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Table of Contents

Article -- Author	Page
Discoveries at the Great Aten Temple - <i>Barry Kemp</i>	2
A head of Akhenaten from the Great Aten Temple - <i>Barry Kemp</i>	19
The glass industries of Amarna: attempting a reconstruction - <i>Anna Hodgkinson</i>	24

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Greetings Amarnaphiles,

I hope that you are doing well in the New Year and that the winter is not too severe where you are.

The latest season of work at Amarna went well and once again our publication is blessed with another great article from Barry Kemp about his work at the Great Aten temple.

I think that you will all enjoy reading it, as well as all of the following articles.

As a small nonprofit organization we are most fortunate to be able to consistently publish articles by the leading experts and researchers of the Amarna period.

Barry has been director of the Amarna project for 40 years and TARF has been a supporter and partner in that enterprise now about half of that time. That partnership includes all of you, our loyal members. This organization could not have facilitated the Amarna Project without your continued interest in and support of this Foundation’s mission.

I hope that you continue to enjoy our newsletter and believe that what continues to be accomplished at Amarna, as reported in the articles of our publication, still deserves your financial support. Thanks!

I wish all of our member’s good health and prosperity throughout the year.

Floyd

Discoveries at the Great Aten Temple

By Barry Kemp
The Amarna Trust

There is an element of ceremony at the start of a new 'season' of fieldwork. On an appointed day (this time Wednesday, September 20th), a committee of local inspectors assembles in the dining-room of the expedition house and, amidst much discussion, the opening documents are signed, which formally hand over the site of the excavations to me, as well as the magazines of antiquities attached to the house. I write on the documents the weighty words, 'I have found them in good condition', referring to the site of the work (the Great Aten Temple) and to the magazines. Our appointed inspectors, who will represent the Ministry of Antiquities, identify themselves. This time they are Mr Mostafa from El-Tell, and Miss Hanan from Malawi. (The following day was a public holiday (Islamic New Year), as was Friday.) Finally, on Saturday, our regular pickup-truck begins the transport of the site equipment to the place near the front of the temple where we base ourselves. A small group of workmen erect our two white tents, our two night guards report for duty, and suddenly we are back in business. The months-long process of organisation, uncertainty and travel has borne its fruit.

The site of the Great Aten Temple, in its uncompromising flatness, does not offer much to look at. The stones of its once-high walls, bright with carved and painted decoration, were systematically removed, down to the foundations, in the decades following the abandonment of Amarna. The foundations, however, offer us a means of understanding. Before Akhenaten's builders laid the first stones, they first spread out a huge raft of concrete, smooth and white (using gypsum instead of lime as the matrix). It measured 210 m from front to back (thus from west to east) and 32 m across. Using strings smeared with black pigment they marked out the lines of the main walls and other features (foundations for columns and rectangular offering-tables, hundreds of them), often scoring over the lines again with a chisel. Then came the beds of wetter gypsum mortar into which the lowest layer of limestone blocks was pressed. When eventually the temple was demolished, much of the foundation layer stayed behind, often with the mortar beds of the lowest blocks still in place. This gives us the plan of the building.

In 1932, the Egypt Exploration Society (of the UK) Amarna expedition, directed by John Pendlebury, excavated the entirety of the temple, together with an area in front of it, in exactly one month. In its way, it was a notable achievement. By the end, all of the sand and stone chips which had covered the site were heaped around the outside and the entire gypsum foundation layer was exposed. Pendlebury's architect, Ralph Lavers, made a good plan of it, and ventured an attractive bird's-eye reconstruction of how the temple might have looked, using, as an additional guide, the detailed pictures of the temple preserved in the tombs of two of its senior priests, Meryra and Panehsy.

The main change to the site since Pendlebury left it has been the development of the modern cemetery of the village of El-Tell, which has extended over the ground to the north of the temple site, covering Pendlebury's spoil heaps, until it has reached close to the limits of the temple foundations themselves. The site also became a dumping-ground for village rubbish. This is how it was when the Amarna Project took on the site in the spring of 2012.

The history of the site, as just summarised, explains the strategy we have adopted. It has two main elements. One is to brush away the sand that has blown in since 1932 over the foundation layer, to make fresh plans (at a larger scale than Lavers used, allowing for more detail) and then, after spreading a protective layer of sand, to build up the walls again with fresh limestone blocks, not to a great height but sufficient to inform visitors of the original nature and extent of the temple, and people in the village that a major ancient monument lies here and should be respected.

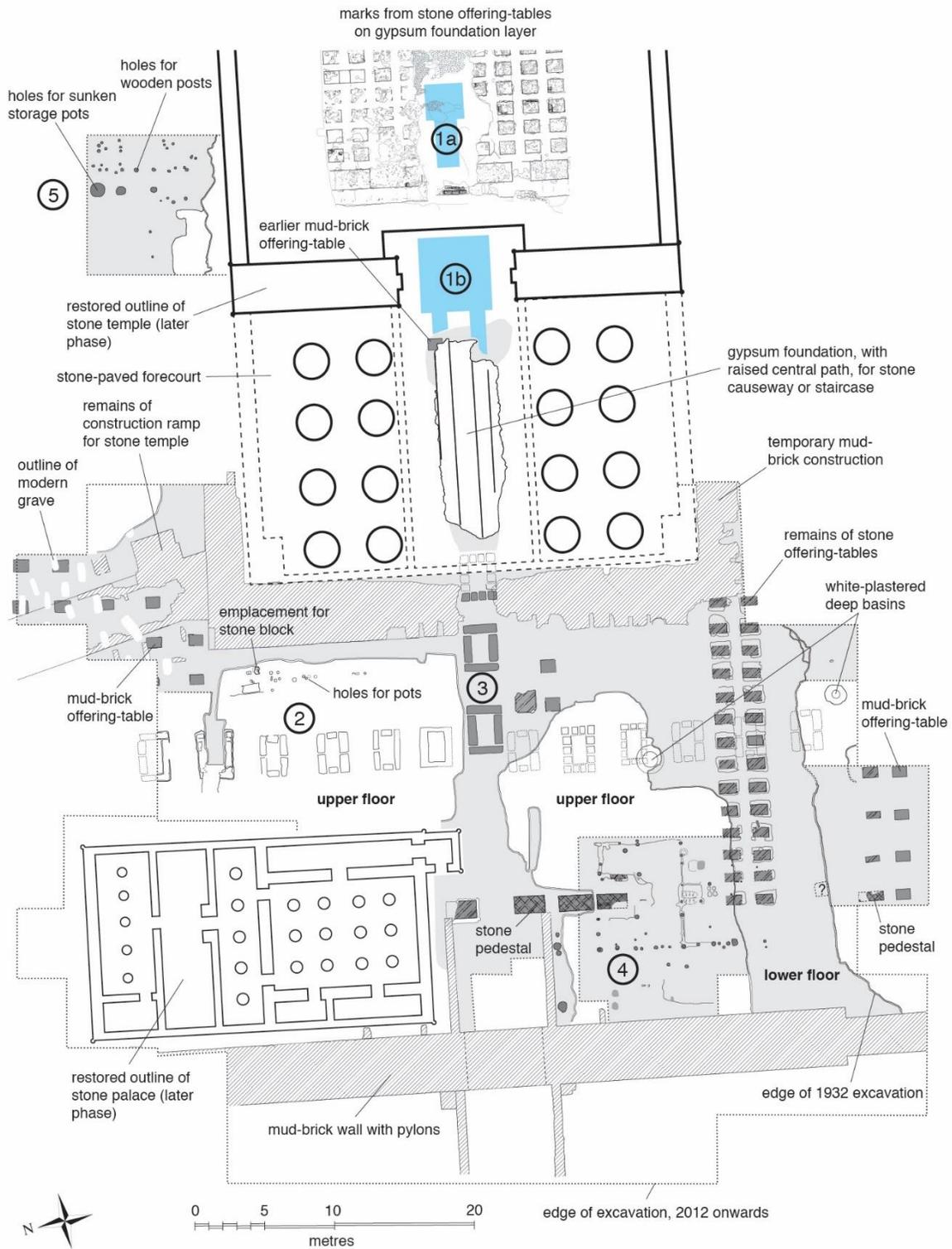


Figure 1: Summary plan of the front part of the Great Aten Temple. The areas of floor in front of the stone temple which are shaded grey belong to the early mud floor ('lower floor' on the plan) which was later covered by the levelling-rubble, which created the 'upper floor' marked on the plan. The 1932 excavation had cut irregular trenches through the levelling-rubble down to the lower floor. Key to numbers: (1a) and (1b): alternative possibilities for the location of the main offering-platform; (2): north-south row of small platforms surrounded by gypsum-coated basins on the upper floor; (3) east-west row of similar constructions on the lower floor; (4) the wooden 'palace' building marked by post holes on the lower floor; (5) a second building of posts on the same mud floor on the north side of the later stone temple.

The other element, which has grown in importance as we have progressed, relates to something that Pendlebury and Lavers had already noticed. The monumental stone temple was not the first structure on the site. In fact, we have established that it was probably not begun until at least Akhenaten's twelfth year of reign. Part of the plan involved evening out a slight natural slope of the underlying desert. Inside the stone walls of the temple this was achieved with a layer of sand (up to 1 m thick towards the front); outside, at the front and for a large distance south, the same was done using brick rubble. Pendlebury (and before him Flinders Petrie) had dug irregular trenches and pits into it but this still left large areas in place. The happy consequence for us is that extensive areas of an early mud floor have been protected, on which survive traces of structures which need to be explained in their own terms rather than as parts of a single temple. 'Levelling-rubble' has become a key term in the vocabulary we use as we work (Figure 1).

Akhenaten's wooden palace

The stone temple stood within a huge space defined by a mud-brick enclosure wall. Opposite where the façade of the stone temple would rise, a pair of pylons, also of mud brick, were incorporated into the wall. When we began, on March 31st, 2012, large spoil heaps from the old excavations covered them and the ground to the south. Pendlebury had worked fast, and his workmen had taken from the ground only a small number of the pieces they found, leaving much behind in the dumps. From the beginning, archaeologist Miriam Bertram took on the responsibility of supervising the removal of the dumps, giving them the same level of careful excavation as any other part of the site. This occupied the seasons of 2012, 2013, 2014 and part of 2015. By the latter part of the 2015 season, a large area had been cleared of dumps, exposing the flat surface of the levelling-rubble (which also had served as the ground level for the stone temple). There having been no work in 2016, September 2017 saw the first major removal. It was done across a block of six 5 x 5 m squares (minus a narrow strip where they abutted against the brick pylons). The rubble, with a general depth of 80 cm, is densely packed, in places concreted by salt deposition. Only in the last days of the season was the underlying mud floor exposed across the full extent, although each pair of squares was excavated in turn to this level (Figure 2).

The mud floor was in good condition, firm and generally flat. In places, it even retained the impressions of donkey hooves. Its main feature was a series of roughly circular patches, the larger ones reaching *c.* 25 cm in diameter, where the mud surface was distorted and damaged. They could be immediately identified as post holes, and most aligned themselves to a rectangular plan with subdivisions. In places, the mud plaster had been shallowly worn away along narrow strips between pairs of poles, presumably where screens had joined them. Especially in the morning sunshine, areas stood out as having a slight shine where the mud had been repeatedly trampled, in places suggesting pathways within and outside the rectangle.

For now, the plan resolves itself into a building measuring 10.5 m north–south, and 7.5 m east–west. It is divided approximately mid-way by an internal wall running east–west. This is interrupted by what might have been a doorway behind which is a small rectangular area defined by posts and an uneven surface, behind which again is a group of four shallow circular depressions where jars had probably stood. To one side, a patch of brownish-black on the mud floor probably shows where one of the standard large pottery bowls or hearths had stood, of the kind commonly used to warm the interiors of houses.

At the northern end, in the middle section, the mud surface was interrupted, partly by itself being somewhat broken and partly by the presence of a patch of thin mud mortar bearing flattened circular 'pads' of mortar, the common way of laying mortar beneath a row of mud bricks. Evidently there had been a relatively small area covered with a layer of mud bricks which had been carefully removed before the levelling-rubble was thrown down (Figure 3). Two large post holes seem to mark the south-western and south-eastern corners of this inner area.

