TECHNISCHE UNIVERSITÄT MÜNCHEN

STUDIENGANG RESTAURIERUNG, KUNSTTECHNOLOGIE UND KONSERVIERUNGSWISSENSCHAFT

BA Thesis, Sommersemester 2013

THE EGYPTIAN NAOS

(E.40.1902)

OF THE FITZWILLIAM MUSEUM IN CAMBRIDGE.

TECHNICAL EXAMINATION AND RESTORATION HISTORY

3 Juni 2013 - 25 August 2013

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List of abbreviations

FM	Fitzwillam Museum
GI	Griffith Institute
Lh	left hand, as seen by the viewer facing the front of the object
lhs	left hand side, as seen by the viewer facing the front of the object
rh	right hand, as seen by the viewer facing the front of the object
rhs	right hand side, as seen by the viewer facing the front of the object

Dynastic chronology and map of Egypt

Predynastic	before 3032 BCE
Early Dynastic Period	3032 – 2707 BCE
Old Kingdom	2707 – 2170 BCE
First Intermediate Period	2170 – 2120 BCE
Middle Kingdom	2119 – 1794/93 BCE
Second Intermediate Period	1794/93 – 1550 BCE
New Kingdom	1550 – 1070/69 BCE
18th Dynasty	1550 – 1292 BCE
Tuthmosis III	1479 – 1425 BCE
Akhenaten	1351 – 1334 BCE
19th Dynasty	1292 – 1186/85 BCE
20th Dynysty	1186 – 1070/69 BCE
Third Intermediate Period	1070/69 – 714 BCE
Late Period	746 – 332 BCE
Ptolemaic Period	332 – 30 BCE
Roman Period	30 BCE – CE 313

(Schulz and Seidel 1998:528)

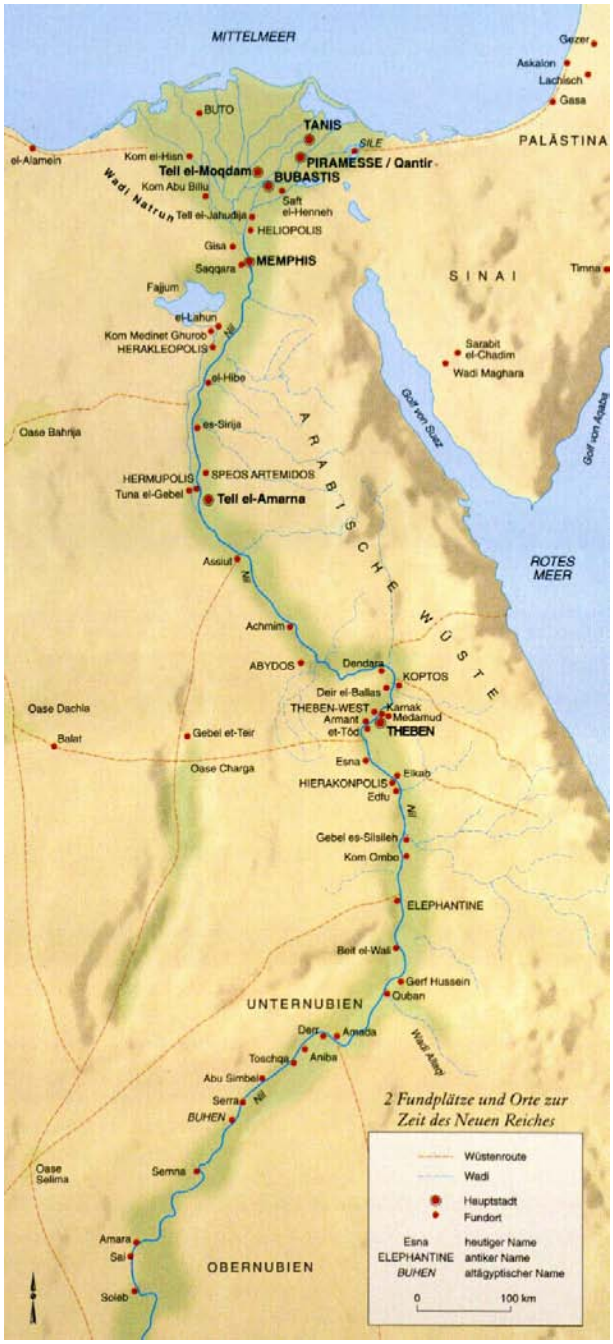


Figure 1 Map of Egypt (Schulz und Seidel 2010: 143)

Introduction

The BA thesis is concerned with the technical examination and restoration history of an 18th Dynasty sandstone naos from Elkab in southern Upper Egypt, bearing the cartouches of the pharaoh Tuthmosis III (1479 – 1425 BCE) which belongs to the Egyptian collection of the Fitzwilliam Museum, University of Cambridge (Figure 2 and 3). It was received in 1902 from the architect and excavator Somers Clarke FSA (1841 – 1926) and was subject to two restoration campaigns in the early years of the 20th century and 1969. The thesis discusses briefly also possible future treatment of the naos.

The naos is an upright rectangular hollowed out sandstone box with an opening to one side. It has a base and the actual box, both from different types of sandstone. There is carved and painted decoration (the pharaoh with various gods) and text on the external surfaces. It would have contained a cult image.

The full height of the object is 1.57 m. At the base the naos is 0.73 m wide and 0.79 m deep. It sits on a square 0.37 m high wooden mount in the gallery.

Three single small fragments, two from the cavetto cornice and one from the roof are also in the Museum's posession. The piece from the roof connects to the front of the naos' roof.

Information about the naos appears in the following publications in chronological order: Clarke, S. 1922 'El-Kâb and its Temples' *The Journal of Egyptian Archaeology* 8: 32, Capart, J. 1937 'Les Fouilles d'El Kab' *Chronique d'Egypt* Bruexelles and Porter, B. and Moss, R.L.B. 1962 *Topographical bibliography of ancient Egyptian hieroglyphic texts, reliefs and paintings. Upper Egypt: sites (Deir Rîfa to Aswân, excluding Thebes and the temples of Abydos, Dendera, Esna, Edfu, Kôm Ombo and Philae)* Oxford, Griffith Institute 5: 173.

Figure 2 The naos E.40.1902, front, full height 1.57 m © FM

Figure 3 The naos E.40.1902, back, base 0.73 x 0.79 m © FM

The Fitzwilliam Museum's Egyptian collection: its development and current display

Shortly after the Museum's foundation in 1816, the initial collection of manuscripts and old master paintings was augmented by Egyptian artefacts. But until the late 19th century Egyptian objects remained few, miscellaneous and often without provenance. So far, the Museum had mainly received objects such as the Third Intermediate Period coffins of Nespawershefyt from benefactors who were affiliated with the University of Cambridge. From the 1890s, there was a more systematic approach to the exploration of Egyptian antiquity and excavations conducted by new organisations such as the Egypt Exploration Fund were funded by universities and museums (such as the Fitzwilliam), which received a portion of the excavated objects in return (Dawson, personal communication, 2013). Collecting items with a known context from documented excavations and wishing for a collection that represents the history of Egypt without gaps, the collection in Cambridge slowly became larger (FM 2013).

Around 1901 it became apparent that the growing Egyptian collection should be allocated its own galleries and two consecutive rooms on the Museum's ground floor were chosen. Showcases were purchased and the objects presented in a chronological order.

The Egyptian galleries were refurbished in the late 1960s with the display being arranged from an art historical perspective (Ashton, personal communication, 2013). The objects, in particular the naos, had received restoration treatment (Annual Report 1969: 6) prior to the re-opening in 1970. New showcases, which were also used as a storage facility, were built along the gallery walls (FM 2013). By that time the two Egyptian galleries had been named after benefactors who had bequeathed their collections to the museum: Gayer-Anderson Room, room 20 at the West end of the building and Greg Room, room 19 at the East end (FM 2013).

The next re-modelling of the Egyptian Rooms took place between 2004 and 2006. The larger gallery, the Greg Room, has been divided into two sections with the windows being blocked off in the East section for the most light sensitive objects that also represent appropriately death and funeral customs (FM 2013). The other half of the room is dedicated to religion and daily life (FM 2013).

The Gayer-Anderson Room houses inorganic artefacts illustrating the role of the king and the social structure of ancient Egypyt, amongst them the naos. It is placed on a 0.37 m high wooden mount freestanding in the gallery. No work was undertaken on the naos as part of the 2004 – 2006 refurbishment, but questions have now arisen about its condition and the state and desirability of the extensive restorations that were undertaken in the late 1960s.

The acquisition of the naos

The Fitzwilliam Museum's Annual Report from 1905 mentions that 'fragments of a stone shrine received from Egypt in 1903 have been pieced together and set up in the new Egyptian Room'. Three undated black and white photographs, now at the Griffith Institute in Oxford, exist, which show the 'pieced together' naos from three sides in the new gallery.

Somers Clarke documented the excavation of the naos in his notebook (Clarke F 1895: 144-148). Between 16 January 1895 (Clarke 1922: 20) and 28 January 1895 (Clarke F 1895: 148) the naos was found and unearthed. Years later, in 1904, he came back to this notebook F and added on p. 146 'Jan. 1904 Now at the Fitzwilliam Cambridge. went [sic] there in 1902'.

Somers Clarke had no obvious connection to the University. Still, about two dozen finds from Elkab are attributed to him in the Museum's catalogues. In 1902, when Clarke presented the naos to the Musuem, F.W. Green who had helped setting up the New Egyptian Room, had been working at the Museum for some time. Both had previously excavated in Elkab together and Green drew the first comprehensive 'good map' (Clarke 1922: 16, Figure 4) of Elkab in 1896, which was published in Somers Clarke's article *Elkab and Its Temples* in 1922. Somers Clarke's connection to the Museum surely came about through F.W. Green.

Somers Clarke was an English architect and archaeologist born in 1841. After having worked for St Paul's and Chichester Cathedral in his capacity as an architect, he moved to Egypt in 1902, built himself a large mud brick house 3 km upstream from Elkab and lived there for almost 20 years until his death in 1926. But, already in 1893 he had begun exploring Elkab regularly and continued his work there and on other sites in Egypt and Sudan after making Egypt his

home (Bierbier 2012: 124).

The archaeological context of the naos's discovery: Elkab

Elkab is an ancient city on the east bank of the river Nile in Upper Egypt between Thebes and Aswan (Figure 4). The historic name of Elkab is Nekheb which relates to the name of the vulture goddess Nekhbet. Nekhbet is not only the local goddess of Elkab but also the tutelary deity of Upper Egypt (Limme 2001: 468).

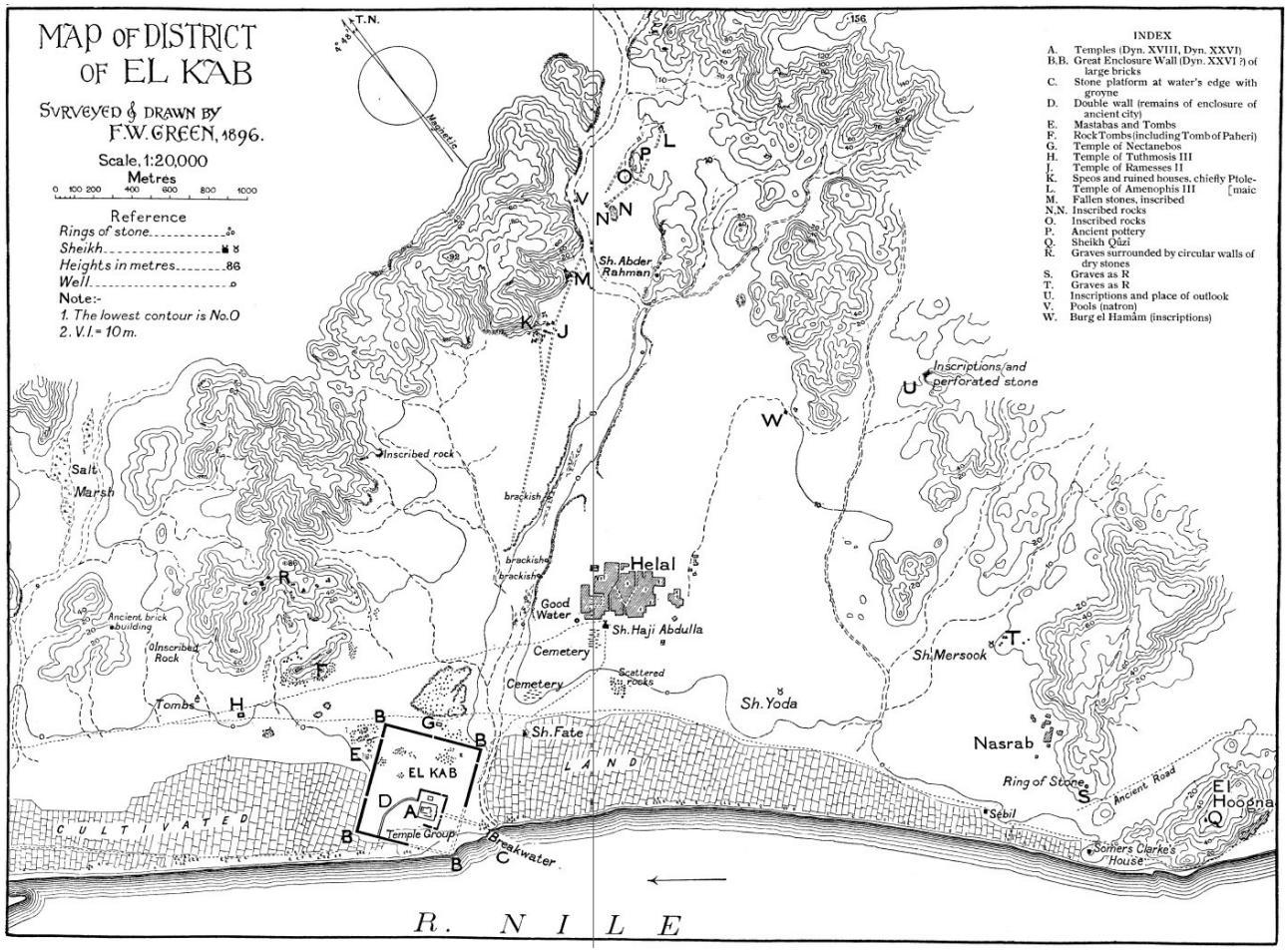


Figure 4 The 'good map' (Clarke 1922: Plate IV)

Elkab had been a settlement from prehistoric to Graeco-Roman times. Its main feature is an enormous, mud brick wall which is called the Great Wall (Clarke 1921: 56) to avoid confusion with other mud brick walls on site. It is approximately 520 x 590 m (Limme 2008: 16) and dated between 500 – 350 BCE (Hendrickx 2010: 154). Within the Great Wall is the Temple Enclosure (Clarke 1921: 56) with a temple district and a sacred lake, remains of a Graeco-Roman village and burial grounds from different epochs (Figure 5). In the alluvial plain north and east of the wall and in the sandstone hills are temples, mastaba, mud brick and rock tombs from various dynasties (Limme 2001: 468).

