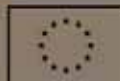


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## QuarryScapes Report

### Characterisation of complex quarry landscapes: an example from the West Bank quarries, Aswan

Work Package 4, Deliverable No. 4



Editors: Elizabeth Bloxam, Tom Heldal, Per Storemyr

Authors: Elizabeth Bloxam, Tom Heldal, Per Storemyr, Adel Kelany, Patrick Degryse, Reidulv Bøe, Axel Müller

# Quarry Scapes

Conservation of Ancient Stone Quarry Landscapes in the Eastern Mediterranean



# Characterisation of complex quarry landscapes; an example from the West Bank quarries, Aswan

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## **QuarryScapes: Conservation of Ancient Stone Quarry Landscapes in the Eastern Mediterranean**

*QuarryScapes is the first project of its kind for addressing the importance of ancient quarry landscapes and raising the awareness of the urgent needs for protecting such sites. QuarryScapes will develop scientific and practical methodologies for documentation, characterisation and conservation of ancient quarry landscapes, raise the awareness of their significance and vulnerability and contribute to legal protection measures and sustainable management. Through case studies in Egypt, Jordan and Turkey, the project will address development of theoretical and practical methods pertaining to the major steps in the process of conservation: from recognition, investigation and assessment of significance, to understanding the risks, developing sound conservation and monitoring concepts, and suggesting mechanisms for sustainable management. The project is subdivided in ten work packages.*

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## ABSTRACT

The Aswan West Bank quarry landscape is part of a prodigious ancient industrial landscape related to stone quarrying in the Aswan region, 900 km south of Cairo in Upper Egypt. Although many studies have been made of the granite quarries on the East Bank at Aswan, there had been little previous research of the silicified sandstone quarries on the West Bank until the QuarryScapes project. Over a period of 3 years, non-intrusive archaeological and geological survey has documented silicified sandstone quarries and their associated material culture over an area of approximately 60 km<sup>2</sup> from Wadi Kubbaniya in the north, to the Old Aswan Dam in the south. Situated in now hyperarid desert, the West Bank quarry landscape can be visualised as a series of gebels capped by silicified sandstone, the flanks of which are now under deep aeolian sand cover. Forming an elevated undulating desert backdrop, bordered to the east by a narrow strip of cultivation associated with the riverine Nubian villages, the most prominent gebels of Tingar and Gulab still bear the traces of ancient paved roads and waste related to quarrying in antiquity.

Displaying a stratigraphic section of Upper Cretaceous sedimentary rocks, the West Bank provides a range of geological resources which have been exploited over a time depth of at least 150,000 years. Silicified sandstone is the most important resource, but also other sandstone deposits, iron ore and clay have, in various periods, been targeted for quarrying and mining. These activities have left largely non-monumental archaeological remains. Since the earliest uses of the stone for tools in the Middle Palaeolithic, its use for grinding stones from the Late Palaeolithic onwards constitutes approximately 80% of the quarrying across the West Bank. Such quarries include a range of types, from small and shallow extractions related to the earlier periods of grinding stone procurement, to large and deep quarries from the pharaonic (3rd – 1st millennium BC) into the Roman period. However, the most visible transformation of the landscape, due to the laying down of roads, relates to short periods of intensive quarrying for obelisks and other ornamental objects, particularly in the 2<sup>nd</sup> millennium BC (18<sup>th</sup> and early 19<sup>th</sup> Dynasty of the New Kingdom). To a lesser extent, the most visually appealing varieties of the silicified sandstone were also exploited in the Roman Period. Moreover, non-silicified sandstone has been quarried, predominantly along the Nile, as displayed by a series of mostly Graeco-Roman period quarries for monumental building purposes.

The archaeological record comprises a range of man-made elements, which to a greater or lesser extent are connected with quarrying of the resource. Small stone structures representing shelters, work places or ritual enclosures, rock art, inscriptions, scatters of ceramics, stone tools, unfinished stone objects and roads represent the multi-period layering of features associated with quarrying across the landscape. Stone alignments, roads and tracks that are part of old caravan routes, as well as ancient burials are some of the additional features documented that make up the cultural landscape as a whole - although assigning relationships between these features and the ancient quarrying remain unclear.

In the absence of radiocarbon dating, chronologies have been devised indirectly from the ceramic evidence, characterisation of features associated with certain quarries, epigraphic evidence and from the record of consumption. With little variation in the material culture associated with quarrying across the West Bank, it is feasible to suggest that the social context of these activities, even during periods of intensive ornamental procurement in the New Kingdom, had a minimal impact in transforming the social organisation. In essence, these activities appear to have been conducted by small groups within low-levels of social organisation, perhaps through kinship ties, who resided in close proximity to the resource. Epigraphic data further attests to procurement as largely outside of state intervention or monopoly of the resource, even during periods of royal ornamental quarrying. Moreover, rock art probably dating to the Neolithic and Predynastic period (5<sup>th</sup> to 4<sup>th</sup> millennium BC), some perhaps even to the Late Palaeolithic, attests to the social construction of the landscape having long cultural and historical antecedents, which may be related to quarrying of grinding stones. In a global perspective, the West Bank quarry landscape represents one of the world's most long-lived testaments to the procurement of a single stone resource.



*An unfinished obelisk base on the Aswan West Bank quarry landscape, Naq el-Gulab and the Nile in the background*

## **Chapter 1: Introduction**

*Elizabeth Bloxam, Tom Heldal, Per Storemyr*

## Background

The Aswan West Bank Ancient Quarry Landscape has provided the setting for undertaking one of the first systematic geological and archaeological surveys of a highly complex ancient stone production site. As a production site whereby exploitation of the main stone resource (silicified sandstone) has a longevity spanning several thousand millennia, the multi-layered history of the site presents many challenges in how to document and characterise its main geological and archaeological elements in the absence of excavation. Multi-disciplinary documentation of the West Bank quarry landscape had already started in March 2004, and on the basis of preliminary results, it was selected as a case study area in the 'QuarryScapes' Project, starting in November 2005 (Work Package 4). Therefore, the following report covers data documented over a total of five survey seasons, each lasting approximately one month, ending in March 2007. This report is the foundation for an additional report on the significance and values of the quarry landscape, which will be published shortly. Together, these two reports will form a basis for a third report on risk assessment, monitoring and conservation of Egyptian quarry landscapes, in which the Aswan West Bank quarry landscape will play a prominent role (Work Package 5, report expected in December 2007). Moreover, the Aswan West Bank will also have a key role in WP8, which concerns the overall scientific analysis of the QuarryScapes project.

