MINISTÈRE DE L'ÉDUCATION NATIONALE, DE L'ENSEIGNEMENT SUPÉRIEUR ET DE LA RECHERCHE

BULLETIN
DE L'INSTITUT FRANÇAIS
D'ARCHÉOLOGIE ORIENTALE

en ligne en ligne en ligne en ligne en ligne en ligne en ligne en ligne en ligne en ligne

BIFAO 114 (2015), p. 519-562

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Excavations East of the Khentkawes Town in Giza. A Preliminary Site Report

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Excavations East of the Khentkawes Town in Giza
A Preliminary Site Report

ANA TAVARES, DANIEL JONES, FREYA SADARANGANI, HANAN MAHMOUD, MOHSEN KAMEL, RABEE EISSA, HUSSEIN RIKHABY, ALEXANDRA WITSELL, SHERIF ABD EL-MONEIM, MAHMOUD EL-SHAFEY, NERMEEN SHABAN ABA YAZEED, RUDEINA BAYOUMI, RICHARD REDDING, CLAIRE MALLESON, EMMY MALAK

Introduction

Ancient Egypt Research Associates (AERA) is mostly known for work on the 4th-Dynasty pyramid builders' settlement of Heit el-Ghurab at Giza (fig. 1).[1] However, since 2005 AERA's team has also been recording and excavating at the Khentkawes site and the Menkaure Valley Temple (MVT, see fig. 1, 2). Initial work consisted of site protection and salvage archaeological recording due to the construction of a wall around the modern Muslim cemetery. In this area the Khentkawes funerary complex was originally excavated by Selim Hassan in a single season in 1932 (fig. 2).[2] Unfortunately S. Hassan did not re-bury the excavated structures so that, in 80 years, knee-high mudbrick walls were eroded down to a few centimeters. Our work consisted of clearing and recording the entire town with plans at a scale of 1:20, photography and archaeological descriptions, as well as recording the funerary monument using laser scanning. We also excavated limited sondages to investigate the stratigraphic connection between the Khentkawes complex and the MVT; and the phasing of the terraces, houses, causeway and streets.[3]

1 Lehner, Wetterstrom 2007; Lehner, Sadarangani 2007; Lehner, Tavares 2010; Driaux, Tavares 2014, p. 3-9; Tavares 2011 with further bibliography. AERA is a non-profit organization funded by private donations (see www.aeraweb.org). For support of the Giza 2014 season we would like to thank the David H. Koch Foundation, Mr. and Mrs. Lee Bass, Ann and Robert H. Lurie Foundation, Glen Dash Foundation, Marjorie Fisher, Ed and Kathy Fries, Lou and Candice Hughes, Bruce and Carolyn Ludwig, Ann Thompson and Bonnie Sampsell. We thank the officials of the Egyptian Minister of State for Antiquities for help with a successful season. The season ran from 31st January to 4th June, 2014. The project is under the overall direction of Mark Lehner.

2 Hassan 1943.

3 For previous work on the KKT, see Tavares 2008; Lehner 2009; Lehner *et al.* 2011, for laser scanning work, see Kawae 2009a; Kawae 2013.

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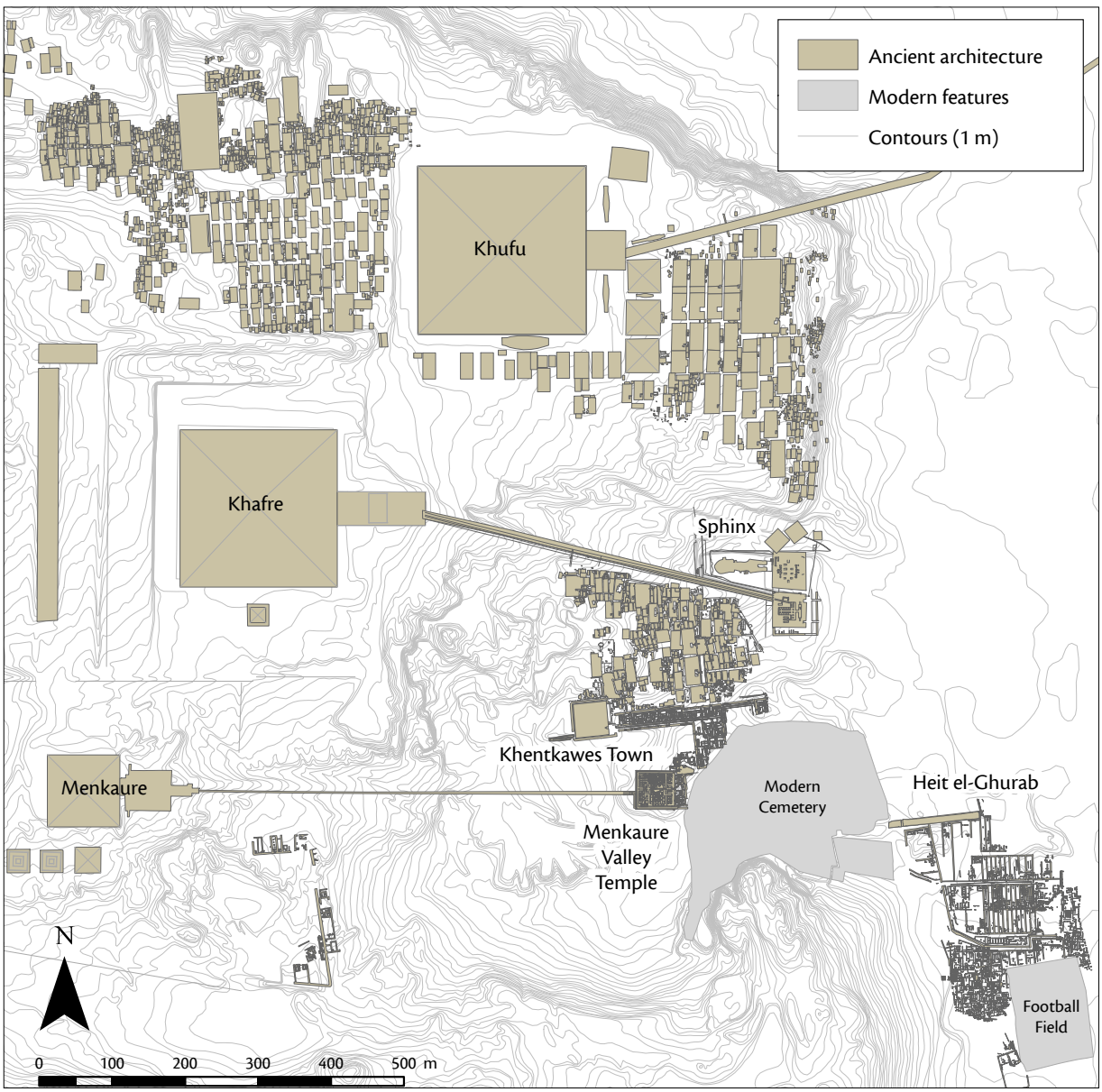


Fig. 1. The Giza Plateau, showing the locations of the Khentkawes complex (KKT), the Menkaure Valley Temple (MVT) and the settlement of Heit el-Ghurab(HeG). Illustration prepared by Rebekah Miracle.

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Fig. 2. The Khentkawes complex (KKT) and the Menkaure Valley Temple (MVT). Illustration prepared by Rebekah Miracle.

The funerary complex was built for Queen Khentkawes I towards the end of the 4th-Dynasty.[4] S. Hassan's excavation revealed a series of 10 large modular houses, built to the north of an east-west street (later a causeway; fig. 2). We designated this part of the complex as KKT-N. S. Hassan also excavated other houses, a water tank, ovens, and silos extending south towards the Menkaure Valley Temple. It is inferred that the houses were built for priests and administrators involved in Khentkawes's funerary cult. S. Hassan published a single phase plan.[5]

4 Hassan 1943; Lehner 2009.

5 Hassan 1943 frontispiece, p. 35-59; Driaux, Tavares 2014, p. 9-12.

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Although most occupation and post-occupation deposits were removed by S. Hassan, we were able to excavate the architectural layout of House E (the fifth house from the west, fig. 2) as well as other small exposures in the Khentkawes complex.[6] AERA's work revealed an intricate picture of development and occupation. We also exposed, to the east, a previously unknown valley complex and basin, which we named Khentkawes Town-East (KKT-E). The earliest buildings on the site seem to be structures I, J, K, L and M, functioning with the valley complex and basin (fig. 2). This phase was followed by the construction of the

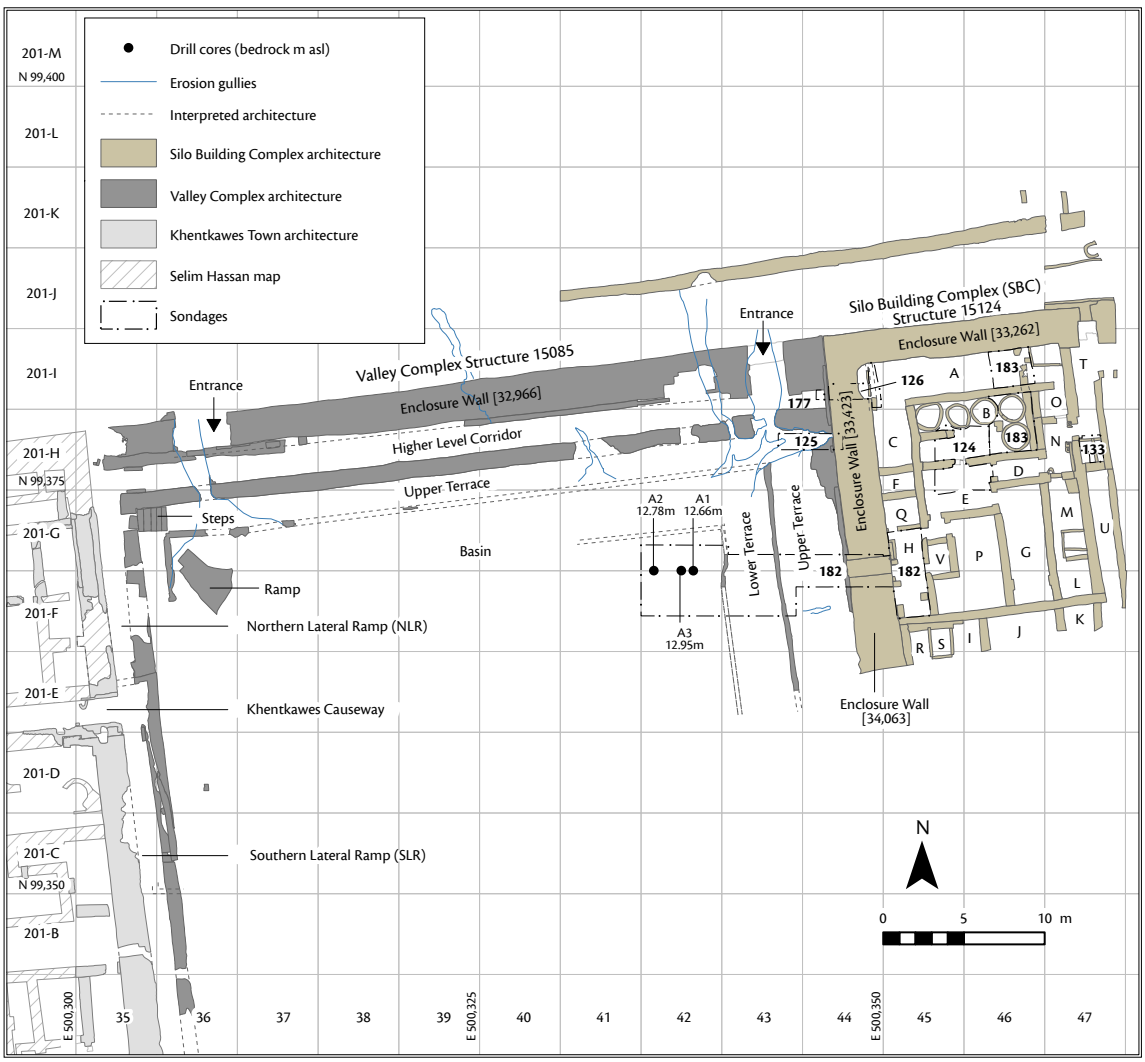


Fig. 3. The Khentkawes Valley Complex (Structure 15085, area KKT-E) and the Silo Building Complex (SBC, Structure 15124, area KKT-E+). Illustration prepared by Rebekah Miracle.

6 Lehner *et al.* 2009b. S. Hassan conflates the information from the excavation of houses A to H, to describe a "generic" house, Hassan 1943, p. 38. Based on this publication Felix Arnold discusses further aspects of these houses Arnold 1998. For details of AERA's excavations in House E, see Tavares, Yeomans 2009; Yeomans 2009; Yeomans, Mahmoud 2011; Tavares *et al.* 2012. House E was reconstructed as part of a conservation and experimental archaeology project, see Tavares 2011.

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large houses A to H along a broad street. Subsequently a causeway was built linking the funerary monument directly to the valley complex and blocking access between buildings I, J and K, L, M. This necessitated a tunnel to be cut into the bedrock to allow for continued north-south movement. The complex continued to be occupied and modified in the 5th Dynasty. A period of abandonment was evident, followed by re-occupation of KKT-N possibly in the 6th-Dynasty.[7]

The Valley Complex and the Building to the East

The Khentkawes funerary monument, houses and valley complex are part of, and built within, an earlier quarry.[8] The valley complex was constructed at a lower level than the houses, within a deep stone extraction pit. The complex was bordered by a thick enclosure-wall on the north, and consisted of two open terraces around a basin; two north-south ramps leading up, from opposite directions, to a monumental entrance between buildings I, J, K, L; and a corridor along the north side of the complex (higher level corridor, fig. 3).[9] We have not been able to investigate the south side of the complex as it lies buried beneath the modern road.

