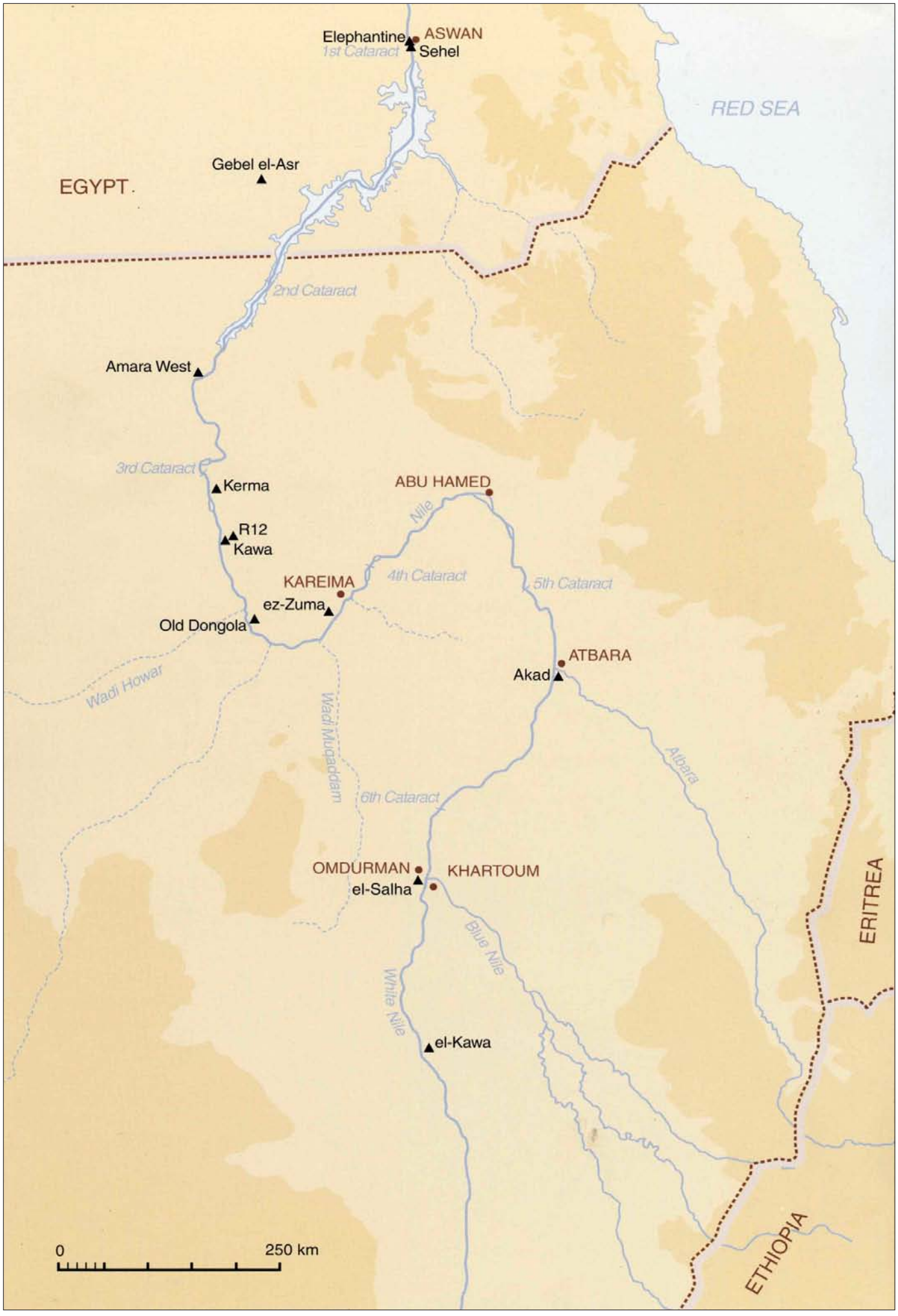
SUDAN & NUBIA

The Sudan Archaeological Research Society

Bulletin No. 6 *2002*


Elephantine
ASWAN
1st Cataract
Sehel
RED SEA
Gebel el-Asr
EGYPT
2nd Cataract
Amara West
3rd Cataract
Kerma
ABU HAMED
Nile
R12
Kawa
KAREIMA
4th Cataract
5th Cataract
ez-Zuma
Old Dongola
ATBARA
Akad
Wadi Howar
Wadi Muqaddam
Atbara
6th Cataract
OMDURMAN
KHARTOUM
el-Salha
Blue Nile
White Nile
el-Kawa
ERITREA
ETHIOPIA
0
250 km

SUDAN & NUBIA

The Sudan Archaeological Research Society

Bulletin No. 6 *2002*

Contents

Front Cover: An apostle from the mural in the chapel at Banganarti containing the king's portrait.

Introduction

Vivian Davies

At the time of writing (mid-September 2002), the 10th International Conference for Nubian Studies has just finished, generously hosted by colleagues in the Università di Roma "La Sapienza". The large number of papers delivered shows how rapidly the subject of Middle Nile studies is growing, with significant advances in knowledge achieved since the last conference held in Boston four years ago, an encouraging state of affairs, to which the content of this present volume bears further witness. There was, however, one hugely important issue which overshadowed the event: the looming crisis of the new dam at the Fourth Cataract.

As reported by the Sudanese delegation, preparatory work for the dam has now begun and actual building will start in two years. It is expected to take a further seven years to complete. In an unwelcome echo of the Aswan High Dam scheme, the reservoir created will flood over 170km of the Nile Valley between the Fourth Cataract and Abu Hamed, enveloping, as we now know from preliminary surveys, thousands of archaeological sites - artefact scatters, settlements, cemeteries and rock-drawings dating from the Palaeolithic to the Islamic Periods. Very little is known about these sites; for the most part only that they exist. Our Sudanese colleagues are urgently appealing for assistance, so that as much as possible of the record may be investigated and documented before the area is lost to knowledge for ever. In response, SARS is this winter launching a campaign of rescue excavation in a region which we recently surveyed (see *Sudan & Nubia* 4 [2000], 51-7), but an extensive international effort will be required if any serious impact is to be made. Our next international colloquium, to be held at the British Museum on 8 May 2003, will focus on the dam emergency. All colleagues with an interest in helping are invited to attend.

The Kushite Town and Cemetery at Kawa, the 2001-2002 season
Survey and excavations

Derek A. Welsby

The team of eight archaeologists from the UK, Canada and Sweden, together with the antiquities officer from NCAM, were in the field from early December 2001 until early February 2002 with a team of up to 36 local workmen.[1] The Italian component of the project arrived later and their work is detailed in a separate report in this volume (see pp. 2-7). As in previous seasons the work at Kawa consisted of the topographical survey, planning of buildings, and excavation in the town and in the eastern cemetery.