## The survey team

**Dr Elizabeth Bloxam** – Archaeologist, Field Director of the Aswan West Bank Survey and leader of QuarryScapes Work Package 4 (Institute of Archaeology, University College London)

**Mr Tom Heldal** – Geologist and QuarryScapes Project Co-ordinator (Geological Survey of Norway)

**Dr Per Storemyr** – Conservation Scientist, Deputy Director of the Aswan West Bank survey and leader of QuarryScapes Work Packages 5 and 8 (Geological Survey of Norway)

**Dr Patrick Degryse** – Archaeometrist (Section Geology at the K. U. Leuven, Belgium)

**Mr Adel Kelany** – Egyptologist (Supreme Council of Antiquities/EAIS Egypt)

**Mr Ashraf el-Senussi** – Ceramicist (Supreme Council of Antiquities, Egypt)

**Dr. Reidulv Bøe**, Geologist (Geological Survey of Norway)

Although not part of the survey team, Mr. Adel Tohami and Mr. Mouhamed Negm of the Supreme Council of Antiquities in Aswan have contributed with observations during the last field season. In addition, **Dr Axel Müller** (Geological Survey of Norway) has contributed in aspects of sandstone characterisation, and **Mr. Leif Furuhaug** (Geological Survey of Norway) has made contributions in digitising drawings and plates.

## Main Objectives

The QuarryScapes project consists of ten work packages (WP's). This report covers the first of two deliverables from *WP4: Aswan quarry landscape: Detailed investigation and significance*.

In the Annex 1 to the contract, it is stated:

*"The WP will perform an in-depth investigation of a complex and large quarry landscape, using this for addressing detailed archaeological and geological surveys and the assessment of significance of such sites."*

The following main objectives were put forward:

1. Develop archaeological and geological characterisation and documentation methods for the West Bank ancient quarry landscape in Aswan, applicable for large and complex quarry landscapes in general (the present report)
2. Develop tools for assessing the significance and values of ancient quarry landscapes (forthcoming report)

The specifications of main objective 1 was given as follows:

*"The first objective of this case study is to **devise methodologies for the documentation and characterisation of such an intricate quarry landscape**, using **non-destructive field surveying techniques**, to understand the synchronic development of the site in its totality and to delineate the extent of the site. This case study will then form the foundation for the **development of a multidisciplinary field surveying methodology, usable in a range of cultural contexts**, in how to characterise and document empirical data in ancient quarry landscapes using non-destructive field surveying techniques. From analysis of this data it is then possible to **develop hypotheses relating to the social context and logistics of ancient stone quarrying**. The case study will comprise the following field survey methods:*

- **Mapping:** Archaeological and geological survey combining interpretation of satellite images with GPS field survey/field GIS techniques to produce thematic maps of the archaeological infrastructure, extraction sites and to delineate the site's boundaries.
- **Characterisation of material culture:** By planning a range of stone-walled features to determine function and chronology; surface survey of ceramics to produce distribution patterns and datable typologies; produce an inventory and typology of the quarry roads via detailed planning; analysis and distribution of partially worked objects.
- **Documentation and registration of extraction technologies** to establish periods of extraction via tool marks and stone tools, as well as of epigraphic data to aid in delineating site boundaries and in determining a chronology.
- **Scientific dating:** Collection of contextual organic remains for C14 analysis.
- **Transportation:** Through a geomorphologic survey, if necessary combined with other methods (i.e. drilling, Ground Penetrating Radar GPR), reconstruct the ancient topography in order to assess the logistics of stone transport relative to levels of the Nile in antiquity.

- **Provenance study:** *Detailed characterisation of the geology of the area and of stone from extraction sites, as well as from relevant archaeological sites*
- **Consumption analysis:** *Identification of partially worked objects in the quarries to be later compared with datable finished objects in museum collections and at archaeological sites."*

With few exceptions, the outlined goals have been met in this work package. Although we have gained permissions to collect C14 samples, it still remains to obtain permissions to do the dating of them. Analysis of roads and transportation networks in the area has been carried out, but we decided not to use drilling and GPR in this part of the work.

## Organisation of the report

This report aims to provide a comprehensive overview, organised in separate chapters, of the archaeological and geological elements that make up the West Bank Aswan ancient quarry landscape. Moreover, it aims to discuss the complex issues surrounding the unravelling of a multi-period archaeological landscape, particularly one where utilitarian quarrying for grinding stones since prehistory forms a consistent "overprint". The first three chapters after this introduction cover the general overview of the site – previous research, landscape and environment and the use of silicified sandstone in general. The next six chapters present the actual results from the survey from different thematic angles. Chapter 10 summarises and discusses the social organisation of the quarrying, and Chapter 11 concludes and discusses the achievement of the project goals. In addition to thematic maps in the report, we have compiled one 1:25000 map of the whole area, and a 1:10000 map of the central part. These are given as separate folded sheets (map enclosures 1 and 2).

## Survey methodology

As mentioned in the goals for the work package, the survey has been carried out using non-destructive techniques. A general survey of the whole 60 km<sup>2</sup> area was carried out using handheld GPS devices combined with detailed satellite photos (IKONOS and QUICKBIRD). This method combined high speed with sufficient accuracy; usually registrations were more accurate than 5 metres, but we have in general given 10-15 metres as the accuracy level in the GIS files.

A pre-set recording structure (see Appendix 1) was designed and used for all the registrations, in order to be able to differentiate between main classes of registrations, sub-classes, chronological interpretations, technology, etc., and give descriptions, drawings and photograph references to each registration. The recording structure can be an important contribution for quarry surveys in general (Appendix 1).

The registrations were fed into Microsoft Access and ArcMap software, and used for compilation of thematic maps and geographic analyses. Three categories of geographic elements are recorded (Figure 1):



- Point registrations: used for recording objects and features less than 10 m in size (examples are dry-stone wall features, artefacts, rockart and inscriptions).
- Polygon registrations: quarries and other features covering a small or large area in the landscape.
- Line registrations: used for recording roads, tracks, stone alignments and other linear features.



*Figure 1. Map showing the density of registrations done during the survey (marked in black). The southern and central parts are, as clearly displayed, most intensively surveyed and contain most of the registrations.*

In addition to the general survey, some areas were covered in greater detail, in particular the central area between Gebel Gulab and Gebel Tingar, but using the same registration methodology. A highly detailed survey was done at two case study areas (OE1 and GS01) involving detailed planning of features, clearing of sand cover in some archaeological features and mapping in scale 1:1000.

Some more thematic specific surveys were also carried out:

- A geological survey aimed at producing a geological map was carried out in the central area.
- A survey of rock art in the area was carried out, and a specific documentations system was developed for that purpose.

The survey has been "non-destructive", seeking to minimise the impact on the site. This implied:

- Except for clearing of sand cover and shallow cleaning of a few features, no archaeological excavations were carried out.
- All pottery that was collected was put back to the location it was found after analysis.

### **Notes on terminology**

The reader will meet many terms in this report that may have different meanings to different people. Therefore, we need to specify how we use the terms and why, in order to avoid confusion.

First of all, the term "quarry", "mine" and related terms need some clarification. In research related to raw material extraction, there is much confusion on terminology, and different sets of terms have sprung out from different traditions. For example, metallic ore mining has a completely different set of terms than stone quarrying. And, archaeologists working with Stone Age assemblages use different terminologies than historians dealing with mining history.