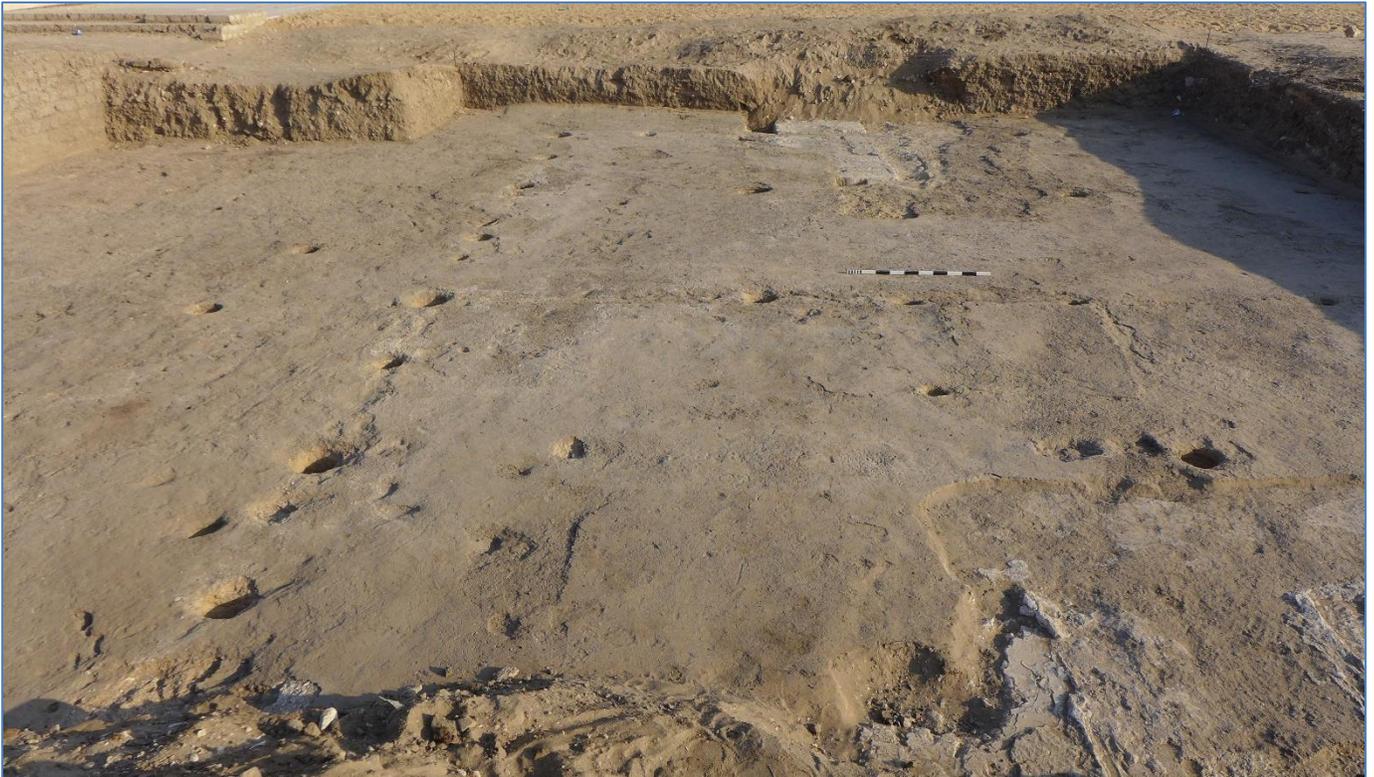


Figure 2: The early mud surface, bearing rows of post holes, exposed in the area south of the temple axis. View to the north. The areas of stonework and gypsum visible at the nearer and further ends of the picture belong to an underlying layer which had been covered by the mud floor.

As areas of the mud floor were exposed and cleaned, and then photographed, Miriam drew a detailed plan (Figure 4). By the end, it looked as though there might be more to the building in areas beyond the limits of the excavation. On the south, it runs into one of Pendlebury's trenches, already excavated and planned (by Anna Hodgkinson) in 2015. Sure enough, on consulting her plans, we could identify likely post holes which had mostly been cut into an underlying layer of gypsum concrete, foundations for two rows of offering-tables which had been cleared away to make space for the building of wooden posts. On the east side, the edge of the building seems to run beneath unexcavated ground, something which will be addressed the next time we work here. The north is likewise bordered by unexcavated ground, in this case a narrow strip on the other side of which some large post holes were found and examined in 2012.

On the last day when all the workmen were employed, Miriam began to examine the post holes one at a time, with the help of a particularly experienced workman, Mostafa Hassan. (We had allowed ourselves several more days of recording before a small group of workmen returned to cover exposed surfaces with sand and dust to protect them.) She did not get far. Although the holes are narrow, they descend for up to 50 cm and are mostly filled with dusty sand. In two of them, wedged well down in the fill, were fragments of hard but brittle gypsum plaster. The fragments from one bore painted decoration. This immediately announced itself as a significant find. Painted gypsum plaster is not common at Amarna but, when it is found, it forms pavements in royal buildings (the Great Palace in the Central City and a part of Maru-Aten being the best known). The position of the fragments in the post holes and the absence of similar fragments in the levelling-rubble above show that they come from the wooden building and, as it was being removed, had become incorporated in the fill of the post holes. Yet there is no sign of gypsum plaster attached to the mud floor itself. The answer is supplied by the remains of mud mortar from a layer of bricks, mentioned above. A low dais of bricks had stood here, bearing a thick coat of gypsum, part of which had been painted.



Figure 3: The northern end of the wooden building, viewed to the south. In the foreground is an underlying stone pedestal which had been found in 1932 and, beyond this, an area of friable mud floor where a smaller rectangular structure of mud bricks had been built and later removed.

At the expedition house, Miriam arranged the painted fragments on a board covered with a thin layer of sand to cushion them and to compensate for different thicknesses. She matched fragments which form two groups which might not originally have been far apart (Figure 5). There appear to be two motifs separated by an area of yellow ground. In each the dominant colours are white and pale blue defined by red lines, which also subdivide the pale blue area on the larger group of fragments. Other areas of patterning are formed from irregular black patches, that in the left-hand group of fragments perhaps from a long plait of hair. At first mystified by what the painting represents, we sent images to several colleagues. Marsha Hill of the Metropolitan Museum of Art, New York, quickly hit on a plausible explanation. She made a tentative comparison with foreign captives depicted on faience tiles from Qantir of the reign of Rameses II (Figures 6, 7 and 8), and others painted in the tomb of Anen and of an unknown official at Thebes (both of the reign of Amenhotep III) and copied by Nina de Garis Davies (all of this material in the Metropolitan Museum). A detailed study and reconstruction of the design from which our fragments (which include a number of isolated pieces not included in Figure 5) come is still under way, but the general picture is clear. The fragments belong to the arms or shoulders of bound or beseeching foreign captives of distinctive appearance.

Part of the beauty of this identification is that the two tomb scenes provide an architectural link to the post holes. The scenes show the king (Amenhotep III) accompanied by a queen (in one case his mother Mutemwia) seated on thrones placed on a pedestal or dais which has been decorated with captive foreigners. The whole is covered by a canopy made from slender wooden posts carved as papyrus-shaped columns which support a roof. Is this what stood at the northern end of our wooden construction? The modesty of what survives should not altogether deceive us. The slender posts could, for example, have been covered with gold leaf, and the spaces between filled with patterned textiles.



Figure 4: Provisional plan of the wooden building discovered in 2017. Plan by M. Bertram. The examination of the floor is unfinished.

There seems little doubt that the building faced towards the north, thus to the axis of the temple, which was evidently established at the beginning (it is scratched on the gypsum-plastered basins which lay on the axis further to the east). One might find a parallel in the so-called Priest's House (built from mud bricks) which lay on the south side of the axis of the Small Aten Temple. We can also see it as having been replaced, when the main temple was rebuilt in stone and at the new, higher level, by the small stone palace that lay on the north of the axis and faced towards it, thus towards the south.



Figure 5: Photograph of the painted gypsum fragments (object registration no. 41900).



Figure 6: Faience tile from a palace of Rameses II at Qantir in the eastern Delta, now in the Metropolitan Museum of Art, New York. Acc. no. 35.1.19. Purchase, Rogers Fund, Edward S. Harkness Gift and by exchange, 1922, 1929, 1935.



Figure 7: Scene in the tomb (TT 226) of an official of the reign of Amenhotep III (name unknown). It shows Amenhotep III seated beneath a canopy. His mother, Queen Mutemwia, stands behind him. Painting by Nina de Garis Davies, now in the Metropolitan Museum of Art, New York. Acc. no. 15.5.1. Rogers Fund, 1915.



Figure 8: Lower part of a scene in the tomb (TT 120) of an official, Anen, of the reign of Amenhotep III. It originally showed Amenhotep III and Queen Tiy seated beneath a canopy. Painting by Nina de Garis Davies, now in the Metropolitan Museum of Art, New York. Acc. no. 33.8.8. Rogers Fund, 1933.

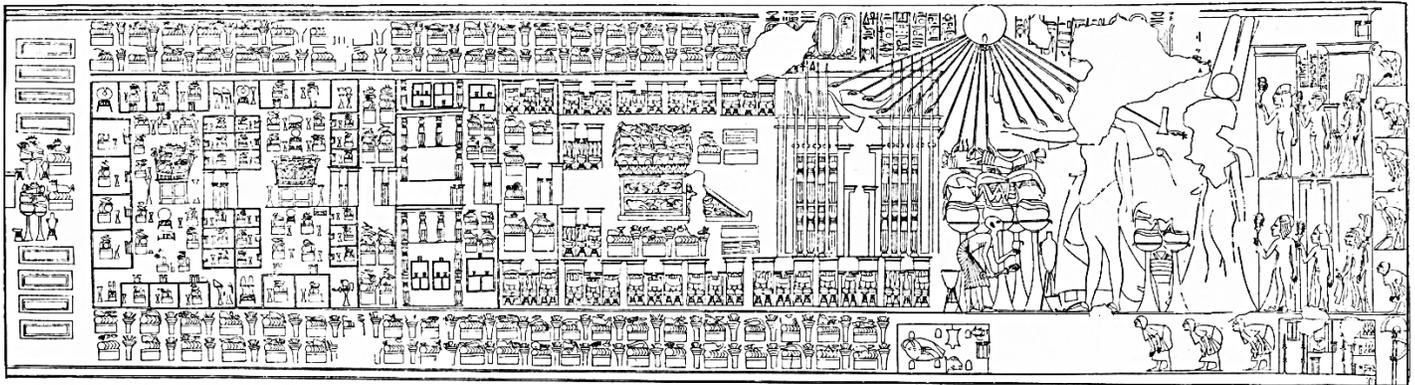
Our wooden palace seems to have belonged to a phase when wooden architecture was more generally employed at the Great Aten Temple. We had encountered it in 2015, on the north side of the stone temple. Archaeologist Delphine Driaux had excavated and planned a series of holes cut into the top of the levelling-rubble (but here much shallower), most of them for wooden posts but some of them forming a line where pottery storage jars had been buried. Before that, in 2012, an examination (by Mary Shepperson) of the stone emplacement for a large stela which occupied ground behind the stone temple brought to light a mud-brick platform or pedestal which had been surrounded by large holes for wooden posts, large enough to have held tall masts. Pieces of incense were found in the fills of some of the holes.

It is natural to think that, in Amarna's early days, temporary accommodation was resorted to and that, in the phase of wooden constructions at the Great Aten Temple, we are seeing evidence of this. The wooden palace was not, however, the first construction at this location. Its mud floor had been laid over a previous one, and over the foundations of pedestals of limestone blocks and of stone offering-tables. Three of the pedestals had been found in 1932; a fourth emerged when the mud floor was first exposed in an exploratory trench dug at the end of the 2015 season. This one bore a black line marking the edge of stonework that had been removed and which had occupied a slightly smaller area. One explanation is that the pedestals had supported free-standing stelae on rectangular bases. At this time, the mud-brick enclosure wall with its pylon-flanked entrance had not yet been built. The pedestals, with whatever stood on them, were perhaps marking the perimeter of an area largely filled with offering-tables (of mud brick and limestone blocks) which had been erected directly on the desert surface and then been surrounded by the first mud floor.

