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## TELL EL-AMARNA, 2014–15

By BARRY KEMP

Three separate field projects were undertaken between late 2014 and early 2015. The first was a re-examination of a small workshop in the southern part of the city first located by the EES in 1922. The second was a further period of re-examination of the front part of the Great Aten Temple. The results add to the sense of disconnection from the cult of the Aten as portrayed in the tomb pictures. The third is a new venture, the excavation of a cemetery of the Amarna period towards the northern end of the site, where the purpose is to broaden the basis for understanding the factors which bore on the lives of the inhabitants of the city.

بارى كامب

تل العمارنة، موسم 2014-2015

نفذت البعثة ثلاث مشروعات منفصلة نهاية موسم 2014، ثم بداية موسم 2015. كان المشروع الأول إعادة فحص ورشة صغيرة كانت جمعية استكشاف مصر EES قد حددت موقعها عام 1922 في الجزء الجنوبي للمدينة. أما المشروع الثاني فكان إعادة فحص الجزء الأمامي لمعبد أتون الكبير تفصيلياً. أكدت النتائج الاتجاه لتوقف عبادة أتون كما توضح رسوم المقبرة. تمثل المشروع الثالث في بدء حفائر جديدة في جبانة تعود لعصر العمارنة باتجاه النهاية الشمالية للموقع، لفهم أكثر للعوامل الكامنة في حياة سكان المدينة.

BETWEEN autumn 2014 and early summer 2015 several periods of excavation and study took place at Amarna (fig. 1). The following summary presents results mainly in chronological order. Funding was, in part, through the Amarna Trust, a list of donors to which can be found in the Trust's newsletter, *Horizon*, which also contains short illustrated accounts of the fieldwork.<sup>1</sup> Funding for specific parts of the work is acknowledged in each of the ensuing sections. Foremost thanks go to the Ministry of State of Antiquities, including the staff of the Minia and Mallawi offices, for permitting and facilitating work both on the various sites and in the magazines, including that at el-Ashmunein. The Amarna Project runs under the aegis of the McDonald Institute for Archaeological Research, University of Cambridge

### **Excavation of a bead workshop M50.14-16 (Anna K. Hodgkinson)**

Between 18 October and 13 November 2014, excavations were undertaken in the Main City South at Amarna. The team consisted of Anna Hodgkinson (field director), Susan Kelly, Ashley Bryant, and Kimberley Watt, and inspector from the Ministry of State for Antiquities, Mohamed Khalil. The work was funded by grants from the

<sup>1</sup> <<http://www.amarnaproject.com>> and <<http://www.amarnatrust.com>>.

G.A. Wainwright Fund, the Corning Museum of Glass (Rakow Grant), the Association for the History of Glass and the Thames Valley Ancient Egypt Society.<sup>2</sup>

The work focussed on the area of a building complex (figs 2, 3) denominated M50.14–16 by C. L. Woolley, who initially excavated these buildings in 1922: ‘At point X, remains of a glaze kiln: pit cut in sand 1.00 m diam. by 0.50 m deep, full of burnt brick, glass and glaze slag, and fragments of the pots used in the kiln for standing the vessels on: the bottoms and sides of these are covered with tricklings of glaze.’<sup>3</sup>

The modern surface of the southern courtyard M50.14 was found covered with vitrified mud-brick and sandstone fragments, something known from other glass-working kilns in ancient Egypt, most notably from Amarna itself: site O45.1 in the Main City North, which was excavated in the 1990s by Paul Nicholson.<sup>4</sup> The excavation revealed no similar structure, however, although the concentration of vitrified material indicates that firing had taken place in cave-like structures or small pits that had been cleaned out. Instead, the courtyard yielded much evidence of other industrial activity, including glass-working, faience manufacture, and chalcedony or agate working, alongside some tools.

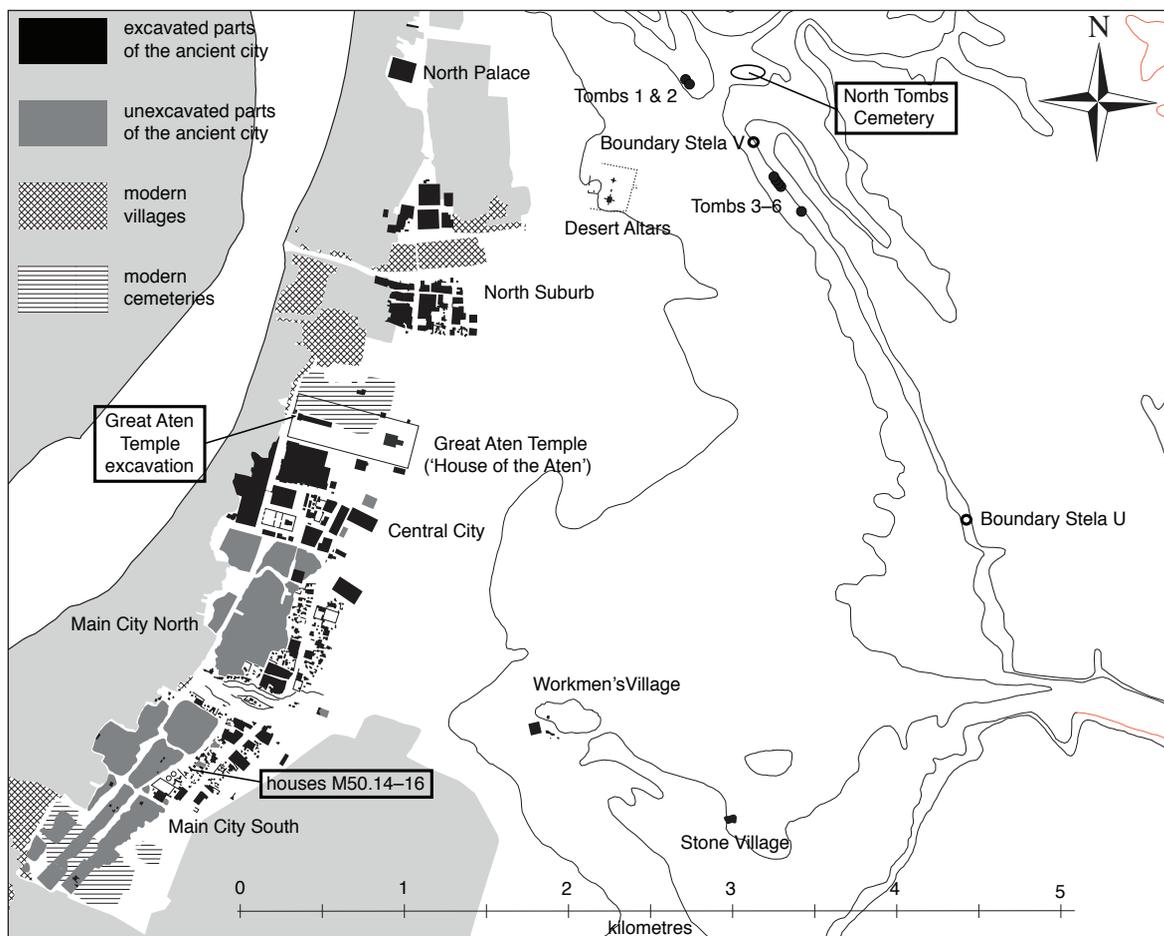


FIG. 1. Map of Amarna showing the three areas of excavation described in the report.

<sup>2</sup> A more detailed report is A. Hodgkinson, ‘Archaeological Excavations of a Bead Workshop in the Main City at Tell el-Amarna’, *Journal of Glass Studies* 57 (2015), 279–84.

<sup>3</sup> T. E. Peet and C. L. Woolley, *The City of Akhenaten*, I (EES EM 38; London, 1923), 19.

<sup>4</sup> P. T. Nicholson, *Brilliant Things for Akhenaten: The Production of Glass, Vitreous Materials and Pottery at Amarna Site O45.1* (EES EM 80; London, 2007).

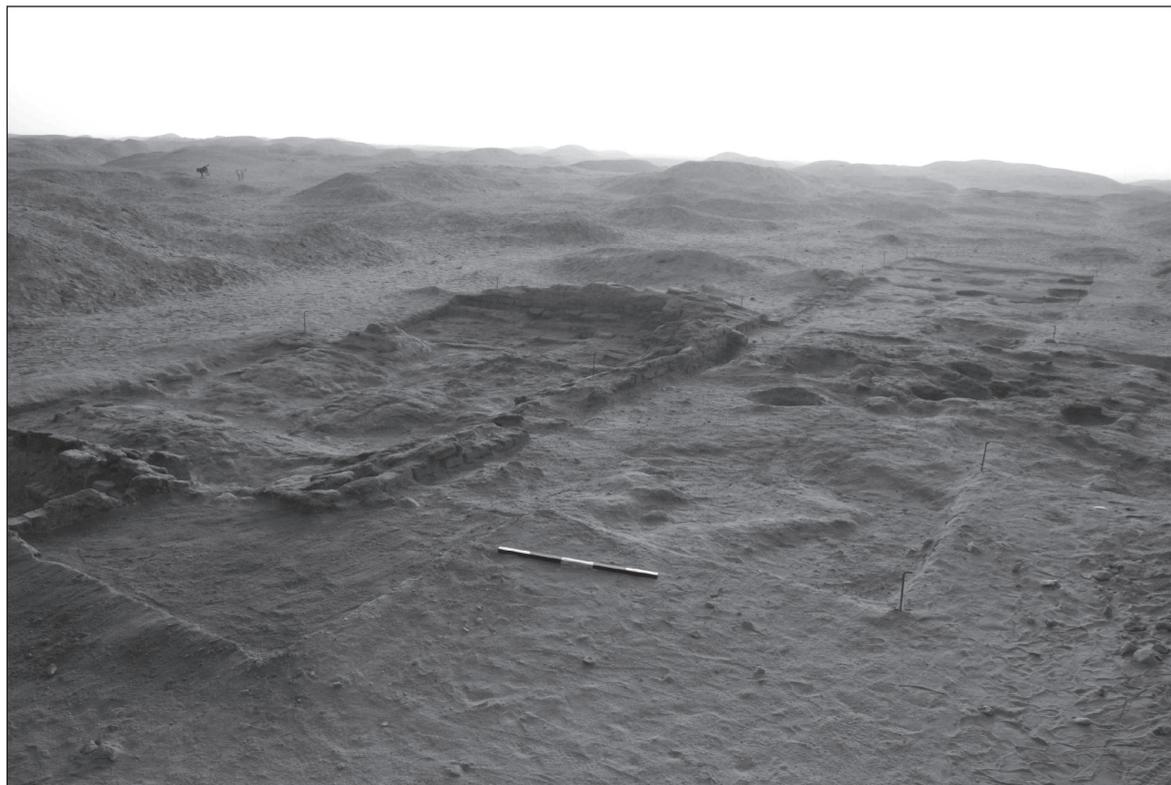
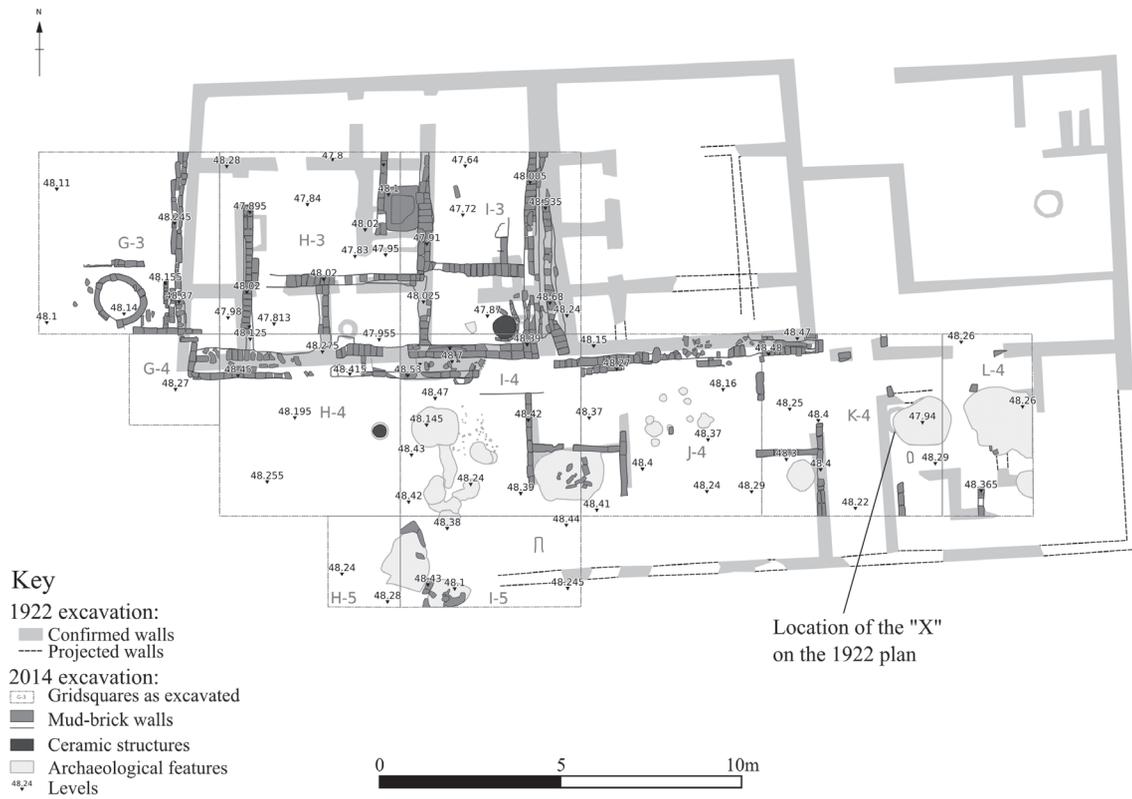


FIG. 2. Top: The house group M50.14–16 as planned in 1922 (light grey), overlaid with the plan made in 2014 (dark grey).  
 FIG. 3. Above: Site M50.14–16 as excavated on November 2014, looking north-east. (Photo by Anna Hodgkinson.)

Overall, the finds are indicative of a bead workshop (fig. 4). Amongst the finds were 329 fragments of glass, particularly chippings of ingots, and 116 fragments of glass rods, bars and strips, indicating that the processing of glass took place. Furthermore, multiple fragments of ceramic cylindrical vessels, probably used as moulds for glass ingots, were found (fig. 5). One large fragment of a glass ingot and a smaller, complete one form part of the assemblage. In order to produce beads, glass-rods would have been wound around copper-alloy rods, of which 15 were found. Two undecorated, dark-blue glass vessel fragments may demonstrate that the decoration of such vessels took place at the site. Other finds included more than 400 faience and glass beads of various of types, including manufacturing errors, five faience moulds and over 100 faience amulets, tiles and other fragments. A large quantity of red-banded chalcedony or agate pebbles and working debitage demonstrate that this material was worked into small beads and pendants.