Some use a purely morphological division between "quarry" and "mine"; a quarry, which is opencast, turns into a mine in the moment the extraction gets deep or moves underground. We use the terms differently: a "quarry" is related to the extraction of rocks, where it is the whole rock that is valuable, and not only components within it. This includes stone blocks and aggregate production. A "mine" is thus a production site for specific minerals that need to be extracted from the rock, including metallic ore, industrial minerals, flint and gemstone.

Many authors use a "quarry" as covering the whole area in which a specific stone is exploited (i.e. "Chephren's Quarry", not "Chephren's Quarries"). We have chosen to use the following divisions:

Quarry: a stone production unit, limited and connected in space (but not necessarily in time), or a group of overlapping units which cannot be separated. A quarry consists of e.g. extraction sites (where the stone actually has been removed from an outcrop, bedrock or boulder), work areas (where secondary production took place), spoil heaps (left over debitage from quarrying) and other features directly related to the stone production.

Quarry area: a limited geographic area containing a group of quarries, connected either through their geographical location or other aspects, such as chronology.

Quarry landscape: ambiguity still surrounds this term but for the purposes of this report may be defined as a 'cultural landscape' shaped by stone quarrying, consisting of groups of

quarries/quarry areas but also associated infrastructure and other elements of material culture related to the exploitation of natural resources. These remains are culturally bounded and extending over a large area.

In order to characterise different typologies of stone quarries, the following terms related to the use of stone have been applied and need some explanation.

Utilitarian stone: non-elite stone production for manufacturing of everyday products, such as tools.

Grinding stone: stone used for grinding implements (primarily for grinding grain, but also for other purposes, such as grinding other vegetable matter, pigments and minerals). Some use "quernstone" and "millstone", however in an Egyptian context "grinding stone" seems to be the most widely applied.

Building stone: stone used for construction of buildings, monumental or not.

Ornamental stone: stone predominantly aimed for use as statues, obelisks or other elite type products.

In an attempt to put forward some messages in the text, we have used the term "low-intensity" quarrying in cases where we see very small-scale and shallow exploitation, and "high-intensity" quarrying for larger-scale and deeper exploitation, avoiding the terms "industrial" and "non-industrial" which can be misleading.

The terms "hammerstone" and "pounder", both rounded stones used in quarrying, can have different meanings according to their context of use. The former is used for breaking off pieces of rock, whilst the latter is used for pulverising the rock for making smooth surfaces. We have some problems with this division, since the same kind of tools are used for both purposes in the Aswan West Bank quarries. We tend to stick to the term "pounder".

In the geological field, we try to use standardised terms according to international geological nomenclature. The main rock in question in this report is silicified sandstone. Here, we have chosen to follow some of the most important previous authors on ancient quarries in Egypt<sup>1</sup>. Others use a similar term – "siliceous sandstone"<sup>2</sup>. The term "quartzite" is perhaps most frequently used in Egyptian context. For such rocks, the term is accepted in some geological nomenclature, however most of them restrict this term to be used only for metamorphic rocks. Thus, for non-metamorphic sandstone, which is densely cemented with quartz, either silicified sandstone, siliceous sandstone or orthoquartzite are recommended.

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<sup>1</sup> see Klemm, D. D. and R. Klemm 1993: *Steine und Steinbrüche im Alten Ägypten* Berlin: Springer-Verlag

<sup>2</sup> see also website [www.eeescience.utoledo.edu/Faculty/Harrell/Egypt/AGRG\\_Home.html](http://www.eeescience.utoledo.edu/Faculty/Harrell/Egypt/AGRG_Home.html)

## **Limitations**

One major problematic encountered in the survey methodology centres on sampling of organic remains for C14 dating to determine chronology. Special permission to export such samples for scientific analysis is a lengthy process in Egypt and within the time constraints between survey and this final report, such procedures are yet to be undertaken. Hence, dating of quarries can only be from indirect evidence, as will be discussed in the report. Moreover, the geomorphologic survey using drilling and Ground Penetrating Radar to assess Nile levels in relation to transport logistics were not undertaken during the survey period, primarily because we considered using the resources on other methods more useful within the short time available.



*The great sand dune to the north of St. Simeon's monastery with the prominent quarry area of Gebel Tingar on the hills to the right and Aswan city in the background, at the East Bank of the Nile.*

## **Chapter 2: outline of the geography and environmental history of the West Bank at Aswan**

*Per Storemyr*

## Introduction

Aswan (ancient Syene) is situated on the East Bank of the Nile by the First Cataract, some 900 km upstream from Cairo and at the border between what is historically known as Upper Egypt and Lower Nubia. Aswan increased in importance during the 1<sup>st</sup> millennium BC, gradually taking over the status as the main city in the region from that of the town of Elephantine, located on the nearby island with the same name. The history of Elephantine goes back to the formative stages of the pharaonic state (Late Predynastic Period; late 4<sup>th</sup> millennium BC) (e.g. Seidlmayer 1996; Kaiser 1998). Elephantine/Aswan has since then represented the southern political outpost of Egypt and has always been a major trading centre. Opposite, on the West Bank, caravan routes southwards to Nubia and the Western Desert oases started. More importantly, at least in the context of this report, Aswan was in the centre of one of the worlds most extensive and long-lived stone quarry landscapes. Granite, silicified sandstone ("quartzite") and sandstone, as well as iron ore, were quarried here for millennia, at least until the Byzantine period.

The region is still very much a border landscape. The famous Old Aswan Dam (completed in 1934) and High Dam (completed in 1971) are both located here, marking the border between the heavily populated Egyptian Nile Valley downstream and Lake Nasser upstream, along which are still very thinly inhabited desert expanses. The dams put an end to millennia of agriculture based on silt deposited by the annual Nile flood. Currently home to some 300,000 people, Aswan has grown from a small town to a substantial city over the last 50 years, not least because of the construction and operation of the dams, its function as a governorate capital and increasing tourism, but also because of large-scale mining and quarrying activities.

Exploitation of resources such as clay, iron ore, granite and to some extent sandstone has been an important factor in the modern development of the city, just as it was in ancient times. Most of the current quarrying and mining takes place on the East Bank, giving it an industrial character. The West Bank, however, is often looked upon as the beautiful desert backdrop of Aswan (Figure 1) – the place where the sun sets over the golden sand dunes of the Sahara. Few know that the West Bank once was a quarry landscape of large proportions and has a very rich archaeological heritage spanning tens of thousands of years, back to the Palaeolithic (see other chapters of this volume).