Topographical survey

This work progressed with the completion of the survey of the northern end of the site.

Planning of buildings[2]

A complex of poorly preserved buildings was planned a little to the north of Temple T, the temple built by Taharqo. The remains have been very badly disturbed by *sebakhin* and only incomplete plans of what appear to be domestic structures were recoverable from surface cleaning. Two substantial buildings in the lower town, first noted in 1993, have also been planned in detail. Building F1 is a rectangular structure, 26.5 x 15.6m in size, with an additional room extending beyond the general building line to the north at the west end. The long axis of the building is aligned approximately east-west with a wide entrance in the centre of the east wall which was later blocked with stone blocks and a column drum. It is built throughout of mud brick with walls between 0.8 and 1m thick. Stairways were noted in the north-east and south-west corners with treads of mud brick strengthened with timber. The core of Building F2 is 13.65m square (Figure 1). Much of the interior is paved with mud brick, both complete and fragmentary bricks being utilised. If this is the primary floor, clearly little of the superstructure survives. A little to the west are two substantial walls, all that is visible of two buildings at least 11m and 27m long. A third rectangular structure, with thin walls probably of *jalous*, overlies one of the substantial walls.

[1] Team members - Mortada Bushara (Antiquities Officer), James Beckwith (archaeologist), Jon Crisp (archaeologist), Claire Haywood (conservator), Margaret Judd (archaeologist, physical anthropologist), Sandra Rowntree (site planner, illustrator), Pip Stephenson (archaeologist), Derek Welsby (director), Isabella Welsby Sjöström (assistant director, pottery specialist).

[2] See Welsby 2002.

Excavations

Two areas were excavated in the town.

Area A.

Building A1 - During the previous seasons in early 2000 and over the winter of 2000-1 the two rooms added onto the south side of Building A1, rooms IV and V, and the eastern room of the original building, room I, were excavated. Also

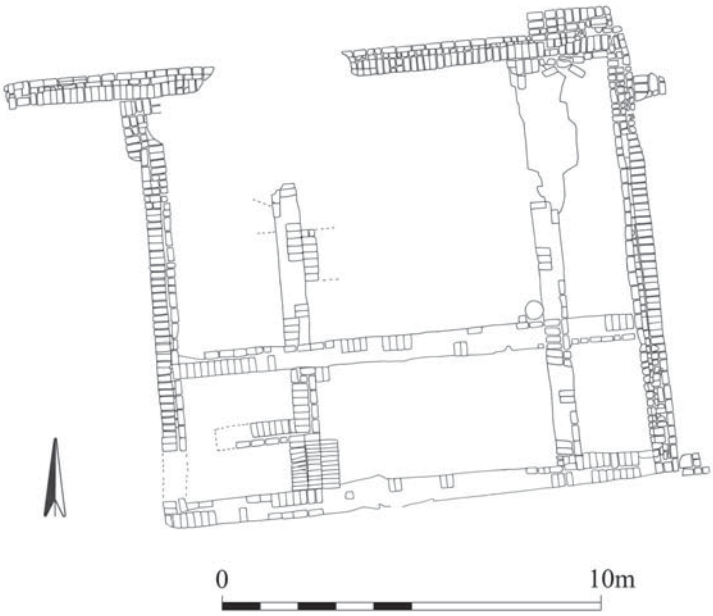


Figure 1. Plan of Building F2 (Scale 1:200).

excavated were the areas adjacent to the building, which included an altar on the main east-west axis outside the building to the west.[3] This year the excavation of Building A1 was completed (Plate 1) and the structure has now been backfilled to protect the walls and the wall paintings. Work was

Plate 1. Building A1 at the end of excavation.

concentrated on the investigation of rooms II and III, and of the area immediately to the west of the doorway from outside the building into room III (Figure 2).

[3] For preliminary reports on this work see Welsby 2000; 2001a; 2001b.

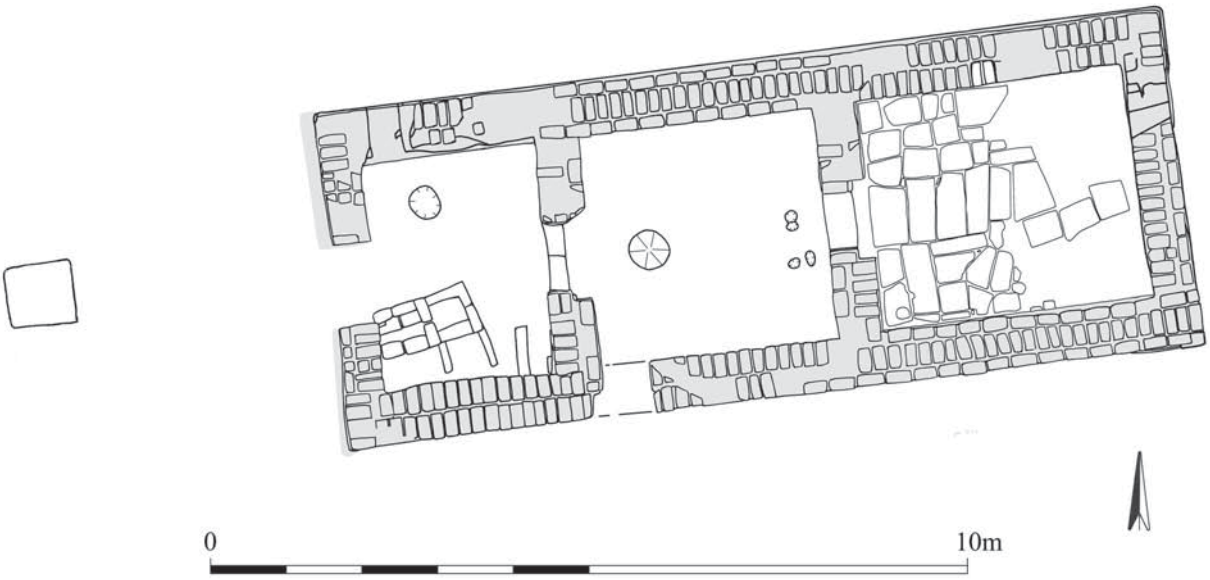


Figure 2. Plan of Building A1 (Scale 1:100).