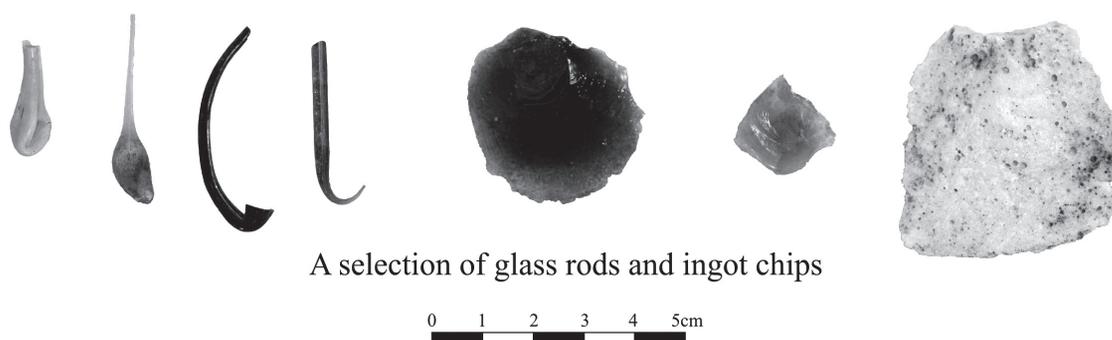


FIG. 4. Selection of small finds comprising glass rods and ingot chips.

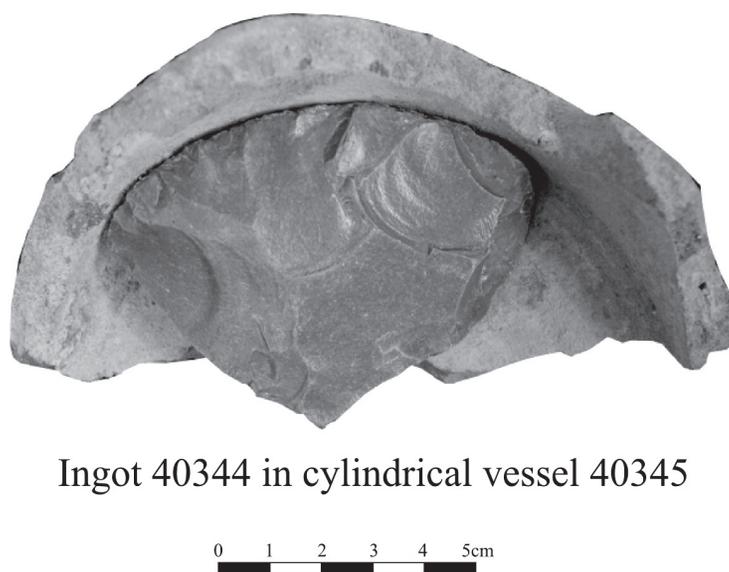


FIG. 5. Blue glass ingot obj. 40344 resting in a fragment of ceramic cylindrical vessel obj. 40345 (they were not found together).

Approximately 60 m<sup>2</sup> of the adjacent house M50.16 were excavated, the preservation of the walls being poor. Within the south-eastern part, a small, open courtyard contained a round oven with ceramic lining, which was most likely used for the preparation of food. Secondary building M50.15 to the east of M50.16 remains unexcavated.

It can be concluded that the excavated workshop must have processed relatively large quantities of glass. These finds have to be regarded in the context of the excavations at the nearby house of Ranefer and the small adjacent house group,<sup>5</sup> and support the hypothesis that this area of the city was somewhat specialised in this activity. A second season of excavation is planned for the autumn of 2016.

### Great Aten Temple

**(Barry Kemp, Miriam Bertram, Delphine Driaux, Anna Hodgkinson,  
Sławomir Jędraszek and Sue Kelly)**

The work at the Great Aten Temple ran between 7 February and 26 March. The archaeological team comprised Barry Kemp (director), Miriam Bertram, Delphine Driaux, Juan Friedrichs, Anna Hodgkinson, Sławomir Jędraszek, Sue Kelly and Julia Vilaró. Marsha Hill recorded stone fragments; Yann Hamon set up a system for low-level vertical photography. A group of four trainee inspectors joined the expedition for one month: Mona Abd el-Daim Naan, Martha Atef Eissa, Alzahra Ahmed Abd el-Fadel and Samah Yussef Muftah. The site inspector was Mr Said Abd el-Malek Abd el-Hamid; the inspector responsible for the magazine was Mr Mustafa Ali Mahmoud. We are greatly indebted to both of them, as to their colleagues in the inspectorate of South Minia. The work was funded through the Amarna Trust and included donations from the Egyptian Department of the Metropolitan Museum of Art, New York, and the Huis van Horus Foundation of Leiden (specifically for new limestone blocks used in recreating the temple's outline).

The work at the temple continued a programme, begun in 2012, to re-examine the site and to make it more intelligible to visitors and more secure for the future.<sup>6</sup> The 2015 season covered several areas around the front of the main building, designated A to E (which apply only to this season). The map (fig. 6) indicates the location of each area. The excavation was conducted within a grid of 5 x 5 m squares.

*Area A, covering squares F25, F26, G25, G26, H26–H29, I26–I29, J26, J27*

The area includes the mud-brick *temenos* wall and southern mud-brick pylon tower, and part of two parallel lines of lime-gypsum foundations for offering-tables. The supervising archaeologists were Miriam Bertram and Anna Hodgkinson. The southern end of the south pylon was exposed, along with part of the wall itself. The corners of the pylon were square, with no trace of a torus moulding. The outer face preserved areas of mud plaster coated with whitewash. On both sides of pylon and wall narrow foundation trenches cut into the existing mud-coated floor were visible.

<sup>5</sup> B. J. Kemp and A. Stevens, *Busy Lives at Amarna: Excavations in the Main City (Grid 12 and the House of Ranefer, N49.18)* (EES EMs 90, 91; London, 2010).

<sup>6</sup> For previous reports, see B. Kemp, M. Shepperson and A. Hodgkinson, 'Great Aten Temple', in B. Kemp, 'Tell el-Amarna, 2011–12', *JEA* 98 (2012), 9–26; B. Kemp, M. Bertram, A. Hodgkinson and S. Kelly, 'Great Aten Temple', in B. Kemp, 'Tell el-Amarna, 2012–13', *JEA* 99 (2013), 20–32; B. Kemp, M. Bertram, D. Driaux, A. Hodgkinson and S. Kelly, 'Great Aten Temple', in B. Kemp, 'Tell el-Amarna, 2014', *JEA* 100 (2014), 1–17.

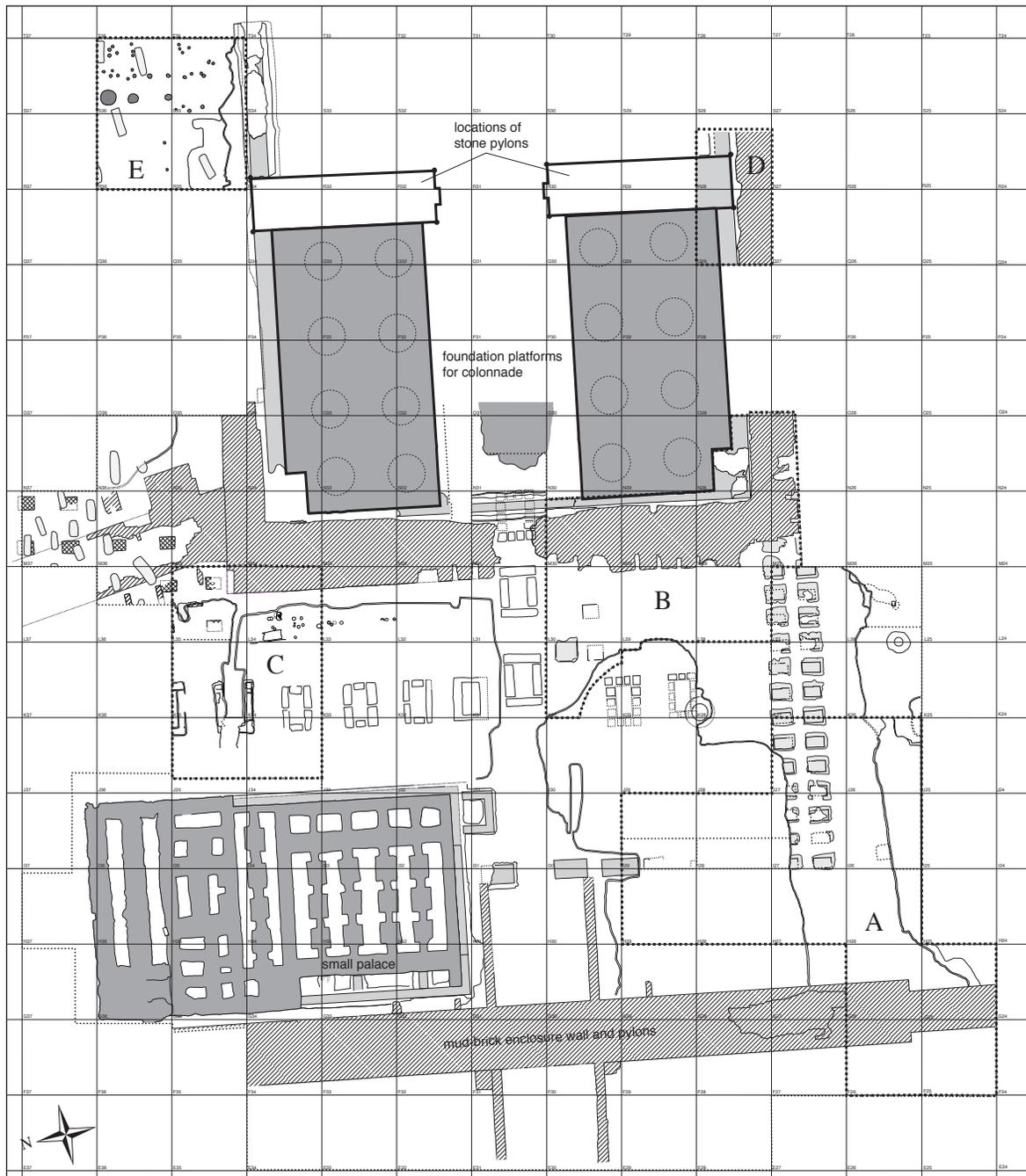


FIG. 6. Plan of the front part of the Great Aten Temple, showing areas examined in 2015. The lettering of areas A to E relates only to the 2015 season.

On the inside of the *temenos* wall and pylon the ancient floor had been exposed in 1932 by a wide and irregular trench which had been cut through the thick layer of mud-brick rubble—‘levelling rubble’—which had been used to level up the temple ground between the time of the first and second temples. Except for a narrow strip along the south side of H26, the excavation here and in the adjacent squares to the east was limited to removing the sand and other debris that had partly filled the trench since 1932. Much of the original mud floor had therefore been exposed to weathering for a time.

After the clearance of square H26 of its modern overburden it was decided to remove the levelling rubble from along the south side. It was composed of mud-brick rubble in which were mixed potsherds, many of which were blue-painted, stone chippings, occasional worked stone pieces, much debitage from chalcedony working as well as numerous incense bowls, some of which still had remains of charcoal adhering to them.

The floor of the wide 1932 trench ran eastwards, as far as the thick mud-brick wall which stood in front of the concrete pedestal for the southern group of large columns. Two parallel lines of offering-tables had been built here, from talatat blocks laid on separate rectangular beds of lime-gypsum cement. In 2014 the eastern half of this layout had been excavated. This year the western half and the eastern end (as far as the broad mud-brick revetment) were completed, bringing the total number of bases in each of the two parallel lines to 14, the easternmost pair slightly overlapped by the brickwork itself.<sup>7</sup> Each lime-gypsum cement base had filled a separate shallow pit cut into the desert and been topped with a layer of lime-gypsum mortar into which the limestone blocks for the offering-table had been set. No linear string marks in ink to guide the builders were visible on the bases, and the block impressions do not all appear to be exactly aligned, indicating a rather hasty style of working.

For some of the northern row of offering-table bases uncovered in 1932 only the southern half had been exposed (although planned as complete), so that the northern half was still covered by levelling rubble. Below this came a thick mud floor which ran unbrokenly over the bases (fig. 7). This indicates that they had already fallen out of use

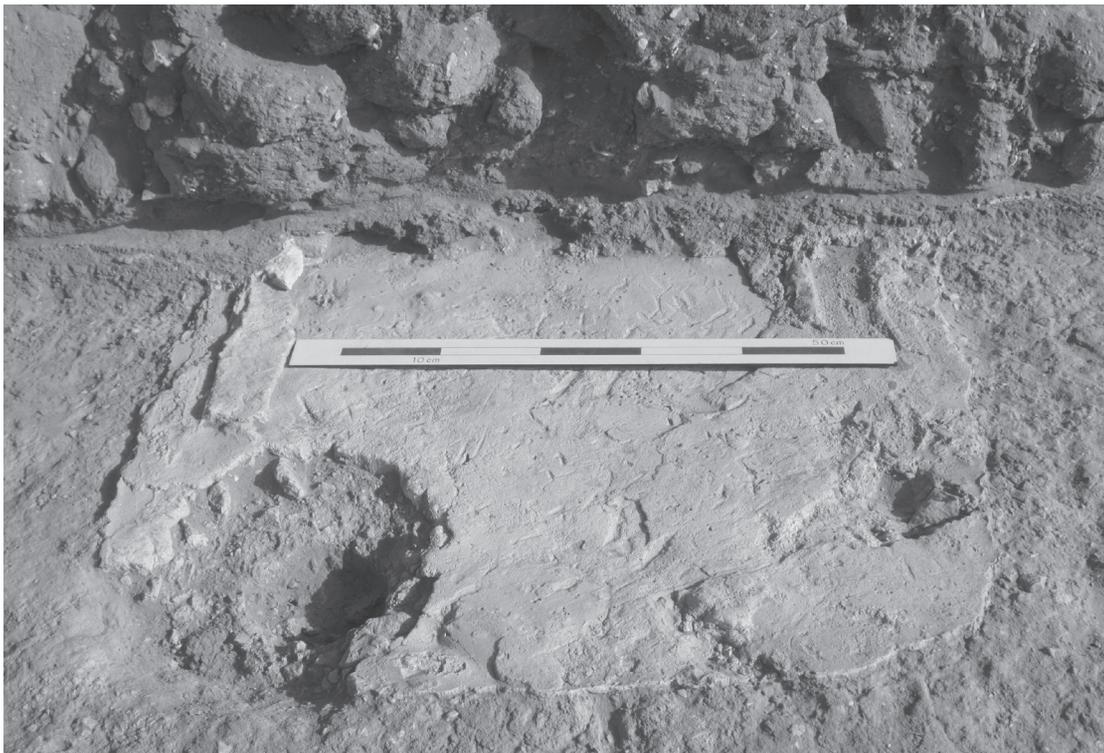


FIG. 7. View northwards of the northern edge of the newly cleaned 1932 excavation trench. The layer of levelling rubble covers one of the cement bases for an offering-table. A small amount of the lime-gypsum mortar for the limestone blocks abuts the left edge of the scale. Between the rubble and the cement base runs an unbroken line of thick mud floor. (Photo by Anna Hodgkinson.)

<sup>7</sup> J. D. S. Pendlebury, *The City of Akhenaten*, III (EES EM 44; London, 1951), 5, pls iii, xxv.3.

and been rendered invisible prior to the laying-down of the levelling rubble. By contrast, two 1932 photographs (EES archive 32/12, 32/35) show three of the easternmost bases with up to two courses of limestone blocks standing in place (and so presumably buried by the rapidly constructed temporary brick wall). This first set of stone offering-tables had therefore had two separate histories: one in which a western group was removed and floored over and the other in which an eastern group remained standing until the early phase came to an end. A square outline, defined by mostly eroded mud floor, natural desert surface and some sub-circular patches of mud, together with a prominent line of whitewash in the south-western corner of grid square I26, may be the remains of a separate mud-brick offering-table in this area.

