

## THE WALLS OF ELKAB

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### 1. INTRODUCTION

Already over 80 years ago, Somers CLARKE (1841–1926) wrote his standard article on the mudbrick walls of Elkab (CLARKE 1921). Afterwards, the walls only occasionally attracted scholarly interest (DE MEULENAERE 1986; KEMP et al. 2004), but, since then new information has become available through some small scale investigations within the broader research of the Belgian excavations at Elkab. The history of the site is now better understood than in Clarke's

time, and this, together with a series of  $^{14}\text{C}$  dates for the walls themselves (Table 1, Fig. 1), has made a renewed status questionis concerning the chronology and function of the walls possible. Nevertheless, the article by Clarke still has its value, particularly with regard to the architectural description, which has not been reinvestigated and which will only be discussed here when of particular relevance for the historical interpretation of the walls at Elkab.

The huge mudbrick enclosure wall (HENDRICKX & HUYGE 1989: n° 35), still standing to a height of over

			BP	cal BC 1 $\sigma$ (68.2 %)	cal BC 2 $\sigma$ (95.4 %)
Temple Enclosure <sup>1</sup>	Lv-2170	W	2280 $\pm$ 80	410–340 (25.6) 330–200 (42.6)	750–650 (2.2) 550–100 (93.2)
Great Walls <sup>2</sup>	Lv-1048	W	2330 $\pm$ 55	510–350 (63.3) 280–250 (4.9)	750–600 (4.9) 550–200 (90.5)
Great Walls <sup>3</sup>	Lv-1049	W	2330 $\pm$ 80	710–690 (0.8) 540–350 (51.5) 300–210 (15.9)	800–150 (95.4)
Great Walls <sup>4</sup>	Lv-1047	W	2350 $\pm$ 65	720–690 (4.4) 540–360 (63.8)	800–200 (95.4)
Outer wall of Double Walls <sup>5</sup>	Lv-2171	C	3680 $\pm$ 60	2190–2180 (2.4) 2140–1970 (65.8)	2280–2250 (1.1) 2210–1890 (94.3)
Outer wall of Double Walls <sup>6</sup>	Lv-2172	C	3840 $\pm$ 60	2460–2370 (15.7) 2350–2200 (52.5)	2470–2130 (95.4)
Inner wall of Double Walls <sup>7</sup>	CAMS-76351	C	3860 $\pm$ 40	2460–2360 (31.4) 2350–2280 (33.1) 2250–2230 (3.6)	2470–2200 (95.4)
Inner wall of Double Walls <sup>8</sup>	CAMS-76350	C	3920 $\pm$ 40	2480–2340 (68.2)	2570–2530 (3.4) 2500–2280 (92.0)

Table 1  $^{14}\text{C}$  dates (GILOT 1997: 151–152; CAMS: unpubl.). Calibration with OxCal v3.10 (BRONK RAMSEY 1995)

<sup>1</sup> Wooden beam in the northern section of the wall.

<sup>2</sup> Wooden beam in the eastern section of the wall.

<sup>3</sup> Wooden beam in the eastern section of the wall.

<sup>4</sup> Wooden beam in the eastern section of the wall.

<sup>5</sup> Charcoal fragments taken within and between the mudbricks of the outer wall of the Double Walls, at a height of about 1 m and about 50 m from the junction between the Double Walls and the Temple Enclosure.

<sup>6</sup> Charcoal fragments taken within and between the mudbricks of the outer wall of the Double Walls, at a height of

about 1 m and about 60 m from the junction between the Double Walls and the Temple Enclosure.

<sup>7</sup> Charcoal fragments taken within and between the mudbricks of the inner wall of the Double Walls, at a height of about 1 m and about 70 m from the junction between the Double Walls and the Temple Enclosure.

<sup>8</sup> Charcoal fragments taken within and between the mudbricks of the inner wall of the Double Walls, at a height of about 1 m and about 60 m from the junction between the Double Walls and the Temple Enclosure.

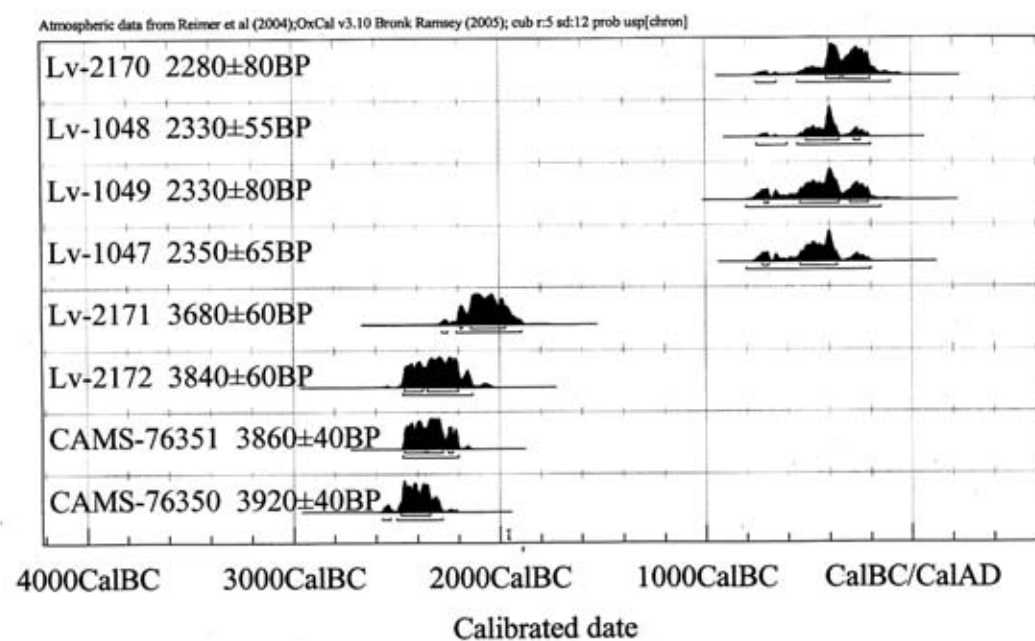


Fig. 1 Multi-plot showing the  $^{14}\text{C}$  age determinations for the different walls of ElKab (see Table 1)

10 m, is at present the most striking feature at ElKab, but it has been known for a very long time that this is only one of three remarkable mudbrick walls (CLARKE 1921). The two other walls are smaller in size and also less well preserved. CLARKE named them the Temple Enclosure (HENDRICKX & HUYGE 1989: n° 14) and the Double Walls (HENDRICKX & HUYGE 1989: n° 17), while he referred to the main enclosure simply as the Great Walls. These names will also be used for the present study.

## 2. THE GREAT WALLS

### 2.1. Description

The Great Walls are a huge enclosure wall, measuring approximately 520 by 590 m.<sup>9</sup> The southern corner has either disappeared due to erosion by the Nile or was never built in order to allow access to a harbour,

a question we will return to. But, originally, the southern side of the wall certainly extended beyond the standing remains. In 1937, CAPART had a test trench made in the western direction, beyond the preserved part of the southern side of the Great Walls, and found its remains further towards the Nile.<sup>10</sup>

The width at the base is 12.50 m (CAPART, unpubl. fieldbook, 1 mars 1937), while the wall itself is 12.10 m in thickness and about 11 m high (CLARKE 1921: 74).<sup>11</sup> The large mudbricks used measure between 38 and 40 cm in length, between 18 and 20 cm in width, and 15 to 16 cm in height.<sup>12</sup> They contain a large amount of organic matter, which was probably indispensable to allow such thick bricks to dry without cracking. Analysis of the organic content shows that faeces as well as straw may have been used as temper (see Appendix). The number of bricks necessary for building the Great Walls can be calculated at about 25 million.<sup>13</sup>

<sup>9</sup> CLARKE (1921: 66) calculates the original size of the walls as: north side 593 m, east side 517 m, south side 577 m, west side 510 m.

<sup>10</sup> "Quelques ouvriers ont été mis à des sondages sur l'emplacement des grands murs d'enceinte à l'endroit de la brèche par laquelle les eaux du ouady pénètrent dans l'enceinte; ceci en vue de s'assurer d'un emplacement où l'on pourra déverser les déblais. A 70 cm de profondeur environ on retrouve les lits de briques réguliers" ... "Les sondages sur l'emplacement du grand mur d'enceinte ont permis de retrouver les lits de briques réguliers sous le sol et sur une épaisseur de 12,50 m" (CAPART, unpubl. fieldbook, 28 février–1 mars 1937).

<sup>11</sup> SAINT-GENIS (1821: 343) mentions a height of only 9 m, which is often cited in the older literature.

<sup>12</sup> CLARKE (1921: 66) states: "The bricks ... measure 0.38 × 0.15 × 0.19 m, but some are of 0.38 × 0.16 × 0.18 m", while CAPART (unpubl. fieldbook) gives slightly larger measurements (39 × 19 × 16/40 × 20 × 16 cm).

<sup>13</sup> For comparison, the walls of the Middle Kingdom fortress at Buhen required 4.6 million bricks, while the pyramid of Senusret III at Dahshur is estimated to have contained 24.5 million bricks (KEMP 2004a: 260).

Wood was used for the reinforcement of the wall. The beams seem to take up the whole width of the wall, forming three regularly spaced horizontal alignments. Visually, this is evidenced by holes in the wall, or sometimes by beams sticking out. Vertically, the holes/beams are located at 1 to 2 m intervals. The specimens observed are trunks/large branches measuring 20–30 cm in diameter, with only the bark preserved, the wood itself being nearly completely decayed and containing numerous insect remains. The overall quantity of wood necessary for such a construction is enormous.<sup>14</sup>

Four samples of wood were taken for identification,<sup>15</sup> but three of them (samples 1, 2 and 4) consist of bark only, the wood being completely decayed. They are therefore unidentifiable. However, anatomically, the fact that the wide rays are heterogeneous may eliminate the option of the wood being *Acacia*. *Ficus* sp. and *Tamarix* sp. are possibilities. Sample 3 consists of bark and mineralised wood, which may be assigned to *Acacia* sp. The small number of identifiable samples makes it difficult to affirm whether the trunks used in the construction of the Great Walls belong to one or to several species. It seems likely, however, that for such a vast quantity, every type of available wood was used.

## 2.2. Recent history

On the map in the *Description de l'Égypte* (vol. I, pl. 66) the Great Walls are drawn as being complete, including the now missing southern corner (Fig. 2). The accuracy of this map can be questioned, however, because on it, the respective positions of the Great Walls and the Temple Enclosure are definitely not correct, the Temple Enclosure being located almost centrally within the Great Walls.<sup>16</sup> Furthermore, it is well known that the representations in the *Description de l'Égypte* were often completed according to the interpretation of their makers. On this basis, it can

therefore be doubted if the southern corner of the Great Walls was still present by the end of the 18<sup>th</sup> century.