In 2011, beneath a considerable depth of modern sand overburden, we exposed a substantial building to the east of the valley complex (Structure 15124, fig. 3), in an area designated as KKT-E+. Originally we named the structure "Silo Building Complex" (SBC). We now know that it comprises at least three distinct building phases, designated here as Complexes 1 to 3 (from latest to earliest).[10] The designation SBC is strictly only appropriate for the later structure (Complex 1, fig. 7) which consisted of the north-west corner of a thick enclosure-wall surrounding a series of internal rooms and corridors (A to V). However the enclosure-wall (Complex 2, fig. 6) was built earlier. We do not know yet the internal layout of Complex 2. An even earlier structure (Complex 3, fig. 4) is known only from a few deposits and short walls.[11]

During the 2012 excavations we exposed the latest phase of the building (Complex 1), which seemed to be a food production and storage unit,[12] with a long and complex sequence of occupation and re-modelling.[13] Defining this sequence was a central aim of the 2014 excavation season. The structures continue to the east and south beyond the current limit of excavation.

Research Questions

A principal reason for working in the Menkaure Valley Temple (MVT) and the Khentkawes site (KKT) is that they provide comparative data to the Heit el-Ghurab (HeG) settlement, both in terms of architectural layout and material culture. Moreover both settlements in MVT

7 Lehner 2011; Jones 2011; Wodzińska 2011.

8 Lehner 2008.

9 For a discussion of the valley complex, see Lehner *et al.* 2011.

10 Although counter-intuitive it is necessary to name the later structure as Complex 1 and the earliest as Complex 3 because the excavation is ongoing.

11 We apply the term "complex" for all three stages purely as a means of differentiating the architectural development of the area. As work progresses it might be more appropriate to designate them simply as Buildings 1 to 3.

12 Aeragram 2012.

13 Eissa, Rikaby 2012; Jones 2013.

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and KKT are considered to be type-sites for "pyramid towns",[14] and yet little is known of their development, phasing and occupation.

We have found that the HeG was a provisioned community, from the analysis of ceramics, objects, lithics, faunal and botanical remains.[15] This contrasts with material excavated from the Khentkawes site and in particular House E. The research design for the 2014 excavations included:

– examining of the character, phasing and dating of Complexes 1 to 3;

– defining the stratigraphic relationship between the basin, the open terraces, and Complexes 1-2;

– investigating the sequence of construction, use and abandonment of the silos;

– assessing the use of ash in the construction and use of the silos;

– defining the building sequence and the character of occupation of room H;

– and investigating evidence for domestic, craft, administrative and possibly cultic activities in this building.

To investigate these questions we excavated sondages 182 and 183 (fig. 3) and analyzed a range of material culture. Below we present the excavation results followed by short preliminary reports on clay sealings, ceramics, animal bone, lithics, botanical remains and artefacts. These are preliminary field reports. Further work on the data will hopefully clarify aspects of this structure, and provide information on the character and functioning of royal funerary complexes and "pyramid towns".

Ana Tavares

Excavation Results

Following the 2014 excavation season we present our current understanding of the development of the basin and the buildings to the east. These results are provisional and some aspects are still hypothetical. They are given in chronological order of development, from earliest to latest[16].

Evidence for an Early Building

In 2012 the team found evidence of an early structure beneath the enclosure walls of Complex 2 and Complex 1 (fig. 4). They saw this at the eastern end of sondage 126 where a later pit cut through the eastern side of the enclosure-wall [33,423]. At the base and sides of the cut a north-south marl brick wall [34,013] was partially exposed, clearly extending beneath the enclosure-wall. With such a small exposure of architecture, it is unclear what this wall was associated with or when it was built.

14 Kemp 2006, p. 205-209.

15 Lehner 2003; Wodzinska 2007; Redding 2012; Murray 2005.

16 For a detailed archaeological report, see Jones *et al.* 2014.

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Fig. 4. Complexes 3 and 2, and sondages 125, 126, 182 and 183. Limits of excavation (LOE) indicated, and elevations given in meters above sea level (asl). Illustration prepared by Rebekah Miracle.

A deposit of crushed limestone and marl abutted the western face of the early wall at a level of 15,62 m asl. During the 2014 season we also found similar deposits in sondage 182, beneath the enclosure wall [34,063] and [33,423]. The composition of these deposits ([34,539] and [34,543], fig. 4, 5), although unexcavated, suggests they are debris relating to limestone quarrying work. Elsewhere in excavations of the KKT and the MVT we have found that the limestone bedrock had been heavily quarried[17] and the resultant debris used to build up the ground level for construction.[18]

17 Lehner *et al.* 2011, p. 160-161, 175-178.

18 Lehner *et al.* 2011, p. 161, 178-180, 190; Aera 2012, p. 12.

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A 4th-Dynasty Structure? (Complex 2, fig. 3, 4, 6*)*

The next building program involved the construction of a thick enclosure-wall built upon extensive banked-up deposits of crushed limestone and marl (fig. 4). Orientated slightly west of north, the northern wall [33,262] is 2,20 m wide and survives to a height of 0,62 m; and the western wall [33,423 and 34,063] is 2,60 m wide and survives to a height of 0,43 m. The whole construction was built using a combination of sandy Nile silt and Nile silt mud bricks. The enclosure-wall had two openings, one in the north-east with a limestone threshold, and one in the south-west where the remains of a limestone door socket was uncovered.

To the north, a long limestone wall [33,452], 0,80 m wide with an entrance on the east, runs parallel to the northern wall of Complex 2. This wall was built after the enclosure wall. If the limestone wall functioned with Complex 2, then the north-east opening of the complex gave access to a broad street (6,30 m wide).

To define the limestone wall and its entrance, we partially removed a deposit [34,465] that overlay the northern side of the wall and extended to the north. This deposit was a concentration of ceramics dominated by beer jars, a number of which were complete, mixed with charcoal, ash, and chert. We only needed to excavate 0,15 m of this deposit to expose the northern side

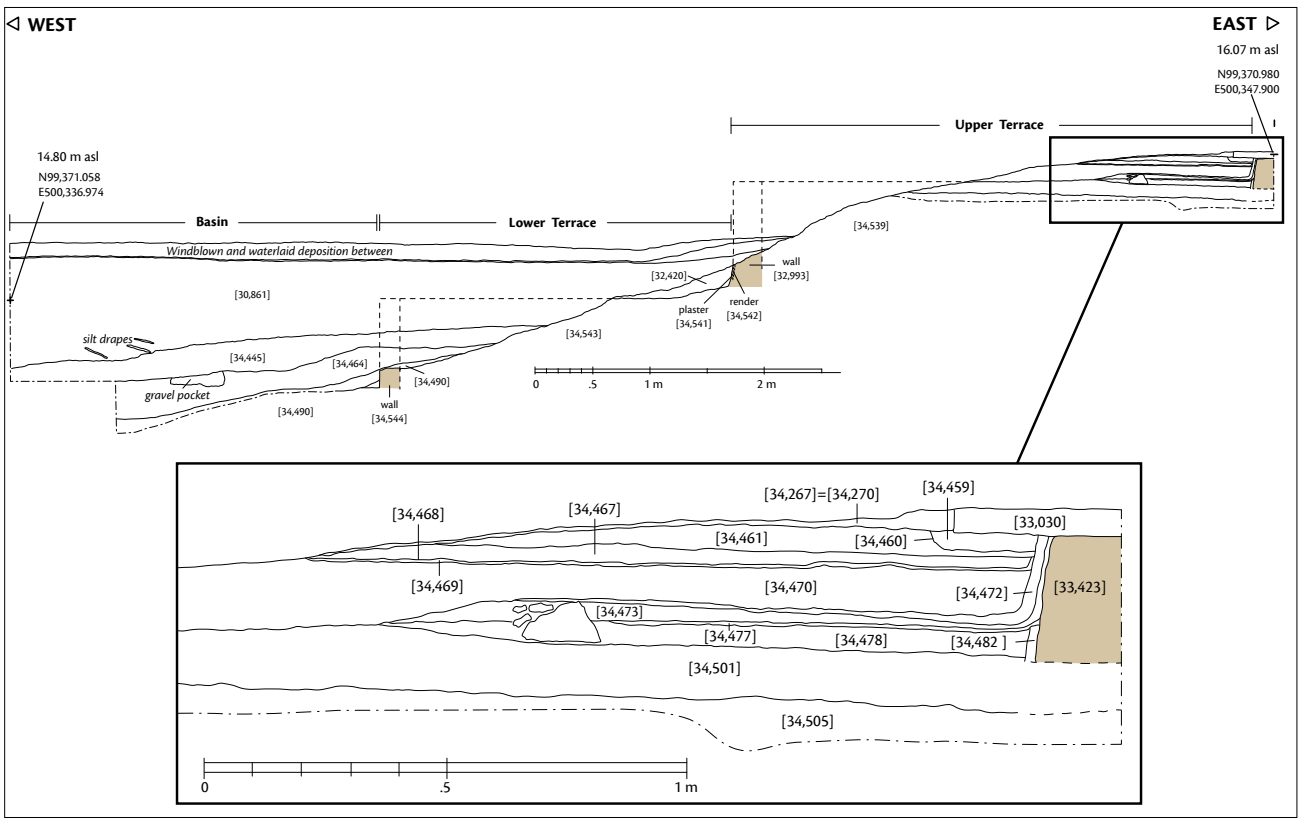


Fig. 5. South-facing section of sondage 182 through the KKT-E basin and terraces. Drawn by Dan Jones, digitised by Alexandra Witsell.

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of the limestone wall, its opening and two thin walls [34,530] and [34,531] north of the wall. Preliminary dating of ceramics from deposits within Complex 2 suggests that the enclosure-wall was possibly a 4th-Dynasty build[19].

In 2011 a north-south wall [32,993], one brick wide, was uncovered 4,50 m to the west of the complex (fig. 5). This wall, built in a cut into the banked-up quarry debris, marked the western boundary of a raised terrace (the Upper Terrace). Due to erosion of the western side of the terrace it has not been possible to establish stratigraphically when this thin wall was constructed in relation to the enclosure wall of the complex (fig. 5). The wall however was built using the same types of mud brick as the enclosure wall so it may have been built around the same time as the complex.

On the western side of the thin terrace-wall we uncovered a second terrace (the Lower Terrace) (fig. 4, 5). Situated 1 m lower than the first terrace, it extended 3,36 m to the west where we uncovered the remains of its boundary wall [34,544]. The surface of the lower terrace had been coated in a mud render [34,542] and then marl plaster [34,541], which lipped up the west face of terrace-wall [32,993] (fig. 5). We also exposed the lower terrace, similarly coated with a mud render and marl plaster, on the western side of the basin. If the lower terrace on the west was the same width as its eastern counterpart (3,36 m) the internal width of the Khentkawes basin would have been 30,28 m.[20]

To the east, within Complex 2 (at the base of sondage 183) we exposed a poorly preserved north-south mud brick wall [34,571 = 34,510] constructed using sandy silt bricks; the type also present in the enclosure-wall and thin wall of the Upper Terrace (fig. 4). This wall survived only a few centimeters high and was founded on sand. We could make out marl plaster adhering to both sides of the wall and on the southern face of the enclosure wall. At the northern end of the sondage we exposed floors either side of the wall; to the west of the wall the floor was covered by rectilinear spreads of ash, [34,575] and [34,585], or cut by rectilinear troughs filled with ash, which we did not excavate this season. There is an associated small spread of limestone [34,594], which may be a partially truncated hearth, oven or platform. Although unexcavated these features are reminiscent of the bakeries at the 4th-Dynasty Heit el-Ghurab settlement (fig. 1). In these a single room or a series of associated rooms were devoted to bread-baking, they were filled with powdery ash, had at least one hearth or oven, one or more mixing vats, and linear troughs, normally adjacent to walls, with circular depressions cut into their ash fills.[21]

At the southern end of sondage 183 we found different types of deposits abutting the western face of the early wall (fig. 4). These were pottery deposits [34,518] and [34,506]. The fact that these deposits are different to the ash and floors at the northern end of the sondage suggests that there is some sort of division (wall?) between the two.

19 A deposit [34,506] below the silos of Complex 1 and therefore likely related to Complex 2 contained one Meidum bowl shred dated to the 4th-Dynasty. It also contained fragments of a CD20 (AW.121127) of the 4th/5th-Dynasty. Further the deposit contained a sealing with the Horus name of Menkaure.

20 In 2011 we thought that the basin was only surrounded by the higher upper terrace which put the width of the basin at 37 m.

21 Such as Bakeries A7d and A7e, Aeragram 1996, p. 6-7; Lehner 2007, p. 24-26; Bakery A8, Lehner 2007, p. 24; Area AA Bakery, Lehner *et al.* 2009b, p. 75-76; EOG-D Bakery, Lehner *et al.* 2009b, p. 47-49.

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Fig. 6. Construction of the valley complex (KKT-E, Structure 15085), and Complex 2. Illustration prepared by Rebekah Miracle.

