

# SUDAN & NUBIA

The Sudan Archaeological Research Society



*Bulletin No. 19*

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Front cover: QSAP Dam-Debba Archaeological Survey Project. Site DS7, Ganati: the re-erected columns in the church (photo: Fawzi Hassan Bakhiet).

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# Newly Discovered Middle Kingdom Forts in Lower Nubia

James A. Harrell and Robert E. Mittelstaedt

## Introduction

Egypt forcibly occupied Lower Nubia during the Middle Kingdom's 12<sup>th</sup> Dynasty and by the end of this period had built 15 forts along the River Nile between the First and Second Cataracts (Clarke 1916; Lawrence 1965; Monnier 2010, 117-159; Vogel 2010). One other Nubian fort from this time has been long known and it is in the desert 25km south east of Aswan, where it guards the Wadi el-Hudi amethyst mine (Figure 1) (Fakhry 1952, 13-14; Shaw and Jameson 1993, 88-94; Klemm *et al.* 2002, 61-62; Monnier 2010, 171-172 ; Liszka 2015). In 2014, while conducting a survey of ancient gold mines in the desert east of Lake Nasser, the authors dis-

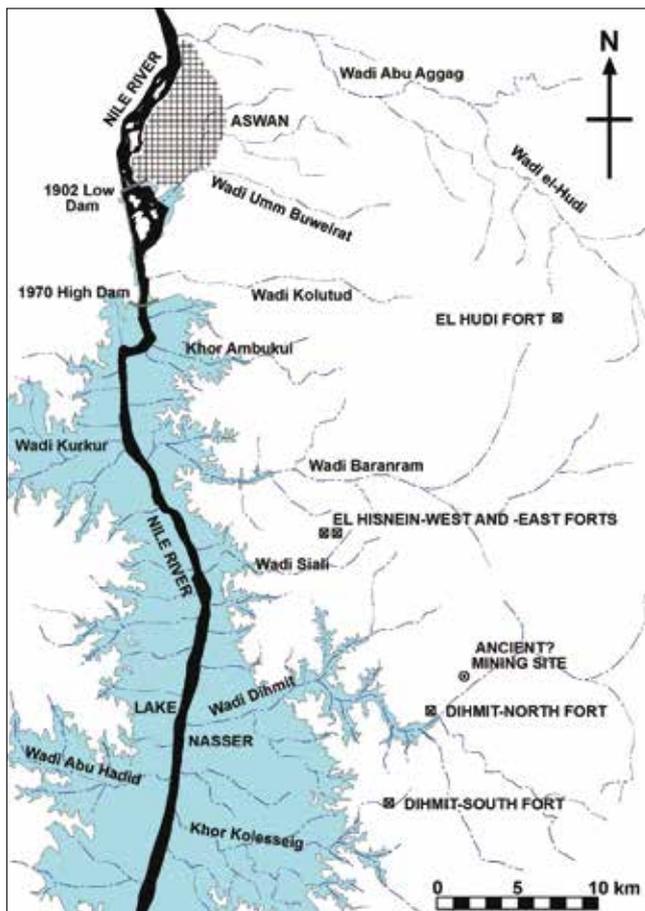


Figure 1. Map of the region south east of Aswan showing the locations of the desert forts. The area covered by Lake Nasser and the wadi courses above lake level are taken from composite Google Earth satellite imagery of recent years, and the original course of the Nile River (prior to the 1902 Low Dam) and wadi courses below lake level come from 1:100,000 topographic maps published by the Survey of Egypt (Aswan sheet 12/78, 1940; and Kalabsha sheet 8/78, 1943).

covered four more Middle Kingdom forts that are associated with these mines: two at the el-Hisnein site (the 'East' and 'West' forts) in Wadi Siali (or Sayala), one in Wadi Dihmit (or Dihmid; the 'Dihmit-North' fort), and the fourth just south of Wadi Dihmit in an unnamed tributary of Khor Kolesseig (or Saqr; the 'Dihmit-South' fort) (Figure 1).

The Middle Kingdom's desert and river forts are fundamentally different kinds of installations. The purpose of the river forts was to control both trade along the Nile and movements of the local Nubian pastoralists, the C-Group Culture, as well as to guard against incursions by the Kingdom of Kerma to the south and the pastoral nomads of the Eastern Desert, some of whom the Egyptians referred to as the Medjay. With the partial exception of Kor (Buhen-South), these forts were constructed of mud brick with perimeter walls up to 14m high and 8m wide at the base (Vogel 2010, 19). The desert forts, in contrast, were built to guard mines (with the possible exception of Dihmit-North), and have lower and thinner perimeter walls of stone (Table 1). Despite their smaller walls, these structures cover areas as large as some of the river forts. Whereas the latter are 'fortresses' in the full meaning of the word, the desert sites are perhaps more appropriately thought of as 'fortified camps or enclosures'. Most of these, however, resemble fortifications with their solid walls, bastions and loophole-like windows.<sup>1</sup> For both this reason and the sake of simplicity, all of the desert installations are referred to here as 'forts'.

