

Report to the SCA on archaeological survey and excavation undertaken at Medinet el-Gurob, 27 March-17 April 2012

Abstract: The article below presents a report on the 2012 season of survey and excavation undertaken by the Universities of Liverpool and Copenhagen, and their international collaborators, at the site of Medinet el-Gurob in the Faiyum region. The principal tasks accomplished were surface collection and analysis of pottery, topographical survey, field-walking for small finds, and excavation of (1) a workshop area dating to the New Kingdom, in the so-called 'industrial area' of the site (2) a 5 x 7m square in the area presumed to be the southern half of the palace, and (3) a 5 x 5m square in the northern residential area of the site. The project also mapped and studied areas that had been subject to illicit excavation and looting during 2011-12.

Introduction (Ian Shaw)

The Gurob Harem Palace Project is a multi-disciplinary Anglo-Danish project dedicated to the study of the urban and funerary remains at the ancient 'harem town' of Mi-wer in the southern Faiyum region. The principal aims of the project are (1) to produce accurate maps of the site and landscape as a whole, combining GIS so as to allow our growing databases of ceramics, small finds and lithics to be mapped onto the visible surface features (2) to create more detailed plans of the main points of archaeological interest in the settlement and cemeteries, (3) to produce a basic modern corpus of pottery at the site, (4) to use satellite photographs, geophysical methods, core-drilling and surface examination to gain a better understanding of the original architecture and ancient activities, as well as the relationship between the site of Gurob and its landscape and environment and (5) to excavate selected areas in order to expand our knowledge of material culture at the site and to supplement and clarify the information available from survey.¹

¹ Preliminary reports on the work so far (2005-2011) have been published in the following articles: I. Shaw, 'Gurob: the key to unlocking an Egyptian harem?', *Current World Archaeology* 23 (June/July 2007), 12-19; I. Shaw, 'A royal harem town of the New Kingdom: new fieldwork at Medinet el-Gurob', *Queens of Egypt*, ed. C. Ziegler (Paris: Somogy Art Publishers, 2008), 104-115; I. Shaw, 'The royal harim at Medinet el-Gurob: new fieldwork (2005-7)', *The Second Young Egyptologists' Conference, Lisbon, 2006*, ed. Luis Manuel de Araujo and Jose das Candeas Sales (Lisbon, 2010), pp.256-64; I. Shaw, 'New fieldwork at the Medinet el-Gurob New Kingdom settlement: investigating a harem palace town in the Faiyum (summary of the 2009-10 seasons)', *Achievements and problems of modern Egyptology: Proceedings of the International Conference held in Moscow on September 29-October 2, 2009*, ed. G.A. Belova (Moscow: Russian Academy of Sciences, 2011), pp.348-64; I. Shaw, 'Seeking the Ramesside royal harem: new fieldwork at Medinet el-Gurob', *Ramesside Studies in Honour of Kenneth Kitchen*, ed. M. Collier and S.

The 2012 team consisted of twenty-five members: Dr Ian Shaw (University of Liverpool, UK), Jan Picton (University College London), Ivor Pridden (University College London), Dr Tine Bagh (Ny Carlsberg Glyptotek, Copenhagen), Anna Hodgkinson (University of Liverpool), Dr Judith Bunbury (University of Cambridge), Sarah Doherty (University of Cardiff), Liz Jones (University College London), Nina Maaranen (University of Helsinki), Hannah Pethen (University of Liverpool), Dr Rachael Dann (University of Copenhagen), Dr Ole Herslund (University of Copenhagen), Henrik Brahe (University of Copenhagen), Lena Tambs (University of Copenhagen), Dr Valentina Gasperini (University of Bologna), Dr Claire Malleson (University of Liverpool), Dr Marine Yoyotte (Sorbonne, Paris), Dr Rosa Spencer (Subject Centre for Archaeology, York University), Dr Mark Manuel (University of Durham), Dr Ibrahim Abd'el-Baset Ibrahim (Faiyum University), Ashraf el-Senussi (Curator of the Kom Aushim Museum, SCA), Kamal Helmi Quftawi, Omar Faroukh, and our SCA inspectors Adel Mondy and Ahmed Mohammed Ahmed Ma'awad.

I would like to thank the Egyptian Minister of State for Antiquities, Dr Mohammed Ibrahim, and the General Secretary of the Permanent Committee, Dr Mustafa Amin, as well as Ahmed Abd-el Aal (the director of the Faiyum branch of the SCA), Dr Mohammed Ismail in the SCA Documentation Centre, Cairo, Hany Abu el-Azam at the SCA Abbasia office, and our inspectors Adel Mondy, Ahmed Mohammed Ahmed Ma'awad for their generous assistance and advice in our work at Gurob in 2012.

Our principal aims in the 2012 season of survey and excavation at Gurob were not only to seek confirmation of the overall layout and chronology of the settlement area of the site but also to understand the nature of Gurob as a whole. We are also aiming to gain a better understanding of the duration and nature of settlement at the site, and its relationship with the surrounding funerary remains and landscape. The six basic strands of work at the site in 2012, described below, were therefore topographical and architectural survey, geoarchaeological survey, excavation, pottery surface collection, botanical analysis and small finds collection and analysis.

Survey (Liz Jones and Hannah Pethen)

The 2012 GHPP survey report comprises two parts: the archaeological mapping section (compiled by Liz Jones) and a section on topographical survey (by Hannah Pethen).

(1) Archaeological mapping

The first surveying task this season was to complete a control survey of the survey stations created up to 2011 (including the station cemented at the end of the 2011 season and located only by provisional coordinates). For this purpose, we used the 3D traverse method for providing accurate and precise coordinates, whereby horizontal angles, horizontal distances and vertical distances are measured repeatedly around a

Snape (Bolton: Rutherford Press, 2011), 207-17; I. Shaw et al., 'The Gurob Harem Palace Project 2011-12', *Journal of Egyptian Archaeology* 98 (2012).

loop of the control points. Five rounds of measurements were taken at each control point in order to detect errors and to improve the precision and reliability of the results. The results of the traverse are given below:

Total Distance Covered in Traverse: 1616.6782 m
 Length of error: 0.028m (about the whole traverse)
 Direction of error: $32^{\circ} 24' 30''$
 Δ elevation: -0.0283
 Δ Northing: 0.0237m
 Δ Easting: 0.0150m
 Angular Misclosure: $20''$
 2D Accuracy: $1/57674$ [1 in 57674 = 1 m in 57.674 km, 1 cm in 577 m]

The angular and linear misclosures within the traverse fell easily within acceptable limits and the Compass Rule of adjustment was applied to distribute these. The Leica TS15 total station was used to observe the traverse, and the traverse processing was carried out through the onboard processing software, and also computed by hand for verification purposes. Following the completion of the traverse, we now have six permanent, coordinate control points across the site as a whole, and these were also plotted in the GIS (see Fig.1 below). The new control points were utilised during the topographical survey and also for the survey of the 'STB' area of looted tombs at the southwestern edge of the site.

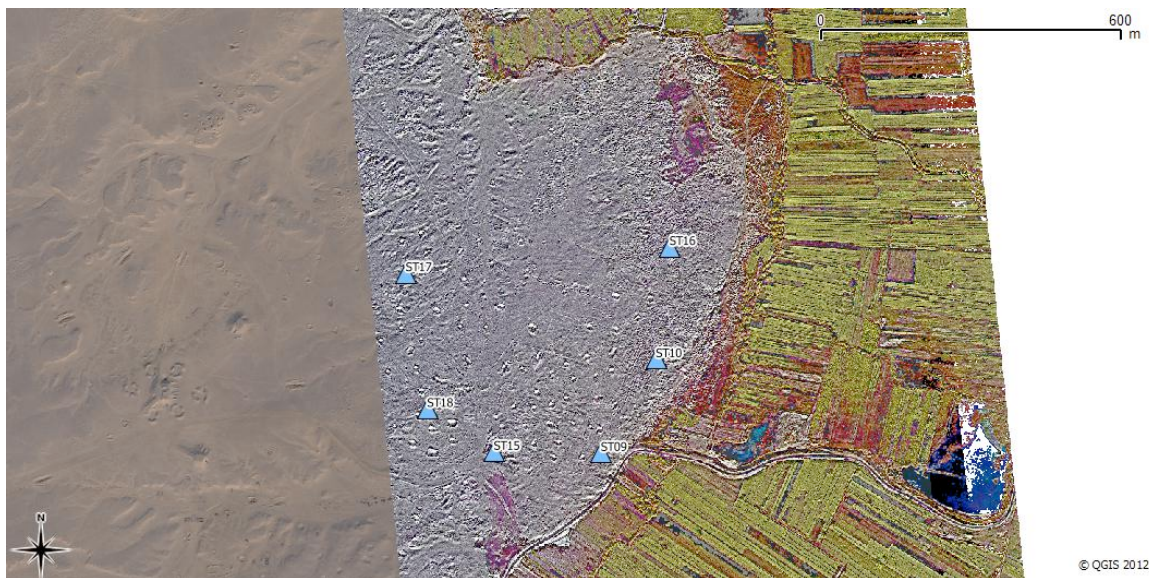


Figure 1: The survey control points on the local site grid.

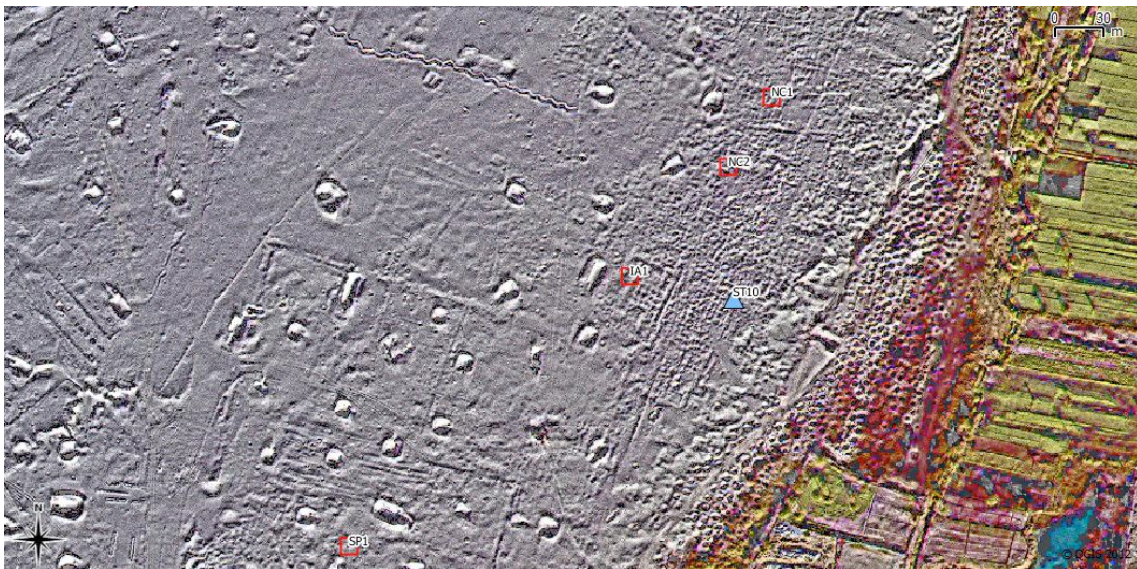


Figure 2: Locations of the 2012 excavation squares.