KKT-E Valley Complex (Structure 15085, fig. 6*)*

Using ceramic dates[22] and mud brick typology[23] we think that during the occupation of Complex 2 the valley complex (Structure 15085) was built and modified (fig. 3). In sondage 182 a blocking [34,014=34,064] of sandy silt mud bricks was built in the entrance of the western enclosure-wall [34,423, 34,063]. This closed direct access from Complex 2 to the terraces and basin (fig. 6). After the blocking, construction occurred to the west, associated with the KKT-E basin (Structure 15085).

22 The ceramics from Structure 15085 have been preliminary dated to the 4th/5th-Dynasties Wodzinska 2011, p. 173-177 whereas the ceramics and sealing from Complex 1 suggest that it was constructed and occupied during the 5th-Dynasty.

23 The walls of Structure 15085 are built using sandy silt and dense silt bricks, whereas the walls of Complex 1 are dominated by smaller, marl bricks. No marl bricks have been found in the architectural elements of Structure 15085. Although brick type is not a secure chronological indicator it does suggest

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How these developments relate to the construction and modification of the valley complex as a whole requires further investigation. Broadly speaking, from prior work we knew the complex had two structural phases. The initial construction concurrent with the early KKT houses I, J, K, L, and M, and comprising a raised terrace (the Upper Terrace) surrounding a basin (fig. 2, 3). A Lower Terrace has been identified on the eastern and western side of the basin. Upon the western side of the Upper Terrace was built a ramp (the Southern Lateral Ramp, SLR) that led up (from south to north) to buildings I, J, K, and L. On the north a thick enclosure-wall [32,966] was built with entrances on the east and west. The next and last major structural phase was the addition of a second ramp (the Northern Lateral Ramp, NLR); a higher level corridor on the northern side of the complex which included a niche at its eastern end; and a corridor leading from the southern end of the SLR. Additional modifications took place between, and during these two phases, such as the narrowing of the SLR, re-surfacing of the Upper Terrace, and blocking of the western entrance of the northern enclosure wall. We infer that the re-surfacing visible in sondage 182 and 125 possibly relates to similar events that occurred in the wider complex. The last change witnessed in these two sondages involved slight cutting back of the enclosure wall [34,423, 34,063] to build a thin wall [33030] on the eastern side of the basin. This may have been concurrent with the construction of the niche and higher level corridor because the thin eastern wall of the niche appears to be a continuation of wall [33,030] which sat in a cut that slightly truncated the enclosure-wall (fig. 5).

In 2014 we carried out three drill cores (A1, A2, and A3) in the Valley Complex basin to establish the base of the basin (fig. 3 with elevation values above sea levels-asl). Drill core A1 reached the limestone bedrock, while A2 reached dense sterile *tafla* (marl) which directly overlays the bedrock. Core A3 only reached the deposits overlaying the *tafla*, which comprised crushed limestone, scattered charcoal flecks, and small lumps of silt.

The 5th-Dynasty Revival (Complex 1)

At the northern end of sondage 183 we found signs that Complex 2 had been slightly re-modelled and occupied prior to the construction of Complex 1.[24] The ceramic assemblages were dominated by bread-baking vessels, and dated to the 5th-Dynasty. This activity may be commensurate with some of the developments in the KKT-E structure.

The northern wall [33,411] of the silo room (room B) was constructed upon the upper ash of this "occupation". This phase marks the full construction of Complex 1 (fig. 7).[25] The core of the building consists of rooms B, D, E, G and P, which are surrounded by a series of small chambers and larger rooms. From the foyer (room N) there is access into small chamber O, and from here through a long, narrow L-shaped courtyard, rooms A and C. The northern and southern walls of courtyard A are scorched from burning. In the north-east corner there is a mud brick bin. From room C there is access over a mudbrick threshold sill into a small chamber F. Retracing one's steps back to the foyer one could also access rooms M and L in the south-east corner of the building. These rooms were filled with ash. In the north-east corner of room M there is a mud brick bench; and in the south-east corner there is a mud brick bin, containing what may have been a vat emplacement.

that the structures may have been built, or at least started at different times.

24 Remodelling is indicated by the cutting down of wall [34,571=34,510] while occupation is evidenced by a clay-lined pit, floor [34,561] and ash deposits [34,560] and [34,562].

25 See Aeragram 2012 for initial excavation results.

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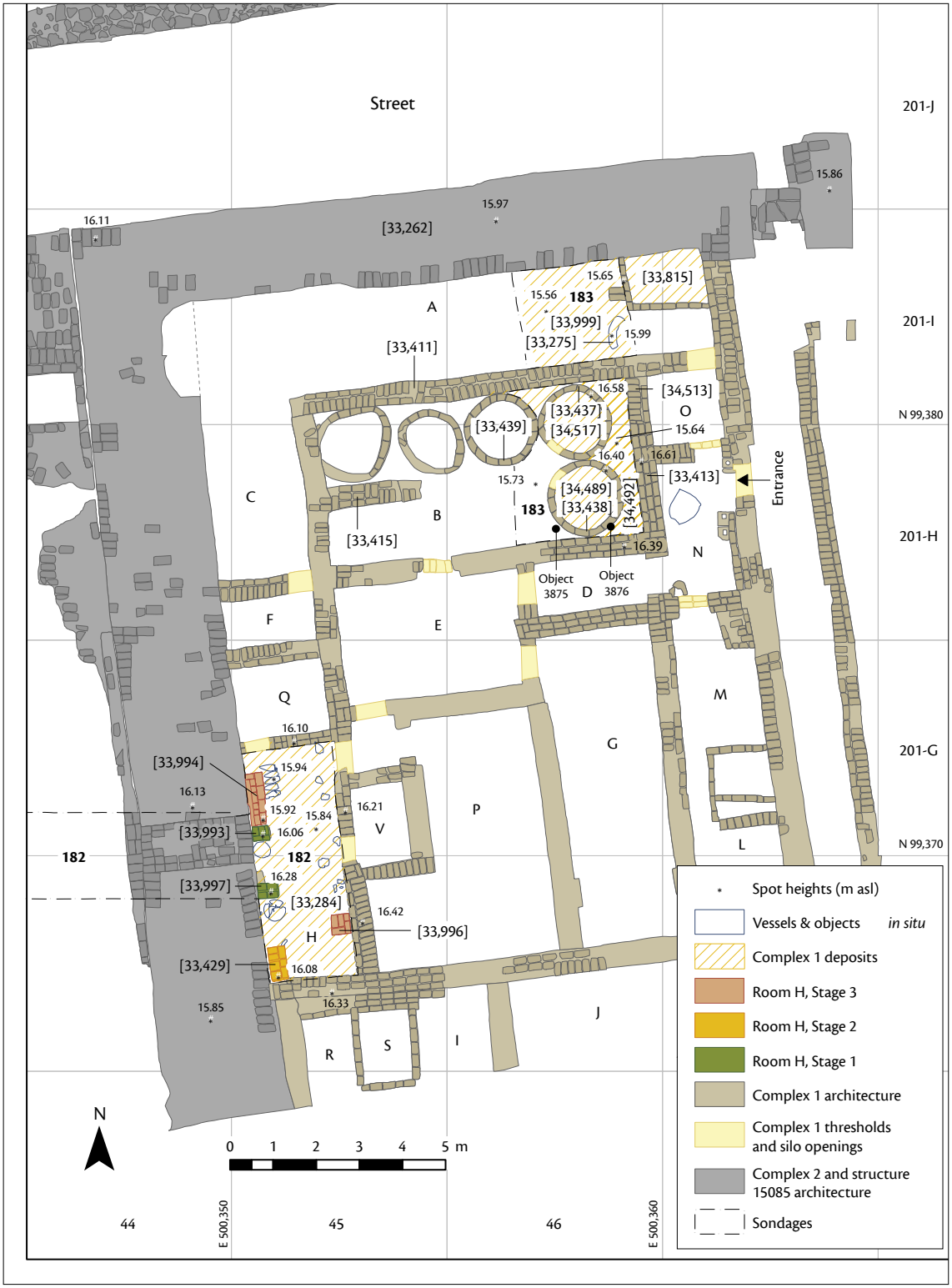


Fig. 7. Details of Complex 1 (SBC) and architectural modifications of room H. (stages 1 to 3). Illustration prepared by Rebekah Miracle.

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From the foyer (room N) one could move through rooms D, E and P, into room H (fig. 7). This room functioned with two smaller chambers (rooms V and Q); together these rooms feel like an annex to the central core of the building.

The silos and the eastern walls [34,513] and [33,413] of room B physically sit on top of the mudbrick wall [34,510] of Complex 2 (fig. 7). Stratigraphically the silo walls are founded both on the pottery-rich deposit [34,518] that abuts the west face of wall [34,510]; and the continuation of the same deposit [34,506] beneath silo [33,438]. The walls bounding room B survive between 0,83 m and 0,98 m high.

The silo walls [33,437] and [33,438] within sondage 183 are very well preserved, surviving between 0,94 m and 1,04 m high. They are *ca.* 0,14 m wide and built using marl brick, which features prominently in the construction of Complex 1. The external faces of these two silos are coated with a layer of very fine, smooth clayish Nile silt render. We found no evidence of plaster or render having been applied to the interior walls of the silos. These silos have an outer diameter of 1,47-1,78 m and inner diameter of 1,10-1,48 m. The top of the north-eastern silo [33,437] is slightly angled inwards. If this is where the silo wall began to dome (at 0,90 m high) then we can make an attempt at reconstructing the height of the silo (fig. 8). If the silo was this shape and stood to this height then from the internal surface of the room it would have been 2,10 m high approximately four royal cubits.[26]

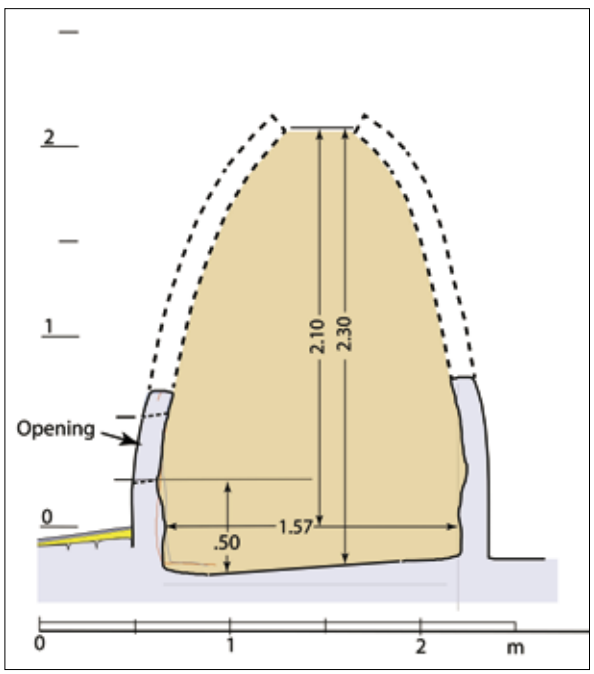


Fig. 8. Profile and reconstruction of silo [33,437]. Drawing by Mark Lehner, digitized by Ali Witsell.

26 Extrapolation of the height and curvature of silo [33,437] by Mark Lehner Lehner 2014. Some of the silos found at Balat (12th Dynasty to the Second Intermediate Period) were shorter Marchand, Soukiassian 2010, p. 111-121. Using these for comparison, Hanan Mahmoud reconstructs the missing upper part of the silos at c. 0,66 m high, giving an external height of 1,70 m and an internal height 1,56 m. Based on these measurements the volume of the silo would have been c. 2,21 m³.

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In both silos, we found the lower part of oval-shaped openings, facing into the center of the room. These openings provided access to the contents of the silos. In silo [33,438] the base of this opening is 0,35 m up from the floor of the room and 0,49 m up from the internal surface of the silo. The opening has a rounded base and is 0,40 m wide. In silo [33,437] the base of the opening was 0,42 m up from the floor of the room and 0,50 m up from the internal surface of the silo.[27] In the south-eastern silo we found make-up deposits overlying a thin plaster floor, which only survived in three small patches. This was sealed by a marl/silt floor [34,489]. This floor sloped downward from north to south-south-west, to where the opening is located. In the north-eastern silo we found a make-up deposit and an overlying floor, [34,517], which also sloped from down from north-east to south-west towards the opening. Within the silo room itself we exposed a clayish floor [33,814]. This surface sloped up gradually towards the north-east at the point where silos [33,437], [33,438], and [33,439] meet.

The silos were probably filled from an opening in the top that was sealed with a stopper. Conical shaped stoppers can be seen in depictions of silos in the form of models and tomb scenes from the Old Kingdom.[28] These openings were reached by either lacing a ladder against the silo or from the tops of the walls that bound the silo room.

The picture that emerges from the archaeobotanical analysis is that the samples resemble those of the Royal Administrative Building in the Heit el-Ghurab settlement.[29] Cl. Malleson argues that the combination of low quantities of cereal chaff and the presence of querns, but no mortars, indicates that the silos had been used for short-term storage of cleaned grain. Pounding and sieving the grain was done prior to its arrival into the building, leaving only the grinding to be done to produce flour. This prior processing would have facilitated the production of a large output of bread.[30]

Ceramics indicate that Complex 1 was constructed, occupied and abandoned in the 5th-Dynasty. This is supported to some extent by the sealings. The stratigraphic relationship between the northern wall [33,411] of room B and a deposit of ash (in the northern part of sondage 183) on which the wall is founded, is crucial. The ash contained a mix of 4th and mid 5th-Dynasty ceramics, indicating a 5th-Dynasty *terminus post-quem* for the construction of the northern wall of room B. Further we found, within the make-up deposits in the two eastern silos and the floors of the silos, pottery dated to the 4th-Dynasty and sealings with the Horus name of Menkaure. This suggests that the silos may have been built and functioned in the 4th-Dynasty[31] before the construction of the northern wall of room B, in the 5th-Dynasty. There is no continuity of lower deposits in the north and south parts of sondage 183, indicating that there may be an earlier physical barrier (a wall?) below the northern wall [33,411] of room B.

