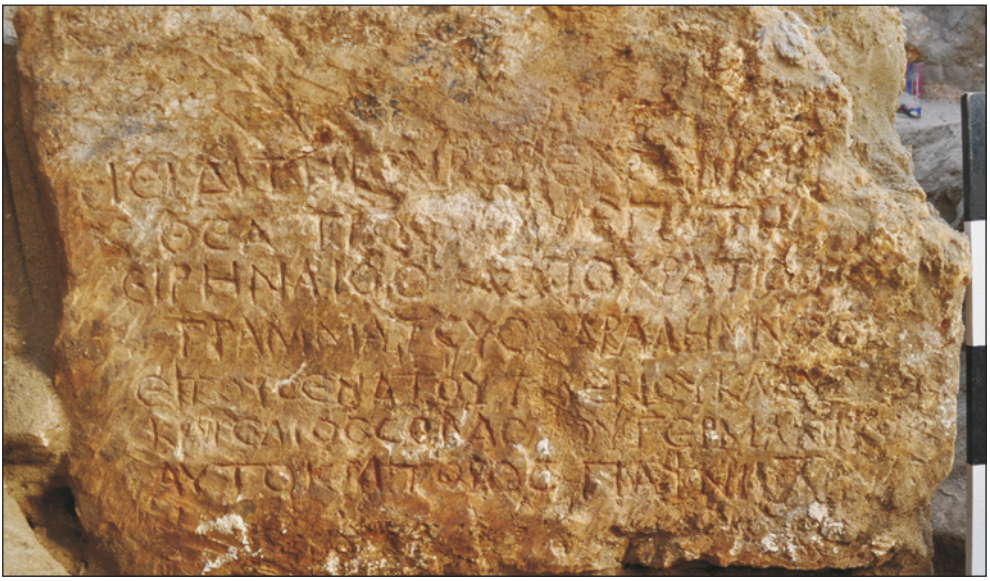

Fig. 15. Dedication to Isis the Nurse Goddess in AD 49, in situ in the courtyad of the Great Temple; each black and white increment=10 cm (Photo S.E. Sidebotham)

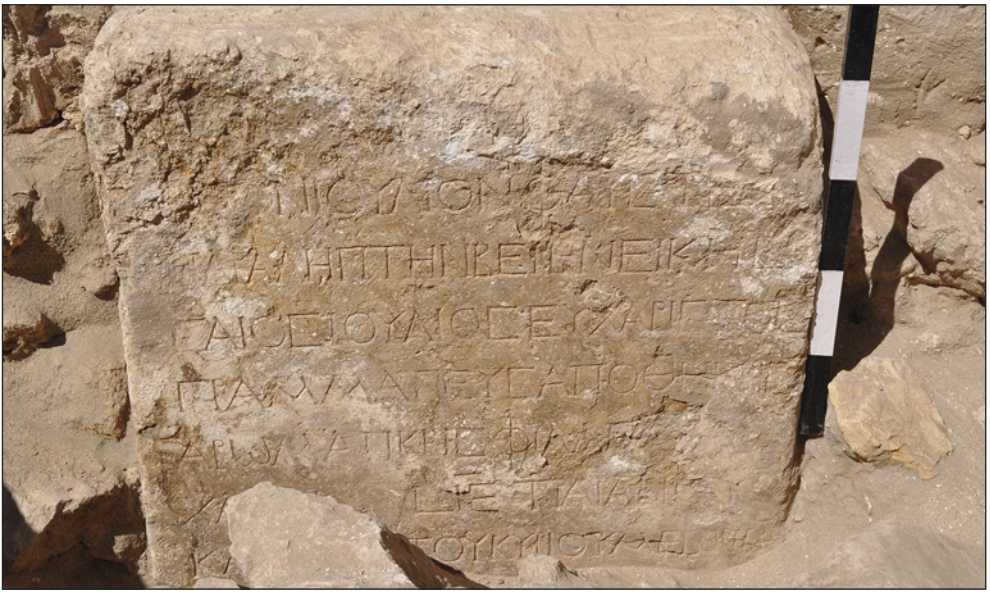

Fig. 16. Dedication of a statue of the receiver of Berenike and mention of an aromatics warehouse in AD 112, in situ in the temple courtyard; each black and white increment=10 cm (Photo S.E. Sidebotham)

Severus (AD 193–211). Buried under this rubble were two large stone podia, in situ, an earlier one to the left of the entrance, the later one standing a little to the side on the north, lining the courtyard in front of the entrance. The two podia must have carried statues, possibly of marble. One was a dedication to Isis the Nurse Goddess made in AD 49 [***Fig. 15***] and the other a dedication of a statue of a prominent citizen of Berenike in charge of an aromatics warehouse in AD 112 [***Fig. 16***] (Ast and Bagnall 2015). None of the individuals recorded in these two texts is attested otherwise at Berenike.