Our TCR705 total station was used to set out several 10 x 10m squares planned for excavation in 2012 (SP1, NC1 and IA1; see Fig.2 above). The wooden pegs for the South Palace square (SP1) still remained after last year's surface collection, so the corners were simply checked by total station before work commenced in this area. The industrial area (IA1) and the square in the North City (NC1) were set out afresh, and a further site (NC2) was set out but surface collection and excavation have not yet commenced there.

Throughout the season surface small finds were recorded using either the total stations or handheld Leica Zeno Mobile Mappers (c.1.5 m accuracy). In the latter case, coordinates were captured in UTM_36, using GPS and GLONASS satellite constellations, and then transformed (by Affine Transformation) onto the local grid. The data was collected in shapefile format, so that it could be uploaded directly into the site GIS. Small finds from within the excavation squares were also measured in.

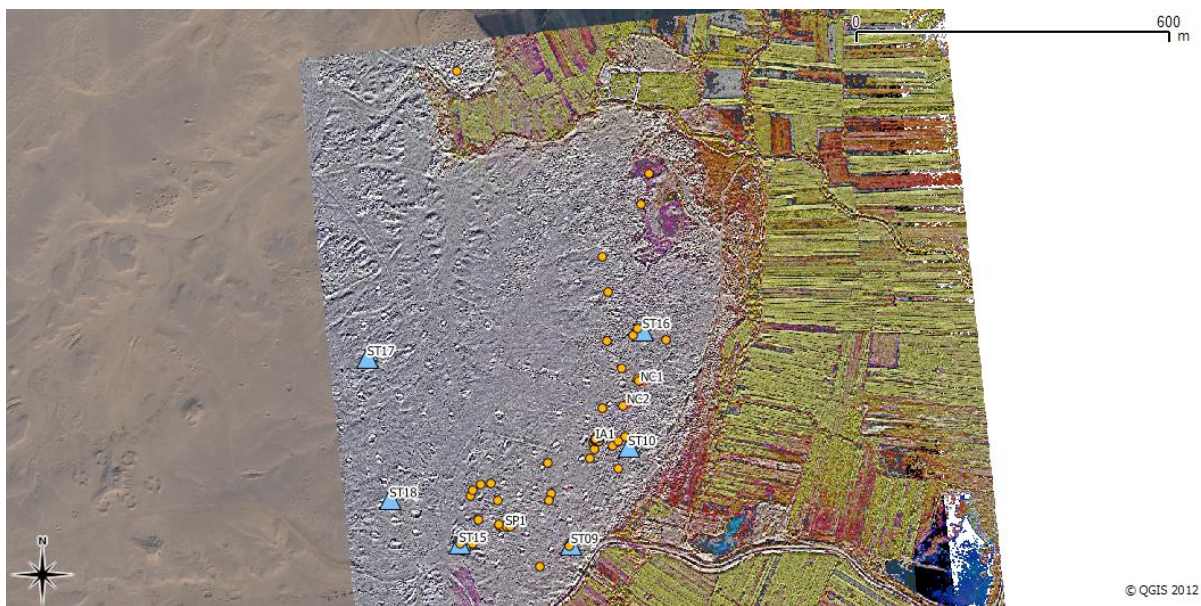


Figure 3: Distribution of small finds, also showing the locations of excavation squares SP1, IA1, NC1 and NC2, and control stations ST09, ST10, ST15, ST16, ST17 and ST18.

Following the discovery of new looting activity in the southwestern area of the site (due west of control point ST18), part of the team was sent to the area to record the damage and to sort through the modern spoil heaps. The decision was also taken to record the exposed and semi-exposed tomb shafts by total station. A total of 17 tombs were identified during this survey and these can be seen in Figure 4 below. Generally, four points were measured to roughly capture the geometry of the tombs and, where possible (and safe for the surveyor), the depths were also observed by total station. These tombs were plotted in the site GIS against the satellite images of the area.

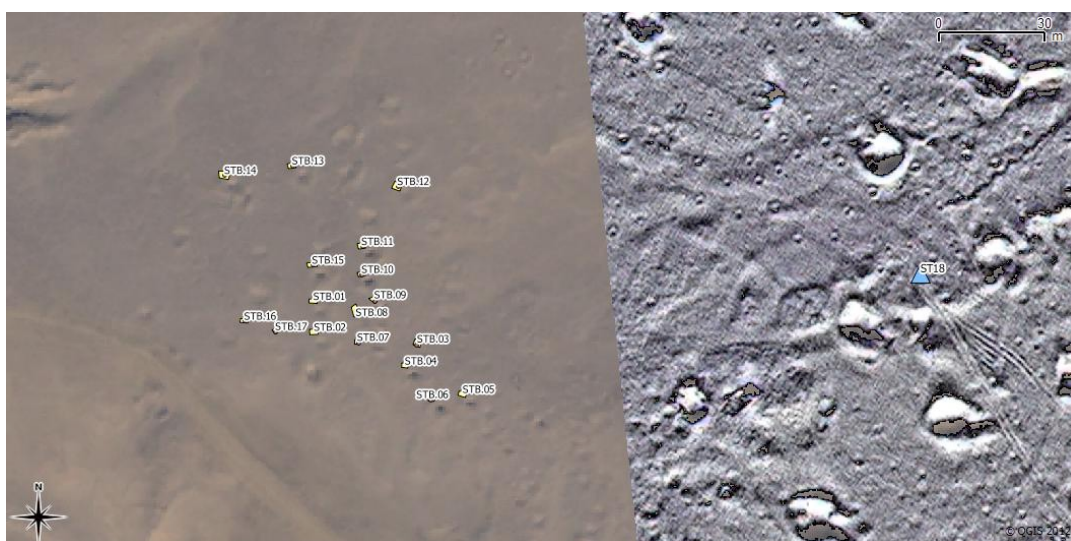


Figure 4: Plot of the South Tombs: STB1-17.

The other surveying tasks conducted on site were:

- Using the project's new automatic level to provide spot heights for the excavation squares;
- Recording the limits of excavation (LOEs);
- Recording the location of drawing points for excavation;
- Recording small finds found with the squares;
- Recording the line of cultivation and line of modern cemetery using Leica Zeno devices;
- Mapping the location of the augur boreholes with the Leica Zenos;
- Independent verification of the GPS confirmation of the SCA boundaries on 12th April, with the inspector and SCA engineer.

With a view to accurately mapping and monitoring activity at the tombs in the northwestern part of the site (see blue circle in Fig.5), and also accurately mapping the tombs in the north of the main site (see red circle in Fig.5), three additional control points were cemented in (stations marked in red in Fig.5). Existing control points are shown in blue. A traverse of the additional points was started, but was unable to be completed before work on site drew to a close – this will hopefully be remedied at the start of the 2013 season.

After each day on site, the survey data was processed in Leica GeoOffice and then integrated into the site Geographic Information System (GIS), built and maintained in Quantum GIS (QGIS). Here, spatial and attribute information for all the archaeological features mentioned above could be mapped and analysed all within the local site coordinate system. A second piece of GIS software, ArcMap10, was also used to prepare data. Also this season, the two raster satellite images we had for the project (of differing ages), were georeferenced from UTM_36N to the local grid. For vector datasets captured by the Leica Zenos, the coordinates were transformed to the local grid using the affine transformation spreadsheet designed and computed by Liz Jones during the 2011 season. The site GIS was created by Clare Malleson in 2006 with responsibility then passing to Anna Hodgkinson and also subsequently to Liz Jones for the 2012 season.

(2) Topographical survey

During the 2012 season at Gurob, Hannah Pethen continued the topographical survey that had begun in 2011. This season she was able to use a robotic total station, which required only one person to operate it, and was therefore faster and more efficient than the previous machine used in 2011. Over the course of 10 days she surveyed 0.148km², as compared with the 0.143km² surveyed in 10 days in 2011 (despite the fact that the time spent specifically on topographical survey was reduced in 2012, because it was not always possible to undertake topographic survey throughout the entire day). A total of 4877 points were taken in 2012, compared to 5829 points in 2011. A larger number of

points was required to survey a smaller area in 2011, because several significant features were surveyed in greater detail at a resolution greater than the typical 5m. Up

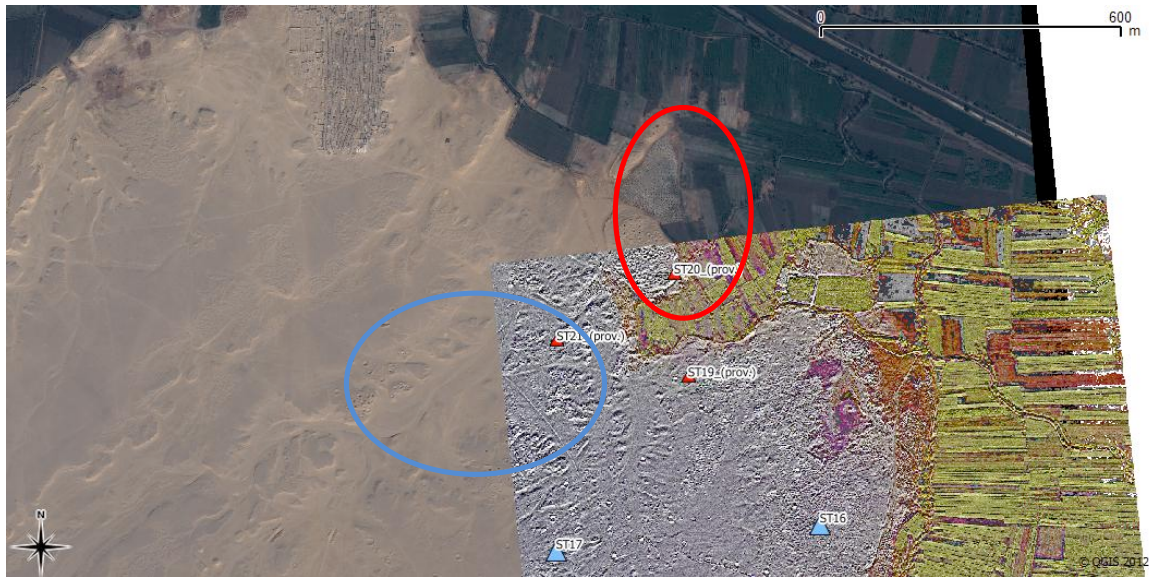


Figure 5: The locations of the new (aborted) control points, ST19-21 (based on provisional coordinates from Zeno mappers)

to 1000 points were taken in a day in 2012 depending on the topography, conditions and other constraints. As with the 2011 data, the 2012 topographic survey points were approximately 5m apart, although in some areas a more detailed survey was necessary.