27 At Edfu silo openings were found at 1,10-1,30 m above the external floor: Moeller 2010a, p. 263-264.

28 For example, a set of six limestone model silos probably from the tomb of Ni-kau-inpu held in the Oriental Institute Museum at the University of Chicago (registration number 10643); pottery model of twelve silos from the tomb of Kamenu at el-Kab held in the Ashmolean Museum, Oxford (accession number E408): Quibell *et al.* 1989, p. 3-4, pl. VI.

29 Sadarangani 2009; Sadarangani forthcoming.

30 See botanical discussion below.

31 We would expect a more mixed deposit if this was re-deposited material.

32 Excavated in 2012: Nolan 2012, p. 3-4.

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Using the ceramic and sealing dates it is clear that the silos were abandoned and collapsed (or were demolished) in the 5th-Dynasty. The deposits overlying the silo floors were particularly rich in sealings, sealing-related objects and ceramics. The patterning of these finds might indicate whether they had fallen from a superstructure above the silos (and therefore connected with the silos' use) or whether they were dumped after the walls of the silos collapsed. The floors of both silos were covered with marl brick collapse. The southern silo collapse [34,475] contained two peg-and-string sealings, other sealings with the Horus names of Userkaf and Niuserre (in addition to a cartouche of Menkaure), bread molds and beer jars. Collapse [33,280], in the northern silo, contained five peg-and-string sealings (probably relating to the securing of silo doors or hatches), and a sealing with the title "Overseer of the Pyramid 'Great is Khafre'".[32] Both deposits contained bone fragments of a toad, indicating that at this stage there was, at least a seasonal, body of water located nearby.

In both silos the primary collapse deposits were sealed with slightly more mixed deposits, containing marl brick fragments as well as frequent pottery. In the southern silo the ceramics were mixed (4th- and 5th-Dynasties, and possibly one 6th-Dynasty vessel). They included beer jars, bread molds, but also funerary and cultic vessels.[33] The sealings included a mix of 5th-Dynasty names, nine peg-and-string sealings, and a number of sealing blanks and discards (see sealings section below). A similar deposit[34] was excavated from within silo [33,437], suggesting that the material may have been brought in and dumped here.

Outside the silos, to the west within the silo room, the team excavated a spread of pottery associated with bread-baking. This included a complete bread mold, a bread tray, beer jar and bowl, sitting on floor [33,814]. The deposit was clearly 5th-Dynasty and suggests that the silo room stopped being used in the 5th-Dynasty. Here, the team also excavated the remainder of a vast deposit of marl brick collapse [33,255]. This had originally spread through almost all of the building, and had largely been excavated in 2012. In this deposit we found, this season, a limestone plaque with carved, raised relief inscription (object 3875) near the south-western outer edge of silo [33,438]. Its location, directly next to the silo, may suggest it had originally hung on the silo wall to specify the content of the silo or for whom the contents were allocated to. However there are no traces of mortar, plaster or any other hanging provision on the plaque itself (see discussion below).

There is a gap between the silos and the eastern wall of room B (fig. 7). If the walls of the room were standing high, supporting a roof or second storey, it would have been impossible to access the "gap" from within the room. The gap was filled with a sequence of eight overlying, levelled deposits markedly different, in composition and types of inclusions, from the deposits that filled the silos or elsewhere in the room.[35] These deposits were much richer in finds than any other deposit excavated this season. They were laid during the construction of Complex 1 or dumped and levelled, later, from above.

The lowest deposit [34,492] overlay directly an earlier wall (horizontally truncated); and abutted both the silo and room walls. The deposit was extremely rich in finds[36] with an unusually

33 Deposit [33,239], see below for sealings and ceramic discussion.

34 This deposit [33,441] overlay deposit [33,279], which in turn overlay primary collapse [33,280].

35 There were no floors within this sequence. The deposits were mostly ash, some marl bricks, ceramics, animal bone, objects and sealings.

36 These included the prow of a hedgehog boat (3876), a quartzite quern (3896), a weight (3914), and a horn core of Bos Taurus, see below.

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high (c. 60 %) percentage of ceramic sherds.[37] The ceramics were a mix of 4th- and 5th-Dynasty vessels and sealings had the Horus names of Menkaure and Niuserre. The overlying deposits[38] have similar ceramic and sealing signatures, including an attestation of the name of Niuserre's pyramid complex at Abusir.[39] These deposits[40] contained high levels of ash with the highest densities of charred plant remains of all the features sampled this season. This is reminiscent of House E further west, where ash had been spread out as foundation material prior to the construction of silos, probably to protect the silos' contents from insects and rodents.[41]

Room A

The features found in room A (fig. 7) show that it was used for cooking. There is a small marl brick bin [33,815] in the north-east corner of the room, abutted by two mudbricks that may be the remnants of a small pillar. Inside the bin the 2012 team stopped excavation at a sandy silt floor. Once the bin had been constructed, an ashy silt floor [33,999] was laid.[42] This was the only floor found in room A and was associated with scorching on the faces of walls [33,411] and [33,262]. Sitting on this floor was a large saddle-shaped red granite quern [33,275] (obj. 3900), probably not far from its original emplacement. In 2012 the team excavated a thin deposit of ash overlying the floor and respecting the walls of the bin. This was then sealed by a small spread of pottery, which contained vessels associated with bread-baking, such as a bread tray, bread molds and platters. Above this lay mud brick collapse or demolition which spread out to cover the majority of the building.

Room H [FIG. 7]

Unlike rooms A and B, which only had one or two floors laid during their life-span, room H shows a far more complex stratified occupation sequence. This comprised laminated floors, plaster and render applied to architecture, interspersed by architectural re-modelling, ending with an assemblage of pottery and objects, possibly *in situ* on the uppermost floor. Apart from this upper assemblage the room had been kept clean.

Originally the room had one marl brick pillar on the west side, built against the blocking in the enclosure wall. To the south of the pillar there was a sunken vat. The main access to the room was in the north-east. Two smaller spaces, room Q on the north and room V to the east, were accessible from room H and are clearly spatially and functionally associated with it. During post-excavation cleaning and drawing, a sealing with the Horus name of Userkaf was revealed embedded in the upper surface of the deposit [34,550] on the western side of the room. This deposit was not excavated but appeared to be one of the foundation layers put down when the room was created.

37 Including complete vessels, a high percentage of miniatures and an unusually low percentage of beer jars. The ceramic signature suggests a funerary or cultic context, not a typical settlement assemblage.

38 Deposits [34,491], [34,512], [34,476], [34,479], [34,001], [33,242] and [33,454].

39 From a peg-and-string sealing in deposit [34,476] see fig. 10. These deposits also contained querns, weights, whetstones, grinders and polishers.

40 Particularly [34,479] and [34,001].

41 YEOMANS, MAHMOUD 2011, p. 49. An identical situation is found at Edfu where ash was not used for the silos' foundations but placed in a gap beside the silos, see MOELLER 2010b, p. 94. For ash as insecticide, see MILLER 1987; see also ash used in silos at Balat: SOUKIASSIAN *et al.* 2002, p. 289; MARCHAND, SOUKIASSIAN 2010, p. 111, fig. 39-40.

42 Ash floors were found in the settlement at Heit el-Ghurab, see for example LEHNER *et al.* 2009a, p. 10-13, 16-18, examples elsewhere: SOUKIASSIAN *et al.* 2002; DREYER *et al.* 2002.

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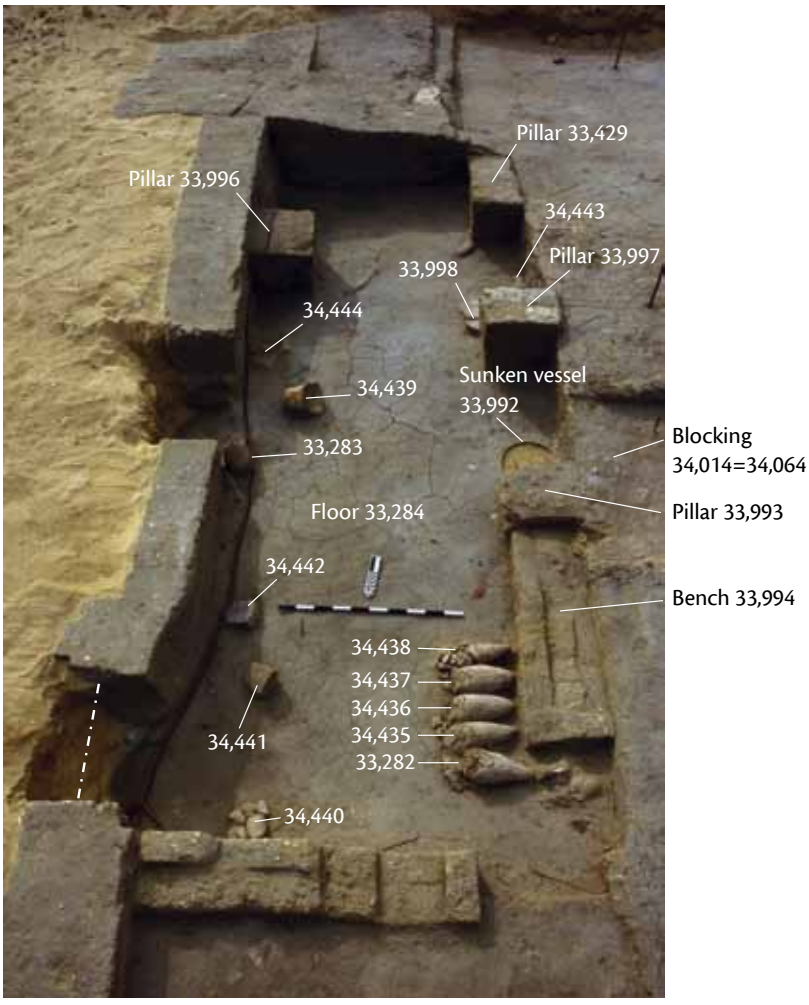


Fig. 9. Objects and ceramics on the upper floor [33,284] in room H. Four pillars, the bench, and the blocking of the entrance through the enclosure wall are also indicated. View to the south. Photograph by Dan Jones.

Room H went through four stages of development. The first stage was the addition of two pillars [33,993] and [33,997] on the western side of the room. Pillar [33,993] was built over an earlier pillar [34,502] which had been levelled. The sunken vessel continued to be used throughout the life history of the space. Stage 2 consisted of the addition of rectangular pillar or bench [33,429] in the south-west corner. The floor [34,474], laid in this stage, contained two small fragments of pigment sticks. Stage 3 was the construction of the fourth pillar [33,996] in the south-east of the room. This was built of sandy silt bricks whereas the other pillars were of marl brick. Also at this time a low (0,15 m high) bench [33,994] was built in the north-west of the room against pillar [33,993]. We know that this was the original height of the bench because the whitewash, applied to the northern side of pillar [33,993] after the bench was built, lipped-down onto the upper surface of the bench. Whether the pillars in the room extended up to the ceiling is unknown but they appear to create defined work spaces. The ceramic tray [33,998] on the southern side of pillar [33,997] (on the uppermost floor of the room) along with the sunken vessel [33,992] reinforces the idea that the small spaces created by the pillars were defined work and/or storage areas.

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The final development in the room was the laying of uppermost floor [33,284] upon which we found a rich assemblage of objects and pottery (fig. 7, 9). The beer jars and bread molds in this assemblage have a 5th- to early 6th-Dynasty date. Against the east face of bench [33,994] there were five beer jars (fig. 9) lying on their side in a north to south row.[43] These may have been toppled from the bench. Close by, in the northeast corner of the room, there was another beer jar [34,440] of the same type, albeit fragmented. Next to the western wall, we found a quartzite quern stone [34,441] and an anvil [34,442], and near the entrance to room V we found two bread molds [33,283, 34,439]. In the south-west corner of the room, between pillars [33,429] and [33,997] we found a bread tray [33,998] and a flint blade [34,443]. It is also interesting to note that all the floor surfaces excavated in room H contained a high percentage of ash and charcoal. However, there was no evidence of cooking taking place in the room. There was no hearth and no scorching or burning on the walls. In fact each time an architectural element was added it was rendered and whitewashed which indicates that the room was meant to maintain an appearance of sterility or cleanliness. Overall room H was kept very clean, despite long and intense use. It was used most likely for food preparation and short-term storage, rather than cooking. Rooms Q and V are yet to be excavated. It is possible that cooking took place in these two smaller rooms.

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Specialist Reports

Sealings

The 2014 SBC excavations produced 254 clay sealings and sealing related objects.[44] A total of 94 sealings or fragments were recovered – 71 of these were impressed by a cylinder or stamp seal and 23 were incised. We use the category "sealing-related object" to classify non-sealing artifacts that we believe to be part of the larger process of sealing manufacture, usage, and discard.[45]

- Findspots and Titles

Of this season's 94 recovered sealings, 21 allowed for the identification of Horus Name or cartouche impressions that span the 4th and 5th-Dynasties, belonging to the reigns of Menkaure, Userkaf, Raneferef, and Niuserre.[46] Highlights of this season's material include two attestations of the name of Niuserre's pyramid (fig. 10), as well as mentions of *ḥs(.w)* singers and *ḥm-nṯr* priests.