The accuracy of the map in the *Description de l'Égypte* is of importance with regard to the question of whether or not a harbour may have been integrated within the Great Walls. In this respect, it should first be noted that on the general location map of the surroundings of Elkab (*Description*, idem) the Nile flows parallel to the south-western wall, at a distance of about 250 m. It is highly unlikely that this is also based on speculation and reconstruction, because the French government of Egypt in those days obviously was highly interested in obtaining accurate maps. This seems to indicate that the southern corner of the Great Walls was still in existence at the end of the 18<sup>th</sup> century. The earliest description known of Elkab, made by Charles PERRY on the occasion of his visit to the site in 1741 (PERRY 1743: 361), supports this. PERRY locates the temple of Nekhbet at about half a mile, i.e. at about 800 m, from the Nile (PERRY 1743: 361). This would locate the wall at a distance of at least 500 m from the Nile, considerably more than the 250 m given in the *Description de l'Égypte*. On the other hand, William HAMILTON, visiting Elkab in December 1801, shortly after the retreat of the French from Egypt, writes about his visit: “*The walls of the ancient town reach to within a few yards of the right bank of the river, inclosing an oblong square of eighteen hundred by sixteen hundred feet*” (HAMILTON 1809: 91). At that moment, the western part of the Great Walls is apparently located at a few meters only from the Nile. At the same time, the description by Hamilton, using the word “inclosing”, seems to imply that the southern corner was still preserved at that moment. This seems confirmed when he states that the Great Walls could be walked all around: “*At regular distances are ramps and steps to mount to the top, where is a walk the whole way round*” (HAMILTON 1809: 91).

<sup>14</sup> Accepting three rows of beams with 2 m intervals, over a total wall length of 2197 m (cf. footnote 9), results in 3295 beams of wood, which, at a length of 12.10 m and a diameter of 25 cm, would represent about 1960 m<sup>3</sup> of wood.

<sup>15</sup> Identifications by Claire NEWTON, 1999–2000.  
Sample 1. Great Walls, east wall, near the north-eastern angle, outer side, lower alignment.  
Sample 2. Great Walls, east wall, to the right of the middle entrance, outer side, lower alignment.  
Sample 3. Great Walls, east wall, on top of the wall but apparently in the construction.  
Sample 4. Great Walls, east wall, near the south-eastern angle, inner side, lower alignment.

<sup>16</sup> This is also explicitly mentioned in the accompanying text: “*une seconde enceinte carrée qui a le même centre que la première ...*” (SAINT-GENIS 1821: 346). There is apparently also some confusion concerning the name “El Kab”, which can be related both to the area enclosed by the Great Walls and to the village of Hellal, which is represented on the map, but not named. The name Hellal, however, was already in use a long time before the French expedition to Egypt, because both “Hellal” and “El Kaep” are already mentioned by NORDEN (1755: 183, pls. CXVI–CXVII).

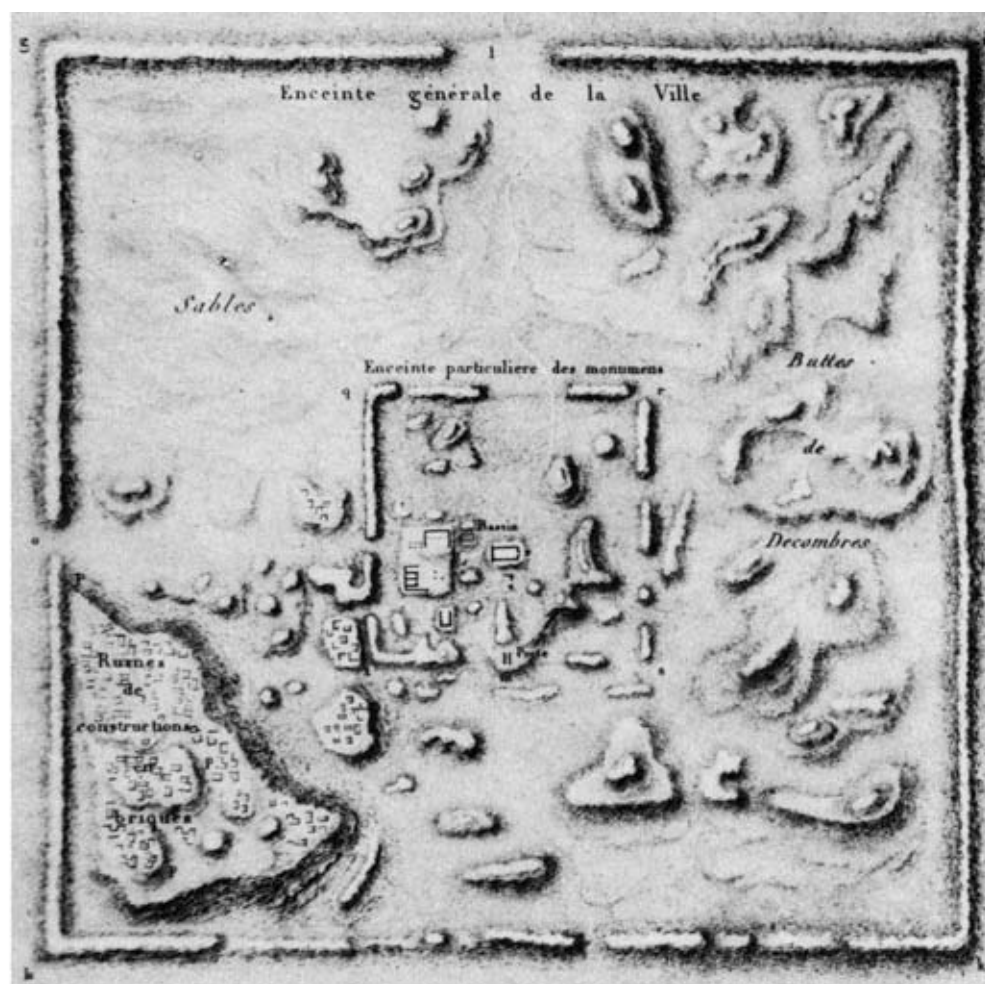


Fig. 2 Map of Elkab (*Description de l'Égypte* vol. I, pl. 66)

All of the visits mentioned took place when the Nile was at or towards its lowest point and the level of the Nile therefore has no bearing on the problem under discussion. PERRY (1743: 324) started his travel in Upper Egypt in December 1741, Saint-Genis was with the French expedition in Elkab in April 1799 (SAINT-GENIS 1821) and Hamilton visited Elkab between 8 and 20 December 1801 (HAMILTON 1809: 16).

Finally, it can be mentioned that in 1887 MASPERO states that the Great Walls were still complete at the beginning of the 19<sup>th</sup> century and that "*Le Nil a détruit une partie depuis quelques années*" (MASPERO 1887: 27). The "*quelques années*" are to be taken as an understatement, but apparently Maspero considered it

common knowledge that the Great Walls had been partially destroyed in a not too far past.<sup>17</sup>

All this would imply that the Nile shifted its course to the east, which should definitely have happened before 1843–1844, when the map by the LEPSIUS expedition was made (LEPSIUS 1849–1859: Abth. I, Bd. II, Bl. 100) on which the Nile follows largely its present day course and the Great Walls are represented with the missing southern corner.<sup>18</sup> If the evolution of the distance between the Nile and the Great Walls from 500 m in 1741 to 250 m in 1799 and a "few yards" in 1801 is correct, this would mean that the eastward shift of the Nile took place during the second half of the 18<sup>th</sup> century and continued into the first decades of

<sup>17</sup> A far more recent, but rather doubtful testimony concerning the existing of the southern corner of the Great Walls, is mentioned by CAPART (unpubl. fieldbook 19 dec. 1945) "*Le ghafir Mahmoud affirme avoir vu de ses propres yeux, sur l'île sablonneuse en temps de basses eaux, les vestiges de l'angle S.O. d'el Kab.*"

<sup>18</sup> Already the description of Stephen OLIN, who visited Elkab in February 1840, seems to indicate a situation similar to the present one: "*in some places this wall is in a ruinous state, but a large portion of it is standing almost entire*" (OLIN 1848: 219).



the 19<sup>th</sup> century, when the destruction of the southern corner of the Great Walls must have happened. On an unpublished sketch map made probably shortly after 1828 by Robert Hay (British Museum, Add. MSS 29832 f.102) (Fig. 3), the southern corner is missing, but the south-eastern part of the Great Walls continues much further than it does on the LEPSIUS map, which would indicate that the demolition of the wall was in progress at that moment. It is however to be noted that the map by Hay is only a sketch map, which is furthermore not drawn to a uniform scale.<sup>19</sup> Nevertheless, the impression gained from the Hay map seems to be confirmed by the description of Anton VON PROKESCH, who visited Elkab in the spring of 1827, and afterwards stated: “*Die Umwallung der Stadt umschließt einen hügel nahe am Ufer. Sie ist, bis auf eine kleine Strecke im westsüdwestlichen Winkel, erhalten und bildet fast ein Rechteck*” (VON PROKESCH 1829: 246). Von Prokesch is one of the most meticulous observers of his generation, and the small missing part of the southern corner mentioned by him can hardly be brought in accordance with the fact that at present over 40 % of both the western and the southern wall have disappeared.

Confirmation for a change in the course of the Nile early in the 19<sup>th</sup> century, can be found by comparing ancient and modern maps of the wider region around Elkab. On the map in the *Description de l’Égypte* (Cartes, Feuille 4, Esné; Planches, vol. I, pl. 66), a village called Assouléhié/As-Souléhié is located on the bank of the Nile, at about 1500 m north-west from the nearest part of the Great Walls (fig. 4). No trace of this village can be found on the detailed map made by Green and CLARKE in 1896 (CLARKE 1922: pl. IV; SCHWEINFURTH 1904: Tf. 14) (fig. 5), nor is a place with this name mentioned by the Survey of Egypt (1920) (fig. 6). On these maps, two islands which should have been located opposite As-Souléhié according to the *Description de l’Égypte*, are also missing. The latter, however, is not particularly astonishing because, especially before the building of the Aswan dam, such islands used to change very easily, both as regards size and location. Comparing the Sur-

vey of Egypt (1920) with the *Description de l’Égypte* shows that the location of As-Souléhié was largely occupied by the Nile before 1920, but comparison with a present-day map indicates that the same area is now again part of the alluvial plain. The disappearance of the village must, however, have taken place long before 1920 because no trace of it can be found at present and there is no remembrance of a destroyed village among the present inhabitants of the area.<sup>20</sup> The village originally being located on the bank of the river itself, it may have been destroyed by the combination of an eastward shift of the Nile and one or more exceptional floods. The results of such an eastward move of the Nile were early in the 20<sup>th</sup> century still part of the oral tradition of the region (CLARKE 1921: 69–70). Presumably as a consequence of the same development, a large island was formed opposite the village of Mahamid. The island which is at present located opposite Elkab (Fig. 7), is apparently even more recent, because it does not yet figure on the 1920 Survey of Egypt map (Fig. 6).