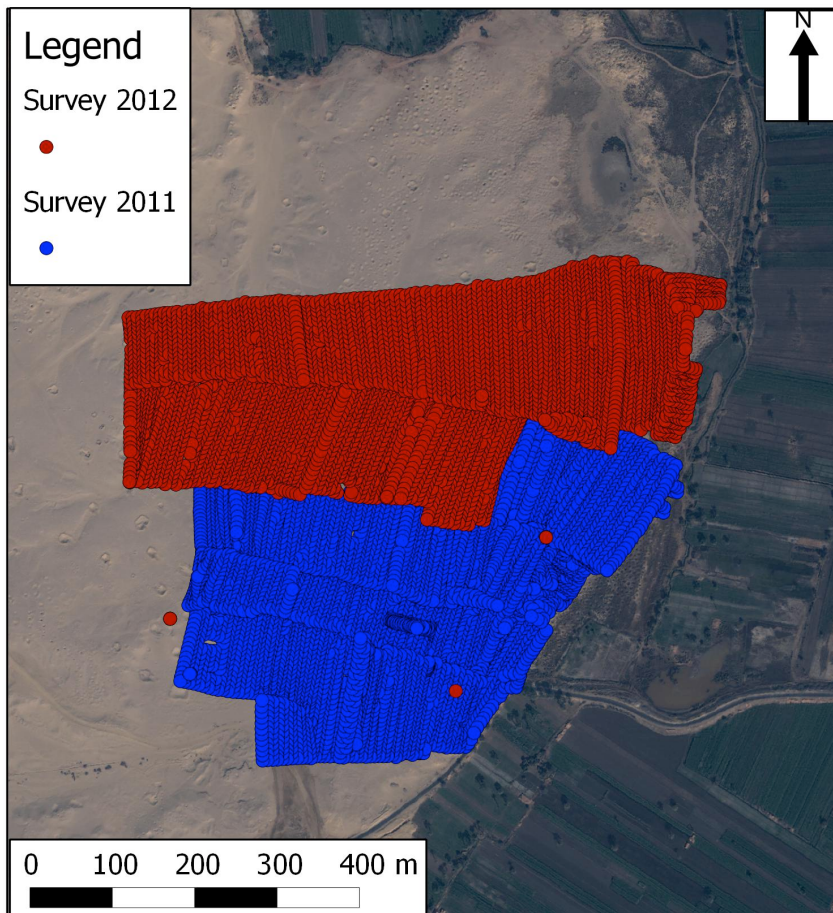


Figure 6: The areas covered by 2011 and 2012 topographical survey points.

The main aim of the Gurob topographical survey is to build a three-dimensional model of the topography of the site in a geographic information system (GIS). The survey data are downloaded from the total station and uploaded into a GIS. The GIS uses an algorithm to interpolate the height of the ground between the individual points recorded in the survey, and so builds a model of the site. A digital elevation model (DEM) of the area was constructed from the 2011 data, and showed promising results. This 2011 data has now been integrated with the 2012 data in an updated digital elevation model, created using a triangulated irregular network (TIN) in Quantum GIS (QGIS). The new DEM is shown in plan in Figure 7 below.

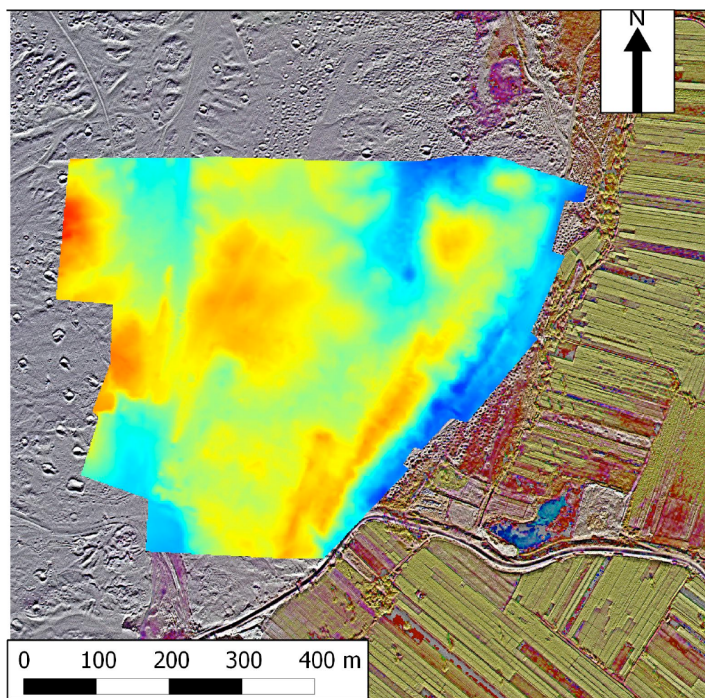


Figure 7: View of the DEM created from the 2011 and 2012 survey data (blue areas are lower, with heights increasing from yellow to orange to red as the terrain rises).

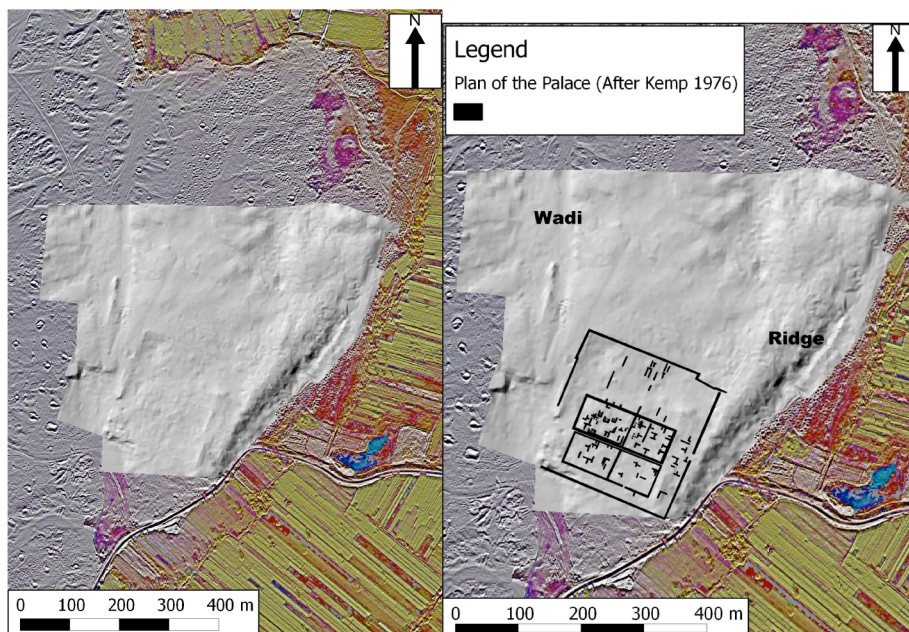


Figure 8: The 2011-12 survey data converted into a DEM and shown as a landscape with hill shading. To the left is the DEM with hillshading alone. To the right, it is overlaid by the plan of the Harem Palace proposed by Kemp (1976). In both images, the landscape is exaggerated to 3 times the height of the original data, in order to provide greater clarity in the model.

This DEM can also be modelled as a landscape, using a technique known as ‘hillshade’. This method reveals the natural slopes and heights of the site in a way the human eye is more familiar with. In Figure 8, above, the light is shown as if coming from a 45° angle with an azimuth of 315. The heights of the DEM have been exaggerated to 3 times their actual size in order to provide a clearer image. Figure 8 shows several archaeological features very clearly. To the south of the DEM, the north-east corner and north and east walls of the northern Palace building appear very clearly. These are still visible on the ground and were surveyed in greater detail than the typical 5m resolution. The enclosure wall of the Palace complex is also very clearly defined, even though this was only surveyed at the typical 5m interval. Other notable features are the ridge along the eastern edge of the site, and the wadi to the west.

The next stage of work involves integrating the new DEM of the site into a larger, lower resolution, model of the surrounding landscape derived from satellite imagery. Information from auger boring around the site and across the area will be used to provide information on past ground levels and relict channels of the Bahr Youssef, which will be incorporated into the model in order to investigate the ancient topography and the position of Gurob in relation to the ancient water management landscape of the Faiyum.

The excavation of an area of possible residential architecture in the ‘north city’ area of Gurob: NC1 (Ole Herslund and Lena Tambs)

From 31 March to 2 April we excavated an area of 5 x 5 m, in the northern part of the presumed north city associated with the harem palace. Surface collection of ceramics and small finds in this square had already been conducted in the 2011 survey season. Having taken ground-surface heights with the total station, pre-excavation photos were taken. The square was then subdivided into four quadrants of 5x5m, so as to make the square more manageable for excavation. We chose to focus on the southeastern quadrant, labelled NC1d. First we removed the layer of topsoil, consisting of sand with a high inclusion of gravel and pebbles. Having quickly encountered the bedrock, some 5cm below surface level, we chose to focus on excavating the northwestern 5 x 5m quadrant (NC1b).

In the northwestern quadrant the situation turned out to be the same in terms of stratigraphy, and we encountered the bedrock almost immediately below the layer of topsoil. We did, however, find a larger patch of darkish brown area consisting of a clayey soil, which could be the remains of badly corroded mud brick, although this is highly uncertain, given the high inclusion of pebbles in this patch.

3) first examined the same area in 1920, they mentioned that they had found some kilns, which they believed to be later than the structure located to the west of the so-called 'Fort'. They described these kilns as glass- and lime-kilns, but they gave no indication as to whether these kilns had excavated at all, or indeed what evidence might support their interpretation as glass- or lime-related. No plans or other archival materials survive for this particular area from the Brunton and Engelbach season.