43 [33,282], [34,435], [34,436], [34,437], [34,438].

44 For more information on the 2012 SBC sealings, see Nolan 2012, p. 2-5; Nolan 2013, p. 12-14.

45 For further discussion on the Giza sealing terminology and typology, see Nolan 2010, p. 87-119.

46 This matches the pattern seen in the 2012 SBC material with the exception of a single Sahure sealing found in the 2012 SBC excavations.

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Fig. 10. Clay sealing from feature [34,476] with an attestation of the name of Niuserre's pyramid at Abusir "Enduring are the places of Niuserre". Photo by Alexandra Witsell.

King	Quantity and Features		Complex
Menkaure	One each:	[34,475]	Complex 1 (collapse in silo [33,438])
		[34,479]	Complex 1 (preparation around the silos)
		[34,492]	Complex 1 (preparation around the silos)
		[34,500]	Complex 1 (make-up in silo [33,438])
		[34,506]	Complex 2 (occupation)
		[34,517]	Complex 1 (floor in silo [33,437])
Userkaf	One each:	[33,239]	Complex 1 (collapse in silo [33,438])
		[34,001]	Complex 1 (preparation around the silos)
		[34,465]	Complex 1 (dump north of wall [33,432]
		[34,475]	Complex 1 (collapse in silo [33,438])
		[34,550]	Complex 2 (make-up for floor in room H)
Raneferef	Two from:	[33,239]	Complex 1 (collapse in silo [33,438])
Niuserre	One each:	[33,239]	Complex 1 (collapse in silo [33,438])
		[34,001]	Complex 1 (preparation around the silos)
		[34,475]	Complex 1 (collapse in silo [33,438])
		[34,476]	Complex 1 (preparation around the silos)
		[34,492]	Complex 1 (preparation around the silos)
	Two from:	[34,479]	Complex 1 (preparation around the silos)

Table 1. Findspots of the 2014 sealings bearing Horus names or cartouche impressions.

As seen in table 1, the findspots for the Userkaf, Raneferef, and Niuserre sealings span the life cycle of Complex 1. Perhaps of most interest here are the Menkaure sealings from features [34,500], [34,506] and [34,517] from the occupation of Complex 2 and the construction of Complex 1, potentially suggesting a reuse or disturbance of Complex 2 building materials

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during the construction of Complex 1. A cross-check with the ceramics from these features indicate that these deposits are preliminarily 4th Dynasty one, but future excavation is needed to determine if this pattern will hold.

- Back Types

The reverse impressions of the 94 sealings broke down as follows:

– 38 were "undetermined," meaning that they were too partial or indistinct to safely identify a back type beyond the presence of a twine/string impression;

– 24 were peg and string closures (with an additional 4 being "architectural" in nature, such as a plaster corner or a possible door bolt);

– 12 were jar sealings;

– 5 were document sealings;

– 2 sealed reed bundles;

– 2 were box sealings;

– 2 were "knot" sealings, meaning they preserved only a twine knot;

– and 1 was a bag sealing.

An additional 4 were possible container sealings, meaning that their backs preserved twine with a diameter and profile appropriate for a bag or jar, but they could not be further classified into either category. Of note here is the relatively high number of peg and string closures,[47] which we suspect to be related to the securing of the silo doors or hatches in some way.[48]



Fig. 11. Front view of various "blanks" from SBC, both complete and broken, grouped roughly by size. Photograph by Alexandra Witsell.

47 This agrees with the pattern noted in the 2012 SBC material, which provided an additional 27 peg-and-string sealings from the 2012 total of 98 sealings (impressed and incised examples).

48 See Tyson Smith 1996, p. 70-72.

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Fig. 12. Various "discards" from the SBC excavations, both complete and broken, grouped roughly by size. Photograph by Alexandra Witsell.

Sealing-Related Objects

We note a strong pattern in two particular categories of sealing-related objects, those that we call "blanks" and "discards." We believe that both the blank and discard categories are gross indicators of on-site activity related to sealing preparation and usage. Of the 160 sealing-related objects found this season, 52 were blanks and 31 were discards[49] – the highest numbers of either category that we have encountered in 25+ years of AERA excavations, indicating that these archaeological contexts – (perhaps more primary than many from HeG) – are especially suggestive of a direct relationship between object, find-spot, and function.

We hypothesize that blanks may represent an early stage in the everyday process of sealing manufacture, capturing the moment that the pure clay was mixed with temper, shaped, and prepared for use in a short sealing session such as we believe may have been taking place near the SBC silos. We believe they could function as a sort of multi-purpose tool, with the clay being used in both structural[50] and administrative fashions, sometimes within one sealing. Although some of the blanks certainly have enough clay mass to serve alone as sealings in and of themselves, it is these other more functional uses of small clay pieces, such as these blanks, that help bolster our interpretation.

49 Again, this agrees with the patterns noted in the 2012 SBC material, which provided an additional 17 blanks and 12 recycle/discards from the 2012 total of 47 sealing-related objects.

50 Informing our blanks hypothesis, but unfortunately outside the scope of the current article, is evidence of "two-part" sealings elsewhere in the AERA corpus. As it sounds, this means that a sealing consists of more than one piece of clay and demonstrates a multi-step process for preparing a sealing. In Sealing 2558, we see initial passes of papyrus or plant strap wrapped around a document, followed by a small blank-like clay piece placed on the papyrus and effectively serving as a piece of tape with which to secure the larger papyrus straps that were then wrapped around the document to hold it closed. Lastly, both the initial clay piece and the straps seem to have then been enveloped by a much larger barrel-shaped piece of clay, which was sealed by a cylinder seal on the obverse. Or, as in the case of Sealing 5324, a two-part jar sealing that shows the addition of a larger, exterior piece of clay over the initial piece applied to the textile-covered jar neck, perhaps the initial blank was deemed too small structurally to hold the sealing in place, necessitating the addition of a second piece. Additionally, see Nolan 2010, p. 104 for further discussion of multi-part Giza storage jar sealings.

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Although each blank is slightly different, their general characteristics are largely the same (fig. 11). They are most often oval or circular in shape, appear in profile as compressed hemispheres, generally appear to have smoothed front surfaces (often retaining palm- or fingerprints), and have back surfaces that are overall flat and often bear the impressions of temper such as sand and chaff. On occasion, the backs of these blanks also preserve impressions of what appears to be the interior carination of a ceramic tray (where the wall meets the base), as if they were prepared in small batches and set aside briefly on a tray while the jar, document, etc. was filled, folded, and tied prior to sealing. Some of these blanks show evidence of being impressed by a woven mat or the like, perhaps indicative of a light cover to protect them from drying out in the air and becoming too leather-hard for use. We do not believe these are "tokens" or game pieces as they are not prepared with the necessary care nor do they display the resulting evidence of finger modeling one might expect for such an object; also the nature of the SBC find-spots coupled with their large numbers seems to us to argue against such a usage for these objects.

The discards category is reserved for items made from sealing-quality clay that have been wadded up and crumpled (fig. 12). Their most diagnostic characteristic is that they bear fingerprints on multiple sides and have an exaggerated three-dimensionality and "used" character that the blanks do not have. Discards[51] frequently have "fold" or "joint" lines present on one or more surfaces, indicating extensive finger modeling and manipulation, but of a more haphazard and less purposeful nature than the blanks – as if they were applied, deemed structurally or functionally insufficient in some way, and therefore removed and discarded, or were remnants pinched off from larger pieces and deemed too small for use. Previous excavations at the Heit el-Ghurab site have produced examples of wadded-up discards with remnants of impressions from cylinder seals. One such example,[52] broke apart during registration, revealing interior impressions of the box the sealing originally sealed. As it seems unlikely that discarded clay would be shipped in from another site, evidence such as these examples suggests a strong connection between this class of sealing-related object and on-site sealing manufacture.

From the 2014 excavations, blanks were most common in features [33,239] (8 examples), [34,001] (5 examples), [34,465] (5 examples), [34,479] (5 examples), and [34,560] (6 examples). Similarly, discards were most common in features [34,560] (8 examples), [33,239] (7 examples), and [34,479] (4 examples). All of these features are in close proximity to the silos.

Overall, the SBC sealing and sealing-related objects make a significant and noteworthy glyptic corpus. Beyond the evidence they provide for the chronology of Complexes 1 and 2, we believe they are objects that represent a real working environment for multiple steps of the sealing process – potentially indicating a close relationship with the distribution of the contents of the silos in room B.

Alexandra Witsell

51 Often in internal gray literature meant for the AERA team, we have called these "recycled/discards". While we have no clear evidence of the recycling of these clay discards in levigation pits, nor the caching of them with the clear intent of doing so, we hypothesize that it is possible that rather than wasting the product they may have been "recycled" once too dry for use and the prepared clay reconstituted in a levigation pit for a second usage.

52 See Sealing 4550 from the Pottery Mound corpus of HeG: Nolan 2010, p. 311-313. This seal was reconstructed from a total of 22 separate sealings, further indicating a strong likelihood that its owner was an active sealing participant on site.

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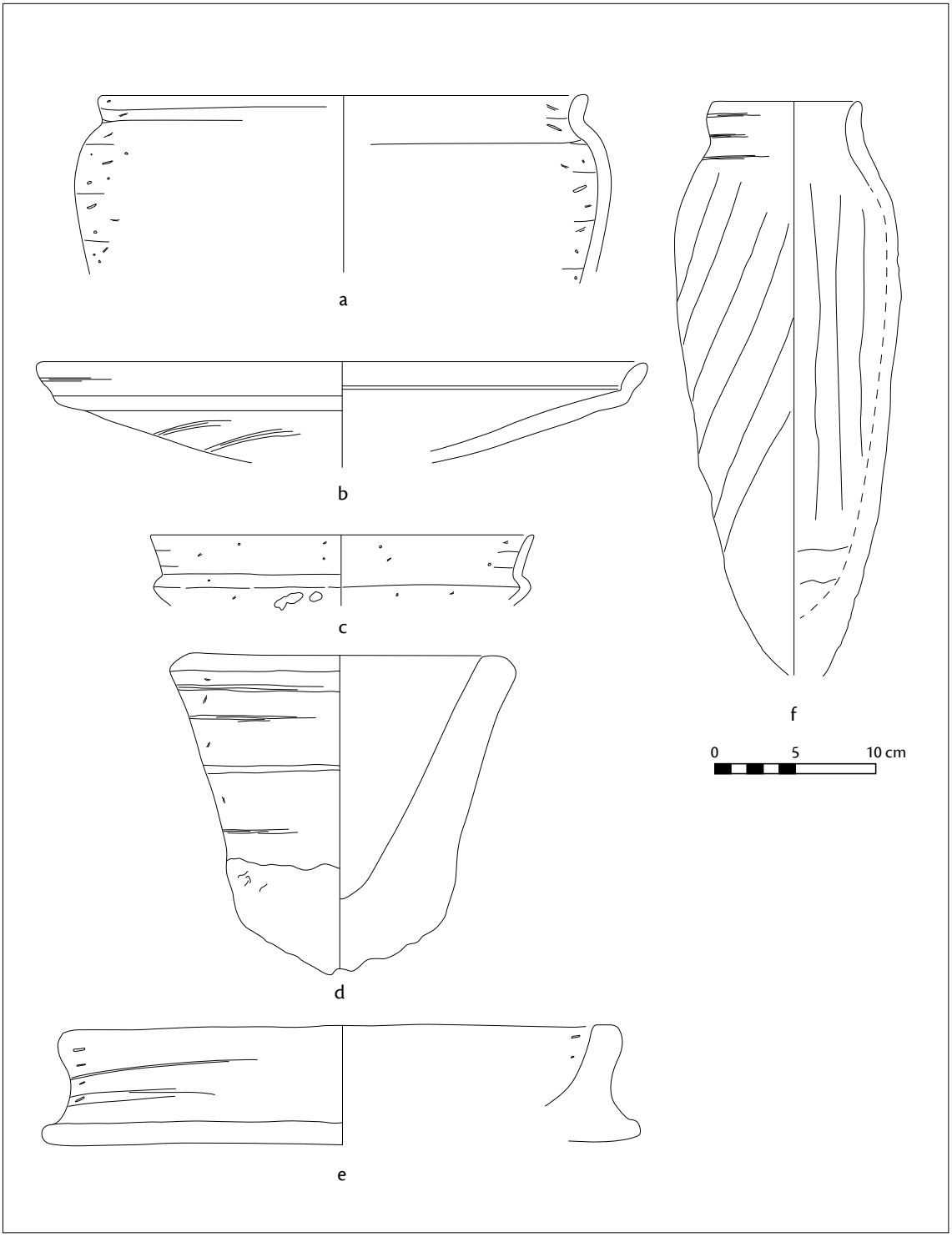


Fig. 13. **a.** Large red carinated bowl usually used for cooking or heating; **b.** Late Old Kingdom red carinated bowl (mid 5th-Dynasty onwards); **c.** late Old Kingdom red carinated bowl; **d.** Bread mold with slightly flattened base, representing the transitional stage between the conical and flat based shapes; **e.** Beer jar found on floor [33,284]; **f.** Late Old Kingdom bread tray.

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Ceramics

The ceramics recovered from the KKT-E+ area represent the largest sample of material culture recovered this season. Both the 2012 and 2014 SBC ceramic finds were crucial to developing the working typology we present here of, 4th-, 5th- and early 6th-Dynasty types (see table 2, fig. 13-16). Beyond the classification itself, the sample was also large enough to allow for a preliminary analysis by the stratigraphic phases as defined by the excavators.[53]

- Demolition and Abandonment Deposits

In the mud brick collapse, which covered the entire KKT-E+ area, there was no clearly 6th-Dynasty pottery; the pottery can be dated to the late 5th Dynasty. The percentage of miniatures in this context is very significant. They represent 20,9 % of the ceramics in feature [33,238], and 14,7 % in feature [33,255].