Much more work is needed on the newly discovered desert forts and so what follows is only as an initial description based on the authors' brief reconnaissance. An analysis of the pottery from these forts was provided by Sylvie Marchand (Institut Français d'Archéologie Orientale, Cairo, Egypt), where she worked from photographs taken by the authors. All the forts are well dated by pottery (and an inscription at Dihmit-South) to the Middle Kingdom's 11<sup>th</sup> and especially 12<sup>th</sup> Dynasties.

## Building materials

Mud brick was doubtless the preferred building material for Middle Kingdom forts but was not an option outside the Nile Valley. Instead, the desert forts were constructed entirely from the locally available bedrock. The stone was not quarried, but rather was harvested as already loose rubble from the neighboring hillsides. The stones were set in the walls without mortar and, with rare exceptions, were not dressed. At all five forts the building material is the same, namely 'granite' according to the two most recent geological maps of the area (the 'gs' unit of Klitzsch *et al.* 1986-1987 and Hermina *et al.* 1989, 52, and the 'gm' unit of EGS 1996). The pieces of rubble collected for the walls can be described as 'cobbles' and 'boulders' as defined in the widely used Udden-Wentworth

<sup>1</sup> The term 'window' is used here in the general sense of a narrow opening through a perimeter wall. Although the actual function of these openings in the desert forts is open to question, we believe they served as both arrow slits (i.e., loopholes) for archers and observation ports.

Table 1. Comparison of Middle Kingdom Desert Forts.

	El-Hisnein-West	El-Hisnein-East	Dihmit-North	Dihmit-South	El-Hudi
<b>Location</b>	23° 50.41' N 32° 59.13' E	23° 50.43' N 32° 59.64' E	23° 44.46' N 33° 3.21' E	23° 41.46' N 33° 1.50' E	23° 57.69' N 33° 7.88' E
<b>Perimeter Wall</b>					
length (m)	~415	~240	~180	~310	~240
height (m)	1-1.2	~2		2-2.4	~2
width (m)	less than 0.3	~1 at base tapering to ~0.5 at the top			
bastions	yes		no	yes	
windows (averaging ~1m above wall base)	no	yes, only in sections between bastions	no	yes, only in bastions	yes, only in sections between bastions
<b>Area (m<sup>2</sup>)</b>	~9000	~3800	~2000	~5900	~3600
<b>Maximum Dimension (m)</b>	~150	~90	~70	~120	~85

grain-size scale where clasts between 64mm and 256mm across are cobbles and those over 256mm are boulders. At the el-Hisnein-West fort the walls are made mostly with cobbles, but boulders predominate in the walls of the other four forts. The clast size decreases somewhat as the walls thin upwards and smaller clasts are sometimes used as a 'rubble fill' in the lower, thicker portions of walls.

### The el-Hisnein-East and -West forts

At the el-Hisnein site, a name coined by the authors and meaning 'the two forts' in Arabic, there are two installations separated by only 700m. Of all the newly discovered forts, the eastern one at el-Hisnein is the most similar to the el-Hudi fort in terms of both size and design (Table 1). Unlike el-Hudi, however, the interior of the el-Hisnein fort is largely



Plate 2. El-Hisnein-East fort from the west with the gold mine in the foreground.



Plate 1. El-Hisnein-East fort from Google Earth satellite image taken on 5<sup>th</sup> January 2013.

devoid of structures (Plates 1-3). Besides the two buildings in the south-eastern half, there is a larger structure, with three rooms, just inside the gate at the fort's northern corner (Plates 1 and 3). This is a good example of the standard Middle Kingdom military barracks with one cross-rectangular anteroom or courtyard opening into two elongated, rectangular inner

rooms (Vogel 2010, 39-41). Such three-room suites are not found in any of the other desert forts. Also inside the fort is a circular-walled structure (3m in diameter) in the small wadi that now cuts through the site. This might be a well as suggested by its shape and location (Plates 1 and 3), but the deeper alluvium in the main branch of Wadi Siali, on the other side of the hill just south of the fort, is a more likely location for a well. Across from the putative well in the fort's north-western half there are four stone rings (3-4m in diameter) (Plates 1 and 3), and on the adjacent ground there are sherds of the distinctive incised ware of the Nubian C-Group Culture. As noted by Trigger (1965, 98) and Bietak (1987, 118), C-Group encampments consisted of stone rings of a size

similar to those in the fort and these supported wood-frame or pole constructions for tent-like shelters covered by reed mats or animal hides. As a further indication of the presence of Nubians at el-Hisnein-East there is the perimeter wall where many of the granite boulders are stacked at an angle (Plate 4). According to Kate Liszka (pers. comm.), this



*Plate 3. View across the interior of the el-Hisnein-East fort showing the ruins of a building in the foreground at left, the three-room suite near the gate, a possible well in the wadi between the two structures, and stone rings to the upper left of the well.*



*Plate 4. Section of the perimeter wall at the el-Hisnein-East fort showing windows and inclined stacking of boulders, especially on the left side.*

construction style may be characteristic of the C-Group Culture. It is also seen at el-Hudi but not at the other desert forts, which yet again affirms the close affinity between the el-Hisnein-East and el-Hudi sites. It is additionally notable that the perimeter walls of these two forts are similar in their construction to the wall built around the C-Group settlement at Wadi es-Sebua (Sauneron and Jacquet 2005, 326-328). Although the latter wall may be an Egyptianizing feature, it is nevertheless consistent with the notion that the Nubians built the el-Hisnein and el-Hudi forts under the direction of Egyptians. It remains to be determined if the Nubians were hired, enslaved or corvée laborers.

