FROM HYKSOS SETTLERS TO OTTOMAN PIPE SMOKERS. TELL EL-RETABA 2014

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Since 2007 a Polish-Slovak Archaeological Mission has been investigating Tell el-Retaba, a major archaeological site in northern Egypt.[1] Until 2012 every year a season of fieldwork took place. Due to the political situation in Egypt in 2013, the field works were suspended, but fortunately exploration could be resumed in 2014, when two field seasons took place, in spring and autumn.[2] These two seasons brought to light an abundance of new information about the long settlement history on the site. The first part of this report presents in chronological order the main results of excavations carried out in three areas: 4, 7 and 9, all concentrated in the western part of the site (see Fig. 1). Archaeological remains dated to a wide range of periods were revealed, the earliest being from the Hyksos Period and the most recent ancient remains datable to the Third Intermediate Period; also noteworthy are some archaeological remains belonging to the modern history of the site (17th–19th century AD), not included in reports from the previous seasons.

After several seasons it now seems possible to construct a phasing system encompassing the whole settlement history of the site (s. next page).

Excavations were not the only activity of the mission: the general archaeological report is followed by presentations of ceramic and anthropological studies, as well as results of geological, pedological, geophysical and engineering surveys.

1. Excavations

1.1. The Second Intermediate Period [phase G]

Area 7

LH, JH

1.1.1. Hyksos cemetery

Research continued in the Hyksos cemetery located among the walls of the SIP settlement (Fig. 2). Three Hyksos graves were excavated during the 2014 season. One of them, a simple tomb [942][3] in square Y115X115, had already been recognised in the 2012 season, but remained unexplored. The newly discovered graves (1431) and (1428) are the first Hyksos graves without a mud brick casing found on the site.

Grave of a young man [942]

Tomb structure [942] erected in oval pit <933> was constructed of mud bricks bonded with a mortar (Fig. 3) whose composition was almost the same as the bricks. [942] was in fact a very simple wall of bricks leaning against the south wall of the grave pit and forming a kind of shelter over the burial – as in Type 2.2 at Tell el-Dabᶜa.[4] The wall, whose thickness measured half a brick, consisted of three courses of mud bricks. The western end of

[1] The mission is working under the auspices of the Polish Centre of Mediterranean Archaeology, University of Warsaw; involved are also: Institute of Archaeology, University of Warsaw; Slovak Academy of Sciences; Aigyptos Foundation, Bratislava. The works have been also supported by the Polish National Science Centre (grant 2012/05/B/HS3/03748) and by the Slovak Research and Development Agency (grant APVV-5970/12).
Reports from previous seasons can be found in: Rzepka *et al*. 2009, Rzepka *et al*. 2011, Rzepka *et al*. 2014.

[2] The team under the direction of Sławomir Rzepka and Jozef Hudec included: Bartosz Adamski, Miroslav Černý, Veronika Dubcová, František Engel, Emil Fulajtár, Anna Gręzak, Lucia Hulková, Barbara Jakubowska, Łukasz Jarmużek, Lukáš Kováčik, Claire Malleson, Martin Odler, Ľubomír Podhorský, Agnieszka Poniewierska, Renáta Rábeková, Agnieszka Ryś, Piotr Sójka, Alena Šefčáková, Eva Stopková, Ján Tirpák, Katarzyna Trzcińska, Jerzy Trzciński, and Anna Wodzińska. MSA representatives were Sameh Ahmed Elsaid Hashem and Mustafa Hassan.

[3] The system of recording excavated units in Tell el-Retaba is based on the system used in Tell el-Amarna. Numbers of fills and deposits are written in round brackets, e. g. (1250), structures in square brackets, e. g. [1624] and cuts in angle brackets, e. g. <1174>. Cf. Kemp and Stevens 2010, 9–10.

[4] Forstner-Müller 2008, 26.

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phase	dating	main features
G	Second Intermediate Period	settlement and cemetery
F	18th Dynasty	open (?) settlement existing until the time of Amenhotep II/Thutmosis IV
E4	19th Dynasty	earliest defence wall – core of Petrie's "Wall 1"; infant cemetery
E3	19th Dynasty	fortress of Ramesses II – extensions of "Wall 1"; barracks/workshops
E2	19th Dynasty	Fortress
E1	19th–20th Dynasty	settlement and cemetery in the ruins of the fortress
D4	20th Dynasty	ruins of 19th dynasty fortress levelled; fortress of Ramesses III – Petrie's "Wall 2"
D3	20th Dynasty	Petrie's "Wall 3", fortress
D2	20th Dynasty	Fortress
D1	20th Dynasty – Third Intermediate Period (TIP)	fortifications abandoned and ruined
C4	TIP	Settlement
C3	TIP	Settlement
C2	TIP	Settlement
C1	TIP	Settlement
B	Late Period	no architecture preserved, only some pottery on the surface
A	modern	i.a. Ottoman ovens and pipes

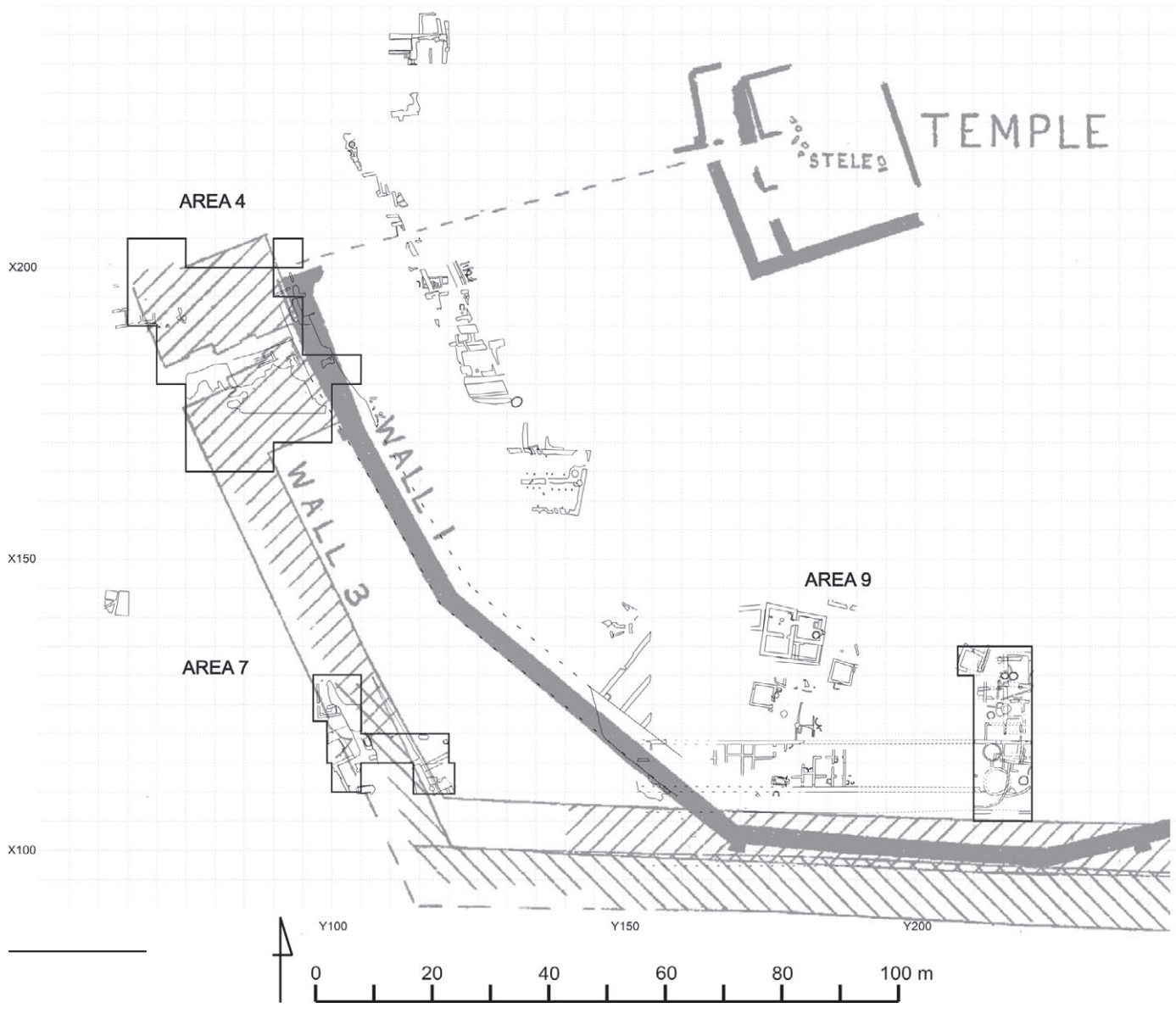

Fig. 1 General plan of the western part of the site with location of areas excavated in 2014 (drawing Ł. Jarmużek)

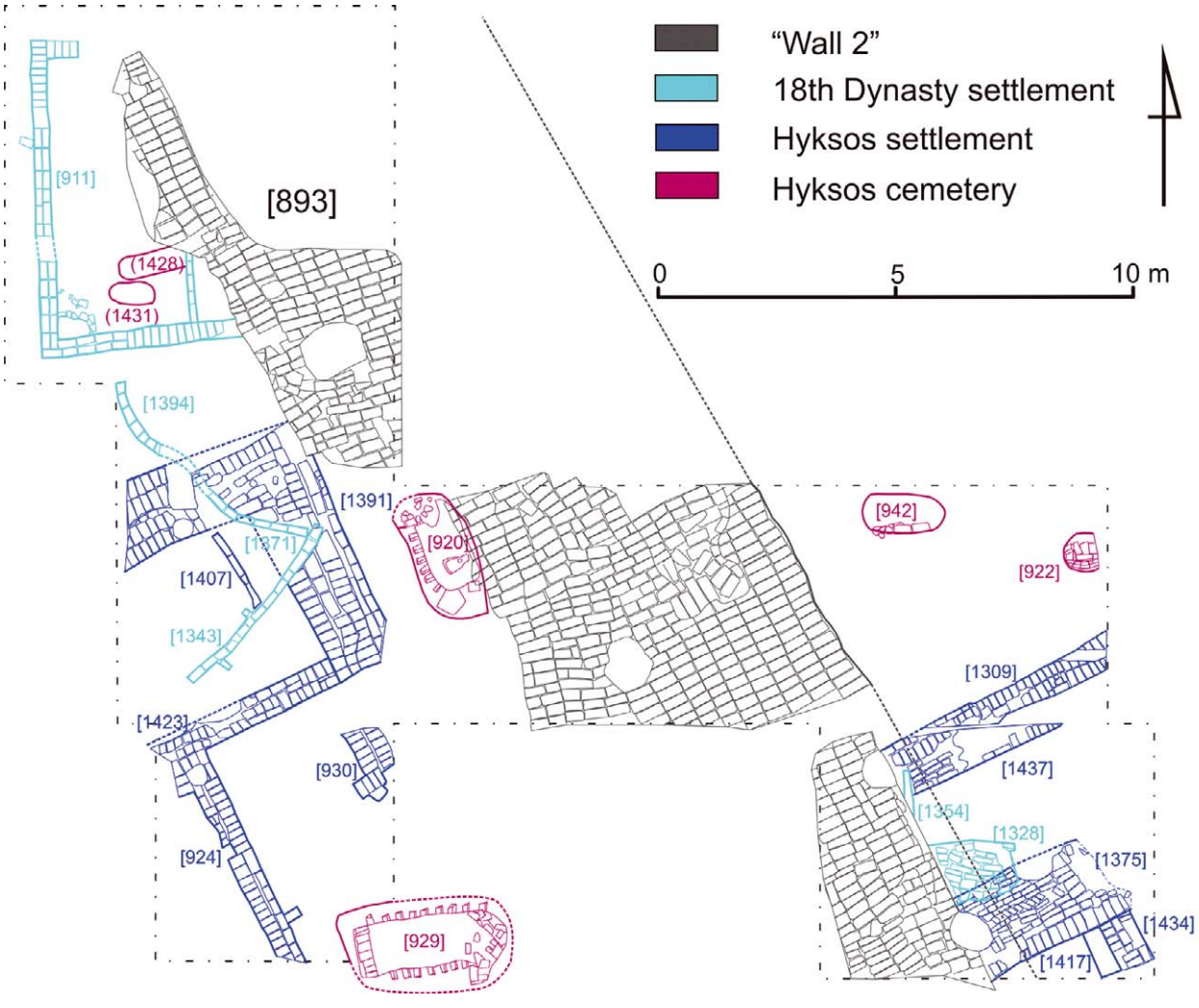

Fig. 2 Area 7 – plan (drawing E. Stopková/L. Hulková)

this wall turned slightly to the south, creating an extra cover for the head of the deceased. In the east, there seemed to be some kind of a corner-support structure, but it was too badly damaged to allow proper reconstruction. Further towards the west, two more backing stones were located. They were not built into the structure of the N wall, but merely attached to it with mortar. The uppermost bricks forming a roof over the burial were also held in position by masses of mortar on the inside and outside. One of these roofing bricks seemed to have been removed, and it was therefore assumed that the tomb was robbed, but further excavation rendered this assumption improbable. This structure is very similar to another simple tomb [922][5] found just a few meters to the north-east of [942].

Fig. 3 Area 7 – Hyksos tomb [942] (photo L. Hulková)

An undisturbed **skeleton (**1425) of a juvenile individual was discovered inside tomb [942] (Fig. 4). The skeleton was partially covered with two mud bricks placed between the screen wall and the pit-wall. These bricks rested directly on the bones. The skeleton was lying on the left side in a strongly contracted position, the head to the west, facing north. The legs were flexed, with the knees pulled up tightly to the abdomen. There were no burial goods in the tomb or in the pit.

[5] Rzepka *et al*. 2014, 43f.

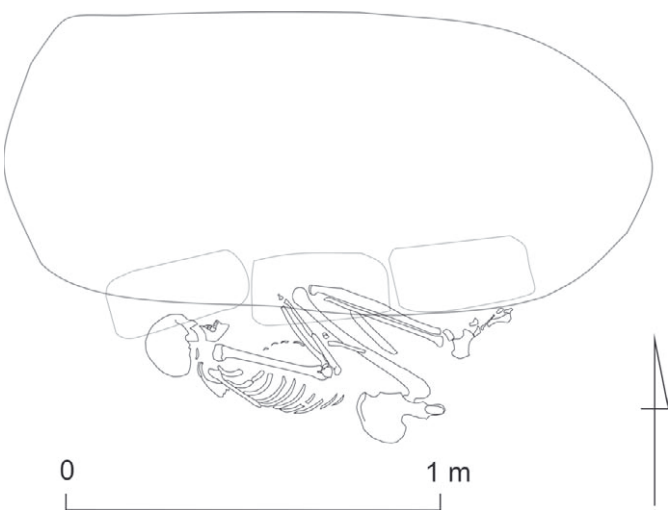

Fig. 4 Area 7 – skeleton (1425) inside Hyksos tomb [942] (photo L. Hulková, drawing E. Stopková/L. Hulková)

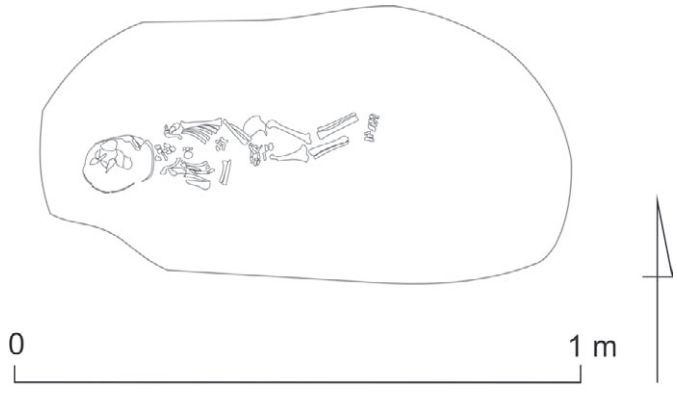

Fig. 5 Area 7 – child burial (1431) with skeleton (1432) (photo V. Dubcová, drawing E. Stopková/L. Hulková)

1.1.1.2. Child burial (1431)

Two Hyksos graves were discovered below the foundation level of the south-western room of "black house" 3 (see below) (Y95X120), directly underneath the layer (1408), in a reddish coarse-grained gravel layer. The first one was a child **burial (1431)** interred in a shallow pit without any grave goods (Fig. 5). Directly above the grave two mud bricks were placed, possibly to cover the burial.

The **skeleton (1432)** belonging to a 0–0.5 year old child was lying supine. The remains lay extended on back, oriented E–W, with the skull towards the west. The left hand laid outstretched on the lap, while the bent right hand rested on the stomach area.

1.1.1.3. Burial (1428)

Child burial (1431) was located ca 20 cm from the south-western edge of another **pit grave (1428)** in square Y95X120. The pit was roughly E-W oriented, dug out to a depth of 92 cm into the reddish sand-gravel geologic layer. However, the major part of the tomb pit could not be excavated, as it was covered by later strata with Petrie's "Wall 2" on top of them.

The uncovered western part of the tomb pit contained only outstretched legs of an adult female (?) **skeleton (1446)**. Based on their position, the deceased was probably deposited extended supine with the head in the east. Apart from a stone tool S1861 recovered from the fill of this part of the grave-pit no grave goods were found.

1.1.2. Settlement structures

Besides the three tombs, also several mud brick walls of SIP structures were uncovered in squares Y115X115, Y115X110, Y100X115, Y95X115 and Y100X120 (cf. Fig. 2).

It seems that both the cemetery and the settlement were established on an aggradation embankment/levee[6] of the ancient Nile tributary of Wadi

[6] See below, chapters 4 and 5 by J. Trzciński and E. Fulajtár.

Tumilat. The tributary was probably an ancestor of the canal which runs along Tell el-Retaba's western and southern sides nowadays. The embankment apparently dried faster after inudations and was therefore preferred as a settlement ground. This upland position explains why older occupational levels were exposed at a higher elevation than layers of the same date on the rest of the tell.

1.1.2.1. Square Y115X115

Continuing the excavation from the point reached in 2012,[7] ashy layers on the bottom of the older settlement area were examined. Both these deposits and occupational layer (1315) were flanked by a mud brick wall [1309] partly uncovered on the southern side of the square in 2012. An occupational layer or floor (1315) belonging to the same phase as the wall extended approximately 1.4 m to the north of it and was covered by layers into which the pit of grave [942] was cut. Wall [1309], which also extended into square Y115X110, seems to be the oldest architectural feature in this part of the excavated area. The stratigraphy indicates that tomb [942] is more recent than the SIP settlement architecture. Wall [1309] should be also older than tomb [922], dated to the 15th Dynasty,[8] as its tomb-pit was also dug into layers that covered the wall.

1.1.2.2. Square Y115X110

In square Y115X110 a later phase of the SIP settlement was dominated by structure [1375] (Fig. 6). This 1.9 m wide architectural feature seems to be a massive wall or a plastered floor of some kind. The interpretation of this feature is not unequivocal, as only one course of bricks remains preserved. The boundaries to the east and north are obscured by layers that might be mud brick detritus associated with a collapse of [1375].

Fig. 6 Area 7 – Hyksos settlement, walls [1375], [1434] (photo V. Dubcová)

Further north of [1375] is wall [1437]. Its northern face seems to be parallel to the above-mentioned earlier SIP structure [1309], but there is a destruction layer separating wall [1437] from wall [1309]. Therefore there probably is an older phase of SIP settlement underneath structures associated with walls [1375] and [1437]. Wall [1336] and deposits (1429), (1430) and (1434) also seem to have belonged to an older phase, but further excavation is needed to determine the relationship between them.

1.1.2.3. Squares Y100X115 and Y95X115

Excavations confirmed the continuation of wall [924] from square Y100X110[9] into square Y100X115, where it met wall [1423] at a right angle. The beginning of wall [1423] was also uncovered in 2012. The wall seems to continue westwards, probably substantially widening on the southern side. At the eastern end of wall [1423] a probably more recent wall [1391] was added (Fig. 7). The wall [1391] partially overlies an older ashy layer (1405) (a fireplace?) and other layers associated with it. Only one course of mud bricks remains and no foundation trench is recognisable. The wall [1391] was of considerable size, measuring170 × 530 cm and 170 × 250 cm (dimensions of bricks ca 17 × 35 × 10 cm). It probably represents an outer corner of a large building (see Fig. 2). On the eastern side of the wall some additional courses of mud bricks seem to be preserved, therefore it cannot be excluded that wall [1391] was additionally reinforced or widened. Wall [930], excavated in 2012,[10] also very probably belonged to the mentioned large building, but its full extent and connection to [1391] have not yet been established.

Relatively few finds were discovered in the SIP layers. The assemblage included some flint tools (S1800, 1801), stone tools (S1850) from fireplace (1405), some bronze/copper fragments, and bronze/copper toggle pin S1862 (Fig. 8).[11]

7 Rzepka *et al*. 2014, 52ff.

8 Rzepka *et al*. 2014, 43f.

9 Rzepka *et al*. 2014, 54f.

10 Hudec in: Rzepka *et al*. 2014, 52–56, Fig. 10, 27.

11 Abd el-Maksoud 1998, 263, no. 476; Thomas 1981, Vol. I, 87 (made of gold), Vol. II, Pl. 40, no. 754.

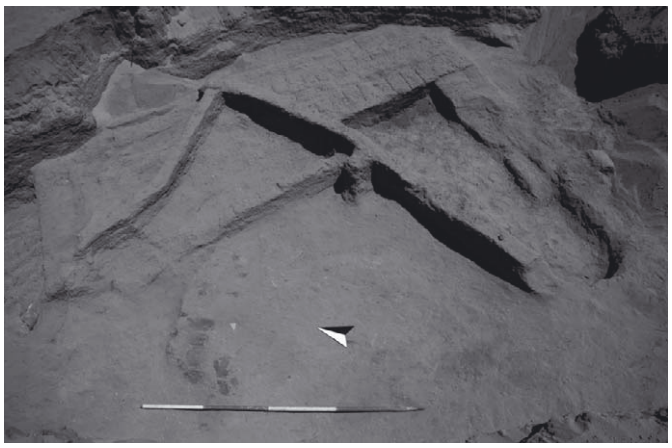

Fig. 7 Area 7 – Hyksos settlement, walls [1423], [1391], and 18th Dynasty settlement above, wall [1371] (photo V. Dubcová)

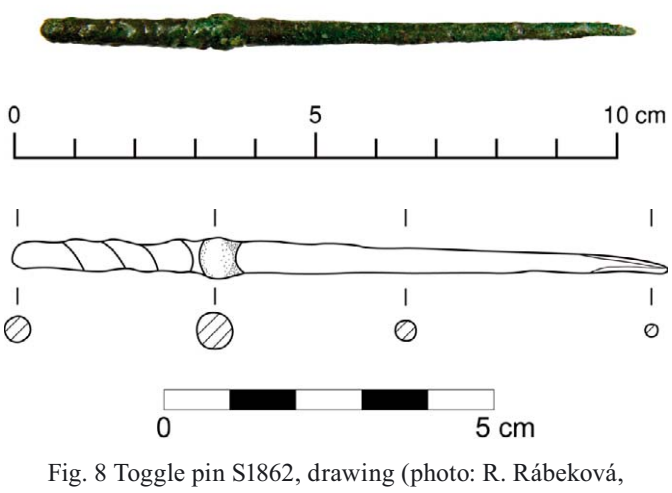

Fig. 8 Toggle pin S1862, drawing (photo: R. Rábeková, drawing M. Odler/Ľ. Hudáková)

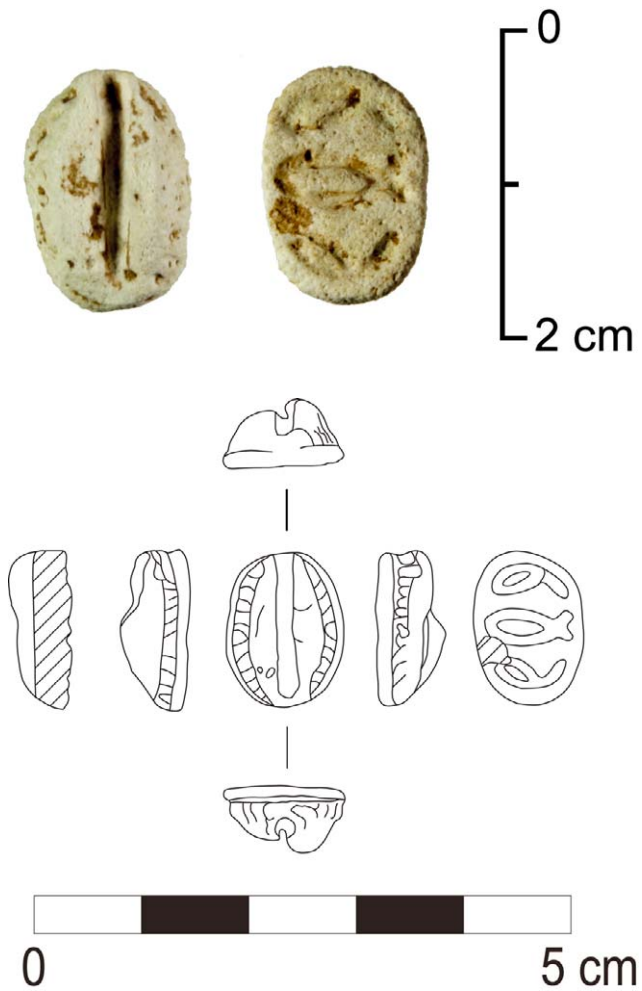

Fig. 9 Kauroid S1853 (photo R. Rábeková, drawing L. Kováčik/V. Dubcová)

A kauroid S1853 (Fig. 9) was found in layer (1411). Its decoration consists of one *sa* and two *anra* signs oriented along the longer axis of the kauroid. It belongs to group 3A3 – Design class III – Egyptian signs and symbols.[12] Similar finds[13] do not assist in narrowing down the kauroid's date and only roughly support the dating of layer (1411) to the SIP.

1.1.3. Relationship between the SIP burials and the settlement structures

Although the excavation in 2012 demonstrated that burials [922] (in square Y115X115) and [929] (Y100X100) are younger than several walls constructed of yellowish mud bricks, further research has indicated that the situation is more complex.

1. There seem to be at least three groups of burials in this part of the cemetery:

a) Tombs with standard mud brick vaults: [810] dated to the late 15th Dynasty,[14] [920] dated to very late 13th through early 15th Dynasty,[15] [929] dated to the very beginning of the 15th Dynasty;[16] robbed or reused, some skeletons in disarray, diverse orientation;

b) Tombs with mud brick screening walls: [922] dated generally to the 15th Dynasty,[17] [942] without datable finds; skeletons against southern side of grave pit, contracted, oriented east-west;

c) Pit graves without mud brick structures (1428), (1431) both without datable finds; skeletons supine, oriented east-west;

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12 Tufnell 1984, Vol. II, Pl. VIIIb, 1404; Petrie 1934, Pl. V, no. 128.

13 Thomas 1981, Vol. I, 80, Vol. II, Pl. 36, no. 677.

14 Rzepka *et al*. 2014, 96f.

15 Rzepka *et al*. 2014, 96.

16 Rzepka *et al*. 2014, 95.

17 Rzepka *et al*. 2014, 94.

2. The a) group alone indicates that the cemetery was used for a considerably long time. At the present state of knowledge it is impossible to determine whether the emergence of groups b) and c) was due to chronological or social factors.

3. The settlement is generally dated to mid to late 15th Dynasty,[18] although some pottery might come from earlier occupational phases.[19] Thus, there seems to be a discrepancy in the stratigraphy, especially between tomb [929] and walls [924] and [930] in square Y100-Y110. According to the stratigraphic sequence visible in sections, the tomb was cut into a layer covering both [924] and [930]. This discrepancy can be explained in one of three ways:

– Pottery made in Tell el-Retaba has some local specifics and differs from material in Tell el-Dabᶜa and Tell el-Maskhuta;
– A later robbers' pit could have been mistaken for a grave pit due to constrained excavation space;
– The pottery used for grave gifts was older and out of fashion.

Further excavation in squares Y100X105, Y105X105 and Y105X100 might shed more light not only on stratigraphic relations between tombs and structures, but also on the development phases of the SIP architecture.

1.2. 18th Dynasty [phase F]

1.2.1. Settlement

Area 7

VD, JH

Works in Area 7 (see Fig. 2) continued underneath and around structures which had been partly unearthed in square Y95X120 already in 2012, including [911] – "black house" 3. In addition, other early New Kingdom structures were also discovered in square Y115X110. It seems that the 18th Dynasty settlement in Area 7, partly documented in 2011 and in 2012,[20] had at least three phases discernible in the preserved archaeological record and partly also in the recovered pottery.[21]

1.2.1.1. "Black house" 3 and its surroundings

(Squares Y100X120, Y95X120, Y100X115, Y95X115)

The stratigraphic situation in the south-western part of "black house" 3 was further clarified by excavating an inner room of the building (room 2). A complete early New Kingdom ceramic bowl was found in this part of "black house" 3 (Fig. 10). Work consisted in the removal of remains of layer (948), which constituted the lower part of the destruction level of the house and contained a large quantity of mud bricks. A kind of flint tool S1799 (whetstone?) and a scarab (S1798) were found in this layer.

The scarab S1798 (Fig. 11) is made of Egyptian faience (frit) and bears a hieroglyphic inscription Nb-nfr-Ḥrw.j/*Neb-nefer-Hory*. It belongs to the design class 3A4 - "*Horus hawk with nṯr and other signs*",[22] which occurs commonly in the so-called Palestinian series and is probably of Canaanite origin. Scarabs representing such a design seem to appear in Egypt/Eastern Delta no earlier than in the late Second Intermediate Period.[23] Names with the component Nb-nfr started to appear in the New Kingdom.[24] This element is attested in finds from Gurob,[25] Tell el-Maskhuta, Aniba, Mirgissa,

Fig. 10 18th Dynasty bowl (photo R. Rábeková)

[18] Rzepka *et al*. 2014, 97f.

[19] Rzepka *et al*. 2014, 98, note 153.

[20] This is also consistent with the situation revealed in 2011 in the so-called "Naville trench", where a second phase was also visible in the structure and stratigraphy of two silos and ovens in an industrial area connected with "black house" 1 [643, 632]; see Dubcová in: Rzepka *et al*. 2014, 56–64.

[21] I.e. Hatshepsut – Thutmosis III; Thutmosis III – Amenhotep II; Amenhotep II – Tuthmosis IV. See Wodzińska in: Rzepka *et al*. 2013, 275–282. This chronological division is only preliminary and needs to be proved in the next seasons.

[22] Tufnell 1984, Vol. II, Pl. IX, 3A4; amended by Ben Tor 2007, 17, 76f, 126f.

[23] Ben-Tor 2007, 127.

[24] Ranke 1935, 185–18.

[25] Thomas 1981, Vol. I, 78, Vol. II, Pl. 33, no. 642.

Fig. 11 Scarab S1798 (photo R. Rábeková, drawing L. Kováčik/Ľ. Hudáková)

Debeira, Dakka, and various Palestinian sites.[26] The possibility that inscriptions of this kind represent meaningful phrases has been suggested by Quirke.[27]

The main occupation horizon of "black house" 3 was recognized underneath layer (948), with a floor made predominantly of clay, on which there were some mud bricks and abundant pottery. This layer yielded a piece of pumice (S1822),[28] grinder (S1854) and bronze/copper fragment (S1829). Pottery was also plentiful in another, sandier layer (1408) covering the whole room. The older structures of "black house" 3 [911] with their associated layers (948) and (1408) and some domestic-industrial installations[29] found in square Y100X115 and partly Y95X115 date from the time of Hatshepsut/Thutmosis III.

In square Y100X115 a curved, ½-brick-thick wall consisting of two to three courses of mud bricks [1343] encircled an area with a large fireplace (1349/1360). The wall was connected with a smaller (probably sinusoidal) wall [1371] (see Figs. 2 and 7). Most of the layers associated with these structures were composed of sand, gravel and ash, with only some recognizable floor remains along the walls. These layers were probably related to external structures attributable to a domestic-industrial area.

Further investigation is needed in order to date structures found underneath the layers filling the 18th Dynasty enclosure. The features in question are remains of a wall (?) (1445), an associated floor (1420/1435), and circular pits (perhaps post holes? (1453–5)). Tumbles of yellow (1421) and black bricks (1433) were also observed there.

Among distinctive finds from this area were flint tools (S1740, S1756), metal objects – a bronze/copper needle, fine chisel (S1805)[30] and a bronze/copper rivet/check rowel (S1765). A concentration of seeds in sand-and-ash layer (1370) was identified as remains of a melon (*Cucumis melo*)[31] (Fig. 12). Such seeds remain popular titbits even nowadays.

Find S1765 (Fig. 13) is a bronze or copper rod[32] measuring 0.6 cm in diameter and 5.42 cm in length. In the middle of the rod there is a disc measuring 1.9 cm in diameter. Both ends of the rod feature widened knobs. Such rivets, usually found

Fig. 12 Melon seeds found in 18th Dynasty layers (photo R. Rábeková)

[26] Ben Tor 2007, Pl. 33, 52.

[27] Quirke 2004, 174–175.

[28] The pumice has been found in a lower part of the layer; its provenience has not been determined yet.

[29] It has not been ascertained whether the "black house" 3 and the domestic-industrial installations were interrelated.

[30] An artefact with a similar morphology, designated as a "point", was published from Tell el-Dabᶜa (Philip 2006, 127, Fig. 58.3).

[31] Nicholson and Shaw 2000, 634f.

[32] Identification of the metal cannot be achieved without analysis.

