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The eastern tower was first documented in February 1998, as a semicircular shape attached to the circuit wall in the middle of the eastern curtain of the Banganarti fortifications (Żurawski 2003: 141, Fig. 2). In the years that followed other parts of the fortifications, like the trapezoid building next to the eastern tower, were studied in detail (excavations in 2001 and 2002, Żurawski 2002: 221–226; Wiewióra 2005: 268–269; 2007: 205–206) [*Fig. 1,* inset]. The eastern tower in this context was presented as an earlier element, adjoined but not interbonded with the trapezoid building. Tachymetric measurements in 2004/2005 of the tower remains visible on the ground established the diameter at 9.30 m and the projection from the face of the wall at 7 m (Żurawski 2007: 310, Fig. 7). Examination of the surface remains suggested that the walls in this part of the curtain were about 0.80 m thick. In other parts of the circuit, the wall was from 2 m to 4 m thick. The remains of the eastern tower were phased to the same time as the circuit wall in sector I (Drzewiecki 2008: 405; 2014).

Excavations in 2010 were carried out inside and in the immediate surroundings of the eastern tower, which is considered a key architectural element of the Banganarti fortifications. The state of preservation of the architecture in this part of the complex turned out to be very good and the accumulations thick enough for the explorations to be continued in the 2011 season. The maximum thickness of archaeological layers was 4.50 m, whereas the architecture was preserved to a height of 4.20 m. Extensive evidence of repairs and rebuilding were recorded in the tower and the adjacent buildings [see *Fig. 1*].

