

# Excavations within the Kushite Cemetery at Kawa

## *The excavations and grave inventory*

*Andrew Ginns*

### Introduction

The cemetery R18, measuring at least 900m north-south by 450m east-west, is located half a kilometer to the north east of the pharaonic and Kushite town at Kawa. Over 800 grave monuments have been identified within the cemetery (Welsby 2001a, 148), typically circular mounds of pebbles of limited elevation. Windblown sand deposits obscure these monument remains and also cover the alluvial deposits into which the graves were cut. During the 2017 fieldwork season a small area (GD3) within the western part of the cemetery was investigated. This work is a continuation of the Sudan Archaeological Research Society's (SARS) project directed by Derek Welsby within other areas of the cemetery (Welsby 2001a; 2001b; 2002; 2008; 2009; 2010).

The season ran from the 26<sup>th</sup> January to the 14<sup>th</sup> March. The fieldwork was directed by Andrew Ginns with Luke Jarvis and Guy Cockin providing archaeological supervision on site. Human remains were studied by Tatiana Vlemincq-Mendieta. The NCAM inspector was Belsem Abdul Hassan. Mohammed Ibrahim was the cook. The majority of excavation was carried out by a team of local men up to a dozen in number.

### Results

Area (GD3) is located at the western side of the cemetery towards its southern end. The (GD3) sector is a 20 x 20m square area. This was cleared of the windblown sand overburden and the underlying alluvial deposits were then cleaned with brushes. The heavily weathered and degraded nature of the alluvium as well as of the fills of the graves caused the grave features to be of a very diffuse character at their surface levels. The most evident features were of later grave robbing pits which were commonly filled by windblown sand deposits.

A total of 25 graves were investigated, containing a total of 22 skeletons, all located in the eastern half of the area (Figure 1). In most cases individual graves either cut into, or were cut by, other graves, a result of their being located in a very densely utilised part of cemetery. Several distinct grave types were represented within the investigated sample. The most numerous type of grave consisted of either a sub-rectangular or an oval pit with a subterranean burial chamber cut

into the north side of the pit at its base. The east-west dimension of the pits was always greater than their north-south dimension. They had steeply sloped straight sides with very abrupt breaks of slope and flat bases. The inhumations were aligned east-west and the chambers were blocked off with mud-brick walls leaving the bodies in void. The investigated graves included nine of this type.

Intermingled with the sub-rectangular and oval pit graves were graves with east-west aligned descendaries leading to subterranean burial chambers located either to the east or west (Plate 1). This is a common grave type at Kawa and many examples have been found in the north-eastern sector of the site. Excepting grave (GD3)55 of infant (GD3)62, these graves were generally larger and deeper than the sub-rectangular/oval pit graves. A total of eight graves with descendaries were investigated. In four of these the bodies had been placed in extended positions aligned east-west on the same axis as the slope of the descendary. A single example containing the remains of infant (GD3)62 had a narrow descendary sloping down westwards leading to a rectangular space off which there was a small sub-rectangular subterranean chamber to the north. In three the bodies had been placed in extended positions aligned north-south at a right angle to the descendary. In common with the sub-rectangular/oval pit graves, the descendary graves also contained brick blocking structures arranged so that the bodies were left in void within

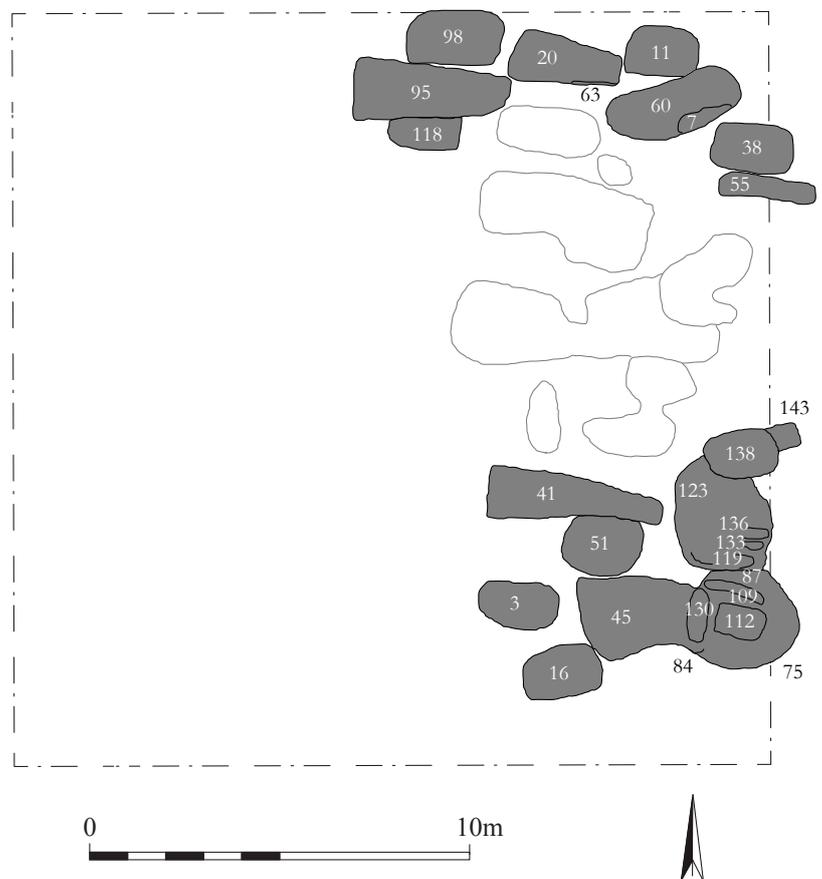


Figure 1. Plan of Cemetery Area (GD3). Shaded graves were excavated, outlines denote unexcavated but identified features (scale 1:200).