So far the field of mud-brick offering tables to the south, recorded by Flinders Petrie and by John Pendlebury, have lain just outside the southern limits of the excavation.<sup>8</sup> They have been plotted in fig. 8 on the basis of the old plans, but their distance from the temple enclosure wall must be considered an approximation.

Having removed, in the first part of the season, the last of the old spoil heaps from the front of the temple, a large area of levelling rubble became available for examination. A 2-m wide trench was dug down into it along the west side of I28 and I29. One purpose was to expose again, at the level of the lower mud floor, part of a limestone-block pedestal which had been discovered in 1932 and of which the northern part had been exposed again in 2013. As the season ended, the lower floor became visible in I29. The southern end of the limestone-block pedestal was in place and the edge of the 1932 pit was visible. Immediately south of this pit the mud floor continued across the trench. Not far along, patches were visible showing through the mud floor of an underlying layer of lime-gypsum mortar bearing the impressions of limestone blocks. This points to the presence of another offering-table of the earliest phase. The possible trace of another was visible at the southern end of the trench but verification of this must await a future season. In square I28 the work ended before the earlier mud floor was reached.

*Area B, the excavation area covering squares K30, L28–L30, M27–M30, N27, N28*

Area B embraced two distinct parts: on the east, the southern half of the thick mud-brick wall believed to have been a temporary construction feature. Here the supervising archaeologist was Juan Friedrichs who exposed and planned the complete spread of brickwork and the lime-gypsum foundations for the wall of stone blocks which had surrounded the foundation platform for the southern colonnade. To the west lay an irregular area, composed of squares L28–L30, and the northern half of K30. The supervising archaeologist for this part was Sławomir Jędraszek.

Within K30 lay a square pedestal of lime-gypsum concrete, 1.5 x 1.6 m and 0.25 m high, which had been made in sections. It had been exposed in 1932.<sup>9</sup> The base of the pedestal rested on the top of several layers of mud floor which had been preserved only beneath the pedestal. The design of the pedestal suggests that it was created on the floor of a pit dug from a higher level which can only have been the top of the levelling rubble. This implies that more than one course of talatat blocks was built above it, to provide a solid foundation for what could have been an isolated stone offering-table. Close to the south of the pedestal, traces were discovered of a mud-brick offering-table

<sup>8</sup> See the references in Kemp, *JEA* 100, 10, note 12.

<sup>9</sup> It is marked on the plan, Pendlebury, *City of Akhenaten*, III, pl. III.

which had been built directly on the desert surface and then surrounded by the early mud floor. A thick patch of white plaster lay against the southern side. Further to the east, traces were also found of a second mud-brick offering-table, its remains reduced to a thin layer of mud dust.

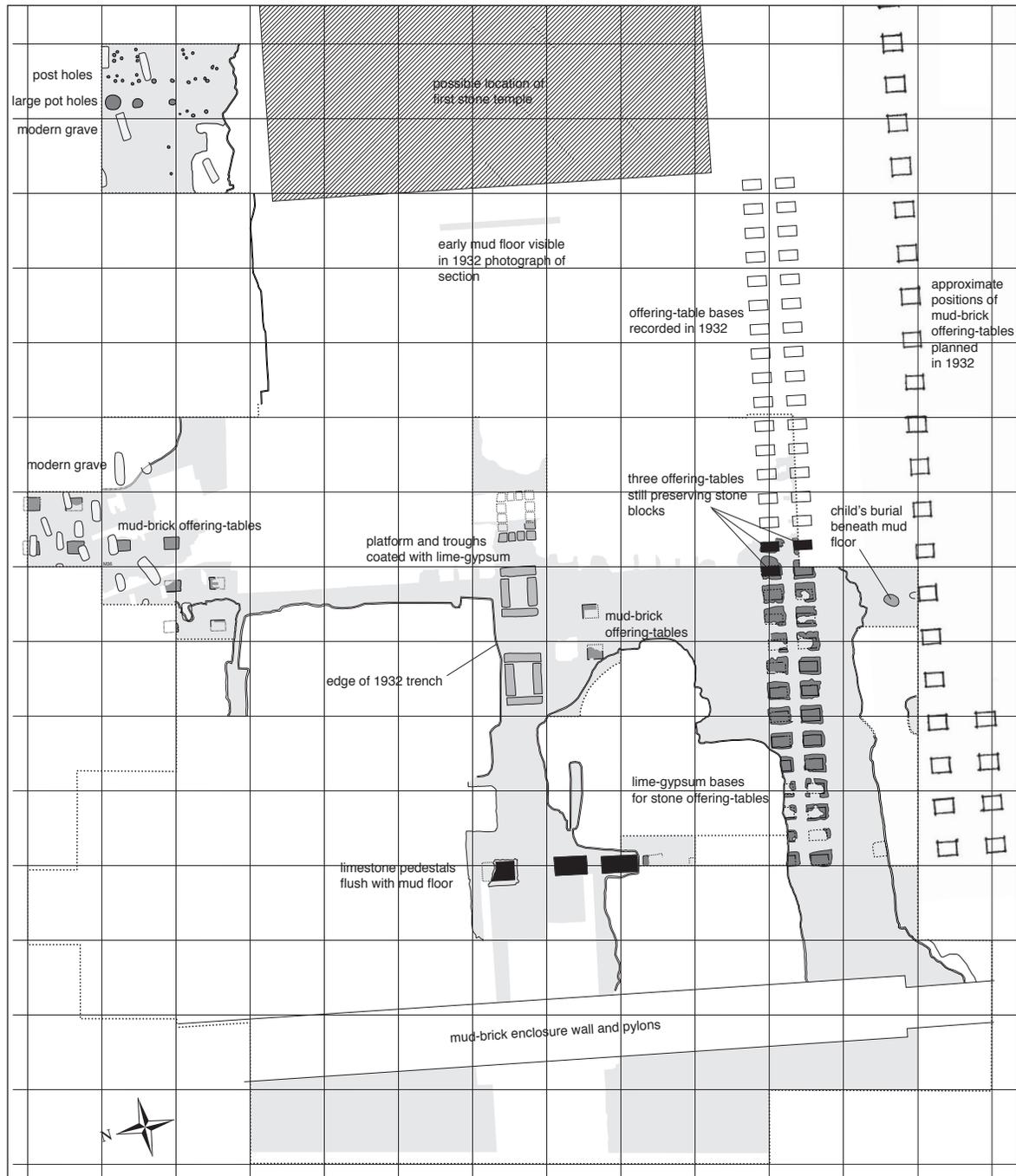


FIG. 8. Plan of the mud floor (rendered pale grey), which rests directly on the desert surface, and of the features directly associated with it.

*Area C, the excavation area covering squares J34, J35, K34, K35, L34, L35*

Area C is at the northern end of the excavation, lying between the Small Palace and the northern of the two platforms for large columns. The supervising archaeologist was Sue Kelly. Square L35, however, was excavated by a group of four trainee inspectors: Mona Abd el-Daim Naan, Martha Atef Eissa, Alzahra Ahmed Abd el-Fadel and Samah Yussef Muftah, who worked under the supervision of Miriam Bertram.

In previous seasons a row of three sets of rectangular basins lined with lime-gypsum plaster and surrounding a rectangular platform was excavated to the south.<sup>10</sup> This year three more such sets of basins were located, continuing the north–south line. The southernmost one continued the same pattern as the others but, when the temple was abandoned, was in the process of being altered by the renewal of the basin dividers, which had not yet been coated with white plaster.

The middle set had been largely destroyed by the trench of a previous expedition (presumably that of 1932 and made in the search for a set of stone offering-tables corresponding to that to the south) which had cut through the middle. Only the outer halves of the basins on the north and south sides remained, with traces of the dividers. Of the northernmost set of basins only the southern half lay within the excavation area. The thin surface layer of sand and dust was removed, but time did not permit any further investigation. As the season ended all three sets were covered with a protecting layer of sieved material.

The basins had been dug within the levelling rubble which created the ground for the second temple. The 1932 expedition had cut a wide trench through it, from north to south, to define the western edge of the wide brick wall which runs alongside the northern column foundations (marked on figs 6 and 9, occupying the present excavation squares M/N32, M/N33). This left a strip of levelling rubble, about 3 m wide, between the edge of the trench and the basins. The surface of the strip had been altered by human activity that involved distorting the ground through saturation with water and through removing patches of the surface by shallow digging which had then filled with fragments of limestone, apparently from the breaking up of architectural elements. In L34 the alteration of the mud surface had left a series of small circular holes, of a diameter suited to the common small pottery storage jars of the period. It had also left an irregular shallow trench with smooth, prepared sides that was partly filled with mud containing plant material, and other poorly defined areas seemingly of similar character. A small patch of lime-gypsum cement bore the remains of a layer of mortar, implying the presence of one or more limestone blocks. Could this, too, have been an offering-table (fig. 9)?

On the lower mud floor of L35, beneath the levelling rubble, the remains were found of more badly preserved offering-tables of mud brick. They had been built directly on the desert surface, the mud floor (which had been white-plastered) having been laid subsequently. Scattered across the square were also fragments of mud-brick walls which belong to an intermediate stage of use, after the mud-brick offering-tables had been destroyed but before the levelling rubble had been put down. They could be connected with the temporary mud-brick construction ramp crossing the north-east corner of the square.

<sup>10</sup> Kemp, *JEA* 100, 5

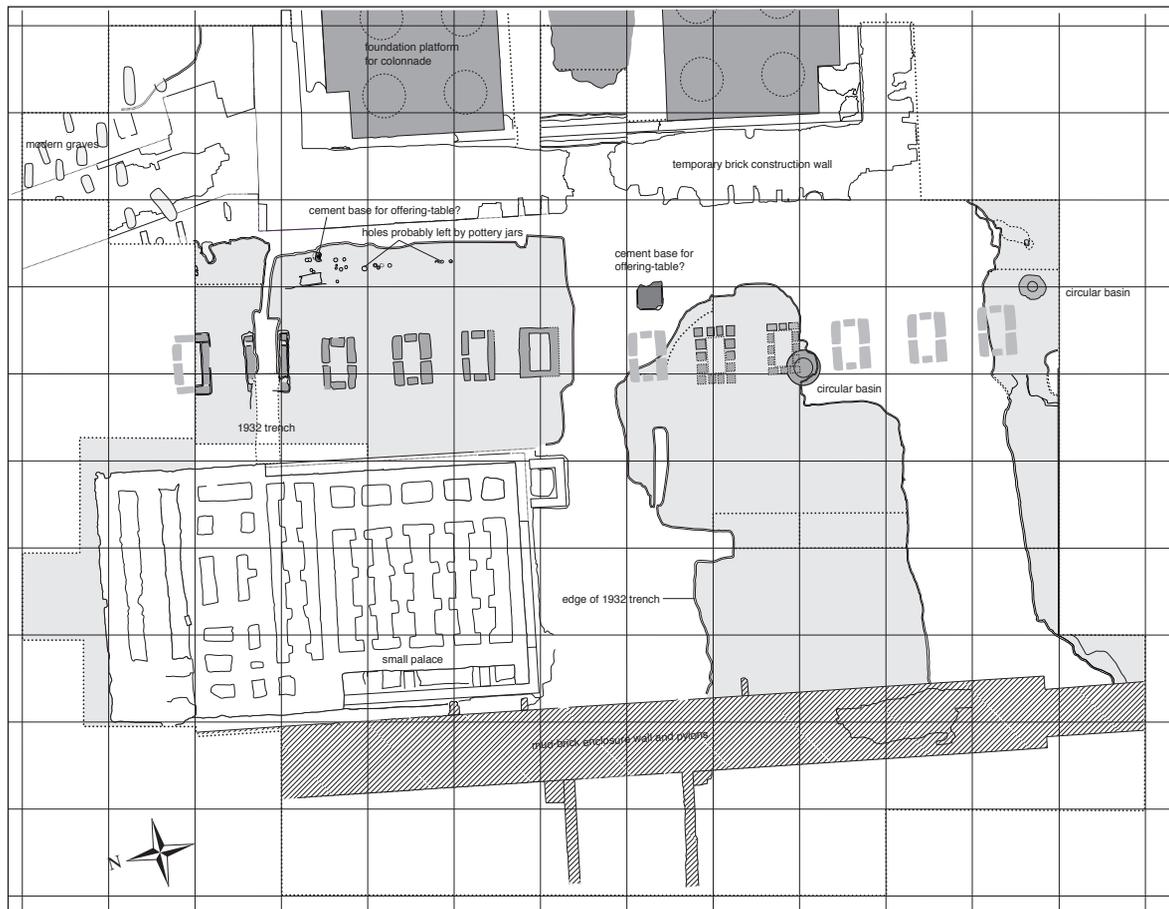


FIG. 9. Plan of the surface of the levelling rubble (rendered pale grey), which was the surface of the temple in its final phase, and of the features directly associated with it.

*Area D, the excavation area covering squares Q28, R28*

Area D lies at the south-east corner of the southern lime-gypsum concrete platform for large columns. The supervising archaeologist was Barry Kemp, assisted by Miriam Bertram. The purpose of excavating across two 5 x 5 m squares was to determine the exact width of the stone pylons which flanked the main entrance to the stone temple. Where the north pylon had stood, all trace of the foundations had been destroyed before the 1932 excavation had taken place. The foundations for the south pylon had, however, remained intact at the southern end, where it joined the south wall of the temple. The sand and dust which had gathered since 1932 were removed, exposing a well preserved area of lime-gypsum concrete on which were marked the impressions of many of the talatat blocks which had formed the lowest course of stones. The width of the pylon could then be fixed as 3.37 m. This measurement was used when setting out the lines for the builders to follow as they reconstructed the north pylon.

The cleaning of the wall foundation trench also clarified how the wide brick wall had been constructed, in part directly over irregular heaps of stone chippings, and how it had been covered by a thick layer of lime-gypsum concrete which must have represented an extension to the south of the floor on which the large columns had stood. These observations confirmed the temporary nature of this thick wall.

*Area E, the excavation area covering squares R35, R36, S35, S36*

Area E comprises a block of four 5 x 5-metre squares: R35, R36, S35 and S36. They are located near the northern edge of the site, a short distance to the east of the foundations for the northern pylon. The southern side of the excavation area approximated to the foundation trench of the north wall of the stone temple, which had been emptied of its sand and studied in 2013.<sup>11</sup> The supervising archaeologist was Delphine Driaux, assisted by Julia Vilaró.

Before the work began it was natural to assume that a field of mud-brick offering-tables extended across the north side of the temple enclosure, an extension of those found in 2014. The block of squares for 2015 was accordingly laid out leaving a gap of 20 m from the 2014 work, in the expectation that the pattern of offering-tables would continue across it.