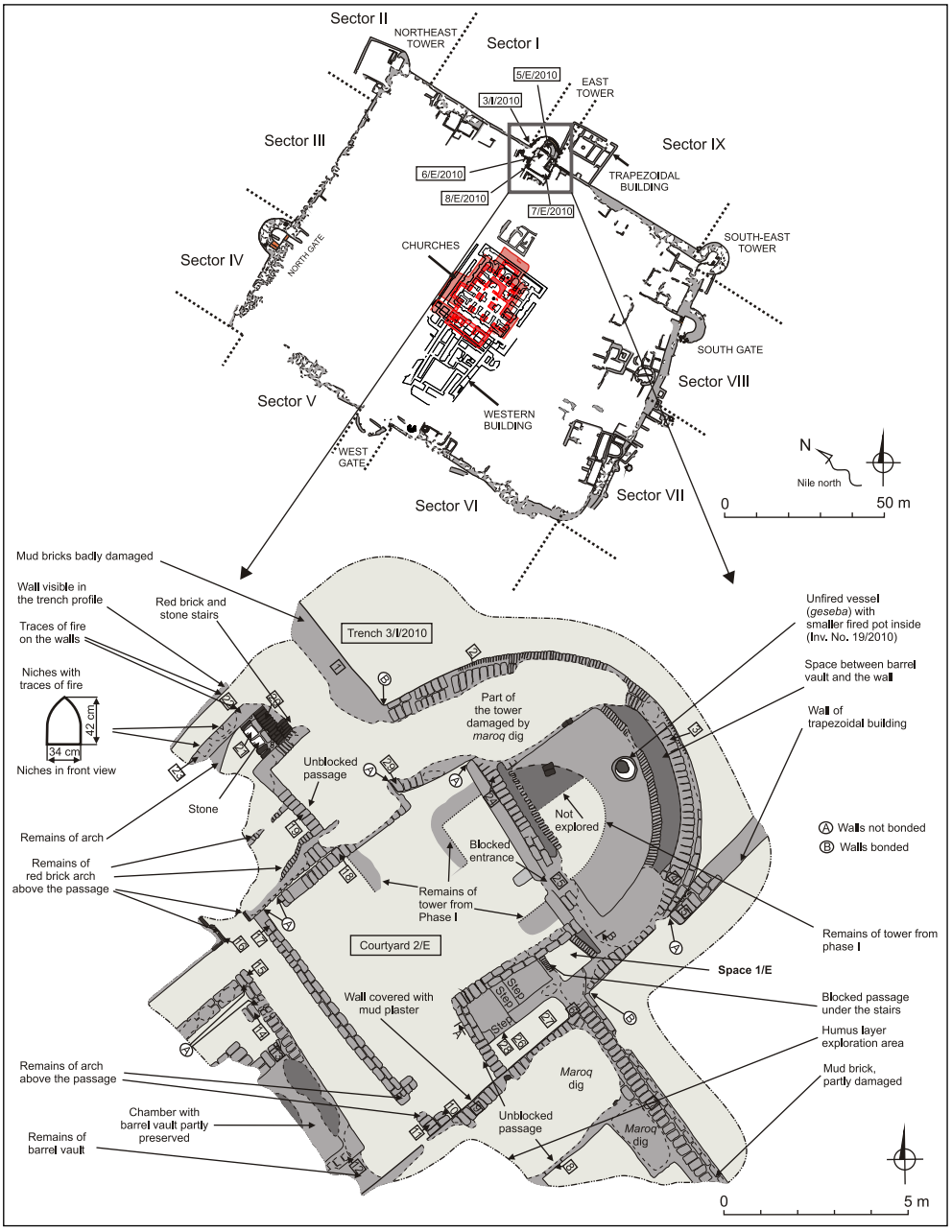

Fig. 1. Banganarti, site 1. Plan of architectural remains in the area of the eastern tower after the 2011 season; inset, plan of the site with architectural remains for the end of the season in 2010 (Drawing A. Cedro, M. Drzewiecki and R. Łopaciuk, M. Drzewiecki)

RESEARCH METHODOLOGY

The first trench (3/I/2010; 2.00 m by 1.50 m) was excavated on the spot where the eastern tower joined the curtain wall in sector I [see ***Fig. 1***]. The top of a culturally sterile layer was reached at a depth of 4.20 m. Humus here was about 2.45 m thick, comprising loose yellow sand with potsherds and small quantities of organic material. The structure of this deposit created a continuous hazard of collapsing baulks, the falling sand damaging non-architectural layers uncovered below.

Next, the interior of the tower started to be explored [***Fig. 2,*** bottom]. To avoid problems with collapsing baulks, the humus layer from the entire area of the tower was removed and only afterwards were small test pits planned. The actual testing was carried out for the most part in 2011, exploring four trenches: 5/E/2010 to 8/E/2010 [see ***Fig. 1***; Drzewiecki 2013: Fig. 8 top). Only in 6/E/2010 was the top of a culturally sterile layer reached. Exploration proceeded in arbitrary levels, roughly 1 m thick in each case. Finds were counted and registered. Pottery underwent selection on site for the purposes of ceramological research (only complete or reconstructible forms, as well as unknown or atypical ones, plus ornamented and inscribed sherds).

BUILDING PHASES

Research on the Banganarti fortifications in 2007 and 2008 had distinguished two major building phases, referred to in brief as wall I and wall II. Wall I roughly corresponded with the Lower Church (Żurawski 2010: 330; Drzewiecki 2014). It remained in use until the 11th century when, at some point, wall II was constructed. Ceramic material from the foundation levels of this new wall was identified by ceramologist Dobiesława Bagińska as being of 11th–13th century date (2008: 421–425). The fortifications roughly retained their original layout, wall II being constructed basically around and over the older structure (see Drzewiecki 2010: Fig. 10; 2011: Fig. 14; 2013: 300–301; 2014).

PHASE I (WALL I)

All recorded surface traces of the eastern tower [see ***Fig. 2,*** top] should be linked to the second phase or later reuse of the ruins of the fortifications. Testing confirmed the existence of a tower also in the first phase of the fortifications. The foundation level was recorded at 4.89 m below the benchmark established on the Upper Church threshold (152.06 m). The tower wall from the first phase in trench 6/I/2010 was preserved to a height of approximately 2.58 m [***Fig. 3***, subphases Ia and Ib]. The material used in construction was mud brick, measuring 32–35 x 17–25 x 8–10 cm on average. The 25 preserved courses demonstrated for the most part a header–stretcher bondwork. Marking the lower section were four separate courses of bricks set up on end, the topmostone of these with some brick deliberately made shorter, presumably in an effort to create a good level for successive brick courses. The importance of this measure is appreciated once it is realized that the wall

was founded in sand. All the courses in the higher parts of the walls maintained an undisturbed level, attesting to the effectiveness of this building method. Alternately, the bricks set up on end could have belonged to an earlier subphase (Ia), while the header and stretcher courses appeared in a successive subphase [see *Figs 3, 4*]. The presence of an interbonded cross-wall flush with what has been identified as the tower wall from subphase Ib and its absence in the section of the wall corresponding to subphase Ia corroborates this observation [see *Fig. 3*].