An alternative explanation for the absence of the southern corner of the Great Walls was presented by CLARKE (1921: 72–74), who suggested the possibility that torrents descending on very exceptional occasions through the Wadi Hellal could have been responsible for its destruction. However, he himself points out that the evidence is contradictory and that normally the water should have attacked the wall at its base, which does not seem to have been the case. In fact, the run-off of the Wadi Hellal passes immediately south of the Great Walls and does not affect its location (cf. SCHWEINFURTH 1904: Tf. 14; CLARKE 1922: pl. IV; SHAHIN 1970–1971: 12, fig. 3).

Human activity on the other hand may also have contributed to the destruction of the southern corner of the Great Walls. It is indeed possible that from this part of the wall, which is the closest to the Nile, mudbricks were carried off by boats for reuse, as happened in 1828 with the stone blocks from the temples.<sup>21</sup> Possibly also the destruction of the ancient quay and breakwater,<sup>22</sup> the latter presumably having

<sup>19</sup> In fact, the Temple Enclosure and the remains within it are drawn on a larger scale than the rest of the map.

<sup>20</sup> Inquiry autumn 2000 in the village of Elkab. The area where the village should have been is now entirely covered by fields.

<sup>21</sup> CHAMPOLLION (*Lettres écrites d’Égypte et de Nubie*, 159–160) mentions on the occasion of his visit to Elkab during the first days of March 1829, that the temples within the Temple Enclosure as well as the small temple of Tuthmosis III had been destroyed a few months before. The exact moment of

destruction is most probably to be placed in November 1828 (DE MEULENAERE 1969: 20–21; VANLATHEN 1987: 34, n. 2)

<sup>22</sup> The quay and breakwater, the remains of which are still visible today, were apparently still an impressive feature at the end of the 18<sup>th</sup> century. They are, in fact, one of the very few elements mentioned about Elkab by VIVANT DENON (1802: 231), who describes them as “*un quai revêtu sur le bord du Nil*”. They were largely destroyed in the 19<sup>th</sup> century (CLARKE 1921: 70–71).

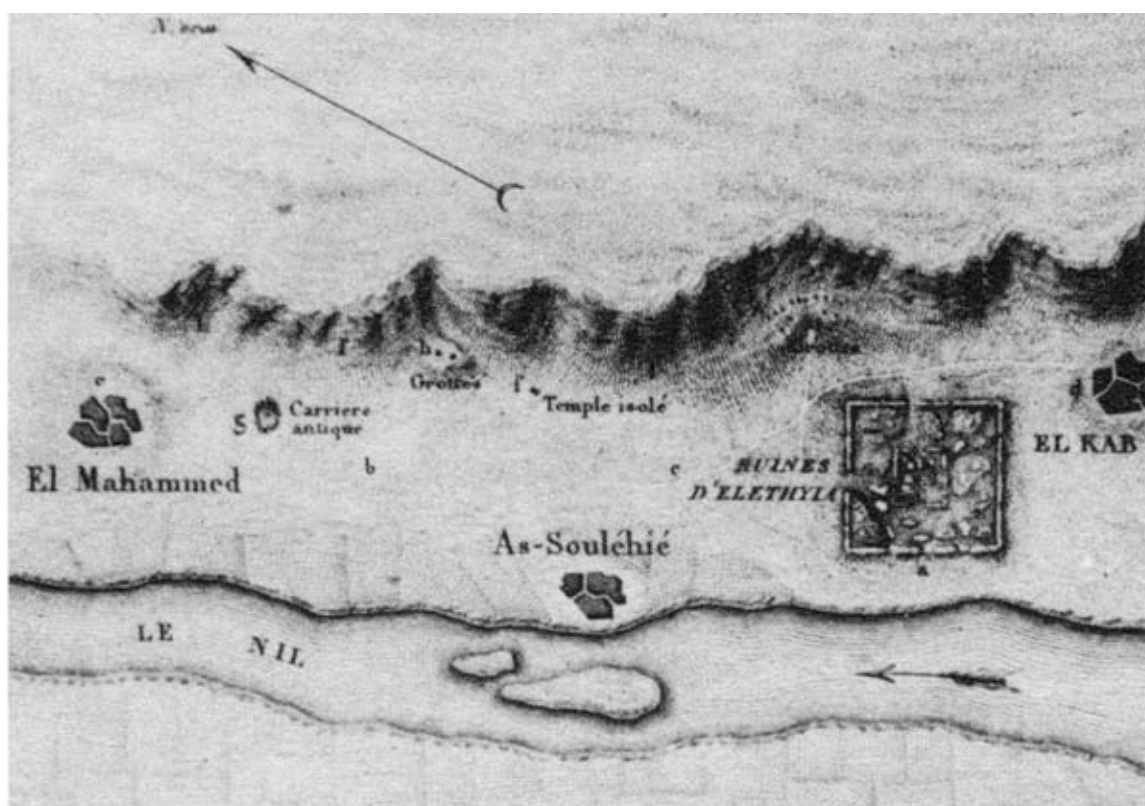


Fig. 4 Map of ElKab and surroundings (*Description de l'Egypte* vol I, pl. 66)

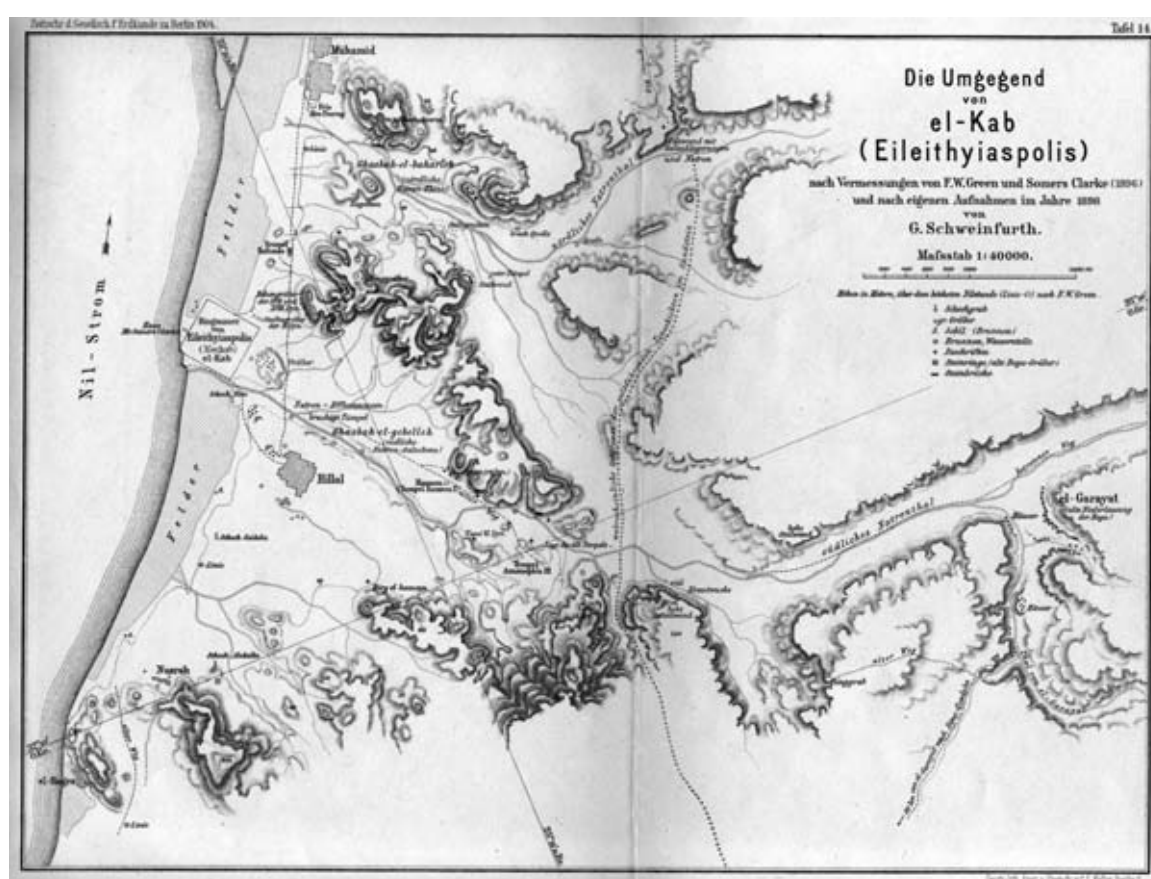


Fig. 5 Map of ElKab and surroundings (SCHWEINFURTH 1904: Tf. 14)

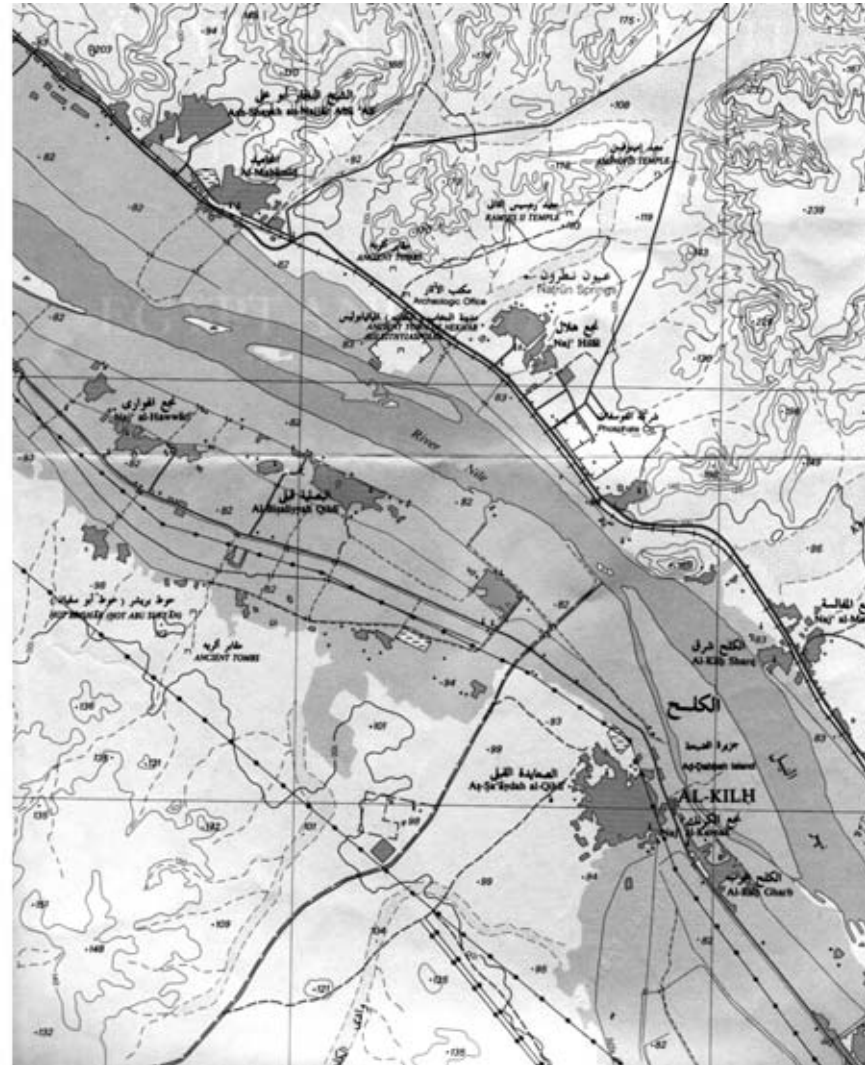


Fig. 6 Map of Elkab and surroundings (*Survey of Egypt* 1920)

been built to protect the Great Walls (CLARKE 1921: 69–72), may have had an influence on the eastward shift of the Nile.