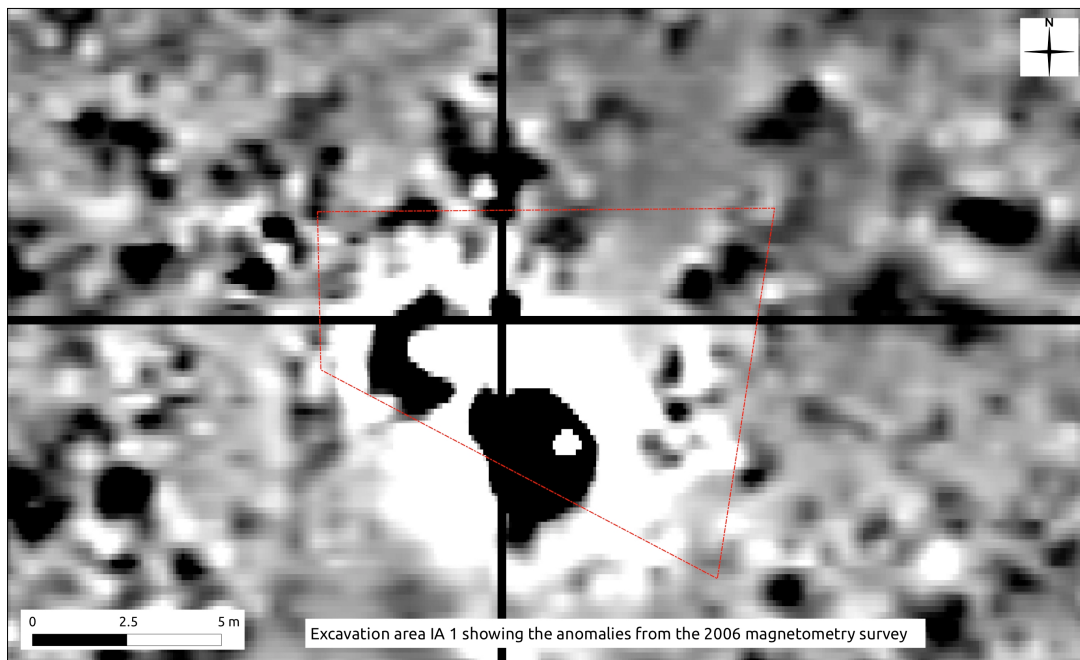


Figure 11: Magnetometry image of excavation area IA1, showing anomalies

The surface of the square, which was first studied in the 2009 GHPP season (Hodgkinson and Boatright 2009), shows a large amount of material relating to high-temperature industries, such as partly vitrified fired and unfired mud brick. In addition, many stone tools were found in the same area on the surface and were registered as small finds during previous seasons.

During the 2010 season, some excavation was undertaken on one of these magnetometry anomalies, which proved to be a kiln (Hodgkinson and Boatright 2010). The 2010 excavations were carefully backfilled in order to preserve the structure, which is described in this report as Kiln 1 (the 'structure number' being 2002). A pottery surface collection was undertaken in the area surrounding the kiln in 2009, and again in 2012, after the excavation square IA1 had been staked out. The 2012 collection excluded the 2010 excavation area, as this was formed from backfill.

The 2012 excavation area was initially set out as a 10 x 10m square, but, following the discovery of some important features related to the kilns to the east, the southern baulk

from the 2010 excavations was chosen as the southern limit of excavation and the initial square extended to the east, forming a trapezoidal excavation area measuring 12.1m (north), 9.9m (east), 11.85m (south) and 4.18m (west).

The initial task in 2012 was to remove the backfill from Kiln 1, which was completed within the first day of work within the area. The excavated southern half of the structure was revealed and cleaned on both inside and outside. The areas to the north and east were then cleaned. It became evident that the probable ancient horizon, the workshop phase, was covered only by a very thin layer of surface material (context 5000), which was a mainly aeolian deposit. This deposit, which overlay the whole square and had a thickness of between 0.05 and 0.3m, contained vast amounts of surface ceramics, as well as small finds, including clay figurines (Picton 2009). Deposit 5000 overlaid a layer of very hard and undulating natural sands, into which all archaeological features have been cut. This natural deposit (5007) surrounds the kilns to the north, and slopes down c.0.2m towards the eastern third of IA1, where it has been given the context number 5017. These deposits, which both show natural bedrock close to the surface, appear to have been the ancient horizon at the time of the functioning of the workshop.

Kiln 1 was fully excavated during the 2012 season, during the course of which the second half of the inner fills was removed and the base was reached. Samples of ashes and charcoal were taken from the base of Kiln 1 for archaeobotanical analysis (for further discussion see Claire Malleson's report below). No entrance or flue was revealed for this kiln, as this would have been a separate structure, outside the kiln itself and above ground level, funnelling the air into the firing chamber at an oblique angle. The prevailing wind at Gurob arrives from the north, therefore a flue in the northern half of the structure could be expected. A possible sub-rectangular cut (5035, not shown on plan), abutting the north wall of Kiln 1, c.0.25m wide, would make a flue on this side of the structure an even more plausible possibility.

Kiln 1, which has been discussed in greater detail in the 2010 excavation report (Hodgkinson and Boatright 2010), was most likely used for the production of pottery. The structure, which measures c.2.8m in its outer diameter, has a thickness of one shift of fired mud brick, and a height of seven courses, c.1.10m in height. It was filled primarily with wind-borne material, very similar to deposit 5000. However, at a depth of c.0.7m from the surface, a darker sandy layer (5036) was reached, containing more eroded material, possibly representing the initial phase of collapse after the structure was abandoned. The vitrification of the inner walls, which would have resulted from a temperature of c.700°C, continued to be visible on the inside of the structure, but appears to have broken off on the northern inside wall.

Surface cleaning to the east of Kiln 1 revealed a second structure, which had been partly cleaned during the 2010 excavation, correlating with the second circular anomaly shown by the 2006 magnetometry survey. This second kiln structure (Kiln 2: structure number 5005), has an internal diameter of only 2m, but measures c.2.4m in its outer diameter.

The wall construction of this structure differs considerably from that of Kiln 1. A layer of unfired, but baked mud brick forms the outer perimeter of the structure, measuring between 0.2 and 0.3m in thickness. This layer was probably packed around the kiln in order to provide stability for the structure, as well as insulation. The main part of the structure appears to be one shift of mud bricks, which are highly vitrified and have expanded towards the inside. A layer of dark green vitrification covers the whole interior of the structure, and curves towards the inside from the top of the kiln, indicating the beginning of the kiln's dome. Again, no entrance or flue area was found, as this was probably initially built on the ancient ground level and therefore has not survived, although further excavation may be able to determine this. The excavation of Kiln 2 began during the 2012 season, but it could not be completed, and only the very top layer (5037) was removed, this still being mainly wind-borne, sandy material, very similar to context 5000.

Three pits were found more or less directly to the north of Kiln 1. Pit 5020 is circular in plan and has a diameter of 0.5m. Its sides are vertical and it has a depth of c.0.4m. It is located c.0.8m to the west of pits 5021 (north) and 5022 (south). Each of the latter had a floor of pebbles at a depth of c.0.15-0.2m below the surface, although 5021 appears to have been over-dug. This layer of pebbles, 5033, disappears into the sides of the pits and can also be seen within the north side of cut, 5035, to the north of Kiln 1, where it appears to become thicker and slopes out/disappears towards the west. This layer is not visible in the opposite (south) section of the area, therefore it appears to be localised. It is most likely that this layer forms a natural patch of pebbles used as a floor for pits 5021 and 5022 (J. Bunbury, pers. comm., April 2012) and was not placed in this area intentionally. All three pits were filled with surface material 5000, but their relationship to the kilns is uncertain. It is possible that they either existed contemporaneously with the workshop, but this might have meant that they obscured a possible flue/entrance area to the north of Kiln 1. Pit 5020, with its vertical sides, may have been an emplacement for a vessel, such as a tall jar, while pits 5021 and 5022 may have used their pebble floors for drainage.

The excavation area slopes down to a lower level to the east, forming a partition measuring 1.9m to the north and 4.6m to the south in width. This area, around a layer of natural sand 5017, incorporates a number of features probably belonging to the workshop, having functioned at the same time as Kilns 1 and 2. A layer of clay, 5008, between 0.01 and 0.05m in thickness lies to the southwest of this partition, at a distance of less than 0.5m east from Kiln 2. This layer is irregular in shape and slopes upwards, following the slope of the natural sands to the north and the southwest. It includes potsherds, and some ancient fingerprints are visible in one place. It is very likely that this surface functioned as a clay preparation area, a so-called "paddling-pit", rather than a trampled-clay floor, in connection with the possible pottery industry in this area, represented by Kiln 1 (P. Nicholson, pers. comm., April 2012). Layer 5008 measures a maximum of 3.4 x 1.6m.

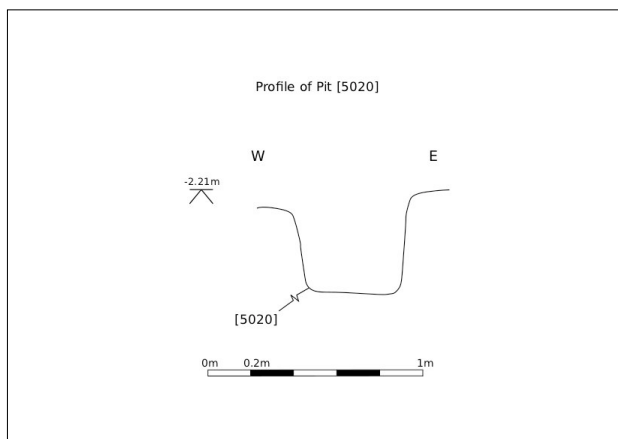


Figure 12: Profile of pit 5020

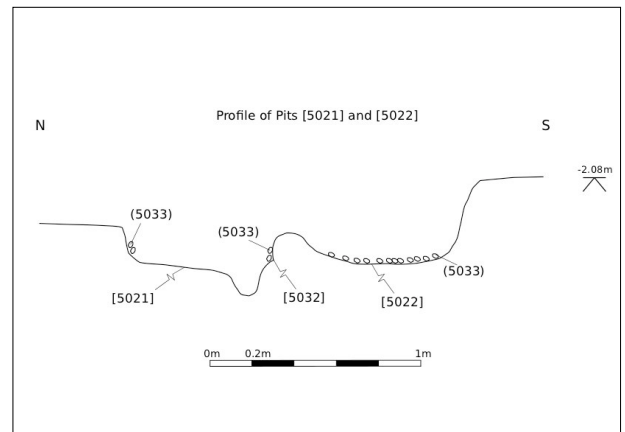


Figure 13: Profiles of pits 5021-2

In the northeastern corner of the excavation area lies another clay surface, *5010*, very similar in appearance to *5008*, and measuring 1.5 x 0.95m. Its function is not clear: its shape in plan is, again, irregular, but the clay surface itself does not undulate as much as *5008*. Therefore it is possible that this layer represents an actual floor layer, possibly belonging to the same workshop phase, and not another clay preparation area. Another short stretch of clay floor, *5025*, can be found against the eastern baulk of IA1, only an area covering 0.68 x 0.2m of its extent has been excavated.

To the south-east of IA1, a very thin, light grey patch of clay, *5024*, can be found, the nature of this layer is not certain, however, it may have been an older clay preparation area or a dump for clay. The north-western corner of the eastern part included a very badly preserved, short stretch of wall, *5012*, only one course of mud bricks high, and 3 bricks long (c.0.5m), with one course of mortar on top. The wall may have originally had a thickness of two shifts, as can be seen by a possible cut to its east.

A very shallow linear cut, *5038*, with a concave base, and only c.0.05m in depth, runs northeast to southwest through the eastern part of IA1. This cut may represent either a robber's pit or the erosion cut of a wall. A series of further cuts can be seen cutting into natural layer *5012*; to the north, sub-oval cuts *5014* and *5015*, both filled with wind-borne surface material *5000*, were found. They both measure c.1.5 x 0.4m. Whilst *5015* appears to be cut into the slope separating the eastern area of IA 1 from the kiln area, the top and base of *5014* lie c.0.1m deeper. Both features are oriented north-south, and their shape in plan resembles that of a grave. While human remains were found within the surface material *5000* (R. Spencer, pers. comm., April 2012), none of these specifically came from within these cuts, therefore this function can neither be ruled out nor confirmed for these features. It is possible that cuts *5014-5* functioned as emplacements for workshop furnishings, such as benches, however it could also be that they were cut into the natural *5017* at a later date, and thus may post-date the workshop phase.