Fig. 2. Eastern tower after the tops of the walls had been cleared of sand; bottom, view during exploration of the humus layer inside the ruins in 2010 (Photo M. Drzewiecki)

The remains of tower walls from phase I were recorded also in trench 5/E/2010. A rounded wall of massive proportions was traced at the bottom of the humus layer. The top courses of this structure were of mud brick. It virtually filled the trench, making further work impossible without damage to the architecture. The walls of the tower from the second phase were built on top of these remains [see *Fig. 1*].

The exploration of trench 8/E/2010 [see *Fig. 1,* inset] revealed the inner face of the fortifications close to the point where the tower joined the wall. The state of preservation of the remains was similar to that in trench 6/E/2010. The trench had to be backfilled before culturally sterile soil was reached because the mud-brick walls making up the northwest and southwest sides of the trench were in danger of collapse.

In summary, fragments of eastern tower architecture from the first building phase were revealed in the trenches described above. Trench 6/E/2010 is the

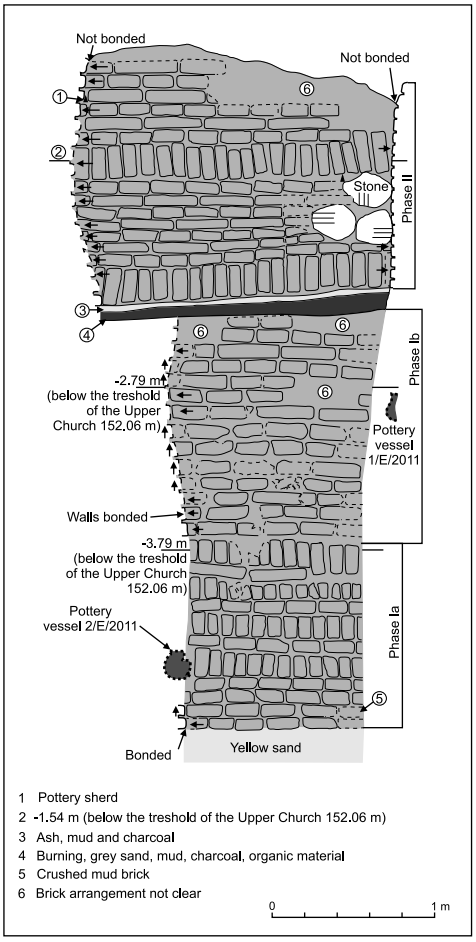

Fig. 3. Eastern tower, inside wall face (trench 6/E/2010) demonstrating tentative division into subphases Ia–Ib, II (Drawing R. Hajduga, A. Głąb, M. Drzewiecki)

Fig. 4. Trench 6/E/2010, northwest and northeast (seen in Fig. 3) profile with level staff set against the wall face (Photo M. Drzewiecki)