Collectively, these finds indicated an extremely wealthy and prominent religious edifice in the heart of Berenike active at the peak of "international" commerce passing through the city in the 1st and early 2nd centuries AD. Many of the inscriptions (as far as they have been deciphered at this point) were precisely dated by day, month and year and were made by wealthy residents of the port, especially secretaries (and translators?), to the goddess Isis and to other prominent citizens of the city. The dedication to Isis raises questions about which deities were venerated in this temple. One of the dedicants was a secretary of an aromatics warehouse somewhere in Berenike. Our excavations have not yet unearthed this building. Therefore, we are not certain exactly which aromatics might have been stored in such an edifice, but black pepper from southern India and frankincense from southern Arabia/the Horn of Africa may have been among the items accommodated in such a facility.

The rubble outside the entrance to the temple also contained a fragment of a stele in Egyptian style, but possibly Ptolemaic in date. It bore (from left to right) images

Fig. 17. Pharaonic stelae: left, of the pharaoh Amenemhat IV (reigned about 1800 BC); right, possibly Ptolemaic in Pharaonic Egyptian style (Photos S.E. Sidebotham)

of Hathor/Isis, Osiris, Harpokrates and Min/Pan (under study now by Laure Pantallaci) [*Fig. 17*]. Of much greater import, however, were two other fragments of a stele carved from sandstone, one of which was inscribed with the cartouche (royal name) of the Egyptian Pharaoh Amenemhat IV (reigned about 1800 BC). These two fragments seem to join with a piece illustrated in Giovanni Belzoni's report from his first excavation of the temple in 1818 (Hense, Kaper, and Geerts 2015). It is possible that the stele was an antiquity brought in the Roman period from somewhere else in Egypt and used to decorate the temple. However, if this is not the case then it could indicate the presence of Egyptian activity at Berenike some 1,500 years earlier than is currently believed, fitting in well with the evidence of expeditions mounted in the reign of this pharaoh that has been forthcoming from the explorations by Rudolpho Fattovich and Andrea Manzo at the site of Marsa Gawasis some 350 km up the coast to the north (20 km south of Safaga) (Bard and Fattovich 2007: 242; Tallet 2009: 697; Mahfouz 2010). Knowing the "hopping" style of sailing in the Red Sea with the need to come in to shore regularly for supplies, there is no reason why Berenike with its potential as a secure harbor exploited later by the Hellenistic founders of the harbor, could not have served as such a way station for the southbound expeditions of Egyptian kings. If so, this would rewrite the history of the site, indeed of much of the Red Sea coast of Egypt.

Clearly, the elaborate decorative features, rich dedications and prominent location of the so-called Serapis Temple made it one of the premier public buildings in early and middle Roman-era (first–early third century AD) Berenike. That a large dedication was made to Isis strongly suggests that she was also worshipped in this temple in addition to one or more other deities. The numerous inscriptions, wall decorations and marble revetment fragments as well as fragments of elaborate dedications leave hardly any doubt that this temple was a rich repository in the center of the city in Roman times and perhaps earlier. It remains to be explained, however, how the pharaonic stelae turned out to be part of a tumble of fragmentary and damaged pieces of statuary, inscriptions and architectural elements stacked in a corner in front of the entrance to the presumably already destroyed Great Temple of Berenike. Could they have been the effect of a general leveling of the town around the temple in the middle of the 4th century AD during the revival of the emporium?

NORTHERN COMPLEX IN THE TOWN

Excavation of trench BE15-110 aimed at testing a large architectural complex that became evident from a study of the magnetic map off this area. This large complex, which opens straight off the northern end of the western of the two *cardines*, closed off a street that started from the area in front of the Great Temple entrance and ran northward between houses, a few of which had been excavated earlier by the American–Dutch team. The results clearly indicated architectural and urban planning continuity between the late Roman-period remains on top and the early Roman (and possibly Ptolemaic) houses found underneath.

The trench was located on top of a magnetic anomaly that took the shape of a square with a niche. Judging by the magnetic plan of the structure to which this room belonged, it consisted of a large courtyard entered from the end of the street and opening onto a series of long narrow rooms on the western side and the main building on the north. The room explored in trench BE15-110 is fitted into the northwestern corner of the courtyard [*Fig. 19*].

Excavations confirmed that the square shape corresponded to walls of gypsum anhydrite ashlars, some of which at least comprised recycled blocks from Ptolemaic or early Roman contexts. The eastern end of this room had an entrance that stepped down into it, while the western

Fig. 18. BE15-110: view of the alcove from the front, looking west; each black and white increment=10 cm (Photo S.E. Sidebotham)

Fig. 19. BE15-110: view looking northeast toward the entrance to the room (Photo S.E. Sidebotham)

end contained a rectilinear alcove. The southern part of the alcove at its eastern end still preserved remains of stone revetment decoration and remains of a wooden frame or closing mounted in the wall around the opening. A piece of hard carob wood (*Ceratonia siliqua*) lay inside the niche. It preserved at least one large iron nail and several dowel holes, and it may have formed part of a large chest. The original floor was not reached this season, the excavation stopping on a layer of tumbled architectural elements.