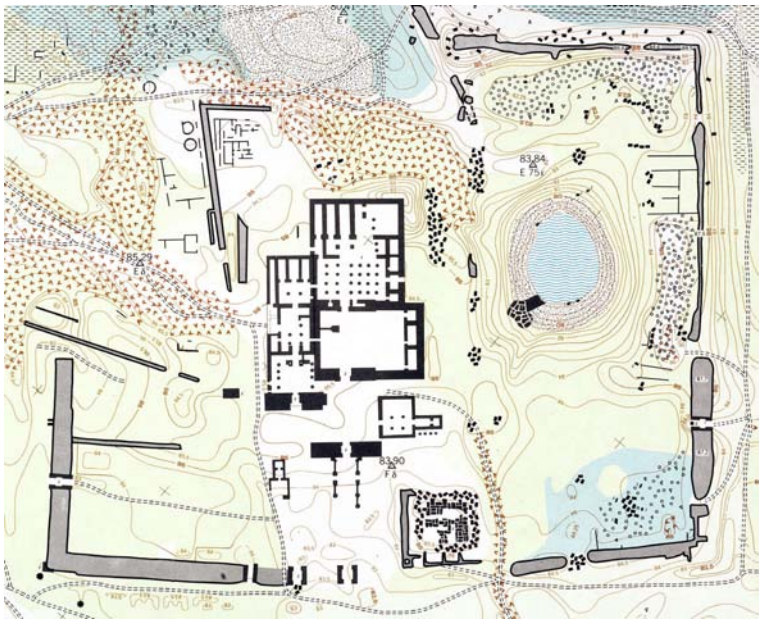


Figure 5 Topographical map of Elkab (Limme 2008: 32)

The first known European traveller came to Elkab in 1841 (Hendrickx 2010: 147). In the late 19th and early 20th centuries the site was excavated almost exclusively by British archaeologists, most notably Somers Clarke who first seems to have come to Elkab in 1893 (Bierbier 2012: 124). They were followed by Belgian archaeologists in 1937 (Limme 2008: 16). Today, Elkab is still of interest for international expeditions.

The naos was found in the Temple Enclosure where the temples range from the 18th Dynasty to the 30th Dynasty, with the ruins of two large temples, one from the reign of Ramesses II and a Late Period temple dedicated to Nekhbet, remaining (Limme 2001: 468). Two temples were allocated to Tuthmosis III (1479 – 1425 BCE) whose cartouche is on the naos. One is Northeast of the Temple Enclosure and approximately 1 km away from the find spot of the naos. Somers Clarke writes:

> To the north at H are the remains of a small peripteral temple of Tuthmosis III which was destroyed so recently as in the first quarter of the nineteenth century. (Clarke 1922: 17)

The other temple of Tuthmosis III was within the Temple Enclosure but only marginal ruins remain (Clarke 1922: 17) because the building stones were used for foundations of later temples (Clarke 1922: 31 and 32).

When Somers Clarke and his team were digging in the area of one of the gateways of the Temple Enclosure in January 1895 they came across the naos. In his article *Elkab and Its Temples* he writes:

> Passing through the gateway towards the temple we found immediately inside it on the east, the remains of a small shrine of stone. It was placed only 0.25 [sic] from the stone work of the door jamb and looked west, so that its door faced those who passed by. Upon it was the cartouche of Tuthmosis III. (Clarke 1922: 32, Fig. 6)

Figure 6 Cartouche of Tuthmosis III. Detail from notebook F © GI

His notebooks give a more detailed account as to the state of the object. At first it seemed to Somers Clarke that only a stump of a sculpted object was found:

> The second days digging reveals a piece of stone lying in the earth at the foot of the block (Figure 7). This proved to be the top & [sic] the whole forms a very tall niche or shrine-opening, to the west, a winged disk over the middle of the opening & the whole surmounted by the regulation … [not legible] cornice: It has all been painted. (Clarke F 1895: 145)

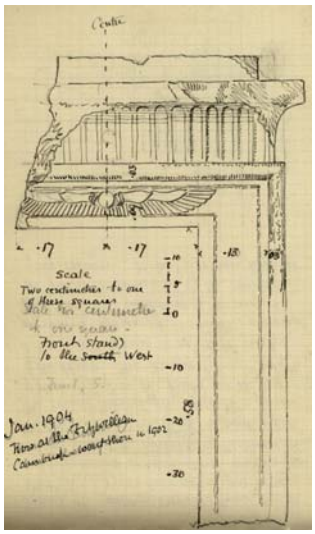


Figure 7 Detail from notebook F © GI

Besides mentioning that the naos was painted, although not to what extent, nor elaborating on the colours, he also writes that the back of it was 'rough tooled' (Clarke F 1895: 145).

The dug up object was covered again, possibly because it was the end of the digging season (Dawson, personal communication, 2013) and re-excavated one year later:

> January 30'.96. Opened the ground & dug out the little shrine on the west side of the gateway in the enclosure wall of the Temple which corresponds with the central axis of by Temple. The shrine is terribly cracked but it is [in] just the same state as when I buried it last year. Immediately we unearthed it, we took it to pieces, having marked all the broken pieces, & transported it except the base to my little house. (Clarke G 1896: 149)

The large single fragment that was laying in the ground in the front of the stump still bears the number '4'. The sketches, especially in notebook G, seem to give a clue to what had remained 'on the stump' (Figure 8). Many more small, single fragments notably on the rhs were never sketched nor mentionend. Several obvious cracks on the back and on the rhs were not marked on the sketches either (Clarke G 1896: 148 and 159). But, Somers Clarke was a meticulous observer and therefore it is likely that the cracks were not apparent when he sketched it. Then, again, it seems strange that he did not elaborate on the fact that the naos was not monolithic. He writes about the 'base' (Clarke G 1896: 149) or marks his sketches with 'Base stone' and 'Base of sentry box' or notes 'stone slab' on the drawing (Clarke F 1895: 148, Figure 9) but this does not necessarily mean the base is an independent stone base. On his cardboard ink and watercolour drawings (Clarke 42 and 43) he does not make it apparent, either (Figure 12). On the other hand he draws features of the base, like the missing rhs back corner, the exact measurements, the sunk rectangular field or the state of the torus moulding which immediately identify it as the actual base.

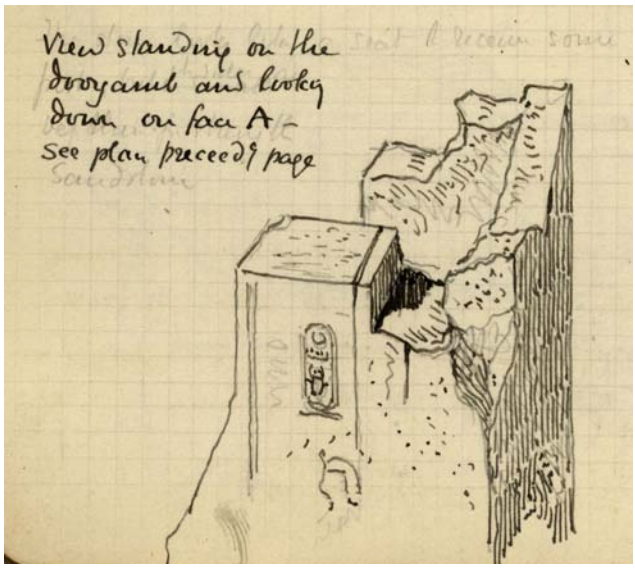


Figure 8 The 'stump'. Detail from notebook F © GI

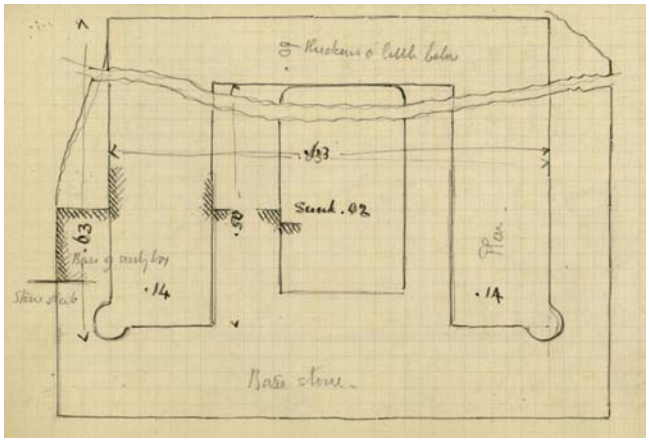
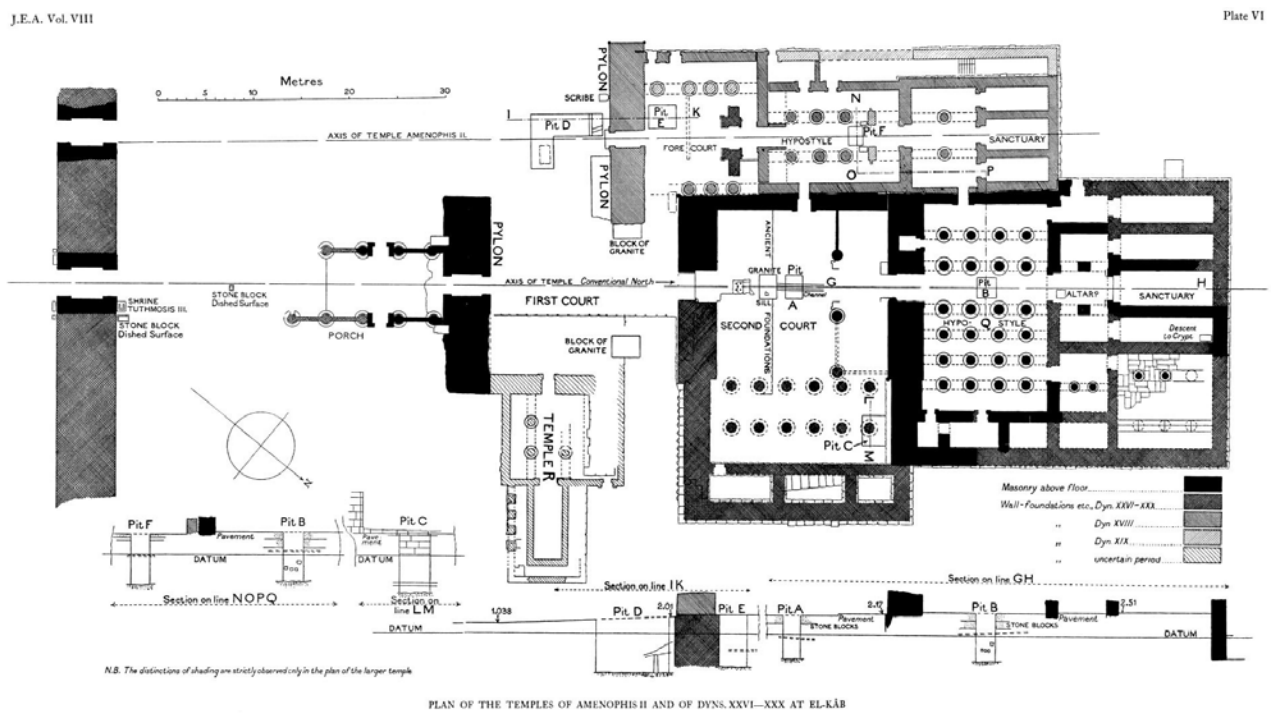


Figure 9 The base. Detail from notebook F © GI

The situation of the naos' find spot is documented not only in Clarke's notebooks but also on his comprehensive *Plan of the Temples of Amenophis II and of Dyns. XXXVI – XXX at El-kab* (Clarke 1922: Plate VI, Figure 10) of the Temple Enclosure. It was placed very close to the Enclosure wall which is dated to the same period as the Great Wall (Hendrickx 2010: 159) and made it impossible to see the scene on the rhs:

> On the E. side of the sentry box it is most difficult to see quite perfectly & still more to draw the figures, as the jamb of the great doorway is very close to the sculpture. only [sic] .25 removed. (Clarke F 1895: 144)



PLAN OF THE TEMPLES OF AMENOPHIS II AND OF DYNS. XXVI—XXX AT EL-KÂB

Figure 10 Temple of Amenophis II in *Elkab and its Temples* (Clarke 1922: Plate VI)

The 'rough tooled' back was exposed and 'immediately behind the shrine is a little square paved place' (Clarke G 1896: 149) and a 'square stone trough' (Clarke 1922: 32).