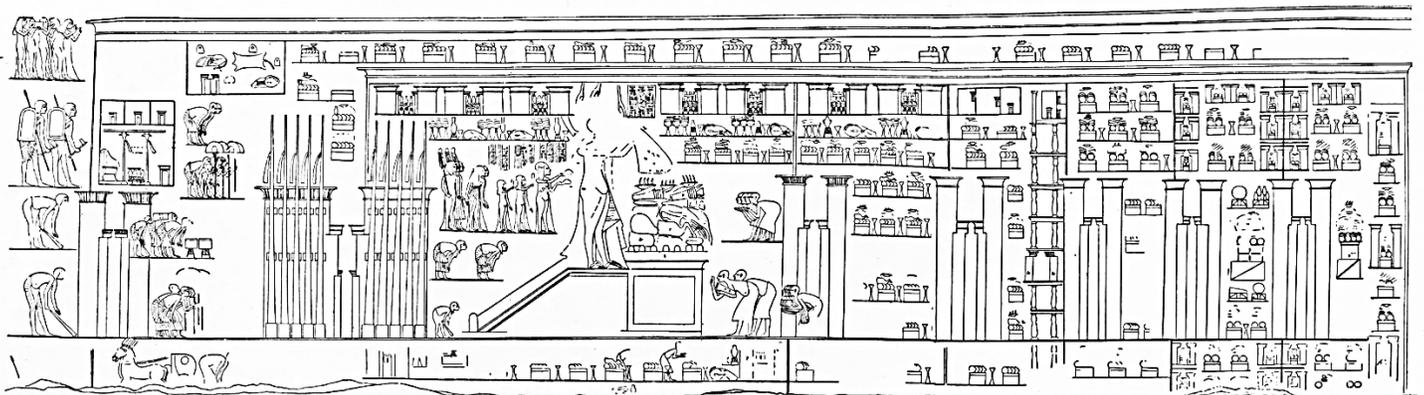
The wooden phase of building, although intended to be temporary, could have served a particular moment in the life of the court. It is not difficult to think of possibilities: a jubilee festival, ceremonies accompanying a royal burial, reception of foreign tribute; or something in the royal calendar outside our current knowledge.

The location of the Great Altar

We have three detailed and similar pictures of the main temple to the Aten in the rock tombs of officials: two in the tomb of Meryra and one in the tomb of Panehsy (Figures 9, 10). A fourth (duplicated) is in the Royal Tomb (chamber alpha). The Meryra and Panehsy scenes give prominence to the performance of an offering-ceremony by the royal family at a platform reached by a staircase which supported a table heaped with food-offerings. In the Panehsy example, Akhenaten and Nefertiti are shown standing on the platform side by side. The platform itself is shown at the front of the first court of the temple, thus immediately beyond the stone pylons which, with their attached colonnades, formed the proper front of the stone temple. This is where Ralph Lavers placed the offering-platform in his reconstruction (Figure 11).



1. Tomb of Meryrō' I (Davies, *Amarna* I, Pl. XXV)



2. Tomb of Panehsy (Davies, *Amarna* II, Pls. XVIII, XIX)

Figure 9: Pictures of the main offering-platform in the Great Aten Temple, shown in the tombs of Meryra and Panehsy. After J.D.S. Pendlebury, *The City of Akhenaten* III. London, Egypt Exploration Society 1951, pl. V, itself after N. de G. Davies, *The Rock Tombs of El Amarna* I. London, Egypt Exploration Fund 1903, pl. XXV (Meryra); II. London, Egypt Exploration Fund 1905, pl. XVIII, XIX (Panehsy).

The position of the platform will have been marked on the concrete foundation. This direct evidence had, however, already been destroyed by 1932, by the digging of graves in an extension of the El-Till cemetery. This left a large hole in the foundation layer. The space which it would have occupied was part of an aisle which led, along the temple axis, between rows of stone offering-tables (Figure 12). This sets a limit to its width, of around 2.5 m (and the standing-room on top needs to be reduced to allow space for a stone parapet). Its smallness in relation to its surroundings is evident on Lavers' reconstruction. There are still traces of foundations for stonework at both ends of the area of damage, but whether of a platform with approaching staircase cannot now be decided.

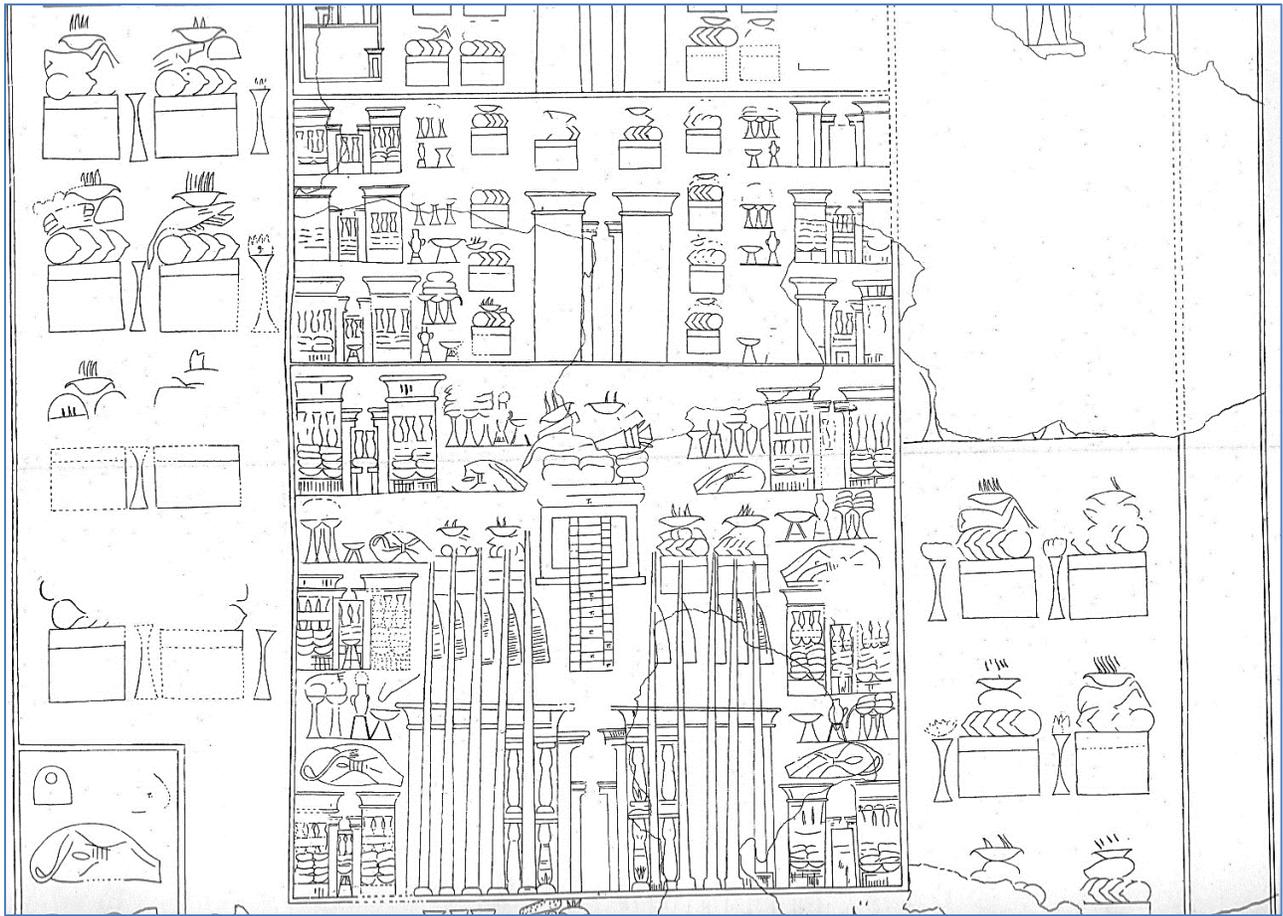


Figure 10: A further picture of the main offering-platform in the Great Aten Temple, as shown in the tomb of Meryra. After Davies, *Rock Tombs I*, pl. XII.

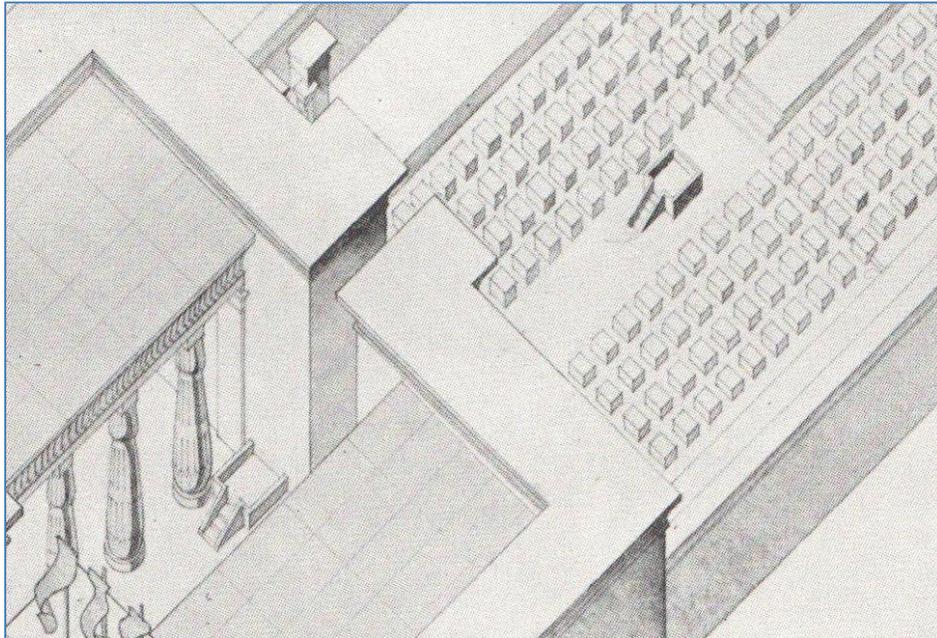


Figure 11: A portion of the isometric reconstruction drawing of the Great Aten Temple by Ralph Lavers, showing the offering-platform located in the first court of the temple, behind the pylons. After Pendlebury, *City of Akhenaten III*, pl. Via.

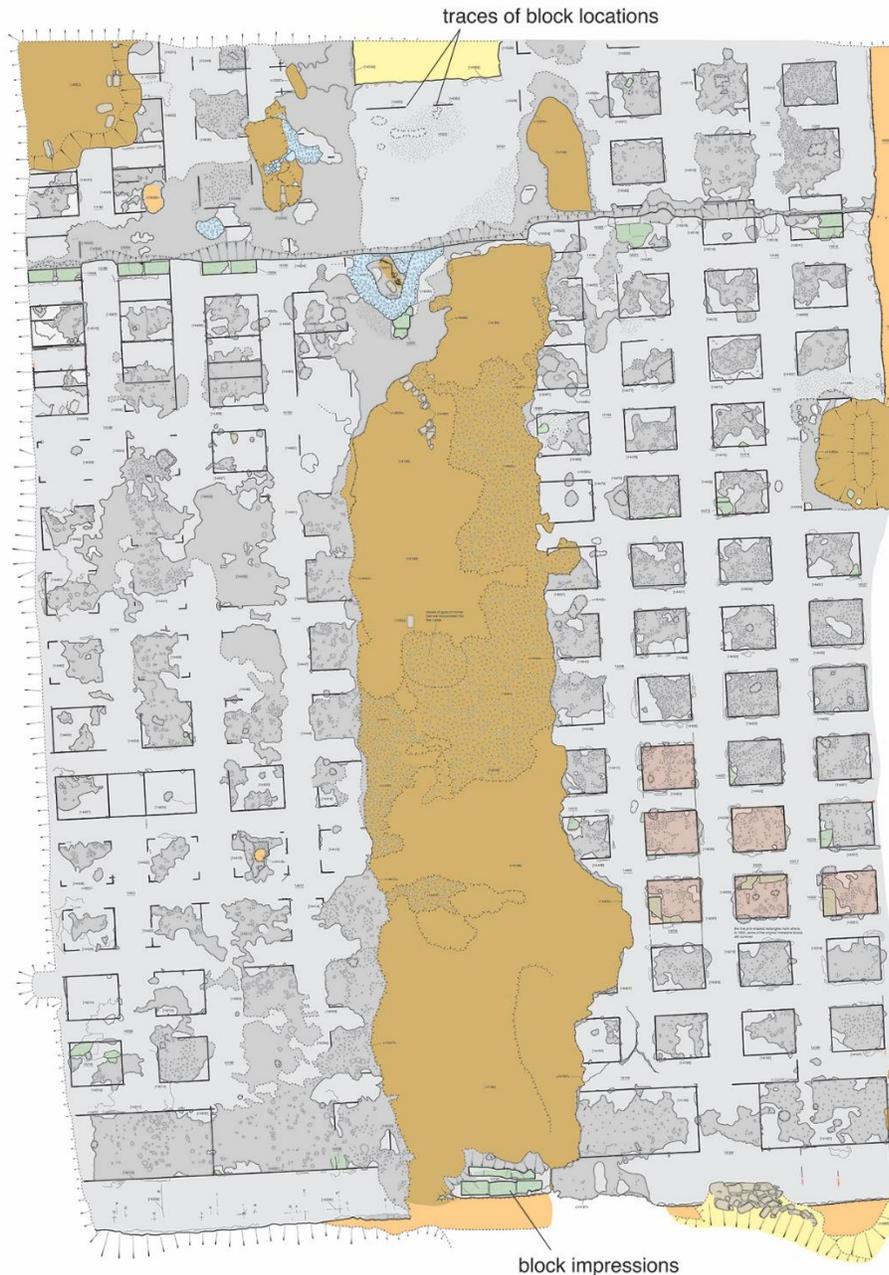


Figure 12: The plan of the remains of the first court of the Great Aten Temple, made in October/November 2012 by members of the field school of that time. Each rectangle is the position of a stone offering-table. Much of the foundation bed along the axis, where the main offering-platform might have been, has been destroyed by modern graves. Note the impressions of stone blocks at the western end of the axis, and probable traces of block positions at the eastern end.