Focussing on the QuarryScapes West Bank survey area from the Old Dam to Wadi Kubbaniya and maximum 3-4 km west into the desert (see main survey map, map enclosure 1), in the following an outline of the geography of the Aswan region is presented. Second, the changing climate from the hyperarid Late Palaeolithic through the moister Neolithic and the onset of the current hyperarid conditions, several millennia ago, is briefly discussed. Moreover, an outline of the changing flood levels of the Nile, from the Late Palaeolithic until recently is given. Except for some surface observations, QuarryScapes has not conducted any environmental and geomorphological studies at the West Bank. Hence, the following summary draws on former studies in the region, especially in Wadi Kubbaniya (Wendorf and Schild 1989), which is located at the northern margin of the survey area.



*Figure 1: The First Cataract area as seen towards the north-east from Gharb Sehel and towards Elephantine and Aswan city. Wadi Abu Agag and the Eastern Desert in the background.*

### **A note on place names**

In this report and the attached main survey map the names of places, hills (gebels), wadis (dry river courses, valleys) and ancient roads and tracks have mainly been taken from the topographic maps Aswan (1934) and Aswan (1991). For the names of villages along the Nile local residents have been consulted. For the West Bank quarries between Gebel Tingar and Gebel Gulab the names used in Klemm and Klemm (1993: 290) have been used. Moreover, names given in old reports, especially de Morgan *et al.* (1894) have been referred to where appropriate. In many cases, especially as regards gebels and wadis, names have also been tentatively given by us for reference purposes.

### **Geographical outline**

On both sides of the Precambrian granitic outcrops in the cataract area, described in Ball (1907) and the place of the famous ancient granite quarries with the Unfinished Obelisk as the highlight (e.g. Röder 1965; Klemm and Klemm 1993: 305-353; Aston *et al.*, 2000), the Cretaceous Nubia Group with its sandstones dominates the geology, which will be explored in detail in a later section (Chapter 5). Bordering the mountainous Eastern Desert, the East Bank is hilly and cut by deep long wadis, traditionally used as travel corridors eastwards and ultimately to the Red Sea. Wadi Abu Agag starts just



north of modern Aswan, whereas the larger and broader Wadi Abu Subeira is located some 10 km further downstream. Along and between these wadis is now a modern industrial landscape where heavy exploitation of clay in underground mines is taking place and where large-scale open-pit iron ore mining ceased some time ago. It is also a large ancient quarry landscape: the silicified sandstone that caps hills and plateaus were heavily used for ornamental and grinding stone quarrying in ancient times (Harrell and Madbouly 2006). A narrow belt of agricultural land is located by the Nile and villages are dotted along the steep hills to the east.

At the West Bank an entirely different landscape is encountered, not least looking so dissimilar to the East Bank because of the partially heavy sand cover that evens the topography and gives the landscape a serene quality. The West Bank is characterised by plateaus, ridges and small hills intersected by short valleys and wadis (Figure 2), as well as one large wadi, Kubbaniya, just opposite Wadi Abu Subeira in the north. This generally low relief seems to have formed in the Pleistocene (Issawi and Hinnawi 1978). The maximum altitude is 200 m above sea level at Gebel es-Sawan, about 100 m higher than the present level of the Nile, at c. 90 m. To the west of the area stretches the Gallaba pediplain (Issawi and Hinnawi 1978), which is bordered by the Sinn el-Keddab scarp, 30-50 km from Aswan and by which the Kurkur oasis is located, an important ancient caravan station for the desert routes that started at the West Bank (cf. Hester and Hobler 1969, Darnell 2005).



*Figure 2: The West Bank as seen from hills near Wadi Abu Agag on the East Bank. Aswan city in the front, Gebel Gulab to the right and Gebel Gubbet el-Hawa with the "Tombs of the Nobles" to the left. Between these two gebels is the short Wadi el-Deir.*

In the south, between the villages at Gharb Sehel by the Old Aswan Dam and Gebel Gubbet el-Hawa, sandstone cliffs, sand dunes and short sand covered wadis, e.g. Wadi Salujah, Wadi Berber and Wadi Saman (the latter name given by us), dominate the landscape. Northwards from Gubbet el-Hawa the river bank widens and the next 7 kms features a narrow strip of agricultural land on Nile inundation silt and where more than 20 closely spaced villages are located between the fertile soil and the low hills of the desert (Figure 3). The villages are collectively known as "Gharb Aswan" (meaning West Aswan), but each village ("Naq") has its own name. Their history is obscure, but according to oral tradition the southernmost village (Naq el-Gubba) was not inhabited until 100-200 years ago (Jennings 1995: 35f). This is probably discussable, as many villages at Gharb Aswan, including "El-Qobbéh" (Gubba), are marked on maps made by Napoleon's *savants* around AD 1800 (see Chapter 2). Together, the villages are now home to more than 30,000 Nubian people (Jennings 1995: 31). The only substantial wadi in this region is Wadi el-Faras, which stretches less than 5 km towards the west.



*Figure 3: The West Bank landscape with Nubian villages as seen towards the south from Gebel el-Qurna. In the front a Graeco-Roman sandstone quarry. Gebel Gubbet el-Hawa can be seen on the horizon.*



*Figure 4: The West Bank just by the new Aswan Bridge, as seen towards the south. Ancient grinding stone quarry in the foreground, Gebel el-Qurna in the background.*

From Gebel el-Qurna (also known as Gebel Shiha and Gebel Chikka, see de Morgan 1894), a small hill and a distinct landmark in the mouth of Wadi Qurna (name given by

us) the river bank again narrows dramatically. Until Naq el-Fugani and Kubbaniya, which are "Sa'idi" (Egyptian) villages 6 km further north, low Nubian sandstone cliffs are located immediately beside the river. This stretch, from Gebel el-Qurna to Kubbaniya and 2-3 kms into the desert, is now the locus for the construction of New Aswan City – a city that will relieve the population pressure in Aswan by housing up to 100,000 people or more. It has already destroyed many archaeological sites (which will be a major theme in a subsequent QuarryScapes report).

Except for the riverine Nubian villages described, no one lives in the West Bank desert today. However, the landscape is used for modern infrastructure: the Western Desert highway between the Old Aswan Dam and Luxor is located 6 km into the desert and is accompanied by large power lines from the High Dam. An asphalt road connecting Gharb Aswan to this highway can be found north of Gebel Gulab, another connects New Aswan City with the highway. The wildlife in this desert is dominated by foxes, jackals, snakes, birds and insects.

Practically the whole stretch of the West Bank along the river and 2-3 km into the desert is dotted with ancient quarries and other archaeological sites, which is the theme of this report. Also, the area is used for modern procurement of sandstone for building purposes. Most of this procurement takes place in a traditional artisan manner and the stone is used for local house building. However, there are also larger sandstone quarries, notably north of Gebel Gulab, and since recently also in the environs of New Aswan City. Another activity in this desert landscape is minor tourism organised by local Nubian people as camel tours for visiting St. Simeon's Monastery and the remains of the Seti I obelisk at Gebel Gulab. The main tourist attraction on the West Bank are the "Tombs of the Nobles" at Gebel Gubbet el-Hawa, just opposite Elephantine Island.