The naos would undoubtedly have been situated within the inner sanctuary of a temple (Arnold 2009: 158 and Wildung: 1980) and might have been cleared out and discarded at that spot which was a usual practice in Egypt and similar to the re-use of building blocks (Ashton, personal communication, 2013). At the moment it cannot be said with certainty which temple it belonged to and when it was placed at its find spot.

It was certainly accessible while the pharaoh Akhenaten was in power (1351 – 1334 BCE) because the gods were defaced, a comon practice during Akhenaten's monotheistic reign. Later attempts were made to disguise the vandalism and hieoglyphs were recut.

The naos

A naos is a cult shrine, which houses the cult statue, in the inner sanctum of a temple. Its form is derived from the chapels of upper Egypt with perpendicular walls and a hunched roof, and lower Egypt with sloping walls, toros moulding and carvetto cornice (Wildung 1980), but the shape varies throughout the centuries (Arnold 2009 and Roeder 1914). The usual height of 0.50 – 0.60 m of the cult statue would have dictated the height of the naos (Wildung 1980) but from the Late Period it became common to house a naos in a naos etc. resulting in naoi of monumental hight up to 7 m (Wildung 1980). Usually a naos would have had a double winged door that was only opened for specific rituals. In

the Early Dynastic Period naoi were made of perishable materials (Arnold 2009). Stone naoi are made from both, hard and soft stones but faience naoi exist also (Roeder 1914).

Description and measurements

The sandstone naos E.40.1902 is a rectangular upright structure with an opening on the front. Although most stone naoi seem to be monolithic (Roeder 1914) this one has a base made from a different sandstone. The base is essentially an almost square plinth with the rear and both side walls and torus moldings at each outer front corner rising up 0.20 m in height, flattened and levelled along its top. The main box sits exactly on the wall foundations of the base. It is crowned with a cavetto cornice above a horizontal torus moulding and at least along the two corners at the front seemed to have been torus mouldings too. From what is left of the roof it seems that it was flat and sloping down towards the back of the naos in a slight angle of approximately 10°. Somers Clarke drew the naos with a flat levelled roof. Both sides and the existing rh door jamb at the front are ornamented in high relief. The back was left in a rough stage, so was the interior. Only the floor was flattened and a rectangular field sunk in its centre.
The surface and state of the stone along the inside of the opening suggests that the naos had not a double winged door or any door at all. The stone only bears traces of surface dressing and nothing indicates a hole or depression for hinges. But contrary to the accepted definition of naoi (Wildung 1980 and Arnold 2009), observation in the field shows that they did not necessarily have doors (Ashton, personal communication, 2013).

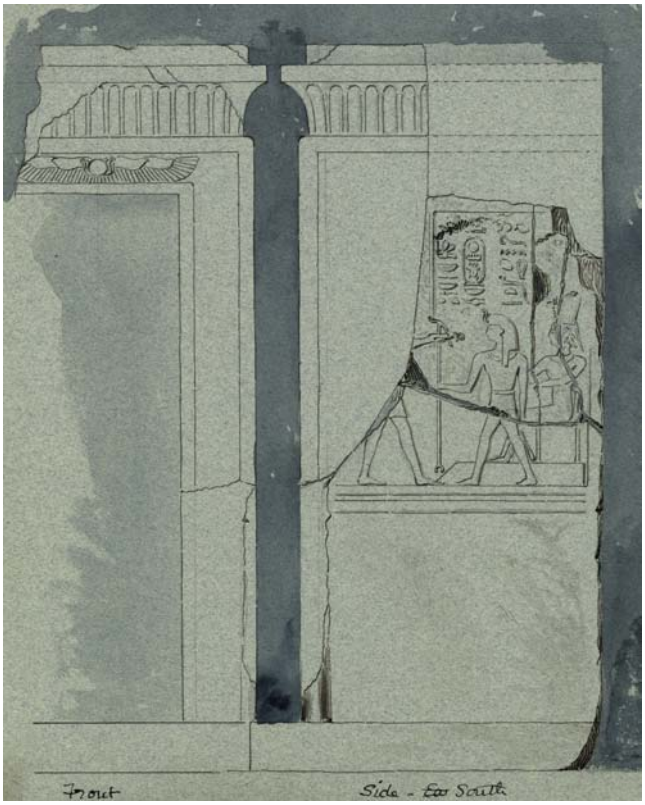


Figure 11 Detail of drawing 42 © GI

Somers Clarke sketched and meassured the naos when he excavated it.

The base features in notebook F twice (Clarke F 1895: 143 and 148), in notebook G once (Clarke G 1896: 150) and it was drawn again on blue cardbord with ink and water colour (Clarke 44, Figure 12). The most detailed and accurate measurements are on page 148 in notebook F. The base is 0.73 m x 0.79 m and the actual three walled naos structure forms a square of 0.63 m x 0.63 m. In his drawings (Clarke F 1895: 148 and Clarke 44) of the base it is obvious that the rh back corner and a substantial part of the lh side, towards the back, were missing. Today the whole length of the lhs of the base has been lost and was already lost when the first images of the naos were taken. The width of the three walls is approximately 0.14 m thick all the way round. The opening of the naos measures 0.35 m and it is 0.50 m deep. The field that is sunk into the floor by 0.02 m is 0.20 m x 0.43 m.

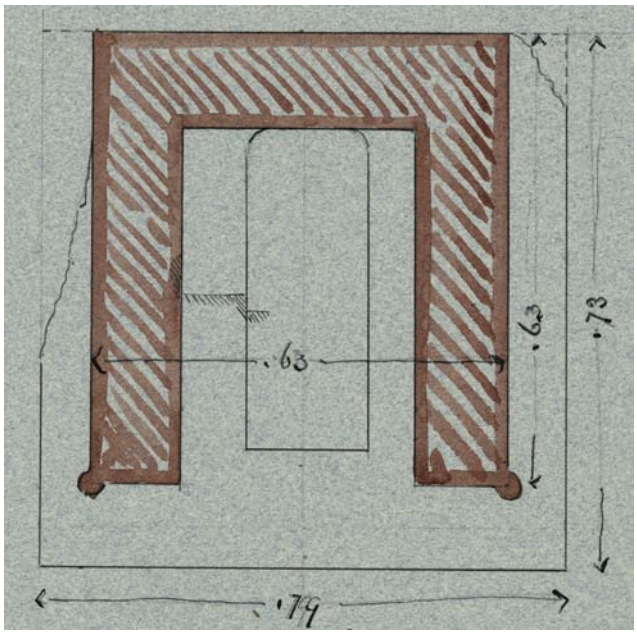


Figure 12 Detail of drawing 44 © GI

Although Somers Clarke is meticulous, the measurements for the height are difficult to comprehend (Clarke 43). At the excavation he would not have been able to measure the height properly since the naos had only remained as a 'stump' in the ground and the large front fragment was laying detached from it (Clarke F 1895: 145 and 147). The 1.0 m he allocates to the full height of the naos has to refer to the opening (Figure 13). From the floor of the base to the top of the roof the naos measures 1.43 m. As to the height of the base one can only guess that it must have been 0.14 m or more. Somers Clarke meassured 0.10 m (Clarke 43).

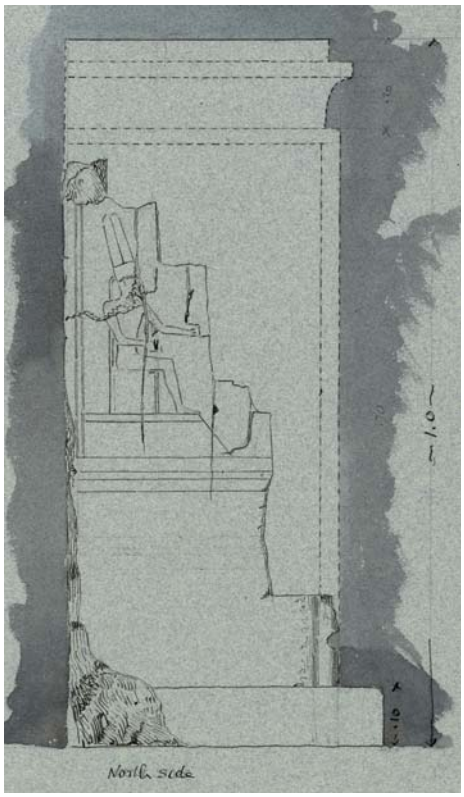


Figure 13 Detail of drawing 43 © GI

Text and images

Above the opening of the naos there is a winged sun disc and the remaining door jamb bears an inscription. On the lhs is a scene with the pharaoh Tuthmosis III offering nw-pots to the god Amun Ra and on the rhs Tuthmosis III receives life from the god Horus and protection from the goddess Nekhbet. Above both scenes are inscriptions.
The scenes on both sides of the naos have the same design and size. They are surrounded by a block border and a register line along the bottom of the scene. Above the rhs scene is a pt-sign, the hieroglyph for sky (Strudwick, personal communication, 2013). Most likely it was supposed to be also above the scene on the lhs but the restorers from 1969 interpreted the carved broad band on the two remaining fragments from this part of the scene as part of the block border and did not remodel the pt-sign.

Left hand side

The scene shows the god Amun Ra, the local deity of Thebes, sitting on a cuboid throne on the hieroglyph maa (Figure 14). He faces the front of the naos and receives nw-pots as offerings from the standing Tuthmosis III. The god wears the double feathered crown. He has a curved beard, a broad collar round his neck and wears a kilt. In his right hand he holds the ankh-sign, the symbol for life, in the other a sceptre. The area around the top end of the sceptre, which would indicate the type, is hollowed out either by re-dressing of the previously damaged surface or by wear from repeated touching. The god's figure was vandalised with a pointed tool and later recut resulting in a slightly flatter carving than the rest of the relief. Tuthmosis III wears a wig with urai. Urai are cobras symbolising power and protecting the

pharaoe. He also has a broad collar and a triangular kilt with sporran and urai. In the right hand corner above the king the wings of the vulture goddess Nekhbet are still visible.

The text above the god reads: *(Words spoken by) Amun Ra, Lord of the thrones of two lands, [not legible] I give to you [not legible]* (Strudwick, personal communication, 2013). Imn-ra nb nswt tAwy /// di.n n.k /// (FM CE 2013). An indiscernable hieroglyph is commonly marked with /// in the transcription.

The text above the pharaoh reads: *Nekhbet, the good god, Menkheperre, son of the sun, Tuthmosis, given life and his generosity like Ra forever* (Strudwick, personal communication, 2013). Nxbt nTr nfr mn-xpr-ra sA ra DHwty-ms di anx nb Aw ib.f mi ra Dt (FM CE 2013). A pharaoh has five names, two of which would appear as cartouches and which are on the naos. In Tuthmosis III case one cartouche would be the nomen 'Tuthmosis', the other cartouche would be his pronomen 'Menkheperre'.

Figure 14 Scene lhs © FM

Right hand side

On this side, the goddess Nekhbet sits on a cuboid throne (Figure 15). She faces the front of the naos. The throne is again placed on the hieroglyph maa. In front of her stands the king who also faces the front of the naos. The goddess' left hand rests on the king's left shoulder whereas her right arm embraces his body. The falcon-headed god Horus faces both of them.

Nekhbet wears the white crown of Upper Egypt and a head dress with her intrinsic symbol - the vulture. She is attired with a broad collar and a long dress. The goddess Nehkbet was called 'the White' as in the 'white crown' which is the crown of upper Egypt. Her carving suffered the same fate as Amun Ra's.

Tuthmosis III has a wig with urai, a broad collar but on this side he wears the shendyet kilt.

Horus' falcon head is defaced. He wears the double crown, a wig with lappets, a broad collar and a kilt. In his hands he holds the ankh-sign and the was-scepter, a symbol of power which the gods would hand over to the pharaoes. Horus and Tuthmosis III are both depicted with tails.

In the centre of the hieroglyphs above the scene is a sun disc with urai.

The text above the god reads: *Words spoken by Horus of Behdet (Edfu) I have given you life and dominion like Ra* (Strudwick, personal communication, 2013). Dd mdw in Hr bHdt(y) di.n n.k anx wAs mi ra (FM CE 2013).

'Behdet' is the name for the town Edfu. Horus was the main deity of Edfu, south of Elkab, but also of Hierakonpolis which is opposite of Elkab on the west bank of the river Nile.

The text above the goddess reads: *Words spoken by Nehkbet [not legible] the throne of Horus [not legible] like Ra* (Strudwick, personal communication, 2013). Nxbt mn xa /// Hr /// st mi ra (FM CE 2013).

The text above the pharaoh reads: *Behdety, king of upper and lower Egypt, lord of the two lands, lord of the cults, Menkheperre, lord of the might, chosen one of Ra, like Ra, forever* (Strudwick, personal communication, 2013). bHdt(y) nsw bit nb tAwy nb ir xt mn-xpr-ra nb xpS stp n ra mi ra Dt (FM CE 2013).

Figure 15 Scene rhs © FM

Front

The inscription on the door jamb translates as: *Behdety, the good god, lord of the two lands, Menkheperre, son of the sun, Tuthmosis, beloved of Nekhbet the White, given life forever* (Strudwick, personal communication, 2013). bHdt(y) nTr nfr nb tAwy mn-xpr-ra sA ra DHwty-ms mry nxbt HDt di anx Dt (FM CE 2013). The hieroglyphs for the goddess Nekhbet were once removed and later recut.

During the period of its use, the naos would have contained a statue, probably of the goddess Nekhbet, possibly even with Tuthmosis III in front of her, under her protection (Strudwick, personal communication, 2013).