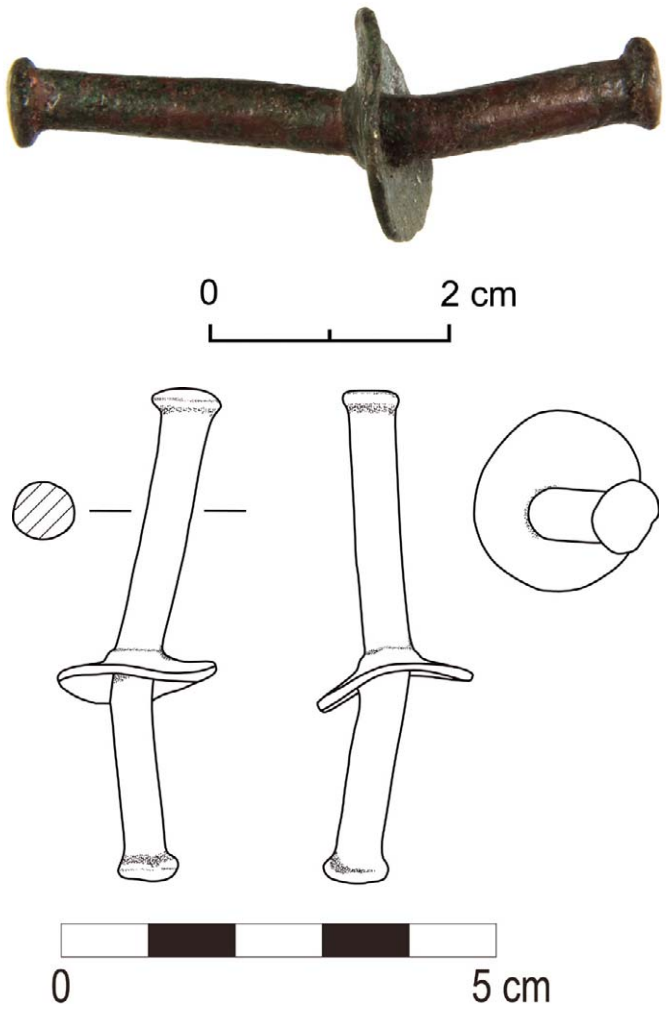

Fig. 13 Rivet or check rowel (?) S1765 (photo R. Rábeková, drawing L. Kováčik/V. Dubcová)

with two discs (two-headed rivets), seem to have been parts of wooden containers. They occur mostly on 18th Dynasty sites, for instance at Fadrus[33], Buhen[34] and Aniba.[35] In Tell el-Retaba, the rivet's stratigraphic position in (1345), a substantial ashy layer associated with the underlying fireplace (1349/1360), might be due to the contamination of the deposit with materials from overlying layers[36].

According to a different opinion, the metal object may be interpreted as a part of a bronze or copper check rowel.[37] The check rowels found in the tomb of Tutankhamun had wooden rods ca 65 cm long, with a central, copper-spiked disc[38]. The off-sets on both ends of the stick and the disc in the middle might indicate that S1765 was attached to wooden rods. However, the usage of check rowels seems to have been limited to the late 18th to 20th Dynasties so far.[39]

1.2.1.2. Square Y115X110

Within the 18th Dynasty remains, two phases could be distinguished. Preserved from the later phase are the remains of walls [1328] and [1354] consisting of only one layer of bricks each. Wall [1328] is probably the foundation of a broader mud brick wall that was built in a narrow foundation trench visible in the modern cut <1326>. Numerous potsherds were scattered – probably intentionally – on the surface of the sandy filling of this narrow and shallow trench. The wall [1354] is only ½ brick thick. It could have been a part of some kind of screen wall or fence dividing various compounds or areas of a housing unit. It is not possible to infer the nature of these structures any further, as too little of them is preserved to allow more precise interpretation. However, it is noteworthy that these walls have the same orientation as the so-called "black house" 3 (see above).

These structures are clearly separated from another 18th Dynasty settlement layer by a sandy deposit (896/1350). This stratigraphic unit seems to consist of wind-blown sand containing only a few isolated potsherds and unworked shells. The earlier phase of the 18th Dynasty settlement is represented only by ashy layer (897/1353) containing potsherds and bone fragments and by deposit (1357). Unit (897/1353) seems to be an occupational layer, but there are no associated architectural structures. Grinders (S1860 and 1785) found in (1357) suggest domestic-industrial usage as well.

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33 New Kingdom Pharaonic sites, Säve-Söderbergh and Troy 1991, Pl. 30, no. 9–12: finds from Fadrus are dated to phase Ia (Early 18th Dynasty, Pre-Hatshepsut) to Iic (Amenhotep II–Tuthmosis IV). See chronology in Säve-Söderbergh and Troy 1991, 51.

34 Randall-Maciver and Wooley 1911, p. 164.

35 Steindorff 1937, Taf. 64: 14, 15.

36 Although the layer is clearly connected with an 18th Dynasty fireplace, it also contained some TIP and LP potsherds, which might, however, also be the result of accidental contamination by workmen during transportation of the excavated material.

37 Crouwel 2013, 74, Fig. 2.

38 Reeves 2006, 146; http://www.griffith.ox.ac.uk/gri/tut-scans/TAA_i_3_8_13.jpg.

39 Littauer and Crouwel 1985, 73.

The later phase of occupation includes several layers (1332, 1337, 1352), mud brick wall [1346] and remains of two fireplaces (1348), all of which lay clearly above older structures and were separated from them by thin sand- and gravel-rich layers.

A rim fragment of coarse ware crucible (S1828)[40] was found with two corroded copper prills attached. The size of the fragment does not permit to reconstruct the whole object. It was found in a stratigraphic unit (1415) from the reign of Thutmosis III. A set of crucibles discovered in Tell el-Dabᶜa was dated to the 13th dynasty[41]. The crucible fragment constitutes the first direct evidence of metallurgical activity at Tell el-Retaba in the New Kingdom. Small fragments of copper alloy objects ("prills"), a frequent find at Tell el-Retaba (the last season brought to light 10 fragments of "prills" and/or scrap metal), can also be explained by the presence of a metallurgical workshop, engaged in the processing of copper[42] ore and possibly also recycling of scrap metal, somewhere on the site.

Conclusion: The mud brick walls of "black house" 3 were preserved to a max. height of ca. 20–30 cm (2–3 courses) and another 20 cm of deposits separated them from the gravel-rich layer in which the two simple Hyksos graves (see above) were discovered. The structures of "black house" 3 were built on even older 18th Dynasty layers (1338, 1363), which covered remains dated to the SIP.

One of the principal tasks of the season was to verify the stratigraphic and chronological relationship between the Hyksos settlement and the occupational level dated to the early 18th Dynasty. The early 18th Dynasty settlement overlies the Hyksos one and consists of several walls and deposits, which are probably also attributable to different phases. The transition between the Hyksos layers and the early 18th Dynasty layers appears to have been relatively smooth. There are certainly no massive destruction episodes separating the 18th Dynasty material from the earlier Hyksos settlement in Area 7.

1.2.2. Settlement

Area 4

MO, VD, JH

The team continued research on the cross-section of the oldest fortification wall documented on the site thus far (Petrie's "Wall 1") in squares Y95X180 and Y100X180 (Fig. 14). Some 18th Dynasty materials were spread out and mixed with later structures investigated in the lowermost levels of the section through "Wall 1".[43]

Mud brick structure [1331], represented by two courses of yellowish mud bricks[44] running east-west, was found underneath the lower course of the inner extension of "Wall 1".[45] It was truncated by a Ramesside child burial, (1333) (see below). Material from this context included *inter alia* pottery datable to the reign of Hatshepsut/Thutmosis III, flint blades, and copper alloy kohl-stick (S1771), and might rather indicate that these strata were 18th Dynasty layers disturbed in the Ramesside period.

The S1771 kohl-stick or fine chisel[46] (Fig. 15) may be dated to the New Kingdom.[47] One end of the object is flattened and the other one rounded, while the section of the rod is circular (4 – 3.3 mm). The artefact is most similar in morphology to kohl-sticks with one end flattened; another find of this type from Tell el-Retaba was similar in shape.[48]

A layer rich in charcoal (1365) was found under burial (1333), in all probability datable to the era of Thutmosis III/Amenhotep II. Another child burial (1372) rather seems to have been a part of the Ramesside cemetery[49] than a solitary burial dated to the 18th Dynasty. Observed below burial (1372) was a tumble of small black mud bricks datable to the reigns of Hatshepsut/Thutmosis III; it may indicate the presence of another "black house" (No. 4). A black ashy layer (1406), also datable to the reigns of Hatshepsut/Thutmosis III, is separated (1361) from underlying layers. The lowermost identified layer of yellow sand (1426) has yet to be excavated.

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40 33.7 × 29 mm, thickness 13.6 mm, weight 11.7 g.

41 Philip 2006, 199–204.

42 Ogden in: Nicholson and Shaw 2000, 149–161.

43 Rzepka *et al*. 2011, 143–146, Figs. 19–20.

44 L. ca. 84–90 cm, W. 31 cm.

45 Drawing of the section: Rzepka *et al*. 2011, Figs. 19–20.

46 L. 109.5 mm, W. 3.1 g.

47 Similar examples: Petrie 1927, Pl. XXIII, nos. 18–20, 41–42, 30; Vandier d'Abbadie 1972, 159–160, nos. 714A–H.

48 Dubcova in: Rzepka *et al*. 2014, 61, Fig. 41.

49 Górka and Rzepka 2011.

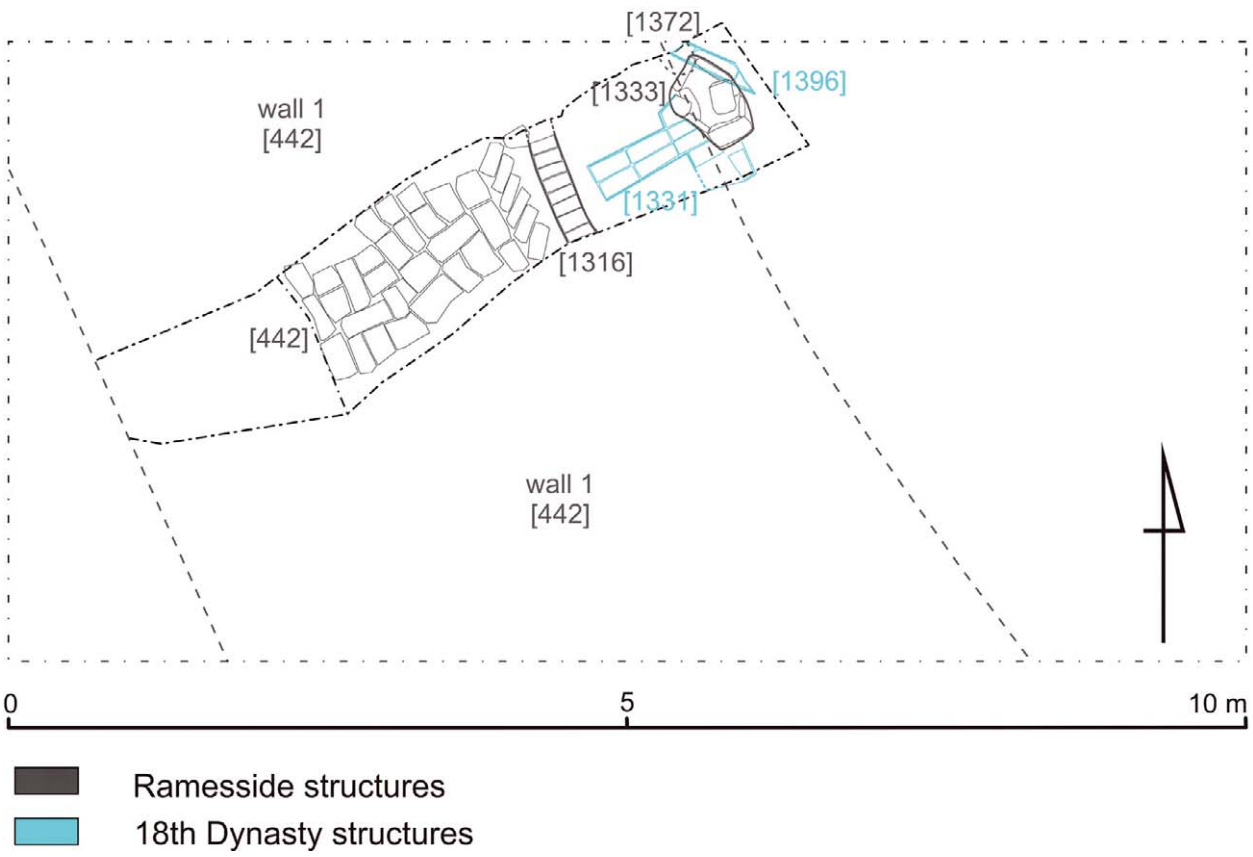

Fig. 14 Area 4 – plan (drawing E. Stopková/L. Hulková)

Fig. 15 Kohl-stick or fine chisel S1771 (photo R. Rábeková, drawing M. Odler/Ľ. Hudáková)

Among small finds from the area were: several simple, flat, circular, pierced faience and ostrich eggshell beads (S1833, 1834, 1835, 1836),[50] a remarkable number of flint tools - scraper S1817,[51] borers or arrowheads S1820 from (1396) and S1837 from (1406), fishhook S1842 from (1406), and sickle blade S1846 also from (1406).[52] All these finds document diverse and intensive domestic and hunting activities. Fragmentary artefact S1805 from an early New Kingdom context (reigns of Hatshepsut and Thutmosis III) might also be a fine chisel.[53] Its section is square on one end (3.5 × 3 mm) and circular on the other.

Discussion: Structure [1331] and the underlying layers might be related to settlement structures of the 18th Dynasty found in the "Naville trench".[54] However, due to the small dimensions of the test pit it was impossible to identify these relations more clearly in 2014.

Several layers (1365, 1396, 1406 and 1426) and part of the nearly black mud brick destruction layer – (1361) – were securely dated to the 18th Dynasty. These layers are altogether about one metre thick. There seems to be a difference between 18th Dynasty layers identifiable above and below mud brick destruction layer (1361), which contained pottery from the reign of Thutmosis III/

50 For similar objects from the Semna fort see Raisner1960, vol. I, Fig. I, nos d–f, i.

51 Tillmann 2007, 210, Taf. 18.

52 Development of the type: Tillmann 2007, 129–132; New Kingdom typology: Tillmann 2007, 70–73.

53 L. 78.4 mm, W. 4 g.

54 Dubcova in: Rzepka *et al*. 2014.

Amenhotep II. The layers below it are probably earlier, from the period of Hatshepsut and Thutmosis III. This stratigraphic sequence could also be partially observed in Area 7.

1.3. 19TH DYNASTY (PHASES E4–E1)

In Area 9, a fragment of the inner structure of the 19th Dynasty fortress was revealed. So far very little is known about the spatial organization within the earliest fortifications (Petrie's "Wall 1"). In 2010, fragments of barracks/workshops were uncovered in the western part of Area 9. Similar buildings were also found in Area 3, in the N-W part of the fortress.[55] In 2014, 19th Dynasty levels were reached in the eastern part of Area 9 revealing several phases of occupation. The uncovered area included courtyards with round silos surrounded by curved enclosure walls. In a later phase the area was used as a children's cemetery, as well as a dump.

In Area 4, two infant burials belonging to an early phase of the 19th Dynasty were discovered. They belonged to the infant cemetery discovered already in 2009.

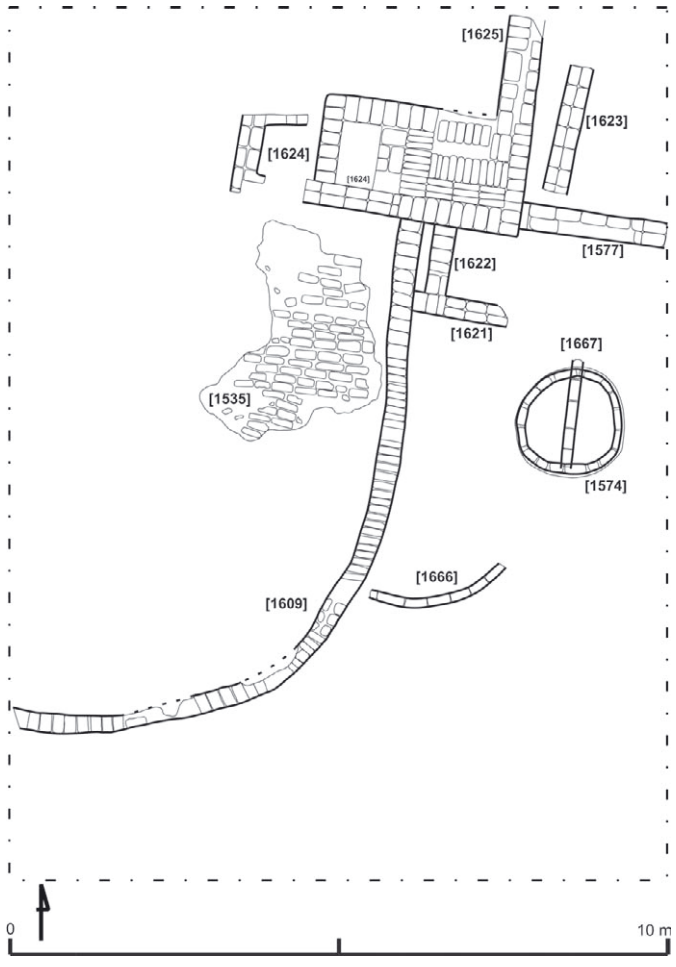

Fig. 16 Area 9 – plan of structures belonging to the 19th Dynasty fortress, phase E4 (drawing Ł. Jarmużek)

1.3.1. Fortress (Area 9, phase E4)

ŁJ, SRz

Structures belonging to phase E4 were only partially excavated. Numerous walls were roughly cleared in order to allow basic documentation (Figs. 16–18). All structures will be explored next season. The present state of research allows us to assume that the excavated structures probably belonged to a building and courtyard delimited by a curving wall. Walls [1624] and [1625] probably constituted the south-eastern corner of a building, as they form a right angle. Both walls were about 3.3 m long, wall [1624] was 0.39 m thick, while wall [1625] was 0.53 m thick. In the space between the walls (probably the interior of the building) several small walls and probably a mud brick floor were found.

Next to the southern face of wall [1624] there was a longer wall [1609], which probably delimited the courtyard connected with the building. It ran southward for about 7 m, then turned to the west and continued for about 5 m. The thickness of the wall varied from 0.32 to 0.37 m. The area to the west of the wall was probably the said courtyard. Its surface, at the present state of works, is estimated at about 41 m^2.[56] The area of the building and the courtyard was covered with mud brick debris (1536) originating from the destruction of features. Inside the courtyard a fallen fragment of a wall [1535] was found. The location and types of bricks indicate that the fallen wall was originally a part of wall [1624]. Thus wall [1624] was originally at least 3.7 m high.

On the eastern side of wall [1609] fragments of several walls were found: [1577], [1621], [1622], [1623], [1666] and [1667]. It is not yet possible to identify the kind of structures to which these walls belonged. The area between the walls was covered with thick layers of ashes, (1652) and (1586), which contained abundant pottery and animal bones. It

[55] Cf. RZEPKA *et al*. 2011, 145–152.

[56] Similar rounded walls delimiting courtyards can be found on other sites, see BORCHARDT and RICKE 1980, plan 6, 21, 29, 103.

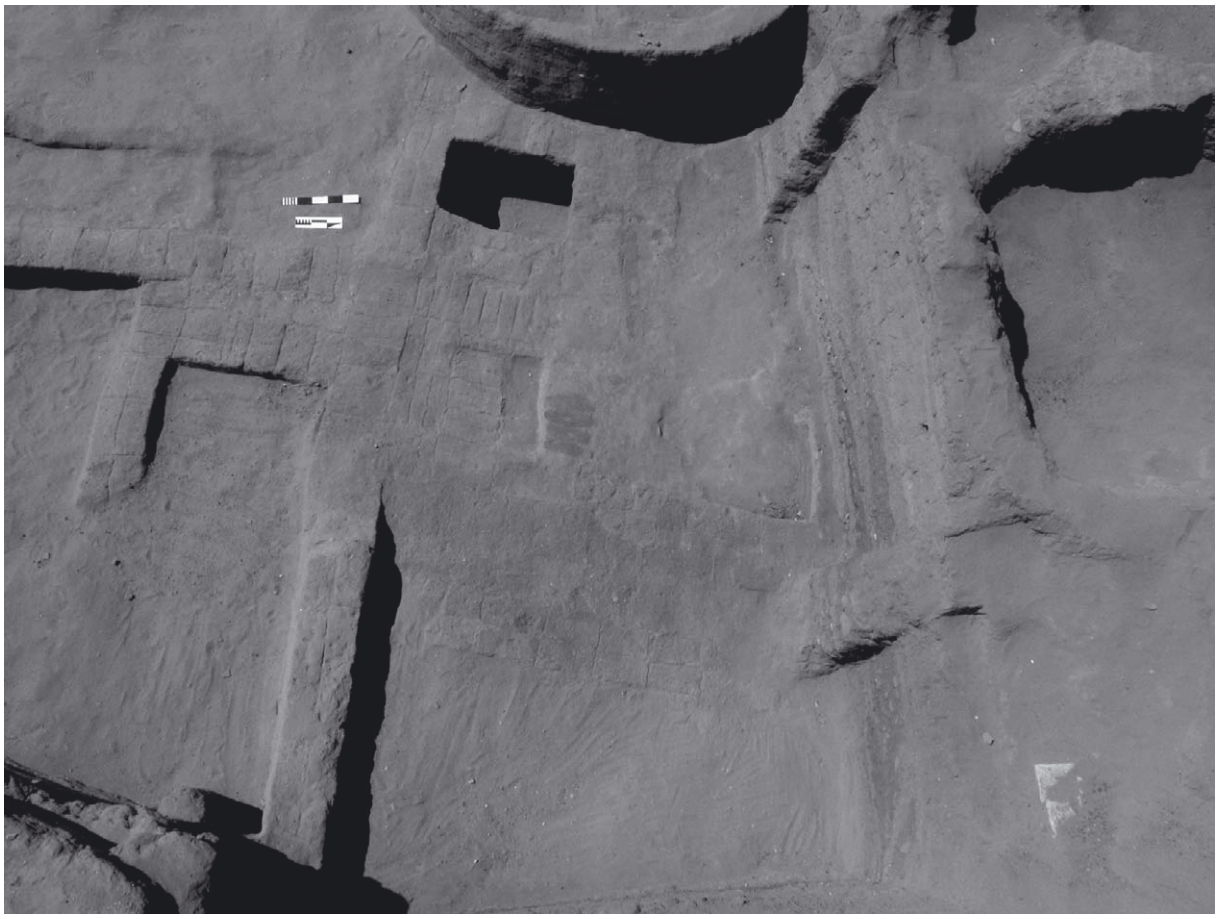

Fig. 17 Area 9 – structures belonging to the 19th Dynasty fortress, phase E4 (photo S. Rzepka)

Fig. 18 Area 9 – structures belonging to the 19th Dynasty fortress, phase E4 (photo S. Rzepka)

seems that the area outside the courtyard served as a dump. After some time a small silo [1574] was built in this area. Its walls had a very irregular bonding pattern and their thickness varied from 0.11 to 0.15 m. The diameter of the silo was about 1.34 m.

Deposits belonging to this phase were quite rich in various types of small finds. One of the most interesting and unique finds was a small Mycenaean terracotta figurine (S1967; Fig. 19) found in stratigraphic unit (1536). It was made from a yellow fabric with some reddish-brown painted decoration. It shows a female figure: a pair of breasts is distinctly modelled on its chest. Although quite damaged, there is no doubt that the figurine belongs to the "the psi-type", [57] i.e. shows a woman with raised arms. As far as it is known to the author, it is the very first example of a Mycenaean figurine discovered in Egypt.[58] Such figurines are of course well known from the Greek mainland and the islands,[59] but they also occur outside this region, in Asia Minor, Syro-Palestine, as well as in the central Mediterranean (Italy, Sicily, Sardinia).[60] Contacts between Egypt and the Mycenaean world are well attested by Mycenaean pottery in Egypt, e. g. in Amarna, Gurob, Deir el-Medina and Qantir,[61] and several fragments of such pottery have also been found in Tell el-Retaba in 2014.[62] Such pottery came to Egypt as a result of exchange[63] and its presence does not mean that Mycenaeans lived in Egypt. The figurines, however, are not obvious trade goods, so the discovery of this object raises the question of a possible presence of representatives of the Mycenaean culture in Tell el-Retaba. For example, in Ugarit (Ras Shamra) in Syria a number of Mycenaean terracotta figurines have been found and they are regarded as significant evidence of Mycenaean population living there.[64] Tell el-Retaba and Ugarit are not comparable in this respect: on the latter site there are many figurines, and they occur in similar contexts as in Greece (i.e. in tombs and in sacred spaces), while in Tell el-Retaba it is just one object found in a dump. Nonetheless, this object constitutes yet another clue suggesting that some Mycenaeans may have lived in Egypt, perhaps as mercenaries fighting in the Egyptian army.[65]

Fig. 19 Mycenaean figurine S1967
(photo S. Rzepka, drawing B. Adamski)

[57] For the typology of such figurines see: French 1971, p. 128 ff., pl. 19 a, b. Due to the state of preservation of the Tell el-Retaba figurine it is not possible to determine whether it belongs to the regular "psi type" or to the "high waisted psi type".

[58] Pilali-Papasteriou 1998, 49–50.

[59] A recent summary on typology, development and meaning of such figurines can be fund in: Tzonou Herbst 2010.

[60] Pilali-Papasteriou 1998.

[61] A list of ca. 20 sites in Egypt (plus several more in Nubia), from which Aegean pottery is known can be found in: Hankey 1993, 113–114. The list is surely incomplete; e. g. Tell el-Retaba should be added to it.

[62] See below, chapter 2 by A. Wodzińska.

[63] Kelder 2010; Hankey 1993, 109–113.

[64] Pilali-Papasteriou 1998, 51–52.

[65] This theory is based mostly on two discoveries: a papyrus from Amarna showing Mycenaean warriors fighting beside Egyptians (Kelder 2010, 126–127; Schofield and Parkinson 1994) and a fragment of boar tusk helmet found in Qantir (Pusch 1985, 254)

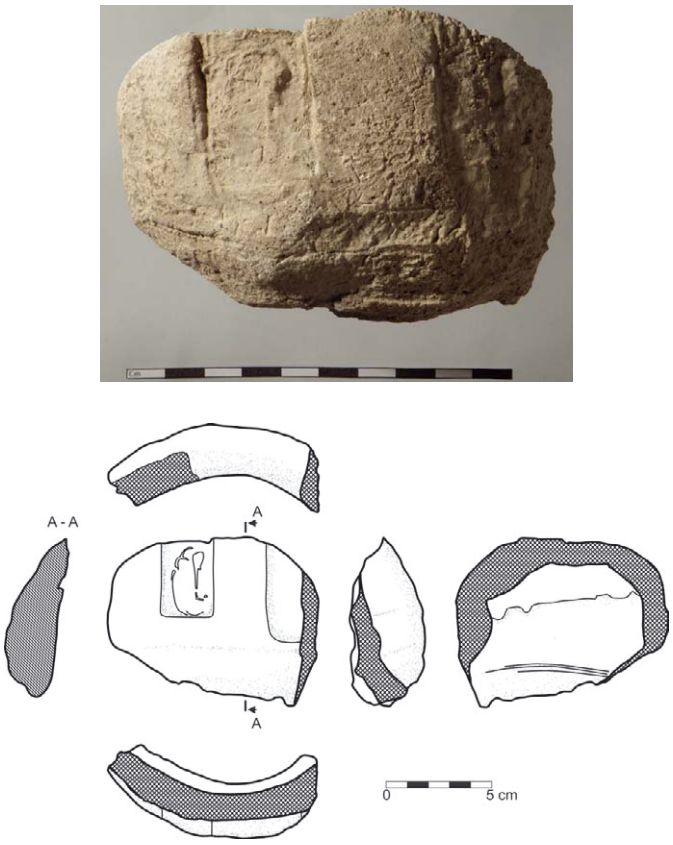

Fig. 20 Jar sealing S1971
(photo S. Rzepka, drawing B. Adamski)

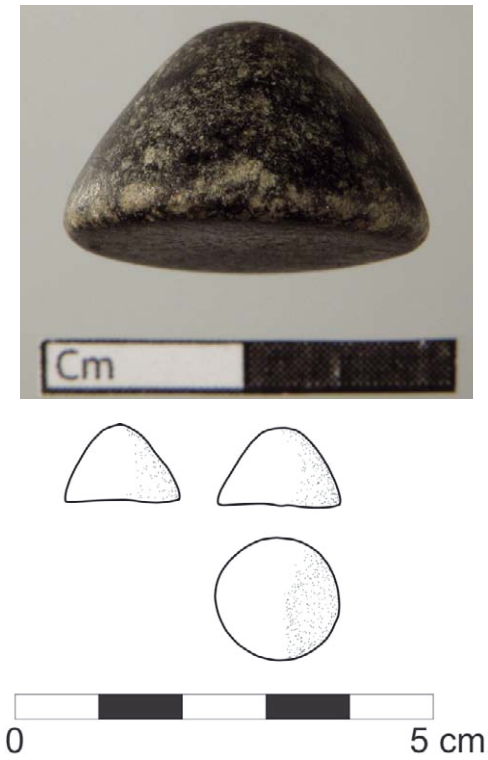

Fig. 21 Game stone S1966
(photo S. Rzepka, drawing B. Adamski)

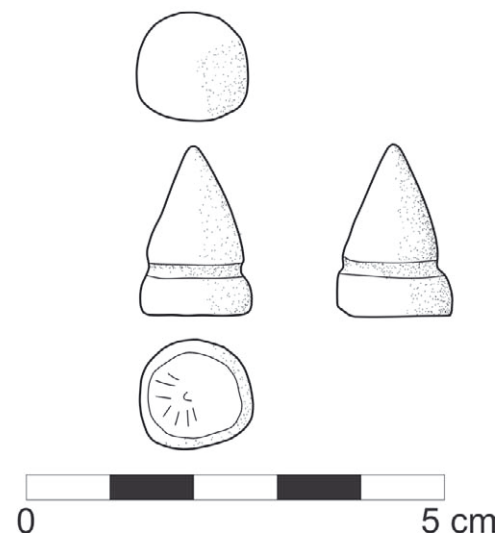

Fig. 22 Game piece S1978
(photo S. Rzepka, drawing B. Adamski)

The same archaeological context (mud brick debris (1536)) yielded a fragment of a stamped jar sealing (S1971, Fig. 20). It was made of white gypsum, which was rarely used for such purposes (usually jar sealings were made of mud).[66] The object was stamped with a rectangular seal. Unfortunately only the lower part of the impression is preserved and even in this part the inscription is not clear enough to be read. This find is clear proof that state provisions were delivered to the fortress – this was to be expected but remained archaeologically unattested to date. Unfortunately, as the stamp is illegible, it is impossible to identify the product carried in the sealed container: it may have been wine, oil, honey or still something else. The unusual material for the sealing (gypsum instead of mud) cannot help to resolve this problem – there is no indication that it was somehow limited to a specific type of supplies.

Other small finds from this rich deposit (1536) included a game stone (or a small weight?) made of basalt (S1966, Fig. 21) and another game piece made of terracotta (S1978; Fig. 22). Worth mentioning is also a partly-preserved penannular ear-

[66] Cf. Bavay 2015; Lecuyot 1997.

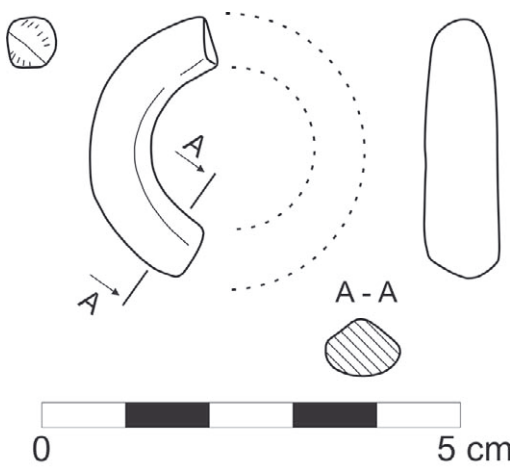

Fig. 23 Penannular earring S1995 (photo S. Rzepka, drawing B. Adamski)

ring (S1995, Fig. 23) made of calcite,[67] found in the fill of the silo [1574].

1.3.2. Children's cemetery (Area 4, phase E4)

MO

Excavations in this part of the fortress provided further evidence for the existence of a children's cemetery dated to the early 19th Dynasty.

A complex stratigraphic situation was revealed; mud brick structure [1316] probably represented the lowermost courses of bricks of the inner extension of "Wall 1". Underneath was wall [1331] (cf. Fig. 14, Fig. 24) surrounded by a later clay layer, (1318). Pottery should probably be assigned to disturbed layers of the 18th Dynasty. Wall [1331] was cut on its eastern side by a burial pit faced with mud bricks – tomb [1333]; it had a rectangular outline on the southern side and an oval one on the northern side (83 × 50 cm).

Fig. 24 Area 4 – wall [1316] (belonging to 19th Dynasty "Wall 1"?) and wall [1331] underneath (photo M. Odler)

1.3.2.1. Child's burial [1333]

Inside the irregularly shaped pit of **burial [1333]** was a Ramesside amphora surrounded by several mud bricks of various dimensions: 32 × 9 cm (3 bricks), 28 × 8–9 cm (2 bricks), 25 × 18 × 8 cm (1 brick) (Fig. 25). The deposit between the bricks and the amphora contained pottery of Thutmosis III (which again might reflect disturbances of earlier layers) and animal bones. A kind of white crust covered the amphora. The bottom of the burial pit was reached not far below the amphora.

