

Some new earthquake-related evidence from Marina el-Alamein in Egypt



Abstract: Earthquake-related damage has been observed in the architectural substance recorded at the archaeological site of Marina el-Alamein on the northwestern coast of Egypt, reflecting seismic events with more widespread impact known from both written and archaeological sources in the immediate vicinity and farther out. Recent investigations in the ancient town, focused on a district in the northwestern part of the site, have uncovered more evidence of potential earthquake-related destruction in a small public bathhouse (H.39) and a building of still unspecified function (H.40) located further to the east. Apart from obvious wall cracking and floor decomposition, as well as evidence of violent fires (attributed at least in one case to the second half of the 2nd century AD), the author has also observed differences in wall construction techniques, possibly chronologically discrete, that could be explained by a desire on the part of the ancient builders to protect buildings against the effects of seismic shockwaves.

Keywords: Marina el-Alamein, seismic events, stone wall construction techniques, bathhouse, latrine

INTRODUCTION

Evidence of seismic activity and related destruction of urban architecture, including violent fires and tsunami-like events, has been recorded repeatedly over the years

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Team

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by Polish archaeologists excavating the site of Marina el-Alamein (Medeksza 2000; Daszewski 2002; Zych, Obluski, and Wicenciak 2008; I. Zych, personal communication). The recent season of the PCMA UW archaeological project at Marina el-Alamein, in October 2020, continuing the excavation of buildings from the 1st through 4th centuries AD in the northwestern part of the site, already close to the unpreserved harbor, has added some new earthquake-related evidence. Previously recognized traces take on the form of cracked wall substance and a badly damaged hypocaust chamber in the bath installed in House H.39. Effectively, seismic shock would have resulted in, first, a “squeezing” of the wall structure and then a release that

caused cracking as well as floor decomposition [Fig. 1; for the location of H.39 see Fig. 2]. Evidence of a similar nature is recognized in the ruins of nearby House H.1, located east of H.39. The crack noted in H.39 appears to have run east, damaging the southern part of House H.1. Indeed, the tension was such that the southern fragments of the building were displaced and moved about half a meter down toward the south [for the location of H.1 see Fig. 2 inset].

In 2020, the team explored the northern part of H.39, contextualizing the bathhouse discovered on this spot in earlier seasons (Jakubiak 2018; 2019). More work was done also on the ruins located south of H.41, that is, structure H.40 [see Fig. 2].



Fig. 1. Cracked walls and mosaic floor in the H.39 bathhouse, view from the east (PCMA UW | photo K. Jakubiak)



Fig. 2. Structures H.39 and H.40 in the northwestern part of the town; top, plan of the site of Marina el-Alamein, circled location of complexes discussed in the text (PCMA UW | drawing S. Maślak, M. Iskra; site plan after Czerter and Bąkowska-Czerter 2020: Fig. 1)

HOUSE H.39

The bathhouse, labelled H.39.2, was investigated in detail previously, identifying the general layout and the standard set of small bath installations of the Roman period in Egypt (Jakubiak 2018; 2019). The excavation was extended to the northern part of the building in an effort to establish the function of this part of the building and to verify the phasing of the bath. An earlier assumption that chamber H.39.2 was a single-phase architectural structure was revised upon recognition of at least three occupational phases, spanning the period from the 1st to the 4th centuries AD. Exploration of the northern part of the building revealed different development dynamics and its own, independent chronology.

The first structure built north of the bathhouse was a stone platform that was added against the north wall of the bath [Fig. 4]. The purpose of this platform is not clear. A deep latrine operated in conjunction with the bath in the western part of the building. It was contemporaneous with the platform, occupying a corner next to the north wall of the bathhouse, but not bonded with it. It was rectangular in plan, with seats and a channel system ensuring the supply of clean water on the one hand and the discharge of sewage on the other. The sewage channel ran east under the latrine wall and alongside the platform [Fig. 3]. A cistern, or rather a waste collector, was discovered in the central part of the excavated area



Fig. 3. Structure H.39 (PCMA UW | drawing S. Maślak, M. Iskra, O. Puzkarewicz)



Fig. 4. H.39, northern part, viewed from the east (PCMA UW | photo O. Puzskarewicz)



Fig. 5. Latrine in building H.39 (the bath facility is behind the wall on the right) (PCMA UW | photo O. Puzskarewicz)

[see *Figs 3; 4*]. Compared to other water cisterns excavated throughout the town (e.g., H.1, H.21, H.40 in the northern and northwestern part, H.9 and H.10 in the southeastern part; see Daszewski 2011; Jakubiak 2016; Bąkowska-Czerner and Czerner 2019), the recently discovered structure is not as elaborate and well finished, but it resembles closely the water or waste collector from the next-door bathhouse. The localization of the two structures close to one another and their specific construction leads to the conclusion that they were part of a sewage system and had been used as collectors for waste water. It is also likely that the installations could have been part of a drainage system in the street or open space that lined the western façade of

building H.39. The manner of construction of this collector, especially the one inside the bathhouse chamber, suggests that at this point the bath may not have been used for bathing anymore.