The material: sandstone and sandstone carving

Sandstone

An investigation of the materials has established that the base and the upper part of the naos are of two different sandstones. Where exactly they were quarried is, at the moment, not possible to say. In the absence of thin sections, both stones were visually examined. Additionally a dispersion sample of the upper part was taken and it was also tested for a reaction with 25 % hydrochloric acid. The upper part has a small break edge on the rhs on the top along the back which shows an off-white fine grained sandstone. It is occasionally interspersed with black accessory minerals and has no obvious stratification (Figure 16). A dispersion sample of the stone shows not very well rounded quartz grains and it does not react with 25 % hydrochloric acid, which suggests silica as the binding medium.

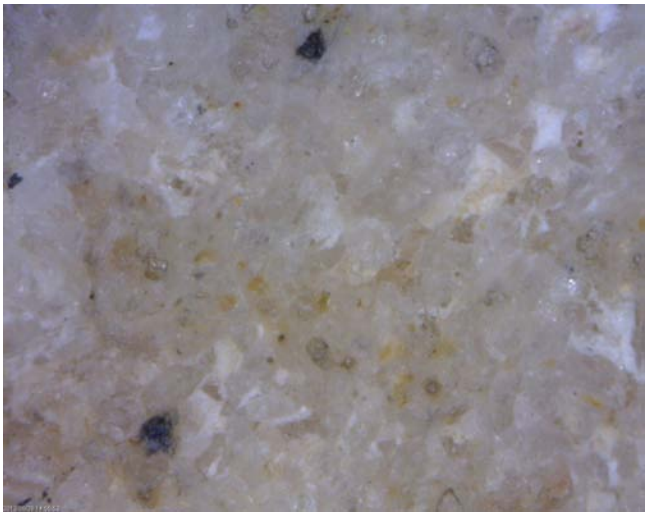


Figure 16 Sandstone top, magnification x 210 Dinolite image

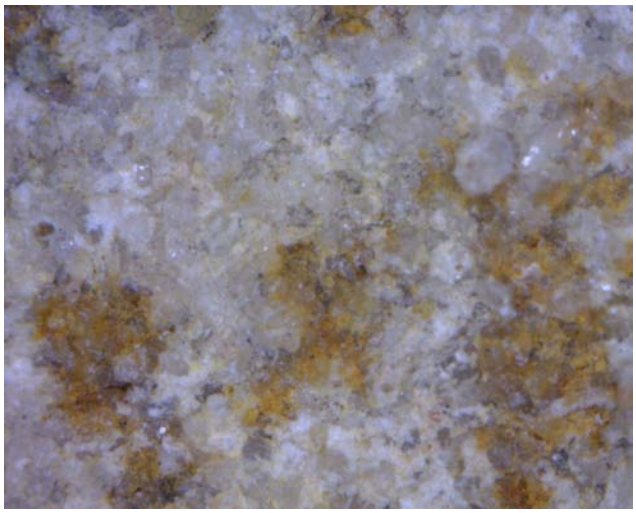


Figure 17 Sandstone base, magnification x 210 Dinolite image

The base is a buff to grey coloured sandstone. It has larger grains in comparison to the other stone, with large spots of iron-staining, often referred to as limonite $FeO(OH)_2$ (Klemm and Klemm 2008: 168) which gives the stone a speckled appearance (Figure 17). The stone shows exfoliation along its bedding plane which is interspersed by ellipsoid iron rich

argillaceous lenses. The delamination indicates weakened bedding planes that might result from thin bands of clay within the stone (Muir 2006: 202).

These general characteristics are found in sandstones from the region around Elkab and further south (Klemm and Klemm 2008: 168) and they '...are stratigraphically assigned to the Duwi Formation of the Upper Campanian stage with fine- to medium-grained cross-laminated sandstone' (Klemm and Klemm 2008: 168).

In ancient times the area around Elkab was heavily quarried (Klemm and Klemm 2008: 169) and Somers Clarke writes that Elkab 'stood in the wide mouth of a valley, the plain being enclosed on the north and south by ranges of rugged sandstone hills' (Clarke 1922: 17). He further writes about the stone that 'the sandstone of which the temples were built was quarried for the most part from the neighbouring hills. It is a miserably weak stuff …' (Clarke 1922: 20).

But, neither sandstone matches exactly any of the samples of the Klemm Collection (now held by the British Museum) from Elkab or Hierakonpolis which is opposite Elkab on the West bank of the Nile. On the other hand, they do not differ greatly either which makes it almost impossible to find a match on the basis of macroscopic examination (Klemm and Klemm 2008: 168). Still, it is not impossible that both sandstones come from a different quarrying region, because later in *Elkab and its Temples* Somers Clarke suggests, in connection to the temple that was built by Tuthmosis III within the Temple Enclosure, that 'the stone made use of by Tuthmosis III is altogether superior and very probably comes from elsewhere' (Clarke 1922: 29). Lucas does not doubt Clarke's suggestion either (Lucas 1948: 72).

Since almost all stone naoi (Roeder 1914) are monolithic and the naos is made of two different sandstones, it gives rise to the speculation that this naos is a case of ancient anastylosis. But at the moment the only argument to support this theory is that the sandstones are different and more investigation into the site, the excavation, the practice of anastylosis during Tuthmosis III and throughout the Pharaonic times and the practice of discarding architectural objects relating to rituals would be necessary.

On the other hand, both parts seem to be 'made to fit' (Figure 18). The joint in the interior illustrates that there is hardly a gap between both stones and they are perfectly lined up. Each plane seems to have been worked to almost perfect trueness previously as the early black and white photographs of the naos' front and lhs reveal.

Whether the whole naos was covered with a preparation layer to make it appear uniform has yet to be established.

Figure 18 Perfectly dressed ashlars, detail front naos b/w image © GI

Masonry and carving

The naos offers a comprehensive guide into the stages of stone working practice.

The back, as Somers Clarke observes, is 'rough tooled' (Figure 19). All marks seem to come from the same tool, a 15 mm flat metal chisel. In some areas, the marks suggest a slightly bull-nose shaped tool. In the centre are two large depressions in the stone where rock became detached by a large heavy blow or has come off naturally due to a fault in the rock.

Figure 19 The 'rough tooled' back in raking light

The marks are certainly from a chisel, very likely a metal chisel, that was driven by a wooden mallet (Figure 22). The chisel would be placed on the stone and with every mallet-blow it advances further, shaving/chipping off a tiny amount of rock. It springs back slightly leaving a dent in the stone. For a few strokes the mason would advance in one line and then place the chisel next to the previous line. Copper tools like chisels, adzes and axes and also saws that were made of smelted copper, cast and beaten into shape appear for the first time around 3600 – 3200 BCE (Stocks 2003: 12). By the time of the New Kingdom bronze chisels with varying amounts of tin had been established (Stocks 2003: 57). Two basic types of copper chisel would have been in use: the 'flat' chisel, a chisel that has its cutting edge along its maximum width dimension (Stocks 2003: 242) and the 'crosscut' chisel (Figure 20), that has its cutting edge at the right angles to its maximum width dimension (Stocks 2003: 241). The 'flat' type chisel would have been hammered into a flat double

tapering section (Stocks: 2003: 28). It is possible to establish the approximate width of a chisel used on the naos but not whether it was double tapered or not. A slightly bull-nose shaped chisel (Figure 21) seems to have been used, too, although the round marks could also be a sign of wear. Copper and leaded bronze chisels would have suffered immediate bluntness and constant re-sharpening was necessary (Stocks 2003: 64).

Figure 20 Copper alloy chisel, 0.15 m, ca. 3000 - 2890 BCE, E.7a.1926 © FM

Figure 21 Copper alloy chisel, 0.10 m, ca. 3000 - 2890 BCE, E.7b.1926 © FM

Figure 22 Wodden mallet, ca. 1550 – 1069 BCE, E.GA.4556.1943 © FM

The base seems to have been worked with the same type of flat chisel, but the single strokes were placed further apart. The whole naos would have been prepared to the rough-tooled stage of the back. In many areas one can still observe these chisel marks under the more advanced surface dressing (Figure 23).

Figure 23 Detail rhs toolmarks

Parts of the naos that required a flatter, smoother surface, like both sides, the front and the interior floor, were dressed with a slightly wider flat chisel. Observable are sharp, flat chisel marks of 20 – 25 mm width and marks that measure 30 – 35 mm. In many areas, such as at the base and in the interior, this stage would have been a sufficient state of masonry. Although the naos does not seem to be 'finished' in many areas, one should keep in mind that the ancient Egyptians did not necessarily have the concept of 'finished'/'unfinished' in the sense of perfection. Egyptian craftsmanship is fulfilled once the intended object is functional and there is no abandonment of an unfinished object, even if it looks like it from a modern perspective. Egyptian objects are not art, they carry a meaning and fulfil1 a purpose (Ashton, personal communication, 2013).

Both sides that were to be ornamented with hieroglyphs and scenes and the door jambs required further treatment in order to get a smooth surface for laying out the design. Any abrasive material from sand, wet and dry, to pumice and other coarse stones would have been in use. Although it does not seem to have been the objective to eradicate all tool marks from the previous process, the abrasive action hardly leaves any marks itself which suggests grinding with a coarse grain first and advancing to a fine grained material. Only in the area between Tuthmosis III and Nekhbet's head

are marks, like scratches, visible (Figure 24). Furthermore it does not seem to be of importance to have the surface of the sides worked to absolute trueness.

Figure 24 Detail rhs, grinding marks and traces of vandalism

The hieroglyphs and the scenes are carved in high relief which indicates that the naos was positioned indoors. A sunk relief has sharp shadows in the sunlight and is therefore more suited for the exterior, whereas bright sunlight would flatten raised relief (Robins 1994: 26).

To achieve an even layout the Egyptian craftsperson employs a squared grid on paintings but also on relief carvings (Robins 1994: 23). Egyptian images, in particular the depiction of the human, follow a strict rule of proportion which changes only slightly throughout Pharaonic times. A standing human figure in the New Kingdom would always be divided into 18 sections of the same distance from the soles of the feet to the eyeline, sometimes extending the grid to a 19th horizontal line along the hairline. A seated figure would be divided into '14 squares between the baseline and the hairline' (Robins 1994: 94). The width of a figure's shoulders is determined by the vertical lines of the grid (Robins 1994: 94). The standing figures on both sides are 0.40 m high and the seated figure is raised to reach the height of the standing figures heads.

To mark out the grid, usually a taut string bearing red paint would be snapped against the wall and sometimes a straight edge was used. Horizontal lines were marked by measuring and marking off the desired intervals at the edges of the image (Robins 1994) but the grids were not always 100 % square. To sum up the Ancient Egyptian craftsmanship, Robins writes concerning the squared grid that:

> Rather than assuming that artists were slipshod and lax, we should accept that absolute precision was not regarded as necessary to the effective functioning of grids. (Robins 2001: 60)

This statement is certainly true for the masonry employed on the naos, too. The masonry functioned well without being absolutly true or having all tool marks eradicated. There is precision where it is needed, for example the horizontal joint

of naos base and the upper part. This also underlines Ashton's statement about the functional requirements of Egyptian craftsmanship.

The actual carving of the hieroglyphs and the figure do not reveal much. Once the signs and figures were drawn onto the ground surface, the stone along the outlines was removed and the whole background set back by approximately 3 mm. How the background was set back can hardly be established but it was certainly well abraded, leaving no tool marks or scratches. The creases on the kilts and the interior lines of the figures were scratched into the surface. Stocks suggests that throughout ancient Egyptian history flint was always been in use for carving too (Stocks 2003: 65) and it could have been used on the relief undoubtedly.

The lines along the block border are scratched rather than cut but on the cavetto cornice the dividing lines are v-shaped with a sharp edge which is ideally achieved with a flat chisel.

The gods Nekhbet, Amun Ra and Horus and Nekhbet's name on the door jamb were vandalised with a sharp pointed device. Nekhbet's name and her figure seem to be the only destructions that someone tried to mend or mellow, by abrading and re-cutting the outlines of the hieroglyphs and the outlines of her upper body. The carving of the goddess is slightly set back, approximately 1 mm, and therefore flatter than the other two figures on that side.

Figure 25 Egyptian mason happily chipping away. Ostracon, E.GA.4324a1943 © FM

Polychromy

When the naos was excavated, Somers Clarke noted that it had been painted (Clarke F 1895: 145). Today, only a few traces of colour can be detected: red, yellow and blue.

The register line consists of two bands. On the rhs the lower one is yellow and the upper one red. On the lhs the counterpart shows traces of red too but no yellow is obvious where it could be expected judging from the opposite side. More red is to be found on Tuthmosis III's face and body on both sides and on Horus' legs. Some of the leaves of the cavetto cornice bear traces of red, too.

In very few areas blue is detectable. On the lhs it is visible on a leaf of the cavetto cornice, along the bottom of the maa

sign, on the rhs it is again along the deity's maa sign.

Blue

The remains of the blue have been identified as Egyptian Blue with the help of the visible induced luminesence (VIL)[1] imaging technique and indeed more than the obvious traces have been detected with the aid of this technique. This method of examination was introduced by Giovanni Verri (Verri 2008) as a non-invasive way to identify Egyptian blue on cultural heritage objects.

Egyptian blue is one of the first synthetic pigments which was used in Egypt from around 2500 BCE until after the Roman period and its chemical composition is similar to the rare natural mineral cuprorivaite, $CaCuSi_4O_{10}$ (Accorsi 2009: 3392). It is produced by heating together a calcium compound, a copper-containing compound, silica sand and soda or potash as a flux at 850 – 1000° C (Accorsi 2009: 3392). The resulting frit is then ground. Often Egyptian Blue is darker than the pigment that remains on the naos, but the finer the grains are ground, the paler the blue appears (Daniels 2004: 217). It is often thickly applied which leads to tensions within the binding media and causes loss of adherence and hence loss of paint. Sometimes it is also under-bound which also causes loss of paint (Ambers 2008: 37).