Plate 1. Grave (GD3)20 ramp entrance and mud-brick blocking to the subterranean burial chamber. View looking west.

their subterranean burial chambers after the descendary had been backfilled.

Five graves had suffered truncation by later events thus removing certainty about their original characteristics. The upper portions of all these graves were missing entirely and their lower portions survived by varying amounts. The remaining lower portions were narrow east-west aligned slots into which bodies had been placed in supine positions. The form of these graves indicated that they were of the slot grave type previously found in area (HA1) of the cemetery.

Within the upper portions of two of the descendary graves secondary burials were encountered. One, grave (GD3)63 of a young child [(GD3)65], was a niche grave cut into the upper portions of the side of a descendary. The other, grave (GD3)7 also of a young child [(GD3)30], had been cut into descendary backfill deposits.

A single burial, grave (GD3)112, could not be confidently assigned to a particular grave type due to later truncations. Within a rectangular burial chamber/grave cut, the body of adult (GD3)115 had been placed on its right side, east-west in a contracted position with the (later to be truncated) head to the west and probably facing south.

## Grave Catalogue

Below are described all graves ordered by type. Special attention is given to two specific graves: (GD3)63, skeleton 65, which was intact with untouched grave offerings, and (GD3)98, skeleton 108, which showed a high number of pathological conditions.<sup>1</sup> Table 7 provides further specific details relating to each skeleton.

<sup>1</sup> All information in the grave catalogue relating to the physical anthropology comes from Tatiana Vlemincq-Mendieta.

### *Sub-rectangular/ oval pit graves*

**Grave (GD3)98.** Oval pit with vertical sides. It had a flat base with a single step halfway along its width so that its northern half was lower than its southern. The body of a middle adult male [(GD3)108] had been placed in the lower northern portion of the grave. This portion was enlarged by an undercut on the northern side of the grave shaft thus creating a side niche. The body was placed on its left side in a crouched position with its head to the west. West of the head were placed two cups (GD3)107A and (GD3)107B; east of the lower legs was ceramic vessel (GD3)107C and amphora (GD3)107D. The lower northern portion of the grave had been sealed with an east-west aligned mud-brick blocking wall. At some point the grave had been robbed, most of the blocking bricks had been removed and the skull of the deceased smashed. This grave had slumped down to a certain extent due to the directly underlying ceiling of grave (GD3)20's subterranean burial chamber collapsing.

Although the preservation and completeness of skeleton (GD3)108 was poor, several pathological conditions could be identified. This individual had at least six healed fractures on the rib shafts, and healed fractures on the left humeral shaft, the left ulnar distal shaft, the proximal right hand phalanges of the third and fifth rays and the styloid process of the right ulna (Plate 2). In this last case, a pseudo arthrosis formed, where the styloid process remained unfused to the distal epi-

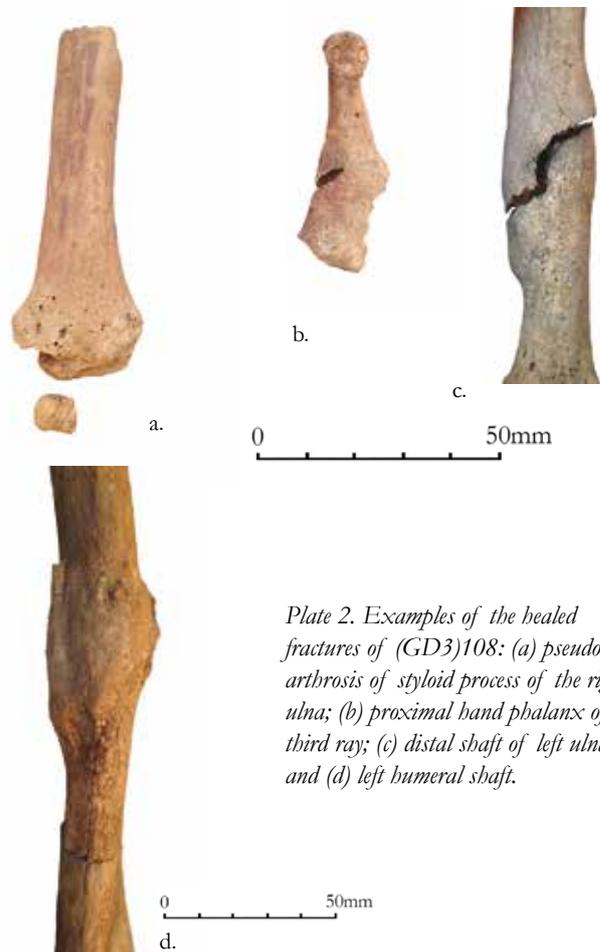


Plate 2. Examples of the healed fractures of (GD3)108: (a) pseudo arthrosis of styloid process of the right ulna; (b) proximal hand phalanx of third ray; (c) distal shaft of left ulna; and (d) left humeral shaft.

physis. Since all of these fractures appeared healed, it can be concluded that the individual survived these different injuries. In addition to this, he displayed osteoarthritis on his right knee, cervical and lumbar vertebrae, right first metatarsal and associated proximal foot phalanx. Intervertebral disc disease of the cervical vertebrae was also observed. This may indicate an active lifestyle in this individual. Unfortunately, this grave was disturbed, damaging the bones and also destroying the funerary context, making accurate interpretation difficult.