All in all, it seems very plausible that the southern corner of the Great Walls was still existent at the end of the 18th century, implying that a harbour was never integrated within these walls.

### 2.3. Date and function

The very first visitors to Elkab considered the Great Walls a town wall (SAINT GENIS 1821; WILKINSON 1843: 271; UNGER 1862). This was, among by others, also accepted by QUIBELL (1898: 2) and CLARKE (1921: 65–69), despite the fact that they stressed that the greater part of the area enclosed by the Great Walls had never been inhabited. CLARKE (1921: 57) suggested that the walls were part of a government attempt to relocate the town because it was threat-

ened by the Nile, but that the whole idea failed “because the inhabitants refused to leave their houses”. However, this idea is based on pure assumptions and it is not very likely that such a large scale enterprise could have failed because of local refusal.

More recently, KEMP (2004b: 275) considered the large “temple enclosures” not only to be part of important religious centres, but at the same time as the location of the most precious assets of a community, such as storerooms and elite residences. But, in KEMP’s opinion, this does not seem to apply to Elkab, for which he suggests that the Great Walls “could have provided refuge for a scattered population or for passing caravans from Nubia or nomadic herds-men from the eastern desert” (KEMP 2004b: 275). In this respect it is, however, to be noted that remains of long, well-built constructions have been found underneath the Graeco-Roman village within the Great





Fig. 7 Map of Elkab and surroundings (SHEET AL-KILH 1999)

Walls (HENDRICKX 1998: 1366–1368). Their orientation is identical to that of the Great Walls and so is the size of the mudbricks. According to the pottery found, these buildings probably date to the 30th Dynasty. Unfortunately, nothing conclusive can be said as regards their overall importance or function. These buildings look like storerooms, but may have been military barracks or could just as well have been intended for the labourers engaged for the construction of the Great Walls or the reconstruction of the temples.

The chronological position of the Great Walls has been considered very differently. UNGER (1862: 85–86), without further argumentation, relates the building of both the Great Walls and the Temple Enclosure, which in his opinion are part of one and the same city fortification, to the Hyksos period and considers Elkab the main Egyptian stronghold

against the Hyksos. By the middle of the 19th century, a stela from the reign of Amenemhet III became known, which apparently originates from Elkab and mentions the rebuilding of a wall constructed originally by Sesostri II (STOBART 1855: pl. I; CLARKE 1921: 65). For several scholars this was ample evidence for attributing the Great Walls of Elkab to the reigns of Sesostri II and Amenemhet III (e.g., QUIBELL 1898: 13; MASPERO 1899: 450; LEGRAIN 1905). This was, however, already convincingly rejected by CLARKE (1921: 64–65), who argued a date from the 26th to 30th Dynasties, among other things because of the obvious relationship between the orientation of the Great Walls and that of the temples, which were being rebuilt during that period. He also noted that the western side of the Great Walls was built over a vast Middle Kingdom cemetery (HENDRICKX & HUYGE 1989: n° 38–40), which obviously must be older. Also,

he observed that for building the western part of the Great Walls, a trench was cut through the already existing town, and that the wall was built in it. CAPART (1946: 168; 1954: 75) suggested on very limited evidence that the Great Walls date to the time of Ptolemy V (reign 204–181 BC), but this proposition failed to gain approval.<sup>23</sup>

The huge size of the Great Walls, as evidenced also by the enormous amount of mudbricks and wood needed for its construction, obviously must have been a major labour investment and was certainly far beyond the local economic possibilities. The number of bricks more or less equals that of a Middle Kingdom mudbrick pyramid (cf. footnote 13) and the central government is to be considered the moving force behind such an enterprise.

The <sup>14</sup>C dates around 500–350 BC for the Great Walls (table 1) were used as supporting evidence by DE MEULENAERE (1986: 208–209) for attributing its construction to the reign of Nectanebo II (360–343 BC), who possibly completed an initiative already developed by Nectanebo I (380–362 BC). This age is not only corroborated by the already mentioned identical orientation of the Great Walls and the temples rebuilt by Nectanebo II, but also by the location of a small, at present completely ruined shrine of Nectanebo I or II (HENDRICKX & HUYGE 1989: n° 37; DE MEULENAERE 1986: 208, n.3) right in front of the eastern gate of the Great Walls. In the opinion of DE MEULENAERE, the wall was built as a last stronghold in Upper Egypt, if ever the Persians invaded Lower Egypt, which indeed happened in 343 BC. At that moment, Nectanebo II retreats to Upper Egypt, but unfortunately hardly any details of that event are known. The fate of Nectanebo II is unclear, but according to DE MEULENAERE (1986: 210), the Great Walls of Elkab were never used for defensive purposes, among other reasons because no remains of major military or civil building works of that period have been found at the site. The Persians ultimately did not move into Upper Egypt and Nectanebo II probably died around 338 BC. With the arrival of Alexander the Great in Egypt in 332 BC, the interests of Egypt were definitively drawn to the Mediterranean and to the east, making a fortification at Elkab pointless.

There are several objections to the military interpretation proposed by De Meulenaere. The Great

Walls do not show the explicit military characteristics of fortresses such as the Middle Kingdom strongholds in Nubia or the Late Period fortifications in Upper Egypt (JARITZ 1986; SPENCE 2004). Indeed, the Great Walls of Elkab are not surrounded by a ditch and nor are there towers or other kinds of projections which would have made the wall easier to defend. Also, there are no traces of constructions protecting the defenders themselves when standing on the wall and the presence of at least five gates would definitely weaken its defence. The lack of solid stone foundations (CLARKE 1921: 66) also seems to exclude a military purpose. The only element by which it differs from the religious enclosures such as at Karnak, are the massive ramps, which on three sides give access to the wall itself. These ramps are not merely constructed for building purposes as their brickwork is integrated with that of the Great Walls themselves, but their presence can certainly not be considered conclusive evidence for a military interpretation. In addition to the ramps, the top of the wall was also accessible by internal stairways (SAYCE & CLARKE 1905: 254).

Relevant for the interpretation of the Great Walls is probably the presence of a late Roman fortress (HENDRICKX & HUYGE 1989: n° 15) in the south-eastern part of the Great Walls. It was excavated by CAPART in 1945–1946 (CAPART 1946: 165–170; 1954). The fortress was partially built over the place where originally stood a very large pylon with a 5 m wide doorway (CAPART 1946: 167; 1954: 74; BADAWY 1954) (Fig. 8). The pylon is located in the axis of the temples, and obviously situated on the dromos leading from the quay to the temples (CAPART 1946: 169) (Fig. 9). The pylon, for which it is not clear if it was built out of stone or mudbrick, was originally part of the Great Walls and its solid foundation was afterwards used as the emplacement for the late Roman fortress. The latter may have been deliberately built within the already existing wall, which would obviously have improved the position of the fortress as a military stronghold. CAPART, however, took it for granted that the relevant part of the Great Walls was already destroyed when the fortress was built (CAPART 1954: 74).

The presence of a huge pylon with gateway within the Great Walls is a strong indication for them being

<sup>23</sup> Capart's date is based on two decorated blocks of Ptolemy V, found reused in the late Roman fortress built partially over the pylon in the Great Walls (cf. *infra*). As these were

the most recent reused blocks, he considered them evidence for the date of the Great Walls themselves.

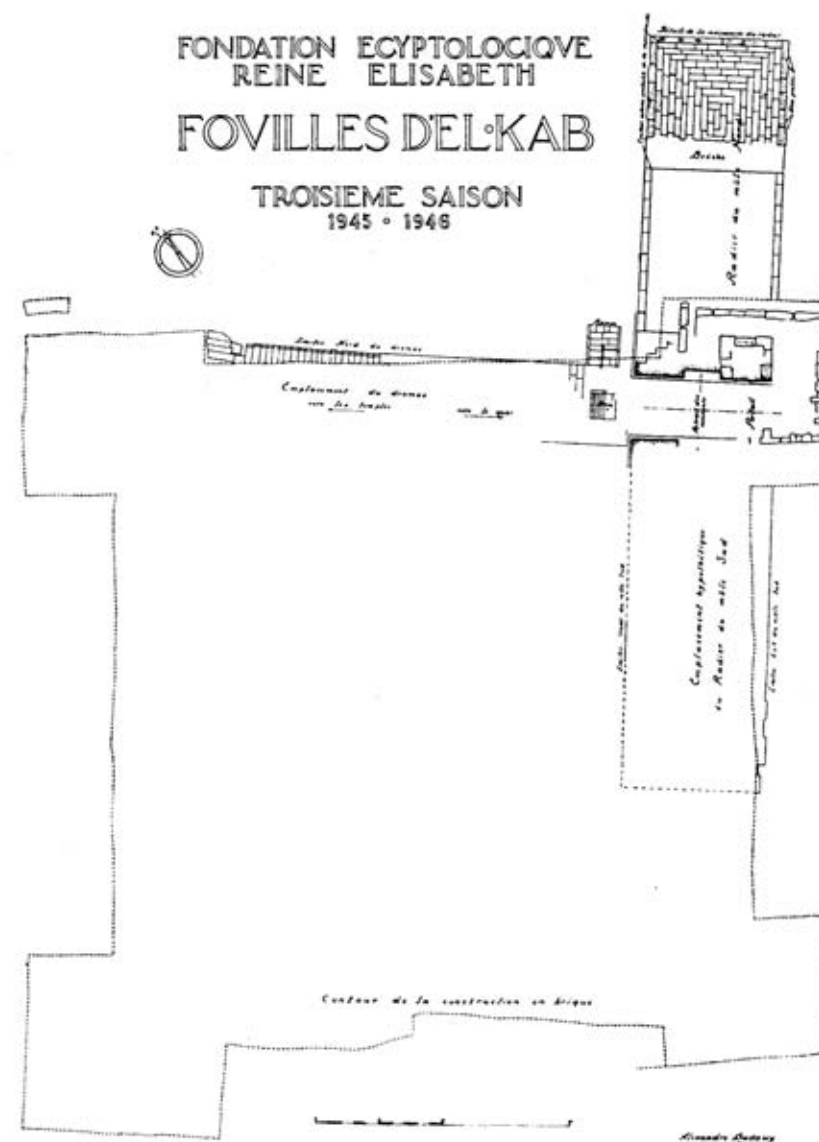


Fig. 8 The emplacement of the pylon in the Great Wall, below the late Roman fortress (CAPART 1946: 167)

a large temple enclosure, which was, by the way, already the opinion of CAPART (1954: 75). In this respect, it should also be noted that Nectanebo I built the temple enclosures of Amun and Montu at Karnak (GOLVIN & HEGAZY 1993) and that large scale mudbrick enclosures are in any case a typical feature of the religious architecture of the Late Period, even if they may also have functioned as a protective device for secular buildings, as argued by KEMP (2004b: 276). The Great Walls of Elkab and the enclosure of Amun at Karnak are both about 12 m wide and built with pan-bedded sections (GOLVIN & HEGAZY 1993: 149). At Karnak, wood is also used in the Amun enclosure (e.g., GOLVIN & GOYON 1987: 83) and the Montu enclosure (CHRISTOPHE 1951: pl. VI). Also, the enclosure of Amun with its original height of about

21 m (GOLVIN & HEGAZY 1993: 150) was far higher than the Great Walls of Elkab. The latter has the same height of 11 m all over the standing part and although the top of the wall is clearly rounded by erosion, it seems that this was more or less the original height. The fact that the walls of Elkab and Karnak are similar in width but different in height might indicate that the Great Walls never reached the planned height and remained unfinished. This might be corroborated by the absence of stone gates, which most probably were never built. Also, there is no trace of the rounded merlons that are generally supposed to have crowned mudbrick walls such as the Great Walls (cf. GOLVIN & HEGAZY 1993: 150).