Stratigraphic observations made in the area within the enclosure walls of the building designated as H.39 have demonstrated that the north and east walls belong to a later phase in the building's development. The building material used here consisted of stones of different shape and size, and the building technique differed from that applied in the walls of the bath chamber. Deposits recorded under the east wall, as well as the compacted sand levelling layer upon which it is founded, indicate that it could not have been built before at least the beginning



Fig. 6. *Tannur* situated in the southwestern corner of the northern unit in H.39, external view of the air hole (PCMA UW | photo O. Puszkarewicz)

of the 3rd century AD. In other words, the original bath layout comprised a long unit containing the bathing establishment and a latrine unit attached at right angle on one side. The open area north of the bath seems to have had a technical function. A small doorway located in the northeastern corner of the northern bath façade opened onto the hypocaust furnace. Therefore, the platform against the northern façade could be interpreted as a place for collecting fuel necessary to keep the furnaces fired. It could also have been used in some way in the removal of ash from inside the furnace. As no ash deposits have been recorded to date, it is reasonable to assume that ash disposal from the bath structure must have been regular and the waste was dumped at some distance from the building.

When the bath complex went out of use, most probably at the end of the 2nd or the beginning of the 3rd century AD based on pottery analysis, the area north of the bath building was levelled, the compacted sand layer supposedly covering from view remnants of older struc-

tures. Street S₁, running along the eastern façade of the bathhouse was raised to match the level of this area (Jakubiak 2016). The compacted sand created a stable foundation for walls built of regular ashlars, both quadrangular and of irregular shape. The latter would have been used for wall substructure. A footing that follows the inside of the east and north walls, at a level of 2.96 m asl, presumably marks the level of a possible floor inside this northern unit. No trace of this floor has survived. The subsurface artifact assemblage, primarily pottery, from this area gives a date at the end of the 4th century AD.

The function of this enclosed space attached to the northern façade of the structure that had once been a bathhouse has not been established. A small oven (*tannur*) was located in the southwestern corner of the unit. It was constructed of sherds of a Dressel 7 type amphora made locally in the Mareotis region (Peacock and Williams 1991: 117–119) [Fig. 6].

BUILDING H.40

Southeast of the bath structure is a building, H.40, two rooms of which were partly cleared previously (Jakubiak 2018). A trench was now opened along the southern side of a street running in an east–west direction, uncovering three additional chambers [Fig. 7]. The chamber located in the southeastern corner of the building is rectangular in layout; it was used presumably as a latrine as attested by a partly preserved sewage canal discharging into a street passing

by the southern façade of the two units excavated before. The inner water supply network has yet to be traced.

The newly excavated units H.40.4 and H.40.5 were originally designed to be square in layout. Evidence of a violent fire was recorded everywhere: ash, charcoal and burnt wooden beams, not to mention a possible roof made of perishable organic material, this in H.40.4. Moreover, the artefactual assemblage, including burnt rope, bears traces of a con-

flagration [Fig. 8]. An apparent wooden box (a rectangular shape of burnt wooden fragments could be discerned) with metal (i.e., bronze) ferrules was identified. The pieces of burnt rope appear to have been stored in the southern part of the build-

ing, near the entrance to the chamber.

According to preliminary observations from the clearing of the area west of the two units already known, doors in the westernmost wall led outside, into a presumed courtyard, which, in turn, would