**Grave (GD3)118.** Rectangular pit with vertical sides. It had a flat base with a single step halfway along its width so that its northern half was lower than its southern. The body of a presumed adult had been placed in the lower northern portion of the grave. Much of this northern side of the grave had been truncated by the creation of grave (GD3)95 and thus the skeletal remains were either much disturbed or missing entirely.

**Grave (GD3)11.** Rectangular pit with vertical sides and a flat base. The body of a young female adult [(GD3)61] had been placed in the northern portion of the grave cut (Plate 3). This portion was enlarged by an undercut on the northern side of the grave shaft creating a niche. The body was placed in a crouched position, on its left side, with its head to the west facing north and its legs flexed. Desiccated wood across the top and along the north side of the skeleton represented the remains of a coffin. The north-eastern corner of the burial chamber contained two ceramic cups (GD3)79A and (GD3)79B and a ceramic flask (GD3)79C. The northern portion of the grave had been sealed by an east-west aligned mud-brick blocking wall. At some point the grave had been robbed, most of the blocking bricks had been removed, the ceramic vessels moved and the coffin lid/upper planking had been shifted southwards.



Plate 3. Grave (GD3)11. Rectangular pit grave containing skeleton (GD3)61. View looking north.

**Grave (GD3)38.** Rectangular pit with vertical sides. It had a flat base with a single step halfway along its width so that its northern half was lower than its southern. The body of a middle adult [(GD3)69], probable male, had been placed in the lower northern portion of the grave (Plates 4 and 12). This

portion was enlarged by an undercut on the northern side of the grave shaft thus creating a niche. The skeletal remains of the body were in a crouched position, on its left side with a slight pronation on the upper part of the body. Its head was pointing to the west and its legs flexed. The arm bones were within the fill of the burial chamber of grave (GD3)60. The creation of grave (GD3)60 had intruded on these grave remains. The grave had also been damaged by robbing activity, many of the blocking bricks had been removed and the body may have ended up in a prone position with its arms missing due to this event. At the western end of the subterranean burial chamber was an amphora (GD3)83A and a ceramic cup (GD3)83B.



Plate 4. Grave (GD3)38. Rectangular pit grave containing skeleton (GD3)69. View looking north.

**Grave (GD3)143.** Rectangular pit with vertical sides and a flat base. The northern side of the shaft was undercut to produce a subterranean burial chamber into which the body of an infant [(GD3)154] was placed. The body had been laid in an extended supine position with the head to the east. Both wrists had faience bead bracelets around them and both ankles had faience bead anklets. The rectangular block of fill around the skeleton differed from the fill elsewhere in the grave, implying that the body had been placed in a coffin. The burial chamber had been sealed with mud bricks with the intention of leaving the body in a void.

**Grave (GD3)138.** Oval pit with vertical sides and a flat base. The northern side of the shaft was undercut to produce a subterranean burial chamber into which the body of a young adult male [(GD3)151] had been placed. The chamber had then been sealed with an east-west aligned blocking wall of mud bricks. At some point the grave had been robbed with the result that the skeletal elements of the deceased were spread throughout the lower portions of the grave and in its robber-pit fill. The remaining leg bones and pelvis, if *in situ*, could indicate the probable orientation: crouched on its left side with its head to the west.

**Grave (GD3)51.** Rectangular pit with vertical sides. It had a flat base with a single step halfway along its width so that its northern half was lower than its southern. The northern edge of the grave had been truncated by the creation of



grave (GD3)41. The grave had also been robbed, most of the burial chamber blocking bricks had been removed and the skeletal remains of a young adult [(GD3)78], probable male, were either missing or disarticulated.

**Grave (GD3)3.** Oval pit with vertical sides. It had a flat base with a single step halfway along its width so that its northern half was lower than its southern. The body of an infant [(GD3)26] had been placed in the lower northern portion of the grave. This portion was enlarged by an undercut on the northern side of the grave shaft thus creating a niche. The grave had been robbed, most of the burial chamber blocking bricks had been removed and the skeletal remains of the infant were either missing or disarticulated. However, the position of the remaining bones seems to indicate that its head was to the east.

**Grave (GD3)16.** Rectangular pit with vertical sides. It had a flat base with a single step halfway along its width so that its northern half was lower than its southern. The northern side of the shaft was undercut to produce a subterranean burial chamber into which the body of a middle adult female [(GD3)27] had been placed. The grave had been robbed, most of the burial chamber blocking bricks had been removed and the skeletal remains were either missing or disarticulated. Narrow east-west aligned slot graves.

**Grave (GD3)136.** Remnants of the eastern end of a narrow burial slot. The majority of this feature had been truncated by robbing activity [(GD3)123]. No remains of the associated burial were present.

**Grave (GD3)133.** Remnants of the eastern end of a narrow burial slot. The majority of this feature had been truncated by robbing activity [(GD3)123]. The slot contained the skeletal remains of a subadult right foot [(GD3)135]. Where the ankle had been was an iron ring anklet.

**Grave (GD3)119.** Remnants of the eastern and western ends of a narrow burial slot. The majority of this feature had been truncated by robbing activity [(GD3)123]. No remains of the associated burial were present. Degraded remains of the mud-brick blocking were present at the eastern end a little to the south of the slot.

**Grave (GD3)109.** A narrow east-west aligned grave slot into which the body of an older child [(GD3)114] had been placed in an extended supine position with the head to the west and facing upwards. Around the right ankle and left wrist were faience bead bracelets. Mud bricks had been placed across the width of the top of the grave slot, a little above the body. The upper portions of the grave shaft had been truncated by the creation of the later graves (GD3)84 and (GD3)87.