- Complex 2

The ceramics excavated from Complex 2 deposit [34,506] (beneath the silos) in sondage 183 were dated to the 4th Dynasty, but this feature was dated by only a few sherds of red carinated bowls.[54]

- Pottery from Inside the Silos

A number of features from inside the silos yielded samples of ceramics. The floor [34,517] in silo [33,437] contained 4 4th-Dynasty Maidum bowls, and using these we dated the feature to the 4th Dynasty.[55] This feature contains also a large Maidum bowl (fig. 13a). Most of the examples we found of this type bear black soot on the outer surface as evidence that the type was used for cooking or heating.[56] A small number of miniature plates were also represented in this feature. The make-up [34,500] for the lower floor in silo [33,438] was also dated to the 4th Dynasty.

The upper deposits in both silos contained pottery dated to the second half of the 5th and through into the 6th Dynasty (fig. 13, c, e).

- Deposits between the Silos and the Eastern Wall of Room B

In the dumped deposits in the small space east of the silos we grouped the deposits into two types of ceramic assemblage. The first group contained deposits [34,492], [34,512], [34,491], [34,479], and [34,476]. The pottery from these features was of the 5th Dynasty, except that in some features (such as [34,492]) there was a mixture of 4th- and 5th-Dynasty vessels. The percentage of stands in this group amounts to about 60 % of the total assemblages. The large number of stands is noteworthy, and some are complete. Beer jars are almost absent from this group.

The second group contained deposits [34,001], [33,242], [33,454]. In this group there was no difference in the dating, but the types were different. Bread production vessels such as bread molds, bread trays and platters represent the highest percentage in this assemblage, followed by beer jars. The sample includes one sherd from a white carinated bowl.[57] A 5th-Dynasty Maidum bowl is also represented.[58] A base of a bowl with mortar inside was found in this feature.[59] Cooking pots and miniatures are also represented.

53 We thank Katarína Arias and Peter French for their helpful comments.
54 VAN DER BEECK 2004, p. 270.
55 VAN DER BEECK 2004, p. 270.
56 HENDRICKX *et al.* 2002, p. 279.
57 WODZINSKA 2005, p. 405.
58 KAISER 1969, p. 57 (XIII-89).
59 RZEUSKA 2006, p. 446.

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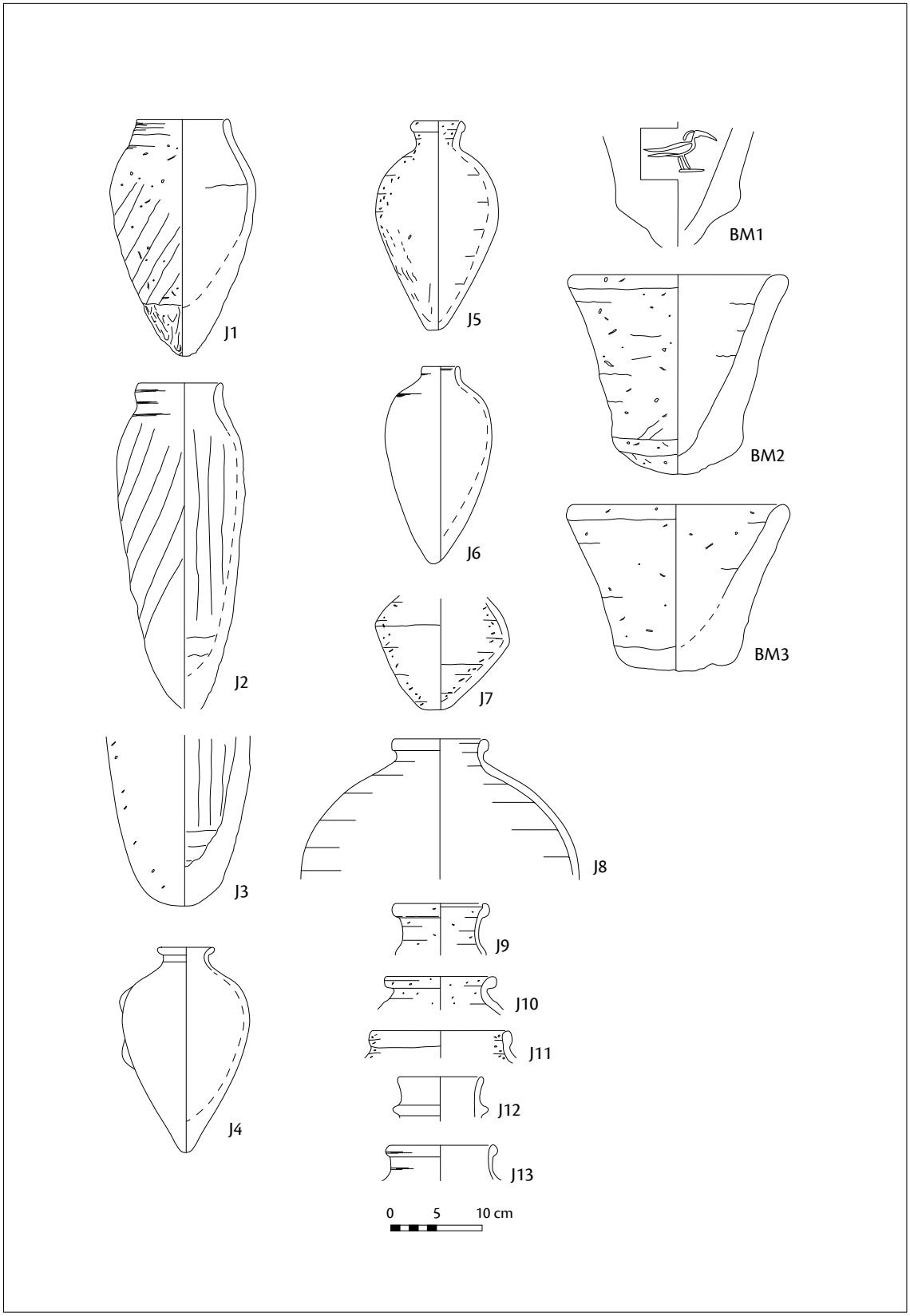


Fig. 14. Ceramic typology: Jars = J; Braed-molds = BM.
Drawings bu the ceramics team.

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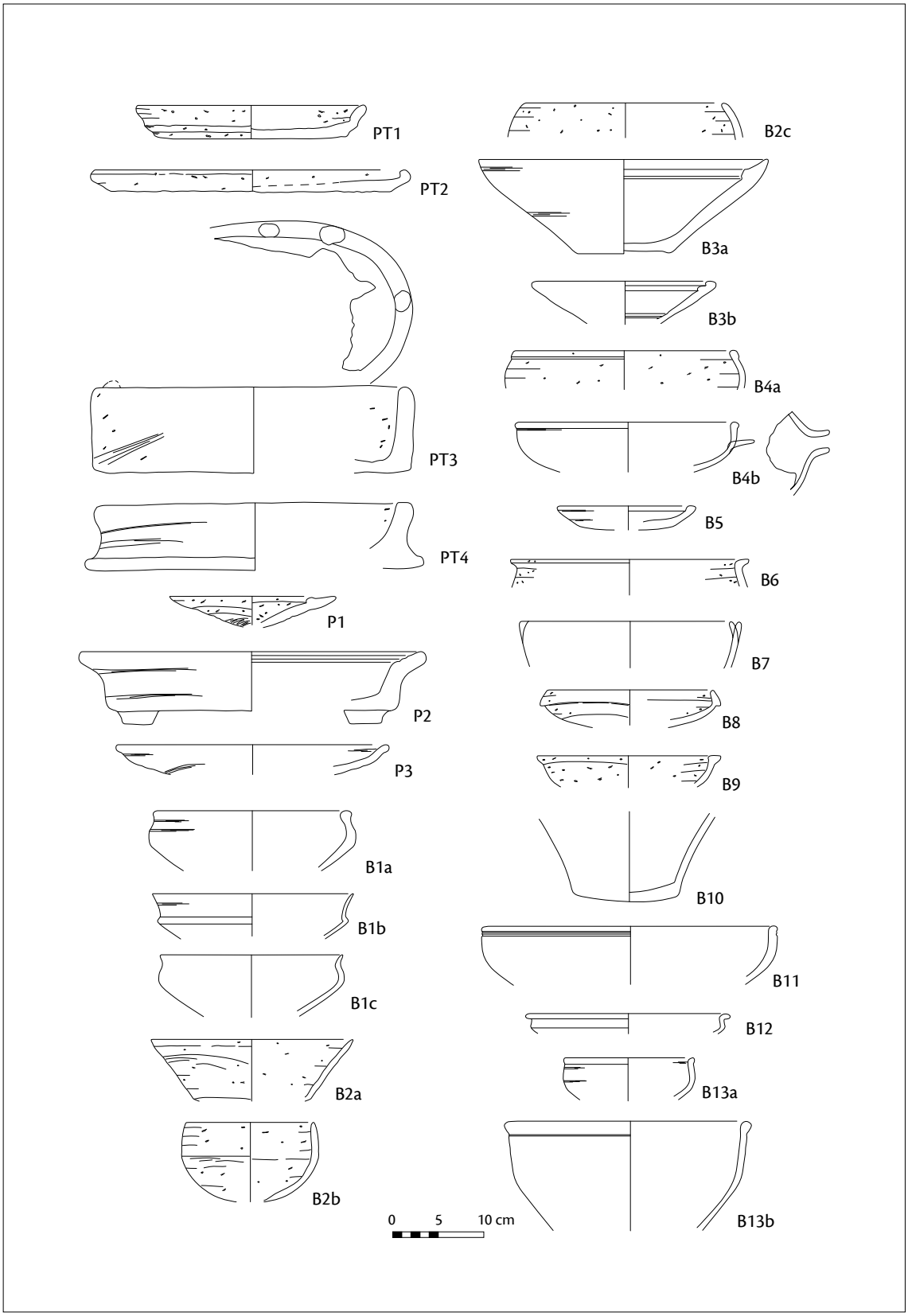


Fig. 15. Ceramic types: Platters = PT; Plates = P; Bowls = B. Drawings by the ceramics teams.

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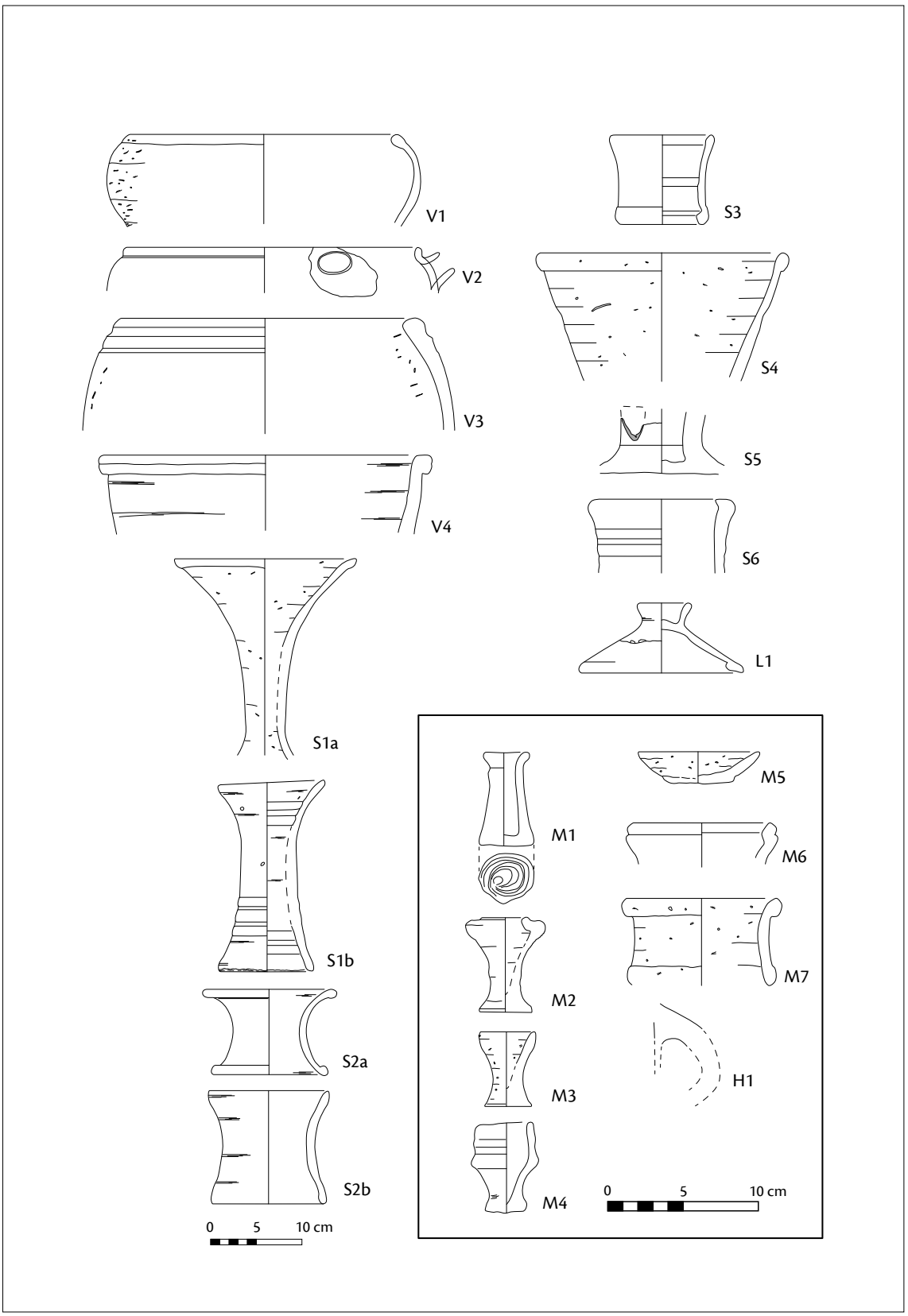


Fig. 16. Ceramic types: Vats = V; Stands = s; Lids = L; Miniatures = M; Handles = H. Drawings by the ceramics teams.