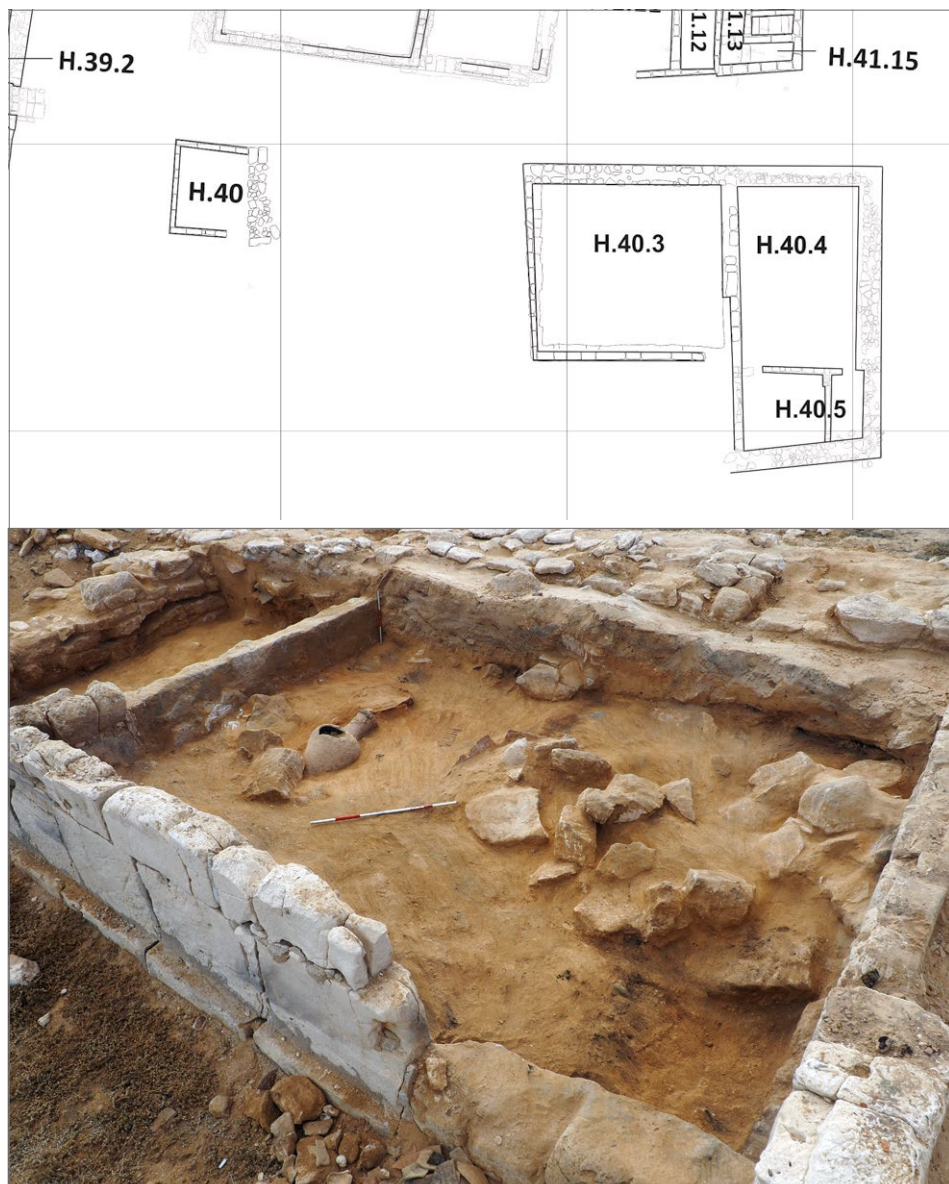


Fig. 7. Unit H.40.5, viewed from the northwest (PCMA UW | photo M. Iskra)

have had an entrance next to a small room (shop? workshop? perhaps guardroom?) excavated a few years ago (Jakubiak 2016). The investigation of this alleged courtyard space revealed two phases of occupation. The initial construction appears to have taken place in the late 1st or beginning of the 2nd century AD, based on the pottery evidence, especially fragments of Benghazi-type amphorae, providing a relatively precise *terminus post quem* for the walking level of the second phase [see Fig. 7 and below, Fig. 11]. The structure appears to have been abandoned for an unknown period of time, the area around the doorway functioning as a convenient rubbish dump for urban waste. Material from the burnt chambers (see above), representing the upper occupational layer, indicates that the building was resettled still sometime in the mid-2nd century AD (extensive destruction has been noted elsewhere and

dated sometime to the second half of the 2nd century AD; see Zych, Obluski and Wicenciak 2008: 90).