**Grave (GD3)87.** A narrow east-west aligned grave into which the body of a middle adult female [(GD3)89] had been placed in an extended supine position with the head to the west facing upwards. Mud bricks had been placed across the width of the top of the grave slot, a little above the body. Much

of this mud brick blocking as well as the upper portions of the right leg of skeleton (GD3)89 had been truncated by the creation of the later grave (GD3)84. Due to this truncation the upper parts of the grave no longer existed.

*East-west aligned descendary graves with east-west aligned burials*

**Grave (GD3)95.** A long narrow descendary sloping westwards to a large and deep subterranean burial chamber. The body of a middle adult female [(GD3)152] had been placed in an extended supine position with the head to the west facing north. The burial chamber had been sealed by a mud-brick blocking wall leaving the body in a void. The grave had been robbed, a hole had been cut through the blocking wall and the head and feet of the burial disturbed.

**Grave (GD3)20.** A long narrow descendary sloping westwards to a large and deep subterranean burial chamber. The body of a middle adult female [(GD3)146] had been placed in an extended supine position with the head to the west facing north (Plate 5). Around the sides of the burial chamber had been placed large rocks intended to hold back the sand strata encountered at that depth from entering the chamber. The rectangular block of fill around the skeleton differed from the fill elsewhere in the grave implying that the body had been placed in a coffin. To the south of the body had been placed ceramic vessels (GD3)147B and (GD3)147C with copper-alloy cup (GD3)147A sat on the rim of (GD3)147B. The burial chamber had been sealed with a mud-brick blocking wall leaving the body in a void. The burial chamber had been cut underneath grave (GD3)20 which had subsequently slumped as the ceiling of the burial chamber collapsed onto the burial.



Plate 5. Grave (GD3)20. Subterranean chamber containing burial (GD3)146 and grave goods (GD3)147. View looking west.

**Grave (GD3)60.** A steep narrow descendary sloping eastwards to a large and deep subterranean burial chamber. The body of a young adult [(GD3)127], probable male, had been placed in an extended supine position with the head to the west facing south. A ring was found around the proximal hand phalanx of the left fourth ray. The rectangular block of fill around the skeleton differed from the fill elsewhere in the grave cut, implying that the body had been placed in a coffin. This burial cut into grave [38] and arm bones of skeleton (GD3)69 from that burial were found within its fill. The burial chamber had been sealed with a mud-brick blocking wall leaving the body in a void. The grave had been robbed, the upper bricks of the blocking wall had been removed and the skull damaged.

**Grave (GD3)41.** A long narrow descendary sloping westwards to a large and deep subterranean burial chamber. The body of a middle adult [(GD3)106], probable male, had been placed in an extended supine position with an east-west orientation. The burial chamber had been sealed with a mud-brick blocking wall leaving the body in void. The grave had been robbed, the upper bricks of the blocking wall being removed and most of the skeletal elements of the body had been dispersed with only the legs remaining *in-situ*.

**Grave (GD3)55.** A narrow descendary sloping down westwards leading to a rectangular space off which was a small sub-rectangular subterranean chamber to the north (Plate 6). Within the chamber the body of an infant [(GD3)62] had been placed. The rectangular block of fill around the skeleton differed from the fill elsewhere in the grave implying that the body had been placed in a coffin. The burial chamber had been sealed with a mud-brick blocking wall leaving the body in a void. This burial cut slightly into the south side of grave (GD3)38. The grave had been robbed, many of the bricks of the blocking wall had been removed and most of the skeletal elements of the body were missing. Luckily the feet were still in position, which allowed the identification of the east-west orientation.



Plate 6. Grave (GD3)55 in the foreground and grave (GD3)38 beyond. View looking north.

*East-west aligned ramp graves with north-south aligned burials*

**Grave (GD3)45.** A long descendary sloping westwards to a large subterranean burial chamber. The body of a young adult male [(GD3)81] had been placed in an extended supine position with the head to the south facing west (Plate 7). The rectangular block of fill around the skeleton differed from the fill elsewhere in the grave cut implying that the body had been placed in a coffin. To the east of the body had been placed large ceramic storage vessels (GD3)70C and (GD3)70B. On the rim of (GD3)70B was placed a decorated cup (GD3)70A. The burial chamber had been sealed with a mud-brick blocking wall leaving the body in a void. At some point the blocking wall had collapsed onto the burial damaging the ceramic vessels. The upper eastern end of the ramp had been cut by later grave (GD3)84.



Plate 7. Grave (GD3)45. Subterranean chamber containing burial (GD3)81 and grave goods (GD3)70. View to west.

**Grave (GD3)84.** A subterranean burial chamber cut into the eastern end of the ramp of grave (GD3)45. The body of an individual from puberty [(GD3)86] had been placed in an extended supine position with the head to the south facing upwards (Plate 8). This burial was directly over grave (GD3)130, that burial's subterranean chamber being reused



Plate 8. Grave (GD3)84 containing burial (GD3)86. View looking east.



and a new descandary cut through the descandary backfill (and perhaps into the cut) of grave (GD3)130. The burial chamber had been sealed by a mud-brick blocking wall built along the eastern side of the body. That blocking wall abutted the blocking of grave (GD3)87 which was partially truncated by the creation of this grave.

**Grave (GD3)130.** A narrow north-south aligned grave slot into which the body of a middle adult (GD3)132], probable male, had been placed in an extended supine position with the head to the south facing upwards (Plate 9). The legs of the body were partially contracted with the knees being raised due to the length of the body exceeding that of the grave slot. The associated descandary may have cut into and damaged the burial in grave (GD3)112. The original form of the descandary of this grave is uncertain due to the later digging of grave (GD3)84. This burial presumably had some form of blocking structure which was removed during the creation of grave (GD3)84.