The entire area was covered with a thin layer of greyish-brown dusty sand. The removal of this exposed the flat top of a compact layer of rubble made from broken mud bricks and brick dust, between 20 and 30 cm thick. It is a continuation of the levelling rubble found across the whole front of the temple. The surface approximates to the ground level of the second phase of the temple although this must have suffered from erosion. In the western part of R36 a thin but compact layer of limestone chippings underlies a thin layer of mud, which could be the last remains of the mud floor of the second phase of the temple. No other features which could belong to this phase were identified.

This surface had, however, been cut by five pits that had been filled with loose yellow sand and pebbles. They are oriented approximately east–west and were found to descend below all of the ancient archaeological layers. They must be graves of the Islamic period, of which several, in an identical condition, had been discovered further to the west in 2014. One of the pits, in the north-west corner of R36, was covered with the tail of a mound of white dust and chippings that is almost certainly a dump from the 1932 excavations. This agrees with the finding, by the 1932 expedition,<sup>12</sup> of ‘modern’ graves inside the first court of the stone temple (some were located in 2012 in square W33). In none of the cases did we remove the fill of the grave pits to a significant depth.

The layer of levelling rubble covered (and so protected) a mud floor laid over a flat and even surface of compacted desert and which showed smoothing marks from a tool. The floor comprised at least two surfaces containing much plant material. In places, and especially in the south-west corner of R35, were patches of white powdery material. Also covering the mud floors were patches of a separate hard and lumpy mud floor the surface of which was distorted as if it had been extensively wetted.

Across the floor were small and roughly circular depressions with a diameter of between 15 and 20 cm (fig. 10). When examined further they were identified as circular holes with generally vertical sides. They appear to be more numerous in S35 and S36, but the examination of all of the possible holes in R35 and R36 was not completed. Many are likely to be post holes. Squares S35 and S36 are crossed by perhaps ten holes in what is close to a single north–south line. Towards its southern end the holes

<sup>11</sup> Kemp, *JEA* 99, 27–8

<sup>12</sup> Pendlebury, *City of Akhenaten*, III, 14, n. 3, 15, n. 1.

correspond with a strip where the upper layer of mud floor has been worn away. A similar though not so well defined strip occurs to the west, along the western edge of S35, where a group of four holes occurs.

A second group of three much larger and deeper holes forms a line parallel to the main line of smaller holes in S35 and S36, and about 1 m to the west. They have depths of 1.01, 0.74 and 0.52 m. Traces of mud line the sides, especially in the case of the largest and northernmost. There can be little doubt that these holes were dug to receive pottery jars which were then fixed in place with mud mortar, their mouths flush with the mud floor. The northernmost would have suited one of the large, wide-bellied storage jars sometimes referred to as 'meat jars' although they served as general storage jars and were not only for meat.<sup>13</sup> The jars had been removed before the levelling rubble was laid down. A better understanding of this part of the site should come from extending the area of excavation in the future, including to the west, to join up with the area where the same mud surface supports mud-brick offering-tables.

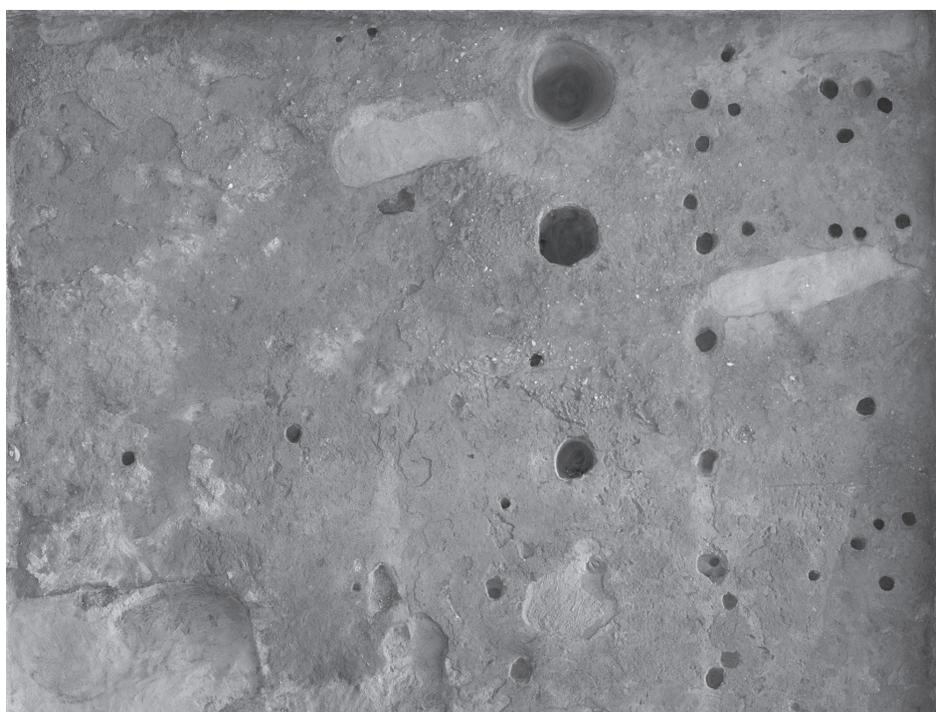


FIG. 10. Vertical photograph of the mud surface in squares R35, R36, S35 and S36 showing post- and pot-holes. North is towards the top. (Photo by Yann Hamon.)

Delphine Driaux suggests that the posts might have supported a cord or line on which were hung strips of meat as part of the curing process which preserved meat in the manner of biltong. An example of this scene occurs on a limestone block from the Great Palace at Amarna.<sup>14</sup> Once the curing was finished, the next step (insofar as we understand the process) was to pack the meat into storage jars for transportation and longer-term storage. This does not quite correspond to the picture we otherwise have

<sup>13</sup> Pamela J. Rose, *The Eighteenth Dynasty Pottery Corpus from Amarna* (EES EM 83; London 2007), 129–30, Type MF1.4.

<sup>14</sup> Pendlebury, *City of Akhenaten*, III, pl. lxviii.9.

of the temple cult, that it centred on the presentation of offerings of fresh produce. Strips of meat bearing the impressions of the strings by which they were hung have been found in some royal tombs at Thebes but this seems not to have been a widespread practice.<sup>15</sup> An alternative explanation for the post holes is that they supported an awning or shelter, in which case the buried pots might have formed a row down the centre, taking into account the possibility that there are more post-holes to be uncovered in R35, R36. This could have been for the benefit of those who were present to participate in ceremonies.

### Discussion

Fig. 8 shows the features which have so far been found on the mud floor laid directly on the desert and later buried by the levelling rubble or the mud-brick wall used in the construction of the later stone temple. The irregular shape of the exposure in part reflects the outlines of the trenches dug in 1932. We have to imagine that somewhere to the east (and probably behind the pylons of the second stone temple)<sup>16</sup> stood a stone temple that was demolished as part of the rebuilding which took place after Akhenaten's year 12 had commenced.<sup>17</sup> By this time the mud-brick enclosure wall and its mud-brick pylons had been built across the front but, to begin with, the site might have been open. In this respect, it would have resembled the Small Aten Temple. The re-examination of the front of this building in 1988 and 1989 showed that the mud-brick offering-tables here had initially spread on to ground in front of the mud-brick pylons.<sup>18</sup> The pylons had subsequently been built across many of the offering-tables, at the same time creating an enclosed space for the temple.

The layout at the front of the Great Aten Temple is sufficiently extensive as to suggest at least a partially autonomous field of activity. At its centre were the platforms and basins laid out along an east–west line which coincided with the axis of the later stone temple (though not quite the axis of the ramps associated with the gateway between the mud-brick pylons). To the north and south were groups of offering-tables, some made from limestone blocks, many more made from mud bricks. They were not built and maintained as a single arrangement. Instead the arrangement gives the impression of serving a system which was responding to changing demands and could accept *ad hoc* changes and cheap and hasty constructions.

At this time in Egyptian history multiple offering-tables are most conspicuously shown as adjuncts to the cult of the Aten. But they make an appearance in another context as well. One theme in the decoration of tombs of the late Eighteenth Dynasty and into the Ramesside period is a funerary garden.<sup>19</sup> Offering-tables appear to surround a pool

<sup>15</sup> See especially S. Ikram, 'Did the Ancient Egyptians Eat Biltong?', *Cambridge Archaeological Journal* 5 (1995), 283–9.

<sup>16</sup> That the mud floor extended at least as far as the outermost stone pylon is implied by its appearance in a section across the 'causeway' between the two sets of large columns recorded in a 1932 photograph, EES archive 32/3, the context of which is apparent from 32/37. Photograph 32/17 is probably another view. For these photographs, see <<http://www.amarnaproject.com/documents/pdf/Annotated-Lavers-plan-EES-photos.pdf>> and <<http://www.amarnaproject.com/documents/pdf/EES-photographs-1932.pdf>>.

<sup>17</sup> For the year 12 label see Kemp, *JEA* 99, 28, and *Horizon* 13, 8–9.

<sup>18</sup> M. Mallinson, 'Excavation and Survey in the Central City, 1988–92.' In B.J. Kemp (ed.), *Amarna Reports*, VI (EES OP 10; London, 1995), 169–74.

<sup>19</sup> B. Geßler-Löhr, 'Die Totenfeier im Garten.' in J. Assmann (ed.), *Das Grab des Amenemope, TT41* (Theben 3; Mainz, 1991), 162–83. Particularly informative is the scene from the tomb of Apuia (no. 6) and a relief in Copenhagen (no. 4), both of the time of Tutankhamun/Horemheb.

of water in the middle of which stands a rectangular island on which rites—especially that of Opening of the Mouth—are performed over the coffin or mummified body of the deceased. Boats ply the pool in which fish and water-lilies live. Could our pedestals surrounded by basins have been central to funerary ritual at Amarna for which the Opening of the Mouth ceremony was retained? Some of the prayers in Amarna rock tombs do express the wish for the deceased to receive offerings in the House of the Aten.<sup>20</sup> If the basins represent the surrounding pool it would imply a miniaturisation of ritual landscape.<sup>21</sup> For such, though with different imagery, the Workmen's Village supplies a good example, in the T-shaped basin in front of one of the chapels which was provided with a tiny quay flanked by stairs modelled in gypsum,<sup>22</sup> the village also the source of pieces of wooden model boats.<sup>23</sup> Yet the subdivision of the basins, sometimes into small square tanks, subverts a similarity to a surrounding pool, and suggests that the waters had a more specific use, of benefit to those taking part in whatever activity was central to the platform.

The platforms and basins remained a feature of the second temple phase. Now modelled in the surface of the levelling rubble they ran in a north-south line (fig. 9). The discovery that Pendlebury's workmen had dug through the middle of one of them makes one wonder if his workmen had done the same in the creation of the wider trenches to the south. In fig. 9 possible additional examples have been added, which help to explain the location of the otherwise isolated circular reservoir at the southern end. But if offering-tables were an important accompaniment in the first period, why not in the second period? So far, only two can be recognised with some probability, both of limestone blocks. The surface on which they might appear has not, however, been preserved over most of the site, where it is more or less the same as the present surface which has seen centuries of weathering and human activity. The artistic sources also show that offerings were not only laid out on solid offering-tables but on portable stands, some of them wooden tables.<sup>24</sup>

#### *Material found during the excavation*

The last of the 1932 dumps and our own cuttings into the levelling rubble produced many fragments of decorated stonework, including the feet of a limestone statue (material studied by Marsha Hill), more pieces of decorated faience inlays, a group of mud sealings, many from wine jars, concentrated towards the southern part of Area A (especially square G25) and broken examples of sculptors' guidance pieces made in gritty lime-gypsum of which examples have been found previously at Amarna.<sup>25</sup> Some

<sup>20</sup> W. J. Murnane, *Texts from the Amarna Period in Egypt* (Atlanta, 1995), 131, 151, 160, 173, 188, 194, 120.

<sup>21</sup> As suggested for the tomb pictures in Gefler-Löhr, in Assmann (ed.), *Grab des Amenemope*, 177-8 where the idea is also discussed that a full-sized version of the core concept—an island surrounded by water—might be the Osireion at Abydos.

<sup>22</sup> F. Weatherhead and B. J. Kemp, *The Main Chapel at the Amarna Workmen's Village and Its Wall Paintings* (EES EM 85; London, 2007), 75, 116, fig. 2.3; 134, pls 2.1-2.4; B. J. Kemp (ed.), *Amarna Reports*, I (EES OP 1; London, 1984), 11-13.

<sup>23</sup> A. Stevens, *Private Religion at Amarna: The Material Evidence* (British Archaeological Reports International Series, 1587; Oxford, 2006), 115-6; B. J. Kemp, 'Report on the 1986 excavations: Chapel 556', in B. J. Kemp (ed.), *Amarna Reports*, IV (EES OP 5; London, 1987), 82.

<sup>24</sup> In the scene in the tomb of Penthu (no. 5) the offering-tables inside the temple appear to be of wood, although those outside the front seem to be solid, N. de G. Davies, *The Rock Tombs of El Amarna*, IV (EES ASEM 16; London, 1906), 2-3, pls vi, vii.

<sup>25</sup> Peet and Woolley, *City of Akhenaten* I, 112, pl. xxxii.3 and .5 (from Maru-Aten); Pendlebury, *City of Akhenaten*, III, 60, pl. lxxi.7 (from the Great Palace).

of this material was the subject of study and recording by Barry Kemp and Miriam Bertram in the period 19 May–14 June, the MSA inspector being Mr Ahmed Wagih Anwar.

*Reconstruction of the northern side to the entrance system*

In 2014 the work had begun of recreating in new materials the outlines of the northern part of the entrance system of the stone temple in its second phase. To this end, the western and northern deep foundation trenches had been filled with a network of small limestone blocks which acted as a solid foundation for a final layer of Tura limestone blocks cut to talatat size. The work was done by a group of builders from El-Till, led by Shahata Fahmy Abd el-Sittar. In 2015 the scheme for this part of the temple was completed. The internal structure of the north platform had already revealed that eight large columns had stood on it, in two rows of four running east–west. To begin with, therefore, the position of each of the columns was laid out as a square foundation of small limestone blocks. A circular pad of white cement reinforced with iron rods was created on each of these foundations, using a circular iron mould, 2.5 m in diameter. As they dried, the builders sprinkled damp orange sand over the surface to have a mellowing effect on the colour of the cement so that it matched the colour of the Tura limestone. At the end of the season, a layer of this sand was also spread around each column base, hiding the square foundations.

Once the creation of the eight circular column markers had been completed, the builders turned their attention to the north pylon itself. Nothing of the original foundation survived but, as noted above, the cleaning of the lime-gypsum foundation layer in Area D established that the width of the pylon was 3.37 m. The northern limit of the pylon is fixed by the line of the northern stone wall of the temple. The southern limit has to be estimated, since the lime-gypsum foundation layer seems to have run fully across the wide space between the two concrete pedestals. In theory, each pylon could have extended part of the way across this gap, making it narrower. The gap measures c. 8.5 m, allowing for the presence of the stone walls built against the faces



FIG. 11. View eastwards of the final stage in marking the position of the northern stone pylon in Tura limestone blocks and the positions of the large column bases with circular pads of slightly tinted white cement.

of the pedestals. At the Small Aten Temple, the gap between the outermost mud-brick pylons is 11.1 m, though each one had a central ‘nib’ projecting into the space.