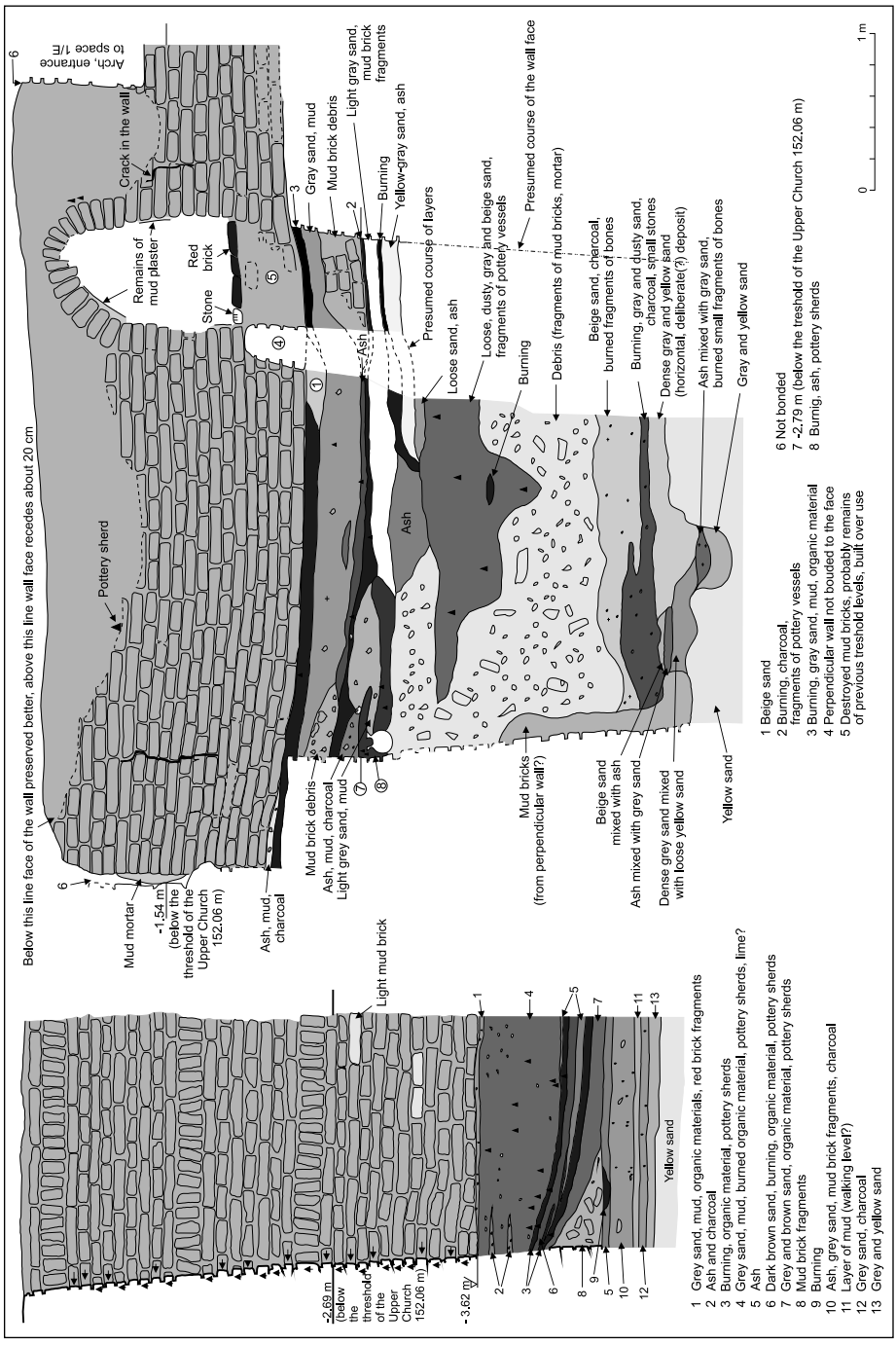

Fig. 5 Sections (in line) through the northeastern wall of trench 6/E/2010, looking northeast, and through the southwestern wall of trench 3/I/2010, looking southwest (Drawing, respectively, K. Solarska, R. Hajduga, M. Drzewiecki and M. Drzewiecki)

only place where the division of the first-phase structure into subphases (Ia and Ib) was observed. The structure from this period was semi-elliptical in plan, roughly 7.60 m across (phase Ib) and projecting about 5.50 m from the face of the circuit wall [*Fig. 6*]. Wall thickness ranged from 1.70 to 2.50 m. The interior inside the tower followed the shape of a semi-ellipse, measuring approximately 4.00 m by 3.30 m. A fragment of the entrance to this chamber was excavated in trench 6/E/2010 but without any clue as to the kind of vault.