*Figure 5: Sand dunes in Wadi el-Faras, about 2,5 km west of the Nile.*

## Environmental change

Situated in the Eastern Sahara and currently one of the most arid places in the world, the West Bank has gone through significant environmental changes over the millennia. However, it has for thousands of years been a dry to very dry landscape, featuring only very occasional rains. Many years may pass between substantial downpours. According to Nicoll (2004), who has compiled and interpreted available studies on climate history in Upper Egypt, Northern Sudan and the adjacent Western Desert, the Late Pleistocene period, terminating around 9,000 BC, was, like today, hyperarid in the region. With many dry interludes, a wetter climate prevailed through the Early Holocene (c. 9000-6000 BC), becoming significantly drier in the Middle Holocene (c. 6000-3000 BC). There seems to be general consensus that arid to hyperarid conditions were established across the region by 4500 BP ( $^{14}\text{C}$  years), i.e. at some stage in the late Predynastic/Early Dynastic period (c. 3000 BC).

There would have been significant local variations, though, and it cannot be excluded that a wetter climate than today prevailed into the Old Kingdom in Aswan. One of the nearest sources of well-published evidence is at Nabta Playa, some 300 km south-west of Aswan, where the modern arid climate was probably established around 4700 BP (slightly before 3000 BC) (Nicoll 2004: 570). This would point to the establishment of arid conditions in the Aswan area even before this date, due to the general southward retreat of the Intertropical Convergence Zone. Newton's (2005) studies at El-Kab and Adaïma, 100 km north of Aswan, indicate relatively small differences between the vegetation cover today and during the Late Predynastic/Early Dynastic period, which would also point to a very dry climate around 3000 BC. It should be noted that easily available groundwater reserves at many places lasted much longer and thus have strongly influenced patterns of human activity in the Eastern Sahara in general since the climate desiccation and until today (in the context of ancient quarrying, see e.g. discussion in Bloxam 2003: 67-75 for the environs of Chephren's Quarry near Nabta Playa in the 3<sup>rd</sup> millennium BC).

Except at the irrigated old floodplain, there is essentially no vegetation at the West Bank of Aswan today. Wadi Kubbaniya has some shrubs in the middle of the drainage (Figure 6), but none of the short wadis show any vegetation. During the Early Holocene climate optimum the area might have been partially devoid of the present heavy sand cover and quite certainly featured temporally active wadis. However, except for Wadi Kubbaniya, which was active in the Early Holocene (Wendorf and Schild 1989: 27), the catchment areas for the West Bank wadis are so limited that they would not have carried much water. There are no playa-like features within 5-10 km from the river, but smaller depressions where the groundwater was situated close to the surface may be found (attested by undated shallow wells found c. 7 km to the west of the Nile; see Chapter 9). A meagre, perhaps steppe-like vegetation cover would have been sustained in the Early Holocene, and it is likely that there were trees (e.g. tamarisk and acacia) along the wadis. Due to a higher Nile floodplain, the riverbank landscape would also have been very different from today (see below), and certainly with much vegetation. Generally, the vegetation cover would have diminished through the Middle Holocene. It is unlikely that there were any vegetation left (except in the floodplain area) when larger-scale stone quarrying started (mainly in the New Kingdom; see Chapter 6), but if some remained there is a possibility that the stone exploitation contributed to the final



disappearance of vegetation. This is because fire setting requiring wood seems to have been an important quarrying method (Chapter 6).



*Figure 6: Wadi Kubbaniya as seen from the west with shrubs in the main drainage.*

Since the Early and Middle Holocene many areas have been subject to deflation, e.g. Wadi el-Deir. However, deflation has probably mainly affected areas close to the river where (Late) Palaeolithic sediments were once accumulated, as in Wadi Kubbaniya (Wendorf and Schild 1989: 17).

We have not yet made any attempts at reconstructing the wildlife at the West Bank in the Early and Middle Holocene, although we would assume that antelope and gazelle would have been the main game.

Some observations may be of interest for further studies of the environmental history:

- A sand dune between Gebel Gulab and Gebel Saman covers cleared tracks that probably date either to the New Kingdom (c. 1500 BC) or the Roman period. If this dating is correct it might indicate that some sand dunes started to form relatively late in this region. Another explanation would be migration of dunes and sand cover over time, but that their initial formation generally followed the climate desiccation.
- By "Khnum Quarry" north of Gebel Gulab is a small active natural spring. If this spring was active also in ancient times, it may have been an important source of water. The area has not yet been investigated for archaeological remains (but a few, perhaps prehistoric rock-drawings have been found here).

## **Nile flood levels**

Currently fluctuating around 90 m above sea level, the Nile at Aswan has changed dramatically since the Late Pleistocene. This is not the place to outline a history of the river or discuss its peculiarities in the First Cataract area, but since the flood levels have

had a major impact on the geography of the West Bank and thus also on the procurement of stone, they will be briefly reviewed. Since the Nile has practically no inclination between Elephantine and Wadi Kubbaniya, the current sea level is used as reference for the whole survey area.

As a probably braided river by the Late Pleistocene (c. 18000 BP), the Nile seems to have deposited silt about 15 m above the modern floodplain in the Wadi Kubbaniya. This corresponds with an altitude of 105 m above sea level. During the so-called "Wild Nile Phase", a short period of extraordinarily high floods around 12000 BP, alluviation is attested as high as 27 m above the modern floodplain (c. 117 m above sea level) (Wendorf and Schild 1989: 777). Note that since Wadi Kubbaniya and perhaps other wadis were blocked by sand dunes in the Late Palaeolithic, they were not necessarily flooded far upstream. In Kubbaniya a seasonal lake was formed behind the dunes.



*Figure 7: Quarry ramp, presumably from the New Kingdom, from Gebel Gulab towards Wadi el-Deir. Nubian villages and the Nile can be seen in the background.*

*Theoretically, in the Late Palaeolithic period, about 18000 years ago, the Nile flood might have reached the flat area just in front of the ramp (by the new constructions seen on the picture), whereas in the Late Predynastic period, about 5000 years ago, the level was approximately at the border between the present villages and agricultural land (tree-covered on the picture). 3500 years ago, in the New Kingdom, the inundation was only 1-2 m higher than the present level of the Nile at c. 90 m.*

Through the Holocene the history of the river at Aswan has generally been one of downcutting through its own deposits. Around 3000 BC, in the Late Predynastic/Early Dynastic period, the maximum flood level was at 94-95 m above sea level (Seidlmayer 2001: 81ff; Kopp 2006: 22ff), i.e. approximately at the present border between agricultural land and the Nubian villages at the West Bank (see the main survey map).