Using the Small Aten Temple as a guide, and preferring the simplest solution, the pylon was built as a rectangle, 3.37 m wide and to the full length of the platform (including outside walls) of 12 m. A block with a circular moulding on the outer corner was set at each corner, and a small projecting ‘nib’ added to the middle of the south face. The foundation of the pylon, built as a network of walls of small local limestone blocks, was raised to the same height as the top of the layer of Tura blocks around the other three sides of the platform. The course of Tura blocks outlining the pylon was then built as the next course up, so that it rises above the outline of the platform (fig. 11). As the work progresses, the foundations of rather unsightly local limestone blocks will be entirely buried.

#### *Other projects*

Alexandra Winkels continued her study of the use of ‘gypsum’ at Amarna. Geologist Jim Harrell spent four days visiting several areas in the desert in continuation of his study of how the local geology was utilised during the Amarna period. One was a pitted area which was probably a source of the lime-gypsum widely used at Amarna. Another was a surface quarry for indurated limestone at Hatnub. Accompanied by Marsha Hill, Anna Hodgkinson and Miriam Bertram, he made a more detailed record of blocks which were probably intended to be worked further into statues.

### **The cemeteries of Amarna**

**(Anna Stevens, Gretchen R. Dabbs, Mary Shepperson and Melinda King Wetzel)**

#### *Background*

In 2005, the Amarna Project began a long-term study of the cemeteries of Amarna, with the goal of better understanding the health, life experiences and beliefs of the people of Akhetaten through an integrated study of human remains and burial practices. From 2005 to 2013, fieldwork focussed upon the largest of the city’s non-elite burial grounds, the South Tombs Cemetery, located in a long *wadi* adjacent to the southern group of officials’ tombs.<sup>26</sup> Around 367 pit burials were excavated, all of a very simple nature; the bodies were usually laid in an extended position, wrapped in textile and placed in a mat or wooden coffin. The graves were marked originally by simple stone cairns, and sometimes by small pyramidions or pointed stelae showing images of the deceased. Grave goods typically fell into one of three overlapping categories: pottery vessels, presumably used to hold or symbolise offerings of food and drink; personal goods such as cosmetic vessels and jewellery; and objects of ritual or symbolic importance, such as scarabs. Amongst the most significant finds is a group of poorly preserved wooden coffins with painted decoration showing offering bearers and columns of hieroglyphic

<sup>26</sup> For previous reports, see B. Kemp, ‘Tell el-Amarna, 2005–06’, *JEA* 92 (2006), 21–56; Kemp, ‘Tell el-Amarna, 2006–7’, *JEA* 93 (2007), 11–35; Kemp, ‘Tell el-Amarna, 2007–8’, *JEA* 94 (2008), 13–44; Kemp, ‘Tell el-Amarna, 2008–9’, *JEA* 95 (2009), 11–27; Kemp, ‘Tell el-Amarna, 2010’, *JEA* 96 (2010), 1–21; Kemp, ‘Tell el-Amarna, 2011–12’, *JEA* 98 (2012), 1–7; Kemp, ‘2012–13’, *JEA* 99 (2013), 2–20. Also B. Kemp, A. Stevens, G. R. Dabbs, M. Zabecki and J. C. Rose, ‘Life, Death, and Beyond in Akhenaten’s Egypt: Excavating the South Tombs Cemetery at Amarna’, *Antiquity* 87 (335), (2013), 64–78.

text. The study of the human remains revealed a population suffering heavy workloads and a poor diet, a picture well at odds with the theme of abundance and opulence depicted in reliefs from the city and elite tombs.<sup>27</sup> In spring 2015, a second phase of the cemeteries project began, with a shift in focus to a group of burial grounds at the north of the site (fig. 1). Excavation began at the largest of these (the North Tombs Cemetery), near tombs 2 and 3 of the northern tomb group. The aim of phase two of the project is to contextualise the results from the South Tombs Cemetery: are they typical for Amarna as a whole?

This report amalgamates the results of four seasons of work on the South and North Tombs cemeteries from late 2014 to mid 2015:

i) The first comprised a study season conducted from 14 November to 12 December, 2014, that saw the final recording of materials from the South Tombs Cemetery in advance of publication. Team members were Anna Stevens, Jerome Rose, Gretchen Dabbs, Andrew Boyce, Gwilym Owen, Megan Paqua, and Alan Clapham. The bioarchaeology team (Jerome Rose and Gretchen Dabbs) re-studied a small number of individuals who were outliers within the overall sample; examined 97 crania for morphological features to aid in identifying ancestral origin; and added 16 previously unanalysed clusters of bone to the overall sample. All of the bioarchaeological data were integrated into a database with the archaeological data to facilitate ongoing analysis. In addition, a typology was established for the burial mats, and the matting samples processed accordingly; plant remains from grave pits were analysed; and the recording of objects from the cemetery was finalised. The MSA inspector was Ms Asmaa Adel Wdea. The work was funded by a British Academy Small Research Grant and the Amarna Trust.

ii) The second phase of work focussed on the conservation of the decorated wooden coffins excavated at the South Tombs Cemetery. This was conducted over two periods, from 10 January to 7 February and 20 April to 8 May 2015. The work was led by Lucy Skinner, with conservators Ahmed Tarek, Nicole Peters, Kellie Boss, Catherine Mallinckrodt, and Flavia Ravaioli, and materials specialists Alexandra Winkels, Rainer Gerisch, and Corina Rogge (January/February); and conservators Hamdy Abd el-Bakr, Mohammed Fattoh, Pia Edquist, and Erica Schuler (April/May). The conservation project was funded by USAID through the American Research Center in Egypt's Antiquities Endowment Fund. The MSA inspectors were Mr Abdalla Ali Abd el-Rahman Ma'ruf (January/February) and Mr Aly Samir Abd Alqamiy (April/May).

iii) The third was an excavation season at the North Tombs Cemetery, from 30 March to 7 May 2015. The excavation team comprised Anna Stevens, Mary Shepperson, and Melinda King Wetzel (site supervisors); and Gretchen Dabbs, Sofie Schiødt, Kate Rose, Conni Lord, Megan Paqua, Reinert Skumsnes, Melanie Pitkin, and Ashley Bryant. The MSA inspector was Mr Abdel Gawad Emad Ahmed, and we were joined by trainee inspectors Mariam Atif Shaker, Farid Fathy Hashem, and Marwa Ahmed Osman. Nineteen workmen from El-Hagg Qandil and El-Till were employed to assist with the excavations. Phase two of the cemetery project is funded

<sup>27</sup> See, most recently, G. R. Dabbs, J. C. Rose and M. Zabecki, 'The Bioarchaeology of Akhetaten: Unexpected Results from a Capital City', in S. Ikram, J. Kaiser and R. Walker (eds), *Egyptian Bioarchaeology: Humans, Animals, and the Environment* (Leiden, 2015), 31–40.

by a National Endowment of the Humanities grant awarded to Southern Illinois University in partnership with the Amarna Project. Several specialists also undertook studies of cemetery materials at this time: Anders Bettum (coffins), Pamela Rose and Valentina Gasperini (pottery), Alan Clapham (archaeobotany), and Jolanda Bos and Lonneke Beukenholdt (hair).

iv) Finally, a first analysis of the skeletal material recovered from the North Tombs Cemetery was undertaken from 19 May to 14 June 2015. The work was led by Jerome Rose and Gretchen Dabbs, with participants Ghada Al-Khafif, Alissa Bandy, Heidi Davis, Heather Manning, Erika Morey, Leah Morse, Lindsey Roberts, Julia Vilaró Rodríguez, Sofie Schiødt, Ashley Shidner, Eleanor Simper and Jessica Spencer. The MSA inspector was Mr Ahmed Wagih Anwar.

The report below provides first an overview of the excavations at the North Tombs Cemetery, including the analysis of the human remains, followed by specialists' reports on the conservation and study of materials from the South Tombs Cemetery.

*North Tombs Cemetery: 2015 excavation season*

*Site description:* the North Tombs Cemetery is located within a bay that is formed by two adjacent *wadi* mouths, which breaks the steep cliffs of the high desert between North Tombs 2 and 3 (figs 1, 12, 13). Whilst the North Tombs have been known to researchers since the early nineteenth century, they represent only the elite end of a much larger cemetery, the full extent of which was only recognised by surveyor Helen Fenwick in 2004.<sup>28</sup>



FIG. 12. Panorama of the North Tombs Cemetery taken from near the *wadi* mouth, facing east.

The bay contains three flat, sandy banks, a spur of limestone rising up in the centre to separate the two *wadis*. There are several modest, undecorated, and largely unrecorded, rock-cut tombs in the cliffs around the bay, including one in its east end (fig. 13). Spread across the banks are robbers' pits and associated spoil mounds that contain modest quantities of bleached human bone and potsherds, materials that have been dug up from graves below. Most of the pottery on the surface and in the robbers' spoil is of Amarna-period date, although there are a few pieces of ribbed Late-Roman amphorae and later glazed wares. The robbers' pits have the appearance of being several decades old, and seem to be visible on an aerial photograph taken by the Royal Air Force in 1922, now in the German Archaeological Institute, Cairo (image 14/18).

<sup>28</sup> See B. Kemp, 'Tell el-Amarna, 2004', *JEA* 90 (2004), 20.

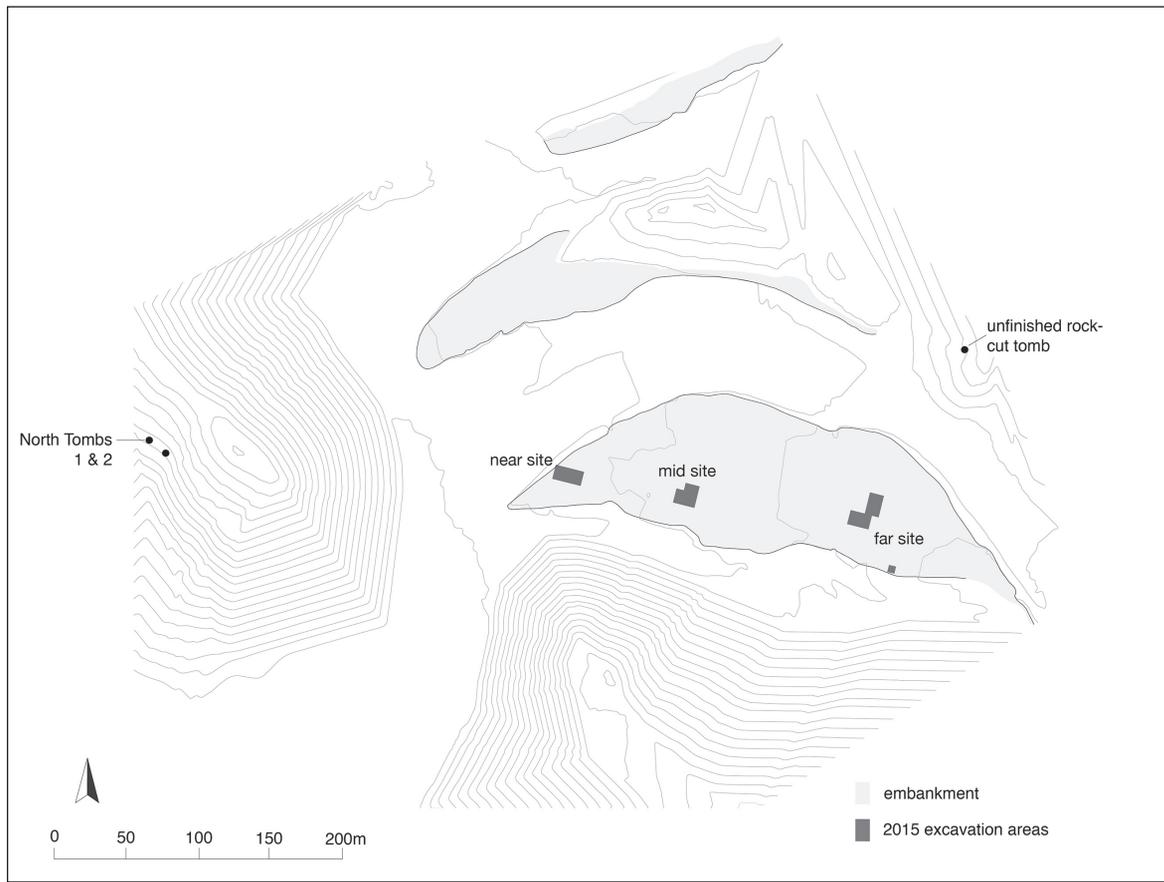


FIG. 13. Plan of the North Tombs Cemetery showing the 2015 excavation areas. Base map derived from a topographic survey by Helen Fenwick.

Areas of the site that do not bear robbers' pits have almost no bone or sherds, being covered with a light scatter of gravel and small limestone boulders. Overall, there is less surface bone, pottery and boulders than at the South Tombs Cemetery. It is possible that more of these materials have been washed away during floods; the sandy embankments are separated by deep wide channels that have formed by flash floods sweeping down from the high desert. It is not yet clear if these channels were already present during the Amarna period, although the fact that there is no obvious bone eroding out of the channel walls might indicate that they were, and the graves were set back from their edges.

*Methods:* During the 2015 season, excavation was undertaken exclusively on the southern bank, the broadest of the three (fig. 13). Twenty-seven 5 x 5 m grid squares were laid out in three areas (figs 14, 15): close to the *wadi* mouth (the 'near site'), approximately halfway along the bank (the 'mid site') and towards the far end of the *wadi* (the 'far site'). In locating the grid squares, ground that was undisburbed by robbers' pits was chosen.