Settlement layers corresponding to the operation of the tower in the first phase were recorded in trenches 6/E/2010 and 3/I/2010 [*Fig. 5*]. No evidence of a floor, whether of clay or masonry, were noted inside the tower. A handmade, cooking pot (Inv. No. 2/E/2011) was noted next to the wall of phase Ia. A cracked but complete amphora lay on its side at the bottom of the fill [*Fig. 7*], under a layer of mud-brick rubble. Rubble filled the interior of this unit up to about half its height, that is, about 2.80 m below the benchmark. Superimposed on the rubble backfill were layers indicating reuse of the ruins [see *Fig. 5* right]. A cooking pot (Inv. No. 1/E/2011, see *Fig. 3* and *Fig. 5,* right) found on the remains of a hearth, could suggest the absence of roofing at this time. The ephemeral mud-brick structure (see *Fig. 5*, mud-brick debris below the

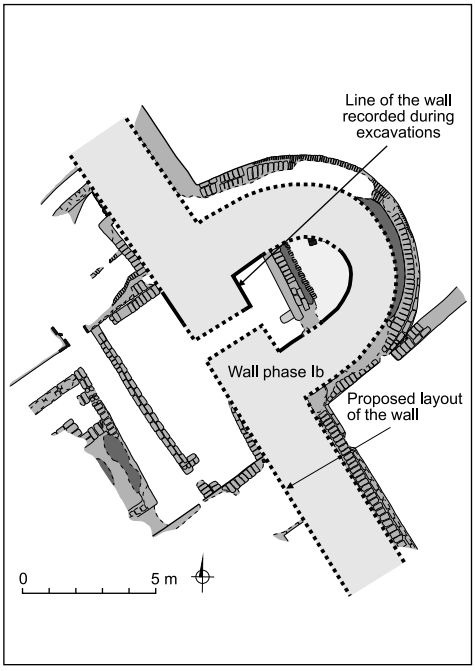

Fig. 6. Proposed line of the fortifications in the area of the eastern tower from wall phase Ib, based on currently available evidence (Drawing M. Drzewiecki)

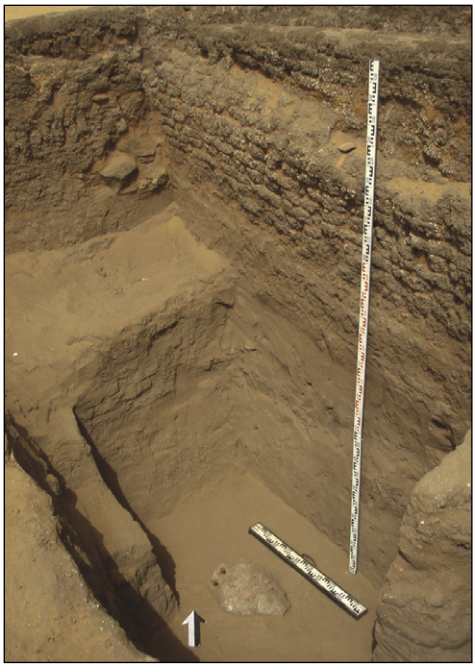

Fig. 7. Amphora (Inv. No. 65/2010) lying at the bottom of trench 6/E/2010 inside the eastern tower, below a level of debris (Photo M. Drzewiecki)

arched entrance) may be evidence of efforts made to adapt the room to a new function. Three layers of burning were noted in the top part of the fill of this room. They covered the entire space of the interior uncovered in the trench. The uppermost layer was the thickest, exceeding 0.50 m [see *Fig. 5*]. New fortifications (Wall II) were raised directly on top of this layer.

On the exterior, layers contemporary with the early tower were 1.50 m thick [see *Fig. 5,* left]. The foundations of second-phase fortifications stood directly on top of the earlier remains. The top of a mud-brick structure was discovered approximately 0.50 m below the foundations of the second-phase wall. It was preserved to a height of about 0.45 m [see *Fig. 5,* left, layer 8]. Superimposed on it were thick layers of burning and ashes [see *Fig. 5*, left, layers *3, 5, 6*]. The nature and function of this structure could not be determined. A layer of dense mud, 5–7 cm thick, was recorded at the bottom of the accumulations; it could have been a kind of tamped floor of clay [see *Fig. 5,* left, layer 11], formed when the fortifications were being constructed. Excess building material, like mud mortar, for example, could have been discarded on the ground, forming over time a hardened level that served as the first walking level around the fortifications.