In rooms II and III the deposits immediately predating the building's construction were revealed as they also were immediately to the west of the building. The primary building, of three rooms aligned with its long axis west to east, was built on a slope. The long south and north walls were constructed on the slope while the north-south walls were each founded at a higher level as one moves from west to east and terraced into the slope. Although the sections of walls to each side of the external doorway are not bonded in with the rest of the west wall (Plate 2), they appear to be primary and, therefore, there is no evidence, as previously thought, that the doorway had been subsequently narrowed. Unlike the doorways into rooms II and I there was no evidence for the presence of a threshold or of any doors, although a single row of mud bricks had been carried across the entrance at foundation level.

In the western room, room III, a mud surface associated with the construction level extended through the doorway outside the building. The floor surfaces within were of mud contemporary with a surface of sand immediately outside the building. These floor surfaces lapped up to, and merged with, the mud render on the walls of the room and covered the very roughly laid bricks and large pottery fragments forming the lowest courses of the east wall of the room (Plate 3). The mud-brick altar located a few metres to the west of the building (Welsby 2001a, 67) dates to an early phase of its use.

Plate 2. The west wall of Building A1.

Plate 3. The west face of the wall between rooms II and III. Pottery sherds incorporated in its foundation are clearly visible.

As the levels of sand built up outside the building, additional patches of mud floor were laid immediately inside the doorway to produce a ramp leading down into the room. It was on this ramp that a mud-brick feature was built. It consisted of two square 'bins' (Plate 4) with sides standing to a maximum height of three courses (260mm) and it was probably originally one course higher. It extended into the room from the west wall, which it abutted, but was angled a little towards the centre line of the building and partially impeded progress from the exterior through room III into room II. Its function is unclear. Both bins were filled with sand.

During these early phases of use of the room there was a

Plate 4. Mud bins within room III looking west.

pot set into the floor in the north-west corner which was used as a hearth, and the flat base of a large circular ceramic dish had been utilised as the base of a hearth in the south-west corner. Another area of burning right in the doorway may have been associated with the construction phase of the building. Within the room was a deposit of sand and small pieces of clay, perhaps rubble among which, in the north-east corner, were many mud sealings.

In room II a sequence of thin floor surfaces was found. These were more sandy than in room III. The primary floor surface in room II sloped down a little from east to west and rested against a stone threshold in the doorway between rooms II and III, at which point it was approximately 200mm higher than that in room III. On the long axis of the building a little to the west of the centre of the room was a perfectly circular pit of conical profile, perhaps a setting for a pottery vessel. By the doorway into room I were four small holes which may have supported posts but if so they will have interfered with easy access through the doorway. Also in this area was evidence for the laying of a number of small fires sealed by patches of mud flooring which formed a slight thickening of the floor up against the step (threshold) into room I.

The stone threshold in the doorway between rooms I and II was set 270mm above the primary floor surface in room II and 65mm above the level of the white sandstone paving in room I.

Associated with the primary phase of the building are fine wall paintings, unfortunately not well preserved.[4] On the east wall of room II flanking the doorway into room I are broad vertical registers of yellow paint bearing large hieroglyphic inscriptions (Colour plates XX-XXII). Beyond these are what appear to be a single symmetrical figure of an individual striding towards the doorway. On the white ground are a few hieroglyphs. The inscriptions flanking the doorway are similar. The upper part, now lost, will have contained the name of a king beneath with are the following texts '.... beloved of [Amu]n-Ra, lord of the thrones of the two lands, given life' on the north side and '.... beloved of [Amun-Ra] who dwells in Gematen, given life' on the south.[5]

The north wall of room II has four figures (Colour plates XXIII-XXIV), what is presumably a king on the left wearing gold sandals (as in room I in a corresponding position on the north wall) processing towards a blue painted god (Amun) and two female figures (Colour plates XXV-XXVI). The scene on the south wall (Colour plate XXVII) appears to have been similar but is much less well preserved and the king was totally removed when a doorway was cut through the western end of the wall to give access to room IV. Whereas the west wall of room I was whitewashed but had the painted dado of blue/black and red bands (Welsby 2001a, Col. pls XLIII and XLIV), the west wall of room II was only whitewashed.

Little remained of the wall paintings in room III. In places several layers of plaster were visible on the walls, each with a whitewashed surface. The penultimate surface at least was decorated with painting, which appears to have been of the same style as those observed in the rooms to the east. There were large areas of red and some yellow adhering to the walls (Colour plate XXVIII) while flecks of blue paint were visible in the deposits immediately above the floor surface. Only a single arm of a figure facing right in the south-east corner of the room on the south wall was recognisable. These paintings were all covered by whitewash in the final phase of the decoration of the room.

As already noted in room III a ramp of mud allowed access down into the building as the sand built up on the exterior. Set on the sand and clay deposit which contained the mud sealings was a hearth, which had heavily burnt the adjacent walls and much discoloured the painted plaster surfaces of the walls. When the level of the sand outside the building had reached a height of about 790mm above the primary floor surface, a flight of three steps (Plate 5) was constructed giving access down into the building and a new floor was laid in room III approximately 260mm above that of the primary phase. Contemporary with this, a new mud-brick threshold was constructed over the stone threshold between rooms III and II. The upper course of the mud

[4] For the paintings in room I see Welsby 2000, 6-7, Col. pls V and VI; 2001, Col. pl. XLVI.

[5] Translated by John Taylor of the Department of Ancient Egypt and Sudan at the British Museum.

Plate 5. Steps giving access down into the building.

bins in room III appears to have been removed at this time and the tops of the walls were flush with the new floor surface. Set on the latest floor in room II was a hearth in the north-west corner and a curved arrangement of brick forming an arc partially blocking access through the doorway into room IV. Its function is unclear.

Whereas room I was filled with rubble, some of it articulated, and many fragments of painted plaster from the upper parts of the walls, no such material was recovered from the other two rooms. Room II was largely filled with sand, although there was a pile of rubble, which appeared to have been tipped into the room from the south, and one small column shaft with capital lay by the north wall (Plate 6). Above the sand filling of room III was a deposit of rubble, much of it bearing impressions of what may be palm fronds. This may be derived from the collapsed roof. Why the fills of rooms II and III differ so much from that of room I is unclear. It suggests that the walls of room I were purposely demolished, with at least part of the west wall falling into the room. Was this an attempt to protect the contents of the sanctuary chamber with its bark stand/altar, a situation recently observed in the Temple of Amun at Naqa? Conversely the other two rooms may have been demolished and the building material removed from the site or the standing walls were gradually destroyed by wind erosion, although one might still expect a greater amount of rubble within their fills with both these scenarios.

No evidence was found in the building for the original location of the statues of Beset and Bes which were found closely associated with it.