The excavation method was first to remove the layers of overburden: typically, a surface crust of water-hardened orange 'marl', below which the fill became a softer gravel-rich sand. As this bulk deposit was removed, oblong patches of marl often began to emerge. These seem to be water-laid deposits that have settled into depressions of robbers' pits, dug in turn into underlying graves. At this stage, each pit was investigated

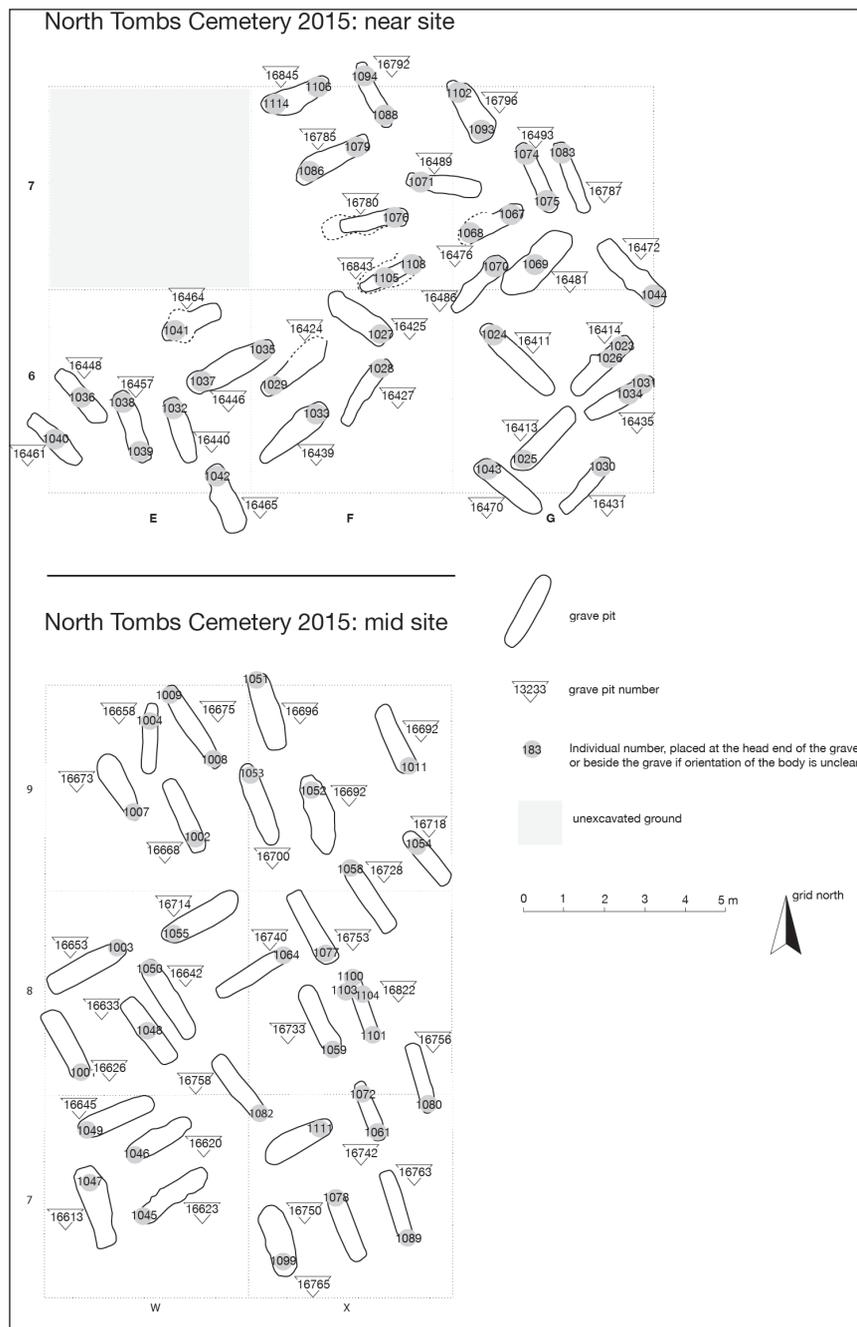


FIG. 14. Graves excavated at the near and mid sites in 2015.

individually. This lower horizon of robbers' pits, no longer visible from the surface, represents looting that took place well before modern times, but is difficult to date more precisely. Almost all of the graves excavated this season had been robbed to a substantial degree; a similar situation was encountered at the South Tombs Cemetery. Often, the robbers simply rummaged around in the grave pit, disarticulating the skeleton but leaving much of the bone inside the grave, although sometimes they threw bone out of graves onto the surface of the site or into an adjacent grave, leaving a more complicated record for the archaeologist to trace. The three excavation areas differed in terms of the amount of overburden that had to be removed before graves emerged,

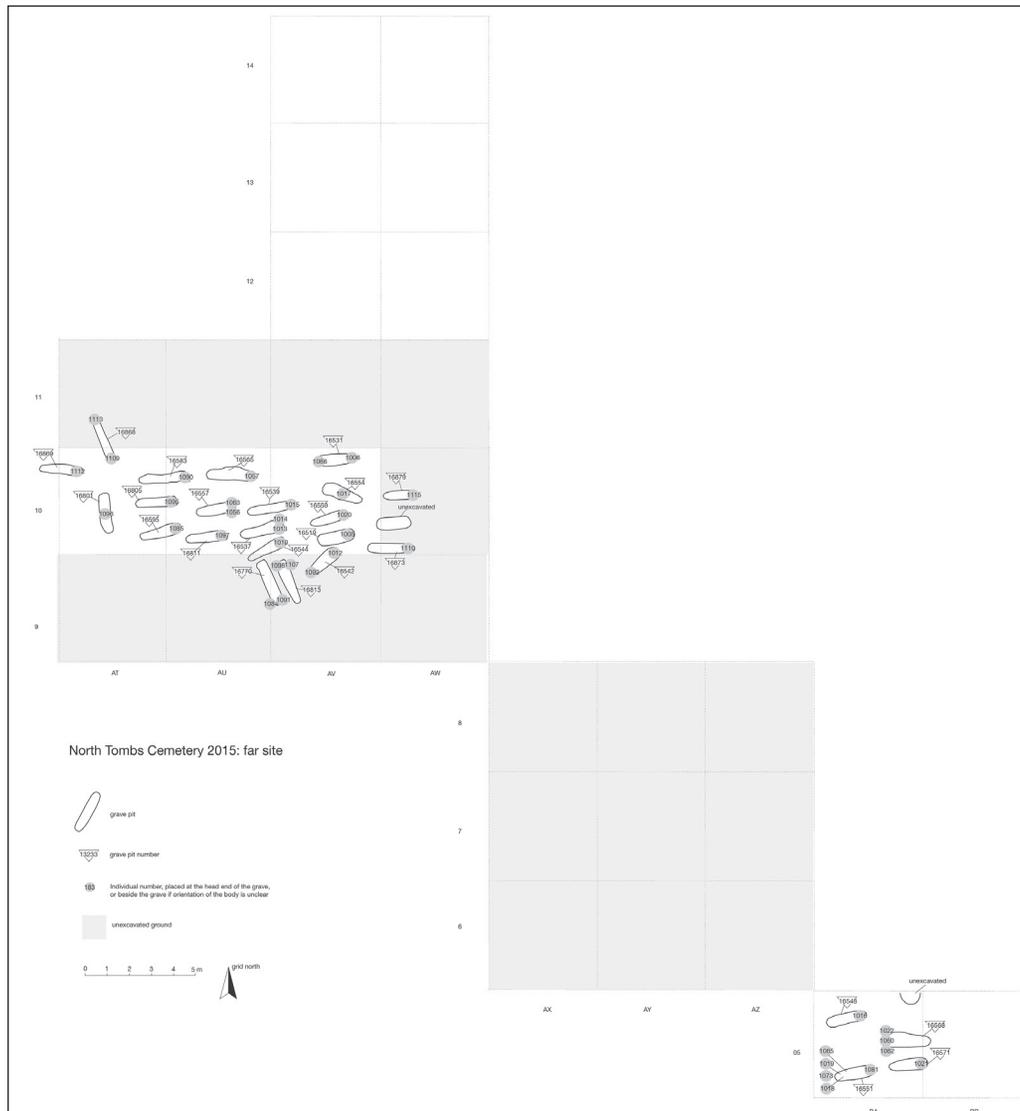


FIG. 15. Graves excavated at the far site in 2015.

due to localised effects of erosion and sand deposition, with the tops of the graves often noted at a higher level at the near site than the other areas. At the far site, no burial pits were encountered within the first set of excavation squares to be opened (AV12–14, AW12–14; fig. 15), a situation that is probably original but is difficult to explain in light of the fact that there is bone visible in robbers' pits surrounding these squares. There is no sign within the stratigraphy of the original Amarna period surface, which was probably destroyed by the looting and perhaps by subsequent flooding.

Each individual set of skeletal remains identified in situ was given its own 'Individual Number', beginning at 1001, and skulls likewise were numbered in sequence from 1001. Individual numbers were allocated in the field only when a set of skeletal remains could be matched with certainty to a grave; it is anticipated that further individual numbers will be assigned as the analysis of the human remains progresses, and co-mingled remains are separated in the laboratory.

*Results:* A total of 85 graves were excavated over the six weeks, with 115 individual numbers assigned (Table 1).

TABLE 1 *Excavated graves*

Area	N graves excavated	N individual numbers assigned at close of excavations	N single burials	N multiple burials
near site	30	41	19	11
mid site	30	36	26	4
far site	25	38	15	10
<b>totals</b>	<b>85</b>	<b>115</b>	<b>60</b>	<b>25</b>

*Grave layout and architecture:* The graves took the form of simple oblong pits cut into the gravel-rich sand; they were generally quite regular in shape with vertical walls, cut just larger than an adult individual and surviving to depths of between around 20 cm to 1 m. With the exception of the initial six squares explored at the far site, each 5 x 5 m grid square typically contained five to six graves, a density that is comparable to the South Tombs Cemetery. In terms of grave alignment, no clear pattern is yet obvious. The graves run in various directions, filling in the ground, although often in two main alignments, perpendicular to one another (figs 14, 15). None of the graves cut into one another and it can be assumed that they were marked at surface level, probably by simple stone cairns, as at the South Tombs Cemetery, although no in situ examples of these were encountered. One disturbed burial at the mid site (grave 16753, Ind. 1077) contained broken pieces of mud brick that may once have been part of a grave marker. No stelae were found that might have been erected graveside. There is, in fact, little worked stone generally at the site, in contrast to the South Tombs Cemetery, which was situated next to a small quarry, the waste from which seems to have been re-used to form grave cairns.

*Treatment of the body:* The bodies were wrapped in textile and in a mat; in general, the preservation of both was very poor. The matting remains to be studied, but seemed usually to be of leaf, grass or reed. The thicker and more rigid *gereed* (palm-leaf rib) and tamarisk-stick matting that was common at the South Tombs Cemetery was rarely encountered. Nor were there any examples of wooden coffins, whether decorated examples or simple unpainted boxes.

Whilst most of the individuals were buried singly, a feature of the cemetery so far is the large number of graves containing more than one person. At least 25 of the 85 excavated graves were multiple burials. In most cases, the individuals were placed closely side-by-side or stacked one on top of each other, often with their heads at opposite ends of the grave (fig. 16). Most of the multiple burials contained just two individuals, but others accommodated up to five bodies. In all of the multiple burials, the bodies had been wrapped separately in textile and matting. In one example, at the far site, a layer of sand about 5 cm deep separated each body (grave 16551, Inds 1018, 1019, 1065, 1073 and 1081), suggesting perhaps that the grave had been reopened for each interment, but generally the bodies were so tightly packed that it seems likely they were interred at the one time. Whilst multiple burials occurred at the South Tombs Cemetery, especially at one particular area (the 'upper site'), they seem, so far, to be

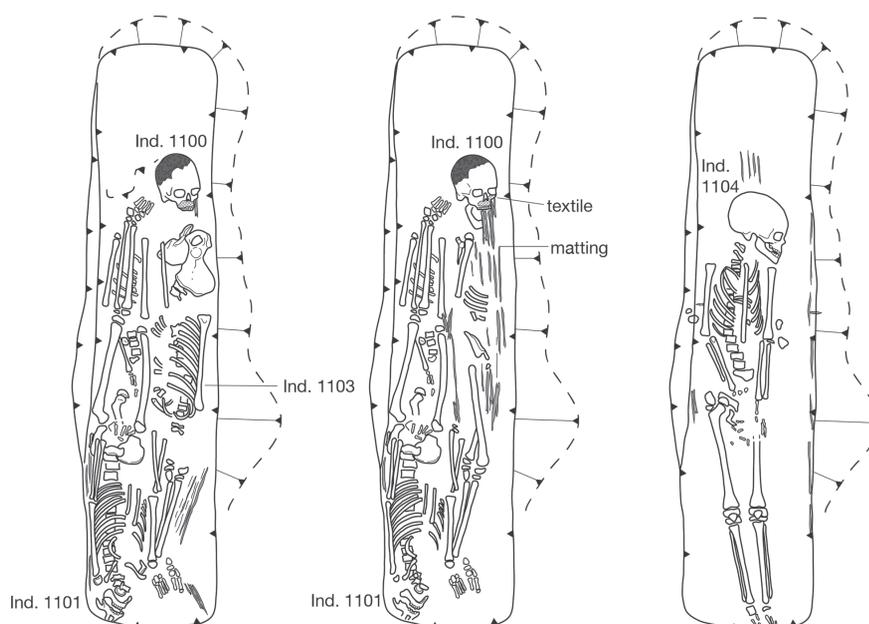


FIG. 16. An example of one of the multiple burials at the North Tombs Cemetery: grave <16822> at the mid site, which contained in situ remains of four individuals buried in three layers. A fifth individual was possibly interred in the space beside Ind. 1103. For the location and orientation of the grave, see fig. 14. Scale 1:20.

more common at the North Tombs Cemetery. The stacking of individuals one on top of another is not something that was encountered at the South Tombs Cemetery, where they were generally laid side-by-side in graves cut usually to around twice the regular width. At the North Tombs Cemetery, the graves containing more than one person are usually only slightly wider than the single burials, if at all.

*Burial goods and offerings:* Very few artefacts were found during the excavations, apart from a few pieces of jewellery (e.g. beads in glass and faience, a *wedjat*-eye ring in faience, a wooden ear plug and a glass ear or hair ring). An unexpected find was a metal needle (obj. 41091; grave 16845, Inds 1106, 1114).<sup>29</sup> Occasionally pieces of pottery with smoothed edges were encountered that were perhaps used as digging tools, and one disturbed grave yielded a flat piece of limestone with edges chipped as though to form a rough blade (obj. 41095; grave 16753, Ind. 1077); was it used by robbers to cut through the matting and textile wrapping on the bodies? Relatively little pottery was encountered, although one robbed grave contained a mass of broken bowls, probably dumped by ancient looters (grave 16472, Ind. 1044).

#### *The skeletal analysis*

The research goals and methods for the North Tombs Cemetery were based on those established for the South Tombs Cemetery.<sup>30</sup> Data were collected on the age and sex of

<sup>29</sup> Michaela Binder reports finding needles in burials at Amara West and suggests they were used to hold the textile body wrapping in place: M. Binder, 'The New Kingdom Tombs at Amara West: Funerary Perspectives on Nubian-Egyptian Interactions', in N. Spencer, A. Stevens and M. Binder (eds), *Nubia in the New Kingdom: Lived Experience, Pharaonic Control and Indigenous Traditions* (British Museum Publications on Egypt and Sudan 3; Leiden, forthcoming).

<sup>30</sup> Dabbs, Rose and Zabecki, in Ikram, Kaiser and Walker (eds), *Egyptian Bioarchaeology*.

each individual in order to group them into social categories for demographic analysis. Information was also collected on the diseases observed on the skeletal remains, the impact of labour on the skeletal joints, and the calculation of individual and average statures. Each skeletal individual was assigned to a team of two persons, who cleaned the remains, numbered each element, estimated the age and sex of the individual (where possible), and identified any pathological conditions manifest on the remains. Additionally, dental data were recorded for use in establishing health profiles and estimating subadult age. Pathological lesions were photographed and some of them were x-rayed to enable later review of the fracture diagnosis.

In total, 28 individuals and 29 isolated skulls were analysed. A major theme in the North Tombs Cemetery sample analysed to date is one of youth. There was one individual classified as an early subadult (3.0–6.9 years) (3.9%), and 11 individuals were classified as late subadults (7.0–14.9 years) (39.3%). Sixteen individuals were classified as adults (over 15.0 years) (57.3%), but the majority of these were categorised as young adults, with 12 individuals aged between 15.0–24.9 years of age at death (42.9% of the total analysed sample). No infants were analysed this season. A similar demographic distribution was observed in the isolated skulls, although a slightly higher representation of individuals classified simply as ‘adults’ was observed, as there are fewer characteristics of the skull that are useful for age estimation, especially in younger adults. Fourteen of the 16 adult individuals were estimated to be females. The sex of the other two individuals could not be estimated from the skeletal material available for analysis. None of the skeletal adults analysed were estimated to be male. This phenomenon is likely due to the young age of the adults: young adult males often present similar morphological features to females, because the secondary sexual characteristics have not yet had time to develop during the post-puberty phase.