When the stone temple was finally built, it was provided with a monumental entrance consisting of a pair of pylons. In front of each stood a deep colonnade of eight columns with bases probably of *c.* 2.5 m diameter. They had been given massive foundation beds of gypsum concrete contained within box-like constructions of limestone walls. The gap between them, also enclosed by a wall, had been filled with sand which buried more of the early mud floor and so was the equivalent of the levelling-rubble outside the foundations. On Lavers' plan, this space is largely filled by the remains of a layer of concrete which preserved the impressions of limestone paving slabs. Pendlebury refers to it as a 'causeway' which 'seems to have been carried eastwards to Gem-Aten (Pendlebury's designation of the main temple) on the same level'.

Starting in 2013, we have methodically cleaned and planned the foundations of this entrance system prior to covering it with new stonework. The ‘causeway’ was left to the last, the cleaning begun in October, with the detailed plan (Figure 13) made by Juan Friedrichs (who has been responsible for most of the plans in this area). The concrete bed had shrunk somewhat since Lavers made his plan, and was covered by dust which gave the impression that the original surface, with its block impressions, had entirely perished. The brushing of the surface quickly revealed, however, that what Akhenaten’s builders had laid down here was more complex than a single foundation layer for paving-stones (Figures 14, 15). It can be best described by reconstructing the steps they took (as summarised in section 1, Figure 12).

The walls of limestone blocks (1 of Figure 12) which surrounded and joined the two foundation platforms for the columns (and which would eventually have been buried and so invisible) left a hollow rectangular space in the middle, floored by the earlier (and by now doubtless damaged) mud floor. Sand (2) was thrown over this to a depth of *c.* 25 cm, and down the middle the builders laid a strip of gypsum concrete, 4.20 m wide (3). On this they laid two double rows of limestone blocks (4), leaving a gap of 1.50 m between them. The gap was then filled to a depth of 10 cm with more gypsum (5) to create a stronger basis for limestone blocks (6) laid over the top. More sand (7) was then added to bring the surface to within 20 cm of the intended floor level of the whole front of the temple (and its interior). This allowed for a final and quite separate layer of gypsum foundation (8) which filled the remaining spaces on each side and on which limestone paving-slabs were laid (9). This pattern of construction seems at first to have extended for the full length of the ‘causeway’. Subsequently (Figure 12, section 2), the upper flanking pavement was spread across the side strips for a distance of around 3 m at the western end although not across the central strip which still bears, over a small area, the remains of an actual layer of laid stones. To bring about an even surface, however, the blocks of the central strip had either been reduced in height (nominally by 10 cm) or had been cut to this reduced thickness before being laid.

It should be borne in mind that, as the builders progressed, they had to estimate the levels of each stage to make sure that, when they finished, there would be a seamless join across the paving stones from one side of the flanking colonnades to the other. The whole construction, in other words, is part of a single scheme. It lends itself to the interpretation that it is the foundation for a long ramp or staircase the terminus of which, at the east end, would have stood on the massively solid foundation of layers of stone blocks which filled the space between the pylons and extended for a short distance further to the east. Its side walls, of double header blocks, has the thickness of the side walls to several ramps or staircases at the Great Palace. Standing in the way of this straightforward interpretation is that, for at least 3 m at the western end, what should be the lowest part of the staircase had been covered by the final paving, as if it was more convenient to lay the foundations consistently for the full length of the causeway, and only shorten its length at the west end when the paving-stones went down.

When Lavers made his plan in 1932, more was preserved around the edges of the foundations, primarily of the uppermost concrete layer which supported the limestone pavement (shown in grey on Figure 13). But at the western end of the central reinforced strip, the regular pattern of block shapes is replaced by at least two longer rectangles which extend across the fill width. No comment on this anomaly survives in the original records. But they look like steps.

I can think of no explanation for this pattern of foundations which excludes a ramp or staircase running down the causeway for the greater part of its length. Its destination would have been the space between the pylons. Was this where the main offering-platform would have stood? The foundations for the pylons do not tell us how wide the gap was between them. I have assumed that the pylon corners coincided with the edges of the causeway, with short internal projections in the middle of each. This would allow for the presence of a large central feature. It could have left 1.5 m of space on either side for access (which is roughly the same gap as between the supposed offering-place and flanking offering-tables in the conventional reconstruction).

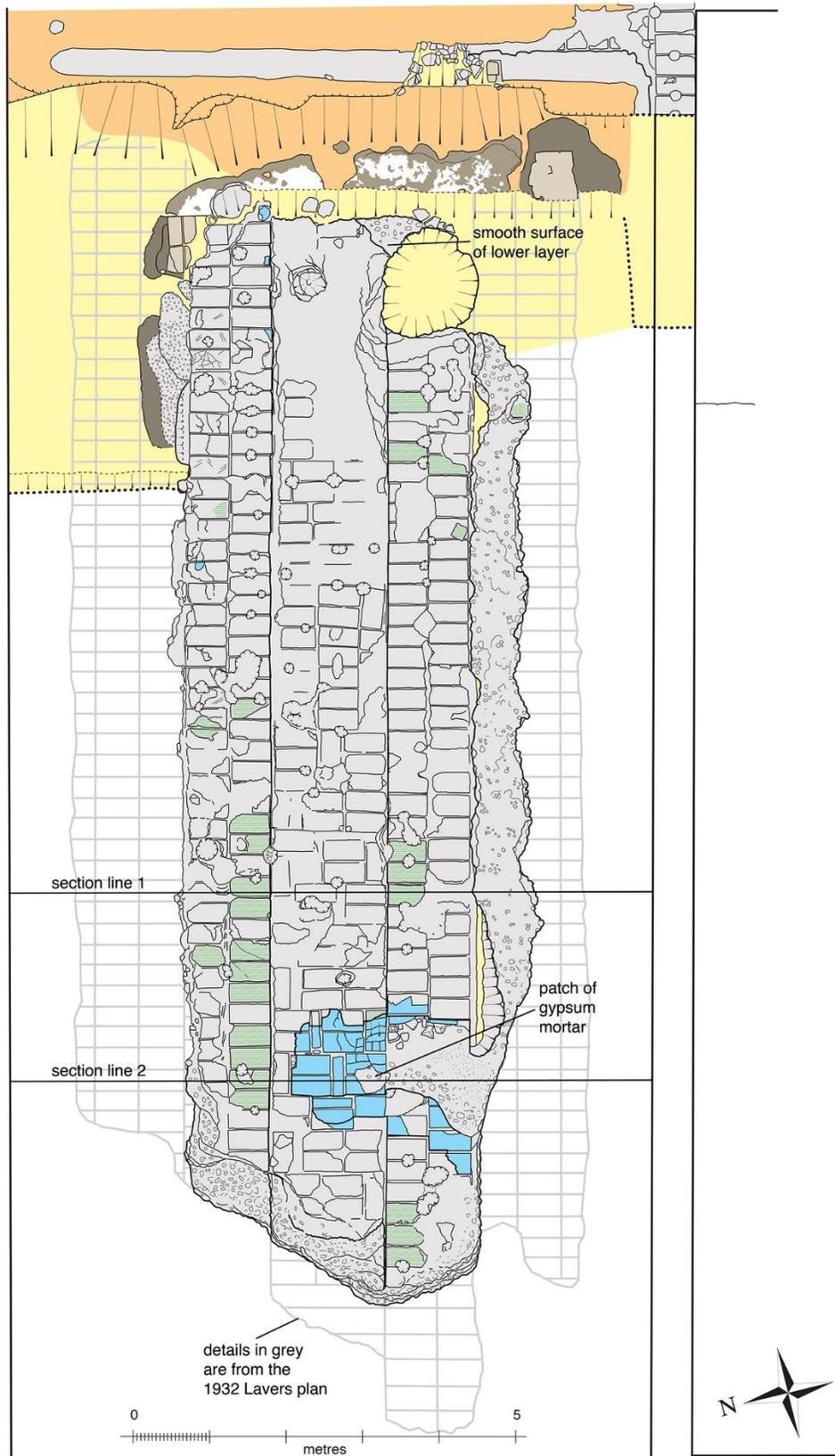


Figure 13: Plan of the gypsum-concrete foundation bed (the ‘causeway’) located between the foundations for the two large sets of columns that fronted the pylons of the temple. Plan by J. Friedrichs. The network of grey lines shows details taken from Lavers’ plan of 1932, when more remained of the edges of the foundations.



Figure 14: View, towards the west, of the 'causeway' after cleaning. Note the mud floor, with the remains of white plaster, that had been buried by levelling-sand.



Figure 15: View from above of the western end of the 'causeway', where some of the original limestone blocks remain.

Archaeologists love phases and periods (often with justification). The evidence does not exclude the possibility that placing the offering-platform between the pylons was the first intention, and a start was made on creating the long access stairway. This plan was later abandoned in favour of a smaller offering-platform in the first court, necessitating removing the stairway and covering the location with more of the paving-slabs.

It is normal in archaeology to hope that future discoveries will clarify what is presently obscure. But in this case, I am unable to think of what further evidence might come to light to settle this matter, all of the ground in question having now been thoroughly examined.

The stone buildings at Amarna represent a distinctive chapter in the history of ancient Egyptian architecture. The mind behind them — Akhenaten’s — was capable of thinking outside tradition, so that what, in other reigns, might be considered to disregard the unwritten rules (in this case placing a large object in the middle of a major gateway) is not necessarily excluded in his reign. At first sight, the survival of large areas of gypsum foundation layers bearing the outlines of foundation stonework, to which can be added the detailed pictures of buildings on the walls of tombs, puts us in a good position to reconstruct how the buildings originally looked. Yet time after time we are left with uncertainty.

The sources take us so far and then leave us to guess important details. Moreover, we have enough evidence from the site of the temple to be able to say that the tomb pictures of the Great Aten Temple are not wholly reliable. As an example, the little side chapels arranged along the sides of the first courtyard shown in the pictures have no correspondence on the foundations, and this suggests that they are an unreal element, a creation of an artist’s imagination. But how far should we take such scepticism?