In addition to these oval cuts, three incomplete possible pits, which were not fully excavated, and which again were filled with surface material 5000, were found in the south-eastern corner of IA1. The purpose of these features is not clear. It is again possible that they were cut later, or that they functioned simultaneously with the workshop.

When examining the satellite photo of the area it becomes evident that IA1 incorporates part of a house, almost square in plan, directly to the west of the so-called 'Fort' building. This house may be the building referred to as the 'small square enclosure' by Brunton and Engelbach (1927, 3) - according to their one paragraph mentioning a possible workshop setting, the kilns were cut into this house, but the basis for this conclusion is unknown. It can probably be assumed that the workshop was part of this building, possibly set within a courtyard or the outbuildings, as was typical in the New Kingdom, with craft activities and high-temperature technologies taking place within these settings (Shaw 2004: 16).

As mentioned above, Kiln 1 was most likely used for the production of pottery. Parallels from the New Kingdom include the updraft pottery kilns at Amarna (Nicholson 2007: 43; compare kiln structures described in Nicholson 2010). Kiln 2 may have also been built for the production of pottery and it is likely that it was used for this purpose. However, the fact that its walls are much thicker than those of Kiln 1 and that the structure itself has a smaller diameter than that of Kiln 1 may indicate that this kiln was intentionally fired to a higher temperature. In fact, this structure is closer in appearance to the kilns excavated by Nicholson at Amarna in the 1990s (see in particular Kilns 2 and 3: Nicholson 2007: 36-43), which had the potential to be used within glass-working. For this reason it cannot be ruled out that the kilns excavated at IA1 at least formed part of a multi-functional workshop.

The pottery found within the fill of Kiln 1 dates mainly from the second half of the 18th dynasty through to the first half of the 19th dynasty (Gasperini et al., pers. comm., April 2012), which would date this structure to the main occupational phase of Gurob. However, with the bulk of the material being wind-borne surface material, this date cannot be certain. A rim sherd belonging to a Meidum bowl (GU12/2002/198/P) was found within one of the bricks in the top course of Kiln 1. Sherds of this type of highly-fired vessel were commonly added to mud bricks during the New Kingdom, as they hardened the bricks, contributing to the stabilisation of the structure (S. Doherty, pers. comm., April 2012). The fact that this sherd was found reused within the kiln structure indicates a very high probability that at least Kiln 1 dates to the New Kingdom. The excavation of IA1 was carefully backfilled at the end of the season for future work in this area.



Figure 14: Excavation area IA1 shown as a trapezoidal shape in red, over the satellite image of Gurob. This image also shows the square building and the 'fort' to the east of IA1.

The excavation of the northern edge of the southern Palace enclosure: SP1-2 (Ole Herslund, Marine Yoyotte and Rachael Dann)

The excavation square labelled SP1 was laid out in the South Palace area, based on GPR (ground probing radar) survey in 2010, which had indicated a likely series of connected mud-brick walls. Initially surface collection of pottery and small finds was undertaken (in addition to the surface collection already accomplished in this area during the 2011 season). The 10x10m square was next subdivided into four 5x5m quadrants, so as to make the square more manageable for excavations. Initially we chose to focus on the northeast quadrant, which was labelled SP1C.

After ground-surface levels had been measured with a total station, the layer of topsoil (3000) was removed with turias and shovels. Beneath this topsoil was a sandy area (3001), a dark-brownish area (3002) and a large sandy area (3003) which later turned out to cover the full extent of the 5x5m quadrant (SP1C). Here and there, we found a dark-brownish clay which turned out to be the fill of pits dug deep into the sandy matrix (3003). These relatively deep pits were defined as contexts 3004-8.

The fill of the pits consisted of a relatively compact clayey soil with high inclusion of pebbles, some presumed modern bricks in a sandy yellowish colour. In addition to the bricks, we found some potsherds, a few small finds of interest (i.e. a small Bes pendant, a ram-form pendant, a presumed faience ring-bezel bearing the name 'Ramesses' and a

wooden amulet representing the goddess Taweret) along with occasional fragments of wood, bones and charcoal. However, these pits also contained modern refuse such as plastic bags, soap wraps, tuna tins, pieces of cloth from military uniforms, and the fragments of a newspaper dating to 1971, thereby providing a *terminus postquem* date for the pits going down into the sandy matrix. After having excavated these pits stratigraphically, we encountered only the sandy context labelled as 3003 throughout the extent of the SP1C quadrant.

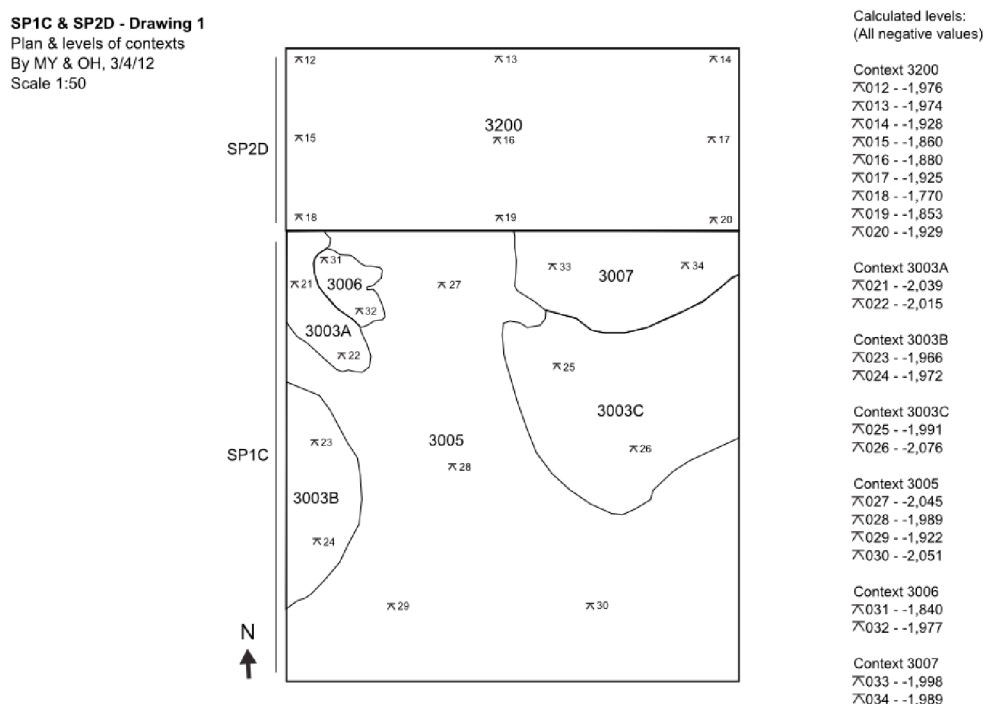


Figure 15: The SP1 excavation area in the South Palace after removal of deposits [3000-3002].

During the second day of excavation at SP1, we decided to extend the area of northwards by adding a 2x5m extension to SP1C, labelled SP2D. Here, we only removed the topsoil after having collected all of the surface material, and having taken pre-excavation photos. Apart from this, we did no further work in this area. Since the excavation of SP1C was ended prematurely, we were not able to undertake end-of-excavation levels, photographs or plans. We estimate that we reached a depth of c.1.5 m below surface level. As mentioned above, the extent of the square SP1C is filled by the deep sandy layer defined as context (3003).

The processing of material from the looted tombs: STB1-18 (Mark Manuel, Rosa

Spencer and Rachael Dann)

Excavations in the Southern Tombs area of the site focussed on the processing of remnant spoil heaps from the illegal excavation of at least two shaft tombs on the site (STB1 and STB2). Both of these tombs were vertically excavated by the looters to a depth of over 4.3 metres, and the removed spoil deposited on the surface surrounding the entrance. As well as the two shaft tombs, several more aborted or unsuccessful attempts at illegal activity were identifiable in the form of shallow pits with small corresponding spoil heaps on the surface (STB3-18). Four small pits were also illegally excavated during the course of our investigations, but there was no discernible disruption to our activities.

(1) Introduction

Work focussed on the two main shaft tombs, with surface recovery of artefacts, in particular human remains, wooden coffin fragments and discarded textile fragments. The remaining spoil was investigated, and all of the material was sieved in order to recover small bone fragments, and other artefacts associated with the tombs. Each spoil heap was assigned a different context number, in order to monitor patterns of deposition, and to try to keep human remains and artefacts from the different tombs separate, although eventually it became clear that there was significant overlap between the spoil of the two tombs and beyond.

Context 6000=6001 surrounded STB1 on the eastern and southern flank of the tomb. A large deposit of textile was visible at the northern edge of the spoil heap, and partially buried by it. This was excavated by hand and the textiles extracted largely intact. The spoil heap also contained large fragments of a painted linen delaminated cartonnage mummy cover (with red, blue and white decoration and hieroglyphs), pieces of painted plaster in the same colour scheme and also red/black/beige, and also large pieces of coffin board held together with wooden nails and dowels. The coffin boards were painted orange or beige or red and possibly represent more than one coffin. One panel of coffin seemed to be decorated with hieroglyphs. Several fragments of small rodent bone were also recovered from this spoil, perhaps indicating post-burial activity within the tomb.

Context 6002 surrounded the northern, western and southern flanks of STB2. Less material was present on the surface of the spoil, but again textiles, human bone, both wooden and pottery coffin fragments and painted plaster were recovered from the site. Interestingly, more lower limb bones were found than anything else with left femora predominating. A minimum of four adults and three subadults were found (4 adult left femora and 3 subadult frontal bones).

Surface analysis and chance encounters identified human remains in five spoil heaps from the smaller aborted illegal activities. One of these spoil heaps (context 6004, around STB3) proved to contain the greatest volume of material, even though it did not appear to be associated with an actual shaft tomb. This material was excavated and

sieved, in the same manner as the spoil around STB1 and STB2. A faience scarab and five small faience beads were recovered from here.

The four other contexts (6003 and 6005-7) all appeared to be isolated deposits, and were hand excavated using trowels and brushes to extract material. Surface scraping of the remaining spoil was conducted, but as no further material was identified, the spoil was not subjected to more intensive investigation. Contexts 6003 (STB18, located south of STB3), 6006 (on a small spoil heap west of STB1 and STB2, but not associated with a pit) and 6007 (STB4, south of STB3) all appear to represent single-event depositions of parts of a burial (often a hand or torso encased in textile), that were extracted from STB1 and STB2. This suggests that looters were removing these parts of the body to a 'safe' distance from their activities in order to identify any rings, amulets or necklaces within the burial wrappings. Context 6005 was slightly different in that it contained the partial remains of an infant, although again the motivation of relocating the burial may have been the same.