PHASE II (WALL II)

The eastern tower, like the fortifications as a whole, was rebuilt in a phase designated as Wall II. A new building rose on the remains of the old tower, using the ruins as a foundation. The exterior of the earlier walls received a reinforcing brick facing that was 0.80–1.20 m thick. The bottom of the tower foundation next to the outer face of the wall from phase II [see *Fig. 7*] was recorded at 3.62 m below the benchmark (152.06 m a.s.l.) located on the threshold of the Upper Church. On the inside, this foundation stood on the ruins of the earlier structure and was found at a much higher level, at a level of approximately 2.44 m [see *Fig. 3*, phase II]. The remains of Wall II on the inside were preserved to a height of about 1.50 m; on the outside it was about 2.90 m, meaning that at the time of the construction of Wall II, there was a substantial difference in levels (about 1.17 m) between the inside of the eastern tower and the area outside the fortifications. The tower was built entirely of mud bricks sized an average 30–38 x 15–20 x 6–8 cm, laid in header–stretcher bond, interrupted in the outer face by three separate courses of bricks set up on end at regular intervals of 0.60–0.70 m along the entire height of the wall [see *Fig. 5* left]. Two courses of bricks set on end were noted in the inside face of the wall [see *Fig. 3*], approximately corresponding to the level of the two lower courses of bricks set on end in the outer face.

One of the results of the rebuilding was a larger tower, which attained a diameter of about 9.50 m and projected from the circuit about 6.00–6.50 m [see *Fig. 6*]. The chamber that was formed inside the tower was of irregular shape [see *Fig. 1*]. It is not clear why this was so, especially as the architecture in this case was disturbed by a pit filled with yellow, humus sand, cutting through much of the tower. The chamber was furnished originally with a barrel vault and the walls rendered with mud plaster. The thickness of the walls (about 1 m) indicates the presence of an upper floor. The entrance to the chamber, which

was discovered blocked with mud brick, was approximately 0.70 m wide and from 1.00 to 1.40 m high [see *Figs 1* top, *5* right].

The remains of an unbaked clay container of the *geseba* type were recorded inside the chamber, standing directly against the chamber wall below the springing of the vault. In order for it to have been used, it would need some space above it for pouring in and taking out grain. Its position right below the spring of the vault in this chamber suggests that the vault had already collapsed by the time that it was placed in position. Another pot, this time fired, was found inside the *geseba*, presumably reused in this location [*Fig. 8*]. Seeds (to be examined by a specialist) were recorded in the fill inside the *geseba*.

Extensive mud-brick architecture was recorded on the inside of the fortifications of phase II [see *Figs 1–2*]. The tower chamber appears to have opened on a small L-shaped courtyard (2/E in *Fig. 1*). A staircase in the eastern corner of the courtyard may have ascended to the upper-story chamber in the tower. Opposite the entrance to the staircase was the exit from the courtyard into a narrow corridor and from that into a close-knit network of barrel-vaulted chambers, corridors and staircases, testifying to a compact architecture lining the inside of the fortifications. At this point in the excavations, structures outside the courtyard were traced only as unit outlines [see *Fig. 1*]. Southwest of the courtyard were long rooms with preserved barrel vaulting (Nos 12–15 [level points] in *Fig. 1*). The architecture extending northwest of the courtyard appeared to be of a different nature (Nos 16, 19–23), making more extensive use of baked bricks (for instance, for steps in the staircase and arch in the doorway). Two arched niches made of mud brick were recorded in one of the walls. They were 42 cm wide by 34 cm high and approximately 25–30 cm deep (next to No. 23). The wall surface in the area of the niches bore extensive evidence of a fire. Large pits of later/modern date in the area to the southeast of the courtyard destroyed most of the architecture there, making it difficult to recognize its nature (Nos 7–9).

Fig. 8. Geseba container with another pot (Inv. No. 19/2010) inside it, found in the fill of the eastern tower chamber from the second phase (Photo M. Drzewiecki)