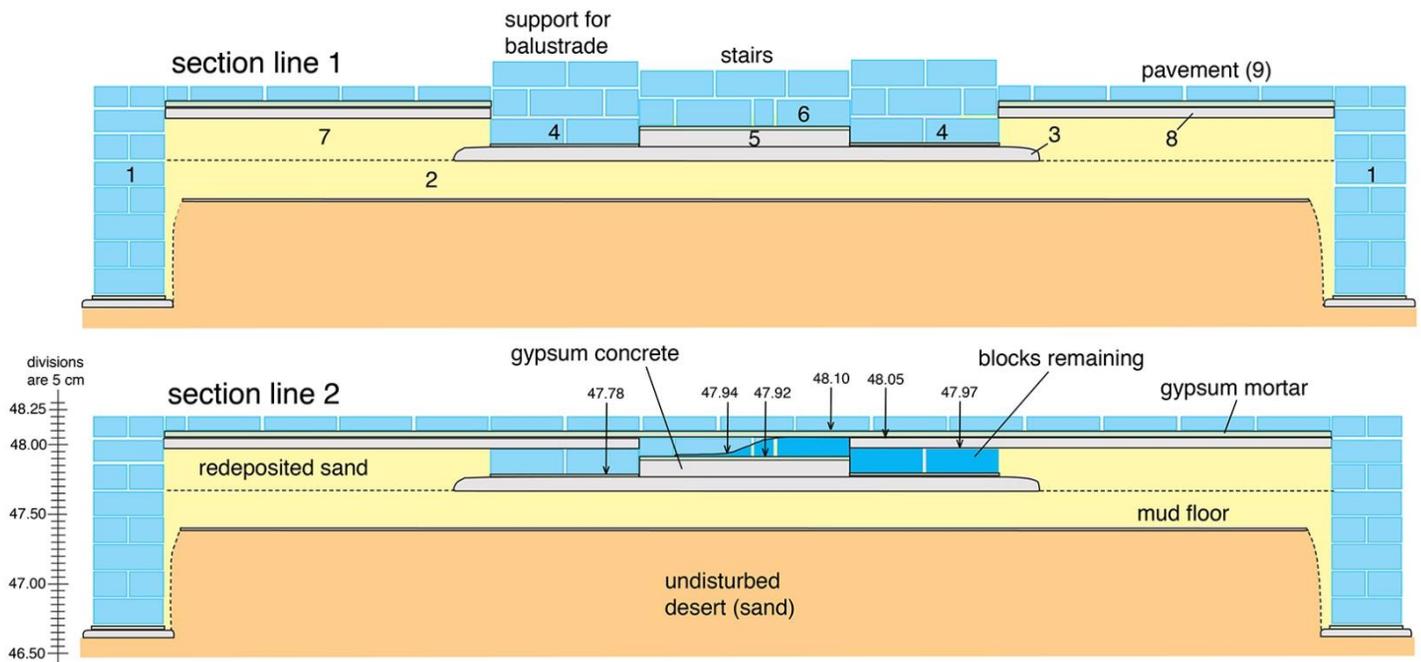


Figure 16: Two schematic sections of the ‘causeway’ (see Figure 13 for their locations). Section 1 restores the stone blocks the positions of which are preserved by their impressions in mortar. The meaning of the numbers is provided in the text. Section 2 combines the remaining stonework (darker blue) with restored stonework at the place where perhaps the stairway ended.

For the time-being at least, I can only present the evidence and recommend that people keep the two options in mind. Yet if the programme is pursued to recreate the outlines of the temple in fresh stonework, it will be necessary to make a decision as to how to mark the structure that is suggested by the remains of the ‘causeway’.

The season ended as it began. Final pay day on site was Thursday, November 9th, when the tents and remaining equipment were returned to the expedition house. On Saturday, an inspector committee assembled once more in the dining-room. I signed off on the site and the magazines, handing them back ‘in good condition’, in the case of the magazines so that a separate team of conservators (Egyptian, British and from the USA) could continue their work on the fragmentary coffins from the South Tombs Cemetery, a project under the direction of Dr Anna Stevens. On the 10th, the last of the temple team including myself travelled back to Cairo.

Notes

The evidence that the stone temple was begun in or after Akhenaten’s year 12 is a hieratic jar label from the fill of a foundation trench belonging to the northern colonnade, see *The Akhetaten Sun*,

The discovery of post holes for a wooden building on the north side of the temple in 2015 is described in *The Akhetaten Sun*, 21, no. 1, June 2015, pp. 17–19; of post holes, some containing incense, at the site of the large stela behind the temple, in *The Akhetaten Sun*, 18, no. 2, December 2012, pp. 11–22.

The images from the collection of the Metropolitan Museum of Art, New York, are available at: <https://www.metmuseum.org>

The plan and reconstruction drawing of the Great Aten Temple by Ralph Lavers is published in J.D.S. Pendlebury, *The City of Akhenaten III*. London, Egypt Exploration Society 1951, pls. III, IV, VIA and VIB. The brief note on the ‘causeway’ is on p. 14.



Figure 17: Restoring the Great Aten Temple

A head of Akhenaten from the Great Aten Temple

*By Barry Kemp, Marsha Hill and Kristin Thompson
(with context information supplied by Anna Hodgkinson
and Miriam Bertram)*

Since 2012, the Amarna Project (British Mission to Tell el-Amarna) has been re-examining the site of the Great Aten Temple as well as marking the outlines of the main building with new stonework. A notable feature of the temple is the way it was surrounded by extensive areas devoid of other buildings, apart from numerous offering-tables built from stone blocks or mud bricks. Most of these had been buried beneath a layer of rubble when, seemingly during or after Akhenaten's regnal year 12, the temple was rebuilt on a larger scale. This layer of rubble sealed a mud floor which had first been laid down at the time of the temple's creation and covered the huge surrounding space. This mud floor carries traces of activities which, if we can understand them better, should shed light on the temple as a cult centre serving the needs of part of the city's population as well as Akhenaten's own concepts for how the Aten should be properly honoured.

In the course of excavating an area of the rubble (square J26 in the Great Aten Temple excavation grid, excavation unit 17404) at the end of September 2017, a small head of Akhenaten was found within the rubble (Walid M. Omar was the workman who found it, whilst working under the supervision of archaeologist Anna Hodgkinson). It was given the object number 41430. The date of discovery was September 28th, 2017.

When first recovered from the ground, patches of sand still encrusted the surface. A broken fragment of gypsum (perhaps from the damage to the top of the crown) adhered to one of them over the position of the right eye. By good fortune and generous spirit of cooperation, Hassan Ibrahim El-Amir, conservator of the Institut Français and a member of the French-British mission to Hatnub (then living in the Amarna expedition house during the course of their autumn season), cleaned the surfaces shortly after discovery and consolidated them. Thomas Sagory, photographer to the same mission, took photographs of the head before and after cleaning.

Description

41430 - TA.GAT 17 #18 J26 (17404) — levelling rubble

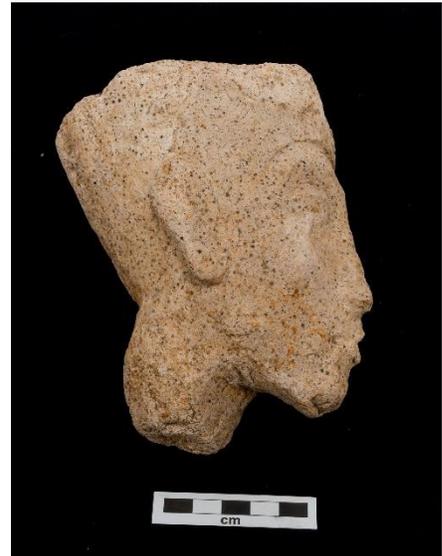
Head of Akhenaten. Gypsum paste mixed with fine dark grit, the paste containing many tiny air cavities. Colour of paste: cream but the surfaces (including of the breaks) are mottled pale brown from chemical reactions during long burial in the ground. These, and the dark grit mixed into the paste, create a general impression of a darker and more uneven colour than is apparent when the paste is viewed under low magnification. The surface bears many faint traces of the smoothing and crinkling of the paste as it was worked whilst still plastic.



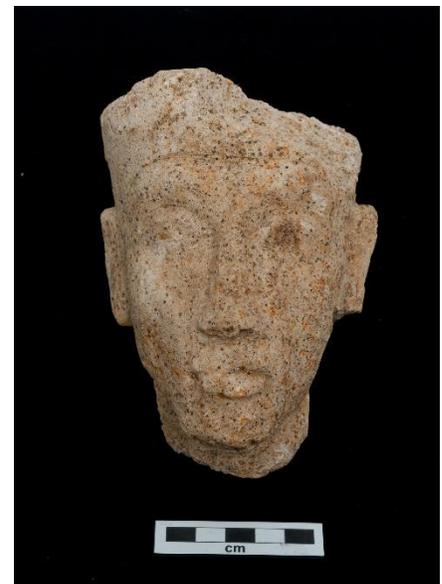
The head has suffered damage. A piece is broken from across half of the top of the crown on the head's left side; there is damage to the right side of the mouth and down the bridge of the nose; a flake is missing from below the left ear; the point of the chin has sustained slight damage as has, shallowly, the back of the neck. The underside of the neck is rough. A slight patch of pale abrasion occurs above the left eye (possibly made during the course of excavation). The inner half of the left eye itself seems to have lost a shallow flake that creates a mistaken impression that a lower edge of the eye is marked (it is slightly darker and unlike the other eye).

Dimensions: max. ht. (bottom of neck to top of crown) 12.8 cm; top of crown (front to back) 10.0 cm; top of crown (side to side) 9.2 cm; ht. of face (chin to start of crown) 8.7 cm; width of face (between temples) 8 cm.

The head has been modelled with minimum detail, very noticeable in the case of the right ear, which is simply a flat, raised outline of an ear, and the eyes, which are rendered as oval swellings set off above by a deep groove from the brow ridge without indications of eyebrows, lower eyelids or other details. The cheekbones have a natural swelling that continues into a bony prominence extending to just in front of the ear. The cheek swelling changes quickly to concave cheeks below, which serves to accentuate the mouth area. The nose (its bridge damaged) is clearly separated from the rest of the face, the right nostril slightly undercut as it joins the cheek. The mouth is narrow from side to side, but the lips are full, the lower lip well advanced beyond the chin. The chin is relatively narrow and long, the profile beneath the chin rising rapidly towards the neck at a marked angle.

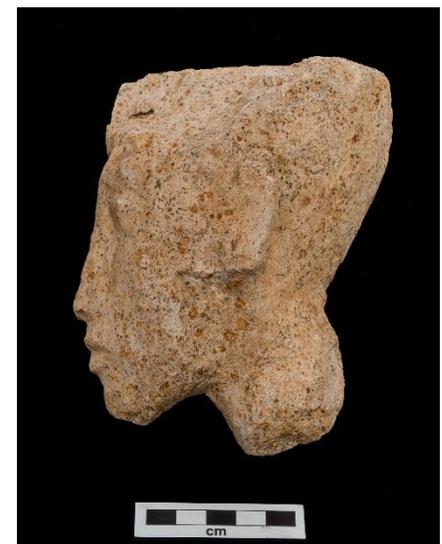


The crown is separately distinguished from the head only at the front, by means of an incised line which begins about 1.8 cm forward from the ears (the right side only fully preserved). The back of the crown rises at an angle from the neck but without a separating line. The edge of the break of the missing slice from the top of the crown, where it meets the front surface, corresponds to the place where a uraeus would have been. Between the bottom of the break and the forehead line two more-or-less parallel and vertical grooves seem to be shallowly modelled as if from the tail of a uraeus, but it is hard to be sure of this.



The general impression of the head is of something rapidly and confidently modelled by the fingers in a stiff clay by someone very practised at doing so, able to maintain a near-perfect symmetry during the course of the actions, and cognisant of the fine points of rendering the royal physiognomy.

As for comparisons, Berlin ÄM 21351, generally accepted to represent Akhenaten, offers good parallels for the shape of the face, the droop of the chin and the slight convexity of the upper line of the neck at the rear that characterise this king's image. Seyfried, *Im Licht von Amarna* (2012), 332, cat. No. 120, illustrates all sides. Another parallel is offered by Cairo CG 753, Petrie's gypsum 'death mask of Akhenaten,' which is similar in its strong characterisation with use of minimal detail. Pendelbury, *Journal of Egyptian Archaeology* 19 (1933), 118, pl. 19/4 has the best photo. Two gypsum heads of roughly the same size as the new head have been found in workshops: a small head usually taken to represent Nefertiti, Berlin ÄM 21353, also illustrated in Seyfried, 326–7, cat. 113; and Metropolitan Museum of Art 21.9.19, representing an unknown royal figure, with a photograph on the museum's website.