A gold mine is 120m west of the el-Hisnein-East fort at  $23^{\circ} 50.43' N / 32^{\circ} 59.54' E$  (Plate 2). This is a single sub-circular pit about 18m across and up to a few meters deep with a central bedrock knob and surrounding spoil piles up to a few meters high. Although there has been recent gold mining here, it seems the pit was only deepened rather than extended laterally. The gold occurs in quartz veins and pockets within the granitic bedrock and some of the dolerite pounders used to work this deposit are found around the pit.

What appear to be the remains of a collapsed stone redoubt sit atop a low hill 50m west of the mine pit at  $23^{\circ} 50.43' N / 32^{\circ} 59.50' E$  (Plate 5). It is circular in outline with a 4.5m diameter and an originally open interior. Given its elevated position, this structure probably served as a lookout post. Just below the redoubt on its south side there are several pieces of sandstone that have been carved into oddly curved blocks. These cannot be grinding stones as the rock is too soft and lacks the parallel striations typical of such equipment, and so they are perhaps architectural elements from the redoubt.



*Plate 5. Collapsed hilltop redoubt with the el-Hisnein-East fort in the background.*

The el-Hisnein-West site hardly deserves the appellation 'fort.' Although in outline it resembles a fort with its semi-circular, bastion-like protrusions along the west and north sides of the perimeter wall (Plates 6-8), this wall seems too weak to serve as a fortification. With an original height of only 1-1.2m and a width of one or two cobbles, an attacker could easily jump over the wall or kick it down (Plate 8). Two igneous felsite dikes, which form wall-like rock formations, were cleverly incorporated into the fort's perimeter: a higher one on the east side and a lower one on the south, with the top of the latter extended upward with stacked stones. A gap in the eastern dike may have been the fort's gate. The main structure within the fort is a multi-room, rectangular building measuring 30 x 17m. Given the bastions along its sides, this appears to be an inner fort but with an original height up to 1.5m, its walls are only marginally more defensible than the fort's outer perimeter.

There is a gold mine inside the el-Hisnein-West fort with the pit at the north-west corner of a roughly square, 40 x 40m, cleared area (Plates 6 and 7). The surface rubble was removed from this patch of ground and deposited in linear rows along its sides, and this was apparently done preparatory to mining. The same rubble clearing is seen around the scattered workings in the Wadi el-Hudi amethyst mine. The extent of the original mine pit is unknown because it has been largely destroyed by modern mining. Sadly, this activity resumed in late 2013 with the result that much of the inner fort was demolished. The gold at this site occurs in quartz veins within the granitic bedrock, but the modern workings

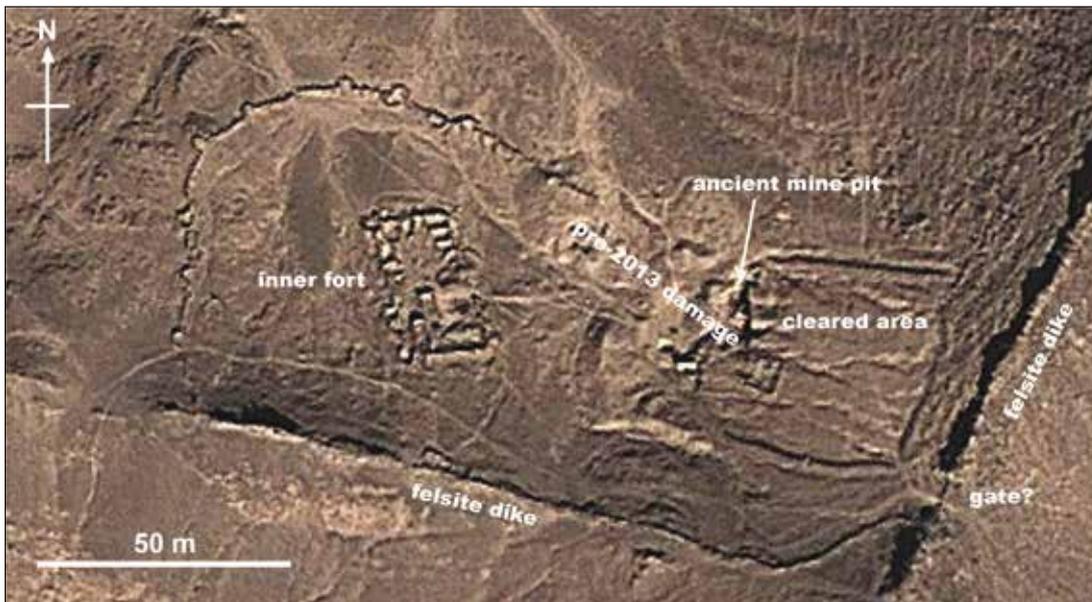


Plate 6. El-Hisnein-West fort from Google Earth satellite image taken on 5<sup>th</sup> January 2013.