The fact that at least 70 % of the surface encompassed by the Great Walls seems not to have been used

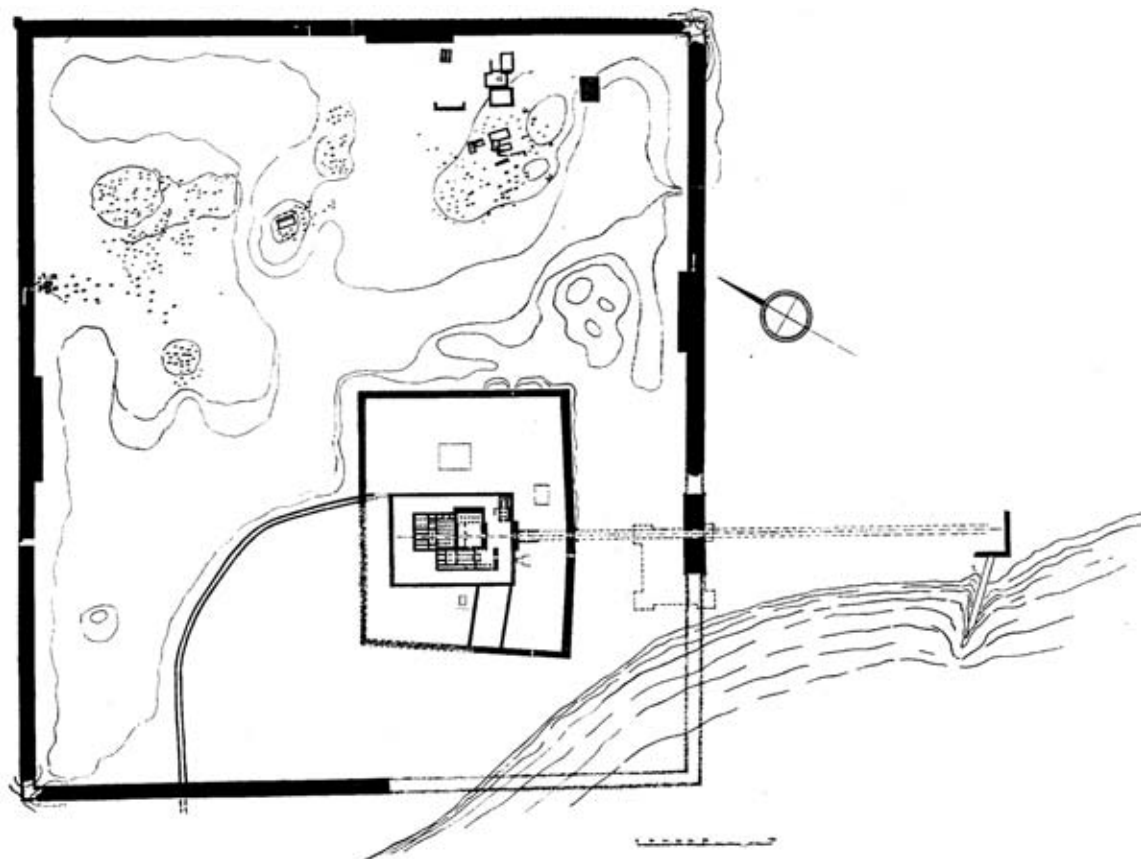


Fig. 9 Plan of El Kab, with reconstruction of the dromos and the pylon in the Great Wall (CAPART 1946: 169)

as either living or temple area remains enigmatic (Fig. 10). But, prior to the construction of this wall, most of the area had been used for cemeteries at different periods. The earliest known dates to the Naqada III period (HENDRICKX 1994), but most probably no trace of it remained when almost 3000 years later the Great Walls were built. This was probably not the case for the Old Kingdom cemetery (HENDRICKX & HUYGE 1989: n° 26) in the north-eastern part of the area enclosed by the Great Walls and certainly not for the large 4th-Dynasty mudbrick mastabas (QUIBELL 1898: 3–7; HENDRICKX & HUYGE 1989: n° 31–34). The impressive remains of the latter can still be seen just outside the northern part of the Great Walls. They most probably served as the northern boundary for its construction.<sup>24</sup> In combination with the already mentioned orientation of the Great Walls in relation to the temples, this may have been decisive for the location of the northern side of the Great Walls. The southern

side is certainly the front side and was built parallel to the run-off of the Wadi Hellal, which certainly determined its position. The position of the western side of the Great Walls was presumably determined by the course of the Nile, although we do not know where exactly this course was at the time the wall was built. However, it is to be noted that the western wall is not entirely at right angles with the northern and southern wall, but that the, now disappeared, southern corner showed a slight inclination to the east. It is conceivable that this deviation from a perfect rectangle was due to the then position of the Nile.

More difficult to explain is the location of the eastern side of the Great Walls, especially because it is mainly its position which creates such a large open space within the enclosure. The wall was built over a large Middle Kingdom cemetery (HENDRICKX & HUYGE 1989: n° 38–40), which apparently was completely disregarded. As far as we know at present, the

<sup>24</sup> The much smaller Old Kingdom tombs excavated by Sayce in 1901–1904 within the northern corner of the Great Walls (SAYCE & CLARKE 1905: 239–247) must already have been reduced to ground level at the time when the wall was built.

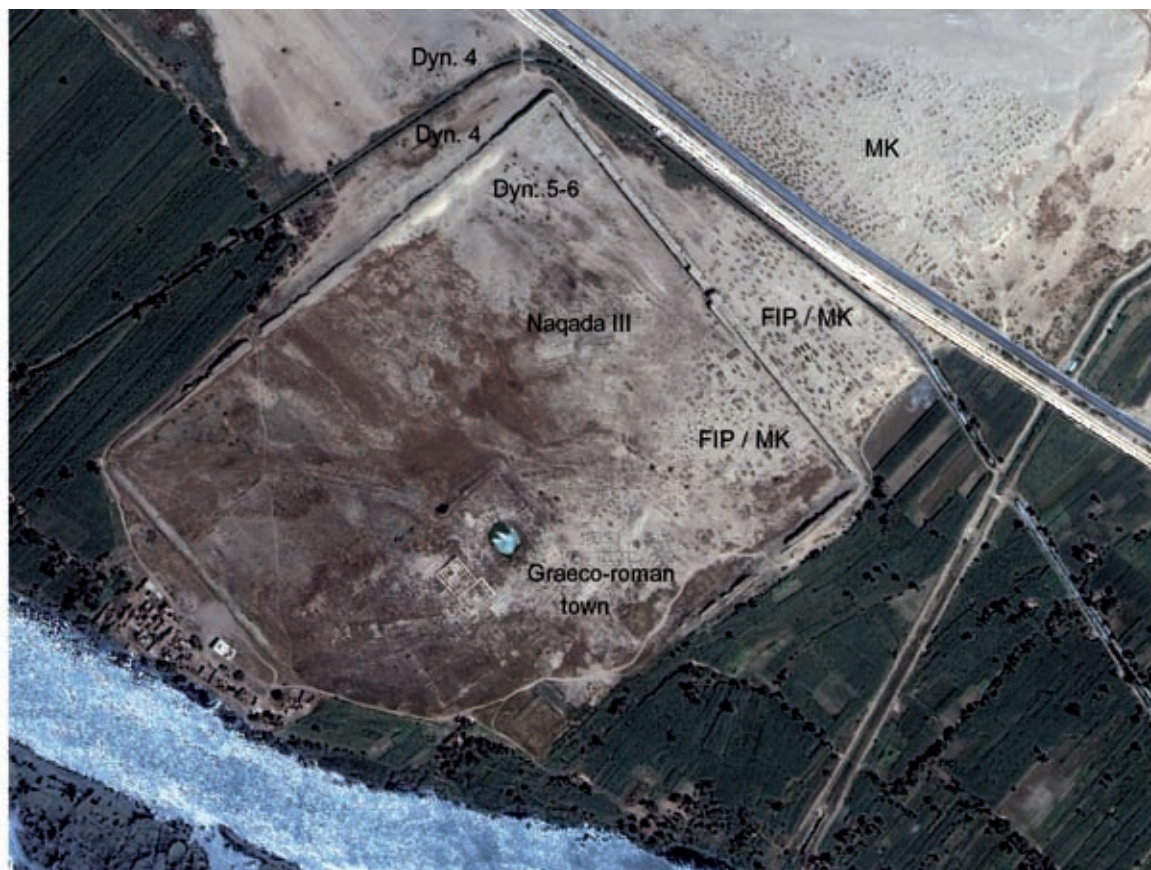


Fig. 10 Satellite photo of Elkab with location of the main cemeteries (courtesy "Friends of Nekhen")

only structure which may have been located in the north-eastern angle of the area enclosed by the Great Walls, is a small 2<sup>nd</sup>-Dynasty temple(?) (HENDRICKX & HUYGE 1989: n° 27). Unfortunately, hardly anything is known about this enigmatic building,<sup>25</sup> and it can in any case be doubted that it was still visible 2500 years after its construction and of any impact on the building of the Great Walls. The reason for the location of the eastern side of the Great Walls, is therefore to be looked for outside the enclosure. There is an obvious relationship with the already mentioned shrine of Nectanebo I or II, located right in front of the eastern gate of the Great Walls (QUIBELL 1898: pl. XXII), but it is far more likely that the Nectanebo shrine was positioned in relation to the Great Walls and not vice versa because the gate is situated exactly in the middle of the wall. Therefore, the only remaining topographical element that can be considered fundamen-

tal for the location of the eastern part of the Great Walls, are the large 4<sup>th</sup>-Dynasty mastabas. The most eastern of these is situated close to the northern corner of the wall and the "end" of the mastaba zone may therefore have served for defining the corner point and as a consequence also the location of the eastern part of the Great Walls.