3D viewable image

A 3D rotatable image of the head, using Thomas Sagory's photographs, with 3D digitization by Thomas Sagory and Benoit Touchard, is available at:

<https://skfb.ly/6w7NX>

Archaeological context

The layer of rubble in which the head was found is largely composed of pieces of mud brick, sometimes mixed with patches of sand. Tip lines are sometimes visible in excavated sections, marking individual moments in the throwing down of loads of debris. The most likely source of the bricks is a thick temporary retaining wall and service ramp built around the site of the twin groups of large sandstone columns at the front of the temple. Given that the rubble might extend southwards over an area of some 140 x 70 m, it is debateable whether this construction would, on its own, have provided sufficient material. Mixed within the rubble are numerous potsherds. They are predominantly from storage vessels, made from Nile-silt rather than from marl clay. Other finds are fragments from stamped jar-sealings, small basalt hammer-stones and numerous flakes from shaping them, and further examples of gypsum mouldings.

This cultural debris appears not to be evenly distributed but to occur in concentrations. One conspicuous concentration was excavated in 2014. It consisted of fragments of carved stone, including the torso of a beautifully rendered statue almost certainly of Nefertiti, a reworked piece of column and part of a slab carved with the later names of the Aten. The mixed character of the material implies the disposal of a small pile of discarded stonework presumably left over from whatever stone constructions had accompanied the first temple on the site. Apart from this group, carved stonework (including inlay pieces) is rare.

The rubble lies directly on the final mud floor without an intermediate layer of sand or ash or cultural debris. Nor do the potsherds derive from pots broken as they stood when the rubble was dumped in. The impression one gains is of a final event in the life of the first temple, when an area was cleared of standing offering-tables, a fresh mud floor was laid down and, on this, temporary constructions were put up, following which the area was cleared again and the rubble dumped over it, creating a fresh floor level higher up which remained the ground level until disturbed by archaeologists.



In general, the material does not resemble the characteristic debris found in Amarna's housing areas, mainly in the infrequency of faience and glass pieces, signs of manufacturing (other than the hammerstones) and absence of stone furnishings.



Detail of front of crown



Old aerial photograph of Amarna Central City

The glass industries of Amarna: attempting a reconstruction

Anna K. Hodgkinson

The first Egyptian-made and -worked glass appeared in the early New Kingdom. Glass was imported as a raw material during the reign of Thutmosis III, as documented in his annals at the Temple of Karnak. Turquoise and dark blue glass was represented together with and as a substitute for valuable raw materials such as lapis lazuli and turquoise, but was not necessarily regarded as less valuable. Despite being an import material, glass was also manufactured in Egypt at this early time, as the results of recent chemical analyses have shown. The new dating of the material from the Syrian site of Nuzi – a settlement believed to have had a developed glass industry long before the Amarna Period – to the late 14th century BCE makes the Levant no longer the only likely source of the emergence of glass during the Late Bronze Age (fig. 1).

The earliest finds from glass are small pieces of sculpture, which were produced by the cold-working of roughly-moulded blocks of glass, and beads, in addition to infrequent core-formed glass vessels. Glass objects from this time are rare and only appear in royal contexts, including the tomb of the three foreign wives of Thutmosis III and his own tomb, KV34, for instance.

By the time of the reign of Amenhotep III, however, his palace at Malkata, sported a fully-fledged glass industry (fig. 1). Past and present excavations by the Metropolitan Museum of Art, New York, have discovered large quantities of raw and finished glass objects alongside the manufacture of faience goods. These two industries are related because they share the same raw materials: silica, soda and lime, although in different ratios.

The move of the administrative and religious capital to Amarna under the reign of Akhenaten resulted in the relocation of the glass industry and the sudden demand in high-status materials due to the presence of a large number of elite persons and royal family members at the site. A large-scale industry was established, which can be identified through the presence of industrial debris, waste from working, raw materials and unfinished products, all of which were found throughout the city, sometimes in larger amounts or concentrations, which suggests the presence of workshops (fig. 2).

When Flinders Petrie excavated at Amarna in the late 19th century, he discovered and published the remains of this glass industry based on the discovery of kilns and glass working debris, the location of which, unfortunately, was not recorded and is therefore no longer known. Petrie brought back with him thousands of objects related to glass-working and -making as technological samples, including cylindrical pottery vessels, fragments of colourful glass ingots and glass rods, which were used for the decoration of polychrome core-formed glass vessels (see, for instance, figs. 3 and 6). These objects are now housed in museums worldwide, the largest number being kept in the Petrie Museum of Egyptian Archaeology in London.

Since Petrie was very much interested in the technology of glass and faience production, he made a first attempt to reconstruct the glass-making process on location at Amarna based on the discovery of the cylindrical pottery vessels mentioned above, together with “fritting pans” - ceramic vessels interpreted by him as containers for the melting of the initial glass batch. Petrie’s interpretation of the cylindrical vessels as stands for the pans has since been proved to be incorrect, and their actual use as moulds for glass ingots has long been confirmed, but it was a fair first try (fig. 4)! Petrie was also interested in the manufacture of faience objects, and he excavated an area, marked on his map of the site as “moulds”, which yielded over one thousand ceramic moulds for faience objects of various shapes and functions (see, for instance, fig. 5).

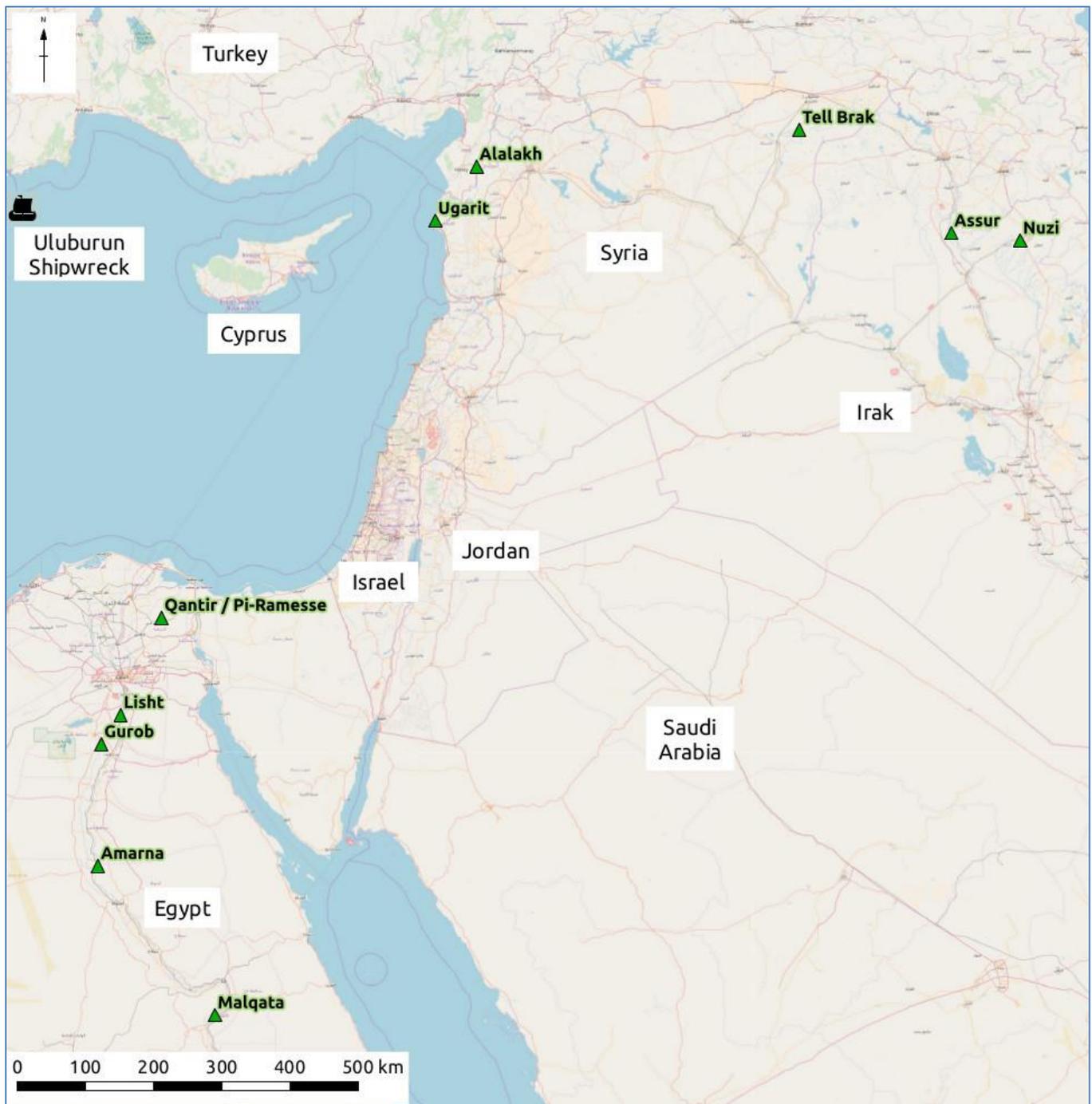


Figure 1: Map of the Eastern Mediterranean area showing sites active in making and/or processing glass during the Late Bronze Age.

Petrie collected thousands of fragments of mainly blue-bodied, polychrome, core-formed vessels with wavy decoration in the area of the so-called *palace waste heaps* in the south-east of the Central City (fig. 2), which highlights the fact that these vessels were probably mass-produced at the site. They were used in elite contexts to hold perfumes and other precious liquids and presented as gifts. Despite the skill and effort required for their manufacture, these vessels were not recycled when they broke, but discarded. By contrast, the production of glass beads, most of which are simple and monochrome (although complex, polychrome beads also exist), is simpler (see fig. 6). For bead manufacture, a soft glass rod is wrapped around a metal rod, a *mandrel*, and this technology is still in use today, known as *lamp working*. In fact, unlike raw glass production, New Kingdom Egyptian lamp working is unlikely to have required complicated kiln structures;

a hot flame from an open bonfire pit, would have sufficed. Because such ephemeral structures were infrequently recognised as such by early excavators such as Woolley or Pendlebury, who worked at Amarna at the beginning of the last century, we have lost a great deal of information on this mode of manufacture, in particular on a household level.

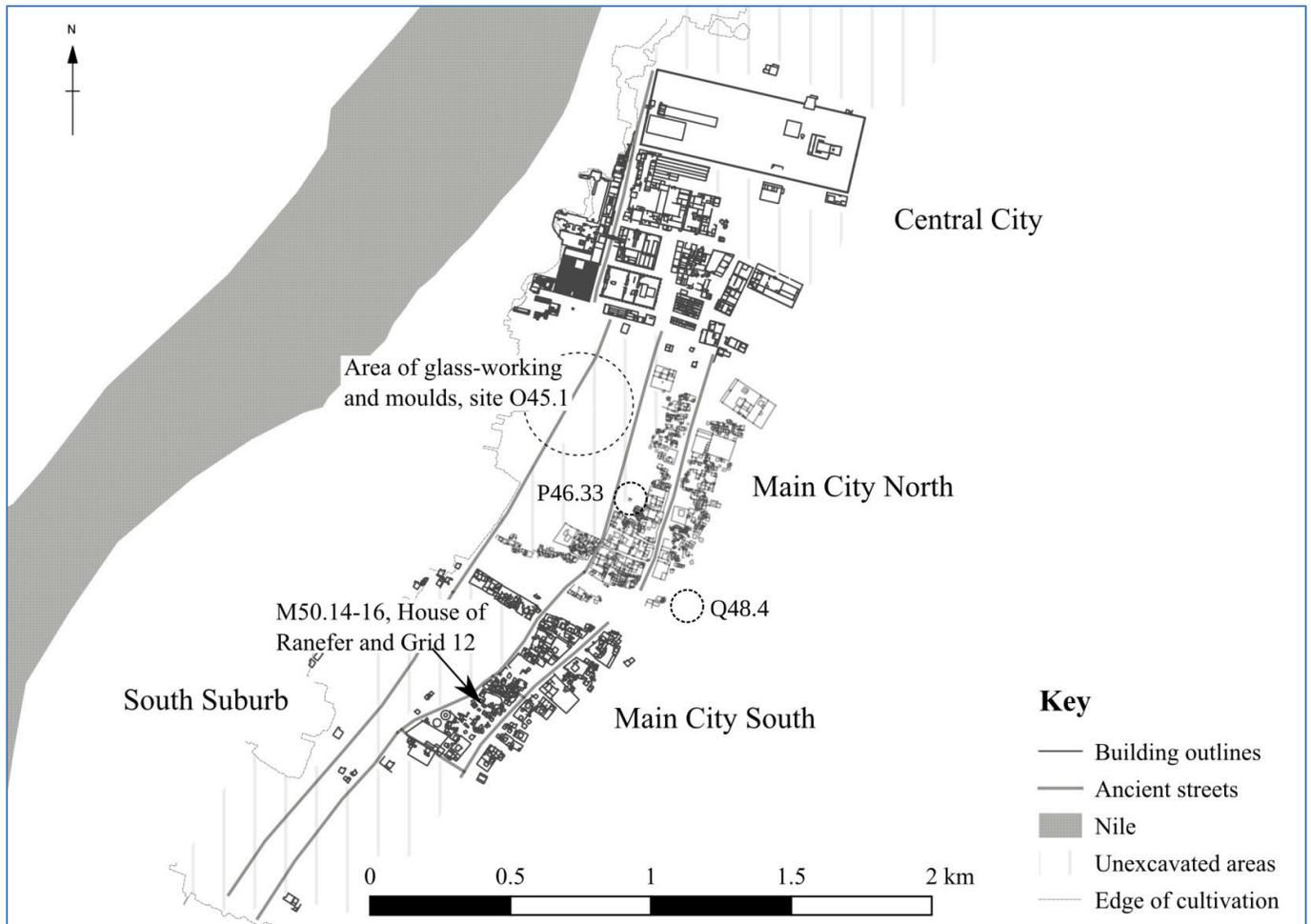


Figure 2: Map of Amarna showing the workshop sites mentioned in the text.