A **skeleton (1341)** of a *circumnatale* child rested on the right side with contracted legs.[68] The base of the amphora was broken off and the opening was then covered by a large sherd from the wall of another vessel (Fig. 26). The rim of the amphora was broken off as well.

Burial [1333] was earlier than the overlying "Burial 2" explored in the season of 2009.[69] It confirmed the presence of a children's cemetery dated to the beginning of the 19th Dynasty and used prior to the expansion which occurred in the second phase of "Wall 1".

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67 Very similar (in shape, size and material) earrings are in the Brooklyn Museum, acc. no 37.1454E, 37.1455E (cf. http://www.brooklynmuseum.org/opencollection/objects/4152/Penannular_Earring; http://www.brooklynmuseum.org/opencollection/objects/4153/Penannular_Earring). Another parallel can be found in: Engelbach and Petrie 1915, pl. XVI.7.

68 Cf. below, chapter 3 by A. Šefčáková.

69 Rzepka *et al*. 2011, 155f., Figs. 19–20; Górka and Rzepka 2011, 95–96, Figs. 6–7.

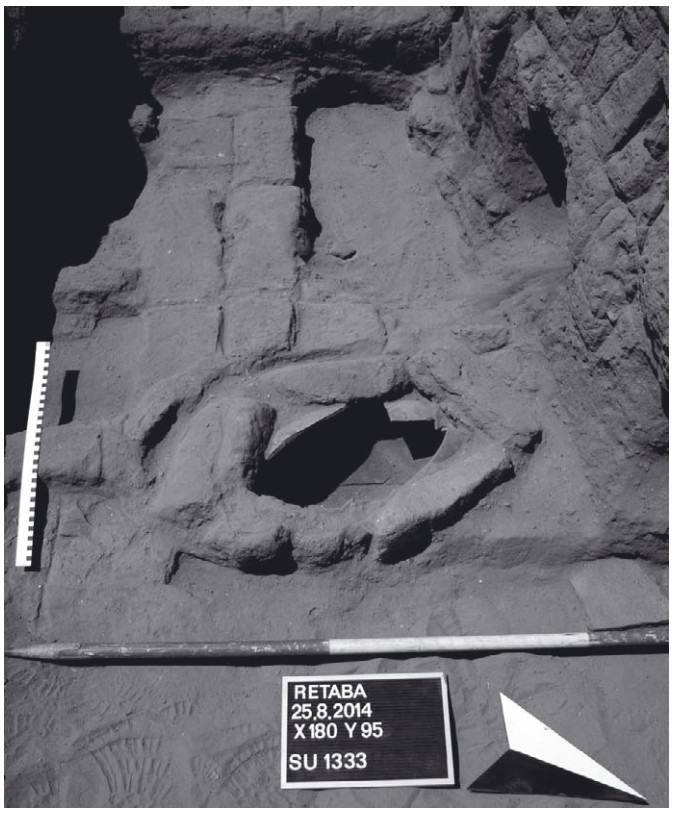
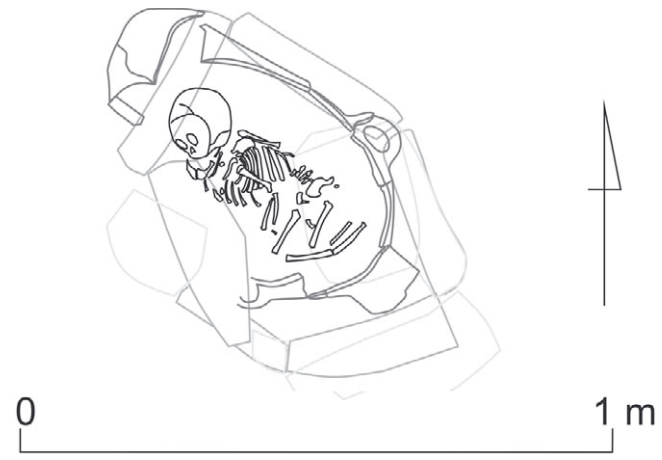


Fig. 27 Area 4 – child burial (1372) (photo M. Odler)



Figs. 25, 26 Area 4 – child burial [1333]
(photo M. Odler, drawing E. Stopková/L. Hulková)

1.3.2.2. Child burial (1372)

It is probable that child burial (1372)[70] also belonged to the mentioned Ramesside cemetery.[71] Judging from the position of the bones, the *infans I* skeleton might have been laid supine in extended position with the head to the north. Bones were deposited on a brown layer and wrapped in a white material (Fig. 27) – possibly a reed mat, covering the body or placed underneath it.[72] No pottery was associated with the burial.

1.3.3. Fortress (Area 9, phase E3)

ŁJ, SRz

The southern fragment of wall [1609], which delimited the courtyard in phase E4 (see above), was still standing during phase E3. The area of the courtyard may have been enlarged by adding a new wall, [1261] (Figs. 28, 29). At the present state of works the total area of the new courtyard can be estimated as at least 84 m^2. Wall [1261] is slightly curved and runs towards the east. After adding this wall the whole enclosure of the courtyard resembled a sinusoidal wall. Wall [1261] was about 0.4 m thick: it was preserved to a height of 0.35 m and was unearthed over a stretch of approximately 4.8 m. The bonding pattern was very regular: it consisted of alternating layers of headers and stretchers. Most of the bricks were typical brown mud bricks, but some were black or green. The most common size of bricks was 38 × 17–19 × 9 cm, but the dimensions of many bricks were different. Irregular-sized bricks were probably necessary to build the slightly curved wall.

[70] The dimensions of the documented layer were: L. 18 cm, W. 18 cm, depth 3–4 cm.

[71] There was a group of 6 burials documented in 2009, see Górka and Rzepka 2011. Besides the burials in amphorae, dated into the reign of Ramesses II, there were also remains of skeletons without containers (e. g. Burial 3).

[72] For Ramesside examples: Cotelle-Michel 2004, 13; Thomas 1981, 20; Raven *et al.* 1997, 76, Nr. 96/1 and 96/3; Naville 1894, 11f; El-Sawy 1979, 9; Bakr 1992, 104.

Inside the courtyard only one structure has been found. It was a round silo [1256] preserved to a height of 0.8 m, with an internal diameter of about 2.7 m and walls about 0.2 m thick. The silo was built in a very regular fashion. Each course of bricks was laid in headers and the size of the bricks was also very consistently 20 × 37 × 10 cm. The inner and outer surfaces of the wall were covered by mud plaster. The outer plaster was about 5 cm thick, the inner one about 2–3 cm thick.

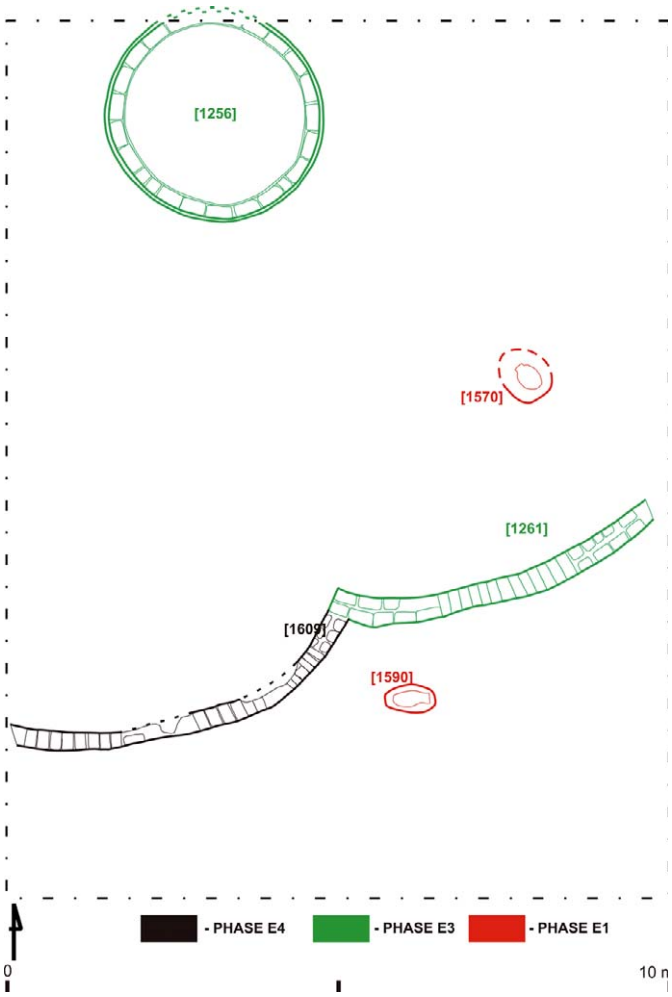


Fig. 28 Area 9 – plan of structures belonging to the 19th Dynasty fortress, phases E3 and E1 (drawing Ł. Jarmużek)

Fig. 29 Area 9 – structures belonging to the 19th Dynasty fortress, phase E3 (photo S. Rzepka)

1.3.4. Cemetery and dump (Area 9, phase E1)

In phase E1 the excavated area served as an infant cemetery. So far two burials have been found (for their location cf. Fig. 28). Traces of other burials were noticed in the western part of the trench. Both unearthed burials were of children buried in jars.

Burial (1568) was found in square Y215X110. The burial pit was rounded in shape and its diameter was about 0.7 m. It was at least 0.25 m deep. Inside the pit there was a jar lying on its side, the mouth pointing to the northwest (Fig. 30). Inside the jar a skeleton of a child was found. The skeleton was placed on the left side, with the head towards the northwest and the face turned towards the northeast. The skull was broken into several pieces. The legs were pulled up to the chest. No object was found inside the jar or the burial pit.

The second grave (1590) was found in square Y215X105, about 4.4 m to the southwest of the first burial. The burial pit was ovoid in shape, 0.76 m long, 0.43 m wide and at least 0.3 m deep (Fig. 31). The jar inside the pit was lying on its side, its mouth to the east. The mouth was sealed with a mud stopper. The skeleton of a child found inside

Fig. 30 Area 9 – child burial (1568) (photo S. Rzepka)

Figs. 31, 32 Area 9 – child burial (1590) (photo S. Rzepka)

Fig. 33 Lump of mud S1998 from burial (1590) (photo S. Rzepka)

the jar was lying on the right side with the head to the east and the face turned to the south. The skull was broken into several pieces. The legs of the child were pulled up to the chest (Fig. 32). There was no burial equipment inside the amphora, but in the fill of the pit (1591) an enigmatic object was found. It was an ovoid lump of mud (S1998, Fig. 33) placed just beside the bottom of the amphora – evidently intentionally deposited there during the burial process. After cutting, the lump turned out to be hollow. The empty space inside was roughly rectangular. Apparently originally there was some kind of object inside, an object wrapped in a layer of mud. This object disappeared completely – it must have been made of organic material, which decayed completely leaving no recognizable traces. The above-described object is so far the only one of its kind among the finds recovered by the Polish-Slovak mission,[73] but it may be a trace of a more widespread burial custom. During excavations by an Egyptian mission carried out in 1990 in the southern part of the site a number of Ramesside infant burials in amphorae were discovered. The only finds mentioned by the director of this mission, Magdy Saad Salip,[74] were "balls of mud" – there is no information on whether these "balls" were solid or hollow inside.

After (or also during?) the usage of the area as an infant cemetery, the place served as a dump. The entire southern part of the trench was covered with a thick layer (1259) of ashes mixed with sand. The thickness of the layer varied from 0.2 to 0.5 m. Large amounts of pottery sherds, animal bones and shells were found in this deposit. Small

[73] Górka and Rzepka 2011.

[74] An unpublished excavation report in the archive of the Supreme Council of Antiquities.

finds were also relatively numerous: among the 21 recovered objects were fragments of querns (S1670, S1934), a stone vessel (S1666), a faience vessel (S1676), flint tools (S1662, S1664, S1669, S1935, S1930), a grinder (S1663), faience rings (S1665, S1667, S1928), faience plaques (S1673, S1668), beads (S1674, S1675, S1908, S1929), a weight (S1678), and a scraper (S1689).

1.3.5. Fragment of a Ramesside stela

JH

Important finds of the season included an out-of-context fragment of a stela (S1851). It was found on the side of the asphalt road crossing the site, among modern rubbish. Its decoration preserved a portion of the sun crown with a ureus as worn by the god Re-Harakhty, his name in hieroglyphs, and a part of a Ramesside cartouche (Fig. 34); the signs *wsr, stp* and *n* are partially preserved. Due to the state of preservation it is not possible to conclude whether the pharaoh previously depicted on the stela was standing or kneeling in front of the standing or sitting Re-Harakhty. The fragment will be discussed in detail in a separate contribution.

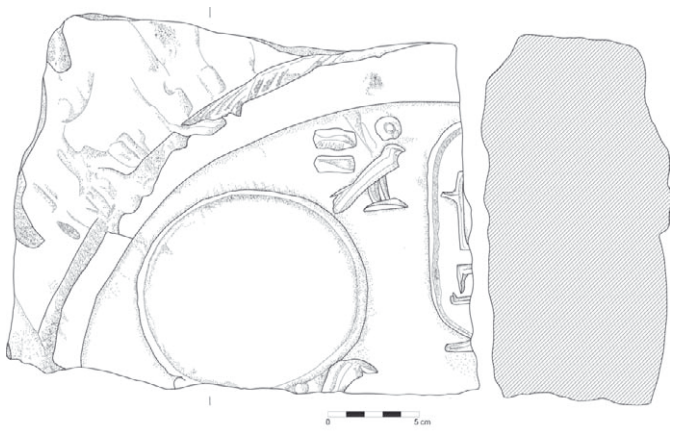


Fig. 34 Fragment of Ramesside stela S1851
(photo R. Rábeková, drawing L. Kováčik/V. Dubcová)

1.4. 20TH DYNASTY

1.4.1. The beginnings of the fortress of Ramesses III (Area 9, phase D4)

ŁJ, SRz

At the beginning of phase D4 the southern part of the excavated area was covered by a 0.2 m thick sand layer (1250), devoid of any kind of objects. After some time it was covered by gravel layer (1248), which was about 0.3 m thick (Fig. 35). Unlike layer (1250) this deposit contained a substantial amount of animal bones, some pottery and three objects: two grinders (S1656, S1657) and fragment of a faience ring (S1655).

Directly on gravel layer (1248) a kind of mud brick structure [1247] was built. Its original shape is impossible to determine due to its poor state of preservation. It was almost completely destroyed by later structures. Structure [1247] was a straight wall, about 0.15 m thick and at least 1.9 m long. Only one layer of bricks is preserved. On the eastern side of the wall was ash layer (1170), a fairly loose deposit about 0.2 m thick, containing small amounts of animal bones and pottery sherds. On the western side of the wall lay compacted layer (1249). It contained some ashes, animal bones and pottery sherds. Next to the northern end of the wall a fireplace or relic of an oven was found. It was in an oval pit 1.05 m long, 0.8 wide and about 0.2 m deep. The fill of the pit (1216), comprised two layers. The lower one consisted of black charcoal and the upper one of white ashes. It is more probable that (1216) constitutes the remains of an oven rather than a fireplace. Usually pits for fireplaces are not as deep. What is more important, thin wall [1247] built along the cut is a common feature of ovens discovered in Tell el-Retaba (see below).[75] After some time the fireplace/oven fell out of use and was covered by walking level (1212), a very compact layer about 20 cm thick, consisting of silt mixed with ashes. It contained a small amount of pottery sherds and animal bones.

[75] Cf. Rzepka *et al*. 2014, 67–69.

Fig. 35 Area 9 – layer of sand and gravel separating 19th Dynasty remains (below) from 20th Dynasty and later deposits (above) (photo S. Rzepka)

Discussion

Sand layer (1250) may suggest that the excavated area was abandoned for some time at the end of the 19th Dynasty and/or the beginning of the 20th dynasty. The layer did not contain any objects and was probably brought in by the wind. Afterwards, the area was covered by gravel layer (1248), which seems to be a levelling layer brought by builders of new fortifications. No stratigraphic relationship has clearly confirmed this, but it seems that these activities (i.e. levelling of the terrain) should be linked with the construction of Petrie's "Wall 2" – a massive (ca. 9 m thick) defence wall, which can be securely dated to the times of Ramesses III thanks to a foundation deposit discovered by Petrie.[76]

1.4.2. Fortress of Ramesses III (Area 9, phase D3)

ŁJ, SRz

Fragments of the large building no. [834/838] have been excavated since 2011.[77] It is a long structure extending E-W, parallel to the massive defence wall [983] (Petrie's "Wall 3"). So far neither western nor eastern limits of it could be identified. Two of the aims of the 2014 excavations in Area 9 were to determine the extent of building [834/838] to the east and to verify some hypotheses concerning this structure's shape and function.

1.4.2.1. Defence wall [983] (Petrie's "Wall 3")

Two fragments of "Wall 3" uncovered in the eastern part of Area 9 were very poorly preserved (Fig. 36). Both belonged to the lowest part of the foundations. The eastern fragment, about 2.2 m long, consisted of only one course of bricks located very close to the northern face of the wall. The western fragment, approximately 3.2 m long, consisted of three courses of bricks, which formed the northern face of the wall. The bricks measured 40–43 × 18–20 × 13–14 cm.

The very poor state of preservation of remains excavated in 2014 probably results from activities of the Egyptian archaeological missions, which

[76] Petrie and Duncan 1906, pl. XXXIV.

[77] Rzepka *et al*. 2014, 75–88.

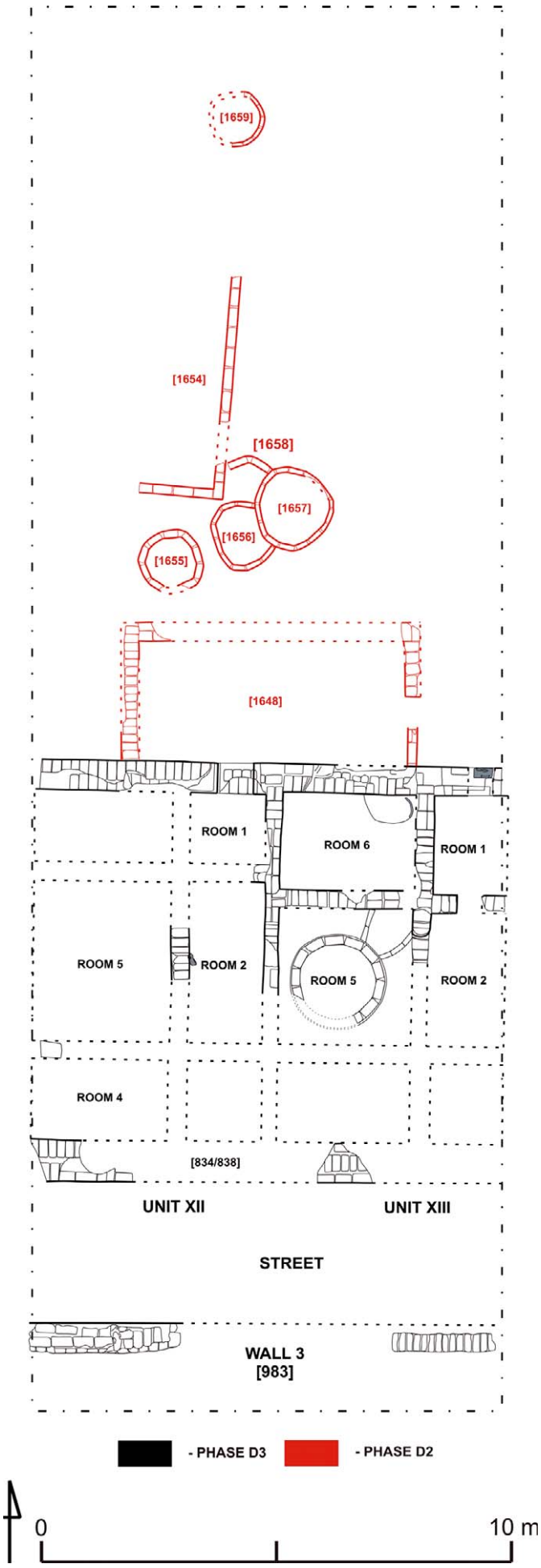


Fig. 36 Area 9 – plan of structures belonging to the 20th Dynasty fortress, phases D3 and D2, excavated in 2014 (drawing Ł. Jarmużek)

carried out some works in the southern part of the site in the 1990s. It seems that at that time most of "Wall 3" was removed in order to clear "Wall 2", which runs parallel to "Wall 3" and was originally partly covered by it.

The northern face of "Wall 3" discovered in the eastern part of Area 9 is not exactly aligned with the northern face of "Wall 3" in the western part of Area 9. The former is located some 50 cm to the north of the latter (Fig. 37). It must be remembered, however, that the fragments excavated in 2014 belong to the foundations only, as no above-ground parts of the wall are preserved. It seems possible that the foundations were not exactly straight – the brickwork may have just filled the foundation trench. A regular, straight face of the wall was built only above the ground. Anyway, the plan drawn by Petrie[78] (who excavated the top of "Wall 3" when it was in much better condition), shows no recesses or buttresses on the inner face of the wall. However, the poor state of preservation of "Wall 3" in the eastern part does not allow for any final conclusions.

1.4.2.2. Street along "Wall 3"

The area between the northern face of "Wall 3" and building [834/838] was probably a street (cf. Figs. 36, 37). However, in the eastern part of Area 9 the present surface of the *tell* is preserved at a lower level than in the western part of the area (where the existence of such a street is certain), so the walking level of this street is not preserved.

1.4.2.2. Building [834/838]

The fragment of building [834/838] unearthed in 2014 resembles the part of the same structure brought to light in 2011 and 2012 (Fig. 38, cf. also Figs. 36, 37). The newly uncovered fragment is 8.8 m wide. Its outer walls are 67 cm (northern) and 89 cm (southern) thick. The bonding pattern is very regular, consisting of a series of alternating courses of headers and stretchers. The inner walls of the building are thinner (37–39 cm) and their bonding patterns are irregular. The mud bricks measure 38 × 19 × 12 cm.

All architectural features of the recently excavated part of the building are very similar to ones in the part of the building excavated in previous seasons. However, the new part allows for more advanced reconstruction of the whole building.

[78] Petrie and Duncan 1906, pl. XXXV.

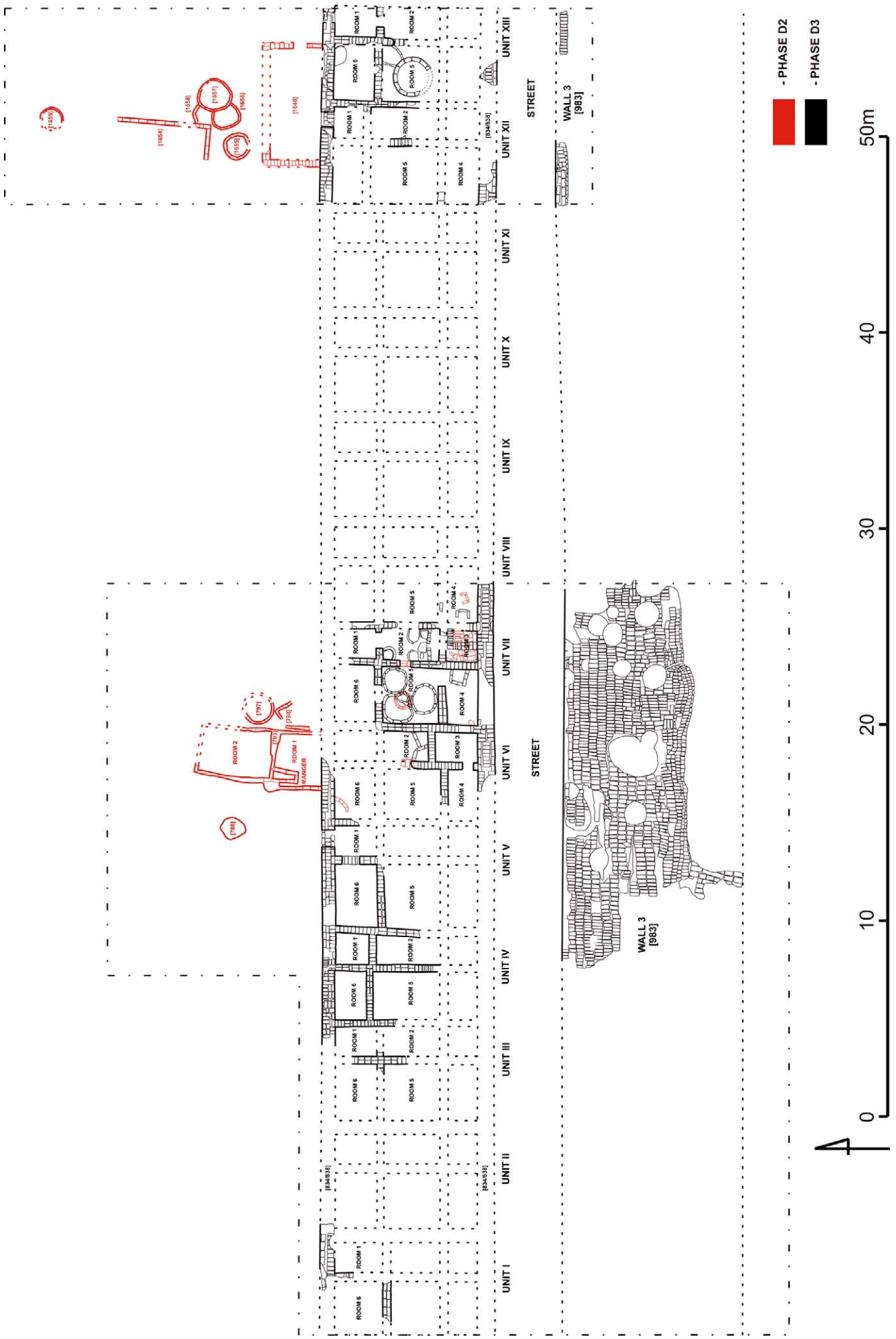


Fig. 37 Area 9 – plan of structures belonging to the 20th Dynasty fortress, phases D3 and D2, excavated in 2011–2014 (drawing Ł. Jarmużek)

Fig. 38 Area 9 – structures belonging to the 20th Dynasty fortress, excavated in 2014 (photo S. Rzepka)

The total length of the building was at least 67.8 m. It contained at least 13 uniform units, each comprising six rooms: three narrow ones and three larger ones.

Unit XII was very poorly preserved. Most of it was destroyed by cuts and structures dating from the Third Intermediate Period. In the case of rooms XII.3 and XII.6, there were no traces of walls or floors. The main entrance to the unit, placed in the northern wall of room XII.1, was approximately 76 cm wide (it was blocked with bricks in the later phase, cf. below). Floor (1242) of room XII.1 was preserved only in the north-eastern corner. It contained some ashes and object (S1640), probably a game piece or weight. The floor was covered with a layer of debris (1241) containing some fragments of clay, which may have originated from a dressing of the ceiling or from a bin that may have been part of the room's furnishings. In the case of room XII.2, only a small fragment of the western wall and the northern part of the floor are preserved. Floor layer (1224) contained some ashes, a small amount of pottery and a grinder (S1630). Next to the fragment of the western wall of the room a stone door pivot was found *in situ*. Scratches on the pivot (left by the door) show that the doorway was located just to the north of the pivot stone. The end of use of the room is marked by layer of debris (1209), which covered the floor. Room XII. 4 was almost totally destroyed; only a small fragment of the northern wall and a small patch of floor (1244) were preserved. The floor contained some ashes, a small amount of pottery and a spindle whorl (S1644) (Fig. 39). Room XII.5 was slightly better preserved. The entrance to this room was placed on its eastern side (cf. above). The partly-preserved floor (1226) contained an abundance of ashes, some pottery sherds and animal bones. In the middle of the floor there was a shallow, roughly circular depression filled with ashes, probably a fireplace. No traces of mud brick structures were preserved inside the room.

Unit XIII was generally better preserved than unit XII. However, two rooms, XIII.3 and XIII.4, were completely destroyed by later structures. The unit has not been completely excavated, as its eastern wall was outside the excavation trench. The main entrance to the unit was placed in the northern wall of room XIII.1. The width of the entrance cannot be determined because of the poor state of preservation of the wall in this area. The only trace of the doorway is a limestone threshold block (39 cm wide) built into the wall. Remains of a round hieroglyphic sign (solar disc?) (Fig. 40) executed in very deep sunk relief show that the threshold was a reused decorated block probably originating from one of the ruined buildings of the 19th Dynasty fortress dismantled at the beginning of the 20th Dynasty.

The floor of room XIII.1 was fairly well preserved. It contained some ashes, pottery sherds, and a large number of fish bones. Three objects were found in this unit: bronze chisel (S1587) (Fig. 41), bone spatula (S1619), and stone vessel fragment (S1620). Although the walls of room

Fig. 40 Threshold made of a reused decorated limestone block (photo S. Rzepka)

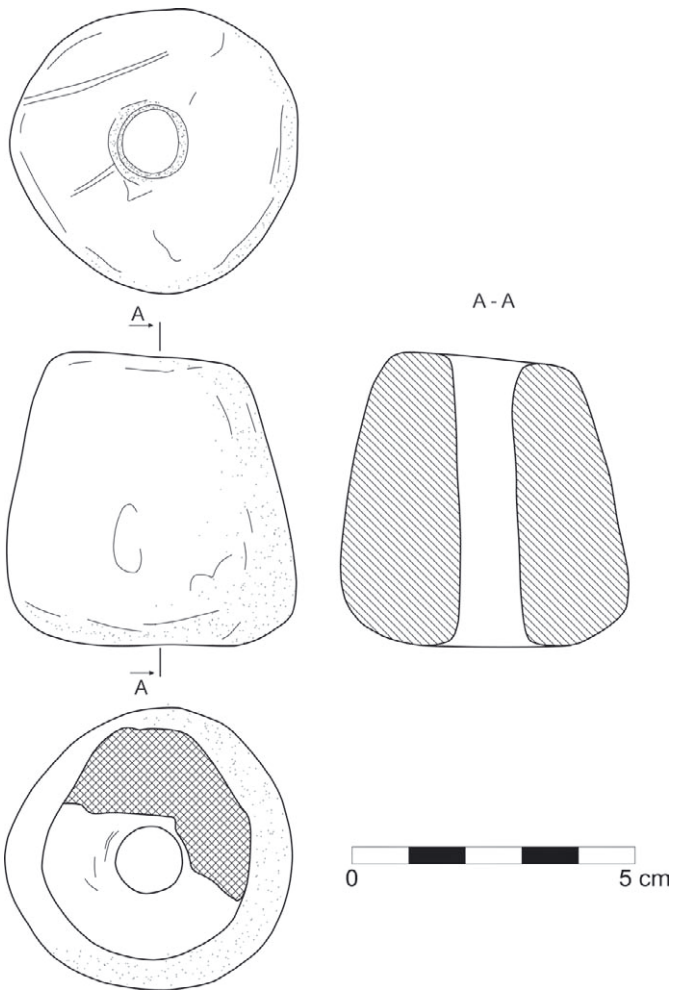


Fig. 39 Spindle whorl S1644 (photo S. Rzepka, drawing B. Adamski)

Fig. 41 Bronze chisel S1587 (photo S. Rzepka, drawing B. Adamski)

XIII.1 were very poorly preserved (only one layer of bricks), it was possible to find traces of two doorways leading to other rooms. The first doorway was probably placed in the middle of the western wall of the room. In the middle part of the wall the brickwork pattern changes from stretchers to headers, indicating the presence of a doorway with a mud brick threshold.[79] The second doorway was probably placed in the southern wall of the room. It had no threshold and was probably 52 cm wide. Room XIII.2 was very poorly preserved. Only a small fragment of floor (1243) was found in the north-western corner of the room. There was also a partially-preserved doorway with a mud brick threshold (covered by the floor) in the

[79] The same occurred in unit V. There was a mud brick threshold in the doorway between rooms VI.1 and VI.6. After some time the threshold was covered with a floor, see Rzepka *et al*. 2014, p. 79–80.

Fig. 42 Area 9 – rooms XIII.5 and XIII.6 in building [834/838] (photo S. Rzepka)

western wall. The doorway, which led to room XIII.5, was at least 55 cm wide. Room XIII.5, which served as a storeroom, featured a round silo [1235] with an internal diameter of 1.58 m and walls about 22 cm in thickness (Fig. 42). The silo, preserved to a height of 16 cm, was built in a very regular manner and its outer face was covered with white plaster about 2–3 cm thick. The structure was filled by mud brick debris (1234), in which two objects were found: grinder (S1639) and quern (S1638). In the north-eastern corner of the room was bin [1237] created by building two thin walls that closed off the space between the silo and the north-eastern corner of the room. The walls of the bin were made of mud bricks laid on edges. At the bottom of the bin a thin layer of ashes (1239) was found beneath a layer of debris (1236). Both structures, the silo and the bin, were built directly on the ground. After some time, layers of floors (1238 and 1211) accumulated around both structures, although the space between the structures and walls of the room was limited. The first floor (1238) contained some ashes, pottery sherds, animal bones, and two objects: scraper (S1660) and stone vessel fragment (S1641). The second floor (1211) was fairly similar. Besides ashes and animal bones, it contained a stone vessel fragment (S1661). All structures and floors were covered by debris layer (1197), which consisted of sand and fragments of bricks. Only one object was found inside this layer – a pottery disc made from a reused potsherd (S1622). The doorway to room XIII.6 was placed in the eastern wall of room XIII.1 (cf. above). Floor (1172) inside the room was white and consisted of some kind of organic material. The same material and the same kind of layers were found in stables discovered in Tell el-Retaba in season 2010[80] and interpreted as remains of animal dung. In addition, the floor layer contained some animal bones, potsherds and a relatively large number of objects: five querns (S1586 (Fig. 43), S1603, S1614, S1616, S1618), four grinders (S1604, S1615, S1617, S1650), one large limestone mortar (S1600) and one net weight (S1608, Fig. 44). In the south-western part of the floor there was a fireplace in the form of a shallow, round depression filled with black ashes (1206). In the north-eastern corner of the room there was a

[80] Rzepka *et al*. 2011; Jarmużek 2013.