Plate 7. El-Hisnein-West fort from the north east. Note the deep pits and high spoil piles around the inner fort, which were not present when the satellite image in Plate 6 was taken.

have pursued these veins into the chlorite schist underlying the inner fort. There are traces of copper mineralization in the quartz (i.e., chrysocolla deposits) and this is a common feature of pre-New Kingdom gold mines where it was the



Plate 8. Western perimeter wall of the el-Hisnein-West fort with a bastion in the foreground.

conspicuous green copper minerals that first alerted prospectors to the possible presence of gold (Klemm and Klemm 2013, 603-606). There is another mine pit 180m south-west of the fort at 23° 50.34' N / 32° 59.00' E, and this is up to 8m across and surrounded by spoil piles. How much of this excavation is the result of modern gold mining is unclear, but it is probably ancient at least in part.

### The Dihmit-North and -South forts

Whereas the el-Hisnein forts are easy to reach by off-road vehicle, in late 2014 it was not possible to drive to the Dihmit-North and -South forts due to the unusually high level of Lake Nasser. Although this makes them difficult to access for researchers, it does help to protect them from the depredations of gold prospectors who, since the 2011 revolution, have been digging up ancient sites throughout the Eastern Desert.

The Dihmit-North site has the smallest of the five desert forts (Table 1) and although its perimeter wall is as high and thick as those at el-Hisnein-East and el-Hudi, it lacks bastions and windows (Plates 9-11). It also differs from the other forts in not having a mine beside it. It was perhaps built to control access through Wadi Dihmit, which is a natural highway connecting the Nile Valley with the desert plateau to the east. Alternatively and more likely, this site is associated with gold mining. A local fisherman reported to the authors that in recent years prospectors recovered substantial amounts of gold from the fort's floor and the densely pitted ground within the fort bears testimony to this activity. Fortunately the walls were left largely undamaged by this digging except at the southern corner, where a pit was excavated to a depth of a few meters. From the shallowness of the other pits (less than 500mm deep) it seems the gold was in the loose surface debris rather than in the solid granitic bedrock underlying the fort, although the prospectors who dug the deep corner pit apparently thought otherwise. The gold found at Dihmit-



Plate 9. Dihmit-North fort from Google Earth satellite image taken on 17<sup>th</sup> July 2013.



Plate 10. Dihmit-North fort from the west with the flooded and dry sections of Wadi Dihmit in the distance.



Plate 11. View across the interior of the Dihmit-North fort.

North came from elsewhere and one possibility is a site 3km to the north-east at 23° 45.80' N / 33° 4.09' E (Figure 1). Here there are about two dozen stone huts arrayed around a shallow, oval-shaped pit measuring 15 x 9m. This site is currently only known from satellite imagery, but the presence of gold prospecting pits in the neighborhood suggest that it is a gold mine and, moreover, an ancient one given the resemblance of its huts to those found around the Dihmit-South mine (see below). Apart from two windbreaks on adjacent hilltops (apparently for lookouts), there are no built structures or other notable archaeological features outside the Dihmit-North fort.

The Dihmit-South site has the largest and most elaborate of the desert forts (Plate 12). There are two sprawling room clusters inside the fort that are bordered by large open areas (Plate 13). The original wall heights for the rooms range between 1.5m and 2m. The fort's only gate is now largely blocked with collapsed debris and among the rubble are

heavily chiselled, rectangular blocks of sandstone that are apparently part of the original gate architecture. Bastions in the desert forts are more prone to collapse than the intervening linear wall sections, and so the well-preserved bastion on the Dihmit-South fort's north side is all the more remarkable with its wall still standing at the original 2.4m height (Plates 13 and 14). In this and the other bastions the windows are mostly blocked with stones (Plate 15).

Surrounding the fort are two curious features: a line of mostly cobble-size stones and, just beyond this, a cleared track 3.2-4m wide (Plates 12 and 16). Both are well-preserved on the fort's north and east sides, and traces remain on its west and, across the *wadi*, south sides. They apparently originally crossed the *wadi* and have since been eroded away. On the south side, the line

of stones has a curious bastion-like protrusion (seen in Plate 12). The purpose of these features is uncertain, but the line of stones is perhaps the collapsed remains of a low, narrow wall like the one that still stands at el-Hisnein-West (Plate 8). Alternatively, as suggested by Franck Monnier (pers. comm.), the stones may have anchored some kind of wooden barrier, perhaps one made with thorny acacia-tree branches. At the fort's north-east corner, there is a second, wider (4.7-5m) cleared track branching off from the first one and heading toward the perimeter wall (Plates 12 and 16). This perhaps leads to an earlier gate into the fort and so suggests that the cleared tracks are, in fact, roadways. There is a similar roadway outside the el-Hudi fort that winds through the mining area and then continues toward Aswan (Fakhry 1952, 12; Shaw and Jameson 1993, 92).



Plate 12. Dihmit-South fort from Google Earth satellite image taken on 9<sup>th</sup> July 2013.



Plate 13. Dihmit-South fort from the west. Note the well-preserved bastion at lower right and, outside the fort, the line of stones and, beside it, a cleared track.