Egyptian Blue has the property to absorb electromagnetic radiation of a broad range but emits intensely in the infrared (IR) range at about 950 nm (Verri 2008: 41). The effect is so strong that even minute traces which cannot be detected by the naked eye become visible. A commercial digital camera that is sensitive to the IR with a cut-out filter that only allows the IR between 800 and 1000 nm to transmit, captures the luminescence when the object is illuminated with visible light (Verri 2008: 42).

The VIL images show that every other leaf of the cavetto cornice was once blue (Figure 26) and the block border

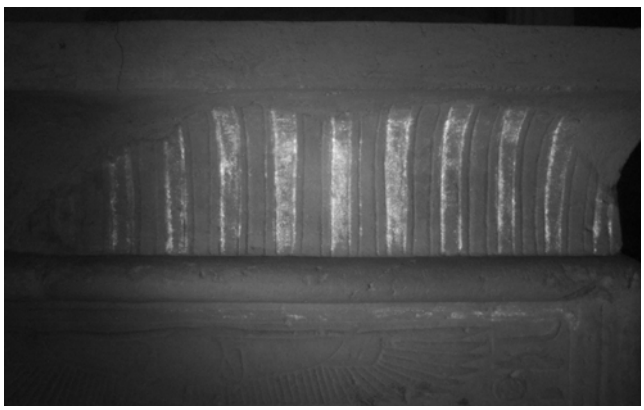


Figure 26 VIL image of cavetto cornice front

framing the relief carvings was blue in parts too. The vulture's wing on the lhs was once blue, the nw-pots Tuthmosis III offers to Amun Ra each had a blue stripe and the deities' maa signs on both sides were meant to be blue too. Nekhbet once wore a blue dress. Except in areas where a large quantity of colour covers a substantial area and/or a specific feature of the carving, it is impossible to say more about the Egyptian blue colour scheme. Minute traces have been observed on Horus' wig and beard, Tuthmosis III's collar from the same side and on Nekhbet's wig. On or along the hieroglyphs on this side and along the door jamb hieroglyphs are tiny specks of Egyptian blue.

1 The VIL imaging was undertaken by the author.

On a cross section of the Egyptian blue is nothing detectable that suggests a preparation layer underneath.

Egyptian blue was also found, with the help of VIL-imaging, in a very small area on the interior back wall of the upper part of the naos which is roughly tooled and on the interior back wall of the base.

Yellow

The properties investigated with polarised light microscopy (PLM)[2] of the yellow pigment dispersion sample taken from the rhs register suggest orpiment. Orpiment, an arsenic sulfate (As_2S_3), belonged to the basic palette of the Egyptian craftsperson by the 18th Dynasty (Nicholson and Shaw 2000: 116). It could have been obtained from multiple sources including Nubia and Sinai, St John's island in the Red Sea and Asia Minor (Pagès-Camagna and Guichard 2010: 28) and it is likely that the yellow on the naos is a remnant from antiquity. It has been detected only on the register line of the rhs and not on the register line on the opposite side of the naos. It is likely that every fourth leaf of the cavetto cornice was yellow (Arnold 1977: 1264), but no traces of orpiment or any yellow could be detected there either.

A cross section from the register line shows an undulating yellow layer of varying thickness. Nothing seems to indicate a preparation layer underneath.

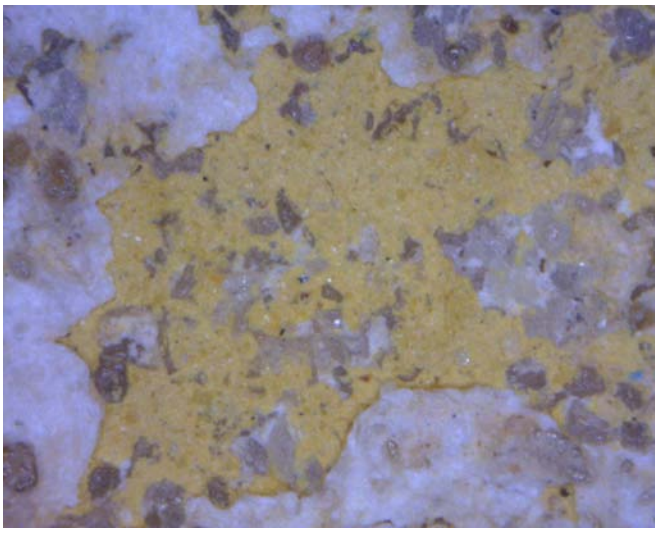


Figure 27 Yellow on the register line, magnification x 210 Dinolite image

Red

The results of the PLM analyses of all red pigment dispersion samples from the naos are best described by the general term red earth. Red colour in the Dynastic period was mostly obtained from naturally occurring red iron oxides (anhydrous oxides of iron) and red ochres (hydrated oxides of iron) (Nicholson and Shaw 2000: 113).

A cross section of the red pigment from the register line, where it covers a large area, seems to form an undisturbed layer of uniform thickness (Figure 28). There is no indication of a preparation layer but in some places the red gives way to a white layer underneath. Where only minimal traces are left, such as on Tuthmosis III's nose, the grains sit

2 The identification of pigments was undertaken by Abigail Granville.

firmly in between the quartz grains.

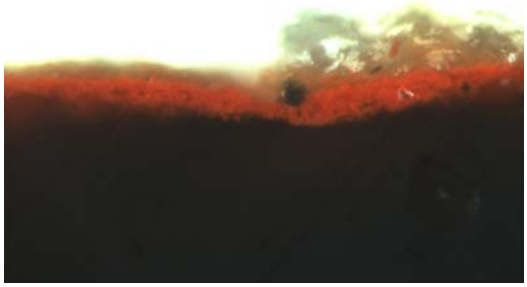


Figure 28 Cross section X02, magnification x 20 © FM

Non ancient red

Some red has been applied by the restorers from 1969. The joints crossing the register line on the lhs horizontally was retouched and it does not differ from the red on Tuthmosis III or the register line. The whole area over Nekbhet's head on the rhs, all along the joints, the infilled areas and the adjacent stone and parts of the hieroglyphs seems to have a reddish hue. The red in this area is probably a side product of the restoration/retouching process.

Rock art specialists use Decorrelation stretch (DStretch) which enables them to enhance colours of digital images of the photographed rocks. DStretch is a plugin for the imaging programme ImageJ and was developed for the use on rock art by Jon Harman (DStretch 2013). DStretch was used on images of the naos to help detect more red traces which could not be picked up by the naked eye. The transformed images did not reveal pigments where they were not noticed before but help to visualize the areas of retouching mentioned in the last paragraph.

Figure 29 DStretch image, lab colourspace

White substance

In two places on the lhs on the outlines of the maa sign, the Egyptian Blue is covered with a white substance. A cross section from this area reveals that the interface of both layers is not very distinct or flat. The yellow and the red on the rhs register line is occasionally covered with, presumably the same white substance (Figure 27). Comparing the rhs today with the early black and white images of this side, it appears as if the white substance was already on the naos. How it got there and when and its function cannot be explained. PLM analysis is not conclusive on the substance.

Preparation layer

The sandstone is of good quality and suitable for fairly detailed carving. A preparation layer of gypsum (calcium sulphate) or chalk (calcium carbonate) to make up for an unsatisfactory stone, as in found for example in the tomb-chapels on the West Bank at Thebes (Nicholson and Shaw 2000: 114 and 117) was not necessary. However, a very thin whitewash of gypsum or chalk (Lucas 1948: 404) to seal off or even out the grainy surface might have been applied. Unfortunately, the surface of this naos does not contain much evidence to affirm it. Only the white material which was found under the red of the rhs register line could be a preparation layer. According to Ashton's observations, a sandstone relief would always have had a thin layer of preparation ground (Ashton, personal communication, 2013), but others report that it is not surprising to find pigments directly applied on the stone. For example, conservator Hiroko Kariya:

> I see pigments directly applied to the stone surface (both sandstone and limestone) quite often. If present, a ground material can be either sulfate or carbonate-based - carbonate might be more common for later pieces. (Kariya, personal communication, 2013)

As described above, some pigments seem to sit in the crevices of the quartz where one would expect to find a ground. A yellow dispersion sample shows particles identified as orpiment and quartz (most possibly from the stone), but no other material (Granville, personal communication, 2013). Again, this would be an argument against a preparation layer.
Since it is impossible to establish the presence of a preparation layer on the naos, the idea that both sandstones were once unified in their appearance with the aid of one cannot be supported either.

The rough tooled interior on the other hand reveals, among the various restoration mortars, patches of a layer that was applied on the rough worked stone surface. The layer renders the rough masonry evenly. At present it can only be said that it is a calcium carbonat bearing mixture with quartz grains and iron-staining. Since it sits directly on the stone it could be an ancient rendering. This mixture is not only found on the interior's lhs but also on the interior's back where minute traces of Egyptian blue were detected by VIL-imaging on the rendering material as well as on the stone The mixture is not as evenly applied at the interior's back, possibly due to being applied in a tight corner with the naos opening of only 0.35 m width.

Previous restorations

The naos has undergone two restoration campaigns, neither of which were documented. With the evidence on the object and the first images, taken shortly after its arrival in the Museum (Figure 30), it is possible to establish to some extent what was done to it in the beginning of the 20th century. The remains of the first restoration are in some areas covered by the later one, in some places still visible.

First restoration campaign

Apart from being broken and having lost almost all of its most likely colourful pigments, it arrived at the Museum neither weathered nor terribly decayed. No consolidation of the surface or salt removal treatment was necessary. At least, judging from what is evident today, there are no obvious signs for the use of for example shellac or nitro cellulose as a surface coating which would have been used by that time for consolidating the surface (Hanna and Lee 1988: 90 and 91).

Figure 30 The naos in the new Egyptian Galleries at the beginning of the 20th century. All three images © GI

The fragments were pieced together with shellac and neat cement slurry and their alignment was well executed. Shellac alone would probably have been too weak to bond heavy stone, but might have been sufficient for the smaller pieces. Nevertheless, cement was also employed (Figure 31). The base appears to have been broken in two large and one smaller piece. When they were cemented together, three bricks were added at the back, presumably to enforce the stability of the structure and holes were filled with concrete. The upper part was cemented onto the base, a grey shadow along the top of the rhs joint seems to be the result of excess joint mortar which was wiped off later. Drips of shellac are found all over the naos. The pieced together naos obviously needed support and a metal structure was put in place. The lhs, having no door jamb left, was supported with a metal beam fixed all the way from the floor of the base to the top of the opening. A drill hole in the interior wall on the lhs and in the top of the opening together with cement and shellac remnants here and on the floor confirm this. The black and white image of the rhs shows another structural component and one area on the rhs on the interior wall shows faint traces similar to the ones on the rhs but they are covered with a 1969 mortar. Two 0.01 mm holes in the interior back wall suggest another set of drill holes for fixing a structure but since they are clean they do not seem to have been used and at least the rh one is visible on the early black and white image.

Figure 31 Lhs back: shellac, cement slurry, 1969 painted mortar

Shellac (Sample Sa 05), 'a resinlike secretion of the lac insect' (Gänsicke et al. 2003: 233), was confirmed by Fourier-transform infrared spectroscopy (FTIR)[3]. The spectra lines of the sample and the reference material were almost parallel. The analytical methods of infrared spectrometry use the property of matter to selectivly absorb energy with a resulting absorption spectrum 'which gives clues to the structure of the absorbing material' (Mills and White 1994: 19). Shellac was a widely used adhesive in many museums in the early days of conservation and was also used on stone. It was favoured due to being readily available and easy to use (Hanna and Lee 1988: 90).

The cement slurry, neat cement mixed with water, and concrete, cement mixed with sand and water, were identified by visual examination. They are dark grey and either without or with sand. Powder samples (samples Sa 06 and Sa 10) were also analysed with X-ray diffraction (XRD)[4]. XRD is an analytical method which uses the characteristc periodical three dimensional atom structure of a crystal material. When x-ray beams hit the structure they are defracted in a specific way and recorded. The resulting diffractogram has to be compared to diffractograms of known material for identification of the sample material (Craddock 2009: 53 and 54).

3 The FTIR was undertaken by Dr. Trevor Emmett. Analytical data is forthcoming.
4 The XRD was undertaken by Dr. Trevor Emmett.

Cement mortars were commonly used in stone conservation until the mid-1960s in museums, for example the Museum of Fine Arts in Boston, U. S. A. (Gänsicke et. al. 2003: 223). Hanna and Lee from the British Museum, (where the application of cement mortars was also practiced), attribute the use to the fact that stone conservators in the early 20th century were quite often stone masons who would know the material from their trade (Hanna and Lee 1988: 90).

Apart from the bricks added to the base (Figure 3), no major infills or additions were employed. The gaps in the joints were not pointed either. Overall, the naos was left in its fragmented stage almost exclusively displaying what had been excavated. The loss of the lhs side of the door jamb exposed the rough break edge and there was almost no roof, leaving a rugged line of fragments at the back.

Second restoration campaign

In the Annual Report from 1969 is the following entry about conservation and restoration work:

> 'The main activities of the Department in this sphere have been directed to preparing Egyptian antiquities for exhibition in the Greg Room. By far the most important undertaking has been the restoration of the sandstone shrine to the goddess, Nekhbet, set up by King Tuthmosis III (*c.* 1490-1436 B.C.) at his temple at el-Kab. This was carried out by Mr N.C. Rayner and Mr F.A. Rookes of the Museum's staff […]. (Annual Report 1969: 6)

Mr. Norman Rayner joined the Fitzwilliam Museum in 1935 as a gallery attendant. He later applied himself to the restoration of the Museum's objects and retired in 1974. Mr. Frank Rookes, a museum technician, left in 1982 (Dawson, personal communication, 2013).