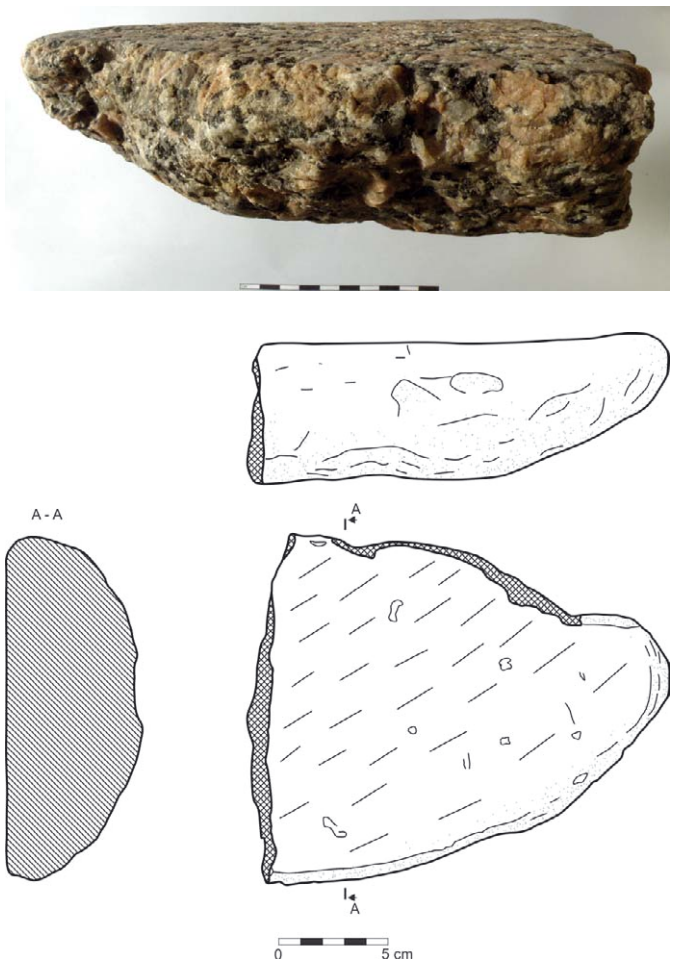


Fig. 43 Quern S1586 (photo S. Rzepka, drawing B. Adamski)

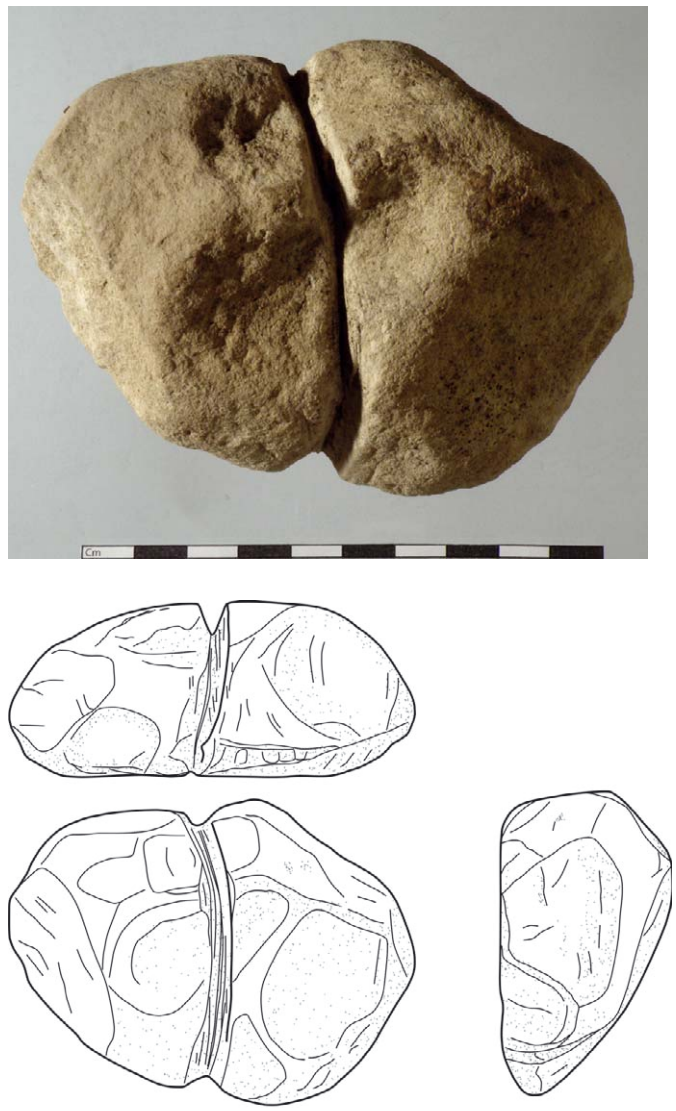


Fig. 44 Net weight S1608
(photo S. Rzepka, drawing B. Adamski)

kind of bin [1181]. The bin was of oval shape, measuring about 100 × 58 cm. The lower part of the bin was cut in the ground to a depth of about 20 cm. The upper part was built up with ceramic walls about 3 cm thick, preserved only on the eastern side (cf. Fig. 42). The bin was filled with a black, clayish layer (1180) containing some organic remains. After some time the floor and all the structures were covered by debris layer (1169), which yielded two grinders (S1585, S1601).

Discussion

The discovery of a new part of building [834/838] permits re-examination of some previous theories about this structure.[81] First of all, the new part of the building confirms that the whole structure was a very regularly planned building containing a series of uniform flats (cf. Fig. 37). The building's domestic character is once more confirmed by the repertoire of small finds (querns, grinders, mortars, etc.) and small installations (bins, silos) found inside the two new units. There was not a single example of military equipment. It seems that the theory about the similarity between units in building [834/838] and houses of type 1c in Amarna can be rejected.[82] As stated in the previous report, there is one significant difference between the two structures. Room 5 in unit VII, which should be the main hall of the house, served as a magazine. The same situation occurred in room 5 of unit XIII. Most of the room's surface was occupied by a silo and a bin. Thus, it seems that in the case of building [834/838] rooms assigned number 5 in most of the units served as storerooms. Of course

[81] Rzepka *et al*. 2014, 88.

[82] Rzepka *et al*. 2015, 88; Tietze 1985, 60–66; Tietze 2012, 66, Fig. 9.3.

this does not mean that units in building [834/838] could not have been used as living quarters, as it was the case in the so-called Clerks' Houses and dwellings in the Workmen's Village in Amarna.[83] Other good parallels to building [834/838] can be found in Middle Kingdom fortresses like Shalfak, Uronarti and Semna.[84] There were also long buildings interpreted as barracks, which comprised a series of smaller units placed along the walls of fortresses. A single unit consisted of three rooms. The surface of such units varied from 32 to 44 square meters. The main entrance to the unit led into an anteroom, which probably served as a place for food preparation, dining and storage. From the anteroom two doorways opened on two long and narrow rooms, which are identified as soldiers' dormitories. It is clear that the general layout of such a single unit is different than the layout of units in building [834/838], but there are also some similarities. Both types of living quarters are similar in size, well-organized and placed along the fortress walls. At the present state of work it is difficult to determine whether building [834/838] served as barracks for soldiers or as living quarters for civilians. The presence of a strong defence wall ("Wall 3") would suggest that the building was part of the military complex, but the repertoire of small finds, the furnishings (silos, bins) and the absence of weapons offer no support for this theory at the moment.

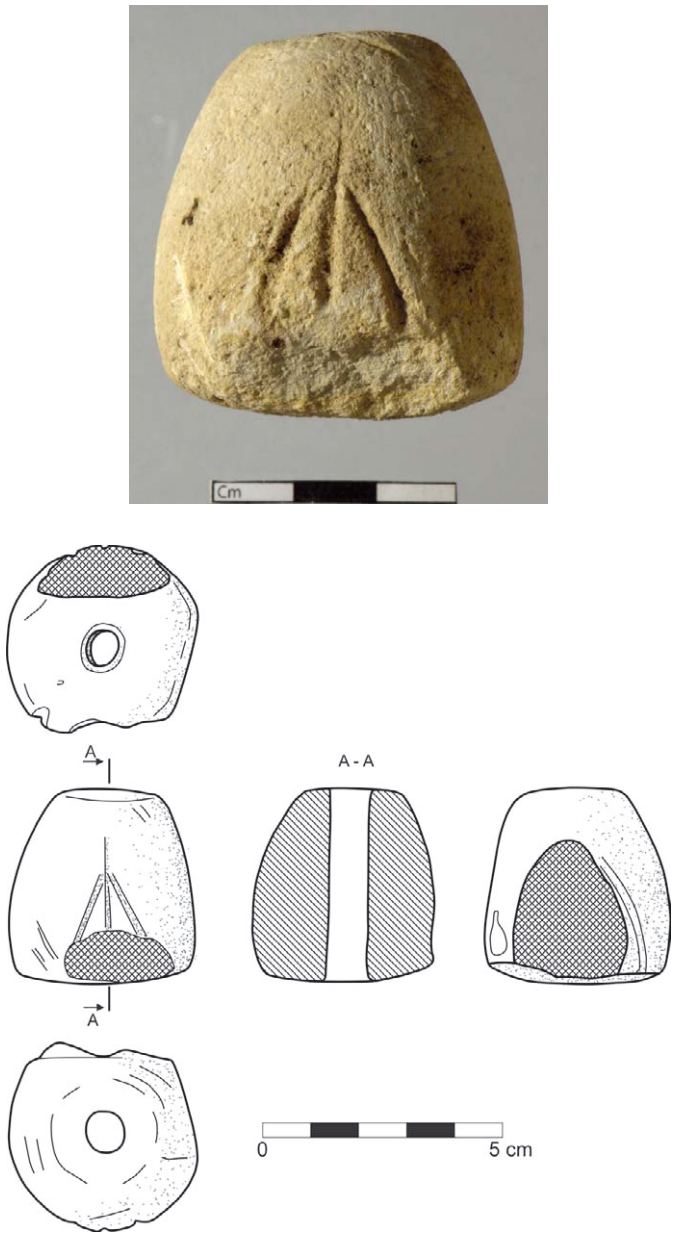


Fig. 45 Spindle whorl S1584
(photo S. Rzepka, drawing B. Adamski)

1.4.3. Fortress of Ramesses III (Area 9, phase D2)

ŁJ, SRz

1.4.3.1. Building [834/838]

In the next occupational phase, some significant changes in the spatial arrangement took place in building [834/838]. The same process was also observed in the western part of the building exposed in seasons 2011 and 2012.[85] In the western part, some rooms and units were merged by removing some walls or making new doorways. Although the eastern part of the building is in a relatively poorer state of preservation, traces of similar changes were noticed.

The main entrance to unit XII was blocked (cf. above). This fact means that the unit must have been merged with unit XI or XIII by opening a new doorway. The other possibility is a new doorway in the southern wall of the building. Unfortunately, the building is heavily damaged, so one cannot exclude either possibility. Another change took place in room XII.2 and XII.5. A wall dividing these rooms was removed. It was covered by floor (1200), which extends from the western end of room XII.5 to the eastern wall of room XII.2. The floor was white and contained some kind of organic material. It was similar to layers interpreted as animal dung, found in stables and some other structures in Tell el Retaba (cf. above). The layer also contained some animal bones and pottery

[83] Pendlebury 1951, 122–130, pl. XX; Peet and Woolley 1923, pl. XVI.

[84] Vogel 2010, 421–422; Dunham 1967, 6, 10, 118, map III and X; Dunham and Janssen 1960, 13–15, map VIII.

[85] Rzepka *et al*. 2014, 82–84.

sherds. Other remains of the second phase of use of the building [834/838] were found in room XII.4. It was the fragmentarily-preserved floor (1240). It contained some animal bones, pottery sherds, one grinder (S1642) and one flint tool (S1643). In other rooms of unit XII no remains from this phase were preserved.

In unit XIII, remains from the second phase of use were found in three rooms. In room XIII.1 only a small fragment of floor (1183) was preserved in the eastern part. It was destroyed by modern cuts and covered by a layer of debris (1182). The floor of room XIII.6 (1166) was relatively well preserved. It contained ashes, charcoal, animal bones, large limestone mortar fragment (S1582), quern (S1583), small bead (S1599) and spindle whorl (S1584; Fig. 45). When the room went out of use the area was covered by debris (1163). Besides sand and fragments of bricks, the debris layer contained two querns (S1574, S1575) and one grinder (S1576). Rooms XIII.2 and XIII.5 were probably merged. Floor (1184) covered the surface of both rooms and the remains of the wall that had originally separated them. The layer contained some pottery sherds, fragments of shells and two pottery discs (S1609, S1612).

1.4.3.2. The area to the north of building [834/838]

The area to the north of building [834/838] has yet to be excavated completely – it will be explored in upcoming seasons. Thus, all presented data should be treated as preliminary. It seems that just outside the northern wall of building [834/838] several minor structures have been built (cf. Fig. 36). Building [1648] abutted the northern wall of building [834/838]. It was about 6.4 m long and 3.1 m wide, and its walls were 37 cm thick. The 70 cm wide entrance to the building was placed in its eastern wall. The area inside the building was heavily damaged by modern cuts, mainly in the eastern part. Floor (1651), preserved only in the western part of the building, contained some ashes, animal bones, pottery sherds and one quern (S2080). In the north-western corner of the room, remains of a round fireplace (1653) were found. The whole area was covered with layers of debris (1641, 1642), which contained fairly numerous pottery sherds and several objects: two stone vessels (S2074, S2075), spindle whorl (S2078), scraper (S2068), grinder (S2079) and faience vessel (S2076).

Fig. 46 Area 9 – silos north of building [834/838] (photo S. Rzepka)

Just to the north of building [1648] several silos were found (Fig. 46). The structures have not been completely excavated, but they seem to be preserved to a height of only one or two bricks. The internal diameter of silo [1655] was about 1.03 m and its walls were 13 cm thick. Silo [1657] was built to the north-east of silo [1655]. Its diameter was approximately 1.44 m and its walls were about 11 cm thick. On the western side of the silos was a kind of mud brick bin. The bin had curved walls and measured 1.46 × 1 m. Its walls were 9 cm thick and they abutted the wall of silo [1657]. Just to the north-west of the cluster of silos was the rectangular building [1654], which was at least 4.8 m long and 1.8 m wide. Between the eastern wall of building [1654] and silo [1657] there was a small curved wall which probably served as a reinforcement for the walls of the silo. The last silo [1659] was found in the northern part of the trench, about 2.7 m from the walls of the building [1654]. The western part of the silo [1659] was completely destroyed. The original diameter of the silo was about 1.02 m and the thickness of its walls was 8 cm.

All the structures uncovered to the north of building [834/838] are relatively small, thin-walled and irregularly arranged, which clearly contrasts with both the size and the regular plan of building [834/838]. The large number of silos and bins shows that this area was used by the dwellers of [834/838] for food storage and processing. A similar arrangement was observed in the western part of building [834/838] (cf. Fig. 37): some poorly built annexes (i.a. silos) were added to the main building in the second phase of its use.[86]

1.4.4. Fortress of Ramesses III: relationship between "Wall 2" and "Wall 3" (Area 9, phases D4-D3)

JH

The cleaning of the section through Petrie's "Wall 2" and "Wall 3" on the eastern side of the corridor cut for the new road contributed to the clarification of construction details and chronology of both walls (Fig. 47). "Wall 2" was built into a mound of fine yellow sand. The mound (not a dune!) was heaped up on top of an artificially levelled cultural deposit; the mound ran from west to east. The hard surface of the level below the mound was similar to the unit below "Wall 2" in square Y115X115. The southern side of the sandy heap was raked out and adjusted for laying bricks. The thickness of the sand layer below the bricks was ca 30 cm (i.e. 1 *djeser*?)[87]; the layer of sand abruptly terminated not far from the southern face of "Wall 2". The basal layer of mud bricks, laid on side and protruded by ca 4 cm (2 *djeba*) from the northern face of "Wall 2". A layer of fine yellow sand concealed the northern face of "Wall 2" to a height of about 1.7 m and ended about 4.5 m north of "Wall 2". The "triangle" of fine yellow sand was covered by a layer of grey coarse-grained sand about 80–90 cm thick. This layer extended almost to the ruins of the 19th Dynasty "Wall 1".

"Wall 3" was constructed on the grey sand and on several thinner layers, which filled the space between the ruins of "Wall 1" and continued underneath the foundations of "Wall 3". It might indicate a time gap between the construction of

Fig. 47 Area 9 – "Wall 2" and "Wall 3" cut by a trench along the modern road (photo J. Hudec)

[86] Rzepka *et al*. 2014, 84–85.

[87] Hirsch 2013, 40.

"Wall 3" and "Wall 2". The foundations of "Wall 2", which in this part measured almost 6 m in thickness, slightly rise towards the south (to resist external attacks from that direction?); the yellow and grey sand layer probably served (1) to counter the pressure of masonry on the northern face of the wall; (2) to permit the approach to "Wall 2" at a height of at least 3.5 m.

1.4.5. Fortress of Ramesses III: migdol (Area 4, phase D)

JH

This season, cleaning was conducted in tower-like structures of the migdol-type entrance to the fortress from the time of the pharaoh Ramesses III, including extensive areas of the northern tower and northern platform of Petrie's "Wall 2" (squares Y70-90X185, parts of Y65-90X190, Y65-85X195, parts of Y65-70X200 and Y90X200), the gateway and the southern tower (squares Y70-80X180, Y75-95X170-175 and Y75-85X165).

The cleaning, carried out for photogrammetric purposes, showed that a considerable part of the north-western corner of the southern migdol tower and the southern part of the entrance between the gateway and the threshold (Y75X175 and Y75X170) had been removed during the previous Egyptian excavations around the year 2000 (according to information obtained from local workers).

1.5. The Third Intermediate Period

In Area 9, another fragment of the multi-phased Third Intermediate Period settlement was revealed. Besides remains of several houses with rectangular rooms (similar to those found in 2012 in the western part of Area 9),[88] excavations brought to light more peculiar, relatively large round structures probably used as storage facilities.

1.5.1. Settlement (Area 9, phase C4)

ŁJ

Building [1646] is very poorly preserved; only two of its walls have been found (Fig. 48). The north-south oriented wall [1646] measures 3.7 m in length and 40 cm in thickness. Only one course of bricks is preserved. Wall [1665], which is perpen-

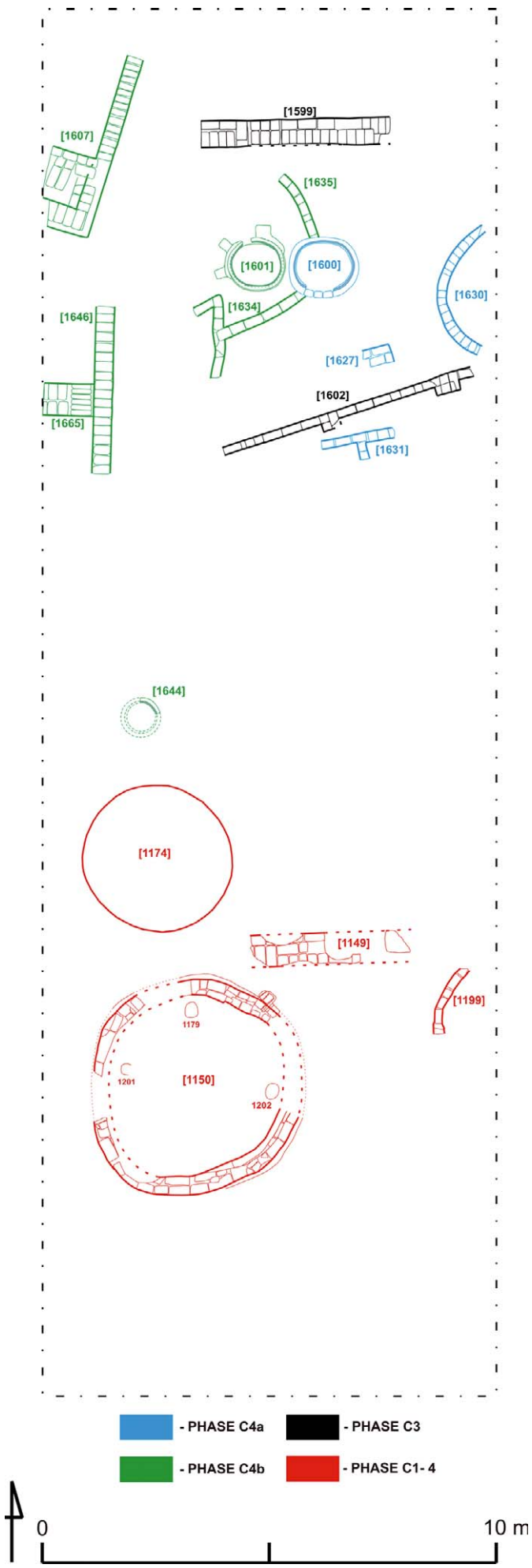


Fig. 48 Area 9 – plan of structures belonging to the Third Intermediate Period settlement, phases C4 and C3, excavated in 2014 (drawing Ł. Jarmużek)

[88] Rzepka *et al*. 2014, 86–93.

dicular to wall [1646], is 70 cm wide and at least 1.1 m long. The western part of the wall is outside the excavated area. In the corner formed by the two walls, to the south of wall [1665], a round cut was found. It was filled with black ashes, which contained some animal bones. The original layout and function of building [1646] remain obscure. It was probably no longer in existence when building [1607] was constructed just to the north.

Building [1607] was found in the north-western corner of the excavation trench. Only its south-eastern part has been unearthed, while the western part is outside the explored area. The eastern wall of the building was at least 4.2 m long and 36 cm thick. The southern part of the wall was connected with structure [1647], measuring at least 1 × 1.5 m and more than 0.68 m in height. It is too high to be a mastaba and it therefore seems more probable that it was a staircase. Inside the building a thin floor [1640] was found. It contained some pottery sherds, an abundance of shells and bronze needle (S2043). The floor was covered with a thick layer of debris (1606). The area to the south and to the east of building [1607] was probably an open courtyard. Here another bronze needle was found (S2040; Fig. 49).

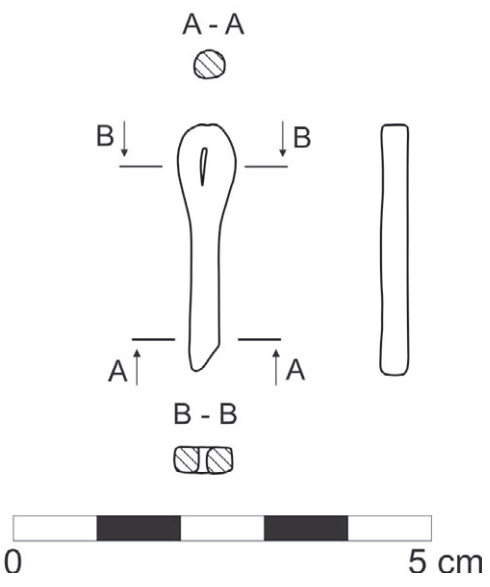


Fig. 49 Needle S2040 (photo S. Rzepka, drawing B. Adamski)

The vast walking level (1626) found on the south-east of building [1607] covered an area of roughly 5.5 × 3 m and was partially destroyed by numerous later cuts. The layer contained some ashes, pottery sherds, animal bones, and three objects: pounder (S2053), scraper (S2071) and pottery disc (S2072). About 3 m to the east of building [1607] oven [1601] was found (Fig. 50). The round oven with a diameter of approximately 1.1 m was preserved to the height of 55 cm. Its upper part was destroyed, but the lower part was found to be in relatively good condition. Oven [1601] had ceramic walls about 2 cm thick. The upper parts of the walls curved toward the centre of the structure. The walls were also covered with a layer of mud about 6–8 cm thick. The whole structure was reinforced by short mud brick walls. Two of them were added to the western side of the oven, one to its northern side. The oven's stokehole was about 20 cm wide and was placed in the northern wall. A rounded cut about 20 cm deep was made in the ground inside the oven to allow for accumulation of a larger deposit of ashes. Ashes (1615) found inside the oven were white at the bottom and black in the upper part. Besides ashes, the layer consisted of some charcoal, animal bones and contained several objects: two querns (S2061, S2061), reel (S2062) and pottery scraper (S2069). The oven went out of use after some time, as indicated by a fragment of an earthenware wall and a pottery vessel found in the upper part of the layer of ashes (1615). The area around the oven was probably partially enclosed by walls [1634] and [1635], both of which measured only 20 cm in thickness. Originally both walls probably belonged to the same

Fig. 50 Area 9 – ovens [1601] and [1600] (photo S. Rzepka)

structure, which was later destroyed by another oven (cf. below). Wall [1635] was preserved over a stretch of 1.5 m. It was located about 60 cm to the east of the oven. The stretch of wall [1634] measured 2.2 m in length and was found about 30 cm to the south of the oven. The western part of wall [1634] was connected with another N-S oriented wall. Space between the oven and the walls was filled with ashes. One layer of grey ashes (1617) filled a shallow depression just to the north of the stokehole. It contained some pottery sherds and pottery disc (S2073). The second layer of grey ashes (1616) filled the area between southern wall [1634] and the oven. The layer contained some animal bones, glass vessel fragment (S2057), faience vessel fragment (S2054), and quern fragment (S2056). Also found in this deposit was a unique pottery vessel in the shape of a pomegranate (see the "Pottery report" below, Figs. 75–77). Just to the east and south of walls [1634] and [1635] was a vast layer of black ashes (1632). It contained numerous pottery sherds, animal bones and shells.

When oven [1601] fell out of use, another oven [1600] has been built just to the east of the previous one (cf. Figs. 48, 50). The new oven was placed on a layer of bricks. Its internal diameter was about 1.24 m and its ceramic walls were 2.5–3 cm thick. They were also covered with a layer of mud about 10–13 cm thick. The stokehole of the oven was placed in its southern wall. It was much wider (60 cm) than in the case of the previously described oven. The fill consisted of layers of black and white ashes (1614). There were also some animal bones, pottery sherds, one pottery scraper (S 2070), limestone chips and slag with trace amounts of bronze. The area around the oven was covered with a thick layer of black ashes (1566). As in the case of the previous oven, the layer was very vast, covering the whole northeastern part of the trench. It contained a large number of animal bones, pottery sherds and shells. There were also twelve small objects: three querns (S1996, S2036, S2037), two pottery discs (S2033, S2047), two figurines (S2034, S2035), scraper (S2048), bead (S2064), flint tool (S2032), stone object of unclear function (S2049) and reel (S2026; Fig. 51) made of a reused base of a pottery vessel. The function of such "reels", of which several have been found in Tell el-Retaba, is obscure.

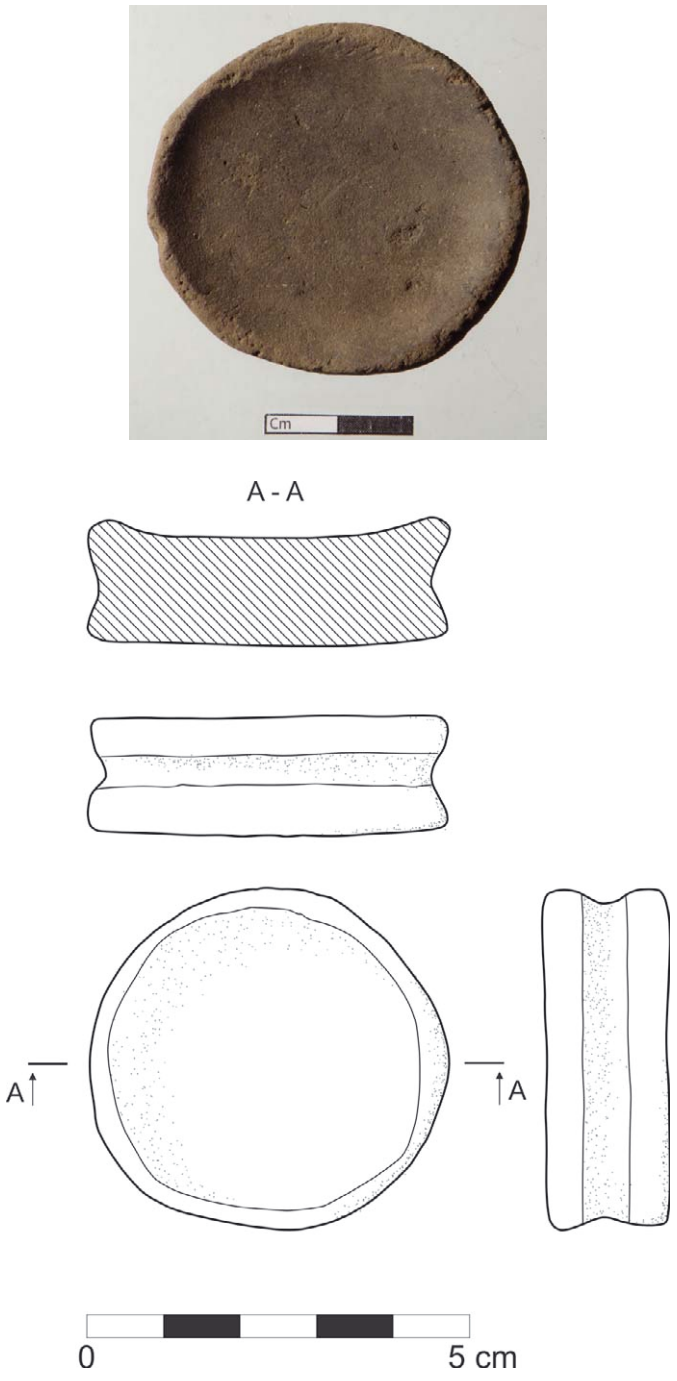


Fig. 51 Reel S2026 (photo S. Rzepka, drawing B. Adamski)

Remains of three other structures were found nearby. Structure [1630] was located approximately 1.6 m to the east of the oven. It was a rounded wall about 24 cm thick. As only the western part of the structure has been unearthed (its eastern part remains outside the excavated area), its original shape is difficult to determine. Structure [1630] may have been a large, round silo (2.66 m in diameter). However, as the deposits inside consisted of black ashes similar to those found around oven [1600], it is probable that we are dealing here with a kind of a curved enclosure wall, which surrounded another oven (as walls [1634+1635] encircled oven [1601]).

Two other structures were found approximately 1.5 m south of oven [1600]. The very poorly preserved wall [1627] was at least 60 cm long and

40 cm thick. Wall [1631], in turn, ran roughly parallel to wall [1627], about 1.3 m to the south of it; it was preserved over a stretch of 1.7 m and measured only 18 cm in thickness. Both structures were covered with debris layer (1620), which consisted of sand and fragments of bricks and contained some animal bones, pottery sherds, three querns (S2041, S2042, S2051) and bead (S2052).

Another oven [1644] was found about 10 m to the south of building [1607]. It is uncertain whether it was contemporary to oven [1601] or to oven [1600] due to the lack of direct stratigraphic relationships between these features. The area around oven [1644] was heavily damaged by later cuts. The oven itself was also very poorly preserved. Its 3 cm thick ceramic walls were covered with a layer of mud (8 cm thick). The oven's original diameter was about 80 cm. Ashes (1643) inside the oven did not contain any objects. Two walking levels were found in close proximity to the oven. Both layers (1613, 1637) were relatively thin and contained some ashes, a small amount of animal bones, and pottery sherds.

Discussion

Remains from the phase C4 suggest that the area was occupied by a house and a large open courtyard located to the east of it. Two ovens, large amounts of ashes, small finds connected with food processing, and several small, thin-walled structures prove that this part of the courtyard served for bread-baking. Similar installations have been found in the western part of Area 9, but those are dated to the late 19th dynasty.[89] Apparently the bread-making technology did not change between the 19th Dynasty and the Third Intermediate Period.

1.5.2. Settlement (Area 9, phase C3)

ŁJ

Wall [1599] was built directly above the thick layer of ashes originating from the ovens (see above, cf. Fig. 48). It was probably a part of a building heavily damaged by later cuts. Part of the structure may still exist outside the northern edge of the excavation trench. The E-W oriented wall preserved to a height of 30 cm was at least 4.2 m long and 0.6 m thick. It seems that the area to the north of the wall was part of a room located inside the building, while the area to the south was a courtyard. Layer (1594), which abutted the wall on its northern face, was probably a floor of the room. It contained some ashes, charcoals, abundant pottery sherds, fish bones and ostrich egg shells. There was also one pottery disc (S2023). On the southern side of the wall there was a walking level (1595), which probably constituted the surface of a courtyard. The unit contained few pottery sherds. On the southern edge of the layer there was a cut, in which pottery vessel (1596) was found *in situ*. Another fragment of walking level (1598) belonging to the courtyard was found about 1.5 m to the west. Its surface was flat and compacted. The unit contained only some animal bones and pottery sherds. The relatively large extent of both walking levels suggests that the area they were in was an open space. The last piece of evidence is a fragment of wall [1602], which is preserved over a stretch of 5.5 m to the south of the building [1599]. Walls [1602] and [1599] were built directly on the layer of ashes. Wall [1602] was, however, oriented differently than wall [1599]: it ran approximately from the northeast to the southwest. The wall, preserved over a stretch of 5.7 m and about 20 cm thick, was reinforced with pillars, of which two were preserved. The pillars protruded about 20 cm from the southern face of the wall and measured about 40–50 cm in width. The distance between the two preserved pillars was 2.2 m. The area to the south of wall [1602] (which was apparently was an enclosure wall) seems to have been an open space; it was covered by layer (1603), an extensive deposit encompassing almost the entire surface of the excavation trench. The layer was disturbed by numerous cuts. It contained some ashes, animal bones, pottery sherds, and several objects: pottery disc (S2024), figurine (S2038), door socket (S2025), and scraper (S2050).