Since then it generally declined to around 91-92 m in the First Intermediate Period (c. 2100 BC) and 90-91 m in the Late Roman Period. During the period of intensive ornamental stone quarrying and associated building of quarry roads in the New Kingdom (see other chapters of this report) the maximum inundation level would have been at 91-92 m, i.e. only slightly higher than the present level of the Nile. This is important to note, as it would imply that possible quays used for shipping of stone could be located around this level, if canals were not dug farther inland, e.g. in Wadi el Deir, where most quarry roads from Gebel Gulab converge. In this connection it may be useful to recall that canals probably used for transport of stone objects from the New Kingdom Unfinished Obelisk quarry at the East Bank have an elevation of slightly more than 90 m (Adel Kelany, pers. comm.).

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*Fragment of the abandoned Obelisk of Seti I at Gebel Gulab photographed by Labib Habachi, probably in the 1950s. The large, flat area is the causeway, constructed to transport the obelisk to the Nile. Reproduced from Habachi (1984: plate 6, p. 33) with kind permission from the American University in Cairo Press*

## **Chapter 3: Introduction to previous archaeological research at the West Bank of Aswan**

*Per Storemyr*

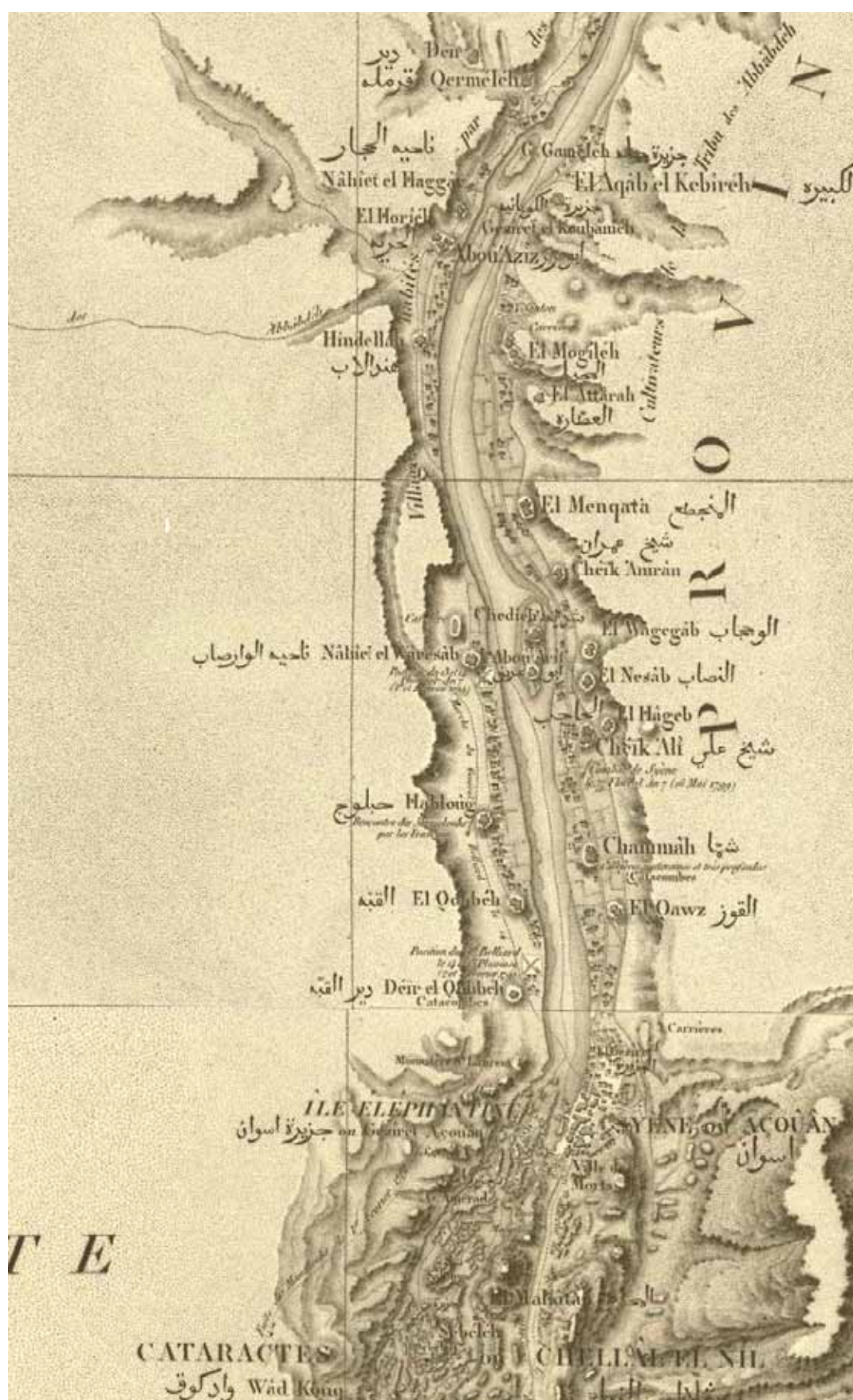
## Introduction

One of the earliest modern references to archaeological sites at the West Bank of Aswan can be found in *Description de l’Egypte* of Napoleon's *savants*, in which Jomard (1809: 78) mentions the place as *Gharby Asouân* and the possible location of ancient *Contra Syene*. In his very brief description mainly abandoned monasteries are mentioned. However, on topographical maps (Figure 1) from the *Description* it is also possible to discern ancient and more recent tombs, such as those of the Muslim sheikhs at Gebel Gubbet el-Hawan and Gebel Tingar. Moreover, many contemporary villages are marked as well as agricultural land and some desert routes. Midway between Gebel Gubbet el-Hawa and Wadi Kubbaniya there is also a *carrière* marked. This is the sandstone quarry at the prominent hill called Gebel el-Qurna (see Chapter 6). The *savants* do not seem to have recognised other quarries at the West Bank, which stands in contrast to their knowledge of quarries at the East Bank. The Aswan granite quarries were well known by AD 1800 and they are described at length in the *Description* (de Rozière 1809). The silicified sandstone *carrières* by Wadi Abu Agag (see Chapters 3 and 6) are also marked on the topographical maps of the *Description*.

Despite the prominent location of the West Bank, in the border region between Egypt and Nubia, little archaeological fieldwork has been carried out since the *savants* recorded what they saw 200 years ago. Since Jacques de Morgan and his colleagues (1894) surveyed the area in the early 1890s, research has largely concentrated on the famous Old to Middle Kingdom "Tombs of the Nobles" at Gebel Gubbet el-Hawa and the mainly Late Palaeolithic settlements in Wadi Kubbaniya. Moreover, excavation of Predynastic/Nubian A-Group, pharaonic and later cemeteries close to Kubbaniya were carried out in the early 20<sup>th</sup> century. Pharaonic and Greek inscriptions have been recorded at some places in this landscape and three rock art sites have been partially published. Work has also been carried out at the three Coptic monasteries in the region. Lately, apart from the QuarryScapes survey, there has been renewed interest in the area, especially as seen from the perspective of interactions between ancient Egypt and Nubia; see the papers by Gatto (2005) and Gatto and Guiliani (2007). The "Yale Toshka Desert Survey" has also studied the area between the West Bank and the Kurkur Oasis, about 60 km to the west, especially from the perspective of ancient desert tracks (cf. Darnell 2005; see Chapter 9).