The function of the building as a whole is still a matter of speculation. So far, no water installations of any kind, whether a water tank or a cistern, have

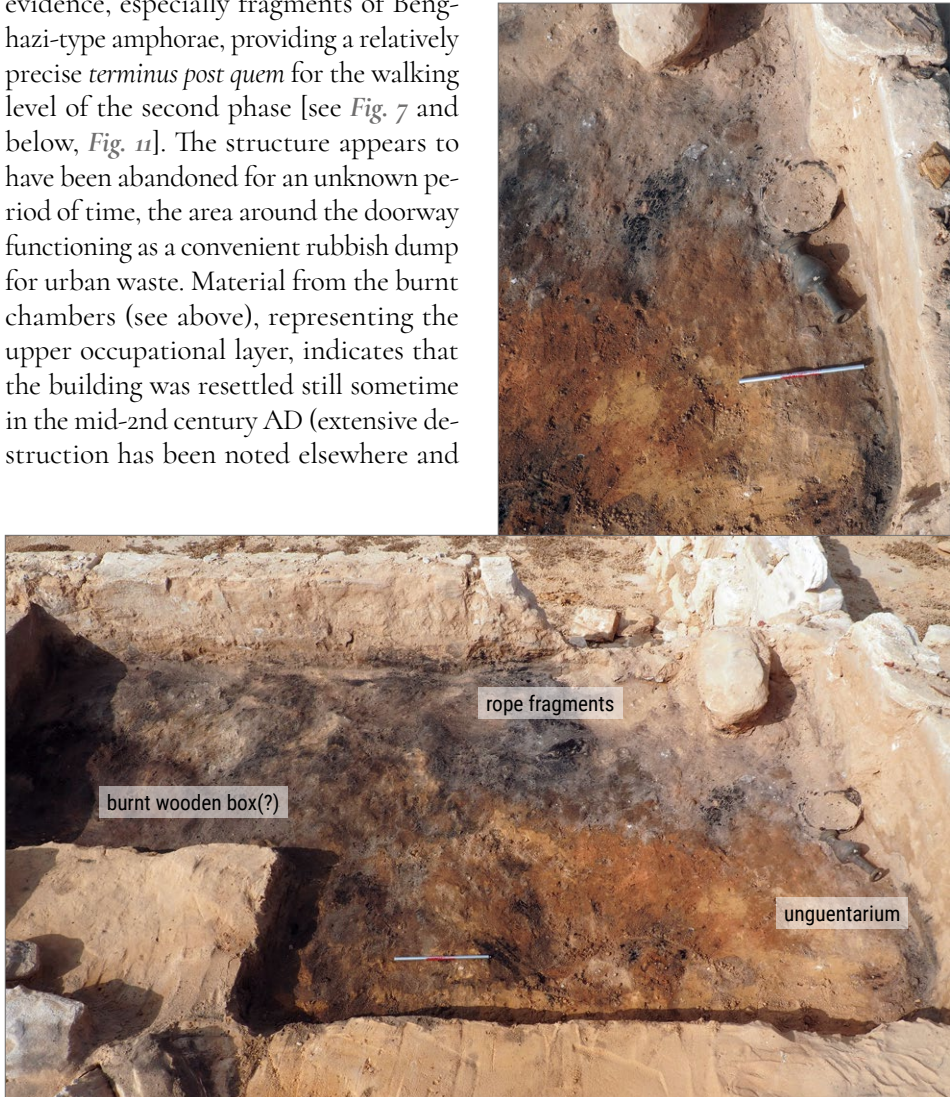


Fig. 8. Burnt layer inside room H.40.4, viewed from the west; inset, detail of the burnt deposit by the south wall (PCMA UW | photo M. Iskra)

been found and these would be the best indication of a household function.

A detailed analysis of wall construction techniques contributes to the discussion of earthquake-related issues at Marina el-Alamein. Part of building H.40 was built of regular, almost standardized ashlar, the rest—at least at the foundation and substructure level—of irregular blocks of stone and boulders [Fig. 9]. The latter are of rather poor quality limestone and it cannot be excluded that they constitute waste from the dressing of stone blocks (which could have been partly quarried from the underground tombs in the necropolis south of the town; see Popławski 2021). Suffice it to say that pre-

cise building from such material is difficult at best. Moreover, an architectural analysis of the wall structure reveals two building phases, corresponding perhaps to the two occupational phases discussed above. A part of the building is constructed of regular ashlar and this part of the structure seems to be earlier in date than the rough walls of irregular stones. No interbonding has been noted between the ashlar walls and the rough-shod walls; the latter appear to have been attached to the better-built walls. Whether this is due to a time lapse between the two kinds of wall structure (with all the consequences for the building chronology) or some practical reasons, it is difficult to specu-