1.5.3. Settlement (Area 9, phase C2)

ŁJ, SRz

The relatively well-preserved building [1528] was found in the north-eastern corner of the excavation trench (Figs. 52, 53). The building consisted of only one room (although it cannot be excluded that there was another room further to the east, outside the excavation trench). The building, roughly rectangular in plan and oriented N-S, measured 5 ×

[89] Rzepka *et al*. 2014, 67–69.

5.9 m. Its walls were relatively thick (70–80 cm) and preserved to a maximum height of 80 cm. The entrance to the building was placed in its south-eastern corner and was unusually wide (1.55 m). Floor (1563) inside room 1 was well preserved. It was a thick layer containing some ashes, animal bones, pottery sherds, as well as sickle blade (S1969) and loom weight (S1972). The floor was covered by a thick layer of sand and brick fragments (1529), which yielded some pottery sherds, animal bones and one grinder (S1960).

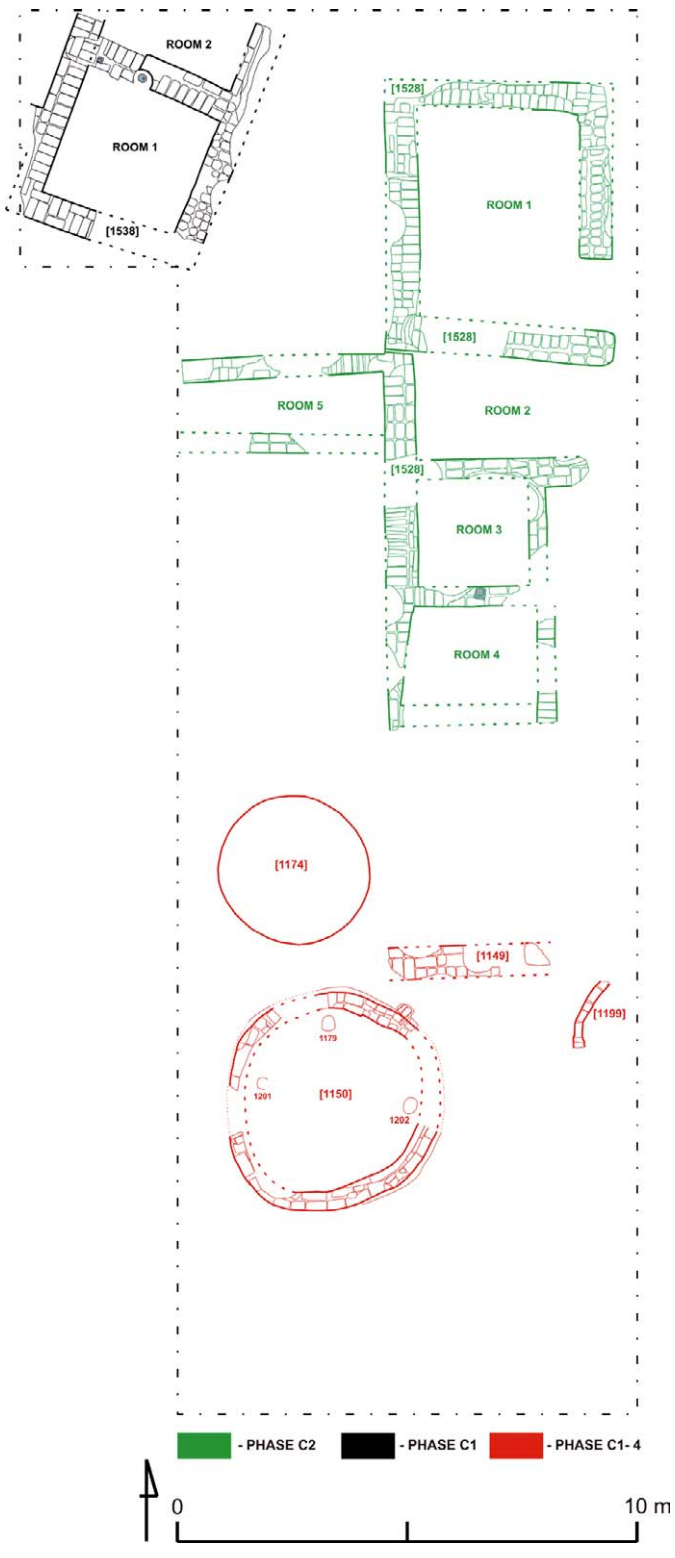


Fig. 52 Area 9 – plan of structures belonging to the Third Intermediate Period settlement, phases C2 and C1, excavated in 2014 (drawing Ł. Jarmużek)

At some point, building [1528] was significantly expanded. At least three more rooms were added on its southern side. It seems that the construction started with the addition of a massive wall [1539], about 8.2 m long and 70 cm thick. Subsequently, thinner walls (40–44 cm) were built to create new rooms. In one of the new walls (wall [1540] between rooms 2 and 3) a small bronze arrowhead was found (S1941, Fig. 54). It seems to have found its place into the middle of the wall not as a result of military activity (an attack against the dwellers of house [1528]), but rather because it had been mixed in with the clayey material used by the builders as mortar. Anyway, it is one of very few examples of weapons found so far in Tell el-Retaba.

One of the new rooms added to building [1528], room 2, was 2.3 m wide and at least 4.8 m long. Its eastern end is outside the excavated area. Floor (1557) inside the room was relatively well preserved. It contained some ashes, pottery sherds, game stone/weight (S1964) and bead (S1963). It was covered by debris layer (1544). Room 3 was almost square and measured 2.3 × 2.4 m. Two layers of floors found in this room were separated by debris layer (1558) and partly destroyed by later cuts. The first floor (1559) contained some ashes, animal bones and pottery sherds. Originally the entrance to the room was placed in the southern wall, as indicated by a pivot stone found in that area. After some time the entrance was blocked with mud bricks. However, the existence of the second floor (1545) proves that the room was still used. The entrance was probably located in one of the other walls, which were heavily damaged and therefore preserved no traces of a doorway. The second floor (1545) contained a small amount of pottery and one quern (S1940). Room 4 was very poorly preserved as a result of destruction by modern cuts. The room measured about 2.10 × 2.65 m. Only a small part of its floor (1560) was preserved, mostly along the western wall and in the north-eastern corner of the room. The floor contained a large amount of ashes. To the east of rooms 3 and 4 there were probably other rooms, which have since been completely destroyed. The area to the west of wall [1539] was also very poorly preserved. Fragments of two walls, [1579] and [1611], suggest the presence of yet another room in that area (although it is uncertain whether it still belonged to building [1528]). Room 5 was 1.38 m

Fig. 53 Area 9 – room 1 in building [1528] (photo S. Rzepka)

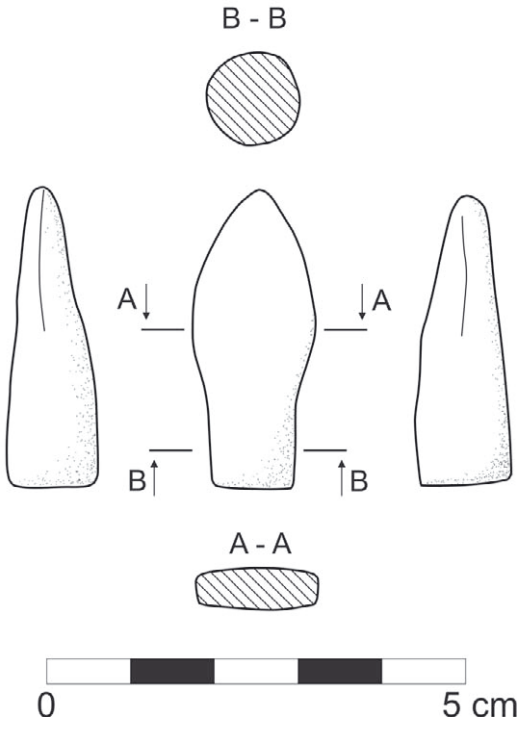


Fig. 54 Arrowhead S1941 (photo S. Rzepka, drawing B. Adamski)

wide and at least 4.4 m long. The western end of the room is outside the excavation trench. No floor was found inside the room. In the area to the south, however, fragments of two floors (1562, 1610) were found. Due to the fragmentary nature of the evidence it is difficult to determine whether the area was an open or a closed space. In contrast, the area to the north of room 5 yielded enough data to establish that it was unroofed. The area measured at least 4.4 × 7 m and featured a number of different layers. The oldest one was walking level (1584), which was preserved in the eastern part of the area, along the western wall of building [1528]. The surface of the layer sloped steeply toward the west. It contained some ashes, charcoals and fish bones. The western part of the area was covered with a deposit of black ashes and debris (1578). The next walking level (1572) probably covered the entire area; it yielded only pottery sherds. Fireplace (1571) was found in its north-western part.

1.5.4. Settlement (Area 9, phase C1)

ŁJ

Building [1538] was found in the north-western corner of the excavation trench, just below the present surface of the tell (Fig. 55, cf. Fig. 52). In

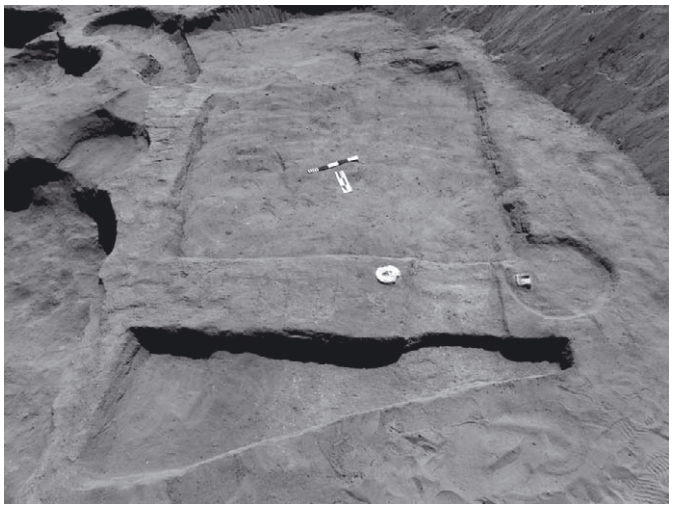


Fig. 55 Building [1538] (photo S. Rzepka)

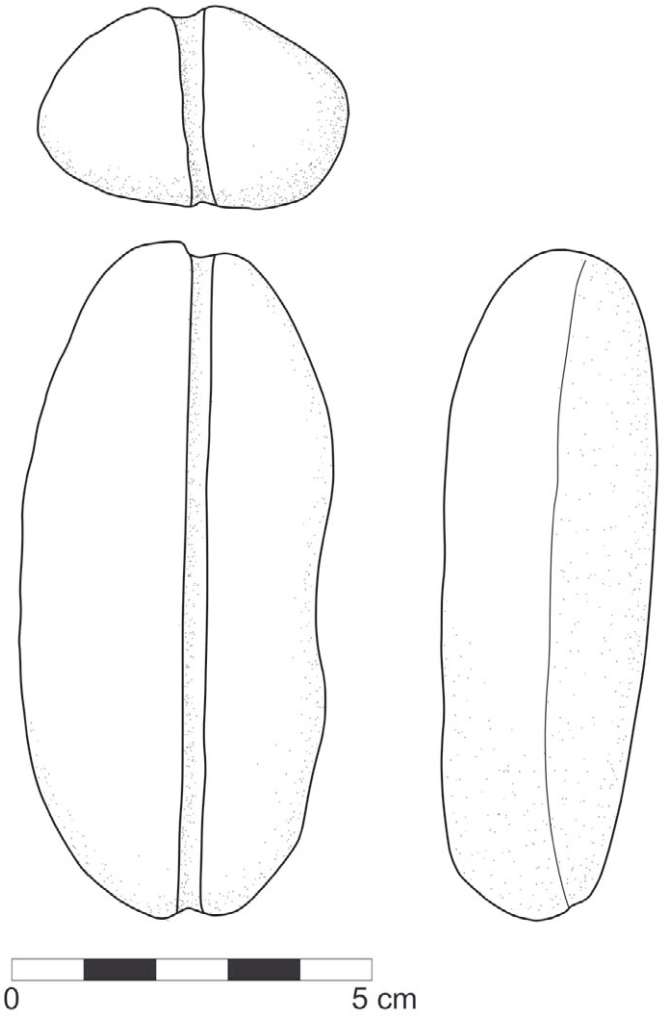


Fig. 56 Loom weight S1944
(photo S. Rzepka, drawing B. Adamski)

order to examine a larger part of the building the excavation trench was slightly expanded at this level. The unearthed fragment of the building (4.3 × 5.6 m) was probably its south-eastern corner. Walls of building [1538] were about 65–70 cm thick, their maximum preserved height being 20 cm (two layers of bricks). Room 1 was relatively well preserved, with only its south-eastern corner destroyed by a modern cut. The room was almost square and measured 2.9 × 3.1 m. Floor (1549) in room 1 contained a small amount of ashes, animal bones and pottery sherds. The number of small finds in this floor layer was relatively high, with five loom weights (S1944 [Fig. 56], S1945, S1946, S1952, S1953), two beads (S1958, S1062), needle (S1955), pendant (S1957) and fragment of a stone vessel (S1954). In the middle of the room two circular cuts were found. They measured about 20 cm in diameter and were both relatively shallow. They may have served as pot stands. The entrance to the room was located in its north-western corner. It was about 85 cm wide and had a threshold built of mud bricks. Unexpectedly, the entrance had two door pivot stones placed on opposite sides. It seems unlikely that there was a double door in such a relatively narrow entrance. Closer examination of the stones allows for a different explanation. It seems that the two stones were not used at the same time. Probably the western stone was placed in the original doorway. However, after some time the socket that held the wooden pivot became enlarged by wear and some parts of the stone broke off. Then the inhabitants made another door pivot stone and placed it on the other side of the doorway. In order to fit it into place they removed a fragment of the wall, which is now visible as a round cut around the stone. Room 2 was only partially explored, as its northern part lay outside the excavated area. It was 3.10 wide and at least 1.6 m long. Floor (1556) of the room contained a small amount of ashes, pottery sherds and one faience ring (S1959). A fragment of a wall

connected with the western wall of room 1 indicates that the building had more rooms.

1.5.5. Settlement (Area 9, phases C1-C4)

SRz, ŁJ

Three structures dated to the Third Intermediate Period were found in the southern part of the trench (cf. Figs. 48, 52). Due to the lack of direct stratigraphic relationships it is impossible to assign them to a specific phase.

Structure [1149] was a fragment of a wall badly destroyed by later cuts. Its preserved fragment was 3.5 m long and 70 cm wide. The wall was built on walking level (1153/1157), also destroyed by numerous cuts. It contained ashes, charcoal, fish bones, some pottery sherds and one grinder (S1573). The level was covered with debris (1155, 1156) probably generated by the collapse of wall [1149].

The other two structures were built in an unusual manner. They were erected in a large cut, at least 50 cm deep, made during the Third Intermediate Period. For unknown reasons a large amount of soil in the south part of the excavation trench was removed. At the bottom of the cut at least two structures were built. Building [1150] was round in plan (Fig. 57). Its internal diameter was 3.85 m and its walls, about 40 cm thick, were built in a very irregular fashion. It is difficult to determine the location of the entrance to the building because of the poor state of preservation of the walls. In some places it was possible to identify the fill (1228) of the foundation trench, which consisted of sand and fragments of bricks. The first floor (1208) of the room contained abundant ashes, some animal bones and pottery sherds. After some time it was covered by a thin layer of clay, (1203). Along the wall of the building there were three round cuts, which served as stands for large storage vessels (1997, 1201, 1202). The floors and vessels were covered with a thick layer of debris, (1192). Besides numerous broken bricks, the deposit contained animal bones, shells, a large number of pottery sherds, and several objects: scraper (S1631), grinder (S1598), disc (S1621), and spindle whorl (S1611).

Fig. 57 Area 9 – building [1150] (photo S. Rzepka)

About 3 m to the north-east of building [1150] another building, [1199], was found. It was only partially excavated, as most of it lay outside the excavated area. The structure seems to have been similar to building [1150].

The area between the two buildings consisted of several layers likely associated with these structures. The lower one was silt-rich layer (1198), which contained some animal bones, shells, pottery sherds, and three pottery discs (S1633, S1635, S1636). Above it was a layer of clay (1194), which yielded a large number of pottery sherds, some animal bones, and shells. On top of the layer of clay was a thin walking level (1196) with some ashes.

Another interesting structure probably connected with buildings [1150] and [1199] was a circular cut <1174> found about one meter to the north of building [1150]. The cut was made exactly inside silo [1256] built during the 19th Dynasty (phase E3, see above). Apparently the inhabitants of the Third Intermediate Period settlement dug a pit in the ground (maybe to prepare a place for a structure of the same type as [1150], which had a floor sunk deep into the walking level), stumbled upon the walls of an old but very well built silo and decided to adapt it to their own purposes. They must have discovered the silo by chance, as surely no walls of this structure were visible on the surface at that time – they had been leveled at the beginning of the 20th Dynasty and then covered by building [834/838]. The silo was emptied of debris and all the original deposits in order to obtain a structure similar to [1150]: a round building sunk deep into the ground. This effect was achieved without building new walls. After some time the cut filled with several layers. The lower layer (1257/1581) contained a large amount of ashes, pottery sherds, several completely preserved pottery vessels (mostly typical Third Intermediate Period bowls, Fig. 58), and one grinder (S1677). This deposit was covered by layer (1177), which consisted mainly of sand. The last layer (1173)

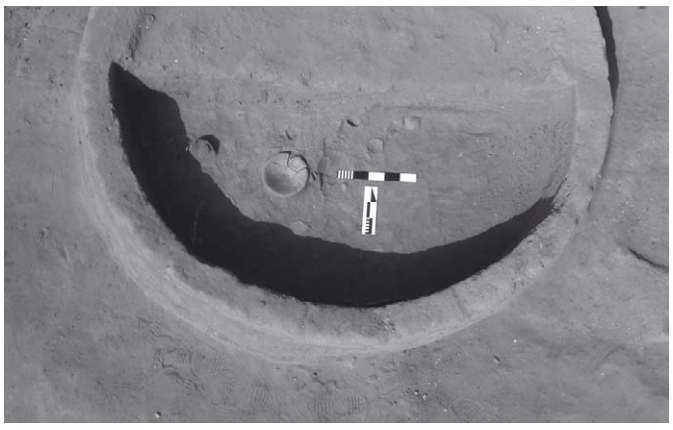


Fig. 58 Area 9 – Third Intermediate Period deposits inside reused 19th Dynasty silo [1256] (photo S. Rzepka)

contained some ashes, animal bones and pottery sherds.

Discussion

The above-described structures are unusual compared to other Third Intermediate Period architectural remains from Tell el-Retaba. In previous seasons, settlement remains were found in Areas 2, 3, 5, 6 and 9: remnants of houses consisting of rectangular rooms, as well as a stable, also rectangular in plan. Structures [1150], [1199] and <1174> are different in two respects: they are circular in plan and they are sunk deep into the surrounding occupational level (their floors were at least 0.5 m below the walking levels outside). The circular shape could suggest that the structures were grain silos,[90] but the finds inside [1150] and <1174> clearly testify against such an interpretation. In [1150] there were 3 large storage vessels dug into the floor and in <1174> large amounts of pottery vessels. A storage function still seems to be the most probable – these structures were probably not grain silos, but cellars for the storage of products requiring cool conditions. The structures are fairly spacious, so presumably they belonged to a large house or houses, but because above-ground TIP remains are almost completely obliterated in this area, this must remain a speculation.

1.5.6. Settlement (Area 4, phases C, B)

JH, MO, VD

Traces of intensive Third Intermediate Period occupation, already documented in 2009–2011,[91] were found in Area 4 by the northern tower of the migdol. During surface clearance just east of this tower, a recent pit cutting through the ancient occupational layers was detected. This irregular pit, dug out most probably during the Egyptian excavations conducted on the site in 1980s, was filled with wind-blown sand containing some pottery and objects, including fragments of stone vessel (S1702), faience bead (S1705), and fish bones.

The section of the pit revealed a sequence of alternating layers - clay floors (altogether 7 layers) separated by sand deposits (altogether 10 layers).[92] Almost all of these stratigraphic units can be dated to Third Intermediate Period-Late Period[93]. Their character and position might suggest some relation to the road (at least 5 meters wide) discovered in 2009. The road ran east-west, from the migdol to the so-called 'temple' excavated by Petrie[94].

1.5.7. Settlement (Area 7, phases C, B)

Several occupational layers and some fragmentary remains of mud brick structures dated probably to Third Intermediate and Late Period were spread throughout the excavated part of Area 7 to the west of "Wall 2". These layers were partly mixed with or laid directly over 18th Dynasty remains. With the exception of the fortification "Wall 2", no other preserved remains of the 19th–20th Dynasty have been found in the area so far. They could have been removed already in ancient times during the construction of the fortification wall, or may have disappeared more recently due to the erosion of the tell.

The excavated layers yielded several bronze and faience fragments, flint tools, grinders, shells and one fragment of a calcite ointment cup S1731 (Fig. 59).[95] Remarkable is the large number of flint

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90 Cf. Arnold 1997, 135–136. According to Arnold, round grain silos had floors slightly sunk below the ground level. In none of the silos excavated in Tell el-Retaba so far was such a feature observed.

91 Rzepka *et al*. 2011, 135–138; Hudec in: Rzepka *et al*. 2014, 69–70.

92 Due to the destruction of the eastern portion of this stratigraphy, it cannot be determined if these floors and sand layers were situated in an open or closed space. Pottery obtained by excavation of these layers may provide a finer chronological division of the Third Intermediate Period settlement.

93 With the exception of some pottery from the reign of Ramesses II in layer [1300] most probably constituting a secondary deposit in this location.

94 Rzepka *et al*. 2011, 136–137, Fig. 9.

95 Vandier d'Abbadie 1972, 114–115, no. 468, dated to the Late Period.

Fig. 59 Fragment of calcite ointment cup S1731 (photo R. Rábeková)

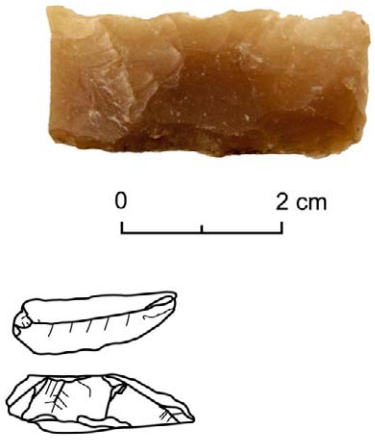

Fig. 60 Flint tool S1707 (photo R. Rábeková, drawing L. Kováčik/Ľ. Hudáková)

tools representing various types, including borer (S1720),[96] flint core (S1722) and blade adjustment (S1730).[97] Documented already in previous seasons, albeit mostly in older layers,[98] they testify to the frequent occurrence and long-lived usage of flint tools (probably very often a secondary one) in this region as late as in the Third Intermediate and Late Period (Fig. 60).

The tang end of a chisel (S1769)[99] was found in (1345) datable to the Third Intermediate Period. An artefact with a similar morphology, referred to as a "point", was published from Tell el-Dabᶜa.[100]

1.6. Ottoman Period (Area 9, phase A)

PS

The surface of the site was heavily damaged by a large number of cuts (Fig. 61). Most of them are round or ovoid in shape, some are irregular. Almost all of the cuts were filled with yellow aeolian sand, but some of them have traces of human and animal activity. Two of the cuts contained ovens.

Oven [1219] was found inside cut <1126> in square Y215X110. The cut was filled by two layers. The upper one, (1125), consisted of fine aeolian sand in which some traces of animal dung and fragments of pottery were found. The lower layer (1218) consisted of loose, greyish brown ash mixed with fine sand and mud brick debris. Inside, some relatively recent organic material was found. The layer was probably associated with oven [1219], most of which was inserted in the ground, cutting through archaeological layers. A part of the cut was closed off with a fragmentarily-preserved wall from the northern side. Currently the wall's thickness is approximately 0.16 m or less and its height does not exceed 0.21 m. Originally the front of the structure was closed with a semi-circular mud brick wall, and a thick layer of baked clay formed a dome furnished with an inlet hole over the oven. The upper part of the structure was completely destroyed. The oven measured about 0.42 m in diameter and was preserved to a height of about 0.58 m.

The second oven [1221] was found inside cut <1142> in square Y210X105 (Fig. 62). The cut was

96 Tillmann 2007, 214, Taf. 22, no. 2.

97 Tillmann 2007, 225, Taf. 33, no. 1.

98 Hudec in: Rzepka *et al*. 2014, 53–54, Fig. 25; Dubcová in: Rzepka *et al*. 2014, 60–61, Figs. 35–37.

99 L. 25.4 mm, W. 1.3 g.

100 Philip 2006, 127, Fig. 58.3.

Fig. 61 Area 9 – modern cuts; marked Ottoman ovens [1219] and [1221] (photo S. Rzepka)

filled by two layers. The upper one, (1141), consisted of loose, fine sand with some traces of animal dung and fragments of pottery. The lower layer (1222) consisted of compact brown mud brick debris, which probably accumulated after the oven [1221] ceased to be used. Within were several fragments of the dome from the oven's superstructure, as well as a pipe (S1607+1627, Fig. 63). This pipe, together with several similar objects found in the vicinity, permits us to date both ovens to the Ottoman Period. The oven [1221] was built in the same way as oven [1219]. Its back side seems to have been cut into a layer of mud brick debris as if to form a niche. The maximum preserved height of

Fig. 62 Area 9 – Ottoman oven [1621] (photo S. Rzepka)

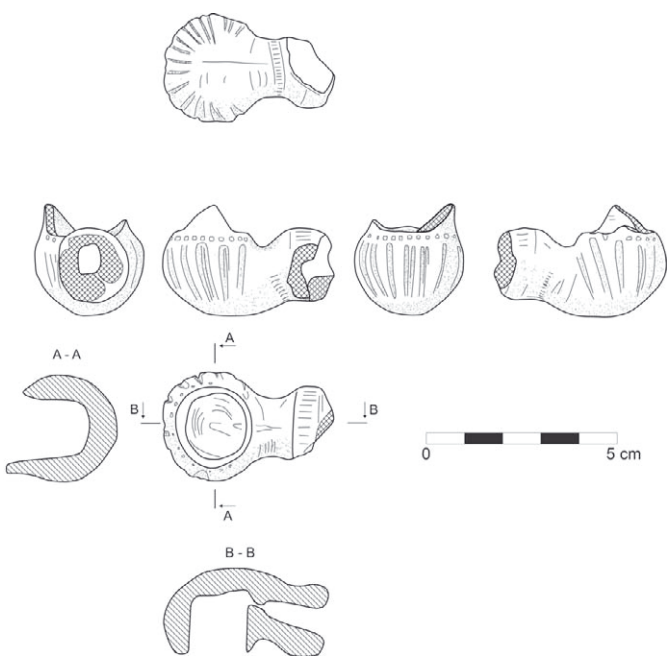

Fig. 63 Pipe S1607+1627
(photo S. Rzepka, drawing B. Adamski)

the oven is about 0.54 m. The front was closed with a semi-circular wall that seems to have consisted of one course of mud bricks or of a thick layer of clay. Its maximum preserved thickness is about 0.21 m and its maximum preserved height is about 0.26 m. Probably the oven originally had a dome with an inlet hole, as did [1219]; their fragments were found next to the wall in (1222). The inner surfaces of the oven walls were burnt. They were orange in colour probably because of the combustion process. The inlet of the oven was directed toward the west and measured about 0.2 m in width. The oven diameter was about 0.48 m. The upper part of the structure was almost completely destroyed. The deposit inside the oven consisted of ashes mixed with fine sand (1220).

Beside these two structures, excavations in this area yielded eight tobacco pipes from the Ottoman Period. Pipes S1530, S1542, S1549, S1590, and S1602 (Fig. 64) were found in subsurface layer (1). Pipes S1905 (Fig. 65) and S1911 (Fig. 66) were found in two cuts <1499> and <1497> located in close proximity to one another.

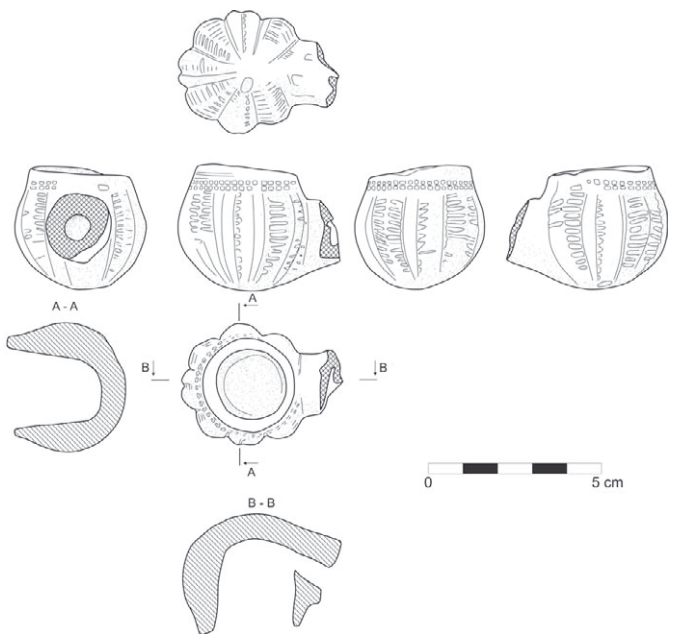

Fig. 64 Pipe S1602 (photo S. Rzepka, drawing B. Adamski)

Discussion

Archaeological material suggests that the numerous cuts in this area should be dated to modern times. Some of them may have been made by *sebbakhin*. Remains of ovens and tobacco pipes allow the dating of some of them to the Late Ottoman Period.

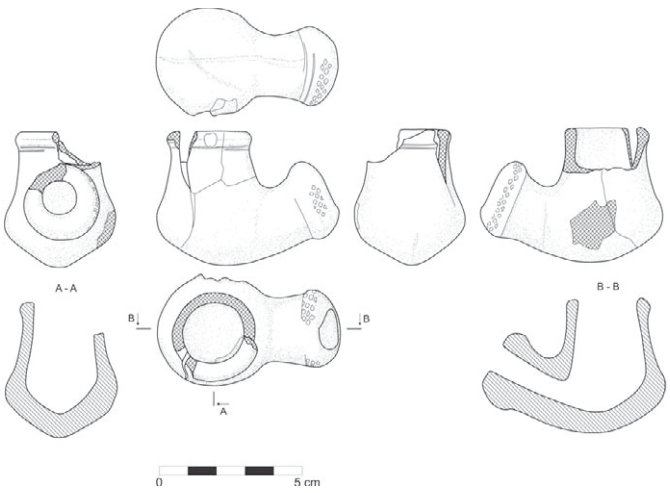

Fig. 65 Pipe S1905 (photo S. Rzepka, drawing B. Adamski)

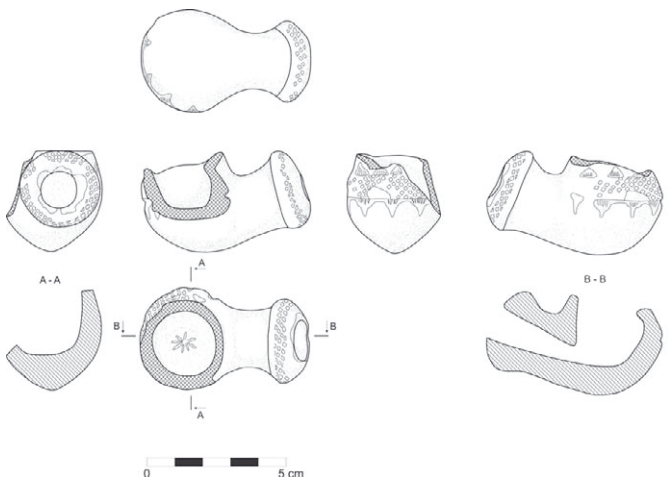

Fig. 66 Pipe S1911 (photo S. Rzepka, drawing B. Adamski)

All pipes belong to the rounded bowl type.[101] Their outer surfaces are decorated with geometric motifs (simple or crossing lines, zigzag lines, lattices or triangles), which were incised, impressed or moulded. They were probably manufactured in Egypt, but a more specific place of origin is unknown.

Almost all of pipes were made of fine Nile clay with very fine and occasionally organic inclusions, fired to shades of brown and grey. Only one, S1607+S1627, was made of fine marl clay with occasional small white and micaceous inclusions[102] fired to beige. All of them have surfaces slightly polished by use.

The oldest pipe S1607+1627 is dated to the end of the XVIIth century or the beginning of the XVIIIth century.[103] Pipe S1530 is too damaged to determine its date, but it seems to come from the XVIIIth century or later. Five pipes S1542,[104] S1549,[105] S1590,[106] S1602,[107] and S1911[108] are dated to the XVIIIth century or the beginning of the XIXth century. The last one, S1905, is dated to the middle of the XVIIIth century.[109]

Seven of the pipes lack manufacturer's marks. In one case (S1911) a stamp impression inside the bowl (on the bottom, where the tobacco was placed) shows a rosette. However, the function of this mark is not entirely clear and it might also be a part of the decoration. Typically, craftsmen's signs were placed on the shank/neck of the pipe. Presumably the reason for this is that both the shank end and the surface of the bowl were decorated, while the neck was left unmarked. Any smooth and undecorated surface was suitable for a craftsman's mark. A lack of craftsmen's marks on Tell el-Retaba pipes suggests an early date for these finds because at the end of the XVIIIth century almost all known pipes were marked.[110]

The absence of remains of domestic architecture suggests that the area was abandoned in the Ottoman times. Ovens and archaeological material may suggest that *sebbakhin* pits functioned as temporary shelters for people reclaiming mud bricks from ancient structures, pasturing animals or just moving between villages. Nomadic Bedouin may have also used such temporary shelters.[111] The discovery of a large number of pipes in a relatively small area suggests that more of them may be discovered in the future in other parts of the site.