Large blocks were either thrown or tumbled into the interior. Many were so large that they could not be removed, at least with the equipment available this season. One of the more interesting and smaller shaped stones was a deliberately cut down part of a large stone offering or libation table, referred to in the literature as a "temple pool". Many similar pieces have been documented during excavations elsewhere in Berenike (e.g., Sidebotham and Zych 2010: 17–18; 2012b: 145), coming from 4th–5th century contexts, some of them also reused. These also appear in substantial numbers in Nubia and Meroë (areas farther south along the Nile stretching from southern Egypt and into Sudan) throughout much of their history (Kuentz 1981; Cunningham-Bryant 2012; Sidebotham 2014: 604–605).

Other remains of teak wood, too fragmentary to determine their original use, but possibly from one or more dismantled ships, lay in the southeastern corner of this trench. These remains were part of the fill of architecture, possibly when it was already in ruins, reflecting squatter occupation, and they were accompanied by other artifacts reflecting a marine-based economy: a brailing ring [***Fig. 13***] and copper-alloy fish hooks. Squatters from this late period left more evidence of their occupation. They reused stone blocks to rearrange the space on the floor of the room and in a corner thus formed, just inside the entrance, they concealed a small jar with a bowl upside down as a lid [***Fig. 13***]. It may have been a kind of foundation deposit with an offering inside, consisting of a piece of charcoal, a piece of limestone and two sherds. This could very well be a substitute offering that is sometimes encountered in the Egyptian tradition. The latest occupation of this room and the vicinity dated to the 5th–6th century AD. The original function of the room and its role in the bigger complex traced on the magnetic map has yet to be ascertained (see also Sidebotham and Zych forthcoming).

BUILDING COMPLEX OUTSIDE THE CITY LIMITS

A large building northwest and outside the city limits was recognized after examination of Corona satellite photos dating from the late 1960s/early 1970s (outlines of this edifice are not visible on Google Earth imagery). The walls were of gypsum anhydrite and coral heads, forming a long narrow rectangular structure with the long side to the east, toward the city and the sea [***Fig. 20***]. Recent abundant winter rains must have washed away the ground, revealing the tops of some of these walls. A magnetic survey mapped a large courtyard in front of the building with a gateway also opening toward the sea.

Three podia of roughly the same size stood in a row inside the structure. They were constructed of slabs of gypsum anhydrite. The floor between them was of gravel and tamped earth. Excavations revealed nothing of its function since it had been almost completely cleared of artifacts, either by the latest users or perhaps by periodic flooding of the adjacent wadi; analysis of the paltry quantity of finds — mostly sherds — did, however, indicate that its latest use was during the Augustan era (30 BC–AD 14). A distribution study of the finds in particular contexts also showed that pottery vessels containing food offerings in the form of mollusks and shells were left in certain places inside the structure.

SURVEY IN THE ENVIRONS OF BERENIKE

A brief survey of the area of modern military bunkers immediately northwest of Berenike identified a number of ancient graves. These were of the typical ring cairn variety that is ubiquitous throughout the Eastern Desert. Most had been looted. The surface sherds and other small finds indicated burials ranging from the early to mid Roman periods. One of the finds was a tiny intaglio (L. 0.75 cm, W. 0.63 cm, Th. 0.20 cm) carved with a human or eros figure milking a goat [see ***Fig. 12***]. There is a very close parallel for this specimen from the Roman Mediterranean port of Caesarea Maritima, Israel (Hamburger 1968: 22 and Pl. VIII, no. 149: J. Rądkowska kindly provided this citation). The Berenike specimen came from near a looted grave with pottery of early Roman date.

Fig. 20. Building with three podia viewed from the south (Photo S.E. Sidebotham)

SURVEY IN THE EASTERN DESERT

During winter 2014 the desert survey revisited several sites for additional photography, video-making and surface sherding to date better the activity at these locations. Sites visited included the 3rd century BC–1st century AD installation at Wadi Lahama/Lahami (24°09.92' N/35°21.93' E), the 1st to 5th century AD *hafir* in Wadi Khashir (24°11.05' N/35°14.08' E), the 3rd century BC–1st century AD mining settlement at Muweillah (24°13.35' N/34°04.11' E), the remains of the 1st–2nd and late 4th–6th century AD *praesidium* at Abu Ghusun (likely the ancient Cabalsi) (24°23.22' N/35°02.93' E), the 2nd–1st century BC, late 1st century BC–6th century AD (and some Islamic) emerald/beryl mining settlement at Sikait (24°37.84' N/34°47.76' E), the 1st–4th century AD road station at Wadi Gemal East (24°34.15' N/34°48.95' E to 24°34.03' N/34°49.06' E), and the late 1st century BC–3rd century AD and 4th century AD emerald processing settlement at Kab Marfu'a (24°32.62' N/34°44.31' E). Our previous surveys of these sites had resulted in measured plans and some dates based on the study of surface pottery, but more sherds were collected that allowed some additional chronological insights and, in the case of Wadi Gemal East, more measurements were taken, specifically of some wall thicknesses and wall heights of the largest building on that site.