Differences in sample size and demographic profile make direct comparisons between the North and the South Tombs Cemetery in terms of trauma and disease rates difficult at this time. However, common conditions from the South Tombs Cemetery, such as compression fractures of the spine, Schmorl’s nodes, and degenerative joint disease, were observed in the North Tombs Cemetery sample at slightly higher frequencies than in the South Tombs Cemetery sample,<sup>31</sup> although this may be due to the disparate sample sizes. The majority of adults analysed from this season exhibited some form of traumatic injury, including spinal compression fractures (78.6%), Schmorl’s nodes (50.0%), and limb fractures (35.7%). Degenerative joint disease (arthritis) was also common, with 21.4% of adults exhibiting spinal degeneration and 50.0% of adults developing DJD in the joints of the arms and/or legs. Subadults show surprisingly high rates of several conditions as well, including spinal fractures (50.0%), Schmorl’s nodes (16.7%), and non-spinal DJD (16.7%). In general, the development of DJD in young individuals is unexpected and suggests lives filled with exceptionally taxing labor.

The presence of malarial infection was documented through the observations of a suite of skeletal lesions. Unlike many pathological conditions, malarial infection does not manifest as a single, identifiable lesion. Diagnosis of malaria from the skeletal remains requires identification of porosity on either the superior eye orbits (*cribra orbitalia*),

<sup>31</sup> Dabbs, Rose and Zabecki, in Ikram, Kaiser and Walker (eds), *Egyptian Bioarchaeology*, 37–8.

the anterior-proximal humerus, or the anterior-proximal femoral neck and either spinal porosity or periostitis. Twenty-six individuals could be assessed for malarial infection, and 15 of those (57.7%) exhibited the suite of diagnostic lesions. Rates were similar between adults (46.2%) and subadults (69.2%), acknowledging that the small sample size likely has a significant impact on the frequency differences reported here.

### *Discussion*

Whilst the North Tombs Cemetery is generally similar in character to the South Tombs Cemetery, there are several distinctive aspects of the results from this first season of excavation. The first is the young age of many of the individuals buried here. Age estimations based on the small sample so far analysed, and on observations in the field, suggests a very constrained age profile, with most of the individuals (82.2%) studied to date having died between the ages of 7 and 24 years. This pattern is not typical of other contemporaneous cemeteries and does not match that identified in the South Tombs Cemetery. Leading on from this, there is little immediate sense of 'family groupings' amongst the graves.

A second aspect is the simplicity of the interments, with a paucity of grave goods, no evidence yet of wooden coffins, and little sign of the use of multiple layers of matting around the burials. The few undisturbed graves excavated contained no objects at all, suggesting that the low number of grave goods is not the result entirely of looting. A third aspect of note is the somewhat disorderly nature of the graves; more multiple burials, and burials placed upside down, were encountered than expected based on the results from the South Tombs Cemetery. The multiple burials are not obviously family burials (although this cannot be ruled out entirely), and may therefore represent either less 'care for the dead' than single burials or the death of multiple individuals in a short space of time and their expedient burial in 'mass' graves.

A preliminary conclusion must be that the burials within the areas excavated this season at the North Tombs Cemetery represent a somewhat different or more restricted portion of the Amarna population than was found at the South Tombs Cemetery; namely, one that is young, relatively poor and involved in extremely heavy labour from an early age. A central question is where these individuals were living, and we might suppose they were from the northern part of the city, although the fact that Panehesy, owner of Tomb 6 of the North Tombs group, seems to have owned a house in the Main City (and another 'residence' beside the Great Aten Temple) needs to be borne in mind.<sup>32</sup> It is perhaps noteworthy that the Egypt Exploration Society excavators working in the North Suburb in the 1930s noted the very modest nature of part (although certainly not all) of the housing areas here.<sup>33</sup>

Explaining the seemingly young overall age-at-death of these individuals is not straightforward. Had they been subject to a particular disease that affects the young? Or might this have been a workforce, conscripted on the basis of youth and subject to extreme working/living conditions that resulted in large numbers of deaths? It may be noteworthy that the main limestone quarries are also located to the north of the city. Recent survey by the Dayr al-Barsha Project is revealing a busy landscape of Amarna

<sup>32</sup> For the Main City residence, see F. L. Griffith, 'Excavations at el-'Amarnah, 1923-24', *JEA* 10 (1924), 302, pl. xxxiii.

<sup>33</sup> H. Frankfort and J. D. S. Pendlebury, *The City of Akhenaten*, II (EES EM 40; London, 1933).

period quarries and associated roadways extending some 10 km north of the Amarna bay, suggested to have once formed a network with harbours and perhaps workers' settlements.<sup>34</sup> No evidence of any substantial workers' settlement has been identified at the quarry sites, but we need to allow that camps with semi-permanent architecture may have existed, or that settlements were located along the floodplain.

There are many alternative explanatory frameworks that will be explored as the project continues; a first priority is to complete the full analysis of the skeletal remains. In any case, the first season at the North Tombs Cemetery has established a solid foundation for the next season of fieldwork, when excavations will proceed to the other banks of the *wadi* to test for variation in demography and burial practice here.

### **The Amarna Coffins Project: coffins from the South Tombs Cemetery**

#### *Conservation and materials analysis*<sup>35</sup> (Lucy Skinner)

The Amarna Coffins Project took place over two months during the 2015 spring season. The conservation work was coordinated by Lucy Skinner and concentrated on the stabilisation and reconstruction of the wooden coffins. Our aim was to combine the skills of conservators from the Egyptian Museum and the Grand Egyptian Museum with those of conservators and specialists from overseas. Using local materials wherever possible we concentrated on preventing further deterioration to the coffins and attempting to bring them to a state where they may be examined, researched, and, perhaps in the future, displayed without further risk of damage. In the course of conservation treatment, we took advantage of the fact that the objects were accessible for scientific examination. Thus, three specialists were invited to participate in the project: Alexandra Winkels to carry out investigation of the plaster grounds and mud fill material; Rainer Gerisch to identify the wood species; and Cory Rogge to facilitate the identification of pigments and other inorganic materials using a portable X-ray fluorescence spectrometer. Some burial matting was also treated. The following is a summary of the conservation work achieved during 2015 and some of the findings of the analysis and technological examination of the coffin fragments.

*Conservation of the coffins:* The completion of the conservation of the coffin excavated in 2008 (obj. 33819) was the first priority. All of the painted surfaces have now been consolidated where necessary (if there are loose paint flakes), using an acrylic consolidant, Lascaux Medium for Consolidation, which is a solution developed specifically for this kind of substrate. One of the advantages of consolidation is that saturation of the pigments often enriches the colour contrast, making the hieroglyphs easier to read. The outside face of the coffin has very minimal ground layer with the pigments and varnish applied directly to the wood, or over a very thin lime/gypsum whitewash. Therefore,

<sup>34</sup> H. Willems and R. Demarée, 'A Visitor's Graffito in Dayr Abū Hinnis: Remarks on the Source of Limestone Used in the Construction of al-Amarna', *RdE* 60 (2009), 222–6; A. Van der Perre, 'The Year 16 Graffito of Akhenaten in Dayr Abū Hinnis: A Contribution to the Study of the Later Years of Nefertiti', *JEGH* 7 (2014), 67–108; V. De Laet, G. van Loon, A. Van der Perre, I. Deliever and H. Willems, 'Integrated Remote Sensing Investigations of Ancient Quarries and Road Systems in the Greater Dayr al-Barsha Region, Middle Egypt: A Study of Logistics', *Journal of Archaeological Science* 55 (2015), 286–300.

<sup>35</sup> For previous work on the conservation of the coffins, see J. Dawson and L. Skinner, 'Conservation of the Wooden Coffins (2012 and 2013)', in Kemp, *JEA* 99, 14–16; Dawson and Skinner, 'Conservation of Wooden Coffins and Three Hairstyles from the South Tombs Cemetery', in Kemp, *JEA* 100, 21–2.

unlike some of the other coffins, the pigment/wood interface on coffin obj. 33819 is quite good. The wood does, however, in some areas require strengthening where it has been weakened due to bio-deterioration (termites or soft-rot fungus). An adhesive known to be effective for strengthening weakened wood, Mowital (polyvinyl butryl), was used in this case. The amount of sound wood remaining is unfortunately small with much of it now transformed into heavy sandy frass deposits, lacking any integral strength. The weight of these deposits is endangering the surviving wood of the coffin and it was decided that in order to protect the decorated surfaces and remaining wood, they would be removed provided they were not imparting essential structural support. Where it was necessary to retain this material, the acrylic adhesive (Paraloid B72) was found to be the most effective for consolidation. Once all the fragments of obj. 38819 had been treated, supportive backings for them were created. This was accomplished using cyclododecane as a separating layer, and applying archival tissue, cotton gauze and adhesive over the CDD.<sup>36</sup> Adjustments to the backings were necessary as joins between pieces were noted by Anders Bettum, who this season started a study of the iconography of the coffins. This was quite easily achieved by trimming edges of the backings and bridging between the two fragments by adhering fresh tissue and cotton gauze. It was satisfying to see the backings functioning as intended—being completely removable and easily adapted.

Another coffin (unit 13438) was conserved partially during this season; this is the 'jackal' coffin, so-termed due to the jackal-headed god exposed during excavation on one panel. Two sections of this coffin were worked on. The first (section 2) is a long panel from the proper right side that varies in height from about 10–20 cm. It is not well preserved and almost no decoration remains on its painted surface. Wood fragments were re-joined where they exhibit cleavage, experimenting with different types of glue, including fish glue, which is intended for adhering wood. Due to the poor state of preservation, we decided to make this panel a low priority during this season; alternative methods of preservation will be explored in the future.

The second section worked (section 1) is a complete panel of the coffin container from the proper left side. This was unwrapped and gauze/cheesecloth impregnated with cyclododecane wax on the coffin surface was removed over the space of three weeks by allowing it to sublime. The remaining wood visible on this side (the back of the panel) was consolidated with PVB. Breaks and cracks in the wood were secured using High Tack Fish glue. Paraloid B72 in a low concentration in acetone and ethanol was applied to the areas of plaster fill and decomposed wood. Once the back of the panel was secured it was fully recorded and photographed to document the visible technology of the coffin. A secure and rigid backing support was constructed by conservators Mr Mohamed Fattoh and Mr Hamdy Abd el Bakr, allowing it to be carefully turned over on to a bean-bag cushion. One section of the top surface of the panel has been exposed, the cyclododecane wrappings removed and the plaster and paint surface consolidated. Sand needs to be removed to reveal the painted surface. The rest of the panel will be exposed and consolidated next season.

A small painted wooden coffin obj. 40105 was conserved by Nicole Peters. The coffin was removed from the gauze bandages used to secure it during block-lifting in the field,

<sup>36</sup> The process is described in Dawson and Skinner, in Kemp, *JEA* 99, 14–16.

and consolidated and reconstructed where possible. Many pieces were difficult to locate and these have been placed in secure storage in the same position as found. Secure packaging has been constructed to house the coffin.

*Vegetable fibre matting from burials:* During the 2013 field season, to preserve representative examples of the matting burials, matting and textile from a sample burial (of Ind. 355, unit 15143) were consolidated and block-lifted from the ground in three large sections. Two of these pieces were then partially treated and backed. This season, sand and cyclododecane remaining on the surface were removed and surfaces secured to allow study, photography and drawing. Due to the slowness of CDD sublimation, further work on these burials has been delayed until next season.

*Plaster, wood, pigment analysis and imaging:* Analysis of the plasters attached to the surface and forming fills in the coffins demonstrates that the plaster is a mixture of calcium carbonate (lime) and calcium sulphate (gypsum) plaster with many inclusions of clay and sand minerals. Further analysis and interpretation of results is necessary, but this probably suggests local production of the coffins. Wood analysis indicates that the coffin panels are made from local wood species, especially *Ficus sicomorus*, with smaller species such as tamarisk forming dowels and tenons. Pigment analysis shows many common minerals such as red and yellow ochres and carbon black, but also high amounts of arsenic-containing pigments—yellow orpiment or realgar. The latter are quite rare, so their use on these ‘non-elite’ coffins is interesting. V-IL (Visible-light Induced Luminescence) was also used to reveal the presence of Egyptian-blue pigment on the coffins. This colour tends to be found on the broad collars on the lids of the anthropoid coffins and on the collars of the offering figures on the sides of at least one of the coffins.

The collaborative approach taken to investigate and conserve the coffins during 2015 has brought to light a great deal of new information and the large size of the team has yielded quick results. Nevertheless, the advanced level of degradation and instability in the coffins means that progress is out of necessity slow and the possibility of future display unlikely for the majority of pieces.

#### *Decorative scheme (Anders Bettum)*

The study of the decoration of the South Tombs Cemetery coffins was initiated in autumn 2014. The first thing that may be noticed with regard to these body containers is the variety of coffin types in use. In addition to decorated wooden coffins, a number of burials had undecorated coffins of wood, matting or pottery. One coffin of mud has also been found, molded into the shape of a mummy (obj. 40103).<sup>37</sup>

Around 20 graves contained painted wooden coffins, eight of which are preserved to a reasonably substantial degree (Table 2). The remainder survive largely as small pieces of plaster and wood and will be studied in a future field season.

*State of preservation:* Common to all of the coffins is their poor state of preservation, noted in the report of Lucy Skinner above. The coffins were buried directly in the ground, and very little wood has survived. In addition to poor preservation conditions, all but one (8) of the burials have been plundered, the robbers usually smashing through the lids to get to the contents of the coffins. The ongoing restoration may reveal more of the decoration on some of the coffins (particularly 1, 5 and 7).

<sup>37</sup> Kemp, *JEA* 99 (2013), 6–8, fig. 4.

TABLE 2 Overview of nine wooden coffins from the South Cemetery

No Reference no/s	Name	Background colour	Basic shape	Secondary decoration	Fragments preserved	Year of excavation	Previous mention
1 Objs 37841-52, 37854, 37987	Not preserved	Black	Anthropoid	Not preserved	Fragments of painted plaster, including a red ear	2007	JEA 93, 21-2, fig. 8
2 Obj. 38819	Maya	Black	Anthropoid	Ritual scenes	Facial mask, upper rim of case	2008	JEA 94, 35-41, fig. 10
3 Unit 13281	Hesyene/Hesyenaten	Black	Anthropoid	Ritual scenes	Large fragments of the case, some from edge of lid	2010	JEA 96, 18-21
4 Unit 13262	Not identified	Black	Anthropoid	Ritual scenes	Large fragments of the case, some from edge of lid	2010	JEA 96, 18-21
5 Unit 13438	Not preserved	Black	Anthropoid	Traditional BD 151	Possibly complete sidewall panels of the case	2011	JEA 98, 4-5
6 Unit 14664/Obj. 40107	Not preserved	Black	Anthropoid	Traditional BD 151	Three inscribed fragments from upper rim of the case	2012	JEA 99, 6
7 Unit 14049/Obj. 40105	Tie (?)	Black	Anthropoid	Traditional BD 151	Possibly complete sidewall panels of the case	2012	JEA 99, 4-6
8 Unit 13672/Obj. 40106	Anonymous	Yellow	Rectangular (catafalque)	Text bands and image panels not filled in	Case relatively intact. Lid largely damaged	2012	JEA 99, 4

*Overall artistic and material quality:* Overall, the artistic and material quality of the coffins appears to be comparable to sub-elite coffins from other New Kingdom sites.<sup>38</sup> The wood that has survived generally seems to be of the same (local) species, and there is a sense of consistency in terms of construction and plank dimensions with coffins produced elsewhere in Egypt. The same applies to the use of pigments and varnish. Some of the coffins (2, 4) appear to be unnecessarily long (more than 200 cm), and the one facial mask that has survived (2) is expertly carved. There is little sign of extravagant materials such as gold foil or inlays.<sup>39</sup>

*Colour scheme (no. 8 excluded):* A common colour scheme was detected for all the black coffins. While mostly true to pre-Amarna tradition, certain features stand out, such as the pale yellow wash inside the coffins (one pink) and the red skin tone applied also to female coffins (2, 3).