Of the architecture in the vicinity of the tower only the courtyard 2/E and the staircase in the courtyard were explored. The courtyard, in the shape uncovered in 2011, was built in stages. The staircase was supported on the oldest walls rendered with mud plaster. Successive walls were added in subsequent building phases, although it is impossible to determine the time elapsed between these. The state of preservation of the courtyard walls is similar to that of the second-phase fortifications. The architecture inside the curtain wall was constructed apparently in the next stages, right after the fortifications

had been rebuilt. Once the northeastern and southeastern walls of the courtyard had been constructed and rendered with mud plaster, the staircase was built. The entrance to the staircase was about 0.60 m wide and about 1.30 m high [*Fig. 10*]. The arch above it was built of red brick. Entering the courtyard one had to move left to reach the staircase; opposite the entrance there was a small niche [see *Fig. 1*]. The slant of the stairs depended on the height of the rooms under them [*Fig. 9*], comprising a dead-end corridor with oblique barrel vault and unit 1/E, also covered with a barrel vault. Chamber 1/E was connected with courtyard 2/E [see *Figs 1, 11*]. The fill of this small room yielded intensive evidence of fire in the form of a layer of ashes and organic matter. The walls bore traces of destruction and sooting due to the proximity of fire. Handmade pots blackened with soot found in the fill must have been used for cooking food. The blind corridor was entered from chamber 1/E, but the doorway was found blocked with a cooking vessel at the bottom and mud bricks above it [*Fig. 12*].

The face of the walls and fortifications forming the courtyard bore extensive evidence of reparations using mud bricks, mud mortar and stone [see

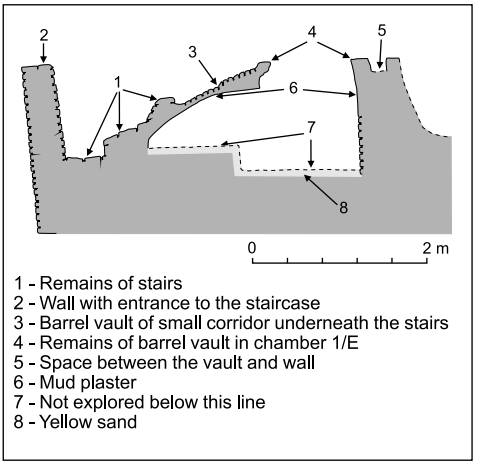

Fig. 9. Section through the staircase (marked AB in Fig. 1) (Drawing M. Drzewiecki)

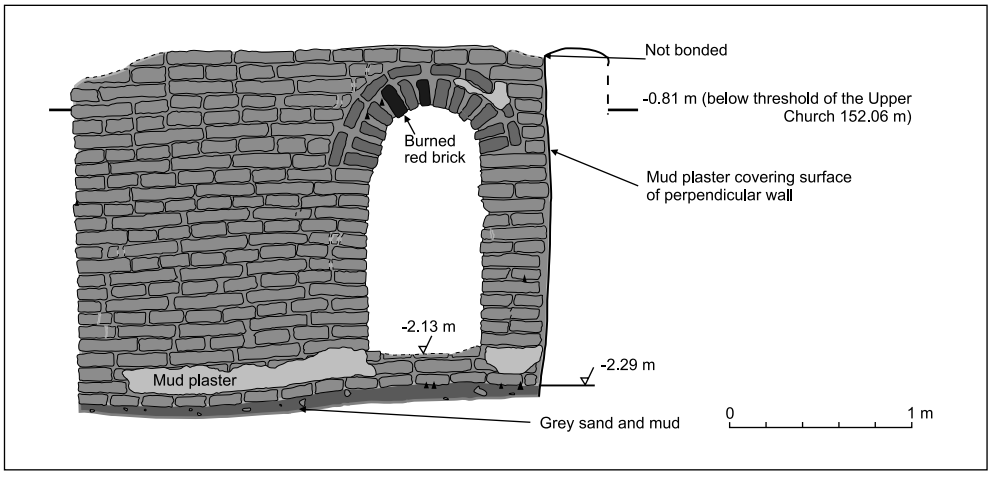

Fig. 10. Entrance to the staircase in the courtyard of the eastern tower (Drawing M. Drzewiecki)