Fig. 9. Unit H.40.3, viewed from the northwest; note the solid ashlar bondwork of the walls in the background and the irregular stone masonry of the wall at right and bottom (PCMA UW | photo K. Jakubiak)

late for now. The latter could be suggested based on general knowledge, considering the localization of the town and the frequent seismic activity observed in the 3rd and 4th centuries AD (but also earlier) when numerous earthquakes were recorded in the eastern Mediterranean, including heavy destruction in Alexandria, situated just a hundred kilometers to the east. Building techniques in Marina el-Alamein could well have addressed the recurrent threat (Hassan et al. 2020; Stiros 2020). The town builders were skilled professionals—the architectural relics uncovered to date leave no doubt as to building quality standards—and the general character of the architecture reveals a prosperous urban community that could invest in good building. In light of this

one is entitled to speculate that the case of H.40 illustrates the application of some kind of anti-seismic technical solutions. The combination of an ashlar bond with masonry walls of irregular stones could have been accidental to some extent (possibly reflecting different phases in town development), but it certainly made the structure more elastic, on the principle of expansion joints in construction. Furthermore, the voids between irregular stones in the wall structure acted effectively as shock absorbers, protecting the building against major damage. This had its consequences for wall thickness: the ashlar walls were thinner than the masonry ones, the latter being so wide at the base in order to provide a stable platform for the upper parts of the walls.

POTTERY ASSEMBLAGE

The pottery assemblage is in principle the same as in the earlier seasons, being the result of the clearing of successive parts of the architectural complex investigated since the beginning of this project (Jakubiak 2016; 2018). Roughly 60% is made up of storage jars: amphorae and other big clay containers, and most of these were produced in local workshops [Fig. 11]. The Mareotis-type amphora (Dressel 7) was the most frequent in this set, although the chronological range of this type is too broad for the purpose of a precise dating (Peacock and Williams 1991: 117–119). The pinched-handle type of amphora was also fairly common, the different fabrics recorded in this set indicating a number of different production centers, in Asia Minor but not only. Apparently, based on macroscopic analyses of the clay matrix,



Fig. 10. Terracotta oil lamp discus from H.40 (PCMA UW | photo K. Jakubiak)

it can be said that some of the amphorae of this type were local imitations. Of particular interest are handles of Dressel 43 (Cretoise 4) amphorae, ranging in date from the 1st to the mid-3rd century AD (Hayes 1983); deposits of this particular type were particularly abundant inside building H.40. Several fragments of Benghazi and Tripolitania amphorae from the 2nd century AD should also be mentioned (Peacock and Williams 1991: 107–108).

Kitchen-ware and coarse-ware forms accounted for about 30%. Most of these were mass-produced locally, unsurprisingly, considering the intensive use and consequently relatively short lifespan of these pots in the average household. Vessels manufactured abroad were also registered, but so far the recorded quantities do not support statistical studies of the local vs. the foreign-made pieces.

The same is true of the tableware, which constituted the smallest group recorded in 2020. Most of the collection is made up of Cypriot sigillata products, originating from household contexts dated to the 2nd and 3rd centuries AD, although some fragments seem to have been later. African sigillata types were also identified in small numbers, originating from deposits of late 3rd or early 4th century date.

The oil-lamp category was represented by at least 35 objects. The collection was severely fragmented, hence the actual number of oil lamps was probably higher. The oldest piece appears to be from the late 1st century AD, the latest from the late 3rd century AD. Many of the finds represented the typical Roman decorated discus lamp type. Motifs moulded in relief on the discus included animal



Fig. 11. Amphorae discovered *in situ*; earlier occupation phase in unit H.40.5 (PCMA UW | photo M. Iskra)

representations: a bull, a lion, and a peacock, characteristic rosettes, as well as an example of a figural image depicting the goddess Athena [Fig. 10]. Most of the

lamps were produced in local workshops, but there were singular examples of lighting devices manufactured in Italy, Asia Minor, and Greece.

CONCLUSIONS

The architectural features uncovered by the University of Warsaw team in the northwestern part of the Marina el-Alamein archaeological site shed light on the overall perception of the character of the town and its functioning down the ages. Public bath complexes, even the small complexes like H.39, definitely held importance as community space. This bathhouse operated during the 1st and at the beginning of the 2nd century AD, most probably concurrently with the *tholos*-type bathhouse recorded further to the southeast, north of the forum area (Bąkowska-Czerner and Czerner 2019). There is no way to ascertain the formula in which this bathhouse functioned, whether it was an exclusive

bathing place and for which class of the town society. Following this season, it is clear that it was an independent structure, furnished with its own latrine. The function of the other structure, discovered earlier and investigated further in 2020, continues to escape identification. The absence of water installations of any kind make it rather unlikely to be a household structure. Overall, investigations since 2012 have cleared the better part of a small district located around an important building of commemorative character, that is, House H.21, close to the town harbor. The results, once the work is completed, will shed light on the role and functioning of insulae in the ancient town organism.

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