*Primary decoration and formal layout (no. 8 excluded):* Seven of the eight coffins studied so far are anthropoid coffins of the black type. No important divergence from pre-Amarna tradition was discovered with regard to the general shape or the execution/decoration of the mummiform image. The coffins display the same system of transverse and longitudinal mummy-strap text bands intersecting the body of the coffin, the transverse ones extending from the lid to the case. The case walls feature the same system of alternating text columns and image panels, and the orientation of texts and images are the same as before the Amarna period. It has not been possible to establish if the coffin lids had hands or not.

*Secondary decoration (nos 1, 8 excluded):* Two types of secondary decoration can be identified. Coffins nos 5–7 continue the pre-Amarna tradition, and show evidence of the BD 151 decorative scheme, which placed the deceased in the role of Osiris in a mytho-ritual drama of resurrection. It has so far not been possible to establish, because of ongoing conservation treatment, if the four sons of Horus were rendered with human or animal heads. BD 161, which also was part of the pre- and post-Amarna decorative scheme, has so far not been attested. The possibility that these coffins also held elements particular to Amarna cannot be excluded. Progress in the conservation work may shed light on these questions.

Coffins 2–4 display a new decorative scheme, so far unattested outside Amarna. The traditional BD 151 elements, including references to the Osirian constellation of funerary deities, have been replaced by figures of human beings involved in ritual activity. Recurring motifs include images of male offering-bearers and women in the mourning pose. Rather than the recitations by the old gods, the texts on these coffins contain prayers for offerings and other benefits in the afterlife. One coffin (4) had a large offering-table painted in the central image on the shoulder of the case walls. Another (2) had had a large *wedjat*-eye, possibly in combination with other iconographic elements.

<sup>38</sup> No typology of the black coffins of the New Kingdom has been published so far. However, there is an MA thesis on this subject: L. Sartini, *I sarcofagi a vernice nera della xviii–xix dinastia: Uno studio tipologico e cronologico* (MA thesis, University of Pisa; Pisa, 2014). A synopsis of this study (in English) is due for publication in the next issue of *EVO*: L. Sartini, 'The Black Coffins with Yellow Decoration: A Typological and Chronological Study', *EVO* 38.

<sup>39</sup> Although a few pieces of gold leaf were recovered loose during the excavations at the site, in one case in a grave with coffin fragments (A. Stevens, pers. comm.).

*Other Amarna coffins featuring ritual scenes:* Two coffins previously discovered within the city of Akhetaten may be added to our ‘corpus’ of coffins with ritual scenes.<sup>40</sup> The first is a coffin case found in the courtyard of house P47.6 in the Main City, excavated by Ludwig Borchardt in 1912,<sup>41</sup> and now lost. Borchardt dated the coffin case to the later New Kingdom, but photographs kindly provided by the Deutsche Orient-Gesellschaft (VII.6.13.065–6) reveal ritual scenes including the typical male offering-bearers and female mourners found on the South Tombs Cemetery coffins. The second addition to the corpus is a coffinette of the royal scribe Iny, discovered in the royal magazines by John Pendlebury in 1931 (obj. 31/591).<sup>42</sup> The model coffin, now in the British Museum (EA63635), contained a pair of clappers, but its original purpose is unknown. The coffinette has ritual scenes (‘Opening of the Mouth’) lining the case walls, and shares certain iconographical elements with coffins from South Tombs Cemetery.

These two additions to the corpus show more complex ritual scenes than the coffins from the South Tombs Cemetery. For instance, the main panels on the shoulder of the case walls show, in both instances, an upright mummy. On the coffinette, the mummy is part of an ‘Opening of the Mouth’ scene, whilst on the Borchardt coffin the mummy is flanked by two figures in the mourning pose. The texts also appear to be more intelligible and contain, contrary to most of the South Tombs Cemetery coffins, clear references to the Aten.

*Conclusions:* The consistency in coloration and formal layout on one hand, and the novelty of the theme in texts and images on the other, makes it justifiable to regard the Amarna coffins with the ritual scenes as a special sub-type of the black anthropoid coffin used in the Eighteenth Dynasty. The presence of coffins of both the traditional and the new type in the same cemetery raises the question of chronology. Did the traditional coffins belong to the first generation of settlers in Amarna, for which no special decorative scheme had yet been developed, or did the two types coexist throughout the reign of Akhenaten? Unfortunately, the archaeological context offers no solution to this problem. It is interesting, however, to note the similarity between the decoration of the Amarna coffins and the white-type anthropoid coffins from the early New Kingdom.<sup>43</sup> In both cases, a flexible set of ritual scenes occurs as an alternative to a more formalised and ‘theologised’ decorative scheme.

The Amarna Coffin Project aims to produce a complete catalogue and analysis of the coffins from the public cemeteries at Tell el-Amarna.

### **Pottery from the South Tombs Cemetery (Pamela Rose and Valentina Gasperini)**

The main objective of the spring 2015 season was to complete the preliminary sorting and recording of all diagnostic sherds from the South Tombs Cemetery; secondly, and following this first stage of study, all the new diagnostic types and all the vessels preserving a complete profile were drawn.<sup>44</sup>

<sup>40</sup> A. Stevens, ‘Beyond Iconography: The Amarna Coffins in Social Context’, in J. H. Taylor and M. Vandenberg (eds) *Ancient Egyptian Coffins: Craft, Tradition and Function* (in press, 2016).

<sup>41</sup> L. Borchardt and H. Ricke, *Die Wohnhäuser in Tell el-Amarna* (WVDOG, 91; Berlin, 1980), 106, plan 29.

<sup>42</sup> Pendlebury, *City of Akhenaten*, III, 92, fig. 9, pls lxxiv.9, civ.

<sup>43</sup> M. Barwick ‘Typology and Dating of the “White”-Type Anthropoid Coffins of the Early XVIIIth Dynasty’, *ET* 18 (1999), 8–33.

<sup>44</sup> Previous reports comprise P. Rose, ‘Eighteenth Dynasty Pottery’, in Kemp, *JEA* 93, 61–2; Rose, ‘Pottery’, in Kemp, *JEA* 94, 58–9; Rose, ‘Pottery Study’, in Kemp, *JEA* 100, 23–5.

The vast majority of pottery from the cemetery takes the form of jars, most commonly red-slipped biconical jars with simple rims, and jars with short, flaring rims (similar to the well-known ‘beer jars’), but again often red-slipped. Open forms are mainly represented by bowls with simple rims and flat bases, small offering-dishes, and large ‘hearth’ bowls, usually with string impressions on the outer surface.

Almost all the vessels from the necropolis are made from Nile silt, the vast majority of which are red-slipped, and only a very small percentage of the sherds are of marl clays. Imported pottery is almost completely absent from the ceramic repertoire, with the exception of one Base ring II juglet from Cyprus (lacking the lower portion of the body and the base). Such juglets are very common imports into Egypt during the late Eighteenth Dynasty. A few fragments of a Canaanite amphora were identified, including sherds found in situ underneath a body of a deceased individual (grave 13205; Ind. 191). Blue-painted vessels appear infrequently in the assemblage, although the poor state of preservation of many of the sherds may mean that the decoration has been lost to erosion.

A high percentage of the closed forms processed during the study season have smaller dimensions than closely similar types from the city, and suggests a possible preference for use of ‘miniature’ vessels in the necropolis. Several of the jars may show ritual ‘killing’ holes around the maximum vessel diameter—although these are almost always on broken edges, making it impossible to be certain of the identification. Few of the vessels show traces of use, stressing that they were most probably deliberately manufactured for their deposition in the funerary area.

#### **Archaeobotany of the South Tombs Cemetery (Alan J. Clapham)**

*Introduction:* In December 2014, ten days were spent at Amarna studying the matting coffins associated with the interred bodies from the South Tombs Cemetery.<sup>45</sup> In April 2015, two weeks were spent at Amarna studying the plant material from the in situ vessels and grave fills, 25 samples in total analysed. A number of handpicked samples were also studied. The plant assemblages provide an opportunity to study what plant species were utilised to make the matting and what food offerings were deposited in non-elite burials.

The majority of the bulk samples consisted of the contents of in situ vessels found within graves, which most likely represent funerary offerings. Most of the plant remains from the vessels were preserved by desiccation. Other samples included those handpicked by the excavators and grave fill deposits which were taken in order to provide evidence of plant remains that may have been associated with the body rather than the in situ vessels. The majority of these were also preserved by desiccation, although several did produce a quantity of charred cereal remains. The matting remains were likewise all preserved by desiccation. Overall, preservation of the remains was good enough to identify it to species level, although sometimes identification of the matting was compromised by the compression and distortion of the remains. The reasons for this distortion may be due to the pressure of the body and grave fill on the plant material, combined with the presence of decomposition fluids of the body.

<sup>45</sup> For previous work on the South Tombs Cemetery samples see A. Clapham, ‘Plant Remains’, in Kemp, *JEA* 93, 62–3.

*The matting:* The matting coffins associated with the bodies were manufactured from three basic types of plant materials. The first comprises sticks of tamarisk (*Tamarix sp.*), and the second the midribs of palm leaves, most likely of date palm (*Phoenix dactylifera*) rather than doum (*Hyphaene thebaica*). In most cases, the latter type of matting was contorted, for reasons that are not yet clear. The third type consisted of a variety of non-woody remains such as palm leaves, halfa grass (most likely *Desmostachya bipinnata*), sedges (*Cyperus spp.*), rushes (*Juncus sp.*) and reed (*Phragmites australis/Arundo donax*).

*The funerary offerings:* The funerary offerings from the pottery vessels consisted of various plant remains, most of which were of food plants. These remains most likely represent food offerings and food for the afterlife. They included the cereals emmer wheat (*Triticum turgidum ssp dicoccum*) and barley (*Hordeum vulgare*), which in the majority of cases were sprouted, suggesting the presence of beer. Fruits including dates (*Phoenix dactylifera*), doum palm (*Hyphaene thebaica*), grapes (*Vitis vinifera*), pomegranate (*Punica granatum*), Christ's thorn (*Ziziphus spina-christi*) and figs (*Ficus carica* and *Ficus sycomorus*) were also found in vessels. The cereals were usually found on their own in vessels, whilst the fruits were deposited as mixtures.

*The grave fills:* The samples taken from the grave fills contained very little in the way of plant remains, with the exception of two examples. One was dominated by whole and fragments of olive leaves (*Olea europaea*), probably the remains of a wreath or funerary garland deposited in the grave. The second was dominated by charred cereal remains; namely, emmer wheat chaff and weed seeds, the latter likely associated with the cereal remains. The presence of charred crop processing residue within a grave fill is unusual and may represent some kind of funerary ritual.

*Sources of plant remains:* The plant *taxa* that were either used as part of the coffin or deposited either as offerings or body decoration were most likely cultivated locally. The only plant *taxon* found in the graves that was likely to have been imported to Amarna was the juniper berries (*Juniperus sp.*). This small tree/shrub does not grow in the Nile Valley and may have been brought in from either the Sinai Peninsula or from further away such as the eastern Mediterranean.

### Pottery from the Stone Village (Anna Garnett)

An initial observation and study of the ceramic assemblage from the Amarna Stone Village was undertaken from 3 to 18 April 2015. The aim of this project, funded by the Egypt Exploration Society's 2015 Fieldwork and Research Budget, is to document, analyse and publish the ceramic assemblage excavated as part of the Amarna Stone Village Project from 2005–2009,<sup>46</sup> building upon the initial recording of Boris Trivan in 2010.

The Stone Village is situated on a low plateau on the eastern desert plain of Amarna (fig. 1). It appears to have functioned as the residential area for a community of workmen associated with stone processing and plastering at tomb sites during the Amarna Period. The inhabitants of this site probably co-existed with the nearby Workmen's Village and are likely to have been involved with the construction of the Royal Tombs, and

<sup>46</sup> A. Stevens, *Akhenaten's Workers: The Amarna Stone Village Survey, 2005-9*, 1: *The Survey, Excavations and Architecture* (EES EM 100; London, 2012); A. Stevens, *Akhenaten's Workers: The Amarna Stone Village Survey, 2005-9*, 11: *The Faunal and Botanical Remains, and Objects* (EES EM 101; London, 2012).

perhaps the rock-cut tombs of officials. It might also have played a role in supplying desert-based workforces. Our understanding of the role of the site remains, however, of a preliminary nature. The aim of the pottery study is thus to clarify in more detail the function of the Stone Village, the experiences of the people who lived there, and its links with other parts of Amarna. The rich contextual data of the Stone Village pottery, and the fact that it is securely dated, provides—like ceramic studies at Amarna as a whole—an opportunity for ceramic research beyond dating alone: a chance to use pottery to explore themes of industry, trade and exchange across Amarna and beyond, and social themes including status, community identity and, in the case of the Stone Village, non-elite experience.

Around 2200 individually numbered diagnostic sherds were checked and recorded in the 2015 season, from a total of 3500 sherds, according to fabric, diameter, surface treatment, form and vessel type, based on the Amarna ceramic typology of Pamela Rose.<sup>47</sup> An initial review suggests that the assemblage is characterised by predominantly domestic vessel types including bowls and plates with simple rims, carinated bowls, biconical jars and beer jars of Nile silt. Marl clays and imported vessels (Levantine and Oasis fabrics, in the form of storage/transport amphorae) are present in much smaller quantities, while blue-painted Nile silt (and less commonly, marl) vessels, characteristic of the main Amarna typology, also occur in relatively limited numbers, as do more simply decorated linear painted sherds. The fabric sub-divisions recorded are also consistent with the established Amarna fabric typology, which is based on the 'Vienna System'.

Initial observations suggest that aspects of the Stone Village ceramic assemblage stand out from the main pottery corpus studied to date from Amarna as a whole—namely, an abundance of Nile silt red-slipped hole-mouthed jars and thick-rimmed Nile-silt water jars (*zirs*). However, this study is still very much in its early stages and a second season of recording and analysing the corpus in 2016 will further elucidate the character of the Stone Village assemblage, as will a detailed integrated study of the ceramics and the contextual data from the excavations.

<sup>47</sup> P. Rose, *The Eighteenth Dynasty Pottery Corpus from Amarna* (EES EM 83; London, 2007).