Plate 9. Grave (GD3)130 containing burial (GD3)132. View looking west.

#### *Secondary burials within upper portions of descandary graves*

**Grave (GD3)63.** A sub-rectangular niche cut into the southern side of the upper eastern end of grave (GD3)20's descandary. Within the niche the body of a young child [(GD3)65] had been placed in an extended supine position with the head to the east facing north (Plate 10). The body had been adorned with three necklaces [(GD3)157]: one made of two strings of green faience beads, surrounding the neck and finishing on top of the chest, with the four ends pending – one of those ends had a bead with a painted eye; a second one with blue rectangular beads; and a third one with teardrop-shaped semi-precious stone beads – red, black and white. In addition to this, a bracelet was found around the right elbow made of ostrich shells. The rectangular block of fill around the skeleton differed from the fill elsewhere in the grave cut implying that the body had been placed in a coffin. At the western end of the niche was a ceramic vessel [(GD3)66]. The niche had been blocked with mud bricks thereby leaving the burial in a void.



Plate 10. Grave (GD3)63. Niche cut into the south side of the upper portions of grave (GD3)20's descandary. It contained burial (GD3)65 which was richly adorned with necklaces. A ceramic vessel had been placed at the feet of the burial. View looking south.

**Grave (GD3)7.** An east-west aligned sub-rectangular grave slot cut into the backfill of grave (GD3)60. Within the slot the body of a young child [(GD3)30] had been placed in an extended supine position with the head to the east facing forwards. Above the body mud bricks had been arranged in a rudimentary fashion to form a blocking structure.

#### *Uncertain grave type*

**Grave (GD3)112.** Rectangular grave cut with a flat base on which the body of a probable male adult [(GD3)115] had been placed on its right side, aligned east-west in a crouched position with the head to the west (Plate 11). The form of the upper portion of the grave is unknown due to its being truncated by the creation of grave (GD3)130. Grave (GD3)130 also truncated the head and left hand of the skeleton.



Plate 11. Grave (GD3)112 centre, grave (GD3)130 top, emptied grave (GD3)109 right. View looking west.

#### *Other cuts*

**Cut (GD3)123.** Sub-rectangular cut with steeply sloping sides and a flat base. This feature truncated the majority of graves (GD3)136, (GD3)133 and (GD3)119. It also cut extensively into grave (GD3)138. Cut (GD3)123 is either a single or a series of robbing events.

**Cut (GD3)75.** Sub-circular cut with steeply sloping sides and a flat base. The density of burials within this cut did not allow it to be associated with a particular grave. Its edges are seemingly comprised of a combination of the cuts of graves (GD3)84, (GD3)112 and (GD3)87.

## Discussion

This area of the cemetery appears to have been used much more intensively than those other areas where excavation has taken place. Also the close juxtaposition of different graves types is not so far paralleled elsewhere. In areas (HA2) and (J) axial graves with east-west aligned descendaries with the chambers to the west were the norm while in area (HA1) slot graves were common.

Amongst the pottery from some of the graves in area (GD3) were Napatan period vessels (Plate 12), the first time early Kushite material has been found in the graves at Kawa. These include forms which are common in the town. Other graves contained pottery of later Kushite date which can be paralleled in area (J) and in grave (1075).



Plate 12. Grave (GD3)38 containing burial (GD3)69 with Napatan amphora and cup placed around the head of the deceased. View looking north.

The very considerable size of the Kawa cemetery makes the excavation of a large proportion of it extremely difficult. The recent work has highlighted the range of diversity which is in no way apparent from the surface and makes one wary of advancing any general comments about the nature of its use and development over time.

## Bioarchaeological analysis

*Tatiana Vlemincq-Mendieta*

### General characteristics of the assemblage

At least 11 of the 22 skeletons excavated had been disturbed, thus affecting their preservation and completeness. The nature of the sediments also affected preservation in some cases (see Figures 2 and 3). Over half of the individuals exhibited poor or fair preservation, while just under half had more than 75% of their skeletal elements remaining. It was, therefore, possible to carry out detailed assessment of biological profiles and pathological conditions in most cases. As is usual in archaeological contexts, small elements (i.e. hands, feet, ribs and fragments of the facial skeleton) were often absent from even the best-preserved individuals.

The disturbed bones often showed signs of weathering and other taphonomic damage (cracks, breaks, bleaching or flaking) attributable to both burial environment and recov-

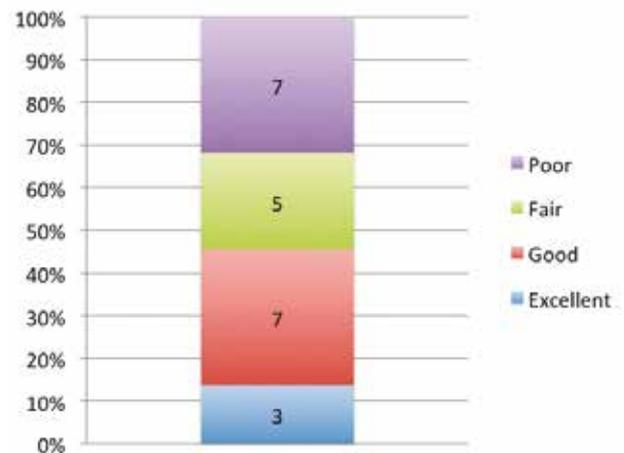


Figure 2. Preservation of the skeletons excavated during the 2017 season at Kawa.