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- The Assemblage on the Floor of Room H

This assemblage, on floor [33,284], consisted of six beer jars, a bread tray and bread molds. The beer jars were all similar to each other; the height of the complete examples is about 0,33 cm. The form of the beer jars (fig. 13f) is similar to the jars found at Abusir and dated to the 5th- and the beginning of the 6th Dynasty[60]. The bread molds, with slightly flat base, represent a transitional stage between the conical bread mold type and the flat based one (fig. 13d). This type of bread mold is dated to the second half of the 5th Dynasty.[61]

- North of the Limestone Wall

The pottery-rich deposit [34,465], dumped slightly over the northern limit of limestone wall [33,452], clearly represents a mixing of 4th- and 5th-Dynasty ceramics. Beer jars were the most frequent type in this deposit. Cultic and funerary ceramics were also very frequent. One of the beer jars in this deposit was particularly interesting because we found inside it a bone from a sheep. This may be compared with an example of a beer jar from Saqqara filled with animal bones (mainly of bulls) mixed with sand, hematite, burnt pieces of plants and burnt bone. The Saqqara example was interpreted as a burnt offering to the deceased.[62] In our case the sheep's bone was found within lumps of mud in the vessel.

Deposit [34,465] included some fragments of high stands. Elsewhere, when found complete, this type of stand is 1 m high.[63] The stands, with a remarkable cut-out decoration, represent, together with the bread trays, the offering tables in tomb scenes.[64] These vessels, together with other material, indicate that this deposit might have come from tombs near to KKT-E+.

- Conclusions

The material from the makeup features and the foundation of the silos, even though it was scarce, contained 4th-Dynasty vessels and there was an absence of 5th-Dynasty material. Because the ceramic material from the floors inside the silos was also scarce they are unreliable for dating purposes. However, the upper occupation of room H (using the material placed on floor [33,284]) was clearly 5th-Dynasty. The demolition debris inside the silo was dominated by bread baking pottery (bread molds and bread trays). The date is the second half of the 5th Dynasty.

- Ceramic Typology

The typology of KKT-E+ materials from seasons 2012 and 2014 depends on shape. It is divided, according to the vessel index (the relationship of the rim size to the maximum body diameter), into four categories open: closed, non-container, and miniatures (fig. 14-16).[65]

Sherif Abd el-Moneim and Mahmoud el-Shafey,
assisted by Nermeen Shaban Aba Yazeed, Rudeina Bayoumi

60 Kytnarová 2011, p. 71, no. 15-3. AS38.2010.
61 Kytnarová 2011, p. 100, Fig 15-2. AS38.201).
62 Rzeuska 2006, p. 482.
63 Reisner 1955, p. 61, fig. 129.
64 Wodzinska 2011, p. 174.
65 Aston 1994, p. 179-181.

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The Faunal Remains

With only 418 fragments recovered the sample of faunal material is very small. Indeed, it was not possible to test many of the hypotheses set forth in the research design. But a number of interesting observations can be made even with this small sample.

Of the total of 418 fragments only 57 could be identified to genus. The distribution of identifiable fragments is provided in table 2. Mammals dominate the sample.

Feature	Bos taurus	Ovis-Capra	Sus scrofa	Felis sp.	Bufo regularis	Claris sp.
33,239	2	1	3			
33,255	1		1			
33,280	3		9		3	
34,001	2		3			
34,064			1			
34,465	3	3	3			
34,475	2	1		1	1	
34,476		1	1			
34,492	2	5				
34,560	1					
34,561	1					
34,562			2			1
Totals	**17**	**11**	**23**	**1**	**4**	**1**

Table 2. Counts (NISP) for Identified Fragments by Feature.

Cattle, *Bos taurus*, are represented by 17 fragments. The ratio of cattle to pig is 0,7:1 and the ratio of cattle to sheep-goat is 1,5:1. But since an adult male provides 7 to 9 times as much meat as a sheep, goat or pig, cattle are providing almost all the meat consumed in the area. Based on the fusion of long bones the cattle in the sample are young to very young.

A horn core from a young male *Bos taurus* was found in [34,492]. This is an important find as it is from the long-horned breed that is usually depicted in Old Kingdom tombs.

Sheep, *Ovis aries*, and goats, *Capra hircus*, are represented by 11 fragments. The five limb fragments that exhibited fusion suggest the animals were between 16 months and 24 months in age. There is no evidence of any animal surviving beyond 24 months. Three bones could be identified as sheep or goat and all are from the goat.

Pigs, *Sus scrofa*, are represented by the largest number of fragments with 23. The pigs are a mixture of age groups. Of 6 distal metapodials, half are fused and half are unfused. The distal metapodial fuses at 24 months of age. The pigs appear to have been slaughtered between 18 and 30 months.

The toad, *Bufo regularis*, is represented by 4 fragments all from around the silos. The fragments, based on color and condition, appear to be *in situ* and not intrusive. The toad needs to be near water for reproduction so this would argue that at least a seasonal body of water, possibly a harbor, was close.

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Fig. 17. A sample blade and blade fragments from feature [34,465]. Photograph by Alexandra Witsell.

The only identified fish bone was an opercular from the catfish, *Claris* sp. Fish are just represented by this specimen and six unidentified fragments. Based on the entire site sample for Heit el-Ghurab[66] one would expect 1.1 fish bone fragments for each identified mammal fragment. For the 2014 SBC sample this is 0.1, suggesting that fish were consumed at much reduced levels by the individuals whose garbage was recovered in SBC.

The relative abundance for the mammals in fauna remains from the 2014 excavations at SBC is very similar to those from the 2012 excavations. The samples in the 2012 excavations are larger (table 3), yet ratio of cattle to sheep and goat, and cattle to pig are very similar. This suggests that the pattern is real. The residents consumed cattle and pig, and small amounts of goat. Based on previous studies of the fauna at Giza,[67] the cattle would have been provided by the central authority and given the emphasis on forelimbs found in the 2012 sample (31 forelimb fragments and 4 hind-limb fragments) the cattle may be from offerings. Pigs would have been obtained by exchange or trade from individuals or a market possibly in Eastern Town. The use of goat is interesting and merits to be looked at in future excavations.

	2012	2014
Bos taurus	47	17
Ovis-Capra	31	11
Sus scrofa	91	23
Ratio of *Bos:Ovis-Capra*	1.5:1	1.5:1
Ratio of *Bos:Sus*	0.5:1	0.7:1

Table 3. A Comparsion of the counts (NISP) and Ratios of 2012 to 2014.

66 Redding 2010, p. 71.

67 Redding 2010.

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In general, the areas inside the SBC are very clean although the average fragment size inside SBC appears to be much smaller than in the Heit el-Ghurab site. It is unlikely that meat preparation and consumption was occurring in the areas sampled in 2014.

Richard Redding

Lithics

The lithic sample from the 2014 excavations at SBC is composed primarily of finished tools. Of 63 lithics, 35 are finished tools or used/modified blades. Only one small core was recovered along with 26 flakes. This included five cortex removal flakes.

The 35 tools include three flakes with use wear, three knife fragments and 29 blades with use wear, retouch or that were modified. Additionally, we recovered four blade blanks. The three knife fragments are all on an imported dark brown chert. The 29 blades and 4 blade blanks are all on an imported, high quality, beige chert, except for one which is made from a dark brown chert with red bands. One of the blades has been modified into a burin and another is a drill. Only one of the blades shows evidence of sheen. Only five lithics, all flakes, are on cherts that could have been obtained in the local gravels. The remaining 58 are on imported cherts. The high percentage of imported chert and low level of flake tools of local cherts is in contrast to areas of the nearby Heit el-Ghurab. This suggests that the tools may have been for higher status activities or were meant for higher status individuals.

The majority of the lithics, 47 of 63 pieces, come from feature [34,465]. These include a very high percentage of the tools (68 %). 21 of the blades are also from [34,465] including one cache of four very fine blades, shown in figure 17. Feature [34,465] is located just north of the limestone wall [33,452], which defines the northern limit of the SBC. Here there is a pottery- and charcoal-rich dump; with mixed settlement and funerary/cultic assemblages of 4th and 5th Dynasty dates. The high percentage of tools and near absence of cores of imported chert suggests that manufacture of the blades was occurring outside of areas of SBC sampled in 2014.

Richard Redding

Archaeobotany

Only charred plant macrofossils are preserved in the KKT-E+ area. The seeds and grains have been detrimentally affected by the fluctuating water table, presence of salts in the ground and the actions of modern plant roots; as a result relatively few specimens were recovered. Very few of the seeds retained sufficient morphological characteristics to allow identification of species, but most could be identified to plant genera or family. There was not a great deal of taxa diversity; this may be a result of the detrimental conditions, or, as discussed below, a result of the ancient activities which created this assemblage. This relatively low level of preservation of charred plant macrofossils is similar to the preservation we have seen in the nearby Heit el-Ghurab site which is also affected by the fluctuating water table and salts.[68]

68 See Murray 2011.

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Plant item	Total item count (partial + complete specimens)
Summaries	
Cereal grains	935
Cereal chaff	318
Wild grasses	6,543
All Legumes	6,585
(Trifolieae tribe)	5,086
(Vicieae tribe)	1,499
Other weeds	631
Edible	30
Cereals	
Hulled barley grains – *Hordeum sativum*	410
Barley chaff – *Hordeum sativum* rachis internode	6
Possible barley grain – cf. *Hordeum sativum*	3
Emmer wheat grains – *Triticum dicoccum*	332
Emmer wheat chaff – *Triticum dicoccum* glume bases	190
Emmer wheat chaff – *Triticum dicoccum* spikelet forks	122
Indeterminate cereal grain	190
Indeterminate cereal grain embryos	8
Total	**1,261**
Wild/Weed Species	
Ryegrass grain – *Lolium* sp.	5,358
Canary grass grain – *Phalaris* sp.	1,091
Indeterminate wild grass, type "A" (<2 mm length <1 mm width/breadth)	4
Prickly Scorpion tail seed – *Scorpiurus* sp.	1,747
Immature *Scorpiurus* sp. seed	55
Possible Medic seed – cf. *Medicago* sp.	148
Possible Sweet clover seed – cf. *Melilotus* sp.	77
Clover seed – Trifoliae tribe	2,683
Trifoliae tribe (small seeds <1 mm)	376
Bitter vetch seed – *Vicia cf. ervilia*	3
Possible Bitter vetch seed – cf. *Vicia ervilia*	12
Possible vetchling seed – cf. *Lathyrus* sp.	13
Legume seed – Viciae tribe	1,471
Indeterminate legumes (small seeded <2 mm)	289
Indeterminate legumes (large seeded >2 mm)	43

Table 4. Total seed / plant item count showing all genera with >2 items. 129 samples. Total sample volume = minimum 1118,6 litres.[69] Total items 16, 167. Approximate (maximum) density (items per litre) = 14,6.

69 Some samples volumes are missing from 2012 samples.

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Plant item	Total item count (partial + complete specimens)
Spikerush seed – *Eleocharis* sp.	374
Dock/Sorrel seed – *Rumex* sp.	229
Possible Rush seed – cf. Juncacae	13
Knotweed seed – *Polyganum* sp.	4
Purslane seed – *Portulaca cf. oleracea*	3
Goosefoot seed – *Chenopodium* sp.	8
Total	**13,862**
Possible Food Plants	
Lentils – *Lens* sp.	9
Possible lentils – cf. *Lens culinaris*	11
Chufa – *Cyperus cf. esculentus* tubers	10
Total	**30**
Indeterminate items	
Indeterminate vesicular item	943
Indeterminate "Textured" fragments	29
Indeterminate root/tuber fragments	21
Indeterminate wild grass grain	13
Indeterminate seed	8
Total	**1,014**

Table 4. Continuation and ending.

The samples from the KKT-E+ botany seems to suggest that the granaries in this complex housed grains which had already been fully processed – threshed, pounded and sieved to remove contaminants (weed seeds and chaff which were smaller or larger than the cereal grains, see table 5). The assemblage of weed seeds (and chaff items) in the KKT-E+ samples consists of items which are generally similar in size to ryegrass grains (the most prevalent crop weed in ancient Egypt, grains not dissimilar in size to cereal grains), with a remarkably low occurrence of cereal chaff. The fact that most of the assemblage is items which are all similar in size suggests that all the items derive from the same stage of sieving/hand-sorting (confirmation of this hypothesis requires multivariate analysis). The fact that there is very little chaff suggests that this had already been removed prior to storage. The "clean" processed grains in the granaries here required only one final stage of sieving or hand sorting to prepare them for grinding. The "waste" from this final stage of processing (ryegrass and other similar sized weeds – but almost no chaff) was then available to be used as tinder in hearths and fires.