2. Tell el-Retaba 2014, pottery material overview

AW

During two seasons of work at Tell el-Retaba, 5403 diagnostic pottery fragments were recorded, 485 from areas 4 and 7, and 4918 from area 9.

Areas 4 and 7

Areas 4 and 7 located in the western part of the site contained the earliest occupational layers dated to the Hyksos period. Remains of a Hyksos settle-

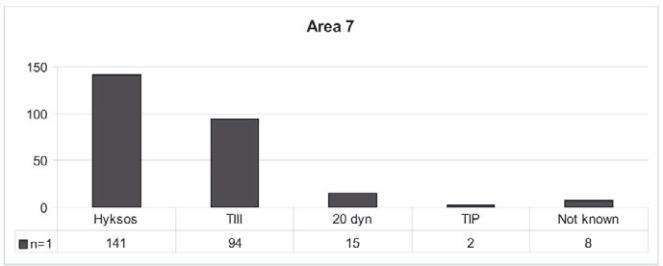

Fig. 67 Area 7 – number of diagnostic fragments divided by period (processing A. Wodzińska)

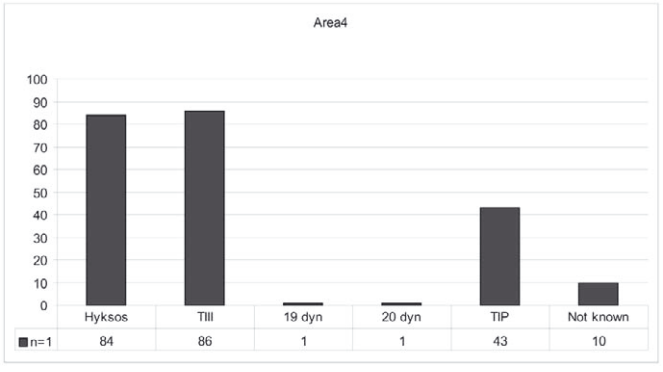

Fig. 68 Area 4 – number of diagnostic fragments divided by period (processing A. Wodzińska)

[101] Saidel 2008, 60; Robinson 1985, 153.

[102] According to Anna Wodzińska.

[103] Vincenz 2011, 45, fig. 1 - similar to B3018.

[104] French 2011, 224, Add. 75 - similar to no. 2.3.

[105] French 2011, 227, Abb. 78 - similar to no.12.6 and 228, Abb. 79. similar to no. 12.9.

[106] No parallels to this pipe were found, but it seems to be similar to others in fabric, workmanship, shape, size, and the angle between the bowl and the shank.

[107] Vincenz 2009, 134, fig. 8.6: 36 - similar to no.36 Type J-18J-B.

[108] French 2011, 224, Add. 75 - similar to no. 4.1, and 230, Abb. 81 - similar to no. 12.22.

[109] Pradines 2004, 290, fig. 9 - similar to Barq-509–43; Ward and Baram 2006, 147, fig. 4 - similar to S1.

[110] Robinson 1983, 268.

[111] The presence of Arab nomads has been observed during Napoleon's expedition to Palestine in 1799 (cf. Saidel 2008, 65).

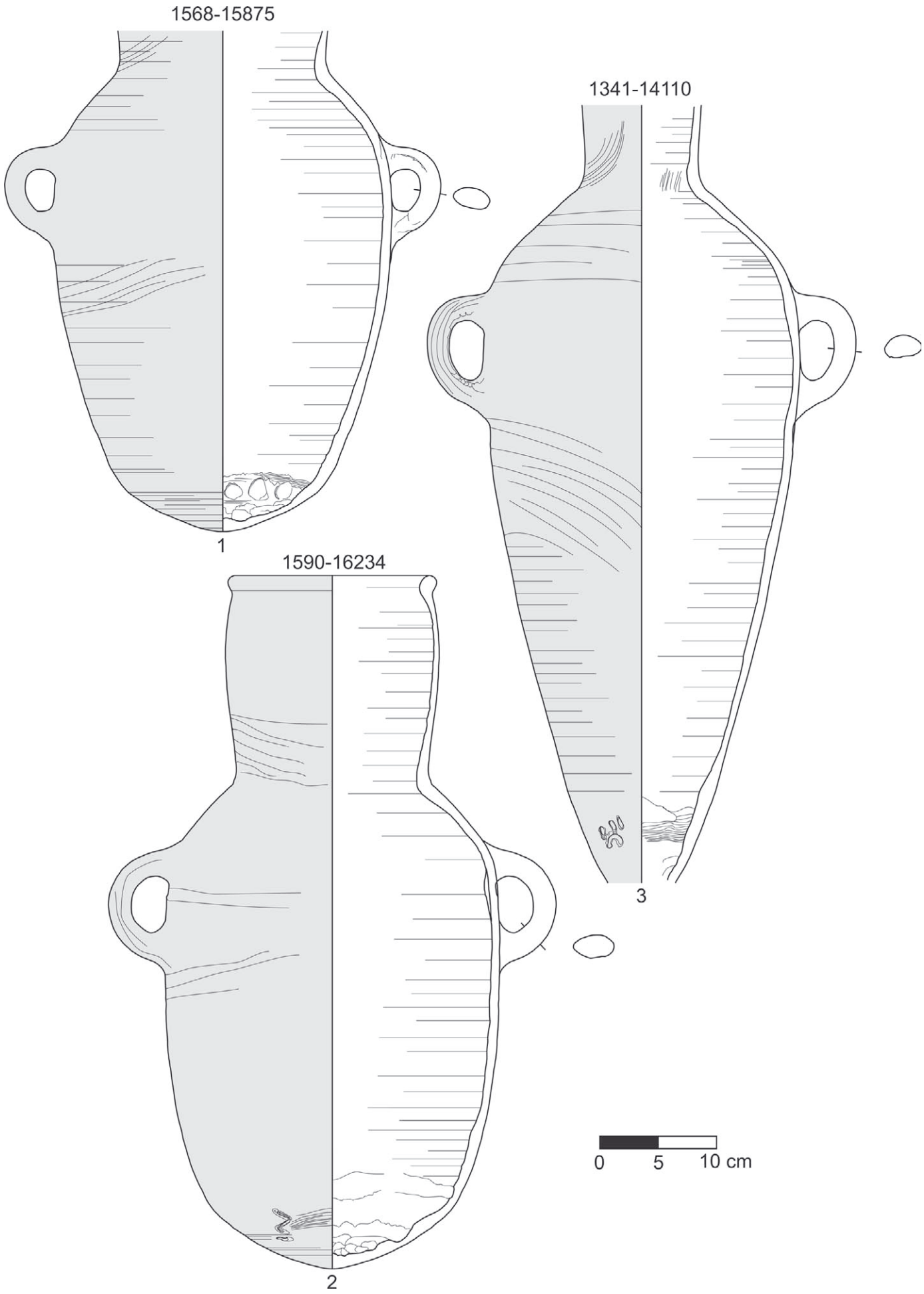

Fig. 69. Amphorae used as coffins, 19th Dynasty.
All pottery drawings by B. Jakubowska, A. Poniewierska, A. Ryś, K. Trzcińska, and A. Wodzińska; digitized drawings and photos by A. Wodzińska. Vessel numbers are composed of two elements: the first represents the stratigraphic unit, the second the pot number.

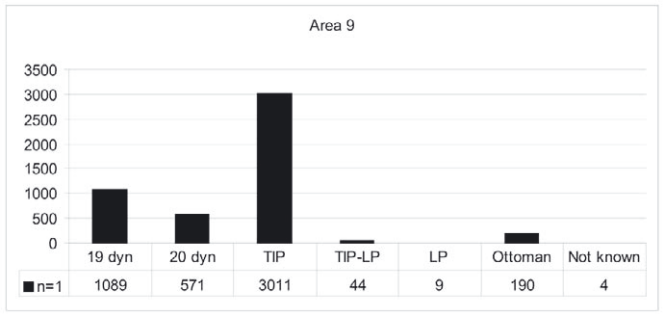

Fig. 70 Area 9 – number of diagnostic fragments divided by period.

ment, already discovered in 2012,[112] were cleared further, bringing 225 diagnostic pottery fragments in total (Figs. 67 and 68). Just above the Hyksos contexts, structures dated to the early 18th Dynasty were excavated uncovering more material (180 diagnostic fragments) already known from previous seasons.[113] The top layers of areas 4 and 7 also included pottery from the 19th (1 fragment) and 20th (21 pieces) Dynasties, as well as the Third Intermediate Period (45 fragments) (Figs. 67 and 68).

Areas 9 and 4 – infant cemetery

Pottery of the 19th Dynasty in areas 9 and 4 was associated with two contexts, funerary and domestic. The funerary assemblage is closely connected with the infant cemetery already discovered during previous seasons.[114]

During the 2014 season, three large amphorae made of marl D fabric and covered with a burnished creamy slip (Fig. 69) were found. The amphorae were used as coffins for children (see above). The vessels represent two different forms: barrel shaped vessels with round bases made on a mold (Fig. 69.1–2, from area 9), and ovoid jars (Fig. 69.3, from area 4). Both of them can be securely placed among early Ramesside pottery. Analogies have been found in Qantir.[115] Two jars

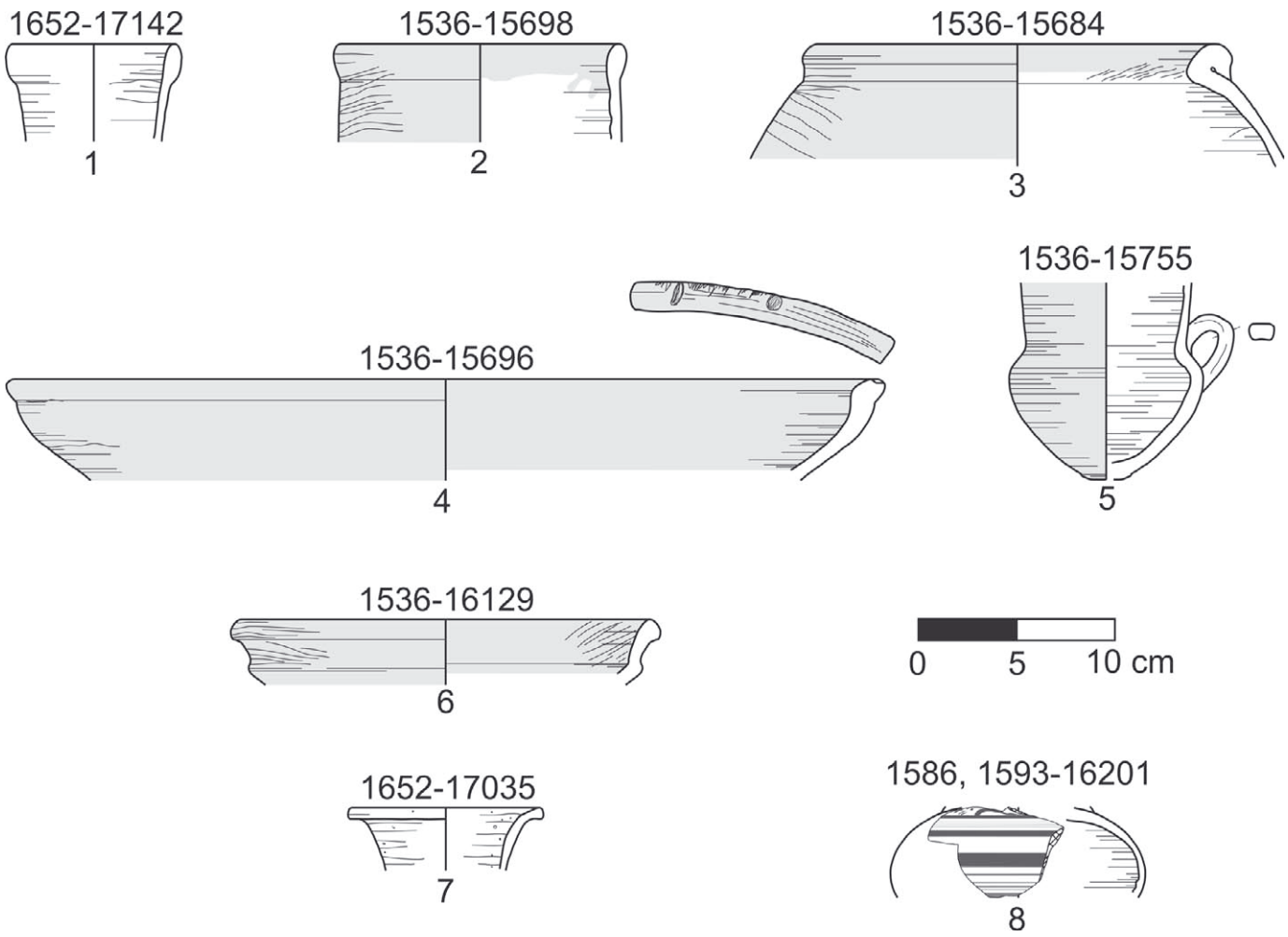

Fig. 71 Selection of pottery from the reign of Ramesses II, nos. 1–6 made of marl fabric, no. 7 – rim of Cypriot base ring, and no. 8 – fragment of Mycenaean stirrup jar.

[112] Rzepka *et al.* 2014, 52–56 and 97–98.

[113] Rzepka *et al.* 2014, 56–64, 98–101.

[114] Górka and Rzepka 2011.

[115] See Aston 1998, 474 for amphorae with round bases, and 497 for ovoid.

carry potmarks placed at the base before firing (Fig. 69. 2–3). This practice is also very well known from Qantir.[116]

Area 9

Pottery found in area 9 came from five general periods including the 19th and early 20th Dynasties, as well as the Third Intermediate Period, Late Period and probably Ottoman period (Fig. 70).

The 19th Dynasty assemblage seems to be especially interesting. Apart from the infant cemetery, it can also be clearly associated with the building activity of Ramesses II. Contexts dated to that period yielded very rich ceramic material, which

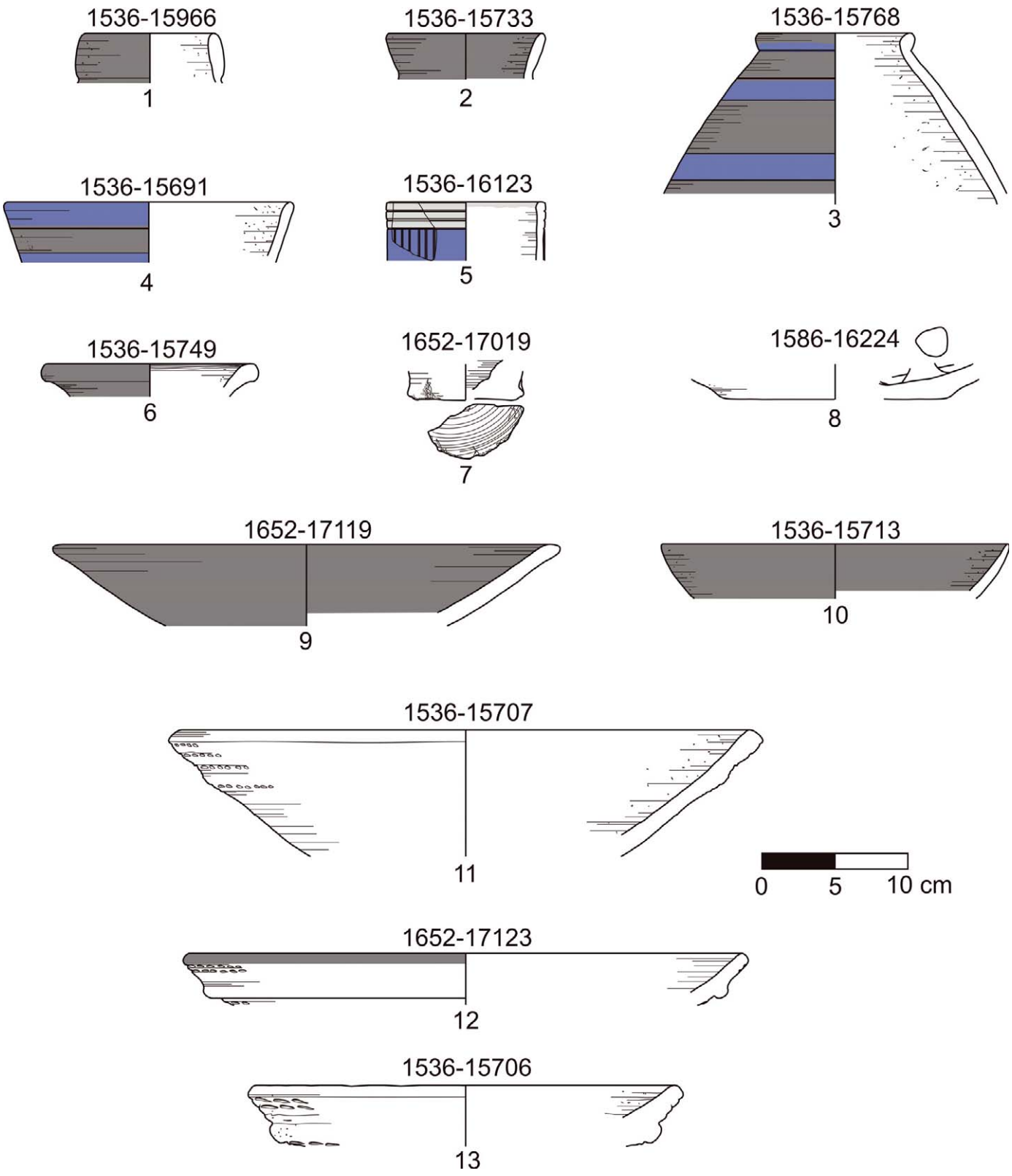

Fig. 72 Selection of pottery from the reign of Ramesses II, vessels made of Nile fabrics.

[116] Aston 1989, 474, nos. 1789, 1791 for round bases; and 477, nos. 1793, 1794 for bases of ovoid amphorae.

comprises both Egyptian forms (Figs. 71.1–6 and 72) and imports – Cypriot (Figs. 71.7 and 73) and Mycenaean (Figs. 71.8 and 74).

The Egyptian forms represent very diverse forms of marl vessels (Fig. 71. 1–6) including amphora rims (Fig. 71.1 made of marl fabric F,[117] and Fig. 71.2 made of marl D[118]) and pots made of marl D with creamy slip; storage vessels – so-called meat jars[119] (Fig. 71. 3), bowls with thickened rims[120] (Fig. 71.4), carinated bowls[121] (Fig. 71.6), and goblets with one handle[122] (Fig. 71.5). All of them are well-known early Ramesside vessels. The best parallels come from Qantir.[123]

Fig. 73 Fragments of Cypriot vessels found in 19th Dynasty layers.

There is also a very large group of vessels made of Nile fabrics (Fig. 72), especially of a very sandy variant of Nile B2 fabric. The group includes red-slipped jars with thickened (Fig. 72.1) and simple flaring (Fig. 72.2) rims. The jars made of Nile fabrics often have blue, black and red painted decoration (Fig. 72. 3–5). One of these jars with a simple rim and cylindrical neck was creamy slipped and bore three incised horizontal lines below the rim, as well as many vertical lines on the neck (Fig. 72.5). Structures built during the reign of Ramesses II, excavated during the 2014 season contained notably more blue painted ves-

Fig. 74 Fragments of Mycenaean vessels found in 19th Dynasty layers.

117 See Aston 1998, 506–507.
118 Aston 1998, 472–473.
119 Aston 1998, 478–487.
120 Aston 1998, 466–467.
121 Aston 1998, 468–469, nos. 1720–1723.
122 Aston 1998, 488–489, nos. 1917–1918.
123 Aston 1998.

sels than contexts excavated in previous seasons: 39 fragments [SU 1259, 1260, 1265, 1536, 1549, 1576, 1586, 1652] were found during the 2014 season and only one in 2012.

Among the Nile fabric pots it was possible to identify some pot stands with red slipped external surfaces[124] (Fig. 72.6), beer jar sherds (here a base in Fig. 72.7[125]), and a base fragment of a weaving bowl[126] (Fig. 72.8). The material also comprises many red slipped bowls made of Nile B2 fabric including specimens with flaring rims[127] (Fig. 72.9), hemispherical bowls[128] (Fig. 72.10), and deep basins with ledge and horizontal lines of string impressions on external surfaces[129] (Fig. 72.11–13). One of them has a red painted rim (Fig. 72.12).

The Ramesses II pottery group also contained two fragments of Cypriot Base Ring imports (Figs. 71.7 and 73). One of them is a fragment of a bull's head (Fig. 73) with an applied eye and at least four white painted horizontal lines (stratigraphic unit (1593)). A very similar fragment was found in Tell Burna.[130]

A number of Mycenaean vessels, probably stirrup jars (Figs. 71.8 and 74), were represented by three fragments of handles, two knobs and three body sherds [SU 1586, 1593, and 1652]. The fragment depicted in Fig. 71.8. can be compared to forms dated to LH IIIB[131] or LH IIIC[132] periods. It is a body sherd with traces of one handle. The creamy surface of the pot is painted with brown horizontal lines. The top of the sherd bears traces of a floral pattern (see the largest sherd in Fig. 74).

TIP

The largest pottery group is the assemblage from the Third Intermediate Period. The material comprises pottery types already known from previous seasons except one very particular vessel. It is an almost complete jar in the shape of a pomegranate made of Nile B1 fabric with a red slipped bur-

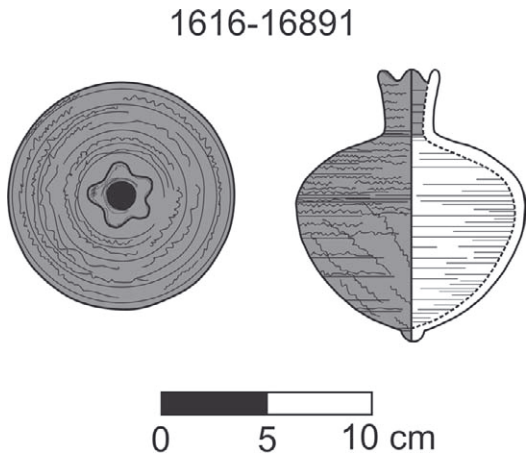

Fig. 75 Vessel in the shape of a pomegranate, Third Intermediate Period.

Fig. 76 Vessel in the shape of a pomegranate, Third Intermediate Period.

Fig. 77 Vessel in the shape of a pomegranate, Third Intermediate Period.

[124] For comparison see for instance Rose 2007, 186, type SA 1.3.
[125] Aston 1998, 184–185.
[126] Rose 2007, 203, types SD 6.2 and 6.3.
[127] Aston 1998, 220–230.
[128] Aston 1998, 232–237.
[129] Aston 1998, 164–165.
[130] See https://telburna.files.wordpress.com/2013/12/20131218_102939.jpg
[131] Mountjoy 1993, 85, Fig. 197.
[132] Mountjoy 1993, 94, Fig. 241.

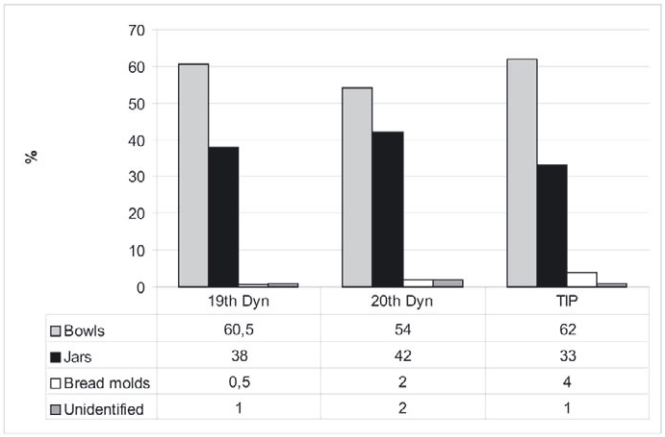

Fig. 78 Relative occurrence of general groups of pottery from area 9, divided by period (processing A. Wodzińska).

nished external surface (Figs. 75–77). Its size corresponds well to that of a real fruit (see Fig. 76). Its internal surface was partly covered with a white substance of unknown origin. This is a very exceptional vessel. Its shape was very common during the New Kingdom, when jars shaped like pomegranates were made of glass and faience.[133] A silver pomegranate jar was found in the tomb of Tutankhamun.[134] Commonly the vessels were associated with fruitfulness and fertility.[135]

The overall pattern of relative occurrence of general ceramic groups within three main occupation phases in area 9 (Fig. 78) is very similar to the one traced in previous seasons. It has been

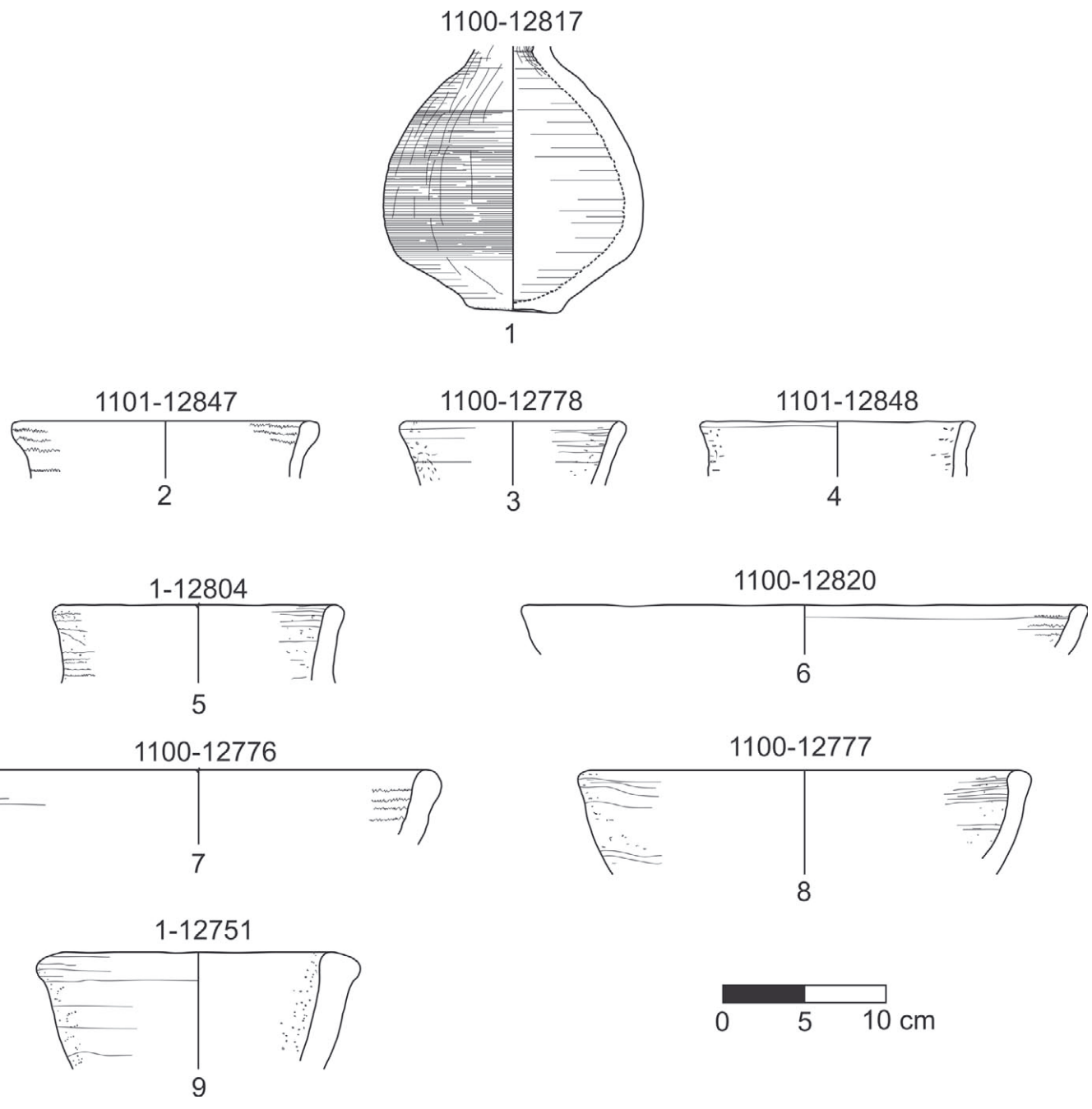

Fig. 79 Pottery probably associated with the Ottoman period.

[133] Caubet 2008, 425.
[134] Reeves 2006, 197.
[135] Caubet 2008, 425.

observed that for the 19th and 20th Dynasties slightly more closed forms (including storage and transport jars) are recorded than for the Third Intermediate Period. Another difference is visible in the relative appearance of bread moulds, which rarely occur in all periods but are the least frequent in New Kingdom layers, especially those dated to the 19th Dynasty. The pattern probably reflects regular domestic activities such as preparation of food and some bread baking, although probably bread was rarely baked in moulds. As it was already stated before,[136] very little cooking activity has been observed in the New Kingdom structures.

Area 9, material associated with Ottoman ovens

A very interesting group of pots came from the latest occupational phase of the site, probably dated to the late Ottoman period. The dating of the material is based on the analysis of ceramic pipes found in the same context.[137]

One vessel is a wheel made jar of fine Nile fabric with a well-smoothed surface (Fig. 79.1). The pot was found filled with organic material, which turned out to be tobacco seeds.[138]

The rest of the group consists of hand-made fragments of jars and basins with burnished dark red and brown surfaces (Fig. 79.2–9). All of them were made of a Nile fabric with numerous small particles of grog. The vessels clearly form a very homogenous assemblage, which appears to have come from the same workshop. Some of them bear traces of burning, so perhaps they were used as cooking pots.

3. Anthropological analysis

AŠ

3.1. Skeletons from the Second Intermediate Period graves

3.1.1. Skeleton (1425) (tomb [942])

3.1.1.1. Preservation: Almost complete, slightly damaged skeleton of a young individual.
3.1.1.2. Morphological characteristics: Damaged to fragmentary, medium robust *cranium*, with mild to moderate muscular relief (MR). Skull indicates *arcus superciliares* in *norma frontalis*, a transient *margo supraorbitalis,* obliterated *sutura metopica*, shallow *fossae caninae*. The glabella of the skull is moderately marked in *norma lateralis*, the *os zygomaticum* is moderately high, with an irregular surface; the *processus zygomaticus* is higher and stronger; the *processus retromarginalis* is large. *Processi mastoidei* in *norma occipitalis* are medium. The seams are mostly open. The *synchondrosis sphenooccipitalis* is closed. The fragmentary mandible of median fabric and median MR has a prominent chin side. Simple *foramen mentale* is identifiable on right side below P1 - P2; the *spina mentalis* is pin-shaped, the rather everted mandibular angles have slight ridges. The *margo inferior* below M2 and the *processus articularis mandibulae* are median. The *trigonum mentale* is formed by a mild bilateral protuberance. The completely preserved teeth are only slightly worn, tooth abrasion ranges mainly from 0 (of incisors) to the 2nd degree (of molars).

Small to medium-sized vertebrae are damaged, gracile to medium robust (7 cervical, 12 thoracic, 5 lumbar). There are Schmorl's nodes on cranial and caudal surfaces of the bodies of thoracic and lumbar vertebrae – i.e. traces of premature degenerative vertebral column injury (Fig. 80). Present are fragments of the *os sacrum* with a medium-sized and loose *os coccygis*. The injured *os sternum* has a small, narrow and loose *manubrium* and a long, narrow corpus, which consists of two parts. The *processus ensiformis* is loose. Damaged and fragmented ribs are gracile to moderately

Fig. 80 Skeleton (1425), man, adultus I. (20 – 25 years), Schmorl's nodes on lumbal vertebrae bodies – i.e. traces of premature degenerative vertebral column defect. (Photo A. Šefčáková)

[136] Wodzińska in Rzepka *et al*. 2014, 116.
[137] See P. Sójka above.
[138] Claire Malleson, personal communication.

Fig. 81 Skeleton (1425), man, adultus I. (20 – 25 years), expressive *impresio ligamenti costoclavicularis* on medial extremities (*extremitas sternalis*) of both clavicles – the effect of heavy physical work. (Photo F. Engel)

robust. Collarbones are well preserved, almost intact, gracile to moderately robust with medium MR and small curvature. The left clavicle is longer, both clavicles have a significant *impresio ligamenti costoclavicularis* (Fig. 81). Observation of fragments of scapulae revealed an adherent *acromion* (accrete at the age of about 16 to 22 years) on the right scapula and a non-adherent *acromion* on the left one. Damaged, moderately robust arm bones have medium MR, proximal adherent-in-progress epiphysis, distal adherent epiphysis, and perimeters of boneheads measuring 137 mm (R) and 133 mm (L). Spindle bones are damaged and fragmentary, gracile to moderately robust, with median MR; their distal epiphyses are partly fused. Damaged *ulnae* are gracile to moderately robust with median MR; the proximal epiphyses are synostosed, and the distal ones are partly fused. The brachial index value (Tab. 1, R1 : H2) is in the category of *mesoceric* (the forearm is of medium length) and falls within the range characteristic for negroids[139]. The majority of small *carpalia*, all medium-sized *metacarpalia* and almost all *phalanges* are preserved.