Since no documentation of the object exists, it remains unknown what state the naos was in by the middle of the century. It is unknown whether the shellac has already became brittle or if the internal metal structure had become unstable. One aspect seems to be obvious, the way in which the naos was displayed as an archaeological fragment was not acceptable any more. The naos was restored to its assumed former completeness, modelling a roof and an entire door jamb onto the fragment. The joints of the fragments were pointed, larger cracks and holes filled, the scenes and partly the hieroglyphs that were missing were modelled into the damp mortar (Figure 2 and 3). All the remodelled areas were retouched to match the stone.

The chief material which was used by Mr. Rayner and Mr. Rookes, who scratched their names in the wet mortar on the roof of the naos, is lime mortar. XRD analysis confirms a calcite bearing mortar (Samples Sa 02, Sa 03, Sa 07, Sa 09 and also Sa 03 which does contain quartz as well).

Joints and cracks were pointed and the surplus mortar smeared onto the original outer surface, in many areas exceeding the actual joint by at least 0.01 m. In some areas the mortar was wiped or brushed off the stone, leaving a white hue along the joint. Although they all appear in slightly different shades and surface structure, they seem to be the same material. This is confirmed by micro-samples which displayed a positive reaction with 25 % hydrochloric acid. Furthermore, all the joints have the same white hue under ultra violet (UV) light exposure, except where they were retouched with brown paint (Figure 32).

Figure 32 Scene lhs, UV image: 1969 retouched restoration mortar, shellac (orange spots)

The brown paint, which is on most large gap-fills on both sides of the naos, is water soluble. The beige paint along the remodelled torus is soluble in industrial denatured alcohol (IDA). Along the torus moulding is also a thin layer of synthetic nature which lends the torus moulding on top and along the lhs door jamb a glossy appearance and surface structure. It is easily distinguishable from the material below in the DStretch processed image. This synthetic layer also comes off with IDA. As mentioned before and well displayed on the DStretch images too, is a red paint which was also used to retouch liberally, especially on the top half of the rhs, covering substantial areas of original outer surface.

The interior of the naos has large patches of mortar on both side walls. In two cases the lime mortar was applied to cover traces of cement mortar. Along the back and the top the mortar has a pattern imprinted from a polystyrene board which was probably holding up the mortar whilst setting.

From what can be observed in the interior of the naos, the fragments do not seem to have been held together with metal cramps. Still, simply using cement and shellac as an adhesive in 1903 would not have been sufficient for an object of that size. Besides the visible metal structure, the use of dowels could be expected. With a standard amateur metal detector, the Garrett™ Ace 150, it was possible to confirm the use of dowels. The detector is not able to locate the exact spot of the dowel, only areas. The metal that was picked up is mainly iron, nickel and sometimes copper which could mean brass, an alloy of copper and zinc. Brass dowels were used for example at the Museum of Fine Arts in Boston

from the early 1900s through to the early 1970s (Gänsicke et. al. 2003: 223) and copper and brass dowels and iron wires on the 1930s restoration of the Tell Halaf sculptures, Vorderasiatisches Museum, Berlin (Geismeier 2011: 8). But, since metal was detected mainly along the 1969 restorations it seems to contradict the aforementioned assumption. However, it is not known to what extent the naos was dismanteld before the 1969 restoration and whether the conservators inserted metal dowels then. It could be imagined that at least the roof and the lh door jamb have some sort of metal mesh to stabilize it but the metal detector was only locally detecting metal along the door jamb.

If it was possible to make an x-radiograph of the naos in the gallery it would give further insight into the internal metal structure. At the moment it is impossible to satisfy health and safety regulations to set up a x-ray facility in the gallery as a very high kilovoltage tube would be required to penetrate the stone.

Present condition

On the early black and white images it is not possible to see where the naos is positioned in the galleries. In 1969 though, it was put on a 0.37 m high wooden plinth which it is still standing on today. The gallery pictures of the Egyptian rooms from 1970 onwards show the naos standing with its back to the wall. Now it is free standing in the Gayer-Anderson Room and its back with the bricks at the bottom and the restoration at top are exposed to the visitor. The Fitzwilliam Museum staff decided in 2006 that the lower part of the back should be covered by a board attached to the wooden support plinth in order to disguise the alien material (Dawson, personal communication, 2013). The excess lime mortar from the top restoration was also trimmed back so that its effect was less intrusive on the original structure (Dawson, personal communication, 2013).

The structure of the fragmented and restored naos appears to be in a sound condition and only minor losses have occured since the first photographs were taken.

On the lhs are losses on the relief carving which are already visible on the first photographs of the naos. These losses, on the register line and Amun Ra's dress, seem to be due to loss of cohesion of the quartz grains which could be caused by a fault in the stone and not necessarily by soluble salts in the sandstone pores. Two vertical micro-cracks 0.50 m and 0.30 m long, along Amun Ra's limbs and under Tuthmosis III's kilt respectively, have not altered since the naos was photographed first. After the first photographic document a chip on the register line was lost and after 1969 a chip underneath Tuthmosis III' right foot and his nose came off. At the moment these areas are stable.

On the same side at the base are two areas of loss along an open bedding which occured after its initial restoration. The bedding of the base sandstone is exfoliated but it does not appear to have become worse since the early 20th century and seems stable now.

The front and the rhs have not suffered any obvious losses since the early 20th century.

No area on the base or on the upper part shows any form of efflorescence and the substrate does not seem to have separated or disaggregated on the surface in a way which would indicate 'cryptoflorescence', i. e. internal crystallization of soluble salts (Muir 2006: 197). The mixing water for cement, concrete and lime mortars could be responsible for soluble salts being transported into porous material such as the naos' sandstone (Hanna and Lee 1988: 90 and Muir 2006: 198). And, it should be mentioned that many ruins of Elkab have suffered deterioation caused by salt and '...the groundwater situation in the vicinity of the town has caused a salt-rich impregnation of these building ruins, with the result that all of the building stone has been affected by extreme weathering in the form of salt burst following its archaeological exposure.' (Klemm and Klemm 2008: 172). Somers Clarke also described the region as one where 'salt

abounds' (Clarke 1922: 16) and reported on salt as the cause of damage to construction material (Clarke 1922: 23, 24, 26, 30, 33 and 38). He does not mention the naos being damaged by salt, although excavators at that time were well aware of the problem of soluble salts in the stones excavated and collected in Egypt (Petrie 1905: 86). The fact that he does not mention it, seems to be an indication that the excavated naos did not have any salt damage.

During more than 100 years at the Fitzwillam Museum, the naos has been exhibited in the Gregg Room, was moved into the adjacent hall during the 2004 – 2006 refurbishment and is now in the Gayer-Anderson Room. The impact of the moving has never obviously had a damaging effect on its structural stability. When the naos was removed from the Greg Room to enable building work to take place as part of the refurbishment from 2004 – 2006, it was decided not to take it off its wooden mount, as that would surely have had a damaging impact (Dawson, personal communication, 2013).

The restoration materials from the early 20th century and 1969 do not seem to have a damaging effect on the sandstones. No active corrosion from metal dowels in the stone is detectable (no staining or blowing up of the surface) and no deterioration is visible where sandstone and restoration material meet. The metal dowels could have been easily affected by the water present in the cement mixtures.

The restorations (Ergänzungen) too show no corrosion of the assumed metal structure inside. However, the restoration material, mainly lime mortar, has detached itself from the stone in areas on the lhs on the cavetto cornice and at the doorjamb beginning at Tuthmosis III's head, going all the way to the base and along the base to the front. This crack, however, is already partly visible on the image from after 1969. Another crack runs vertical to the torus moulding.

The front and rhs have each a crack within the restoration mortar on the cavetto cornice and on the rhs matrial and stone have become separated.

Whether the cracks in the restoration mortar are superficial or running all the way through the material has not been established. The large door jamb restoration on the lhs at least shows no sign of cracking in the interior of the naos.

The pigments are coherent and firmly adherent on the sandstone surface.

At the present state no conservation treatment is required. However, the vertical cracks in the sandstone, the cracks along the restoration material and the areas around the surface loss on the lhs should be observed.

Possibilities for future treatment

In the previous chapters it was undertaken to establish the type of sandstone and how the surface of the naos was treated by an Egyptian crafts person. Based on physical evidence and archival material its restoration history was pieced together, resulting in the conclusion that at present no conservation treatment is required. Still, however sound the condition of the naos is, the former restorations, in particular the one from 1969, are not satisfactory on various levels. The 1969 restoration creates the impression that the naos is whole, although fragmented. The restoration is distinguishable from the remaining original material but not harmoniously integrated, contrary to article 12 of the Charter of Venice (1965) which demands for a restoration:

> Replacements of missing parts must integrate harmoniously with the whole, but at the same time must be distinguishable from the original so that restoration does not falsify the artistic or historic evidence.

Due to random colour matching and a variety of surface textures of the pointed joints, larger infills and restorations, the surface appears patchy and incoherent with the infills dominating the scenes. An unspoiled view of the naos, its scenes

and hieroglyphs is prevented. The restoration was carried out without respect to the antique surface by for example rubbing the lime mortar into the adjourning carved surface.

Two questions arise:

To what extent should the naos be (re)-restored?

What are the implications on the substance if altered?

The manner of the restoration and how it will be perceived by the visitors is an issue that could be discussed by a wider audience. The Fitzwillam Museum has in the past involved the public to learn how visitors perceive the various restoration approaches like the 'archaeological approach', 'interpretive outline of the decoration' approach, 'restoration using the *puntinato* technique' and the 'full restoration' on attic vases (Julie Chang, questionnaire and Julie Dawson, case labels). Keeping in mind that museum objects are partly conserved for the public to enjoy and enlighten and that museums are dependent on public funding and donations, a questionnaire of that kind could certainly create interest.

A variety of scenarios for further treatment is possible. The least impact on the naos would be retouching restorations, infills and the pointed joints 'harmoniously'. Ideally the current paint could be stripped down with water and IDA and a water based paint re-applied.

All restored areas could be set back by 5 mm and then retouched or painted in a uniform colour. But in this case the one of the major problems have to be addressed – the removal of the lime mortar. Lime mortar can only be mechanically removed. Options such as laser, dry-abrasion systems, ultrasound chisels or pneumatic micro chisels should be discussed and tested. However, any removal will most certainly affect at least the upper layer of quartz grains. This might be acceptable within the joints but not on the actual carved surface. Still, if the outcome of tests proves to be in favour of a method, taking away the pointing mortar will leave a different coloured edge along the fragment. This difference of colour together with the above mentioned red hue, the soil, especially on the back, the grime form years of touching the object and the few remaining pigments present the next problem. Pigments could be temporarily covered with for example Cyclododecan, a saturated cyclic hydrocarbon which sublimes at room temperature, a method frequently used at the Fitzwillam conservation lab and the surrounding areas cleaned with the appropriate solubles. The solubles could either swabbed or removed with poultices. The spots of shellac could be removed with IDA, keeping in mind that there is the danger of staining the surface (Scott et al 2010: 1).

If it was decided to remove all 1969 restorations, certainly more knowledge about the restoration itself could be gained but it is highly likely that the remaining fragments would need a structure like the one used in the first restoration to give the naos stability. This option comes the closest to the naos' fragmentary state and it would still be possible to experience the naos original antique appearance, judging from the early black and white photographs.

The last option would be to dismantle the whole naos into its single fragments and rebuild it with contemporary conservation products. Like with the lime mortar, the cement and concrete would be difficult to remove. But, at least cement is not on the actual carved surface. Observing the state of shellac, cement and concrete, they all seem to be stable and not decomposing and consequently endangering the cohesion of the fragments' interfaces. An restoration of that kind is certainly not necessary.

Conclusion

The 18th Dynasty sandstone naos from Elkab, Upper Egypt, bearing the cartouches of Tuthmosis III (1479 – 1425 BCE) was discovered in 1895 by Somers Clarke in the Temple Enclosure next to the gateway towards the temple. In 1896 Somers Clarke excavated the fragmented naos which was received by the Fitzwillam Museum in 1902. At the Museum the fragments were pieced together with shellac and cement slurry and a visible metal structure was employed to stabilize the naos. Three black and white photographs of the naos in the Egyptian Gallery, showing the front and both sides, are the only existing documents from the early 20th c. They are kept at the Griffith Institute in Oxford. In 1969 the naos was restored a second time. Since no documentation about the restoration campaign exists the reason for undertaking it remains unknown. The metal structure was removed and the naos which previously was exhibited as a fragment was restored to its assumed original appearance. Structural parts of the naos, joints and missing parts on the relief were remodelled with lime mortar and retouched with various paints. The restoration was executed by Mr. N.C. Rayner and Mr. F. Rookes who were Fitzwillam Museum staff. Metal dowels were detected by a standard metal detector. When they were put in place, during the initial or the 1969 restoration campaign, is impossible to say.

The base and the upper part of the naos are of two different sandstones. Both show characteristics that are found in the sandstones in the Elkab region and further south. Where they were quarried is, at the moment, impossible to say. The ashlar of each part along the joint is worked to exact trueness and the joint is perfectly lined up. Similar tool marks on the upper part and the base suggest that both pieces were made at the same time. The tool marks appear to come from metal chisels, very likely bronze chisels, which were hit by a wooden mallet. The width of the flat chisel varies from 15 mm to 35 mm. No traces of tool marks on the high relief reveal how it was cut, except that it was flattened with abrasives.