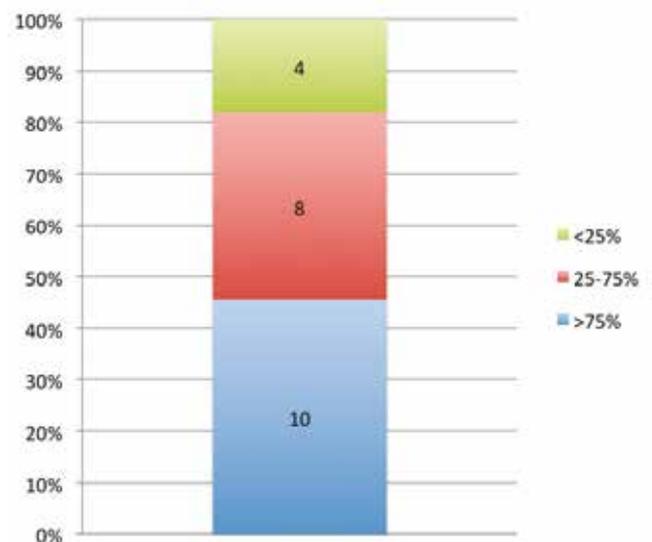


Figure 3. Completeness of the skeletons excavated at Kawa during the 2017 season.



ery procedures. All the remains displayed yellow-brown soil staining, as a response to long-term interment.

### Bioarchaeological methods

During the field season a brief bioarchaeological study was carried out, pending a more extensive laboratory-based analysis. The type of burial (primary, secondary or disturbed), orientation, position, completeness (<25%, 25%-75% or >75%) and preservation (excellent, good, fair or poor) of the skeletons were assessed in the field. Subsequently, a demographic (biological profiling) study was carried out, based upon the methods detailed below. Dr Daniel Antoine, Curator of Physical Anthropology at the British Museum, provided the field forms and standards for bioarchaeological analysis.

#### Age estimation

Several methods were used in order to age the individuals. The methods can be grouped into adult and subadult categories. For adults, methods employing age-related changes to the pelvic joints were preferred, since the auricular surface (Lovejoy *et al.* 1985) and the pubic symphysis (Brooks and Suchey 1990) are generally believed to be more accurate than other techniques. Additional methods included the fusion of the basio-occipital basio-sphenoidal synchondrosis and the medial clavicle (Buikstra and Ubelaker 1994). Multiple methods are always preferable to individual methods in isolation, as even usually accurate methods can mislead. Subadults were aged using the dentition – eruption and formation of the teeth (Gustafson and Koch 1974) – as well as bone measurements (especially the long bones, the basilaris portion of the skull, and the ilium) and epiphyseal fusion (Scheuer and Black 2000).

Once the individuals were aged, they were allocated into age categories, originally posited by Buikstra and Ubelaker (1994) and summarised in Table 1.

Table 1. Age categories used to subdivide the assemblage (based on *Institute of Bioarchaeology – British Museum – standards*).

Age category	Symbol	Age range
Foetus	F	<Birth
Infant	I	Birth-1 year
Early Childhood	EC	2-5 years
Late Childhood	LC	6-10 years
Puberty	P	11-15 years
Adolescent	AO	16-19 years
Subadult	S	0-19 years
Young Adult	YAd	20-34 years
Middle Adult	MAd	35-49 years
Old Adult	OAd	50+ years
Adult	A	20+

#### Sex estimation

The sex estimation of this assemblage was carried out using several methods, preferentially involving analysis of sexually dimorphic features of the pelvis and the skull, with the ad-

ditional use of some bone measurements. Skulls were scored using the five features presented in Buikstra and Ubelaker (1994): nuchal crest, mastoid process, supraorbital margins, glabella and mental eminence. Pelves were assessed using the greater sciatic notch (Buikstra and Ubelaker 1994), the arc composé (Bruzek 2002) and the Phenice method (Phenice 1969), which assesses the presence or absence of the ventral arc, the subpubic concavity and the medial aspect of the ischiopubic ramus. The sex of the individuals was estimated on a five-grade scale that is summarised in Table 2.

Table 2. Sex categories used to classify the adults of the assemblage (from Buikstra and Ubelaker 1994, 9).

Symbol	Sex category
M	Male
M?	Probable male
?	Unknown
F?	Probable female
F	Female

Estimation of sex in subadults is often highly inaccurate. The methods used are still highly speculative (Schutkowski 1993) and, thus, no attempt was made to determine the sex of the subadults.

#### Stature estimation

The length of the long bones is used to estimate the total height of an adult individual. An adaptation of Trotter's formulae (Trotter 1970) was used to estimate stature, which provide stature calculations for ancient Egyptians, the closest group to Kawa's population (Raxtler *et al.* 2008). While any of the long bones can be used for this function, the left femur was selected as it was present in almost all cases.

### Demography of the assemblage

The small size of the assemblage (n=22) makes any serious assessment of demographic structure questionable at best. Nevertheless, the data have been assessed with age and sex parameters in mind in order to give a general overview of the assemblage. Figure 4 shows clearly that the majority of the individuals found during this season were adults (64%).

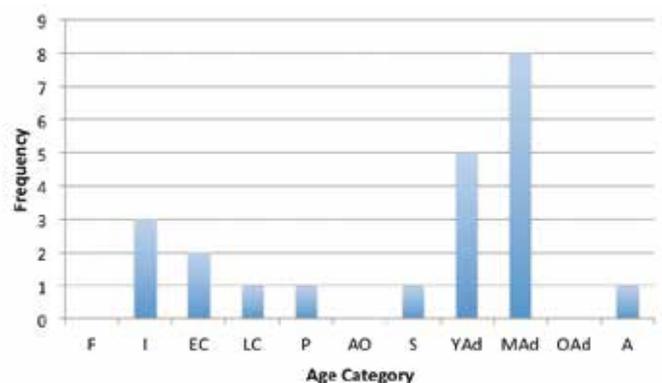


Figure 4. Distribution of age categories of the assemblage excavated during the 2017 season at Kawa.