Among the more remarkable remains at Dihmit-South are two well-built and -preserved houses on the low hill west of the fort (Plates 12, 17 and 18). These rectilinear structures measure 7 x 5m and 4 x 4m, and the smaller (southern) one has an L-shaped extension on one side. The walls of both houses are built like those in the fort but on a slightly smaller scale. They are 1.4-1.5m high and taper upward from 0.8-1m wide at the base to 400-500mm at the top. The eroded remains of two other similar houses are found just to the south on the edge of the *wadi* (Plate 12). As far as we are aware, these houses are unique in terms of their design and preservation among Egypt's Middle Kingdom remains.



Plate 14. Interior view of the well-preserved bastion noted in the caption for Plate 13.

On the rising ground across the *wadi* to the south there are two mine pits bordered by large spoil piles (a lower pit at 23° 41.36' N / 33° 1.48' E, and an upper pit at 23° 41.30' N / 33° 1.50' E). Both pits are about 35m across, up to several meters deep, and excavated in hydrothermally altered granite (Plates 18 and 19). In the floor of each pit there is a square, vertical-walled shaft 13-14m deep. Presumably these branch out at their bottoms into tunnels, but this has not yet been investigated. From the noxious, ammonium-laced fumes wafting out of the shafts, it is clear that they are now colonized by bats. Found on the floors of both pits are the dolerite and milky quartz pounders used by the miners. These men were apparently housed in the dozens of small, crudely built stone huts that surround the mine pits. There are abundant indications of copper mineralization in



Plate 15. Two windows in a bastion wall at the Dihmit-South fort that have been blocked with stones.



Plate 16. Line of stones and cleared track just outside the Dihmit-South fort's north-east corner.



Plate 17. Northernmost of the two well-built houses west of the Dihmit-South fort.



Plate 18. Dihmit-South site from the south with the fort at upper right, two well-built houses to the west at upper left, the lower mine pit at center, and sandstone block with inscriptions and rock art at lower left.

case. The Dihmit-South mine may well be for gold but it is also possible that copper was produced here as well, at least in the upper pit. Such combined gold and copper mines are known from the Middle Kingdom elsewhere in the Eastern Desert, such as in the Wadi Umm Balad area west of the Gulf of Suez at 27° 49.76' N / 32° 46.14' E (Castel *et al.* 1998; Klemm and Klemm 2013, 56-61). Although modern gold prospectors have been active in the area and even reoccupied the two houses west of the fort, the ancient mine pits appear to be largely undisturbed. Instead, a new mine adit was excavated in the hillside above the upper pit.



Plate 19. Lower mine pit at the Dihmit-South site. Note the square shaft opening in the pit's floor at center.

Cut into a large block of pebbly sandstone beside the lower pit are six hieroglyphic texts and six rock-art scenes (at 23° 41.31' N / 33° 1.46' E; Plates 12 and 18). The longest and best-preserved of the texts (Plate 20) reads: (line 1) Regnal year 31 under the majesty of Horus, Life of Births; (line 2) the King of Upper and Lower Egypt, Kheper-Ka-Re, Son of Re, Sensusret [I], may he live like Re forever and ever; (line 3) his true and favorite servant, a man of...[possibly the hometown of this official as a city determinative appears to be written] who does what is praised by the one who sent

the upper pit (veins of chrysocolla) and traces of the same in the lower one, but in neither were quartz veins seen. Such veins are invariably present where gold deposits are found. It is possible these were missed in the authors' too brief examination, and the presence of numerous modern gold-prospecting pits in the immediate area suggests this is the

(line 4) him, the Chief of the South, User-Montu [or possibly “son of User-Montu”], Intef...; (line 5) I brought *ḥsmn* and all kinds of fine stone [?](translation provided by James Hoffmeier working with Carola Vogel, Lutz Popko and Kenneth Kitchen). This translation is preliminary since it is based only on the photograph in Plate 20. The word *ḥsmn*



Plate 20. Hieroglyphic text dated to year 31 of Senusret I on a sandstone block in the Dihmit-South mine.

can mean amethyst, bronze (or copper) or natron depending on the context (Harris 1961, 63-64, 121-122 and 195-196), but in this case it can only refer to either amethyst or copper. If the gemstone is meant, it must come from the Wadi el-Hudi mine because no trace of amethyst has been found at Dihmit-South. And if it is the metal that *ḥsmn* refers to, this could well be the copper ore in the Dihmit-South mine. The rock-art scenes on the sandstone block include two each showing cattle (Plate 21), ostriches, and human figures. While this rock art cannot be dated with certainty, it seems likely that it was left by the non-literate C-Group Nubians who are known to have produced scenes of cows and their calves like the one in Plate 21 (Williams 1983, 99-104, see especially pls 95-96; Bietak 1987, 118). This attribution is supported by the presence of C-Group incised ware inside the Dihmit-South fort. All the rock art on this block is essentially the same in



Plate 21. Rock art scene of a cow and its calf on the same sandstone block as the text in Plate 20.

terms of execution style and degree of weathering, and so is probably contemporary.