All of the human remains were kept separate, although, due to time restrictions, only contexts 6000=6001 and 6002 were subjected to immediate further analysis. Initial analysis of the remains from STB1 and STB2 reveal that there is, collectively, a minimum of 7 adults including one male and one female over 30 years of age, and 4 subadults with a range of ages. Little pathology was observed.

(2) Human remains from STB1; context 6000=6001

The bones of several individuals representing a variety of ages were found amidst the spoil, often intermingled with pieces of shroud, coffin board, painted plaster, and papyrus reeds. A minimum of three adults are represented (3 left femora found) and four subadults (3 right femora and 1 left tibia too young to match other femora) which suggests either that several people were buried in a single tomb or that individuals have been intermingled from surrounding tombs. Mostly lower limbs were represented (additional bones limited to 1 rib, 1 vertebra, 1 left innominate, and a single set of right arm bones plus additional right humerus and left radius); it is possible that the looters dragged the torsos away from the spoil heap to look through the remains for amulets and jewellery. There were a couple of situations in which parts of the thoracic skeleton were buried elsewhere (contexts 6003, 6005 and 6007), just below the surface.

Most likely, the right/left tibiae and fibulae plus right/left femora, left innominate, and cranium are all part of the same individual, judging from the robustness of the bones and muscle attachments. Age and pathology were not assessed, but no obvious pathological lesions were visible. The four sets of subadult bones represent a variety of ages. Although not formally assessed, these most likely range in age from 5/6yrs to 15yrs.

Adult:

L MC1, MC2, MC3, MC5 plus proximal shaft of MC4?

L scaphoid, hamate, trapezium, capitate
 R scaphoid, hamate, triquetral, trapezoid, lunate, capitate, pisiform plus 5 proximal
 phalanges, 6 intermediate, and 4 distal
 R/L tibiae and fibulae (complete) plus R/L femora (complete)
 R femur complete plus distal ½ L femur
 2 L femora - 1st fragmented, 2nd all present but distal articular end
 R humerus (complete but damaged head) plus R ulna plus R radius
 R humerus (smaller, no proximal end)
 L radius, proximal ½
 L innominate - ilium and ischium only; male: narrow sciatic notch, no pre-auricular
 sulcus
 Cranium male: large mastoid process, blunt square orbits, zygomatic arch extends past
 EAM, small occipital protuberance
 R/L parietals
 lumbar vertebra
 assorted rib fragments

Subadult:

L foot: calcaneus, talus, navicular, cuboid, 2nd cuneiform, MT3, MT5
 R foot: calcaneus, talus, navicular
 L hand: scaphoid, hamate, triquetral, trapezoid, MC2
 R hand: pisiform, MC1?
 phalanges with unfused epiphyses: 5 proximal, 1 intermediate, 1 distal
 R femur plus separate proximal epiphysis (almost adult size)
 R/L femora no epiphyses (3/4 adult size)
 L femur plus separate distal epiphysis (2/3rds adult size)
 R/L tibiae plus fibulae (shafts only) - likely match R/L femora
 R tibia no epiphyses (2/3rds adult size)
 L Tibia no epiphyses (1/2 adult size)

(3) Human remains from STB2; Context 6002

One partial male adult skeleton was found, including most of the cranium (excluding the
 right facial bones and right portion of the frontal bone), right mandible, right and left
 clavicles, right and left scapulae, right and left humeri, sternum, most of the ribs,
 vertebrae C4-C7, T3-L4, sacrum, left femur, left patella, left tibia and fibula, and a variety
 of hand and foot bones. This skeleton was assessed as male, based on the features of
 the skull - large mastoid process, large occipital protuberance, blunt orbit, zygomatic
 arch which extends beyond the external auditory meatus, large gonial eversion on the
 mandible. The sacrum was also quite curved, typical of males. There were a few
 pathological lesions observed including some evidence of joint disease in the spine -
 some bone growth around the posterior vertebral body of T5, a small amount of lipping
 and new bone growth on the posterior bodies of T9 and T10 which were extending
 vertically to meet, and a Schmorl's node on the body of T8. There was also some
 periostitis on the anterior and posterior proximal shafts of the left femur, representing

non-specific infection. Non-pathological lesions included Pacchionian pits (small depressions) along the sagittal suture of the endocranial surface of the cranium. Age was not assessed, as no innominates were present to observe the pubic symphysis or auricular surface and not all sutures of the cranium were present. However, as the clavicles are fused, this individual is probably over 30 years of age.

An adult right innominate was found with female features - wide sciatic notch, ventral arc, triangular obturator foramen, but small subpubic angle. The two adult right and left clavicles mentioned above probably belong with this innominate, on the basis that they are highly gracile and probably female, albeit with obvious muscle attachments for trapezoid and costoclavicular ligaments. The fused epiphyses of the clavicles indicate that the individual is over 30 years of age.

The adult femora were assessed for pathology, but those with only the proximal halves remaining were too eroded and weathered to observe any surface pathology. The left complete but fragmented femur has periostitis along the whole shaft, indicating non-specific infection. The subadult frontal bones were assessed for pathological lesions and there was found to be evidence of possible cribra orbitalia (evidence of malnutrition) in the left orbit of one of the frontal bones. Age could not be assessed but there was no evidence of a metopic suture in any of the three frontal bones, therefore they were probably older than 2 years old.

Adult:

Partial male adult skeleton: cranium minus R facial bones and R frontal bone, R mandible, R/L clavicles, R/L scapulae (R is fragmented), R/L humeri, sternum (in two pieces), 9 R ribs, 10 L ribs, vertebrae C4-C7, T3-L4, sacrum, L femur, L patella, L tibia, L fibula, L talus, R 2nd cuneiform, R navicular, 6 proximal phalanges (pedal), 1 intermediate phalanx (manual), 1 distal phalanx (manual).

R innominate female: triangular obturator foramen, wide sciatic notch, ventral arc, but small subpubic angle

R/L clavicles (complete) very gracile

R clavicle acromial end

3 L femora - 1 complete but fragmented, 2 proximal halves very eroded

R femur proximal shaft only

multiple large cranial fragments with Pacchionian pits approx ½ cm.

R/L parietals fragmented

C1

2x C2

5x thoracic vertebrae

1x lumbar vertebra

Subadult:

3 frontal bones partial but each with R/L orbits

occipital bone plus R/L temporals plus basilar portion (possible matches one of the frontal bones)

The pottery (Valentina Gasperini, Ashraf el-Senussi, Sarah Doherty, Tine Baghe, Lena Tambs and Nina Maaranen)

In 2012 a new method of recording pottery was introduced, based on the prior creation of an interim corpus that included all the principal shapes of pottery already discovered and studied during the archaeological work at Gurob from 2005 to 2011. Following on from the corpus, we decided to register in the pottery database only the new shapes of pottery that were found (which would then later be incorporated into the corpus for future seasons), and we decided to record only the parallels for the shapes already known. This significantly reduced the amount of time involved in recording types.

The methodology for the pottery analysis first began with the division of the Nile silt from the marl clay and then separation of the diagnostics. Each collection in turn was weighed and recorded, then the diagnostic sherds were compared to the corpus and counted, any parallels being noted, using the new numerical system introduced by the corpus. If there were some new types not contained within the corpus, they were kept for further analysis. Such non-parallels were measured, registered, drawn, photographed and added to the corpus later. We were able to identify almost 200 new shapes of pottery, mainly jars (103 new types), bowls (38 new types) and amphorae (28 new types).

In particular we were able to identify 39 new shapes of jars in Nile silt, 46 new shapes of jars in marl clay, 19 new shapes of bowls in Nile silt, and 15 new shapes of bowls in marl clay. We also recorded 26 Canaanite sherds. This confirms the existing hypothesis that the site of Gurob could have been an appropriate area for the importation of foreign goods, particularly from the Canaanite area (modern day Lebanon and Palestine). We were able also to identify 10 Mycenaean (Greek mainland) and 2 Cypriot sherds. It is worth noting that all of the Mycenaean sherds could be identified as stirrup jars, while the Cypriot ones could be identified as 'red lustrous wheel-made ware', possibly dating to the first half of the 18th Dynasty.

The preliminary dating of the pottery processed during this season seems to follow the general range of chronology of the site: from the half of the 18th dynasty to the Ramesside Period; except for 3 pieces that could be dated to the Old Kingdom (probably Meidum bowls) and 1 rim sherd of a Roman cooking pot, possibly dated to the 1st century AD. Four different areas have been investigated during the season of 2012: The 'industrial area' (IA1), part of the South Palace (SP1), the North City (NC1) and an area of looted tombs at the southwestern edge of the site (STB). The highest percentage of pottery belongs to area IA1, followed by SP1, NC1 and STB.

Area IA1 The kiln area was arguably the most challenging for the pottery team. Context 5000 alone generated 540.79 kg of Nile silt body sherds and 188.9 kg of marl clay body

sherds. In total, area IA1 produced 557.19 kg of Nile Silt body sherds and 216.7 kg of marl clay body sherds. The area also produced a high number of diagnostic sherds: 46.6 kg of Nile silt and 24.4 kg of marl clay. The proportion of Nile silt to marl is similar to that noted in previous seasons at Gurob (see Perunka 2011).

It is worth noting that 149 new shapes have been registered from the IA1 excavations. Many of these were storage jars (70), followed by bowls (30) and amphorae (20), with the addition of a few larger vessels such as bread-moulds, meat jars and basins. It is highly likely that the large number of sherds uncovered from square IA1 results from the aeolian deposition processes after the kilns were finally abandoned, rather than being specifically related to the function of the kilns when they were in use. However the pottery could be dated from the end of the 18th dynasty to the Ramesside Period. The loose vitrified mud bricks were also collected and weighed (1809 kg).

Area SP1 The South Palace area produced quite a different set of results. The total amount of Nile silt body sherds from this area is 281.04 kg, and 41.25 kg of Nile silt diagnostic sherds. The total of marl clay body sherds is 45.08 kg and there were 12.8 kg of marl diagnostic sherds. It seems that the palace contained a greater amount of marl pottery in comparison with the kilns area. The largest amount of blue-painted ware also came from this area, which is to be expected due to its palatial location (and was also the case in the North Palace excavations of 2010, see Shaw and Picton 2010). 40 new shapes of pottery have been registered from the Palace area: 29 new jars, 2 new bowls (one of which dating to the Old Kingdom) and 6 new amphorae. The highest percentages of Mycenaean ware, Cypriote ware, Canaanite ware and blue-painted ware belong to this area.

Area NC The North City area was quite limited both for pottery and archaeological recovery. Nevertheless the pottery team recorded 18.5 kg of Nile silt body sherds, 0.61 diagnostic Nile silt, 10.55 kg of Marl clay, and 1.35 kg of diagnostic marl. It is interesting to note the higher quantity of diagnostic marl clay sherds, as compared with marl body sherds, a phenomenon unique to this square. Only one new type was recorded from this area: a Marl D white-slipped rim of a large bowl with inner thickened rim and inner carination.