The fact that the large open space takes the location of some (but not all) older monuments into account, may indicate that reference to/respect for tradition was a fundamental element for the lay-out of the Great Walls. In a broader context, this can be seen as a manifestation of the archaism that continued from the Saite period into the time of Nectanebo I and II (GOZZOLI 2006: 103–109; BOTHMER 1969: pass.).<sup>26</sup> On an even more general level, reference to the past also aims at confirming the political importance of the king.<sup>27</sup>

<sup>25</sup> The exact location of this temple is unknown. SAYCE & CLARKE (1905: 239) mention a few granite blocs which must have belonged to it, without exact location.

<sup>26</sup> For a summary of the archaizing tendencies, see DER MANUELIAN 1994: xxxv–xlii.

<sup>27</sup> See also the pertinent remarks by SPENCE (2004: 270–271) concerning the possible political-symbolic function of large mudbrick enclosure walls.

### 3. THE TEMPLE ENCLOSURE

#### 3.1. Description

The Temple Enclosure measures approximately 165 by 205 m and is orientated parallel to the Great Walls. Although the western corner is missing, it is generally accepted that it was originally a complete enclosure wall (CLARKE 1921: 63–64). Within this enclosure wall are the temples and also the sacred lake.

The Temple Enclosure had a width of close to 6 m, but it has nearly completely collapsed, only one fragment still standing to a height of about 11 m above the surrounding debris. Although the width of the Temple Enclosure is only half the size of that of the Great Walls, it nevertheless seems to have stood at a similar height. The bricks are identical in size to those of the Great Walls, and so is the brickwork and the use of wooden beams as reinforcement. A sample of the latter consisted of *Acacia nilotica* type charcoal and very mineralised *Acacia* sp. wood.<sup>28</sup>

A possible difference between the Great Walls and the Temple Enclosure is that the latter has stone reinforcements of the corners (SAYCE & CLARKE 1905: 257; CAPART, unpubl. fieldbook, 9 février, 9–12 mars 1938). Such reinforcements have up to now not been attested for the Great Walls, but this, however, has not been investigated in detail.

Within the Temple Enclosure, another wall (CLARKE 1921: 63; 1922: 22, pl. V) enclosed the two principal temples. A gate with a pylon (CAPART 1940: pl. 7–8, J), leading to the temple of Nekhbet, is integrated in the southern side of this wall. At present, very little can be seen of the smaller temple enclosure and it has also not been investigated.

Furthermore, within the Temple Enclosure and especially in its western part, the remains of a few other massive walls can be found, the original lay-out, date and function of which remain completely unknown at present, although it is conceivable that they were part of earlier, possibly New Kingdom temple enclosures.

#### 3.2. Recent history

On the map in the *Description de l'Égypte*, the Temple Enclosure is figured with the now missing western corner. As for the Great Walls, the accuracy of this map can of course be questioned, especially because

the temple remains are located too far north as compared to reality. Nevertheless, given the fact that the western corner of the Temple Enclosure should be looked for in the area which was particularly thoroughly devastated by the sebakhin during the first half of the 19th century,<sup>29</sup> it can easily be accepted that this corner was still in place at the end of the 18th century. An attempt by CAPART in 1938 to locate the western corner failed, and, in his opinion, it had completely been dug away by the sebakhin (CAPART, unpubl. fieldbook, 8–9 mars 1938). It is far easier to demonstrate that the northern and eastern walls of the Temple Enclosure have suffered much damage over the last few centuries. In a not too remote past, it must have been a far more impressive monument, as can be seen on a drawing made by E.W. LANE in 1826, before the destruction of the temple remains (LANE 2000: fig. 126) (Fig. 11), and a panoramic view of the area enclosed by the Great Walls, made in 1842–1845 by the LEPSIUS expedition (LEPSIUS 1849–1859: Abth. I, Bd. II, Bl. 99). On the latter drawing, made after the destruction of the temples, the Temple Enclosure can be seen as the most prominent feature within the Great Walls.

The gradual destruction of the northern side of the Temple Enclosure can be traced in detail, starting from the drawing by LANE (Fig. 11). On it a number of cracks in the wall can be seen. When these are compared with a photo made by F.W. Green in 1902 (Fig. 12), it is obvious that large parts of the wall had by then collapsed following these cracks. Still more parts had disappeared in 1966 (Fig. 13). The corner fragment collapsed as recently as 1981, on the occasion of very heavy rains (Fig. 14). And even the last standing fragment suffered considerably during the 20th century (CLARKE 1921: 60, n. 1).

#### 3.3. Date and function

It can hardly be doubted that the Temple Enclosure is a temple enclosure in the true sense of the word. Between the wall and the temples themselves, there is hardly any space left for other buildings. More importantly, the excavations directed by CAPART, revealed the remains of a stone gate and a small pylon as part of the Temple Enclosure, which are respectively the entrances to the temples of Thot and Nekhbet (CAPART 1940: pl. 7–8).

<sup>28</sup> Identification by Claire NEWTON, 1999–2000 (cf. footnote 15). Sample 5. Temple Enclosure, northern wall, lower alignment.

<sup>29</sup> For the sebakhin and their activity, see BAILEY 1999.

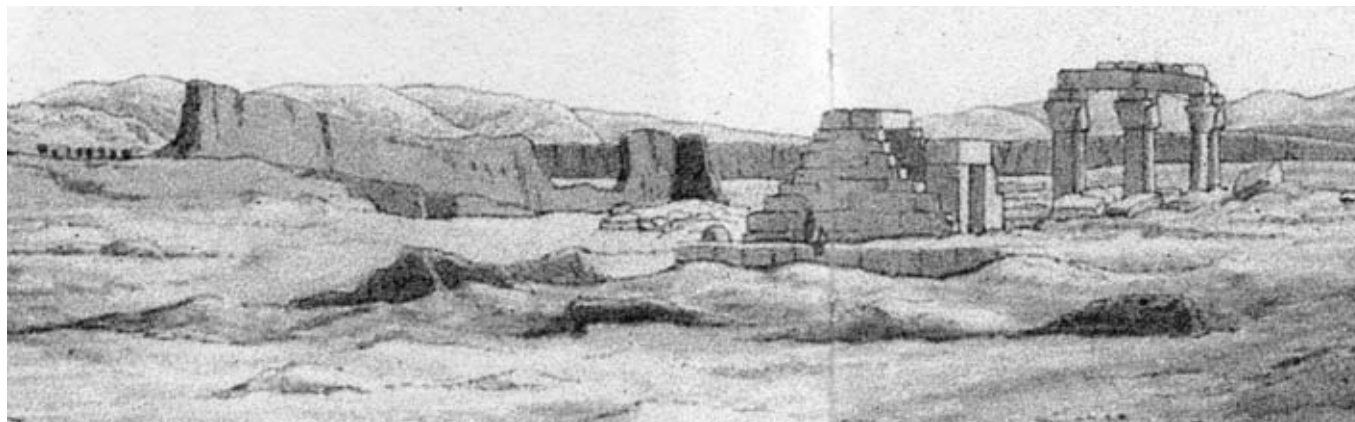


Fig. 11 Detail of a view of Elkab in 1826, by E.W. Lane, showing the Temple Enclosure and remains of the temples (detail of LANE 2000: fig. 126)



Fig. 12 The north section of the Temple Enclosure in 1902 (photo W.F. Green, FERE archive)

The single  $^{14}\text{C}$  date available for the Temple Enclosure confirms its near-contemporaneity with the Great Walls, already suggested by the architectural resemblance (cf. CLARKE 1921: 64). Definitely, the Temple Enclosure dates from the time of the reconstruction of the temples, from the First Persian period until Nectanebo II. A more precise date is probably given by the above-mentioned gate and pylon, on which, despite their bad state of preservation, the name of one of the Nectanebo is still visible (CAPART 1940: 13).

If the Temple Enclosure and the Great Walls indeed date to Nectanebo, they can be considered the final construction element of the rebuilding of the temples during the 27<sup>th</sup> to 30<sup>th</sup> Dynasties.

To the west of the temples, an enigmatic corner of a large mudbrick wall was discovered during excavations by Pierre Gilbert in 1955,<sup>30</sup> which has a slightly different orientation compared to the temples themselves. Possibly this could be all that remains of the enclosure related to the New Kingdom, or even earlier temples.

<sup>30</sup> The unpublished excavation notes mention no details about this wall.



Fig. 13 The north section of the Temple Enclosure in 1966 (photo CFBE)



Fig. 14 The north section of the Temple Enclosure in 2005 (photo CFBE)

#### 4. THE DOUBLE WALLS

##### 4.1. Description

The Double Walls are often said to have been part of a circular wall enclosing the ancient town of Elkab (e.g., CLARKE 1921: 56–57, pl. X; SÉE 1973: 115; UPHILL 1988: 14), but they can only be followed over a distance of 290 m between the south-western wall of the Great Walls and the north-western wall of the Temple Enclosure. The Double Walls were cut by the western side of the Great Walls (CLARKE 1921: pl. XVIII, below) and a test excavation by CLARKE and SAYCE in 1904 showed the Double Walls to reappear on the western side of the Great Walls, although it is unknown over which length (SAYCE & CLARKE 1905: 271). The Double Walls also continued for at least 20 m south of the spot where they touch the Temple Enclosure. It has been suggested that the Double Walls continued from here below the eastern side of the smaller wall surrounding

the two main temples (CLARKE 1922: 21–22), but, although this may well be true, it has never been archaeologically confirmed.

The Double Walls are preserved in a most irregular manner and their size is therefore difficult to measure accurately. CLARKE mentions a thickness of about 2.44 m for the inner wall and 2.74 m for the outer wall, with a space of about 4.88 m between them. The highest point of the outer wall reaches at present about 2.5 m above the surrounding debris, while the inner wall is preserved at a slightly higher level, but not exceeding 3 m. The walls must originally have been considerably higher, and a description by a ghafir in 1893, referring to the middle of the 19<sup>th</sup> century, states them to have been almost as high as the preserved part of the Temple Enclosure, which is 11 m (CLARKE 1921: 60). The bricks of the Double Walls are smaller in size (35 × 13 × 6 cm)<sup>31</sup> than those of the Great Walls and the Temple Enclo-

<sup>31</sup> CAPART, unpubl. fieldbook: mur courbe, côté N: 34 × 18 × 10/35 × 19 × 11 cm; CLARKE 1921: 59.





sure and also of a completely different nature (see Appendix).

Both the inner and the outer wall are constructed in vertical layers (Fig. 15). The layers of the inner wall are slightly inclined towards the south, implying that they are leaning away from the outer wall (Fig. 16).<sup>32</sup> Furthermore, in some parts of the wall it can be seen that it was constructed in sections, but it is impossible to confirm that these were of regular layout and size.