The excavations carried out by Barry Kemp and colleagues since the late 1970s have revealed the structural remains of workshops in the Main City, including some firing structures, which were possibly used in high-temperature industrial processes. Workshops Q48.4 and P46.33 contained evidence of glass-working alongside other industries, as did the small houses of Grid 12, N50.23 and the elite house of Ranefer, located in the Main City South and excavated in the early 2000s (fig. 2). The work of Paul Nicholson and Caroline Jackson on workshop site O45.1 has provided us with new information regarding high-temperature industries at Amarna: two large kilns were discovered, which may have been used for the production of raw glass. In addition, some smaller firing structures were used for the processing of bronze (or copper-alloy), faience and pottery. Workshop O45.1, with these large kiln structures and its location just south of the main palace, can be considered an institutional workshop, possibly even underlying direct royal control.

Chemical analysis has demonstrated that the colourants used to give the glass and the faience the popular shades of blue came from two different sources: a dark blue colour was achieved by adding to the batch processed cobalt ore, which was brought to the Nile valley from the western desert. Lighter shades of blue, by contrast, were produced using copper, the base of bronze. Therefore, it is highly likely that copper was provided to glass and faience workshops as a by-product of metal working activity by smiths.

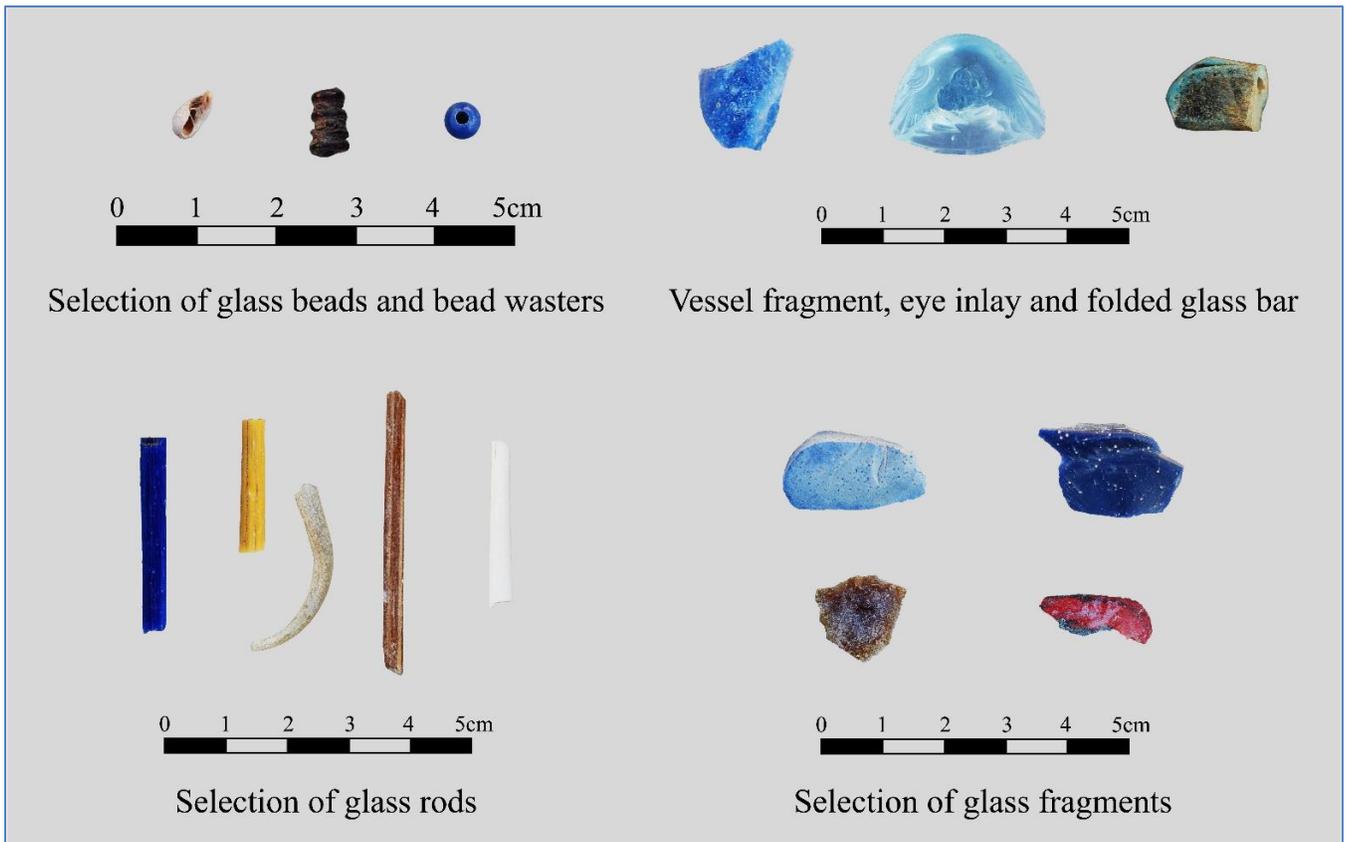


Figure 3: Objects related to glass working and some finished objects from site M50.14–16. Photos: A. Hodgkinson.

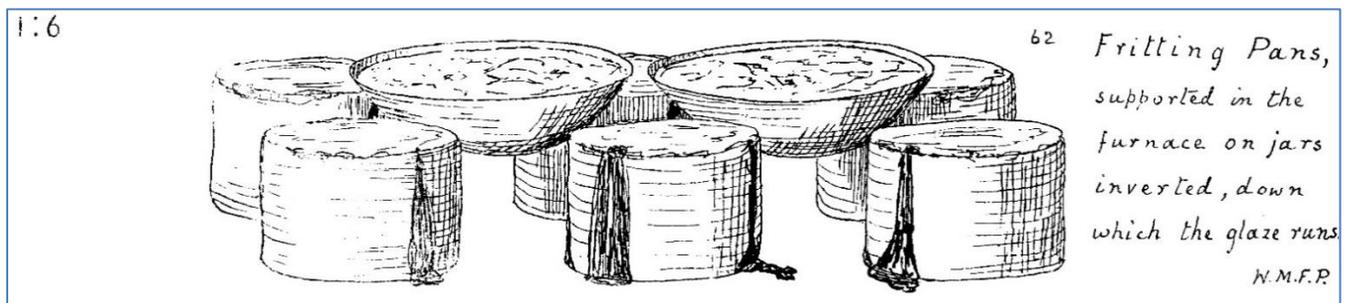


Figure 4: Petrie's reconstruction of the glass making process. From Petrie, *Tell el-Amarna*, 1894.

Workshop M50.14–16, first excavated in 1922 by C. L. Woolley, who also recognised it as a glass and glazing workshop, and then re-excavated by the author in 2014 and 2017 (figs. 2 and 7), yielded evidence of a series of industrial activities, all of which are somehow related: evidence of hot and cold glass working includes glass ingot fragments: one of these is large and the same size and shape as those found on the Uluburun Shipwreck, in addition to an almost fully preserved, but very bubbly ingot (fig. 8). Glass rods of many colours, used in the manufacture of jewellery and the decoration of glass vessels were found within the courtyard of the house. Finished and unfinished products include glass beads, usually dark blue in colour, and vessel fragments, although only three survive, all of which are dark blue and plain (fig. 3). A small number of amulets and inlays show signs of having been carved in a cold state, connecting the glass industry directly with the chipping of stones: agate, a red-banded stone was processed at the site in order to produce beads. Apart from glass and stone objects, faience amulets were also made here, including a variety of polychrome necklace amulets and others depicting household deities such as Bes. A series of ceramic moulds for faience demonstrates that at least some of these objects were made at the site (fig. 5).

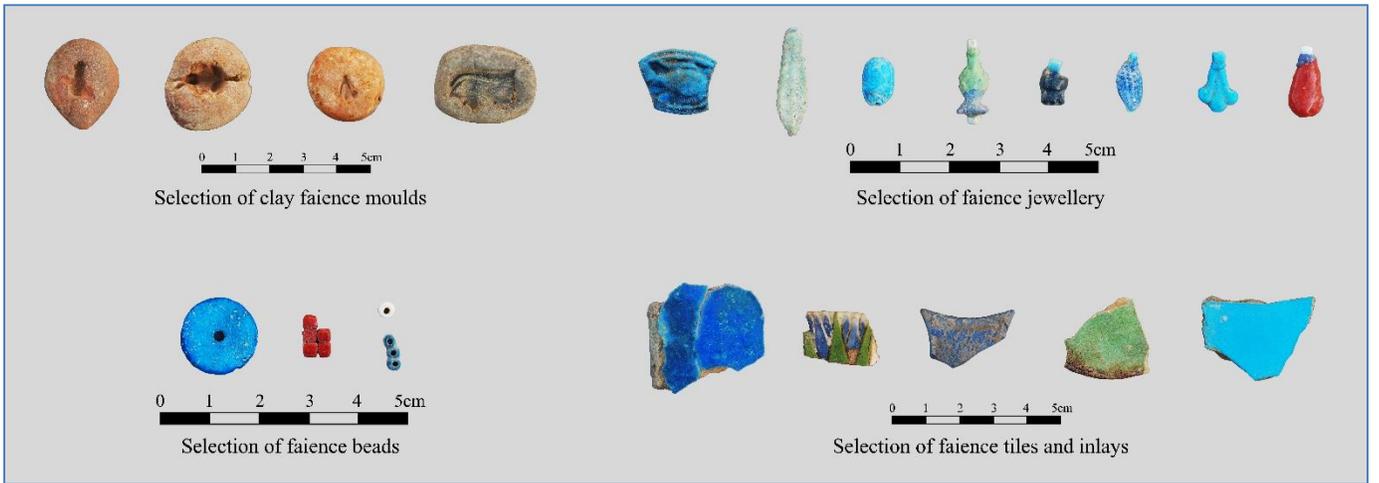


Figure 5: Faience objects and ceramic moulds for making faience from site M50.14–16. Photos: A. Hodgkinson.



Figure 6: Beads, fragments of glass vessels and glass rods from the Spurell Collection, from Petrie's excavations. Courtesy of the World Museum, Liverpool. Photo: A. Hodgkinson.

The 2017 excavations for the first time yielded evidence of metallurgical activity at the site, in the form of crucible fragments and lumps of copper-alloy. The combination of high-temperature and chipping technologies at one site highlights the fact that the specialist knowledge was shared among the craftspeople in addition to both raw materials such as colourants, and fuel for kilns and furnaces. Since a similar combination of industrial activities was observed in the nearby houses of Grid 12 and the House of Ranefer, we can identify an industrial cluster of houses in this area of Amarna's Main City South.