Figure 16: Some of the characteristic pottery from the 2012 season at Gurob: l. Mycenaean sherd, c. blue-painted sherds, r. upper part of Marl D vessel.

Area STB The area of looted tombs at the southwestern edge of the site (STB1-3) produced a relatively low amount of pottery: only 6.1 kg of Nile silt sherds and 0.2 kg of diagnostic Nile silt, and no marl clay. Just 2 new types were recorded: a base of a drop jar (remarkably well preserved) and a rim of a Canaanite amphora.

Summary In conclusion, the new pottery *corpus* provided an invaluable means for quick and effective recording of pottery. Given that the pottery team had such a vast amount of sherds to process, as four squares were opened during the excavation, if the team had to record each single diagnostic, it would never have completed this task. The proper recording and analysis of pottery always takes a considerable amount of time, but the discovery of almost 200 new types this season should substantially aid the team next season.

Small finds (Jan Picton and Tine Bagh)

In the 2012 season, small finds were either collected from the surface or excavated from the three excavation areas (IA1, SP1 and NC1) and a group of looted tombs at the southwestern edge of the site (STB1-18). The surface finds had their provenances recorded in three dimensions using the total station, while those from the excavations were recorded primarily in terms of context (since many were found through sieving). In total, 143 small finds were recorded in the 2012 season.

This total may appear to be relatively low, compared with previous seasons at Gurob, but in fact one individual small-find number actually comprises three sacks of textile fragments, while another comprises several hundred pieces of plaster coffin fragments, and a third is a painted linen delaminated cartonnage mummy cover, deriving from the looted tomb STB1. The spoil heaps from the latter tomb also incorporated a significant number of human remains. The cartonnage almost certainly dates to the Third Intermediate Period, while the pottery can be securely dated to the 18th dynasty, suggesting later re-use of a New Kingdom tomb. The inscription on the centre panel is currently being studied.

As in previous seasons, the majority of other finds were small broken pieces of faience, especially fragments of faience vessels, as evidence of an élite society. This season we recorded 12 rough clay figurines, of which 5 can be securely identified as the type known as ‘woman on a bed’ figurines. The stone fragments this season included granite and quartzite, and a number of limestone architectural or sculptural features associated with the looted tombs STB1-3.

Among the more notable finds this season were:

- Painted linen cartonnage from the STB area

- Plaster fragments deriving from a painted coffin, from the STB area
- A small delicately carved figurine/amulet of the hippopotamus goddess Taweret, from the South Palace excavations
- A very finely carved intact glazed steatite scarab, from the STB area
- A set of model copper alloy cow horns set onto a loop similar in style to a set found at Amarna by Petrie (Petrie Museum of Egyptian Archaeology UC46844)
- One new style of clay 'woman on a bed' figurine, showing a recumbent female with another smaller figure lying 'top to tail'.



Figure 17: Figurine/amulet of the hippopotamus goddess Taweret from the southern palace (SP1) excavation area.



Figure 18: Glazed steatite scarab from the looted tombs STB1-3.

Archaeobotanical study (Claire Malleson)

During the 2012 season, samples were taken for archaeobotanical analysis from two areas of the site (IA1 and SP1c). Two samples were taken from area IA1, specifically from the kiln excavated in 2012. The preserved charred plant materials were observed to be in an excellent state of preservation, therefore only one of the two samples was processed by flotation. A third sample was taken from a modern dump in area SP1c. Flotation was carried out using the bucket method and a 300µm mesh, samples were dried and examined under a binocular microscope at x7 – x15 magnification.

(1) IA1 samples

While a greater portion of the grassy/straw material was better preserved in the sample that was not processed by flotation, overall there was no significant difference between the specimens preserved in these two samples. It was immediately apparent that there was very little, if any, wood-charcoal present in these samples. Considering the fact that this material is almost certainly kiln fuel, the lack of wood-charcoal is surprising. The samples consisted primarily of the charred remains of typical field-weed species and some dung, dominated by the culms and rhizomes of a species of Graminae (grass) or Cyperaceae (reed/sedge).

Species present include:-

Triticum dicoccum (Emmer wheat)

Hordeum sativum (Barley)

Lolium sp. (Rye grass)

Phalaris sp. (Canary grass)

Phragmites sp. (Common reed)

Rumex dentatus (Dock)

Linum usitatissimum (Flax/Linen)

Trifoliaeae tribe (Clovers)
 Boraginaceae (Borage family)
Acacia sp.
Tamarix nilotica

Based on the relative proportions of the above species and the dominance of the culms, it seems highly likely that these species are incidental and were gathered accidentally along with the grasses/reeds that were selected as kiln fuel.

Given the low temperatures that this fuel would have provided, and the very short period of time for which it would have burned, it seems most likely that this specific sample represents the tinder rather than the primary kiln fuel source. The only comparative material (New Kingdom kiln fuel at Amarna) was only examined by a wood charcoal specialist. As the material from Gurob seems not to contain any wood charcoal, the use of reeds/sedges as a tinder fuel is of particular interest. It should be possible to determine the species once the photographs taken on-site have been compared with a reference collection.

(2) Area SP1C

This sample was processed more as an experiment, as it was established by the presence of dated newspaper fragments that this material had been severely disturbed. However, it proved interesting in that the sample very clearly contains some ancient material, including species no longer present in Egypt. It should be noted that approximately 50% of the specimens identified in this sample were desiccated, including some of the *Triticum dicoccum*, which strongly indicates that in future excavation seasons archaeobotanical samples should be taken from a wide range of archaeological contexts (for dry-sieving), not just contexts that visually appear to contain charred materials.

Species present include:-

Triticum dicoccum (chaff)
Hordeum sativum (chaff)
Lolium sp.
Phalaris sp.
Portulaca oleracea (Purslane)
Scorpiurus sp. (Prickly caterpillar plant)
Rumex dentatus
Asphodelus sp. (Asphodel)
cf. Tamarix nilotica
Ficus carica (Common fig)

As *Triticum dicoccum* was only present in Egypt until the Graeco-Roman period at least some of this context must contain some ancient material for this species to be present in this sample.



Figure 19: *Trifolium alexandrinum* ('Berseem,' Clover) seed pods in fields adjacent to site.

Comparative collection During the season samples of species currently growing on the edges of the cultivation adjacent to the site were collected and recorded.

Conclusions This initial season of assessment confirms the suspicions that both charred and desiccated plant remains are well preserved at Gurob. A suitable location for conducting the flotation was established, and in order to maintain a control over any modern contamination of samples during flotation specimens of modern species present have been collected. Material from the site, specifically the kiln area, provides an opportunity to investigate a previously unknown aspect of this technology.

Geo-archaeology (Judith Bunbury and Kamal Helmi Quftawi)

Geo-archaeological work in the Gurob Harem Palace Project 2012 focussed on the edge of the cultivation to the east of the site, with the object of exploring the area now identified as a possible New Kingdom channel, and attempting to identify the location of the harbour described for Gurob in such documents as Papyrus Wilbour and the Victory Stele of Piankh (see Yoyotte 2012: 137-44).

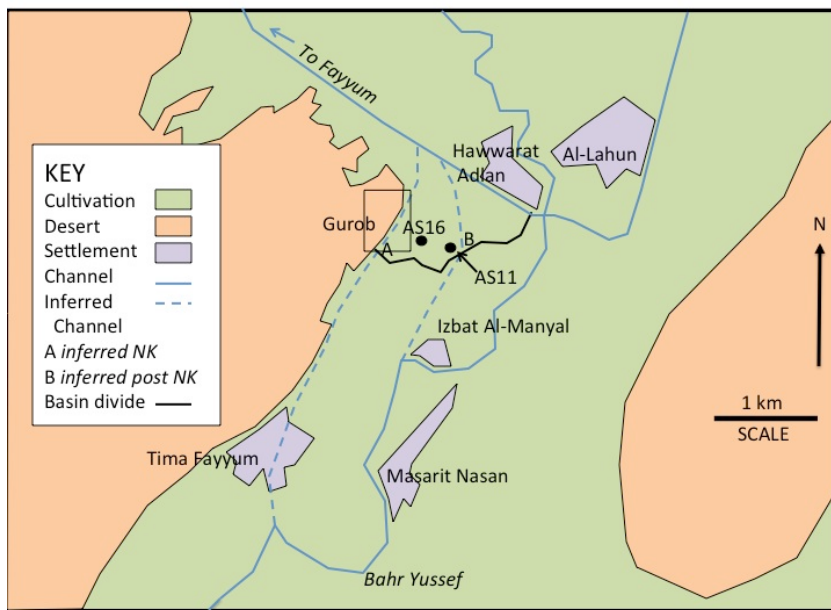


Figure 20: Regional view of the setting of the site of the Gurob Harem Palace showing the site, a recent basin divide, current channels in the area and two inferred former channels marked A and B. Auger sites AS11 and AS16 in the cultivation are also shown. The area of the inset map below is shown with a black rectangle.

Work by Earl (2011 Cambridge University unpublished MSc project) showed that former lakes in the Abusir area were often associated with date palm groves since the date requires at least 6 m of damp soil to grow. In a similar way, field patterns and date groves in the Gurob area indicate the locations of two previous channels in the areas that are marked A and B on the plan in Figure 20 above. Both of these have now been investigated using an Eijkelkamp hand auger following the method of Bunbury et al. (2008). Core AS11 (GHPP 2010) intersected fine-grained channel deposits, which contained a trace of pottery. However there were insufficient sherds to indicate a New Kingdom harbour or channel found in the area. Channel A was intersected in core AS03 (GHPP 2009) and contained 4.5 m of fine-grained channel deposits with abundant New Kingdom sherds. The limit to the east-west extent of this feature is provided by AS02 (GHPP 2009) that encountered flood plain silt. It is therefore possible to make an interim interpretation of this feature as a channel along the desert edge. Channel A, thought to have been diverted from the Bahr Youssef at Tima Faiyum, seems the most likely candidate for a water-body at Gurob during the New Kingdom.

Waterfront development at Gurob

Inspection of the numerous pits that have been excavated into the sediments at the desert edge reveals that there are abundant sherds in the area marked on the plan as 'waterfront' (see Fig.21) and extending as far north as point C. To the south, core AS05 encountered desert edge deposits without sherds and thus provides a southerly limit for the feature. Away from this area, silts and sands have also been excavated by the

sebakhin, but there are no sherds incorporated into the material. When combined with the evidence for a body of water in AS03 (see Shaw 2009), we may propose that this area served as a point of embarkation for the Palace.