CLARKE (1921: 59), when studying the building material and techniques, came to the conclusion that the two walls of the Double Walls were contemporaneous, as is also suggested by the radiocarbon dates (Table 1). The dates, on the other hand, also seem to show evidence for at least one rebuilding(?) phase of the outer wall (cf. *infra*). The architect Jean Stiénon noted in 1949 that the size of the bricks was different in the two walls and he accepted the existence of connecting walls between the inner and outer wall. At present, however, such connecting walls are not visible and it is not clear if Stiénon had

Fig. 15 Construction in vertical layers of inner wall of Double Walls (situation in 1966, photo CFBE)



Fig. 16 The Double Walls; inner wall at right side (situation in 1966, photo CFBE)

<sup>32</sup> The section of the wall drawn by KEMP (MOELLER 2004: 264, fig. 4) does not show the vertical layering of the outer wall, which moreover is also wider in reality. Furthermore, it is not clear from the drawing what the layers on the left of the inner wall represent.

actually seen them.<sup>33</sup> If, despite the fact that the sections of the inner wall are leaning away from the outer wall, the walls are indeed part of the same building project, the question remains how they relate to each other. Are they individual walls originally separated by an empty space in between or are they to be considered as heavy casing walls, the area between them originally having been filled up? The latter possibility seems the most likely and this would leave us with a very impressive wall with a thickness of nearly 10 m.

Another unanswered question concerns the nature of the outward projection of the wall at about 55 m north of the junction of the Double Walls and the Temple Enclosure, which was visible in 1968 (cf. 1/1000 map, DEPUYDT 1989). At present this projection is no longer noticeable due to bad preservation and increased vegetation. Possibly it may have been part of a bastion. All of these questions can, of course, only be resolved by renewed excavations and architectural investigation.

#### 4.2. Recent history

The Double Walls do neither figure on the map in the *Description de l'Égypte* nor on the sketch map made by Robert Hay (Fig. 3). The area where the Double Walls are to be expected, is on both maps covered with town remains, and both walls were at that moment obviously still completely covered with debris. However, by the time Hay visited Elkab, the sebakhin had definitely already started digging away the ancient mound.

The Double Walls are probably mentioned for the first time on the occasion of VON PROKESCH' visit to the site in 1827 (1829: 246), who states: "*vom Thore in der ONO Seite zieht eine Scheide, 5'9" dick und gleichfalls aus ungebrannten Ziegeln, nach dem hügel [i.e. the tell] und dessen Abhang hinauf, als habe man diesen Theil der Stadt absondern wollen*". As von Prokesch mentions the Great Walls and the Temple Enclosure elsewhere, he can hardly have been describing anything else but the Double Walls, despite the fact that the orientation in his description is definitely erroneous. There can never have been a wall starting from the eastern part of the Great Walls because this area is described by all early visitors, including von

Prokesch himself(!), as completely devoid of ancient remains. He most probably confused the parts of the Great Walls which he labelled ONO and WSW. This would also explain the reference to a gate in the same wall, which exists in the eastern part of the Great Walls, but not in the western. The fact that von Prokesch does not mention that there are two parallel walls, could imply that the outer wall, which is in any case preserved at a lower level, was still covered by town ruins in 1827. The map by Hay clearly shows that the sebakhin roughly worked from the south towards the north and therefore must have reached the inner wall first. Also, the thickness of the inner wall of 2.44 m as measured at its base by CLARKE (1921: 59), is not too far away from the 1.82 m given by von Prokesch,<sup>34</sup> who probably measured it at a higher level.

Because of his problematic description, it can always be doubted if VON PROKESCH actually saw the Double Walls, but they definitely appear on the map made in 1842–1845 by the LEPSIUS expedition. On this map the part still covered by town remains is restricted to the area immediately south of the Double Walls. The LEPSIUS map also confirms that the sebakhin worked from south to north. They inevitably must have come upon the Double Walls, but left large parts of it standing because they obviously preferred the organic-rich settlement fill to the mudbricks of the walls, which were made with a little amount of organic temper only (CLARKE 1921: 59; see also Appendix). As far as can be judged from the LEPSIUS map, the Double Walls more or less mark the northern side of the tell and the settled area.

The sebakhin apparently used the space between the walls as a dumping place for sherds and other material useless for their purpose. In 1898, Gaston Maspéro, who was then director of the Antiquities Service, gave permission for the removal of many tons of sherds for the construction of the new Luxor-Aswan railway (CLARKE 1921: 59).

#### 4.3. Date and function

The chronological position of the Double Walls has been the subject of much dispute. An Early Dynastic or Old Kingdom date was often proposed (e.g.,

<sup>33</sup> Unpublished fieldbook, samedi 19 février 1949: "L'architecte prélève un échantillon des briques de chaque série des murs. Il constate que le mur extérieur de la grande enceinte courbe est fait de briques plus grandes que le mur

intérieur, et qu'il devait avoir entre eux des murs de refend."

<sup>34</sup> For the calculation of the measurements given by VON PROKESCH, see VANLATHEN 1987: 33, n. 2.

BADAWY 1954: 33; SÉE 1973: 114; GREEN, in: SAYCE & CLARKE 1905: 263), while others pleaded in favour of the Middle Kingdom, particularly the reign of Amenemhet III (cf. CLARKE 1921: 59). However, three out of the four available <sup>14</sup>C dates indicate a date around 2400–2300 cal BC, which corresponds to the late Old Kingdom.<sup>35</sup> These dates refer to both the inner and outer wall and therefore seem to indicate that they were part of one building project. The fourth date, for the outer wall, is a little bit more recent and refers to the very end of the Old Kingdom or the First Intermediate Period. As this last date considerably deviates from the three others, it may very well indicate a reconstruction phase. Of course, these dates do not imply that there was no wall before the late Old Kingdom.

All authors unanimously considered the Double Walls as a town wall. The existence in Egypt of city walls already during the Predynastic period was argued on iconographical grounds by WILLIAMS (1994), while actual walls of the Early Dynastic period and the Old Kingdom have been found at Elephantine (ZIERMANN 1993) and at Balat for the end of the Old Kingdom (SOUKLIASSIAN et al. 1990; see also ZIERMANN 1998). The identification of the Double Walls of Elkab as a city wall seems undeniable, although the presence of Old Kingdom buildings within the walls has never been shown beyond doubt.

City walls constructed in the manner of the Double Walls, with two heavy casing walls built up in vertical layers, are known in the south of Upper Egypt from the Early Dynastic period and the Old Kingdom at Elephantine (ZIERMANN 1993) and from the Old Kingdom onwards at Edfu (MOELLER 2003; 2004) and Kom Ombo (KEMP 1985).

Finally, there remains the problem of the original extent of the Double Walls. According to CLARKE it was possible in 1893 to trace the continuation of the Double Walls on the west side of the western part of the Great Walls, but these remains had disappeared a few decades later (CLARKE 1921: 60). If indeed the extant Double Walls were originally part of a more or less circular construction, this would imply that less than a quarter of them has been preserved. Howev-

er, it is to be emphasized that no trace of this wall has been found where it should theoretically be located, to the south of the temple area. And this despite the fact that this part of the site, and particularly the dromos of the temple, has been thoroughly investigated (CAPART 1940; VANDERSLEYEN 1970). Therefore, the reconstruction model of a circular town wall is not as evident as generally accepted.<sup>36</sup> Although he does not explicitly mention it, CLARKE apparently was aware of this problem, because in his reconstruction of the Double Walls (CLARKE 1921: pl. X), he locates the hypothetical part of the wall to the west of the dromos. This, however, supposes the wall to make a strange kink underneath the present temple area. However, even when disregarding this observation, the Double Walls can hardly have been circular, because the part that remains consists of two concave wall parts joined at an angle of 135°. If it was originally a symmetrical construction, the wall would rather have been polygonal.

It can nevertheless be accepted that the Double Walls were part of a closed construction. Otherwise they would indeed be quite meaningless. But the preserved part of the walls is not necessarily part of a symmetric layout. The extent of the enclosed area, however, cannot be determined. The only element of information is presented by the extension of the settlement remains, still present as a tell in the early 19th century, which can most probably be reconstructed as more or less oval in shape with a maximum length (N–S) of about 300 m and a maximum width (E–W) of about 170 m (HENDRICKX, in prep.). The fact that Old Kingdom walls could be irregular in lay-out is clearly illustrated by the example of Elephantine, although admittedly built in different circumstances, with constraints imposed by the shape of the island. Also the Old Kingdom walls of Edfu seem to have been irregular in shape (MOELLER 2003).

It is impossible to determine at what moment the late Old Kingdom Double Walls lost their function and became obliterated by more recent building layers. But there can hardly be any doubt that the city wall must have been rebuilt on several occasions dur-

<sup>35</sup> Previously, a date in the First Intermediate Period or early Middle Kingdom has been suggested by one of us (HENDRICKX 1999: 290) based on only two dates available at that moment. However, the new dates and the improved calibration curves for <sup>14</sup>C dates most likely exclude the early Middle Kingdom.

<sup>36</sup> Several authors (e.g., ATZLER 1972; SÉE 1973: 115; UPHILL 1988: 14) proposed a connection between the “circular town wall” at Elkab and the *nīwt* (town) sign (Gardiner O49).

ing more recent periods, as was actually also the case at Elephantine, Kom Ombo and Edfu. The epigraphic evidence is indeed quite decisive in this respect. A first item is the already mentioned stela published a long time ago by STOBART (1855: pl. I) mentioning two different phases of building activity during the Middle Kingdom, respectively under the reigns of Sesostris II and Amenemhet III. Another piece of evidence has recently come to light in the tomb of Sobeknakht at Elkab and consists of an inscription referring to the possible destruction and restoration of the city wall during the 17th Dynasty (DAVIES 2003a, 2003b). Obviously, the city walls of Elkab continued to exist from the late Old Kingdom onwards to at least the onset of the New Kingdom and most probably also for a long time afterwards.

#### APPENDIX: ARCHAEOBOTANICAL STUDY OF MUDBRICKS FROM ELKAB

Claire Newton

##### MATERIALS AND METHODS

Mudbricks from two of the walls of Elkab were collected and examined for their plant tempering material: one from the Great Walls, in place on the north wall, east of the collapsed “entrance”, and one fallen off of the outer wall of the Double Walls. Additionally, two bricks were collected from the 3rd-Dynasty mastaba,<sup>37</sup> as a point of comparison both with the Elkab walls and with the mud plaster from Predynastic Adaima (NEWTON 2004).

Half of each sample was gradually dissolved in water and all the floating organic material was collected on a 0.4-mm mesh geological sieve. Once dry, the organic samples were sorted under a low-power microscope.

##### RESULTS

The best preserved material is in the oldest bricks, located the farthest from water, *i.e.* the 3rd-Dynasty mastaba bricks (Table 2). Plant remains in the Great Walls are also well-preserved, though their colour is darker than those of the mastaba brick. They are also more diverse (hard wheat and barley chaff and straw, a grape pip, twigs) and are probably mixed with goat/sheep pellets which might account for the different state of preservation; faeces as well as cereal by-products may have been used as temper instead of “pure” cereal by-products such as seems to be the case for the mastaba material (Table 3).