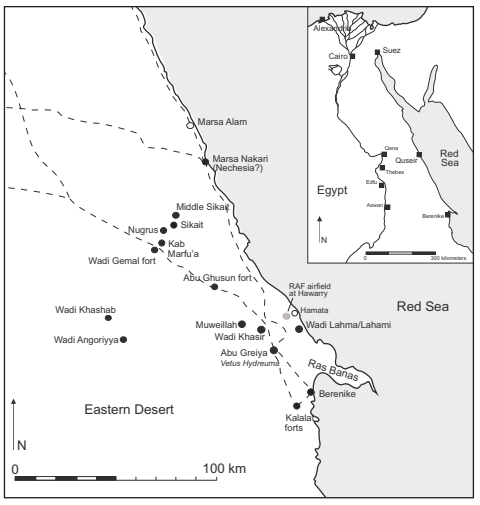

Fig. 21. Map of the Eastern Desert showing the location of sites surveyed in the 2014 and 2015 seasons (Drawing J.K. Rądkowska)

Southwest of Berenike (at 23°53.51' N/35°27.66' E) the survey documented a narrow pass on the route leading from the large and small *praesidia* in Wadi Kalalat that was littered with early and late Roman era sherds, including those made in Egypt as well as imported from elsewhere in the Mediterranean. Clearly this lay along one route linking these nearby installations with Berenike. Both forts would have provided protection for the emporium and also probably supplied some of the potable water consumed in the city.

Continued survey in the Eastern Desert in 2015 resulted in the discovery of a large site, hitherto unknown to western scholars. It was first reported by a Dutch resident of the Red Sea coast to Sidebotham in the fall of 2014. This large settlement in Wadi Angoriyya (24°18.02' N/34°49.28' E) comprises about 100 buildings. Dating to the late Roman period (4th–6th centuries AD), the community likely belonged to Christians escaping problems along the Nile at that time. Our survey and those of others conducted in the Eastern Desert

have recorded about a dozen settlements similar in appearance and date (Sidebotham 2011: 173–174, 276).

Somewhat northwest of the settlement in Wadi Angoriyya the survey recorded petroglyphs of three large long horned cattle and several smaller ones [***Fig. 22*** left] as well as *dalu* (signs indicating the presence of a water well) (at 24°18.77' N/35°00.47' E) (see Fuchs 1989: 130–131, 134–135, 137; Redford and Redford 1989: 9, Fig. 1; 11, Fig. 6; 26, Fig. 40; 30–31, Fig. 51; 33, Fig. 58; 34–35, Fig. 61; Rohl 2000: 29, 35, 43, 73, 75, 82–83, 89, 91, 95, 115, 118, 121, 146). The relative proximity (about 35 km in a straight line) of the long-horned cattle cemetery in Wadi Khashab to these petroglyphs may indicate a functional relationship between the two. However, the parallels noted above have been either undatable or have been attributed from predynastic to "Pharaonic" periods.

The project continued to draw a detailed plan of the Roman era emerald mining settlement at Nugrus using a total station (see Sidebotham et al. 2004: 23–26). This is part of a longer term endeavor that aims to study and document in detail approximately nine known ancient sites in a region the Romans called Mons Smaragdus (Emerald Mountain), which comprises approximately 300 km^2 of the Eastern Desert northwest of Berenike. This intensively mined region was the only known source of emeralds anywhere inside the Roman Empire and was exploited from before the Roman period and into Islamic times (Sidebotham et al. 2004; Foster et al. 2007). Working with the Wadi Nugrus survey team, the SCA inspector Farag Shazly Mohamed located and surveyed a rock-cut niche with a relief image cut inside it and an inscription, the name Anubis, cut in the rock wall at its back [***Fig. 22*** right].

The survey team also visited the World War II RAF airfield at Hawarry not far from the coast [see ***Fig. 21***], first shown to the team by Bedouin informants in 2011. Measurements and additional photos were taken in 2015. RAF historians may have more to say about this facility.

Fig. 22. Rock petroglyphs in Wadi Angoriya, left, and rock-cut niche discovered by the survey in WadiNugrus (Photos S.E. Sidebotham)

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