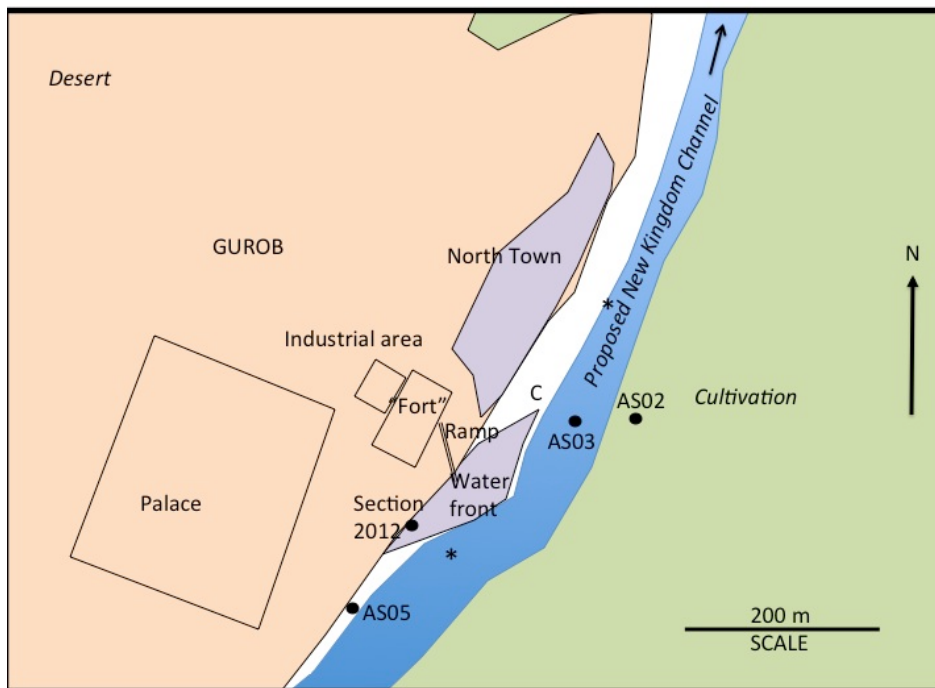
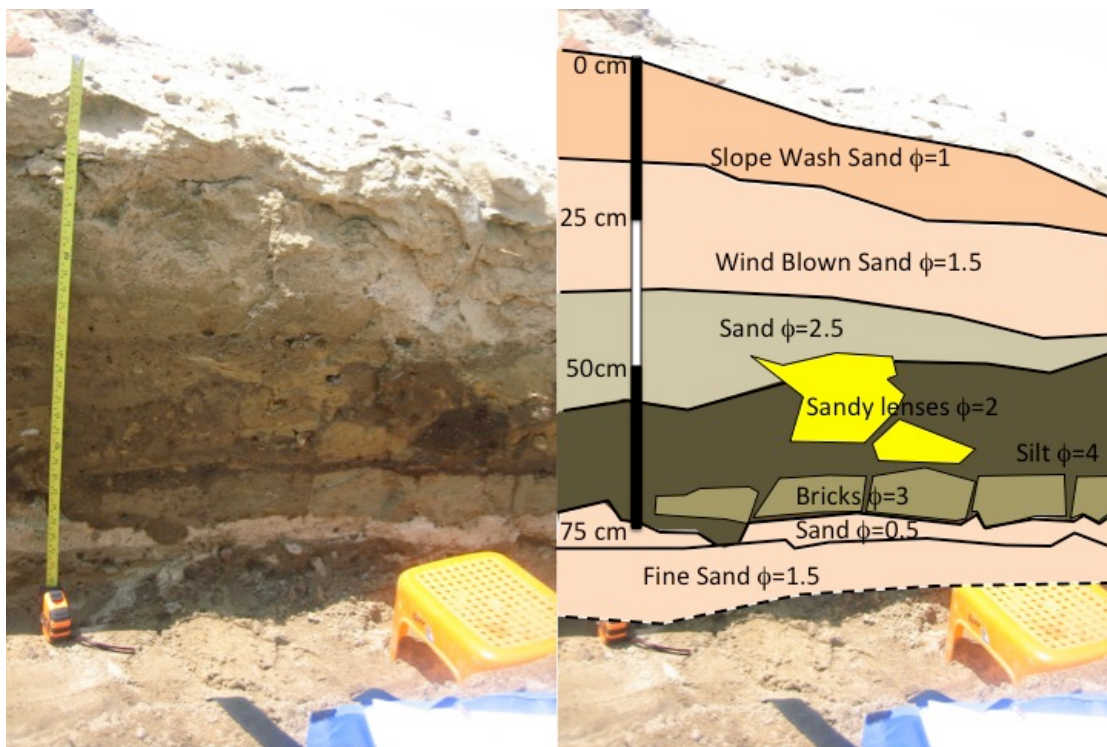


Figure 21: Local area of Gurob showing currently proposed New Kingdom waterway adjacent to the eastern edge of the site and the newly proposed waterfront area that may represent the harbour of the palace. Point C is the northern limit of sherd-rich mud.



Gurob Harem Palace Project 2012 Section in pit at N29°12.007', E030°57.132'

Figure 22: Cleared section (left) with sediment interpretation (right) from the edge of the cultivation at the bottom of the ramp from the 'fort' at Gurob, showing apparent mud bricks with a sandy foundation that are covered by windblown sand and subsequently slope wash.

Process of channel formation

Since it is clear from the floodplain deposits in AS02 that the channel has not migrated through this area, the corollary is that the channel must have been diverted to and from the site. Management of the waterways is consistent with observations from later sites such as Oxyrhynchus (Subias et al. pers. comm.) that the Bahr Youssef had been diverted to the desert edge during Roman times. Further north, recent drill-cores suggest that the western branch of the Nile at Memphis was no longer extant during the New Kingdom. Further south, the work of Sarah Parcak (pers. comm.) has indicated that the channel was present during the Early Middle Kingdom but did not persist for long at that time. Morini (2007) shows that agriculture in the Faiyum area developed as Lake Moeris shrank in size in the Middle and New Kingdom. It is thought that from the 11th Dynasty onwards there was human regulation of the water flow into the Faiyum.

In conclusion, the Bahr Youssef seems to have flowed past Lahun and Haraga at the beginning of the Middle Kingdom and continued to do so although, as the Faiyum gained in importance, the royal focus shifted southwards from Lisht to Lahun. By the end of the Middle Kingdom, and during the reign of Amenemhat III, increasing investment in controlling the input of water into the Faiyum is evident. However, the

evidence from Gurob suggests that it was at the beginning of the New Kingdom that the Bahr Youssef was diverted from its northward course into the Faiyum basin. It seems that this process was controlled from Gurob where the new channel flowed past the city on its eastern side.

Site taphonomy

There is evidence for much modification since the New Kingdom. Firstly the still undated remains of the waterfront area at Gurob were covered by a relatively thin layer of windblown sand, which was also covered with thinly layered slope-washed sand. Into these two layers a number of pits have been cut – these are either burial shafts that have subsequently been excavated or the remains of *sebakh* extraction at the site. In some areas the silts at the desert edge have been stripped of sand, revealing the underlying silts while in other places, the silt has also been extracted. The southern part of the waterfront deposit seems to have been truncated during removal of material to construct the new Gisir Al-Bahlawan.

Future work

Future geological work will test the hypothetical course of the New Kingdom channel particularly in the area of the waterfront at the base of the ramp at Gurob. The principal targets are indicated by asterisks (*) on the plan in Figure 21 above. Excavation of the waterfront deposits would also help to provide additional context for the results of augering.

Summary

In the eighth season of work at Gurob we have made excellent progress on several elements of our overall long-term strategy for the site: mapping, pottery surface collection, geoarchaeological interpretation, and excavation of selected features. We are also now further advanced in producing a fundamental corpus of the characteristic fabrics and forms of pottery vessels at Gurob. Furthermore, we have begun to study the botanical aspects of the archaeological record within the ancient town.

Although we were once again obliged to devote some of our resources to the documenting of recently looted tombs at Gurob, this season we were pleased to note that illegal activity on the site has certainly diminished. We are grateful to our SCA colleagues for working with the local police to backfill many of last year's most damaging illicit excavations.

Bibliography

- Brunton, G. and Engelbach, R. (1927) *Gurob*, BSAE, London.
- Bunbury, J.M., Graham, A. and M.A. Hunter, 2008: 'Stratigraphic landscape analysis: Charting the Holocene movements of the Nile at Karnak through ancient Egyptian time', *Geoarchaeology* 23, 351–73.
- Herbich, T. (2006) *Unpublished report on the geophysical work undertaken during the 2006 season at Gurob*.

- Hodgkinson, A.K. and Boatright, D. 2009. *Cleaning the kiln areas previously excavated by Brunton and Engelbach in gridsquares N8-9*. In Shaw, I.: Report to the SCA on archaeological survey undertaken at Medinet el-Gurob, 1-22 April 2009. 18-20.
- Hodgkinson, A.K. and Boatright, D. 2010. The Kiln Excavation. In Shaw, I.: Report to the SCA on archaeological survey and excavation undertaken at Medinet el-Gurob, 4-15 April 2010. 13-16.
- Morini, 2007: *Il territorio del Fayyum nell'antichità: Il sistema idrografico tra continuità e innovazione*. University of Bologna, unpublished PhD thesis.
- Nicholson, P. 2007. *Brilliant Things for Akhenaten: The Production of Glass, Vitreous Materials and Pottery at Amarna, Site O45.1*. London.
- Nicholson, P. (2010) *Kilns and Firing Structures*, UCLA Encyclopedia of Egyptology, Department of Near Eastern Languages and Cultures, UC Los Angeles.
- Perunka, V., 2011: 'Pottery', unpublished *Gurob Harem Palace Project SCA Report for 2011*, 9-13.
- Picton, J. 2009. 'Small finds', unpublished *Gurob Harem Palace Project SCA Report for 2009*, 11-14.
- Shaw, I. (2004) 'Identity and occupation: how did individuals define themselves and their work in the Egyptian New Kingdom?', in J.D. Bourriau and J. Phillips (eds) *Invention and Innovation: The Social Context of Technological Change 2*. Oxford: Oxbow, 12-24.
- Shaw, I., 2009: Unpublished *Report to the SCA on archaeological survey undertaken at Medinet el-Gurob, 2009*.
- Shaw, I., 2011: 'Seeking the Ramesside royal harem: new fieldwork at Medinet el-Gurob', *Ramesside Studies in Honour of Ken Kitchen*, ed. M. Collier and S. Snape (Bolton: Rutherford Press, 2011), 453-63.
- Shaw, I. and J. Picton, 2010: 'Excavation of H14a', unpublished *Report to the SCA on archaeological survey undertaken at Medinet el-Gurob, 2010*, 10-13.
- Yoyotte, M., 2012: *Le "harem" royal dans l'Égypte ancienne: enquête philologique, archéologique et prosopographique*, L'Université Paris-Sorbonne (Paris IV), February 2012 (unpublished PhD thesis).

Dr Ian Shaw
 Senior Lecturer in Egyptian Archaeology
 School of Archaeology, Classics and Egyptology
 University of Liverpool L69 7WZ

27 July 2012