Building A2 – Excavation of this structure was begun but is yet to be completed. The upper layers of sand have been removed throughout the building and its plan, at least in its latest phase, is clear. There is abundant animal bone and pottery within these sand layers. One mud-brick wall is secondary and on a slightly different alignment to the rest of the building. A rough partition, constructed of irregular pieces of stone, was also noted. In the north-west corner of the building a deep pit is a recent robber hole – within its fill was found a tin can. On analogy with buildings elsewhere on the site this was probably designed for domestic use.

Area Z. A small section of a building (Building Z1) was visible on the surface approximately 300m to the north-north-west of Temple T. Although the ground surface in this area today is flat, excavation demonstrated that in the Kushite period the situation was very different. The building is constructed on the edge of, and down, a steep slope to the west, presumably the slope of the river bank, although the present-day bank top lies approximately 40m further to the west. Whereas the walls in the eastern part of the building are visible on the surface with the construction level only about 100mm below it, less than 10m to the west the walls were traced to a depth of approximately 1.5m and appear to continue to dip down steeply (Plate 7). The depth of overburden renders further excavation impractical. The plan of the building as now known is difficult to understand and this may be partly the result of the eastern part having been totally removed by erosion while, as noted, the western part is unavailable for excavation. At present we have one large room terraced into the slope. On the west side of the room a solid mass of masonry appears to contain a stairway rising from south to north with treads of mud brick and timber, which presumably gave access to the first floor over the adjacent room, which had no doorway at ground level. Within

Plate 6. A column shaft with capital lying among the sand fill in room II.

Plate 7. General view of Building Z1 looking north east.

the room was a floor of mud preserved towards the southern end where there seems to have been a number of repairs. A little to the south of the centre of the room was a post-hole in line with a horizontal hole in the east wall only a little above the floor level. These two features were presumably related but their function is obscure. How the wall running off from the stairway to the east fits in with the plan of the building is unclear. It terminates as though on one side of a doorway, yet there is no continuation of the wall nor any other features which in combination with it may have enclosed an area, be it a room or courtyard.

The western wall has slipped down the slope. An attempt to counter this had been made during the life of the building by the construction of two phases of buttresses at the southwest corner, while a stepped buttress was built up against the middle of the south wall. Adjacent to this buttress was found a deposit of mud sealings with impressions.

The form and function of this building remain unknown. The pottery associated with it suggests that it is later in date than the other buildings so far excavated by SARS at Kawa and was constructed later in the Napatan period.

Site R18, the eastern cemetery. A large number of graves have been located within the 400m^2 under excavation, even though surface indications suggested the presence of only four tumuli. The surface features bear little or no relation to the original layout of the graves.

Graves with long descendaries are arranged roughly in north–south rows (Colour plate XXIX), some of the descendaries attaining a maximum depth of over 2.5m. Mudbrick blocking walls are visible in the doorways into the grave chambers and some of these suggest multiple use of the tombs. Although the large descendaries respect each other, a number of smaller descendaries have been inserted in the narrow space between them, presumably in an attempt to associate the burials interred in their tombs as closely as possible with the main burials (Plate 8). One of these contained the crouched inhumation of an infant with a Bastet amulet around the neck in glazed composition (Figure 3).

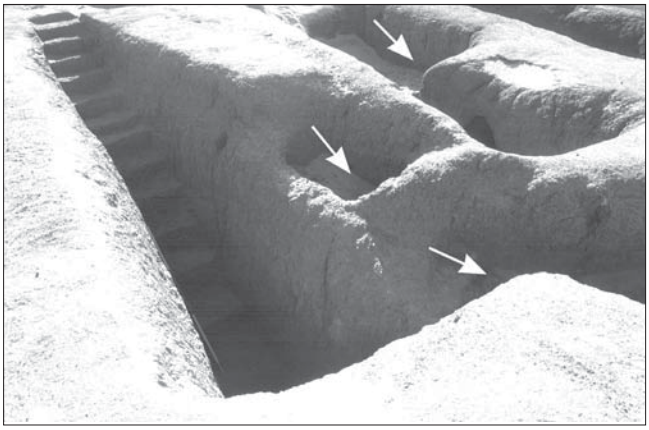


Plate 8. Secondary graves inserted in the vicinity of Tomb [HA2]58 looking south east.

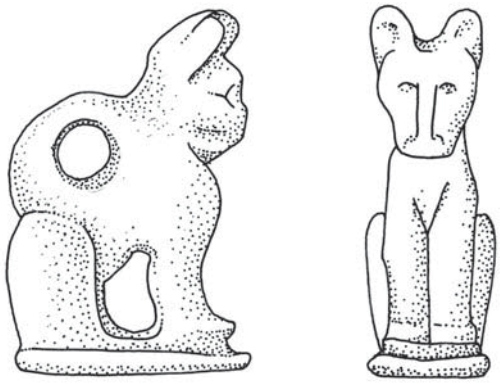


Figure 3. Bastet amulet found at the neck of a child buried in Tomb [HA2]112 (Scale 2:1).

None of the large tombs has been entered. Their considerable depth below the surface and the very friable nature of the overlying alluvium make it too dangerous to enter the tombs through the doorways and it will be necessary to dig down through the alluvium to remove the roof of the chambers to allow access. Only one chambered tomb, which was quite close to the surface and extended only a short distance into the alluvium, was excavated. It contained the body of an extended individual in a cartonage coffin (Plate 9), which

Plate 9. Individual buried in a cartonage coffin in Tomb [HA2]100 looking west.

had very poorly preserved painted decoration in red, black and yellow on its sides. This is presumably a secondary burial, or at least the grave was not dug for the burial of the individual subsequently interred in it, as the coffin is much too long to fit within the chamber and extended out into the descendary, the blocking wall being built over it. In an adjacent grave an extended inhumation in another cartonage coffin was buried high in the fill of the descendary. Immediately underneath the coffin was a shallow bowl of a type which is very common in the rubbish deposits associated with Building A1.

At least one grave, although it has a sloping descendary, is rather different. On the north side off the descendary is a side niche; part of the mud-brick blocking wall survived *in situ*. One burial, of a child, is at the bottom of a long rectangular cut and was covered by mud bricks.