Pelvic bones are damaged and fragmented with a weak to moderate MR, the edge of the *os ilium* is not fully adherent, *tuber ischiadicum dx.(*?) is almost completely adherent. The *fossa iliaca* is higher and narrower, the *sulcus praeauricularis* is narrow and shallow (a part is damaged), the *arc composé* has a smoothly continuous curvature, the *facies auricularis* has a rather acute angle without reduction. The *incisura ischiadica major* is narrower on the right and wider (?) on the left (bilat-

[139] Aiello 1981, 420–422.

Tab. 1 Postcranial characteristics of young man skeleton (1425) (according to Bräuer 1988; in mm; R - right, L - left)

Sex	**Man**	
Age	**A1 (20 - 25)**	
Humerus	R	L
1.	324	328
2.	320	318
5.	21	18
6.	17	15
7.	58	52
8.	136	133
9.	41	41
10.	44	43
6. : 5.	81.0	83.3
7. : 1.	17.9	15.9
Radius	R	L
1.	251	
1b.	249	
2.	238	
3.	39	37
4.	14	14
5.	11	11
3. : 2.	16.4	
5. : 4.	78.6	78.6
Ulna	R	L
1.	269	259
2.	241	232
3.	34	
11.	12	12
12.	15	15
3. : 2.	14.1	
11. :12.	80.0	80.0
R1. : H2	78.44	
Femur	R	L
1.	441	
2.	438	
6.	22	23
7.	26	27
8.	81	
9.	34	34
10.	24	
18.	43	44
19.	44	44
8. : 2.	18.5	
6. : 7.	84.6	85.2
10. : 9.	70.6	
19. :18.	102.3	100.0
Tibia	R	L
1a.	388	
8.	29	
8a.	32	
9.	21	
9a.	21	
10b.	73	
9. : 8.	72.4	
9a. : 8a.	65.6	
H1 : F1	73.47	

Fig. 82 Skeleton (1425), man, adultus I. (20 – 25 years), *patellae* with the notch *incisura vastus lateralis* located on the exterior edge. (Photo F. Engel)

eral differences!). The relief represents *symphysis ossis pubis* I.

Femurs are damaged, moderately robust, with median muscle relief without pilaster; the right femur is hyperplatymeric, with traces of proximal epiphysis accretion. Such traces are missing on the left femur. The *linea aspera* is weak. The vertical diameter of the right *caput femoris* is 43 mm and of the left 44 mm. A facet (small pad) is visible on the right front of the *collum femoris*. The well-preserved *patellae* are rather small, each with an *incisura vastus lateralis* located on the exterior edge (Fig. 82). Long bones of the right foreleg are damaged, the *tibia* is medium robust, the *fibula* is gracile and both show median MR. The *tibia* has adherent epiphyses, small retroversion, a distal knuckle facet and a median cross section of the V-type. Medium-sized *tarsalia*, long *metatarsalia* and some *phalanges* are preserved.

3.1.1.3. Metric characteristics: see Table 1

3.1.1.4. Variations and pathological changes: Schmorl's nodes occur on the cranial and caudal surfaces of the bodies of thoracic and lumbar vertebrae. A notch, *incisura vastus lateralis*, is found on the edge of each *patella*.

3.1.1.5. Conclusion: The morphology of the bones and the adhesion/fusing of the epiphysis on long bones seem to indicate a young man, approximately 168 cm tall (above median height), in the adultus I age group (20–25 years) at the time of death. Traces of degeneration are visible on the vertebral column. This fact, together with very pronounced *impressio ligamenti costoclavicularis* on the clavicles, may have been caused by heavy physical work. The notches on *patellae* might be consequences of excessive crouching (?).

3.1.2. Skeleton (1432) (burial [1431])

3.1.2.1. Preservation: Damaged, very gracile skeleton of a child with weak muscle relief (MR); parts of the axial skeleton are missing.

3.1.2.2. Morphological characteristics: The mandible is missing from the fragmented skull. The *ale majores* and *corpus sphenoidalis* identified but not conjoined; the front petal and the *sutura frontalis* are open. Remains of deciduous teeth: the maxillary *dens incisivus* 61 developed a complete crown, the first right molar (54) has an incomplete crown.

3.1.2.3. Metric characteristics: Diaphysis lengths of long bones: *humerus sin.* 77 mm; *radius dx.* 57 mm, *radius sin.* 62 mm, *femur sin.* 92 mm, *tibia dx.* 77 mm, *sin.* 78 mm.

3.1.2.4. Conclusion: Child, age 0–3 months (circumnatale).

3.1.3. Skeleton (1446) (burial [1428])

3.1.3.1. Preservation: A distal portion of the lower extremities of an adult: two parts of the *tibia sin.*, distal epiphysis of *fibula sin.*, *phalanx I. sin.*, diaphysis of *tibia dx.*, distal part of the fibular epiphysis, damaged tarsal bones, two fragments of a distal part of femoral epiphysis *dx.*(?).

3.1.3.2. Morphological characteristics: The distal parts of the lower extremities exhibit gracile to medium robustness; relief muscle insertions undetectable. Adherent distal epiphysis of *tibia sin.* and epiphysis of *phalanx I. sin.*; the diaphysis of *tibia dx.* is noticeably laterally flattened (transversal diameter in middle 15 mm, sagittal diameter in middle 29 mm, index of cross-section in middle of diaphysis is 51.7).

3.1.3.3. Conclusion: An adult female?

3.2. Skeletons from 19th Dynasty burials

3.2.1. Skeleton (1372) (burial [1372])

3.2.1.1. Preservation: A distal part of the lower limbs of a child.

3.2.1.2. Morphological characteristics: Gracile distal parts of lower extremities with weak muscular relief: both sides – *calcaneus, talus, os cuboideum, os cuneiformes lat., os cuneiformes intermed.* Four metatarsals without proximal epiphyses, distal tibia epiphysis *sin.*, distal phalanges, medium phalanx of a first toe.

3.2.1.3. Metric characteristics: Length of *calcaneus dx.* 35 mm, *calcaneus sin.* 34 mm.

3.2.1.4. Conclusion: 3- to 4-year-old child (*infans* I).

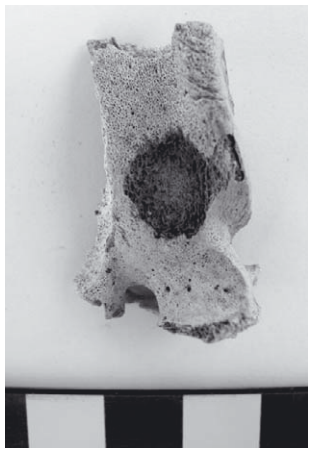

Fig. 83 Skeleton (1341), child, circumnatale (0 – 3 months), cranium, *os sphenoidale dx*. regular and circular damage (10 × 10 mm), a pathological lesion? (Photo A. Šefčáková)

3.2.2. Skeleton (1341) (burial [1333])

3.2.2.1. Preservation: Almost completely preserved skeleton of a very gracile child with weak muscular relief (MR); the surfaces of the bones are eroded.
3.2.2.2. Morphological characteristics: The back *fontanella* on the fragmentary skull is open. The two halves of the mandible are unfused. Approximately in the central part of the *os sphenoidale dx*. there is a regular circular aperture (10 × 10 mm, a pathological lesion?) (Fig. 83). A partially eroded *lamina externa* (anaemia?) is visible on the flat part of the bone.

Unerupted primary dentition. Maxillary incisives 51, 52, 61 and first molars (54, 64) developed complete crowns; incisives 52 and 61 also have parts of the necks. Incomplete crowns are developed in the right-side canine (53) and second molar (55?) of the *maxilla*. Arcs of well-preserved vertebrae are not conjoined. The bones of extremities are also present.
3.2.2.3. Metric characteristics: Diaphysis lengths of long bones: *humerus dx.* 75 mm, *sin.* 74 mm; *radius dx.* and *sin.* 61? mm, *tibia dx.* 76 mm, *sin.* 74? mm, *femur dx.* 89 mm, *sin.* 88 mm. Dimensions of *os ilium* c) *dx*. 39 mm, *sin.* 40 mm; d) *dx.* 32? mm, *sin.* 34 mm.
3.2.2.4. Conclusion: Child, age 0–3 months (*circumnatale*).
3.2.2.5. Animal bones: Two fragments of a dog (?) *mandible dx*., weathered and partially burned.

3.3. Anthropological analysis of the findings from season 2011

3.3.1. Skeleton (609) (burial [609[, early 20th Dynasty[140]

3.3.1.1. Preservation: Heavily damaged, fragmentary, very gracile skeleton of a child with weak muscle relief (MR).
3.3.1.2. Morphological characteristics: The maxillary *incisivus* 61 developed a complete crown.
3.3.1.3. Metric characteristics: Diaphysis lengths of long bones: *humerus sin.* 67 mm; *tibia dx.* and *sin.* 67 mm.
3.3.1.4. Conclusion: Child, age 0 ± 2 months (*circumnatale*).

4. Geology of the Tell el-Retaba site – a preliminary report

JTrz

Introduction

The Tell el-Retaba archaeological site is situated in a long, natural depression, extending as an elongated, E–W-oriented structure between Cairo on the River Nile and Ismaïlia on Lake Timsah.[141] This natural depression is a wadi, a flat and wide ephemeral river valley in a desert area. The Tell el-Retaba site is located in Wadi Tumilat, which has a total length of about 52 km and a width between 2 and 9 km; in the easternmost tip of the western area it is known as Ras el-Wadi.[142] This is a natural tributary extending to the east from one of the main ancient branches of the Nile known as the Pelusiac Branch.[143] In the past, Wadi Tumilat was not only one of the waterways for floodwater of the Nile Delta but also a bridge between the ancient centre of Egypt situated right adjacent to the Nile in the southern part of the Delta and the Sinai Peninsula, the north-eastern part of the Delta and the Levant area.[144] So far, detailed geological research was not conducted in Wadi Tumilat and in the Tell el-Retaba site, and the geological data on the youngest Holocene of the area are rather scanty.[145] In turn, archaeological investigations have been carried out here in the last few years, recently by the Polish-Slovak archaeological mission.[146]

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140 See Rzepka *et al*. 2014, 67–68.
141 Moshier and Hoffmeier 2015, 101–108.
142 Redmount 1989, 1–38.
143 Bietak 1975, 88–90; Redmount 1995, 127–135.
144 Butzer 1976, 22–38.
145 Said 1993, 69–78; Butzer 1959, 46–67.
146 Rzepka *et al*. 2008; 2009; 2011; 2014.

Locality of the investigations

In 2014, during a season of the Polish-Slovak mission, geological investigations were carried out twice in the Tell el-Retaba site: in April and in September. At first, the investigations were focused in the west area of the site, separated by a modern asphalt road from the east site. In September the investigations generally concentrated in the east area and its margins.

The west area constitutes only a small part of the site; it is triangular in shape with the longer side along the modern road to the east. This road crosses the entire site, dividing it into the west and east areas. Along the south-western boundary occurs an old asphalt road which surrounded the site prior to the construction of the modern road. This road reaches to the buildings located in the north-westernmost part of the west area, and in the south-easternmost part connects with the modern road.

The topography of the site is variable. To the north and north-east occurs the highest ground forming a distinct hillock, and the surface of the area gently dips to the south-west. Beyond the old road, the surface is flat and intended for farm-

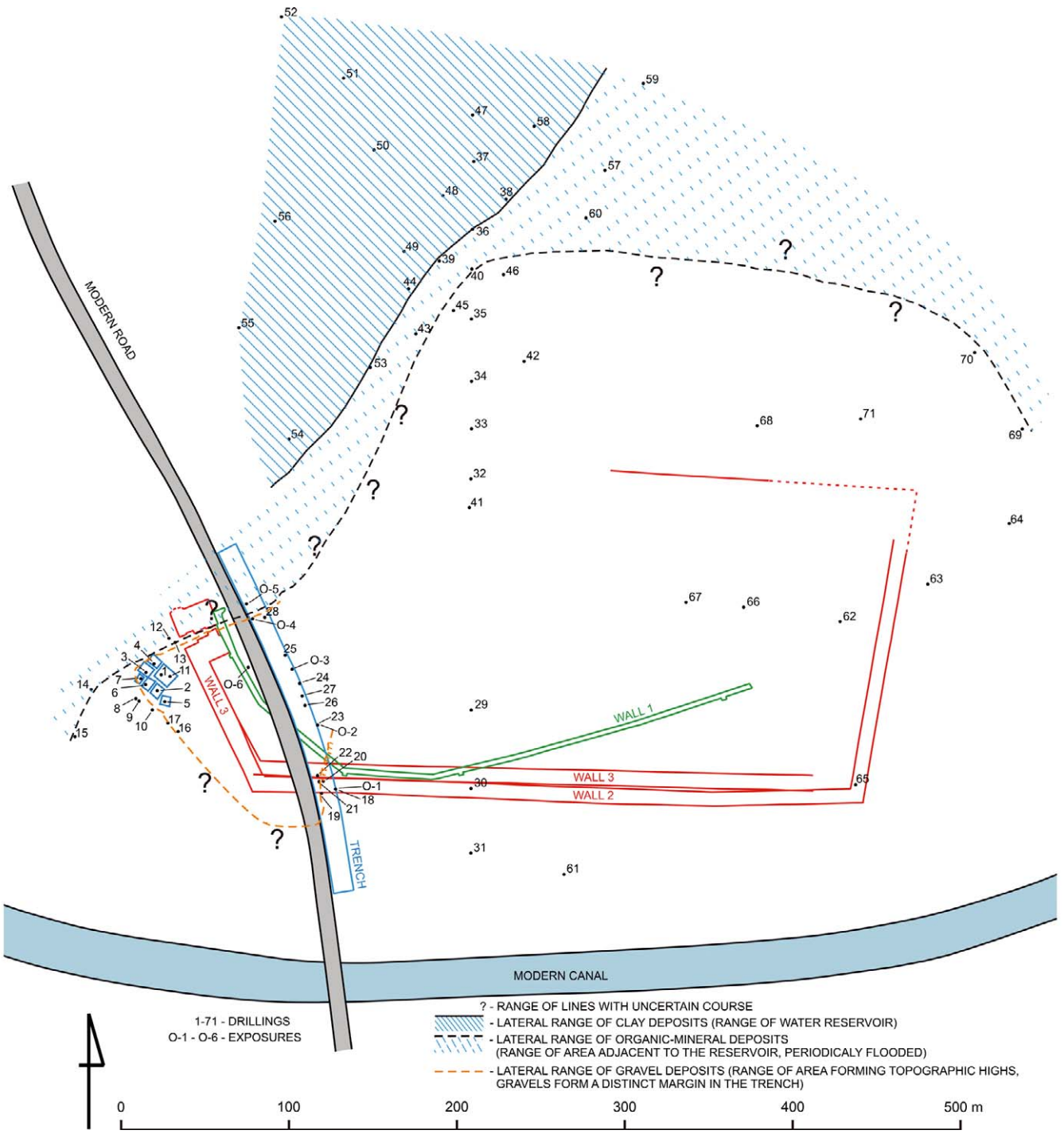

Fig. 84 Location map of the Tell el-Retaba archaeological site – geological drillings made during the 2014 season (1÷71 drillings, O-1÷O-6 – exposures) (drawing Ł. Jarmużek)

lands. In the western part of this area trenches were dug for a sacral object. The walls of these excavations were used as sections to describe the exposed beds. Additionally, drillings were made in the floor of each excavation to deepen the succession. A total of seven excavations has been made in the area, four to the south-west, two to the north-west, and the largest between the NW and SW trenches. A total of 17 drillings were made in the west area, 8 in the excavations, two above the excavations to the north-east, five along a dirt road and two beyond the buildings in the north-eastern part of the area with farmlands (Fig. 84).

In the spring season, preliminary investigations were also commenced in the east area. At the boundary with the modern road, this area is cut by a several metre deep trench extending along the road. The eastern and western walls of the trench are continuous sections, which cut the entire east area of the site (Fig. 85). The trench is approximately N–S-oriented and in the north terminates with an arc bent to the north-west. Five sections have been located in the trench (exposures O-1 to O-5); their walls were cleaned and the sections were deepened by an excavation and/or drilling. High lithological variability was noted within the trench. In the southern part of the trench, sand beds are generally exposed in the eastern wall and gravel beds generally in the western wall. Additionally, several drillings were made along the trench to determine the lateral range of sands and gravels. Eleven drillings were made in the trench and in the first season a total of 28 drillings was made. The location of exposures and drillings in the east area of the site is shown on the map (Fig. 84).

In September, geological investigations were conducted mainly in the east area and in directly adjacent areas. The east area is restricted from the west by the modern road, from the north it borders with a bazaar and a dirt road to the village, from the east with village premises and from the south with a modern channel. The highest elevation occurs in the central part of the area, from where the surface dips to the north, east and south. To the west it is flat ground extending to the trench along the modern road, from where it dips to the west area of the site. To the north the area gently dips to the lowest area covered with dense vegetation, and then slightly elevates and becomes flat (Fig. 86). To the east the surface dips less gently and becomes flat. From the north-east the area of the

Fig. 85 Trench along the modern asphalt road located on the western margin of the east area (photo J. Trzciński)

site continues into a large field of sand dunes forming a distinct transverse dune (Fig. 87). Aeolian deposits partly cover the gently dipping northern slope of the site and the surface in its central part, and continue to the west in the west area of the site. Geological investigations in the second season concentrated on drillings to map the east area. A N–S-oriented line was delineated across the site, along which the drillings were made. In the flat area to the north, the drillings covered the entire area surrounding the site, lying to the west and east from the N–S line. Similar surface map-

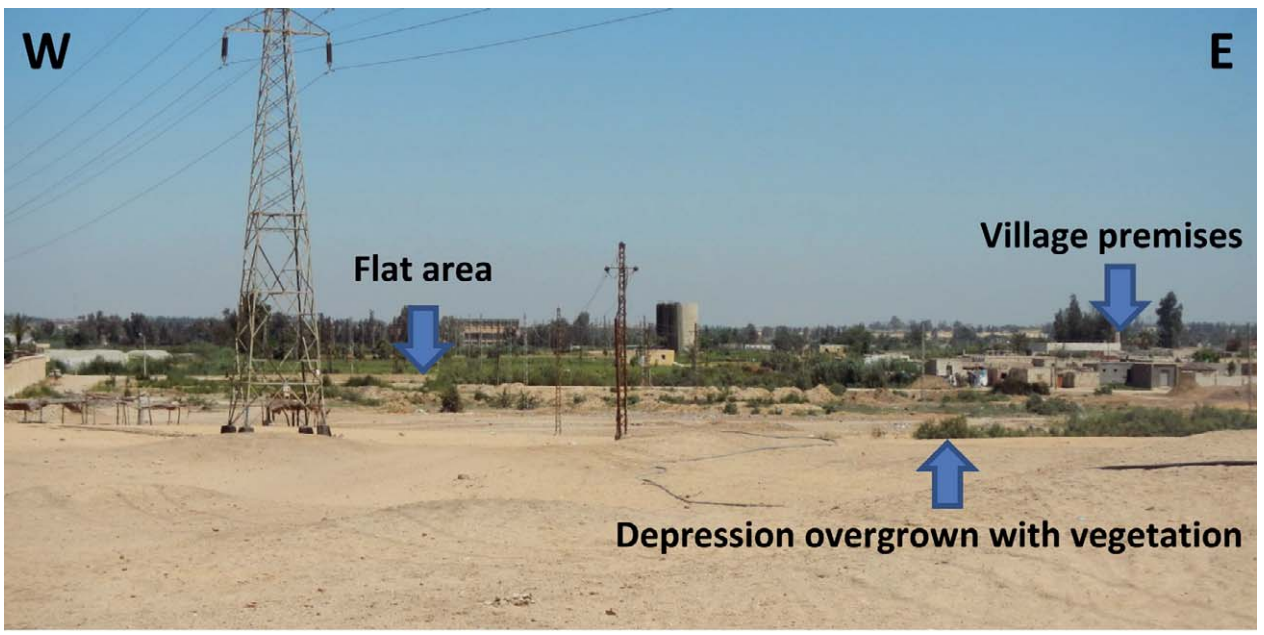

Fig. 86 East area of the site – view from central point towards the north (photo J. Trzciński)

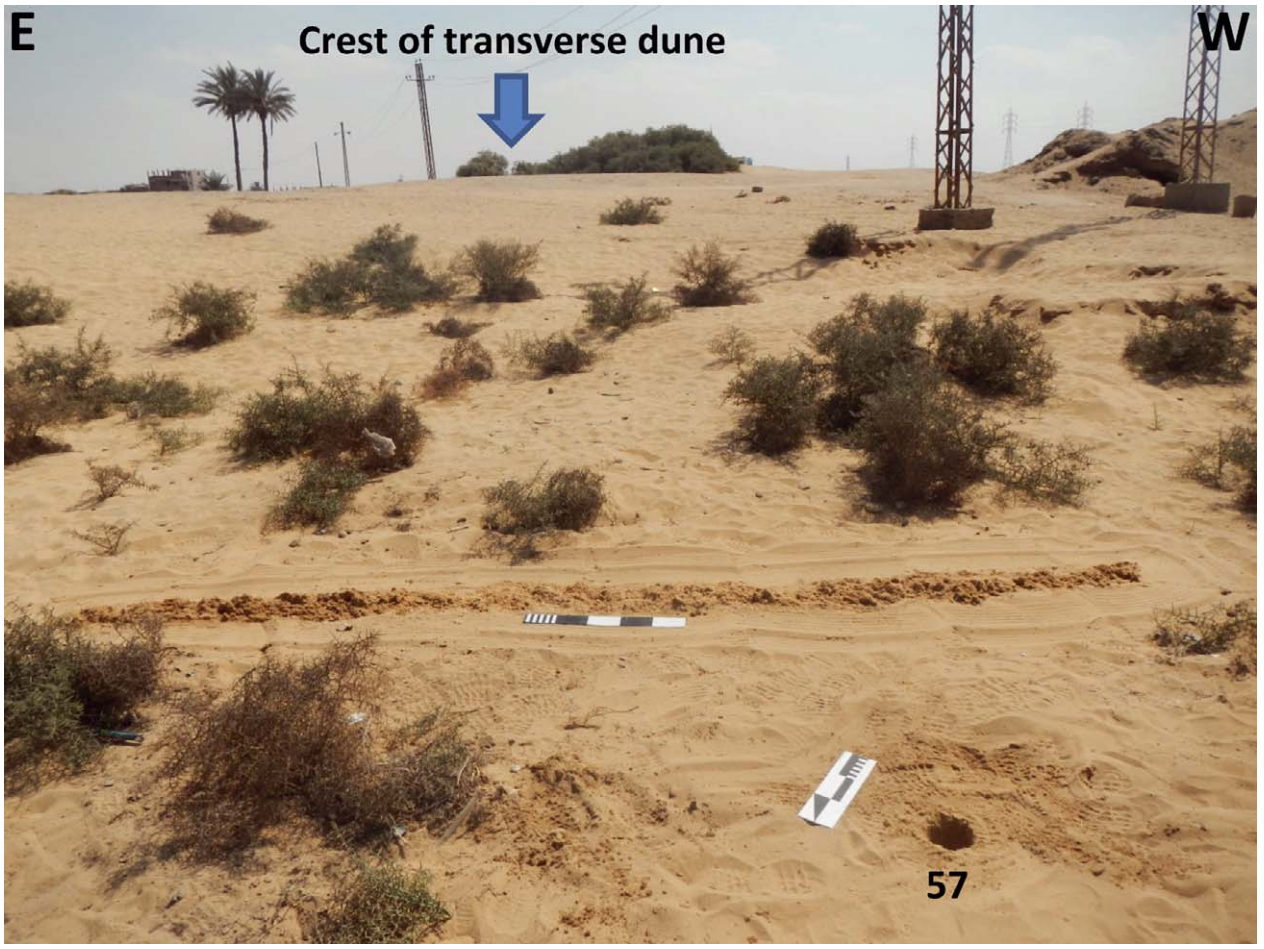

Fig. 87 North-eastern margin of the site. View towards the south on a NE-SW-oriented elongated dune field with a transverse dune overgrown with palm trees. Drilling no. 57 (see Fig. 84) visible in the lower part of the photograph (photo J. Trzciński)

ping was conducted in the flat area to the east, between the dune field, the village premises and the local channel. A total of 43 drillings was made in September; additionally one exposure was described (exposure O-6), located to the east of the west area near the modern road. The location of all drillings and exposures is presented on a map (cf. Fig. 84).

Deposits occurring in the site and in the adjacent area

Sand facies

The sand facies are exposed in the eastern part of the trench in the east area of the site and are particularly visible in exposure O-1 (cf. Fig. 84). The sand beds can be sub-divided into units differing in lithology and origin (Figs. 88, 89). The sands contain abundant, unevenly distributed pebbles. The pebbles are well-rounded to subangular, rarely angular. The 5–10 cm thick gravel interbeds are often visible. The sands are poorly laminated with the exception of the uppermost beds.

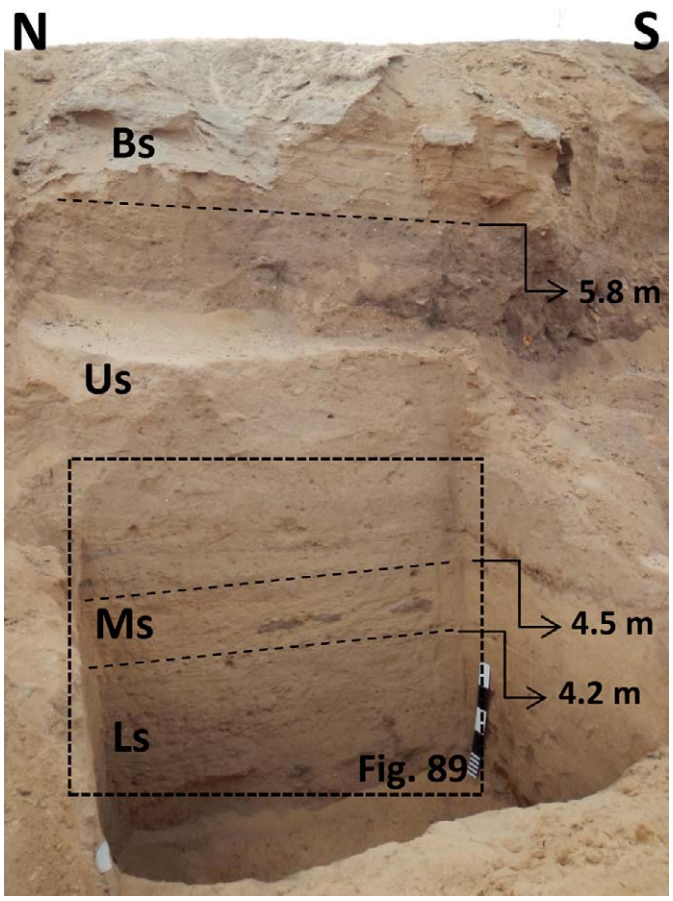

Fig. 88 Exposure O-1 – general view with sub-division into units: Ls – lower unit, Ms – middle unit, Us – upper unit, Bs – bedded unit. Relative position of unit bases and tops is shown on the right side of the photograph (approximate value above sea level). Detailed description in text (photo J. Trzciński)

Lower unit

The unit is 70 cm thick (cf. Figs. 88, 89). The sands are grey-yellow in colour and have indistinct bedding. In the lower part occur numerous gravels; they are randomly distributed or form oblique, S-dipping beds. The gravel beds contain randomly distributed, ash-coloured clay intraclasts (Fig. 89). The upper part of the unit contains 5 cm of distinctly laminated sands, emphasized by gravel. The deposits do not contain calcium carbonate (do not react with HCl).

Middle unit

The unit is 30 cm thick (cf. Figs. 88, 89). The sands are light-yellow in colour, have a nodular structure, and their tops and bases are indistinct. The beds dip to the south-west. The sands contain elongated, horizontally lying brick fragments. The brick fragments have strongly eroded top surfaces. Grain surfaces are frosted. The deposits do not contain calcium carbonate (do not react with HCl).

Upper unit

The unit is 130 cm thick (cf. Figs. 88, 89). The sands are grey in colour, passing upwards into light-grey and grey-black, and are composed of beds differing in grain size and uneven boundaries, dipping to the south at about 5°. The beds are emphasized by thin silt horizons. The uppermost beds are grey-black, massive or with poorly visible lamination, and comprise fine gravels, and fragments of pottery and bones. The deposits do not contain calcium carbonate (do not react with HCl).

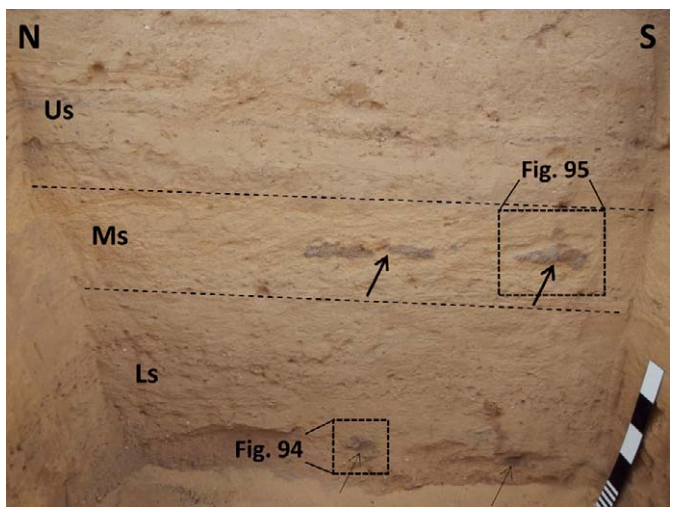

Fig. 89 Fragment of exposure O-1 marked in Fig. 88. Lower unit shows fragment of ash-coloured clay (marked with thin arrows) and middle unit shows fragments of mud bricks (marked with bold arrows) (photo J. Trzciński)

Bedded unit

This is the uppermost unit, attaining 60 cm and with distinct lamination emphasized by alternating light-grey to dark-grey horizons (cf. Fig. 88). The lighter layers are sandy and reach 2–5 cm in thickness, and the dark layers are clayey and are 0.5–2 cm thick. Occasionally gravel beds also occur. Pebbles are evenly distributed in the entire unit. The beds dip to the south. In horizontal cross-section the clay beds are strongly fractured (Fig. 90); exposure of their tops shows fractures on the surface in horizontal cross-section (Fig. 91). The fractures are rather unclear due to the crumpled top surface. The contribution of clay beds decreases towards the top, where they are replaced by sand beds with a small admixture of pebbles and pottery fragments. The unit does not contain calcium carbonate (does not react with HCl).

Fig. 90 Transversely fractured clay beds (arrowed) in the trench located to the south of exposure O-1. Dashed line marks the exposure of the horizontal surface in Fig. 91 (photo J. Trzciński)

Fig. 91 Exposed horizontal surface of the clay bed with desiccation cracks (photo J. Trzciński)

Synclinal structure

On the opposite side of exposure O-1, a synclinal structure is visible in the western wall of the trench (Fig. 92). The syncline limbs are gently bent upwards at their ends, and the syncline axis is W–E-oriented with a gentle western dip. In the thickest part, the syncline is 60 cm thick and extends on a distance of about 4 m. In the lower part of the structure occur sands with gravel and numerous pottery fragments. Towards the top the syncline is filled with interbeds of clay and sand. The clay beds are thicker, 2–3 cm, and the sand beds reach a thickness of 0.5 cm. The clay beds contain vertical cracks with the upper tips slightly curled towards the top (Fig. 93). The structures are similar to those observed in the opposite side of the trench in the strongly laminated unit (description above). Close to the axial part of the syncline occurs a small dome-shaped structure, composed of sands with pottery fragments (cf. Fig. 92).

Drilling no. 18

The drilling was made in the floor of exposure O-1 (cf. Fig. 84), additionally deepened due to the pres-

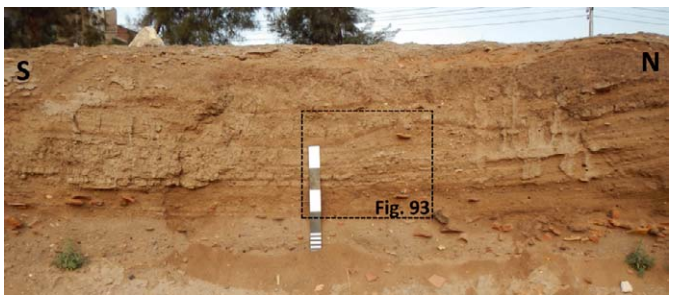

Fig. 92 A larger part of the synclinal form in the western wall of the trench (photo J. Trzciński)

Fig. 93 Fragment of the synclinal form marked in Fig. 92. Clay beds with transverse fractures (desiccation cracks) with upturned edges (arrowed) (photo J. Trzciński)

ence of the groundwater table. The log is dominated by poorly sorted, light-coloured sands with grains 0.1–1 mm in size. Interbeds of gravel with 5 mm pebbles and grey-brown sand occasionally occur. The sand grains are polished. At the depth of 1 m occurs an interbed of fine, light-grey sand, with grain size of 0.1–0.5 mm, and rare pebbles with grain size of 5–10 mm. Below occur coarse-grained sands with grain size of 0.5–2 mm and with 3–4 mm pebbles. The grains are polished and the sands do not contain calcium carbonate (do not react with HCl).