The mastaba brick contains the highest percentage of organic matter in volume: 14 % as opposed to 0.3 and 3.8 % respectively for the Double Walls and Great Walls bricks. That probably reflects its better state of preservation. In terms of number of items identified – which does not take into account the uncounted items such as straw and twig fragments – the mastaba and the Great Walls bricks are similar, the Double Walls brick being very poor due to its bad state of preservation. That is related to its low topographical position, where it has been subjected to humid conditions in which organic materials are easily degraded.

The remains in the mastaba brick show that barley straw and chaff were the intended temper added to the soil, and that the other remains are a part of the cereal’s processing residues. *Cyperus* sp., *Rumex* sp., a Boraginaceae (*Echium* cf. *rauwolfii*) and at least six types of wild grasses may therefore be considered as weeds in the barley fields. The types of cereal remains include grains, lemma and palea, rachis fragments and chopped straw; they are probably mixed remains of several processing stages of the cereal: separation

	Mastaba	Double Walls	Great Walls
Compactness	++	+	+++
Mineral material	limestone nodules	few pebbles, potsherd	salt crystals, potsherd
Type of sediment	loamy sand	very sandy	clay sand
Desiccated organic material	+++	+	++
State of preservation	+++	phytoliths	++
Carbonised organic material		+	+

Table 2 First observations on the mudbricks collected from several buildings in Elkab

<sup>37</sup> The 3rd-Dynasty mastaba is located on top of the main rock necropolis at Elkab. It was excavated in 1996 and 1999. For a preliminary report, see LIMME *et al.* 1997; HUYGE 2003.

of the hulled grain from the straw after threshing, by winnowing and sieving, and separation of the naked grain from the lemma and palea after dehusking, also by winnowing and sieving.

The intended additives seem more diverse in the Great Walls brick, comprising hulled barley but mainly hard wheat straw and chaff, as well as animal dung. Other remains are also more diverse, but their origin is less clear; they may be cereal field weeds or pasture/fodder species incorporated in the brick with the dung, and/or any plant material available in the vicinity. The acacia and tamarisk leaves/twigs in particular may belong to this last category, the wild legumes, the sedge/rush tubers may be pasture/fodder plants, whereas the *Lolium* type spikelets, unlikely to survive digestion, were probably mixed with the cereal processing remains. The mixture of cereal residues with a variety of other plant remains from other activities may be in relation to the quantity of material necessary for the construction of the Great Walls, of a much larger scale than the mastaba superstructure. It is remarkable that F. UNGER, in the 1860s, had already studied the organic temper of mudbricks from the Great Walls, and had found roughly the same elements, in particular barley and naked wheat chaff (UNGER 1862: 81). In fact, that study was the first in Egypt dealing with mud brick temper and its botanical contents.

#### DISCUSSION

Considering the nature of the cereal by-products used as temper, it is significant that in the mastaba brick barley is the only cereal used. Although that may be due to the limited amount of material studied – one brick only – it is consistent with results from other such materials of that period. For instance, the adobe lining pits in late Predynastic Adaïma also includes plant tempering, consisting in a mixture of barley and emmer wheat processing by-products, the barley being in all cases the most abundant (NEWTON 2004).

Barley chaff and straw seem to have been a favoured material for mudbrick tempering in Egypt. A further indication of this is the temper analyzed from Roman mudbricks collected from Ismant el-Kharab in the Dakhla oasis. In that case, barley chaff and straw are also the most abundant plant material, at a time when naked wheat was already the most important cereal crop in Egypt (THANHEISER 1999). However, this cannot be taken as a general rule, since other examples show different results. In mudbrick buildings in the southern region of Kharga oasis, dat-

ing between the 5<sup>th</sup> century BC to the 3<sup>rd</sup> century AD, three types of plant tempering material were used; the main components of each of these are: barley chaff and straw, olive leaves mixed with barley chaff and straw, and hard wheat chaff and straw (unpublished data).

The cereal component of the temper from the Great Walls brick studied includes hard wheat in majority, with a small proportion of barley (~12%). This underlines the importance of naked wheat in the plant economy at the time of the construction of the Great Walls. Naked wheats are not part of the first crops cultivated in Egypt, as opposed to emmer wheat and barley, and are not abundant in the archaeobotanical material until the Ptolemaic period. It is usually thought that naked wheat only became a significant crop in Egypt during the Ptolemaic period, and the main cereal crop under Greek and Roman influence (BOWMAN 1986: 101; THOMPSON 1999: 128). The precise dating of its large-scale cultivation in Egypt is not known, due to the dearth of archaeobotanical studies on sites from the period (Late Period to Ptolemaic period). It is clear, however, that before it became the major cereal crop, it had been in cultivation for some time.

The importance of naked wheat in Egyptian agriculture also probably varied regionally, which makes its assessment all the more difficult. The date of construction of the Great Walls to the reign of Nectanebo and the identity of the cereal products used as tempering in its bricks lead us to reconsider the hypothesis that naked wheat was only a secondary crop before the Ptolemaic period. Its economic importance in the Late Period would then be already significant in the Upper Egyptian agriculture.

Two recent archaeobotanical studies, from an oasis site and from an Upper Egyptian site, are relevant to emphasize the importance of the data from the Elkab wall bricks. At ‘Ayn-Manâwir in the Kharga Oasis, emmer wheat was still predominant over hard wheat during the First Persian occupation (5<sup>th</sup> century BC), whereas emmer wheat has not been found in Roman (2<sup>nd</sup> century AD) contexts (NEWTON 2002, p. 365–366, NEWTON *et al.* 2005). Cereal remains studied from Ptolemaic contexts in the same area are not numerous enough to come to any conclusion; both hulled and naked wheats are present (NEWTON 2002: 365).

In the “priests’ houses” located within the precinct of Karnak temples (excavated by Aurélia Masson, CFEETK), no remains of naked wheat have been found from the 25<sup>th</sup>/26<sup>th</sup> Dynasties until the early Ptolemaic period; emmer wheat is still the only

identified wheat species, together with hulled barley (unpublished data). In comparison with the Great Walls mudbrick plant temper, this points to the geographical variability in the economic importance of hard wheat.

In addition to its palaeoethnobotanical significance, studying mudbrick temper also yields impor-

tant if selective data on agriculture. In this case especially, since we are dealing with a critical chronological period. In fact, up to now archaeobotanical studies on late periods until Ptolemaic times have been few and are needed from the delta and the Nile valley itself if we want to understand this important stage in the history of Egyptian agriculture.

Brick				B3	B1	B2
Wall				Mastaba	Double Wall	Great Wall
Date				3 <sup>rd</sup> Dynasty	Old Kingdom	Nectanebo
Date BC				~2700–2625	~2400–2200	cf. 4 <sup>th</sup> c.
Brick size (cm)				25 × 12 × 6,5	24 × 18 × 8	31 × 15 × 9
Brick volume (l=dm <sup>3</sup> )				2,0	3,5	4,2
Volume treated (l)				2,0	1,9	2,1
Volume organic matter (ml)				275	5	80
% of organic matter				14,1	0,26	3,8
Volume organic matter sorted				275	5	80
% of the total organic matter of one brick				100	55	50
Taxon	English name	Type of remain	Preservation			
Animal remains						
Herpetofauna	cf. small lizard	vertebra	D		2	
Entomofauna	insect	cuticle fragment	D	9	p	abdt
Insect pupae in cf. Boraginaceae leaves			D			p
Ruminant/donkey		dung	D			p
Sheep/goat		pellet	D		p	
Rodent/bat type		dung	D			p
Wood/vegetative parts						
X		wood	C		p	p
			D		3	abdt
X		thread	D	1		
			C	1		1
Acacia type	acacia	leaflet	D			24
			C		2	1
<i>Tamarix aphylla</i>	leafless tamarisk	internode	D			11
			C			
<i>Tamarix</i> type	tamarisk	stem fragment	D	4		
Boraginaceae type		leaf	D		4	
<i>Cyperus rotundus</i> type	nutgrass	tubercule	D			1
Cyperaceae type		tubercule	D			3
Poaceae		culm base with roots	D			1
		culm node	D	9		20
		culm fragment	C	p		p
		root fragment	D	4		
Fruits						
Acacia type	Acacia	seed coat	D			0,25
<i>Vitis vinifera</i>	Grape		D			1
Total fruits				0	0	1,25
Cereals						
<i>Hordeum vulgare</i>	hulled barley	caryopsis	D	19		
		palea & lemma	D	9		p

Table 3 Mudbricks from Elkab. Counts of identified plant macroscopic remains

Brick				B3	B1	B2
<i>Hordeum vulgare</i>	hulled barley	arista	D	29		
		hollow spikelet	D	34		7
		rachis fragment	D	184		18
		rachis base	D	9		
<i>Triticum turgidum</i> subsp. <i>durum</i>	hard wheat	glume	D			abdt
		rachis fragment	D			140
		rachis base	D			7
		rachilla fragment	D			33
		rachilla base	D			1
Cerealia		caryopsis, fragment	D	2		
Total of cereal remains				286	0	206
Wild grasses						
<i>Crypsis schoenoides</i>	pricklegrass	caryopsis	D	21		9
<i>Digitaria</i> sp. type	crabgrass	hulled caryopsis	D	1		
<i>Lolium</i> sp.	rye grass	spikelet	D			13
<i>Phalaris</i> sp.	canary grass	hulled caryopsis	D	7		
<i>Setaria viridis/verticillata</i> type		hulled caryopsis	D			1,5
wild Poaceae		caryopsis	C		1	
			D	16		
		panicle fragment	D	2		
Poaceae		caryopsis	D	1		
Total wild grasses				48	1	23,5
Other wild plants						
<i>Cyperus</i> sp.	sedge		D	2		4
Cyperaceae		fruit w/ bracts	D	1		
<i>Coronopus niloticus</i>			D			4
<i>Enarthrocarpus</i> sp.		fruit segment	D			4
<i>Echium</i> cf. <i>rauwolfii</i>			D	0,2		
<i>Heliotropium</i> sp.	heliotrope		D			3
cf. <i>Silene</i>	campion/catchfly	fruit	D			7
Caryophyllaceae		fruit base	D		1	3
			D			2
Chenopodiaceae			D			1
<i>Cullen plicata</i>			D			15
<i>Astragalus</i> cf. <i>tribuloides</i>	milk-vetch	pod fragment	D			5
<i>Astragalus</i> sp.	milk-vetch		D			12
<i>Trifolium</i> sp.	clover		D			3
Fabaceae			D			19
<i>Malva</i> sp. type	mallow		D			1
<i>Rumex</i> sp. type	dock		D	1		
Cyperaceae/Polygonaceae			D	1		
Total other wild plant remains				5,2	1	83
Total				367,2	13	375,75
Total per brick				367,2	23,6	751,5
Number of types of plant remains				25	9	42

Preservation: D: desiccated, C: carbonized

Unless otherwise stated, the type of remain is the smallest dispersal unit resulting from sexual reproduction, *i.e.* seed or fruit.

Table 3 continued Mudbricks from Elkab. Counts of identified plant macroscopic remains

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