The finds. Among the finds are large quantities of pottery from within a rubble and rubbish deposit in room I of Building Z1, which includes one bowl with a moulded animal, probably a crocodile, on the rim (Plate 10); two others had been found in Buildings A1 and A2. Quantities of jewellery were recovered from the floor surfaces in room II of Building A1. These include bead necklaces, some still articulated,

Plate 10. Pottery basin with an appliqué crocodile on the rim.

and amulets of faience. Also found in this room was a small clay human figurine and a ceramic bird with outstretched wings (Plate 11). The seals from Building A1 room III have yet to be studied in detail. Some, however, appear to bear the throne name of the Kushite ruler Piye (Figure 4) and suggest a date in the later 8th century for the use of the building. The sealings from within the building are very different from the large numbers found in the rubbish deposits outside it which were found in previous seasons. The sealings from Building Z1 are very different yet again. The limited number of types appear not to bear inscriptions. One very large seal type has the oval ground divided into four by horizontal lines. At the top and mirrored at the bottom is a hippopotamus, while in the middle are mirror images of a crocodile (Figure 5). Immediately outside the west wall of Building A2 was

Plate 11. Ceramic bird from room II in Building A1.

part of the base and foot of another ceramic statue of the same type as the statue of Beset.

It is hoped that the final season of the present five-year campaign will take place in the winter of 2003-4, when it is the intention to complete the excavations of Building A2 and of the tombs discovered in the last season in the cemetery, Site R18.

Figure 4. Mud sealing bearing the name Men-kheper-Ra, *from Building A1 (Scale 1:1).*

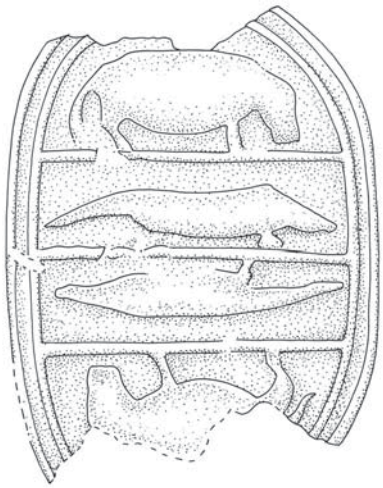


Figure 5. Mud sealing from Building Z1 (Scale 1:1).

Stabilisation and Investigation of the Wall Paintings

Claire Heywood

Introduction

The Department of Conservation at the British Museum provided a conservator, Pippa Pearce, for a six week period during the 2000 to 2001 season. Unfortunately, due to the large amounts of extremely fragile detached plaster uncovered in Room I of Building A1, the excavation could not proceed onto Rooms II and III. Investigations, to a depth of 30cm, confirmed that there were wall paintings of a high standard in Room II and possible wall paintings in Room III. In order to complete the excavation of the building, a British Museum conservator attended for the whole excavation third season, to treat the surviving wall paintings and detached wall plaster located within Building A.

Plate 1 (p. 32) shows the layout of the building looking east. The room in the foreground is Room III, which had whitewashed walls. Adjacent to this is Room II, where the majority of the paintings survive up to a high of 1m. The farthest room had been excavated early in 2001 and the paintings on the walls conserved and then back-filled.

The back-fill from the previous season's investigations in Rooms II and III was removed. In Room II the upper 30cm of the wall paintings had been successfully and effectively consolidated by Pippa Pearce using 2% Klucel G, a hydroxypropyl cellulose, in IMS (Industrial Methylated Spirits, a polar solvent, made of 96% ethanol, 2% methanol and 2% water). During a close inspection in Room III faint coloured patches were identified, suggesting that wall paintings may survive beneath the whitewash. The coloured patches were only visible within the upper quarter of the surviving wall, where areas of red were visible in places through the whitewash layer (Colour plate XXVIII).

Conservation condition assessment and pigment identification

1. Support wall: The support walls were made from silty clay mud bricks, which were in good condition and quite stable. The bricks contained small rounded stones, potsherds, charcoal and bone inclusions.

2. Plaster layers: The mud-plaster rendering was applied in three layers:

3. The first rough *arriccio* layer, used to even out the wall surface, was of silty clay probably of alluvial origin. The mud bricks on the internal face had long, thin, fibrous impressions, which point to the probable use of a chopped straw binder within the plaster. The north wall had suffered extensive loss of plaster. The thickness of this plaster layer varied between 7 and 10mm.

4. The second *arriccio* layer, a fine layer of silty clay, was used to even out the wall surface further. This layer had a maximum thickness of about 5mm.

5. The final *intonaco* plaster layer, probably a sieved alluvial deposit, was used to create a very smooth, flat surface onto which the painting could be applied. The thickness is a maximum of 5mm.

6. Paint layers: The ground on which all the paintings were applied was a whitewash (either calcium carbonate or calcium sulphate). This was in a very poor condition; the whitewash was crumbling and flaking extensively. All pigments were applied using a tempera technique, i.e. applied to the surface in a water-based medium. Due to the degradation of the binder the paint layers were very loose and friable, and had suffered extensive loss.

Two fragments of wall plaster from the 2000 to 2001 season had been taken to the British Museum to undergo treatment research. During this investigation the pigments were identified by the Conservation Research Group (Robinet 2001). The fragments were analysed directly by Raman spectrometry using a green laser (532nm) on blue and black pigments and a near-infrared laser (785nm) on red and yellow pigments.

The blue pigment was identified as Egyptian blue, $CaCuSi_4O_{10}$, a manufactured pigment consisting of a mixture of silica, copper and calcium.

The black pigment was identified as carbon black (not bone-black, as there were no additional peaks corresponding to phosphates).

The red pigment was identified as red ochre, haematite (Fe_2O_3) from the naturally occurring red iron oxides.

The yellow pigment was identified as yellow ochre, limonite ($FeOOH.xH_2O$), also a naturally occurring iron-based mineral.

Technological observations and discussion of paint and render layers

Room II

In most cases the outline was either sketched in red or yellow paint. This would probably have been the responsibility of an 'outline scribe' literate in the meaning of the hieroglyphic script (James 1985,8). The bulk of the illustrations were then filled in and detailed by other artistic craftsmen proficient in the use of pigments. The outline in most cases was emphasised in black. The dado, on the north, east and south walls, is one of the few exceptions to this, as the outline was sketched in yellow.

The work done in Room II was probably completed by a team of craftsmen, differences in the standard and infilling techniques suggesting that there was more than one artist. However, there was little evidence to suggest more than one scribe; the only identifiable inconsistency was with the use of different colours (red or yellow) for the outline sketches

without any apparent reason. The tools that the craftsmen and scribes would have employed were similar. Both the artists and the scribe/(s) would have used a type of pen for the more detailed work. James (1985, 10) suggests that this would have been made from a type of rush trimmed to form both fine and thick lines. The brushes for the infilling were probably made from palm-rib beaten out at one end to produce a stiff brush. The British Museum has such a collection of brushes still containing the paint pigments, found in the tomb of Metuhirkhopshef at Thebes (James 1985, 11).