In this introductory account, the main focus will be on the ancient quarries at the West Bank. However, since the quarry landscape comprises so many other archaeological elements, it is important to provide a brief overview of their research status. Note that many issues taken up below will be discussed in greater detail in chapters to follow. Most archaeological sites mentioned below are marked on the main survey map (map enclosure 1).

*Figure 1 (next page): Map put together from Description de l’Egypte, Plate volumes V, map sheets Kom Ombo, and the Cataract/Syene, covering the area from Wadi Kubbaniya in the north to Sehel island in the south. Compare with the attached main QuarryScapes survey map. Reproduced from the online version of Description de l’Egypte by Bibliotheca Alexandrina (<http://descegy.bibalex.org>)*







*Figure 2: View of Elephantine Island around AD 1800 from Description de l’Egypte, Plate 32, vol. 1. In the background is Gebel Tingar with the very visible tomb of Sheikh Othman and the inscribed "Tingar rock" just beside. Reproduced from the online version of Description de l’Egypte by Bibliotheca Alexandrina (<http://descegy.bibalex.org>)*

### **Silicified sandstone quarries**

It would seem that de Morgan and his colleagues were the first to note the existence of ancient ornamental stone quarries at the West Bank, although they do not specifically refer to them as "quartzite" or silicified sandstone quarries (de Morgan *et al.* 1894: 125-7). Three quarry areas with associated quarry roads were recognised in the environs of Gebel Tingar, which, according to de Morgan (*ibid.* p. 126) means "west hill" in Nubian. Quite a few Greek inscriptions (of Roman date, see below) were recorded in the quarries and these inscriptions may have lead de Morgan to erroneously believe that the stone procurement in the area was mainly related to the Ptolemaic period (cf. Jaritz 1981: 245). The inscribed rock – the "Tingar rock" – close to the tomb of Sheikh Othman (Figure 2) was also investigated (de Morgan *et al.* 1894: 126-7, see below) (Figures 2 and 3). A few years earlier these inscriptions had attracted the interest of Wilbour and Sayce (Wilbour 1936: 552-3), who named the rock "Pig Rock". However, these investigators do not seem to have recorded any ancient quarries.

In the decades following de Morgan's investigations few seem to have taken an interest in the prodigious quarry landscape. Ball (1907) and Weigall (1909, 1910) do not mention the quarries; geologist Ball even states that the only spot in this "inhospitable desert" of any archaeological interest is the inscribed rock mentioned above (p. 45f). Weigall was also very familiar with the same feature (e.g. 1909: 169ff, 1910: 438f), and with his general interest in quarries, it is curious that he does not mention these specific ones. In the travel guide of Baedeker (1929: 25), however, the quarries and especially the fragmented but inscribed obelisk top of Seti I (New Kingdom, 18<sup>th</sup> dynasty) at Gebel Gulab are mentioned as interesting objects for desert trips (see photo at title page of this paper). It is unknown from where Baedeker got the information about the obelisk top, but the description may be the first reference to it. There is not a word about the quarries in Clarke and Engelbach (1990 [1930]), but Attia (1955: 63, 234) might refer to them in his description of "quartzite" in Aswan. Lucas and Harris (1999 [1962]: 62f) leave out the West Bank in their extremely brief description of ancient Egyptian "quartzite"

quarries, but they apparently mention similar quarries at the Aswan East Bank (probably Wadi Abu Agag, cf. Harrell and Madbouly 2006: 52).



*Figure 3: The "Tingar Rock" with hieroglyphic inscriptions. In the background, towards the west, the elongated hill with the main quarries at Gebel Tingar.*

Only with Labib Habachi's (1960, see also 1984: 32f) description of sandstone and "quartzite" quarries and roads at Gebel Gulab (which he erroneously calls Gebel Saman) and his investigation of the Seti I abandoned obelisk, can renewed interest be attested. Habachi also clearly recognised the great significance of the ancient quarry landscape, comparing it with the famous ancient sandstone quarries at Gebel el-Silsila north of Kom Ombo. The fragmented obelisk has also attracted interest later, e.g. by Brand (1997).

Twenty years after Habachi's work, around 1980, the first survey of the West Bank quarries was carried out by Rosemarie and Dietrich Klemm. Their work is mainly published in Klemm and Klemm (1993: 289-303), but also in e.g. Klemm *et al.* (1984). A substantial proportion of their works are dedicated to technical studies on the provenance of the 18<sup>th</sup> Dynasty Memnon Colossi at the West Bank of Luxor, which the Klemms' claim must have been quarried at Gebel Tingar and not at the more well-known, but now largely destroyed, silicified sandstone quarry at Gebel Ahmar in Cairo, as discussed by others (e.g. Heizer *et al.* 1973, Stross *et al.* 1988; Wehausen *et al.* 1988; see also Aston *et al.* 2000: 53 on characteristics of the two silicified sandstones). This debate is not yet settled, but will only be of minor importance in this report (see Chapter 6).

Klemm and Klemm (1993: 289-303) also give a good, though preliminary, description of the geology, geomorphology and ornamental quarries at Gebel Tingar, Gebel Sidi Osman, Gebel Saman, Gebel Gubbet el-Hawa and Gebel Gulab, as well as parts of the prominent network of quarry roads. Moreover, they briefly mention that there are more quarries south of Gebel Tingar and north of Gebel Gulab. They also briefly describe associated archaeological features such as pottery, stone tools (pounders), small smithies, ephemeral shelters, simple dry-stone walls and a few inscriptions. On the basis of pottery and tool marks they suggest that procurement of ornamental stone would mainly have taken place in the New Kingdom (especially the 18<sup>th</sup> Dynasty) and in the Graeco-Roman period, but they also infer that the site probably has a history back to the Old Kingdom on the basis of objects in silicified sandstone from this period found in the Aswan area.

The Klemms' overlooked that the main quarrying activity in the area was actually related to the production of grinding stones. Moreover, they did not recognise that the "central ramp", running from Gebel Tingar to below Gebel Gulab, is part of the ancient (Roman) desert road that continue westward beyond the quarry area (see below and Chapter 9). Their description and accompanying map provided a good basis for the initial stages of our fieldwork. Such work is described in Heldal *et al.* 2005 and Bloxam and Storemyr (2005). There is also a brief description of the ornamental stone production in the area in Aston *et al.* (2000), but here the quarries at Gebel Tingar are erroneously described as partially associated with the construction of the nearby Coptic St. Simeon's monastery.

Until the QuarryScapes fieldwork, the oldest known quarries in silicified sandstone at the West Bank were discovered in Wadi Kubbaniya during the excavations of the Late Palaeolithic seasonal settlements by Wendorf and Schild (1989) in the late 1970s and 1980s. Here, small quarries and a workshop dedicated to the production of grinding stone were investigated by Roubet (1989) and associated with the nearby settlements. A very important quarry as seen from the perspective of the long history of stone procurement at the West Bank, it will be focused on in Chapter 6.