The subadults consisted of three infants, two early children, one late child, one from puberty and a subadult with no given specific age category (Table 3). No individuals were attributed to the age categories of foetus, adolescent or old adult.

Table 3. Subadult age distribution.

Age	no. of individuals	% of subadults	% of assemblage
Foetus	0	0	0
Infant	3	37.5	13.5
Early Childhood	2	25	9
Late Childhood	1	12.5	4.5
Puberty	1	12.5	4.5
Adolescent	0	0	0
Unknown	1	12.5	4.5
Totals	8	100	36

A total of 57% of the adult individuals are middle adult, while 36% are young adult and none are old adult (Table 4; Figure 5). Therefore the middle adults represent the majority

Table 4. Adult age distribution, by sex (individuals within the 'probable' categories have been combined with their respective sexes).

Age	no. of males	no. of females	Total	% of adults	% of assemblage
Young Adult	4	1	5	36	23
Middle Adult	4	4	8	57	36
Old Adult	0	0	0	0	0
Unknown	1	0	1	7	5
Total	9	5	14	100	64

of the adult assemblage, with the same number of females and males. While females mostly are represented in the middle adult category in this assemblage, males are equally represented in both the young and middle adult categories.

It was possible to determine the sex of all adults recovered. There is an overrepresentation of males versus females (Table 5, Figure 5), with nine males and five females. According to Waldron (2007, 35), highly skewed sexes in a collection of osteological material can invalidate assertions made on the basis of its study. The assemblage should have an equal rep-

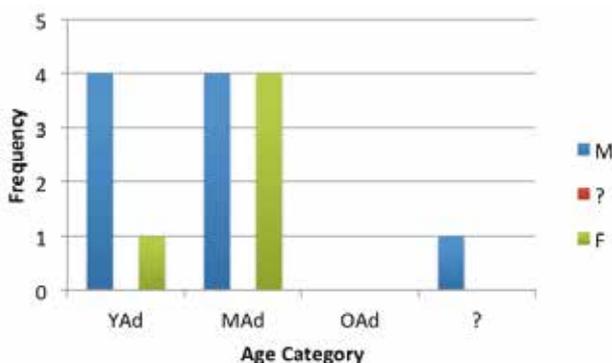


Figure 5. Sex estimation of adults by age categories (individuals within the 'probable' categories have been combined with their respective sexes).

Table 5. Sex and age estimation of individuals in the assemblage.

Grave no.	Skeleton no.	Age	Sex
(GD3)11	61	YAd	F
(GD3)16	27	MAd	F
(GD3)20	146	MAd	F
(GD3)38	69	MAd	M?
(GD3)41	106	MAd	M?
(GD3)45	81	YAd	M
(GD3)51	78	YAd	M?
(GD3)60	127	YAd	M?
(GD3)87	89	MAd	F
(GD3)95	152	MAd	F
(GD3)98	108	MAd	M
(GD3)112	115	A	M?
(GD3)130	132	MAd	M?
(GD3)138	151	YAd	M

resentation of each sex, unless there are valid cultural reasons for notable differences. Although the results are imbalanced, it is fair to say that 14 individuals is too small a sample size to claim a genuinely valid sex-based disparity.

The results on stature estimation are shown in Table 6 and Figure 6. The three females represented here are extremely consistent, all of them with a height between 156 and 157cm. The males, on the other hand, can be divided into either a small stature group (155-159cm) or a tall stature group (170-174cm). This disparity is difficult to assess here because the sample is reduced to ten individuals. Further analysis within a larger sample group is needed. The shortest male [(GD3)106] is shorter than all females, which may be an exception, although re-analysis of this individual within a laboratory is required to ensure the original sex estimation was correct.

Table 6. Estimated final achieved height for adults, from femoral length (using Raxter et al. 2008).

Grave	Skeleton	Sex	Femoral length (cm)	Stature estimation (cm)
(GD3)11	61	F	42.8	157 ± 2.517
(GD3)16	27	F	-	-
(GD3)20	146	F	42.5	156 ± 2.517
(GD3)38	69	M?	41	156 ± 3.218
(GD3)41	106	M?	40.3	155 ± 3.218
(GD3)45	81	M	47.2	170 ± 3.218
(GD3)51	78	M?	-	-
(GD3)60	127	M?	41.9	159 ± 3.218
(GD3)87	89	F	-	-
(GD3)95	152	F	42.5	156 ± 2.517
(GD3)98	108	M	48.5	173 ± 3.218
(GD3)112	115	M?	48.7	174 ± 3.218
(GD3)130	132	M	47.6	171 ± 3.218
(GD3)138	151	M	-	-

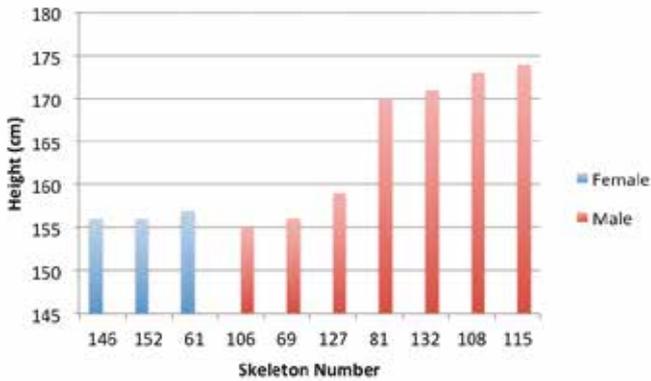


Figure 6. Graph of estimated final achieved height by sex (plotting male and probable male together).