## Discussion

### *Wall dimensions*

From Table 1 it is evident that the el-Hudi, el-Hisnein-East, Dihmit-North and, except for height, Dihmit-South forts have perimeter walls built to the same dimensions: i.e., ~2m high, ~1m wide at the base and tapering upward to ~500mm at the top with, for the forts that have them, windows ~1m above the base of the walls. The perimeter wall is 1-1.2m high at el-Hisnein-West, and at Dihmit-South it varies from 2m to 2.4m. These dimensions seem to represent multiples of the cubit or, at least, an approximation of it. Although the length of the cubit during the Middle Kingdom is uncertain, there is no reason to think it was significantly different from the royal cubit of 523-525mm known from New Kingdom cubit rods. It is also true, however, that 2m is about as high as workers can lift stones when building a wall, and so perhaps the height is a reflection of this limitation and only coincidentally equals about four cubits. Higher walls could have been constructed with the aid of ladders or scaffolding, and so obviously those in the desert forts were only built as high as was deemed necessary. At Kor, the only river fort with some stone construction, the early 12<sup>th</sup> Dynasty outer wall of ‘Fortification II’ and the 13<sup>th</sup> Dynasty wall of ‘Fortification I’ were made with undressed blocks of the locally available sandstone (Smith 1966). These walls are 900mm wide at their bases, taper upward, and have semi-circular bastions. Although only the lower courses survive, the walls could not have been much higher than 2m given their narrow basal widths. Thus, from the evidence at Kor, it appears that the perimeter walls of the desert forts were built to standard Egyptian military specifications, at least, when using undressed stone.

### *Builders and miners*

It is known from inscriptions associated with Middle Kingdom gemstone mines in Nubia that Egyptian troops were heavily involved in these enterprises. For example, they were at the Wadi el-Hudi amethyst mine (e.g., inscription WH 6 from year 17 of Senusret I; Sadek 1980, 103) and at the Stela Ridge mine for carnelian and other colored chalcedonies (e.g., stela of Horemhet from Toskha West and dating to year 4 of Amenemhet II; Simpson 1963, 50-53). The el-Hudi fort was certainly garrisoned by troops and the other desert forts probably were as well. It is also clear that C-Group Nubians were present in at least three of the forts (el-Hisnein-East, Dihmit-South and el-Hudi) and there is no reason for this unless they were there to do labor; i.e., building and mining under supervision of Egyptian troops. Some of the miners, however, were Egyptians as indicated in the aforementioned WH6 inscription at el-Hudi. Egyptian miners were probably present at some or all of the other forts. This is suggested, for example, by the many dispersed stone huts outside the Dihmit-South fort and at the mine near Dihmit-North. These



are suitable shelters for Egyptian miners who are there by choice but not for escape-minded Nubian captives.

### *Purpose of the forts*

The term 'fort' implies a defensive structure built to repel human attackers, but the desert forts seem poorly designed to do this. This is especially the case for Dihmit-North, which has no bastions or windows in its perimeter wall to aid the defenders. Any one manning the walls inside this fort would have been effectively blind to activity on the outside. This fort is also closely overlooked by elevated ground on three sides, providing attackers with a clear view of its interior. The forts with bastions and windows are not much better off. The windows provide a very narrow field of view and so would have been of limited benefit to archers and observers. Only at Dihmit-South, where the windows are in the bastions, would the archers have a good shot at the areas outside the perimeter wall between bastions. There are no indications in any of the forts of step-up parapets on the inside of the walls, including the bastions, and so these barriers were too high to allow the defenders to strike at the attackers from above. If the walls were intended to repel attacks, then the defenders seem to be largely limited to one dubious tactic, engaging the enemy as they climb over the top of the wall. At this point the climbers are at their most vulnerable because they cannot wield their weapons when holding onto the wall. Perhaps this is a sufficient tactic if the attackers are small in number, as would probably be the case for marauding bands of Nubians from the Nile Valley or Medjay from the Eastern Desert.

If the Nubians working at the forts were war captives from Egypt's conquest of Lower Nubia, then the forts may have been built to imprison them and so functioned as fortified labor camps. That such camps existed in the region is demonstrated by an inscription left by Antefoker, Amenemhet I's vizier, at el-Girgawi near the mouth of Wadi Korosko, about 150km south of Wadi Dihmit (Quirke 1988, 85-86; Obsomer 1995, 245-249; Monnier 2010, 165). Here Antefoker says he built an enclosure (*hmrt*) to hold Nubian captives. If the desert forts served the same purpose, it is unclear how the spaces inside could be shared by troops and their captives or how the captives could be prevented from escaping over the low walls.

If not for repelling attackers or confining prisoners, conceivably the walls around the desert forts were merely intended as statements of ownership and control. Such seems to be the purpose behind the modern-day practice in Egypt of building high walls around all manner of properties. The ancient Egyptians had the same penchant judging from the mud-brick enclosure walls around sites where no fortifications were needed, such as pyramid and temple complexes.

A final possible purpose of the perimeter walls is the protection of animals. The people working at these sites would have had animals – donkeys for transport, and cattle, sheep and goats for food. These animals would naturally attract predators, such as nocturnal packs of jackals and especially hyenas, and so would need to be kept inside the forts at night.

It is known from zoo containment studies that hyenas and jackals can jump vertically up to two times their body length (BNZ 2007, 36-40). The average body lengths for the Egyptian striped hyena and golden jackal are, respectively, 1.04m and 0.87m (Osborn and Helmy 1980, 361-371 and 422-432) and so these animals can jump up to about 2m. Gupta (2008, 23 and 25) reports that containment walls for both hyenas and jackals at several zoos around the world range from 2m to 3m with these heights reflecting not only on how high the animals can jump but also including a safety margin. Thus the perimeter walls at the desert forts are at just the right height to stop all but the largest and most determined canines. If the line of stones around the Dihmit-South fort did, in fact, anchor something like an acacia-thorn barrier, perhaps this was more to prevent animals from wandering away from the fort than to impede human attackers.