The individuals on the north (Colour plates XXIII-XXVI) and south (Colour plate XXVII) walls, wearing red garments with cream-yellow legs and feet, were painted in slightly different ways. The ground in all cases is the whitewash, except for the feet in the middle of the south wall. The lower section of the yellow feet probably had a thin layer of red as a ground colour. This was probably done to emphasise the 'golden' colour of the foot as it is unlikely that the whole lower legs and feet were completely in-filled in red, prior to the yellow feet being painted. This theory is supported by the absence of red beneath the yellow on the upper ankles and the blue section around the mid-ankle.

The pigments for the 'golden' feet on the north and south walls were applied in a different order. On the south wall the outline was made in red and then emphasised in black. On the north wall, all the outline was made in red and then infilled before the black outline was applied. Also, the feet on the north wall overlap the black borders in an untidy fashion, whereas the feet on the south wall are very neat and within the outline borders. The tear-drop shapes within the legs on the north wall have a yellow border but no remaining infill pigment, though the pinkish hue would suggest that it was originally red. However, red pigment survives on all the other walls and no explanation can be given as to why the red in these tear-drop motifs has not survived. The south wall tear-drop motif is infilled in blue.

The blue strips around the ankles on the north wall were outlined again in yellow, whereas on the south wall there was just the original red outline sketch.

The blue staff towards the east end of the north wall (Colour plates XXIII-XXIV) had a yellow ground under the Egyptian blue. This may have been done to increase the vibrancy of the blue. There were also two patches of yellow pigment, one just visible under the red tip of the staff, and one just outside the outline almost completely over-painted by the white-wash. These seem to have been over-painted in a manner equivalent to rubbing out and it is only the degradation of the pigments that have made the changes visible.

It is possible that the east wall, to the north (Colour plate XXI) and south (Colour plate XXII) of the doorway, was painted by different craftsmen, due to the pigments being applied in different sequences on both the panels and the red legs. To the south of the doorway the outline sketch was made, then infilled with the red pigment; blue and black detail was then applied (except for the blue borders) and finally the yellow pigment. North of the doorway, the yellow pigment was applied before the blue and black detail. The red legs were not as carefully painted on the south side of the doorway as were those to the north.

The west wall has only one layer of white-wash, which has suffered extensive damage. There is no evidence that it had been decorated with paintings.

Room III

The east wall had been re-plastered over the original white-wash (and possible lower painted layer). This layer was then re-white-washed and had coloured pigments applied to it. At some point later this layer was also white-washed, completely covering the wall paintings (Colour plate XXVIII). The upper layer of the south wall was also white-washed over the painting, with one red arm remaining visible. On the north wall red, yellow and black pigments were visible in patches under the white-wash.

On the west wall there were no surviving wall paintings. In that respect Room III is consistent with Room II. The wall has been white-washed and re-plastered on numerous occasions. To the north of the doorway the wall was plastered three times and white-washed three times. To the south there was a total of three layers of plastering and five layers of white-wash above the first plaster and white-wash layer, in the following sequence:

(i) original plaster and white-wash
(ii) plastered and white-washed
(iii) plastered and white-washed
(iv) a very fine layer of mud, possible dirt or repair layer, and white-wash
(v) another very fine layer of mud and white-wash
(vi) finally, a layer of plaster and white-wash

It is not known why Room III, and the west wall in particular, was re-rendered on numerous occasions. There is evidence of burning in Room III, i.e. reddened and soot-blackened bricks on the west wall. The re-rendering may therefore have been necessitated by fire damage.

Treatment

Below the backfill was a layer of wind-blown sand, which was removed manually to reveal more of the wall paintings. Colour plate XXIII shows the painting on the north wall of Room II as they appeared when first exposed. The painted surfaces in Rooms II and III were covered with encrusted sand.This was removed mechanically with brushes, wooden tools and a puffer, prior to consolidating the surface of the painting. Removing the encrusted sand from the surface of the paintings was a delicate process, care being taken to avoid detaching the loose and friable pigment from the surface of the wall plaster.

As the pigments in Room II had virtually no surviving binder, consolidation was a priority. The present surface was exceptionally light in colour and bright due to the absence

of a stable binder. It was already known that the wall paintings would darken with consolidation (Colour plate XXIV). This was considered to be acceptable as the original binder would itself have made the overall appearance darker. The consolidant chosen, following consultation with experts within the Department of Conservation, was 0.5% solution of Klucel G in IMS. This treatment was preferred as the solvent carrier (IMS) would minimise swelling of the mud compared to water-based solvents. It also prevented the original binder from being confused with the later conservation treatment. However, due to the problems associated with transporting chemicals to Northern Sudan, especially post September 11th, an alternative consolidant that could be transported as normal luggage was also investigated. Gum Arabic, a vegetable gum from the Acacia tree, a slightly acidic salt of a complex polysaccharide (AIC 1989, 14), was selected. Gum Arabic, *Acacia Arabia*, was probably the original binder for the pigments and had been effective for hundreds of years. It was, therefore, safe to assume that the Acacia gum would be a suitable second choice treatment. The gum selected was from *Acacia Senegal* rather than the locally sourced *Acacia Arabia*. The *Acacia Senegal* Gum Arabic, in an exceptionally pure form, was bought in England and sprayed onto the surface of the paint as a 0.5% solution in water. The low concentration of the solution ensured that termites were not attracted to the gum and also allowed the consolidant to be applied in layers until a suitable strength was reached. Overall the use of Gum Arabic was successful.

The blue pigment was one of the most vulnerable colours. This may be due to the thicker application of this colour to increase its vibrancy. The blue pigment had suffered the most loss and required the most consolidant to stabilise it. Colour plate XXV shows a detail of the lower part of two blue legs, probably those of the god Amun, in the centre of the north wall. A comparison of the painting before and after conservation demonstrated that the cleaning and consolidation improved both the stability and the appearance of the painting.

An attempt was made to remove some of the white-wash in Room III to reveal the pigments underneath, without completely removing the evidence of the final white-wash layer. The white-wash layer was reduced with a brush, water and cotton swabs of acetone and IMS. The extent of the yellow and red paint layers were revealed on the east wall but the design could not be interpreted (Colour plate XXVIII).

Failing contact between the wall plaster and the support wall

In order to support the very weak upper areas of the walls, a mud mortar was used to fill any obvious gaps around the loose plaster. A mud slurry was applied behind the plaster to fill the void and ensure the contact between the plaster and the wall was maintained (Plate 12). The slurry was a combination of crushed silty clay in 20% Paraloid B72, and an ethyl methyl methacrylate in a 50:50 ratio of acetone and IMS.