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Table 7. Summary of the preservation, completeness, orientation, position, sex and age of all individuals excavated at Kawa during the 2017 season.

Grave	Skeleton	Preservation	Completeness	Orientation	Facing	Position	Sex	Age
(GD3)3	26	Poor	<25%	E-W?	South?	-	-	I
(GD3)7	30	Good	>75%	E-W	Fowards	Extended + supine	-	EC
(GD3)11	61	Good	>75%	W-E	North	Crouched on left	F	YAd
(GD3)16	27	Poor	25%-75%	W-E?	-	-	F	MAd
(GD3)20	146	Good	>75%	W-E	North	Extended + supine	F	MAd
(GD3)38	69	Fair	25%-75%	W-E	North	Crouched on left	M?	MAd
(GD3)41	106	Fair	25%-75%	E-W	-	Extended + supine	M?	MAd
(GD3)45	81	Excellent	>75%	S-N	West	Extended + supine	M	YAd
(GD3)51	78	Poor	25%-75%	-	-	-	M?	YAd
(GD3)55	62	Poor	<25%	E-W	-	-	-	I
(GD3)60	127	Excellent	>75%	W-E	South	Extended + supine	M?	YAd
(GD3)63	65	Excellent	>75%	E-W	North	Extended on right	-	EC
(GD3)84	86	Good	>75%	S-N	Upwards	Extended + supine	-	P
(GD3)87	89	Fair	25%-75%	W-E	Upwards	Extended + supine	F	MAd
(GD3)95	152	Fair	25%-75%	W-E	North	Extended + supine	F	MAd
(GD3)98	108	Poor	25%-75%	W-E	-	Crouched on left	M	MAd
(GD3)109	114	Good	>75%	W-E	Upwards	Extended + supine	-	LC
(GD3)112	115	Poor	25%-75%	W-E	-	Crouched on right	M?	A
(GD3)130	132	Good	>75%	S-N	Upwards	Extended + supine	M?	MAd
(GD3)133	135	Fair	<25%	-	-	-	-	S
(GD3)138	151	Poor	<25%	W-E	-	Crouched on left	M	YAd
(GD3)143	154	Good	>75%	E-W	Upwards	Extended + supine	-	I

## Bibliography

- Brooks, S. and J. M. Suchey 1990. 'Skeletal age determination based on the os pubis: A comparison of the Acsádi-Nemeskéri and Suchey-Brooks methods', *Human Evolution* 5(3), 227-238.
- Bruzek, J. 2002. 'A Method for Visual Determination of Sex, Using the Human Hip Bone', *American Journal of Physical Anthropology* 117, 157-168.
- Buikstra, J. E. and D. H. Ubelaker 1994. *Standards for data collection from human skeletal remains: proceedings of a seminar at the Field Museum of Natural History, organized by Jonathan Haas*. Arkansas Archeological Survey. Fayetteville.
- Gustafson, G. and G. Koch 1974. 'Age estimation up to 16 years of age based on dental development', *Odontologisk Revy* 25, 297-306.
- Lovejoy, C. O., R. S. Meindl, T. R. Pryzbeck and R. P. Mensforth 1985. 'Chronological metamorphosis of the auricular surface of the ilium: A new method for the determination of adult skeletal age at death', *American Journal of Physical Anthropology* 68(1), 15-28.
- Phenice, T. W. 1969. 'A newly developed visual method of sexing in the os pubis', *American Journal of Physical Anthropology* 30, 297-301.
- Raxter, M. H., C. B. Ruff, A. Azab, M. Erfan, M. Soliman and A. El-Sawaf 2008. 'Stature Estimation in Ancient Egyptians: A New Technique Based on Anatomical Reconstruction of Stature', *American Journal of Physical Anthropology* 136, 147-155.
- Scheuer, L. and S. M. Black 2000. *Developmental juvenile osteology*. London.
- Schutkowski, H. 1993. 'Sex determination of infant and juvenile skeletons: I. Morphognostic features', *American Journal of Physical Anthropology* 90(2), 199-205.
- Trotter, M. 1970. 'Estimation of stature from intact long bones', in T. D. Stewart (ed.), *Personal Identification in Mass Disasters*. Washington D.C., 71-83.
- Waldron, T. 2007. *Paleoepidemiology: the epidemiology of human remains*. Walnut Creek, California.
- Welsby, D. A. 2001a. *Life on the Desert Edge. Seven thousand years of settlement in the Northern Dongola Reach, Sudan*. Sudan Archaeological Research Society Publication 7. London.
- Welsby, D. A. 2001b. 'Excavations within the Pharaonic and Kushite site at Kawa and in its hinterland 2000-2001', *Sudan & Nubia* 5, 64-70.
- Welsby, D. A. 2002. 'The Kushite town and cemetery at Kawa, the 2001-2002 season. Survey and excavations', *Sudan & Nubia* 6, 32-37.
- Welsby, D. A. 2008. 'The Northern Dongola Reach Survey. Excavations at Kawa 2007-8', *Sudan & Nubia* 12, 34-39.
- Welsby, D. A. 2009. 'Houses and Pyramids at Kawa, excavations 2008-9', *Sudan & Nubia* 13, 72-76.
- Welsby, D. A. 2010. 'Excavations at Kawa, 2009-10', *Sudan & Nubia* 14, 53-55.