In fact, a large amount of kiln debris in the courtyard of M50.14–16 points towards a high-temperature kiln structure, which was in use during the Amarna Period, but no longer exists (fig. 9). This evidence matches the discovery of the ingots mentioned above, and several fragments of cylindrical vessels, indicating, but not confirming, the manufacture of raw glass in a similar way to that reconstructed for site O45.1.

Workshop M50.14–16 furthermore contained some ovens as well as some small and superficial fireplaces, which only became apparent through careful excavation in modern times. In the close vicinity of these fireplaces some clusters of unfinished beads were found, indicating this as their production site (fig. 7). Beads, rather than the more intricate glass vessels, can be considered the main output of this workshop, suggesting that some glass workshops were more specialised and more advanced in the processing of finished glass than others.

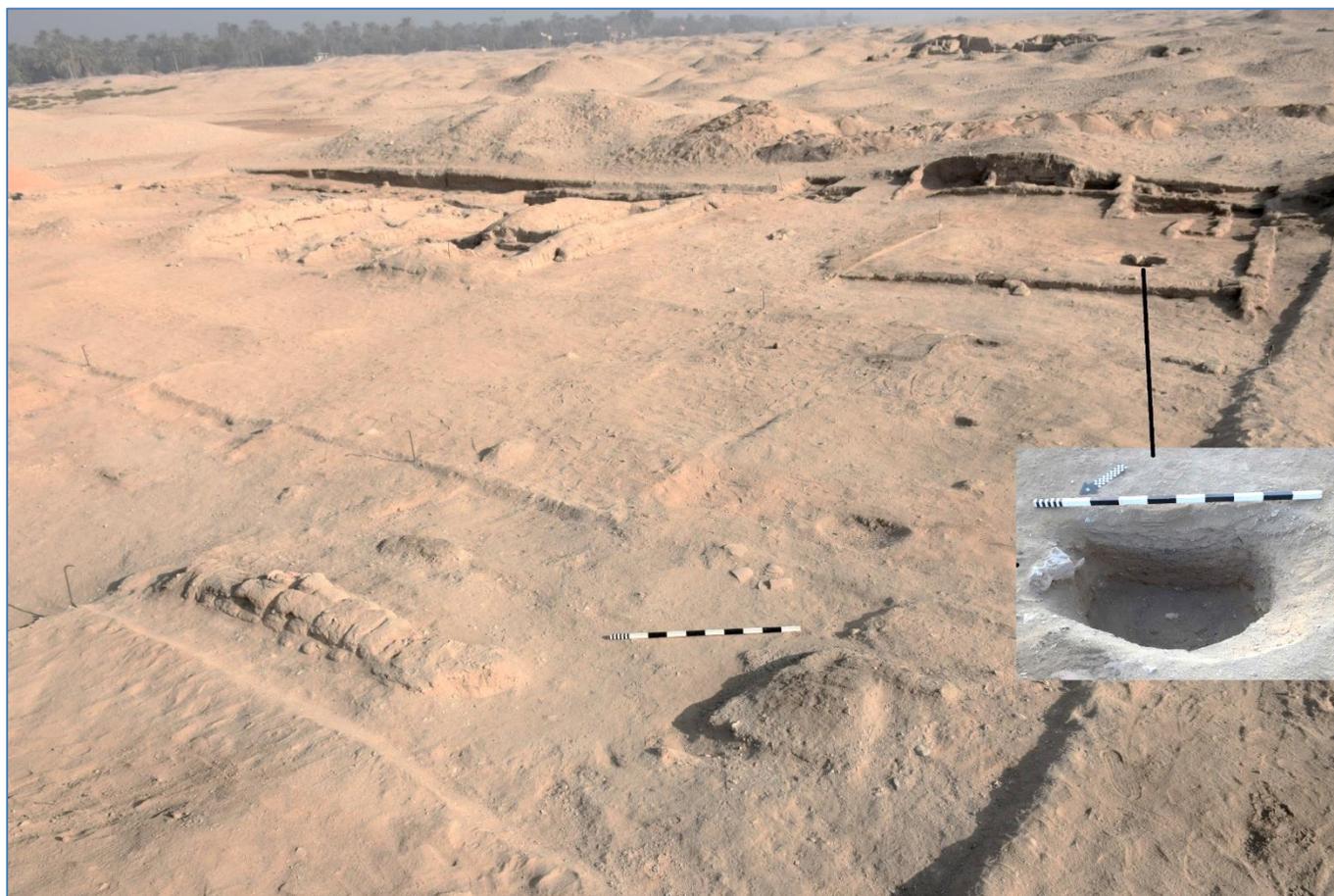


Figure 7: The eastern courtyard of site M50.14–16 looking northwest, showing a firing structure.
Photo: A. Hodgkinson.

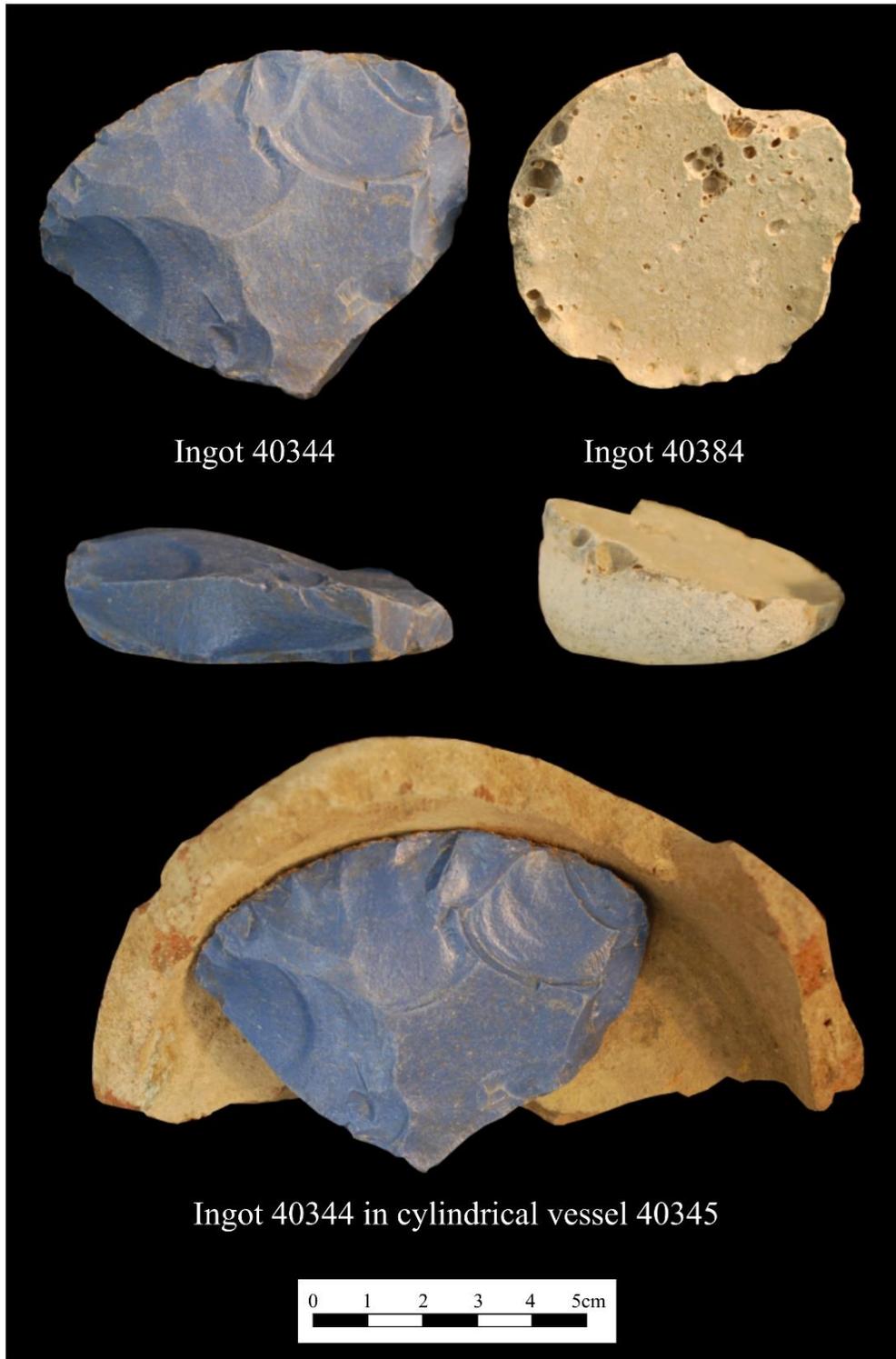


Figure 8: A large fragment of a glass ingot (also shown inside a cylindrical vessel) and a small, almost complete ingot, both from site M50.14–16. Photos: A. Hodgkinson.

Barry Kemp has already suggested an industrial network throughout Amarna, which shared expertise and raw materials, with members of the elite and the royal court in charge of distribution of both raw materials and finished produce. I hope to have conveyed that this system is very likely to have been in place at Amarna, not only for the manufacture of raw glass and glass objects, but also for several other industrial activities, many of which were linked through expertise and resources.



Figure 9: A concentration of vitrified mud bricks (kiln debris) on the surface of the courtyard of workshop M50.14–16. Photo: A. Hodgkinson.

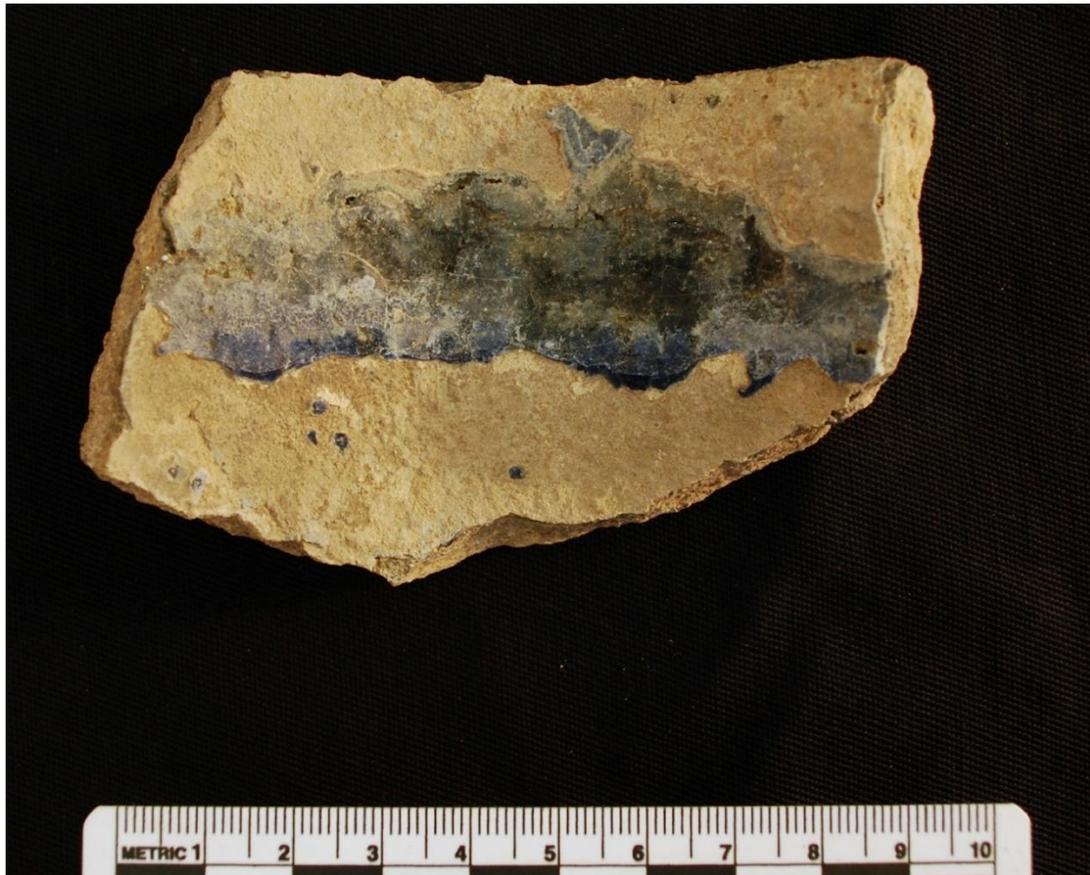


Figure 10: Wall fragment of a cylindrical vessel (glass ingot mould) from site M50.14–16, which has blue glass adhering to it. Photo: A. Hodgkinson.

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