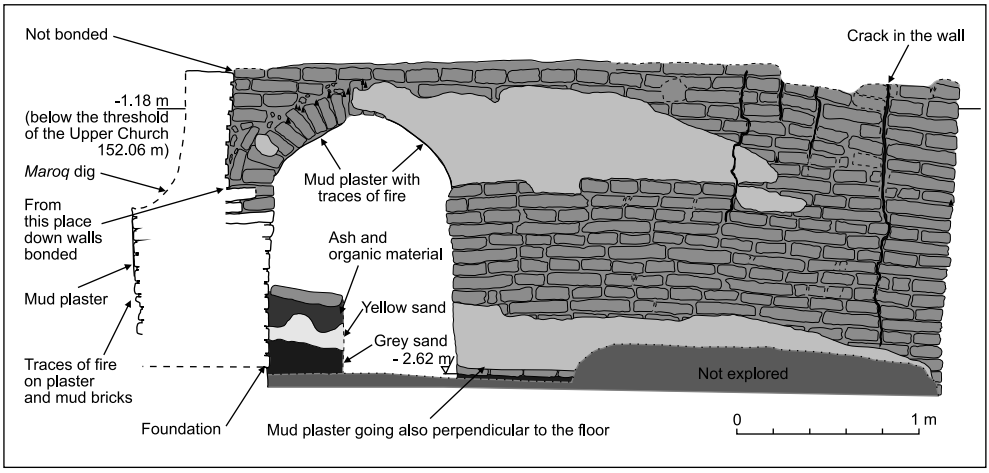

Fig. 11. Entrance to small chamber 1/E in the eastern tower (Drawing M. Drzewiecki)

Fig. 12. Small chamber 1/E, blocked entrance to the corridor under the staircase (Photo M. Drzewiecki)

Figs 3, 4, 7]. With time the walls started to sink, resulting in cracks and fissures [see *Figs 5, 11*]. The reason for this was that the structure was raised partly on the remains of the first-phase fortification wall and partly on non-architectural layers. The effects of this process were well observed on the wall separating the chamber inside the tower from the courtyard [see *Fig. 5*]. They were also the reason for closing work in trenches 7/E/2010 and 8/E/2010, because stress caused by the exploration of layers below the foundations of the courtyard and staircase walls caused the walls to lean in dangerously.

The courtyard was filled with humus. No unambiguous traces of a clay level or floor could be found in the courtyard. The only place is the outer staircase wall where, in the foundation courses, the mud render appeared to run at right angle from the wall, for about 2–3 cm, as if there was a usage level in the courtyard at this time [see *Fig. 11*].

RECAPITULATION

Like the rest of the Banganarti fortifications, the eastern tower went through two building phases. The first tower was smaller and the chamber inside it regular in shape. The archaeological evidence suggests food preparation activities in this area, although it could have also been used, at least for a time, as a storage space for amphorae (holding either wine or olive oil). The thick walls ensured stable conditions inside the tower, limiting the daily temperature fluctuation and thus creating appropriate conditions for storing liquids of this kind.

Observation of the stratigraphic relations leads to the conclusion that the first phase in the existence of the fortifications was more complex than hitherto accepted. Subphases Ia and Ib were distinguished in trench 6/E/2010. They were not observed elsewhere, mainly because of the difficulties in excavating to such depth in other parts of the Banganarti fortifications. Most of the time the first-phase structures are concealed under later architecture.

The end of phase I structures must have been eventful judging by the rubble inside the tower and by the layers of intensive burning. A layer of mud-brick rubble of considerable thickness [see *Fig. 5*] could be proof of the existence of an upper storey in the tower. Short-lived ephemeral construction in the ruins was attested by remains of cooking pots and provisional mud-brick walls. All this was heavily mixed with large quantities of ashes and burning. Evidence of destruction as well as layers of burning and ashes were noted also on the exterior side of the fortifications, where an ephemeral mud-brick structure was constructed as well [see *Figs 5* left, legend descriptions 3, 5, 6, 8].

The new fortifications were built superimposed onto the older walls. The building included a dense network of architecture against the inside face of the circuit wall, as well as most probably also the Upper Church. The surroundings of the eastern tower underwent some minor rebuilding in the second phase, the biggest change being presumably the construction of the trapezoid building by the outer face of the circuit wall. Its walls touched upon the face of the rounded part of the eastern tower walls.

The archaeological remains from this and later times are modest, the humus layer, roughly 2.40 m thick in this area, composed of loose yellow sand mixed with potsherds and organic material. The only evidence of activity in this area in post-medieval times comprised numerous pits dug in search of fertile soil (*maroq*) and a well-preserved unbaked vessel of the *geseba* type presumably for storing grain, which could even be of 20th century date. A much older vessel was discovered inside the *geseba* jar.

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