Interpretation

The clay fragments observed in the lower unit represent mud balls, very common in this part of the succession; additionally pebbles occur frequently (Fig. 94). These features point to high-energy transport of the material on a short distance, and the nearby presence of clay sediments that were subject to erosion by flowing water and then washed out. This evidences that the deposits were formed due to redeposition of the gezira sands in a relatively more humid and probably cooler climate. Water reservoirs filled with clay sediments must have occurred close to the fortress. These sediments were exposed after water level fall and later washed out with high energy. At that time, water level highs must have occurred; they resulted from more intense supply from the branch of the Nile. This could have been caused by a local increase of rainfall in the Wadi Tumilat area, resulting in a local and short-term cooling, or regional increased rainfall in the Nile River basin, resulting in elevated water levels in the river and its branches.

The characteristic nodular structure occurring in the middle sand unit points to its aeolian origin, and the strongly eroded surface composed of fragments of mud bricks must have been subject to corrosive wind action, which additionally reinforces such interpretation (Fig. 95). The brick fragments are most probably derived from the oldest settlement stage in the site, the Hyksos Period; a cemetery from this period was discovered to the north and north-west of exposure O-1. The frosted surface of quartz grains indicates the aeolian origin of this bed. This means that the sedimentary conditions could periodically become drier, and a slight warming could also have taken place.

The upper unit represent deposits of short-distance surface flows in a clear NE to SW direction. Pottery fragments and bones found in these deposits are related to the functioning of the fortress during the 19th dynasty (Petrie's "Wall 1"). Exposure O-1 was at that time located beyond the fortress walls, and was the site in which all kinds of waste were disposed of. Silt horizons and grey-black deposits of this unit (cf. Fig. 88) probably derive from the erosion and washing out of mud bricks building the defence walls of the fortress. This part of the deposit indicates that again the sedimentary conditions must have changed into more humid with frequent rainfall.

The dismembered clay horizons occurring in the bedded unit represent typical desiccation cracks (mud cracks). They formed after deposition of sand, whose gently S-dipping surface was later covered by clay. The sands were deposited during

Fig. 94 Fragment of lower unit of exposure O-1. Ash-coloured mud ball with admixed pebbles (arrowed) – close-up from Fig. 89 (photo J. Trzciński)

Fig. 95 Fragment of middle unit of exposure O-1. Visible fragment of mud brick with eroded surface (arrowed) – close-up from Fig. 89 (phto J. Trzciński)

a short-term, rapid event in a water reservoir. Next, finer fractions were deposited and clay beds were formed. After such a cycle, a break in sediment supply took place, after which water partly evaporated from the water reservoir and partly infiltrated in the sediment. As a result, the clay bed dried up and cracked due to clay contraction. The destroyed surface of the dried beds points to the erosive activity of water flowing down the slope and carrying sand and clay. This part of the deposits represents diverse sedimentary conditions with short humid periods interchanging with short dry periods. Rhythmic slope sediments described in the eastern wall of the excavation near exposure O-1 probably represent a margin of a depression, which on the opposite wall of the excavation is up to 5 m wide and N–S-oriented. It was a small, shallow reservoir, in which rhythmic sand and clay deposits were accumulated. Each time after filling with water suspension and deposition of the material on the bottom, the reservoir dried up. Such cycles were repeated several (up to 10) times until the reservoir became completely filled with sediments. Its size and infilling with rhythmic sediments indicate a longer humid period with torrential rains interrupted by dry periods. The domination of polished grain surfaces in the entire succession points to the aqueous origin of the sands, whereas grains with frosted surfaces, of aeolian origin, occur sporadically. This unit may be related with the functioning of the fortress from the 20th dynasty (Petrie's "Walls 2 and 3") and the presence of a later settlement from the Third Intermediate Period.

Similar desiccation structures as those described from the upper unit occur also in the synclinal structure on the opposite side of the excavation. Here the clay beds are much thicker, which indicates a more central part of the water reservoir, and their tops are not as destroyed as in those located on the reservoir slopes and observed in the opposite wall of the excavation. The structure was probably formed along "Wall 2", in the southern part of the defence wall of the 20th dynasty fortress. The bed with abundant pottery fragments seems to represent a waste dump from the times of this fortress (Figs. 92, 93). The clay layers within the rhythmic deposits may derive from the destruction of mud bricks washed out by rain, of which the defence wall was constructed.

A drilling made in the floor of the excavation near exposure O-1 showed the presence of typical gezira sands, which originated during the activity of the easternmost branch of the Nile Delta.[147]

Gravel facies

Gravel beds are visible in the western wall of the trench along the modern road near its southernmost tip (Figs. 96, 97), and on the opposite side of the trench, in the eastern wall, near exposure O-2 (cf. Fig. 84) and its close vicinity (Figs. 98, 99). Gravel beds were noted also in drilling logs along the trench, from W 19/14 to W 28/14, and in excavations made in the west area (cf. Figs. 84, 100). The maximal thickness of the entire succession of gravel beds reached about 1 m.

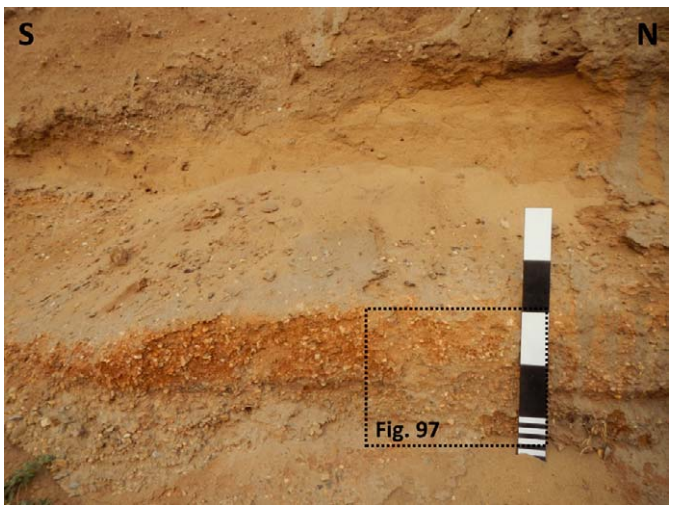

Fig. 96 Gravels exposed in the western wall of the trench on its southernmost end (photo J. Trzciński)

Fig. 97 Gravels – upper, rusty-coloured part. Enlarged fragment of Fig. 96 (photo J. Trzciński)

[147] Bietak 1975, 88–90; Redmount 1989, 20.

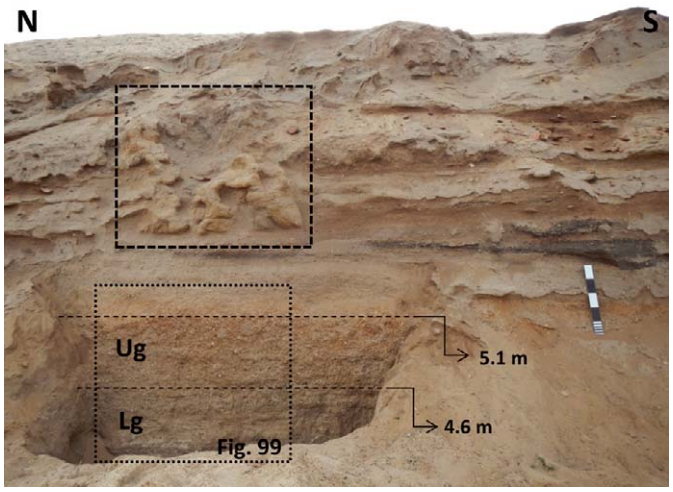

Fig. 98 Exposure O-2 showing gravels in the eastern part of the trench in the east area: Wg-upper bed, Lg-lower bed. Dashed rectangle marks remains of walls of workshops of the 19th Dynasty fortress. Relative position of bed bases and tops is shown on the right side of the photograph (approximate value above sea level) (photo J. Trzciński)

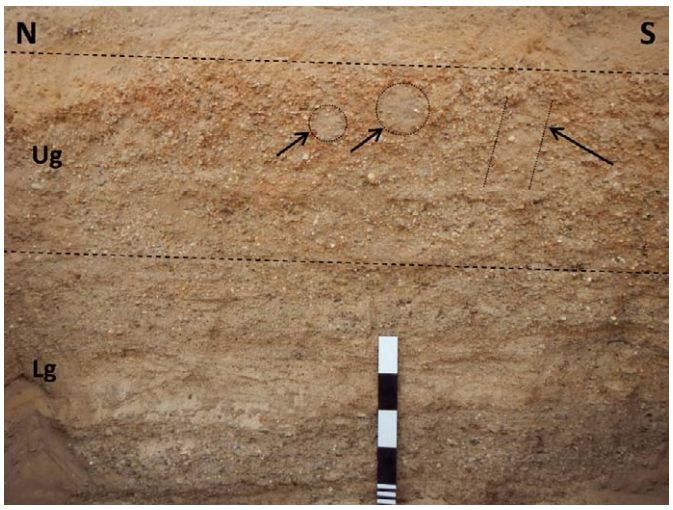

Fig. 99 Close-up of exposure shown in Fig. 98. Note oval structures (two left short arrows) and vertical structure (right long arrow). Detailed description in text (photo J. Trzciński)

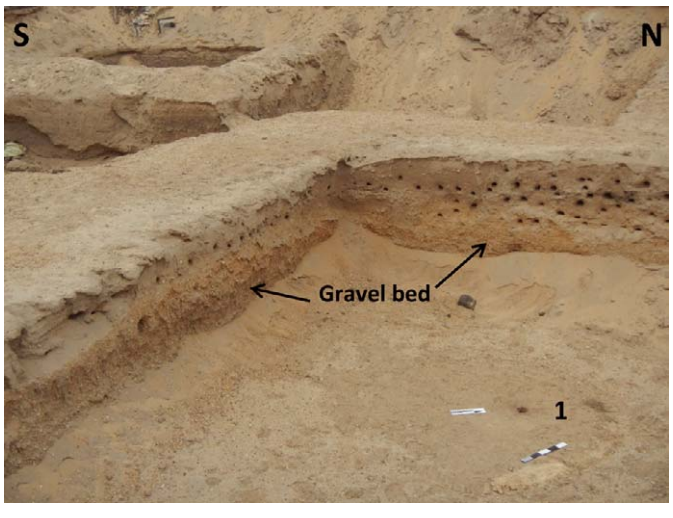

Fig. 100 Salvage excavations in west area with gravel bed exposed. Drilling no. 1 located in the floor of the excavation (photo J. Trzciński)

Western wall of the trench

In the upper part of the succession (Figss 96, 97) the gravels are rusty in colour, and have a variable thickness, maximally reaching 50 cm. The pebbles are usually sub-rounded, but well-rounded and subangular grains, with diverse sizes from 0.5 to 3 cm, have also been encountered; the latter grains are usually bladed. Well-rounded pebbles comprise light-coloured quartz, sub-rounded grains represent light-coloured, dark-coloured and multi-coloured quartz, and sub-angular grains are usually white limestones. Single angular pebbles have also been noted. Limestone pebbles occur abundantly in the upper, rusty coloured part of the gravels. They are concentrations of calcium carbonate and their structure is nodular and friable – the grains fall apart at hand touch. The gravel deposits contain calcium carbonate (they react with HCl).

Upper gravel bed

In exposure O 2/14 the gravels are rusty-coloured and massive in the opposite side of the trench, in the eastern wall (Figs. 98, 99). However, they reveal oval structures close to their top (Fig. 100), infilled with the overlying light-grey sand with gravel. Directly above the rusty gravel bed occurs a lighter rusty coloured bed with a maximal thickness of 50 cm, averagely 10–15 cm, with significantly lower contribution in pebbles and without calcium carbonate (no reaction with HCl). This bed is extremely hard. The light and dark rusty coloured beds are cut by vertical structures (Fig. 100), 5 to 10 cm wide, filled with light-grey sand with gravel. The infilling shows indistinct bedding. The deposits contain calcium carbonate (react with HCl).

Lower gravel bed

The bed occurs below the upper bed, is light to dark grey in colour and shows distinct horizontal bedding (Figs. 98, 99). The transportation directions of the material cannot be determined. Gravel beds are often separated by beds of coarse sands, up to 10 cm thick. Graded bedding has been noted in the gravels and sands. Between the pebbles occur poorly sorted sand grains with sizes within 0.1–2 mm. Quartz grains have polished surfaces in the lower part of the bed and frosted surfaces in the upper part of the bed. The deposits do not contain calcium carbonate (do not react with HCl).

Drilling no. 23

A drilling was made in the floor of exposure O-2 (Fig. 84); the succession was deepened by 2 m and the groundwater table was reached. Till the depth of 0.8 m the log resembles the grey-coloured, lower gravel bed with interbeds of light grey sands. Below, to the depth of 1.1 m occur well sorted, light grey sands, with grain sizes of 0.3–0.6 mm, and with single pebbles 3–5 mm in size. Below, to the depth of 1.5 m the sands are composed of finer grains, they become grey-brown, and comprise silt and brown-coloured clay nodules. Beneath, to the depth of 1.9 m, occur grey silts with few clay particles. The base of this bed is much harder than the overlying deposits. The lowest 10 cm is represented by a soft sediment, saturated with water, represented by yellow-grey, coarse-grained sand with grain size at 0.2–2 mm, mixed with fine sand with grains below 0.1 mm, silt and clay. Mica flakes are common. Quartz grains have polished surfaces in the entire log and the deposit does not contain HCl (no reaction with HCl).

Interpretation

The strong cementation of the gravels lying directly on the rusty gravels in exposure O 2/14 and their lighter colour may indicate long utilization of this bed as the surface of the ground. A similar interpretation can be drawn for the oval and vertical structures infilled with material from the overlying bed. These are traces of utilization which after becoming abandoned were filled with overlying material. The bedding visible in the horizontal structure (Fig. 99) indicates an aqueous infilling. This fact points to a relatively humid period with rainfall. Polished quartz grains in the rusty gravels also indicate the aqueous origin of the sediments, whereas the overlying beds contain grains with frosted surfaces, evidencing aeolian and/or weathering origin. This is additional proof of long utilization of this part of the deposit, which could be subject to local blowing out prior to the period of human activity in the area, that is before the arrival of the Hyksos, who dug their tombs in this deposit. Limestone pebbles, which are concentrates of calcium carbonate, must have originated due to long-term weathering of the gravels in desert conditions, in the period directly preceding the beginning of settlement in the area. The gravels represent the oldest deposits in the Wadi Tumilat area, occurring directly on the gezira sands. The wadi as an erosional depression within the Nile Delta was one of its branches, in which water periodically flew between the Nile and the sea.[148]

Graded bedding in the gravels and sands indicates their fluvial origin and points to an environment with high-energy flow that periodically decreased the transportation energy. The rusty colour and obliteration of primary bedding in the upper part suggest long-term, intense weathering in a dry and hot climate. This part of the succession contains fractured quartz grains, grains with a siliceous coating, and flints with ring structures (alternating substitution of fine-grained silica by coarse-grained, porous silica). These features point to intense surface weathering with large differences between daytime and night-time temperature.

The log of drilling no. 23 suggests that the gravel beds represent the topmost part of the gezira sands. During the development of the ancient Nile Delta, they constituted the final infilling of the area with deposits, which took place at the end of the Neogene. In a subsequent stage, weathering of the surface took place in dry climate and at high temperatures, alternating with humid periods. Next, the surface of gravels and gezira sands was eroded by the overflowing waters of the Nile, which periodically also entered the Wadi Tumilat.

Drilling logs

A significant supplementation to the data on the palaeotopography and palaeogeography of the study area are drillings made in areas directly adjacent to the site. The drilling made in the west area and in the trench across the east area near its western margin have allowed to determine the range and position of the top surface of gravels directly overlying the gezira sands; the range of gravels in the south-western part of the site was described above. Subsequent drillings made in the southern part of the trench, between drillings no. 22 and no. 19 (Fig. 84) have not evidenced the presence of gravels, which are replaced by grey-coloured, poorly sorted sands. Successive drillings made in the trench towards the north (from no. 23 to no. 28) have again pierced through gravels, the thickness of which systematically decreased in this direction. The presumed range of the gravels in the study area is shown in Fig. 84.

[148] Said 1993, 71–73.

Clays were drilled in the northern, lowermost part of the site (Fig. 86). The southernmost occurrence of these deposits is drilling W 36/14 (Fig. 84). A succession of ash-coloured sands with interbeds of clay and plant remains was drilled here. Similar deposits occur in drillings W 38/14 and W 39/14. To the north, the contribution and thickness of clays increases, particularly to the west from the N–S line (Fig. 84). To the east of this line, clay deposits occur in drillings to the north, whereas to the south their contribution is smaller. In the north-eastern part of the site occurs a large transverse dune, extending from the east to the west (Fig. 87). Additionally, the west area also contains thin clay beds; they were encountered in drillings located to the west (nos. 3, 4, 7, 14 and 15) (Fig. 84).

Three drillings nos. 30, 31 and 61 were made in the area located to the south of the site (Fig. 84); they showed the presence of alternating, light- to dark-grey sands, silts and gravels.

Interpretation

In the west area of the site occur discontinuous gravel covers, which form local, small, 1 m high elevations. In the trench, the gravel cover terminates to the south, forming a steep, S-dipping slope. The slope has a NE–SW orientation (Fig. 84). Moreover, diluvia occur at the slope foot; they are slope deposits that originated during gravitational slide of sands and gravel along the slope and their mixing at the slope foot. To the north of the trench, the gravels disappear on a small distance, to reappear again further. In the northernmost part of the trench, gravel beds lying on the gezira sands have a gentle dip. Analysis of gravels from the entire site shows that the deposits formed low, flat elevations with a depression between them. The depressions were periodically flooded with water which left clay sediments. Diluvia formed on the steeper slopes. Most probably, the defence walls of the 19th dynasty fortress were located near the margins of the gravel cover, which may explain the irregular plan of this fortress that probably matched the topography of the area at that time.

Deposits noted in drilling no. 36 point to the presence of a margin of a larger water reservoir (Fig. 84). The ash colour of the sands, a thin clay bed and plant remains found in the sediment point to shallow water overgrown by nearshore water vegetation. Similar deposits were noted in drilling no. 38 located to the east, and drilling no. 39 located to the west of no. 36, which indicates that the reservoir margin extended at the same height more or less perpendicularly to the N–S line. Drilling no. 45 evidenced the same sediments as drilling no. 36, suggesting that to the west the reservoir was deeper southwards. Subsequent drillings to the west of drilling no. 54 indicate that the reservoir extended to this locality and probably beyond the modern road. Such a course of the shoreline is suggested by deposits noted in the west area in drillings no. 14 and no. 15, in which thin clay beds occurred. This was the shallow reservoir margin that surrounded the fortress from the west. It can be assumed the reservoir represent the "ponds of Atum" mentioned in Papyrus Anastasi VI, which were visited by the Bedouins from the Sinai to water their herds.[149] Periodically the reservoir widened or contracted, which is evidenced by the log of drilling no. 40 with alternating clay and sand beds.

The northernmost drillings along the N–S line (no. 47 and no. 48) have the most complete succession of clay deposits, including black, strongly compacted clays. Similar grey-black clays were noted to the east of the N–S line (Fig. 84); they probably occur further to the north from the site, whereas to the east is present a wide, flat area, periodically flooded to the south. The transverse dune occurring in this area confirms an earlier suggestion of a flat ground, which must have been a wetland and was periodically flooded; this is evidenced by thin interbeds of clays noted in the easternmost drillings. Such a wetland was an area, in which aeolian sands were captured and accumulated in form of a dune.

Drillings made to the south of the site indicate only the presence of the gezira sands (nos. 30, 31 and 61). Drilling no. 65 (Fig. 84) made near the corner of the fortress wall from the 20th dynasty (Petrie's Wall 2) in the south-eastern edge of the site has evidenced that in this locality the wall was built directly on the gezira sands. The 20th dynasty fortress has a distinctly different outline than the 19th dynasty fortress. It is much larger and follows the shape of a rather regular rectangle. It seems that the 20th dynasty constructors – in contrast

[149] Goedicke 1987.

with those from the 19th dynasty – did not build the defence walls on the margins of the gravel covers.

Summary

Geological investigations conducted in the Tell el-Retaba site allow to draw the following preliminary conclusions:

1. The area of the site was shaped by the accumulation of the river – a branch of the Nile with an easternmost connection with the sea,
2. Wadi Tumilat is a depression formed in course of erosional-denudation river activity; remnant erosional outliers (gravel deposits) cover the Wadi area,
3. The site was an erosional outlier – an island – whose surface dipped steeply to the south and gently to the north,
4. In Hyksos times, the ground was utilized for the first settlement,
5. The natural topography was used to construct the first fortress during the 19th dynasty,
6. Low ground occurred to the north of the site; it was utilized by a large water reservoir which surrounded the area with the fortress,
7. To the west and partly to the east, the land surrounding the fortress was also flooded with water.

5. Pedological survey

EF

Data on soil conditions are particularly useful for reconstructing the paleo-environment of the site and its surroundings and for the investigation of the embedding of foundations of ancient architecture, their statics and durability. The pedological survey conducted this season enriched the archaeological interpretation of the studied area by contributing significantly to the knowledge of the natural environment in which ancient Egyptians made their livelihood, as well as of their economic base and technological development. The processing of the data obtained from the chemical and physical analyses of samples currently deposited in Egypt will be crucial for the final evaluation of the survey results.

Taking into account the needs of archaeological research, it is possible to draw specific conclusions concerning the paleo-environmental conditions in the studied settlement area. Tell el-Retaba was located on the bank of a Nile branch. Before the settlement was established, the land was formed by accumulation of sandy alluvial sediments covered by aeolian sands on the surface. Typical carbonated fluvial soils developed on the sandy sediments of this alluvial plain, where the water table was close to the surface. The environment was not swampy (although ground water level was relatively high), possibly due to the sandy texture and good infiltration capacity of the soil. It was possible to use the land for grazing. However, due to the high permeability of the soil, its rapid drying and poor capillary rise, agriculture required irrigation. The fertility of the area was also limited by the fact that the rich suspended sediments of river silt or loam that fertilized the soil in the central parts of the Nile Delta did not reach this area (as indicated by an investigation of selected soil profiles – Fig. 101).

The settlement was founded on an elevated, drier gravel bench free of ground water influence. The gravel soil was significantly drier than the surrounding area, as evidenced by the strongly developed rusty weathering soil horizon (cambic Bw horizon). The soils of this area developed during a significant arid period in the Holocene. However, humidity increased later on, perhaps even prior to the establishment of the settlement, but also during its lifetime. This is evidenced by secondary calcification of weathered and rusted B-horizon and by formation of carbonate and manganese nodules and coatings. The prolonged soil humidity during the settlement period is also evidenced by manganese coatings on stones and skeletons in the Hyksos graves. However, this was not a water-logging in the true sense of the word. The tombs, which had a lower density of soil material infilling than their surroundings, were also more likely to collect humidity from the surrounding deposits by lateral flow.

A water-logged depression has been identified beyond the walls of the north-west edge of the site. Humolit soil formed in the depression during the settlement's existence. It probably emerged as a result of local conditions, which reflected a change in climate and in the flow regime. However, it might have also come into being as a result of anthropogenic action affecting the run-off regime (e. g. the use of irrigation). The location of the water-logged site behind the Tell el-Retaba hill opposite to Nile arm shows that the water-logged site and clayey sediments could have formed because when flooding occurred; the floodwaters flowing round the hill on two sides converged behind it, losing their speed and transporting capacity at the meeting point.

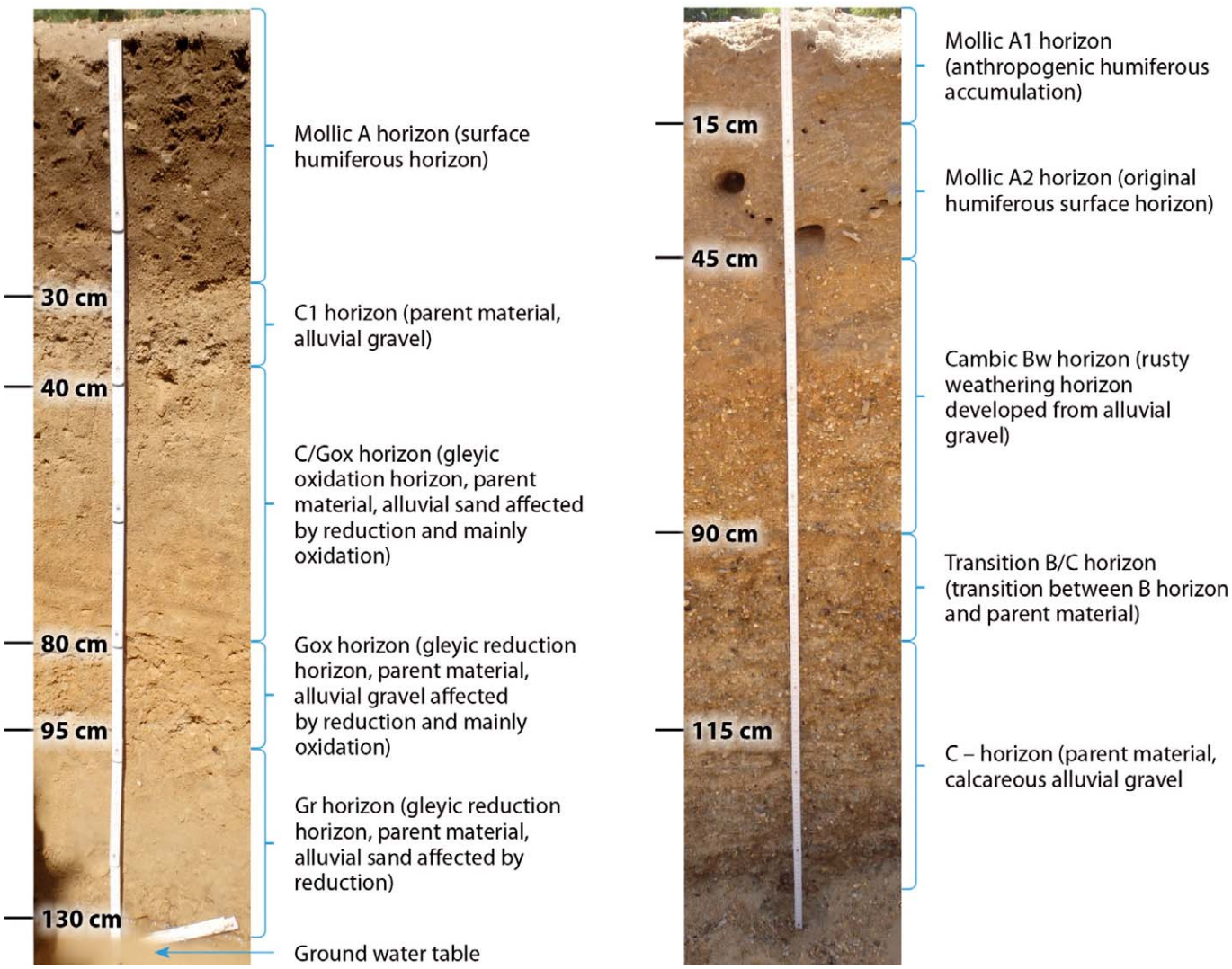

Fig. 101. Comparison of soil profiles of a) recent soil on alluvial plain neighboring Tell el-Retaba and b) original soil at Tell el-Retaba (photo E. Fulajtar)

6. Geophysical survey

JT

In 2014 the survey reviewed an area in the western part of the fortress using the magnetic method. The method had already proven the most effective in mapping mud brick architecture. The underlying layers consist of sand and gravel; the same material is the main constituent of those layers filling and covering mud brick structures with considerable magnetic susceptibility circa 2×10^{-3} SI.[150] The magnetic survey system MAGNETO® DLM 1-channel was used for the detection of ferromagnetic objects and structures. The data logger DLM98 was used for data logging and digitization. The data were processed and interpreted by the SENSYS MAGNETO® software. Magnetic measurements were obstructed by the presence of iron garbage and by previous excavations, which lowered the clarity of the magnetic images. On the resulting magnetic map the anomalies caused by recent iron objects have been removed. Only the magnetic anomalies reaching values of –20 to 20 nT were kept, as they likely indicate archaeological structures. For the result see the map (Fig. 102).

[150] Rzepka *et al*. 2009.

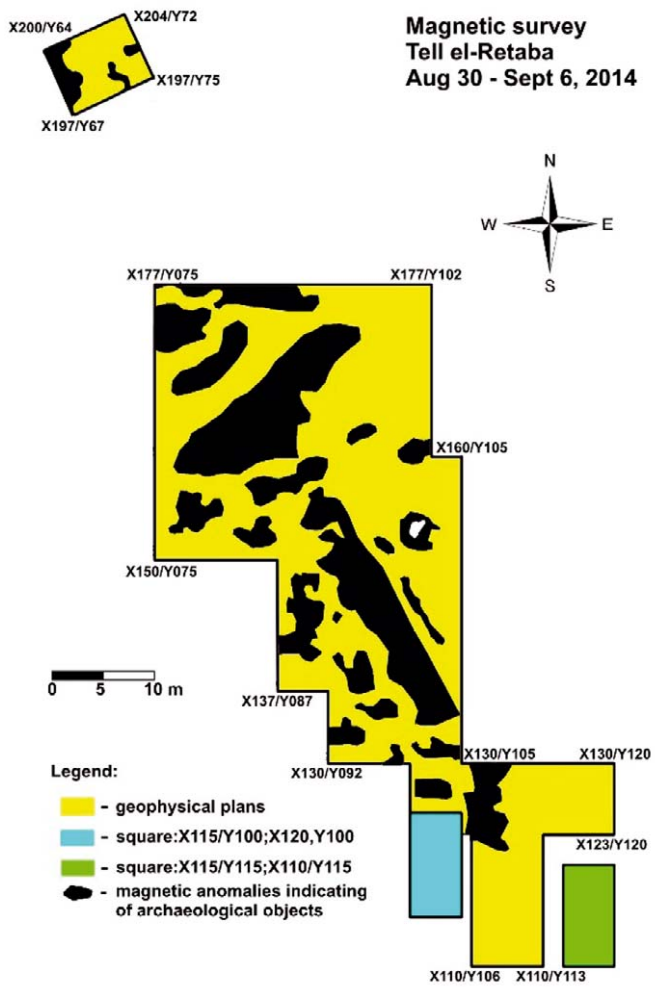

Fig. 102. Results of magnetic survey between areas 4 and 7 (processing J. Tirpak)

7. Engineering survey

MČ

Several structures (fortress walls, houses, outbuildings, etc.) with foundations and wall fragments in varying states of preservation were uncovered on the site. All of them were made of mud bricks, although in some cases the building material was probably reused (e. g. "recycling" of 18th Dynasty mud bricks from "black houses" on top of the core of "Wall 1"?). Observations in the section through "Wall 1" might indicate the use of distinctive greenish mud bricks in the lower part of its outer extension and also on top of the wall's core. The mud bricks were probably applied due to the ruined state of the core prior to building the wall's extensions – thus, the core of the wall was partially destroyed and had to be reconstructed, as well as raised.

The recorded foundations of mud brick walls on the site are relatively shallow, given the modern knowledge of foundation design and examination of stresses, as well as strains in subsoil in relation to the foundation load. From the point of view of stress analysis, any retrospective examination of foundations requires verification of individual limit states:

– Ultimate Limit State (bearing capacity of the subsoil);
– Limit State of Serviceability (subsoil settlement)
– Foundation material failure, eventually overload of building material strength (e. g. mud bricks, mortar, etc.)

In accordance with the bearing capacity check, preliminary stress analysis calculations allowed to estimate the maximum dimensions of the migdol towers and defence "Wall 2". With the given dimensions of the tower's ground plan at 14.0 × 22.5 m, the tower could have been built up to a maximum height of around 15.0 m. Based on the width of the foundations of "Wall 2" estimated at about 9.0 m, the maximum height of the wall could have been about 12.0 m and the width at the top could have reached ca. 6.5 m.

The calculation of the bearing capacity of the subsoil was performed on the basis of observations made at the site using currently valid Eurocodes in order to also take into account the ancient structure's safety factor. Although the constructions were not analysed with such precision in ancient times, their extreme longevity justifies the correctness of including a safety margin, especially since the subject of the investigation was a military installation with higher stability requirements.

Paradoxically, also destructive agents (construction activity, sabbakhin, etc.) provided opportunities to observe the stratigraphy and study the soil conditions. Naville's trench through the northern migdol tower permitted to reconstruct its building process, observe its foundation parameters and determine its relationship to "Wall 1".

Several mud bricks and subsurface sand samples were analysed on the site to check and verify some of the boundary conditions. They were tested and analysed using the resources available in the field, mainly to obtain basic information on mud brick composition, density, dimensions, walling technique, etc., to indirectly determine the approximate strength of the mud bricks.

The analysed bricks contained some additional ingredients like pebbles and pottery shards, but no straw or animal hair. This observation is in agreement with evidence for the practice of using

stronger bricks in foundations and lower parts and lighter bricks more often in upper parts of walls.

More detailed research on the bricks can be conducted in a laboratory where standard granulometric analyses are performed, with densimetric tests allowing to draw grading size curves for fractions 0.001 – 0.125 mm, as well as screening tests with a set of standard sieves for fractions 0.125; 0.25; 0.5; 1.0; 2; 4; 8; 16 and 32 mm.[151]

The acquired data, in addition to verifying the estimated dimensions of the structures, would suggest correlations and elucidate procedures for building-up and usage of materials in specific parts of buildings. It would also reveal technological details through analyses of geo-engineering conditions, the state of the structure in antiquity and the properties of the individual types of mud bricks (e. g. black, greenish, sandy-yellowish, stony, etc.), for instance their dimensions, density, grain and additives.

Another helpful method would be to test the bricks' compressive strength. Field tests of soil to specify the shear strength and deformation modulus of subsurface soils could also prove useful. The abovementioned analyses are planned for next season**.**

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