Faint pigment traces on the naos were identified as Egyptian blue, orpiment and red earth. No other colours could be detected and there is no indication for a preparation layer.

The naos is in a sound condition. Structurally it is stable but it should not be moved. Sandstone and restoration materials show no sign of degradation.

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Sample list

Sample list XRD, powder samples

Sa 01, Sa 08	lhs, back, top corner	mortar, '69', buff coloured, hard, orange sand grains, heavy reaction with HCl 25 % in matrix
Sa 02	top	mortar, '69', buff coloured, hard, orange sand grains, heavy reaction with HCl 25 % in matrix
Sa 03	top	mortar, '69', grey, hard, orange sand grains, heavy reaction with HCl 25 % in matrix
Sa 06	back, lhs, bottom corner	mortar, '03', hard, grey, hardly sand grains
Sa 07	back, lhs, bottom corner	mortar, '69' buff and grey, hard, sand grains
Sa 09	back, lhs, bottom corner	mortar, white mortar, soft, sand grains
Sa 10	interior, lhs, joint top base	mortar, '03', grey, hard, slurry

Sample list for FTIR

Sa 04	interior, lhs, top corner	soft mass with fibres, light grey	→	white tack
Sa 05	interior, floor	orange brown hard, orange in UV	→	shellac
Sa 11	lhs, top, cavetto cornice	synthetic shavings		

Micro samples from joint-fill for HCl reaction

m Sa 12	lhs, cavetto cornice	heavy reaction of matrix in HCl 25 %
m Sa 13	front, cavetto cornice	heavy reaction of matrix in HCl 25 %
m Sa 14	rhs, joint Tuth III skirt	heavy reaction of matrix in HCl 25 %
Sa 15	interior, lhs	preparation layer?, antique?, buff coloured, mixture of various grain size, reaction with Hcl 25%

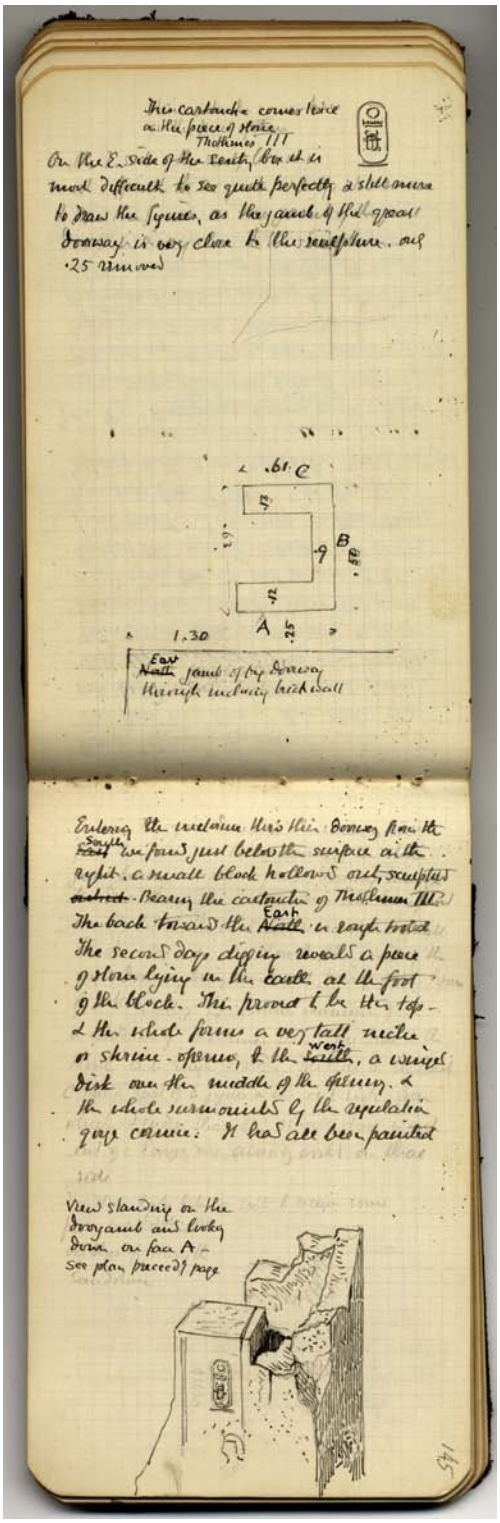
Appendix

Somers Clarke's notebooks

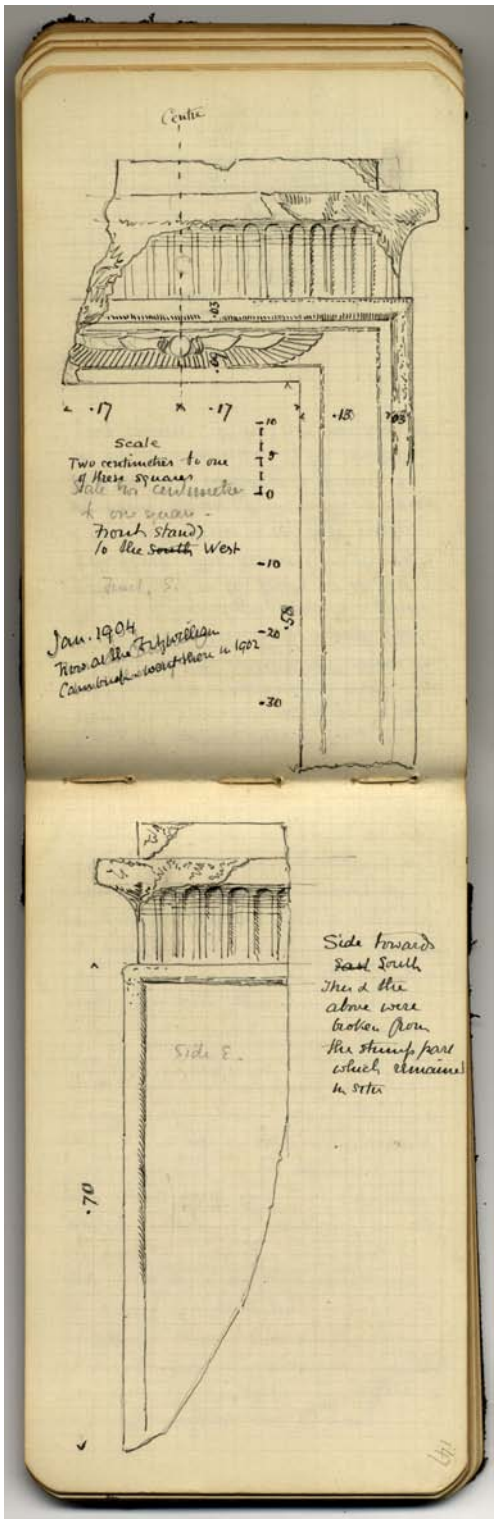
Somers Clarke's drawings

Early photographs of the naos

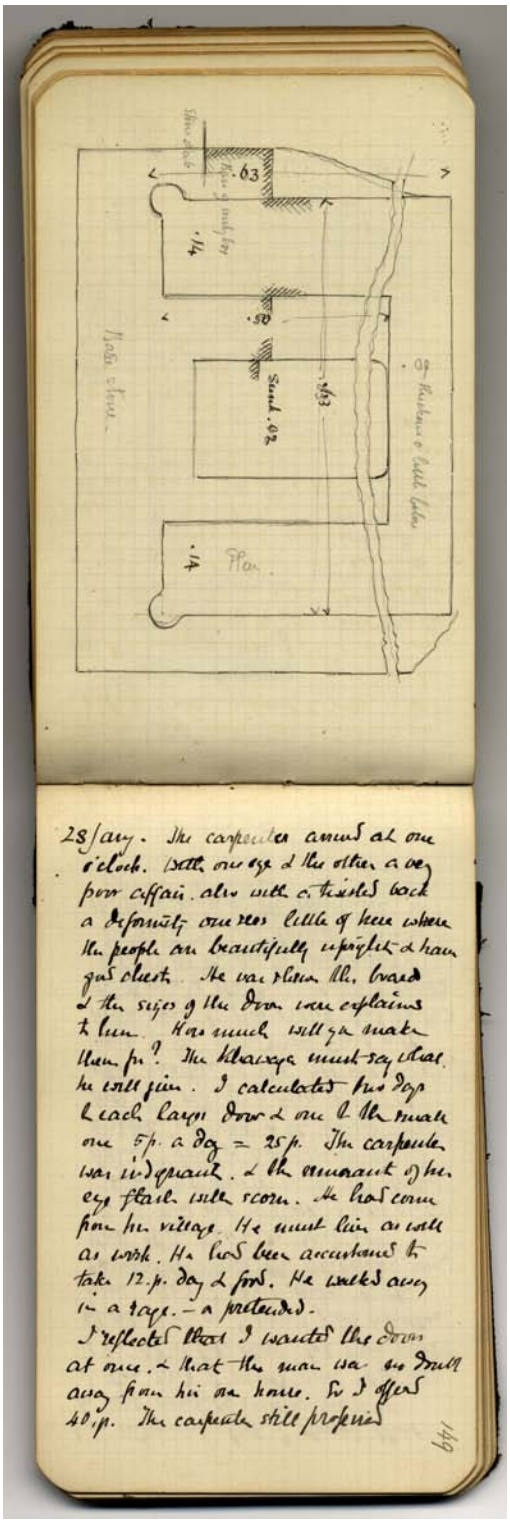
Images of the naos from the Fitzwillam Museum



Clarke, S. 1895 *Notebook F*: 144 and 145 © Griffith Institute, University of Oxford



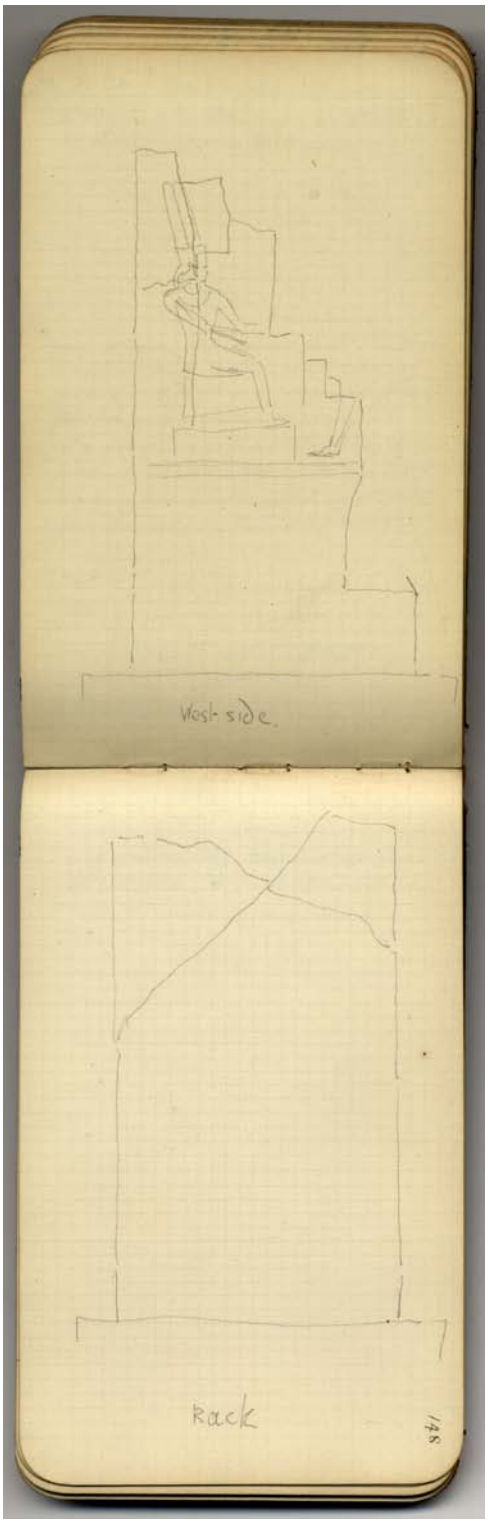
Clarke, S. 1895 *Notebook F*: 146 and 147 © Griffith Institute, University of Oxford



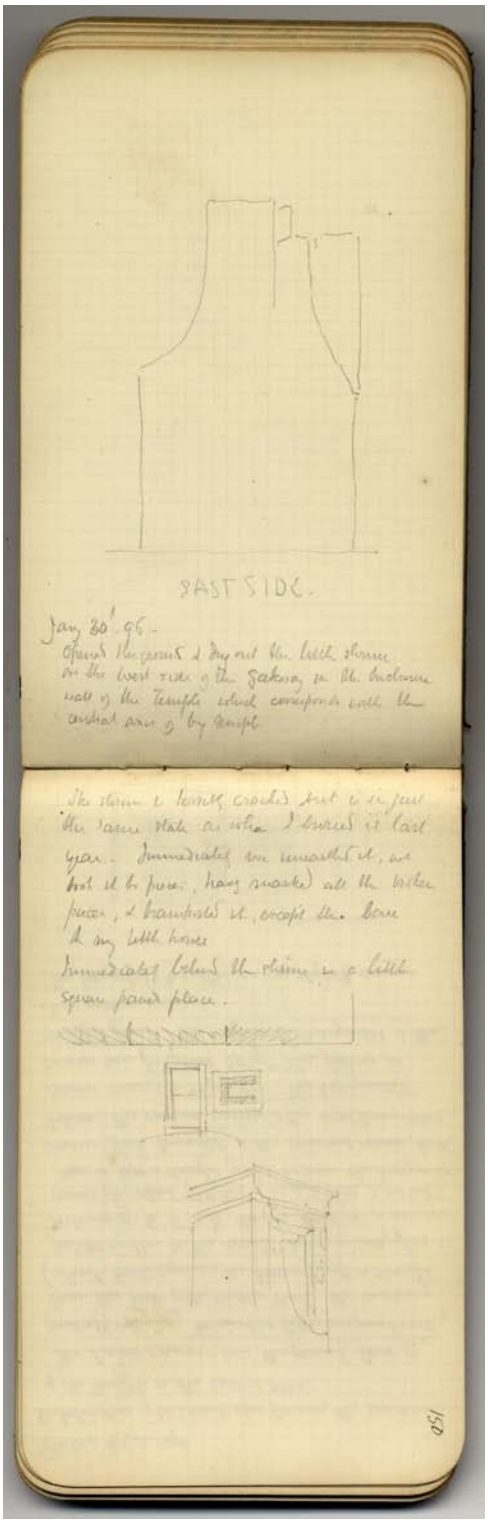
28/Jany. The carpenter arrived at one o'clock. With one eye & the other a very poor affair. also with a twisted back a deformity one sees little of here where the people are beautifully upright & have good chests. He was taken the board & the sizes of the door was explained to him. How much will ya make them for? The Khawaja must say what he will give. I calculated two days & each layn door & one for the mats one 5/p. a day = 25/p. The carpenter was independant. & the remnant of his eye flash with scorn. He had come from his village. He must live as well as work. He had been accustomed to take 12/p. day & food. He walked away in a rage. — a pretended.
I reflected that I wanted the doors at once. & that the man was so small away from his own home. So I offered 40/p. The carpenter still proposed