It is likely that the perimeter walls served more than one of the above functions. However, the Middle Kingdom chalcidion mine at Stela Ridge provides a good indication of the principal purpose of the desert forts. Stela Ridge is north west of Abu Simbel in the western Nubian Desert at 22° 54.03' N / 31° 19.00' E and was about 70km from the River Nile. Although there is abundant loose stone nearby, no fort was built here. Clearly there were no concerns with attacks or predatory animals, and this is doubtless due to the mine's great distance from the Nile, which placed it well beyond the reach of such threats. Also, if Nubians were doing forced labor at Stela Ridge, then there was no need to confine them behind walls. The mines with forts in the eastern Nubian Desert were much closer to the Nile where predatory animals would be a problem and they were also in territory occupied by the sometimes hostile Medjay. One may surmise from this that defence from both of these threats was the reason for building the desert forts.

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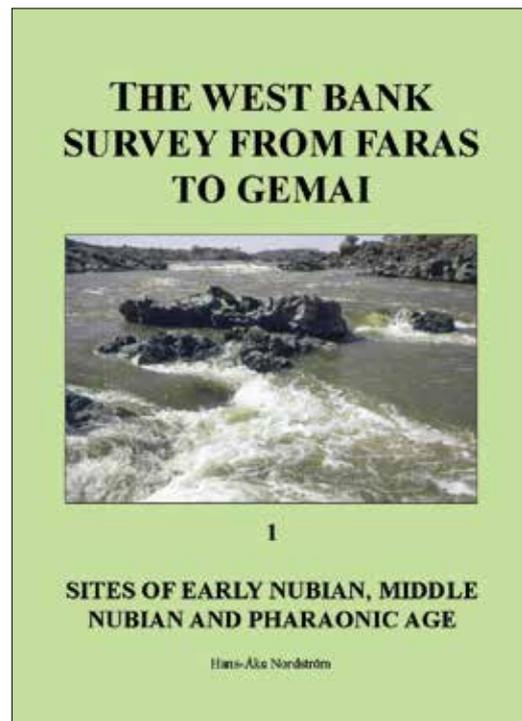
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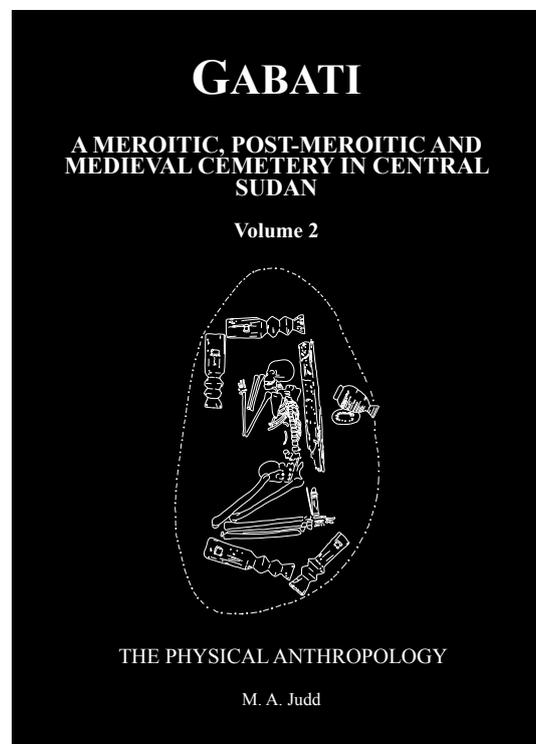
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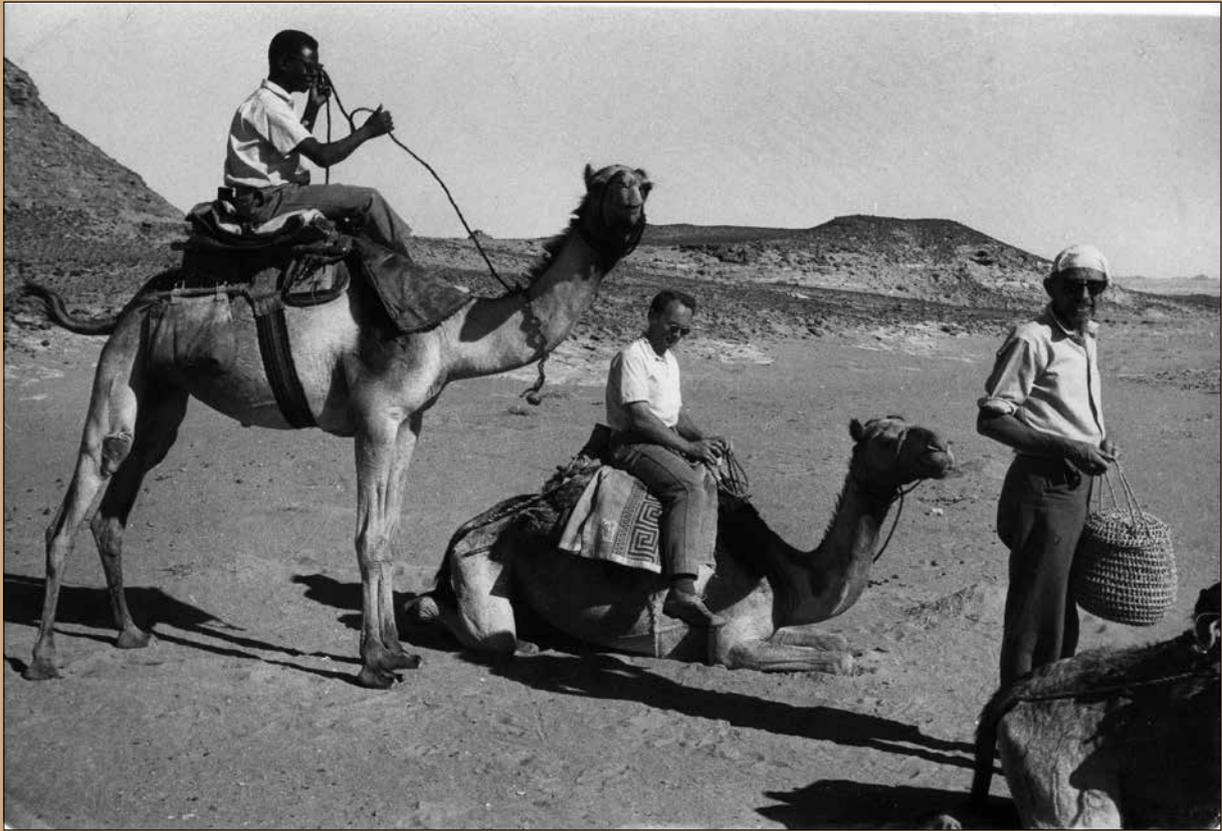
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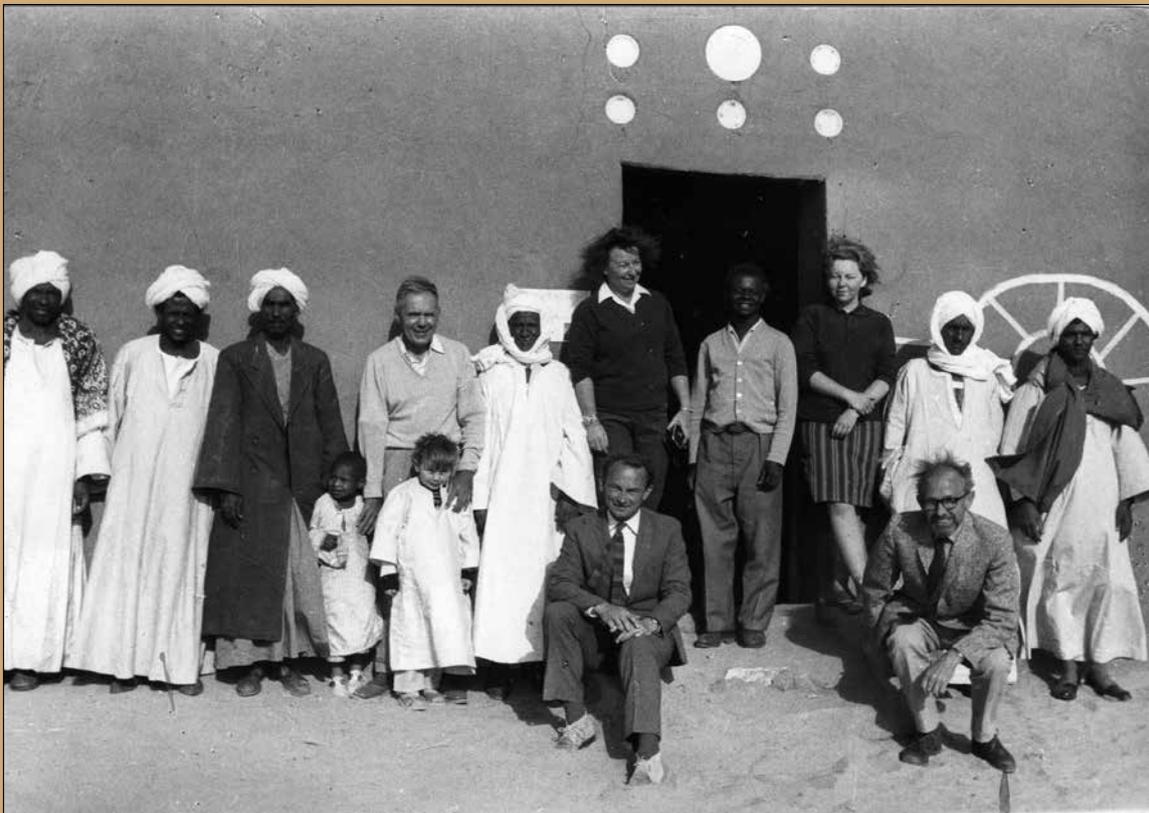
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*The Debeira West excavation team 1964 with amongst others, Peter and Margaret Shinnie, John Alexander, John Anquandah and Tony Bonner (photo: SARS Alexander Archive, ALE P003.04).*