This composition of the charred botanical assemblage – the low occurrence of cereal chaff compared to ryegrass and ryegrass-sized seeds (see table 5) – appears to indicate that the function of the SBC building may have been storage of clean grains, facilitating efficient flour production; lack of pounding/sieving resulted in lower labour costs and a more efficient operation. The fact that the grains were stored de-husked – thus more vulnerable to pest infestation – may indicate that this was seen as shorter-term storage.

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Items[70]	Ratio	Interpretation
Cereals: chaff & weeds	1:16.14	Indicating that this assemblage is clearly fuel made up of cereal processing by-products.
Ryegrass: all other weeds + cereal chaff	1:1.82	Highlighting the dominance of ryegrass in this assemblage; it makes up almost 50 % of the by-product assemblage.
Cereals: Ryegrass	1:7.22	Indicating that the grains have been removed – for grinding.
Ryegrass: All trifolieae tribe >1 mm (approx. same size as Ryegrass)	1.05:1	Seeds the same size as ryegrass, so remained in the mix of material used as fuel.
Ryegrass: Canary grass (small grained grass)	4.91:1	Indicating either that the smaller canary grass grains have been removed by sieving prior to storage, or that it was not such an abundantly present crop weed as ryegrass.
Ryegrass: Viciae & large legumes (approx. same size as Ryegrass)	3.47:1	Seeds the same size as ryegrass, so remained in the mix of material used as fuel, but not such an abundantly present crop weed as ryegrass.
Ryegrass: cereal chaff	16.85:1	The very low density cereal chaff item indicates that it must have been removed prior to storage.

Table 5. Comparative ratios of selected plant materials.

Claire Malleson

Objects

The objects excavated this season from sondages 182 and 183, indicate that the main activities in the area were food storage and preparation (attested by querns, grinders, lids, stoppers, and a stone vessel) as well as crafts (indicated by an anvil, ceramic tools, weights, whetstone, pounder, and pigment sticks). A gamer, a ceramic token and numerous faience beads were also found. These finds complement objects excavated in previous season, which were grouped into the following classes: personal adornments, crafts, administrative, gaming, household items, and statue fragments. Crafts attested in the area include grinding, construction/demolition, abrasion/whetting, drilling, weaving and fishing.

In 2014 three unique objects were excavated from sondage 183. They were a very large granite saddle quern (obj. 3900), a limestone plaque with raised-relief hieroglyphs (obj. 3875), and the prow of a limestone hedgehog-boat statuette (obj. 3876).

Of the four querns excavated this season, one (obj. 3869, quartzite) was found in room H on floor [33,824]; two other quartzite querns were found dumped behind silo [33,437] (quern 3897 from feature [34,479] and 3896 from feature [34,492]); and the fourth (obj. 3900) was excavated in room A.[71] Quern (3896) was reused as an anvil, as indicated by small drilled

70 Calculations are based on total number of items.

71 See also Aeragram 2012. We thank Giulio Lucarini for insightful comments on this find. Querns from HeG and KKT/MVT are grouped by shape into: saddle, boat, slab and flat/rectangular types: Adams 2002; Tavares, Malak 2011.

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Fig. 18. Limestone plaque, object 3875.
Photograph by Ahmed Ali Mohamed.

surfaces. Quern (3900) was an exceptionally large saddle-quern of red granite, [72] well-shaped and with clear indications of use. The quern was originally used longitudinally, and subsequently used laterally, i.e. grinding across the width. It was found on floor [33,999/34,000], and was probably originally placed against wall [33,262].[73] The close proximity, within a narrow space, between the large quern, the bin [11,250] and a cooking area against wall [33,411] have parallels from other sites.[74] At the HeG site, individual bakeries were distributed throughout the settlement, as well as being an integral part of most houses. Storage was centralized.[75] Large-scale grinding in the Old Kingdom seems to have been achieved by replicating a household mode of production – i.e. many small querns were used concurrently. The large quern (3900) seems to be an exception to this mode of production.

72 The measurements are: length 64 cm, width 36 cm, thickness 18 cm; height of concave lateral section 1,4 cm, height of longitudinal concave section 14 cm; base length 41,5 cm, width 26 cm; working surface length 35 cm, width 24 cm. Querns excavated at the HeG site vary from 25-40 cm. On a cursory search no Old Kingdom parallels were found although a large (52 cm) boat-shaped quern was excavated from the Middle Kingdom settlement at Kom el-Fakhry: Tavares, Kamel 2012.

73 Counter-intuitively, when grinding, users face a wall rather than brace their feet against it for extra leverage see querns *in situ* in ʿAyn Asil in Soukiassian *et al.* 2002, fig. 254, and tomb models in Tooley 1989. Quern emplacements, which raise the stone above the ground, seem to be attested only from the 11th Dynasty onwards: Vandier 1964, p. 296-297; Samuel 1989, p. 263-264, fig. 12.5-6.

74 The proximity, within the same room, of quern stones, mixing pits, sunken jars and cooking areas is quite striking at ʿAyn Asil: Soukiassian *et al.* 2002, p. 294-297, and particularly fig. 252; conversely bakeries can consist of more than one room.

75 For example bakeries in North Street Gate House: Lehner *et al.* 2009a; and House Unit 1: Kawae 2009b; for large storage silos in the Royal Administrative Building see Sadarangani 2009.

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Fig. 19. Hedgehog-boat, limestone, object 3876. Photograph by Alexandra Witsell.

A small limestone plaque (object 3875, fig. 18) with three raised-relief hieroglyphs was excavated outside silo [33,438].[76] The signs may be read as *smyt*, meaning desert or necropolis.[77] The plaque might have been inserted on the silo wall to indicate content[78] or allocation.[79]

The prow of a limestone hedgehog-boat model (object 3876, fig. 19) is the most unusual object excavated to date on the site.[80] "Hedgehog-ships" made of ceramic and faience have been excavated from Elephantine, Abydos, Tell Ibrahim Awad and Dahshur.[81] Object 3876 is the only known limestone example. It is also different in shape: more of a boat model than a flattened plaque. It comes from deposit [34,492] behind the silos. This was the first deposit laid down after the silos were built and rendered. This feature included also the quern stone with drill marks (3896), and almost complete pot stands and beer jars. The material was re-deposited, and although mixed, may in part have been originally from a cultic context.[82]

76 The dimensions are: height 8,4 cm, width 8,4 cm, thickness 3,6 cm, height of signs 0,5 cm. The signs are *s, t,* and three-hill sign, in Gardiner's sign-list O34, X1 and N25: Gardiner 1979.

77 We thank Stephen Quirke and Hratch Papazian for their helpful comments on this piece. Hannig 2003, [27700] p. 1181.

78 As in a model granary, where an hieratic inscription written above the granary hatches designates the following types of grain: *bš3, swt, išd, wꜥh*. The model is from Tomb 98, in Qubbet el-Hawa, dated to the 6th-Dynasty, now in the British Museum No. EA 21804, AN32302001: Budge 1887; Breasted 1948; Tooley 1989, p. 96.

79 Could the content of the SBC silo have been allocated to the necropolis (*smyt)* within a late functioning of the royal funerary cult?

80 The dimensions are: length 13,9 cm, width 5,1 cm, thickness 4,3 cm. Based on the example from Tell Ibrahim Awad, possibly half of object (3876) is preserved, suggesting an original length of approximately 28 cm.

81 We thank Willem van Haarlem and Julia Hamilton for their helpful comments. There over 41 examples from the Satet temple at Elephantine, from 5th-Dynasty dumped material. They are small, simple oval or lentoid-shaped faience plaques with a hedgehog head at one end and markings (spots) indicating hedgehog spines: Dreyer 1986, p. 76-79, pl. 37-39; Kopp in Raue *et al.* 2008, pl. II; Hamilton 2013. For a pottery example see Dreyer 1986, pl. 39, no. 243. For an example from Abydos see Petrie 1903, p. 28, pl. XI, 241; faience Ashmolean Museum, Model E74. An exquisite pottery example from Tell Ibrahim Awad, with internal details of the ship clearly modelled, was published by van Haarlem 1996, p. 197-198, fig. 1. Examples excavated in Dahshur, made of pottery, are closer in size to the SBC example: see Fakhry 1963, p. 14, pl. XLIX b, c.

82 The Dahshur and Giza hedgehog-boats seem to indicate that, after a certain time-lag, private votive objects could have been placed in royal valley temples, i.e. a 5th-Dynasty private deposit in a 4th-Dynasty royal temple. It is also possible that the Dahshur and Giza examples were originally part of a collection of private funerary equipment. However given that numerous Memphite Old Kingdom tombs have been excavated, if hedgehog-boat models were part of private funerary equipment it is likely that other examples would have been found.

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The hedgehog-prow boats, known as Henet-boats, are shown in 4th- and 5th-Dynasty tomb reliefs, many from Saqqara and Giza, in a procession with a papyrus rowing boat named a Shabet boat. H. Altenmueller argues that the Henet and Shabet boats are night and day barques, respectively, for the tomb owner's journeys.[83] Although depicting heavenly journeys, they might also refer to non-royal pilgrimages to "real" locations.[84] Hedgehog-boats are private votive objects found in temple contexts and indicative of popular beliefs.[85] The Elephantine examples were dedicated by private individuals at the Satet temple,[86] and the examples from Abydos and Tell Ibrahim Awad also come from provincial temples.[87] The original context of both the Dahshur and SBC finds is different, as they were excavated in the vicinity of valley temples rather than temples to local deities.[88] Could they be indicative of popular piety focused on earlier royal funerary monuments?

The finds from this season indicate that, together with other material culture and architecture, Complex 1 (and possibly Complex 2) was a storage, distribution and production building. In contrast the hedgehog-boat comes originally from a cultic context and suggests, together with the ceramics, that a room or chapel in a nearby cult structure may have been cleared and the material mixed and dumped, within a short period of time, in the SBC.

Ana Tavares, Emmy Malak

Conclusion

The preliminary reports above summarise the results of the 2014 excavations in the structure east of the Khentkawes valley complex. The work clarified dating, phasing and character of parts of this structure. Three distinct building phases were identified. They are designated as Complexes 1 to 3 (latest to earliest). We determined the stratigraphic relationship between the Khentkawes valley complex (in particular the basin and the open terraces) and Complexes 1 and 2. Ceramics and sealings indicate that Complex 2 may have been built in the 4th-Dynasty and that Complex 1 was built, functioned and was decommissioned in the 5th-Dynasty. Sealings

83 Henet-boat scenes come from tombs in Giza and Saqqara, with single examples from Hammamia, Zawyet el Maitin and Meir. Henet-boats were depicted exclusively in non-royal tombs, with the exception of the tomb of Meresankh III: Altenmueller 2000, Altenmueller 2002, Altenmueller 2007.

84 References to "real" places include sailing to Buto and rowing to Heliopolis (tomb of Kaninisut Giza, G 2155) and rowing in the Delta (Kaemheru Saqqara D2). While hedgehog-head boats appears often in scenes depicting day and night voyages to the "Canal of the West", the "Offering Field", and the "Beautiful West" see Altenmueller 2002, p. 278-279. Both W. van Haarlem and J. Hamilton consider that they may also refer to "real" voyages to Buto and other Delta locations, as part of non-royal pilgrimages (personal communication).

85 Kemp 2006, p. 118, 126-128, fig. 40, 44. On the connection between hedgehogs and ships see von Droste zu Hulshoff 1980, p. 95-115.

86 Dreyer 1986; Hamilton 2013. J. Hamilton highlights the absence of hedgehog-boat scenes at Qubbet el-Hawa although there are numerous boat models dedicated at the Satet temple. She suggests that the models could have been a substitute for the reliefs (personal communication). This makes the Memphite combination of reliefs and actual boat models (as exemplified by the Dahshur and Giza pieces) even more striking.

87 The Abydos plaques are listed with pre 5th-Dynasty finds: Petrie 1903, p. 28; the example from Tell Ibrahim Awad was excavated from the Old Kingdom temple: van Haarlem 1996.

88 The Dahshur examples were excavated outside the south enclosure-wall of the Sneferu valley temple with other dumped material: Fakhry 1963, p. 13-14. For recent excavations in this area see Alexanian *et al.* 2013.

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include the names of Menkaure, Userkaf, Raneferef, and Niuserre, as well as a mention of the pyramid "Enduring are the places of Niuserre" at Abusir. The material culture analysed provided ample evidence of administration, storage and food preparation (excluding meat preparation). Evidence of food consumption is ambiguous. The botanical samples indicated short term storage of partly-processed grain. This, together with the very large quern stone found in room A, suggests that large quantities of flour were being produced for bread baking. Most of the material culture can be characterised as settlement material with the exception of some dumped deposits, which contained ceramics and objects originally from either the cemetery or the cult structures nearby. The position of this complex, adjacent to the valley complex of Khentkawes and just south of the Khafre valley temple, and the depth of material culture preserved, make it central to our understanding of how royal funerary complexes and "pyramid towns" functioned and were administered.

Abbreviations used

AERA	Ancient Egypt Research Associates
asl	Above Sea Level
HeG	Heit el-Ghurab
KKT	Khentkawes town
KKT-E	Khentkawes town – east
KKT-E+	Khentkawes town, area to the east of the valley complex
KKT-N	Khentkawes town – north
LOE	Limit of excavations
MVT	Menkaure Valley Temple
NISP	Number of Identified Specimens
SBC	Silo Building Complex
SLR	Southern Lateral Ramp
NLR	North Lateral Ramp

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