149

Clarke, S. 1895 *Notebook F*: 148 and 149 © Griffith Institute, University of Oxford



Clarke, S. 1896 *Notebook G*: 147 and 148 © Griffith Institute, University of Oxford



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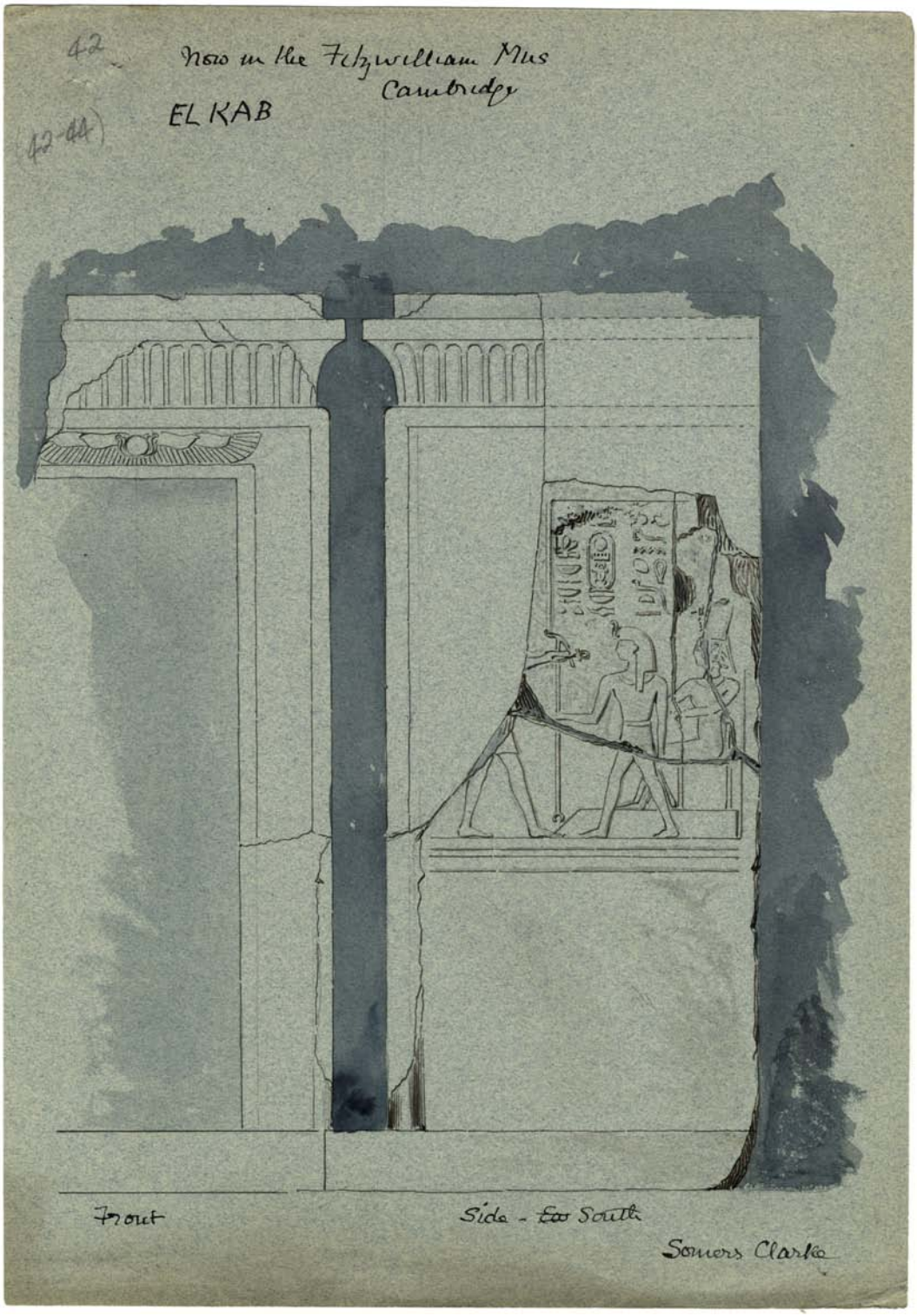
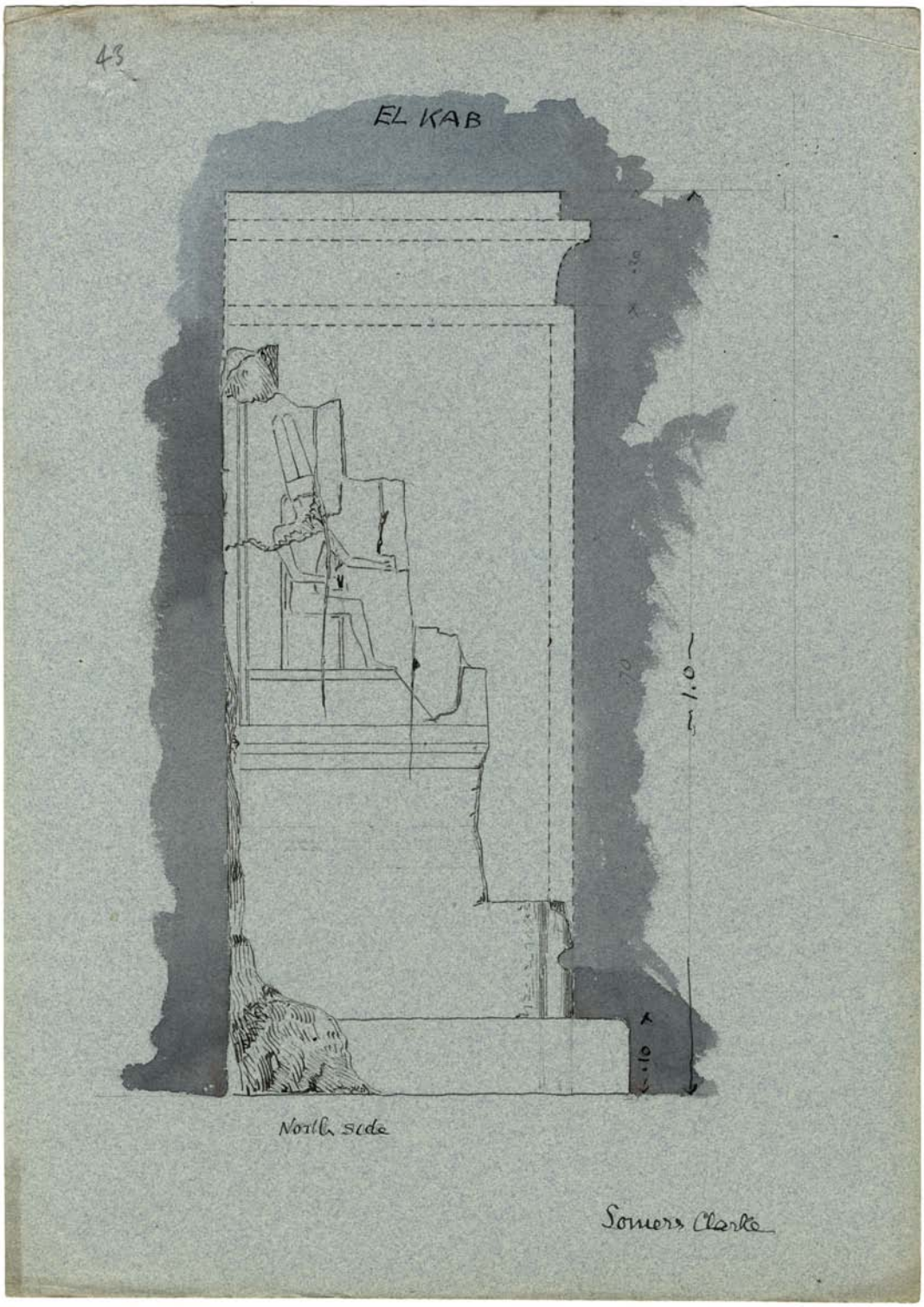
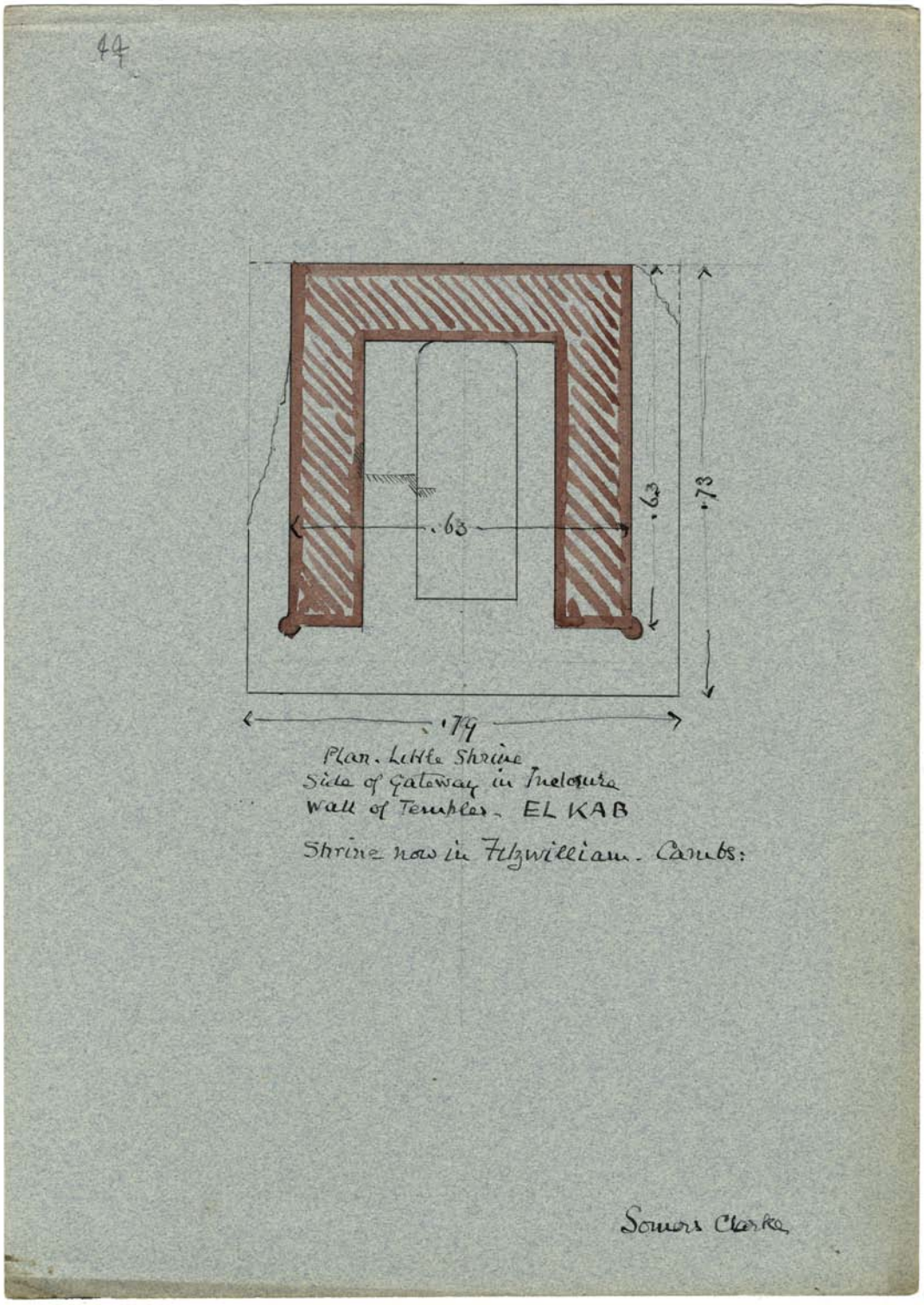


Clarke, S. without date *Drawing 42* © Griffith Institute, University of Oxford



Clarke, S. without date *Drawing 43* © Griffith Institute, University of Oxford



Clarke, S. without date *Drawing 44* © Griffith Institute, University of Oxford

Naos in the Egyptian Room at Fitzwilliam Museum in the early 20th c. © Griffith Institute, University of Oxford

Appendix

Naos in the Egyptian Room at Fitzwilliam Museum in the early 20th c. © Griffith Institute, University of Oxford

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