Once the paintings were completely exposed, the silty-clay wall plaster dried out at an ever increasing rate, causing the plaster to continue to separate from the mud-brick wall. Large areas, therefore, required a mud support to ensure that the plaster maintained contact with the wall. Ultimately it became necessary to check the condition of the paintings on a daily basis. Whenever movement was detected a high concentration of Paraloid B72, 20% in acetone was injected into the walls to keep the painted plaster in contact with its support wall.

The use of solvents was essential; water would have caused the plaster to swell and lose all its strength and ultimately fall

Plate 12. Poor plaster to wall contact.

off the wall. The glass transition temperature of the B72 (the point at which the consolidant would start to flow) did not present a problem as the working temperature was below 40EC (Horie 1996, 107). The wall painting was then back-filled with sand before seasonal temperatures rose above that level. The back-fill also provided the plaster with long-term support.

Threats to stability of the wall paintings

Once the wall paintings were consolidated, numerous threats to their condition remained.

1. *Archaeological recording* - The tracing of the paintings, though an essential recording activity, involved suspending a drawing frame from the wall, setting datum points into the wall (in areas where the painted plaster was already destroyed) and having slight pressure applied to the surface of the painting while the tracing was made. These actions had the potential to damage the paintings.

2. *Other human activity* - Visitors on camels, donkeys, tractors and in tourist vehicles, drove or rode over the site and

many stopped to take an invasive and in some cases damaging look at what was happening.

3. *Animal activity* - Materials or chemicals which might be a food source to any animal were avoided during conservation. Covering the wall paintings prior to back-filling, to protect them from the elements would have increased the risk of damage from both humans and animals (see back-filling). Damage by bees which started to burrow holes into the plaster from Week One of the excavation could not be stopped. In previous seasons there had been damage caused by termites, snakes and a dog.

4. *Weather* - The sun was bright and quite hot and the wind was almost constant. Sandstorms were potentially abrasive to the paintings. The drying effect weakened the wall plaster causing it to become powdery and lose contact with the wall support.

Back-filling

At the end of the excavation the conservation work was completed and the process of back-filling with sand began. There is no intention to reveal and display the paintings again, and their reburial will improve the wall paintings' chances of long-term survival. For the wall paintings this was a high risk activity and it was necessary to protect them from the worst of this abrasive process. The walls were temporarily covered with Melinex (Plate 13), chosen for its strength and slip (low surface friction). The Melinex was placed against the painted surface to protect it as the sand was poured into place. As

Plate 13. Protecting the wall paintings with melinex during the backfilling.

the sand level rose the Melinex was gradually raised. Once the sand reached the top of the surviving walls, the Melinex was completely removed. The back-filling of the building was complete in three days (Plate 14 - the building back-filled is visible in the foreground; the exposed rooms in the background belong to Building A2).

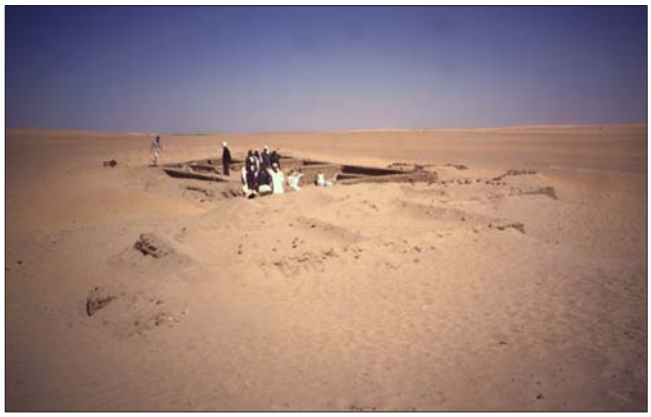


Plate 14. Building A1 after backfilling.

Acknowledgements

The project would like to thank the Director General of the National Corporation for Antiquities and Museums, Mr Hassan Hussein Idriss, and his staff for their assistance and support for its activities. Thanks also go to the British Council in Khartoum and the Representative, Mr Paul Doubleday. In the field we were greatly assisted by our *ghaffir* Selem Abdul Magid and the people of Kasura. Funds were provided by SARS from a number of sources chief among them the Bioanthropology Foundation and the British Museum. The mud sealings were drawn in the field by Sandra Rowntree and inked-in for publication by Claire Thorne.

Claire Heywood would like to thank numerous conservators from the British Museum Department of Conservation. In particular Frank Minnie for his advice on Gum Arabic, Nicki Newman for her advice on Klucel G, and Eric Miller, who, over a period of 20 hours, taught her all she needed to know to cope professionally with the problems and hurdles that lay ahead conserving wall paintings in the Sudan.

Bibliography

AIC, 1989. *Paper Conservation Catalogue*. 6th edition Oct. 1989, Washington, D.C.

Horie, C. V. 1996. *Materials for conservation - organic consolidants, adhesives and coatings*. 2nd edition, Oxford.

James, T. G. H., 1985. *Egyptian Painting*. London.

Robinet L. 2001, 'Report on the Analysis of pigments from a painted mud plaster', The British Museum, Department of Conservation, Conservation Research group, internal report, May 2001

Welsby, D. A. 2000. 'The Kawa Excavation Project', *Sudan & Nubia* 4, 5-10.

Welsby, D. A. 2001a. 'Excavations within the Pharaonic and Kushite site at Kawa and in its hinterland, 2000-2001', *Sudan & Nubia* 5, 64-70.

Welsby, D. A. 2001b. 'An early Kushite shrine at Kawa in northern Sudan', *Egyptian Archaeology* 19, 25-27.

Welsby, D. A. 2002. 'Kushite Buildings at Kawa', *British Museum Studies in Ancient Egypt and Sudan* Issue 1, Jan. 2002 (http//www.thebritishmuseum.ac.uk/egyptian/bmsaes/), 32-45.

Plate XX. Kawa, Building A1. The east wall of room II with the painted inscriptions flanking the doorway through into room I.

Plate XXI. Kawa, Building A1. The east wall of room II to the north of the doorway through into room I.

Plate XXII. Kawa, Building A1. The east wall of room II to the south of the doorway through into room I.

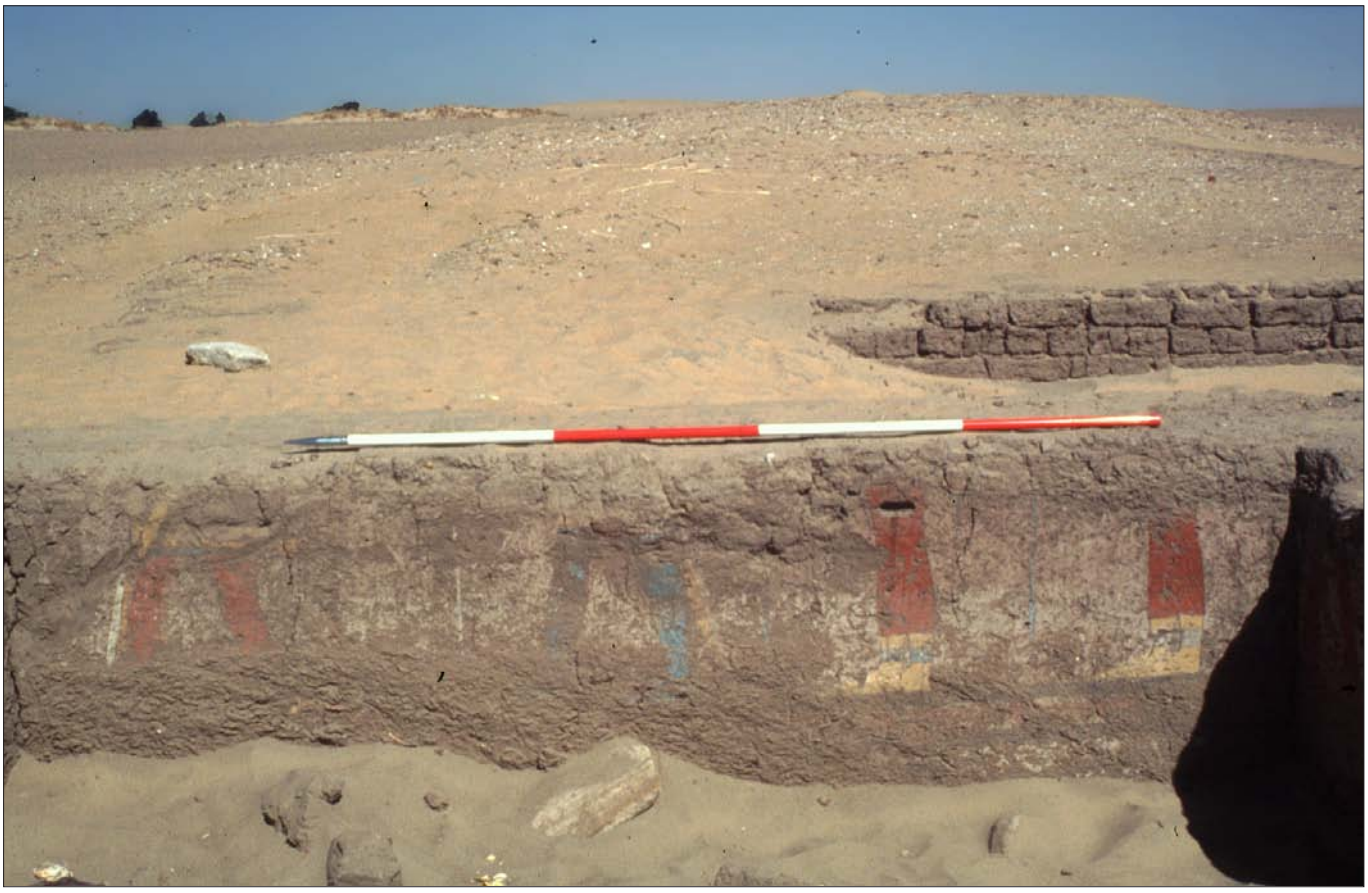


Plate XXIII. Kawa, Building A1. The north wall of room II before conservation. Building A2 is visible in the background partly covered by a dense deposit of pottery and bone fragments.

Plate XXIV. Kawa, Building A1. The north wall of room II after conservation. On the left the king, wearing golden sandals, processes towards Amun in the centre behind whom stand two goddesses.

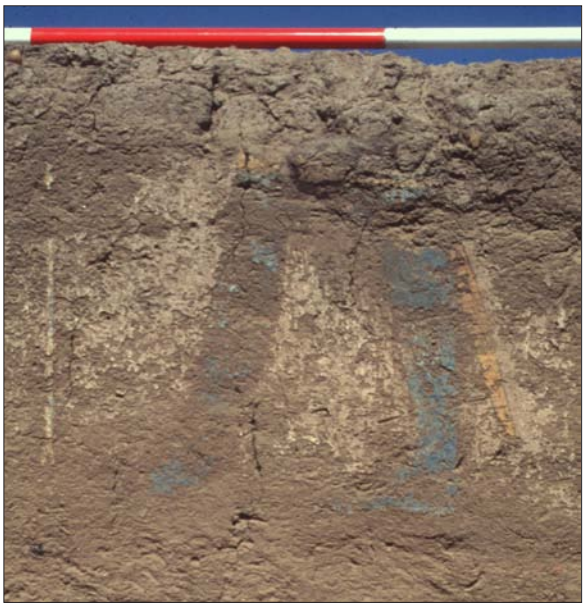


Plate XXV. Kawa, Building A1. Detail of Amun in the middle of the north wall of room II.

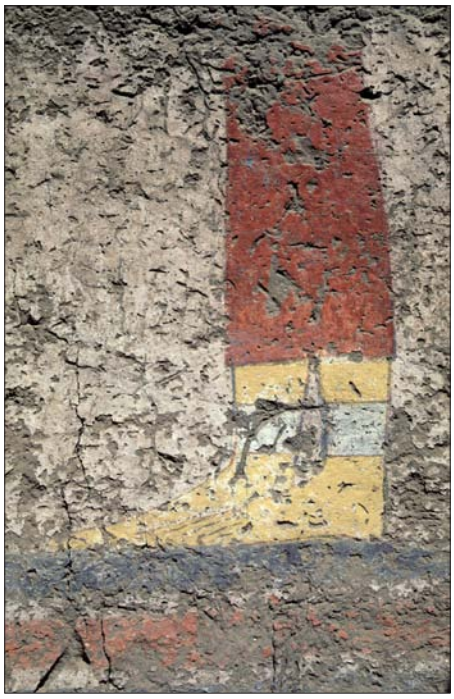


Plate XXVI. Kawa, Building A1. Detail of one of the goddesses on the north wall of room II.

Plate XXVII. Kawa, Building A1. The south wall of room II after conservation.

Plate XXVIII. Kawa, Building A1. The east wall of room III south of the doorway.

Plate XXIX. Kawa, Site R18, the eastern cemetery. Descendaries of tombs arranged in north-south rows.