## **Non-silicified sandstone quarries**

Some authors have noted the existence of what is now known as non-silicified sandstone quarries (Chapter 6) in the survey area between Gebel Tingar and Wadi Kubbaniya. As mentioned above, the quarry at Gebel el-Qurna, midway between Gebel Gubbet el-Hawa and Kubbaniya is marked on the map made by Napoleon's *savants* (Figure 1). Wilkinson (1847: 415) also notes a quarry in the same area. This quarry is referred to as Gebel Shiha by de Morgan *et al.* (1894: 202) and as Gebel Chikka on their accompanying map. These authors also mention a quarry south of Kubbaniya (p. 202), probably the one called Gharb Aswan by Klemm and Klemm (1993: 271, photo p. 273). This small quarry has many similarities with the much larger Gebel el-Silsila, and the main activity was attributed to the Ptolemaic period on the basis of pottery and inscriptions. Klemm and Klemm (1993) also found traces of other sandstone quarries, notably at Gebel Gubbet el-Hawa and within St. Simeon's monastery (p. 271-3) (Figure 4). In the latter case the Klemms assume an Old to Middle Kingdom date of the quarrying on the basis of tool marks (but see discussion in Chapter 6).





*Figure 4: The inner part of St. Simeon's monastery with an ancient quarry face to the right.*

### **Iron mines and clay exploitation**

As noted in Chapter 5 and 7, the Aswan area is rich in iron ore and clay. Considering the West Bank, de Morgan *et al.* (1894: 139-141) paid attention to the deposit between Gebel Gubbet el-Hawa and St. Simeon's monastery and inferred that "millions of tons" of iron ore would have been extracted here, but were not able to date the ore extraction. The mines were later briefly mentioned by Ball (1907: 66) and on their map of the West bank quarries Klemm and Klemm (1993: 290) refer to them as "Coptic clay and iron oxide mines". However, the mines have not been investigated until the QuarryScapes survey (Chapter 7).

Clay worked from bedrock (not Nile silt) is also described by de Morgan *et al.* (1894: 141), who even inferred that there is a large (undated) underground clay mine close to the Tombs of the Nobles at Gebel Gubbet el-Hawa. Klemm and Klemm (1993: 271-3) also noted several ancient and recent places of clay exploitation across the West Bank landscape. On their map (p. 290) both "Coptic" and "recent" clay workings are marked. It is, however, unclear how these authors dated the clay exploitation.

### **Settlements**

Apart from the Coptic "settlements" represented by the three monasteries (see below) and the Late Palaeolithic seasonal settlements in Wadi Kubbaniya (Wendorf and Schild

1989), no other ancient settlements are known in the West Bank survey area from the Old Dam to Kubbaniya. However, Gatto and Guiliani (2007) have recently found a Predynastic/Nubian A-Group settlement and associated cemetery in Naq el-Qarmila, about 2 km north of Kubbaniya. There are also cemeteries from other periods (e.g. Pan-Grave, Greco-Roman) nearby and there seems to be a Graeco-Roman temple and town in this area as well (ibid.).

Junker (1919: 2) wondered if there were settlements associated with the multi-period cemetery he excavated at Naq el-Sheikh Mohammed (Kubanieh Süd, see below), close to Gebel el-Qurna. Since the area around the cemetery was heavily covered by sand he did not find any traces of settlements, but inferred that they could have been located just opposite on the East Bank of the Nile at which there is generally more land available for agriculture. It should be noted that the area within the present Nubian villages and associated agricultural land from Gebel Gubbet el-Hawa to Gebel el-Qurna has never been archaeologically investigated, hence it is not unlikely that ancient settlements might be located here.



*Figure 5: Gebel Gubbet el-Hawa ("The Dome of the winds") with the "Tombs of the Nobles" as seen from the hills on the East Bank. The building on top of the hill, literally surrounded by ancient quarries, is the tomb of Ali ibn el-Hawa.*

## **Cemeteries**

Practically the whole stretch along the Nile from Gebel Tingar to Kubbaniya is dotted with cemeteries from Prehistory to the Islamic era, but only a few have been investigated. From south to north known rock-cut tombs and other types of cemeteries are located at Gebel Tingar, in Wadi Saman (name given by us) close to the river by St. Simeon's monastery, immediately beside St. Simeon's monastery, at Gebel Gubbet el-Hawa, between Naq el-Gubba and Naq el-Gulab, by Naq el-Faras, at Gebel el-Qurna, at Naq el-Sheikh Mohammed, at Gebel Shihahh by the Isisberg monastery, at Hagar el-

Ghorab by the Aswan Bridge and just by Naq el-Fugani (see partial overview by de Morgan *et al.* 1894 and Porter and Moss 1937). This list is incomplete, as during our survey numerous other scattered cemeteries and burials have been spotted.



*Figure 6: The area around Gebel el-Qurna and Naq el-Sheikh Mohammed in the early 20<sup>th</sup> century, as seen from the north and with the Nile at left. In the foreground Junker's excavation of the cemetery called "Kubanieh Süd" was carried out. To the right is the excavation camp. Photo reproduced from Junker (1919)*

The late Old and Middle Kingdom "Tombs of the Nobles" at Gubbet el-Hawa is by far the most prominent cemetery at the West Bank (Figure 5). The early history of research on the tombs by Grenfell, Budge and many others is summarised in Porter and Moss (1937: 236-42). They received renewed interest from the early 1950s to the early 1980s through work of Edel and Habachi (see brief history of research in Jenkins 2000, and references therein). Of particular interest, in the context of this report, is the tomb of Elephantine governor Harkhuf, famously known as a traveller and "overseer of caravans" in the 6<sup>th</sup> Dynasty. He might have used the desert road starting in Wadi el-Deir, the so-called "Elephantine Road" (see below) on his expeditions, as discussed in e.g. Weigall (1909: 169ff) and Goedicke (1981).

Junker (1919, 1920) excavated the two multi-period cemeteries at Naq el-Sheikh Mohammed (Kubanieh Süd, Predynastic to Byzantine; Figure 6) and Naq el-Fugani (Kubanieh Nord, Middle Kingdom to Late Period?). The earliest part of the former is complex and, according to Smith (1991: 94-8), it is difficult to assign it to either the Predynastic Naqada culture or the Nubian A-Group. The earliest part of the latter appears to be of Middle Kingdom date so to some extent associated with the Nubian C-Group.

## Temples and monasteries

As part of his excavation of the ruined Isisberg Coptic monastery (also known as Dayr al-Kubaniya) by Gebel Shihahh, just north of Naq el-Sheikh Mohammed (Figure 7), Junker (1922) discovered that the monastery was built on top of a small Ptolemaic temple, but this temple was not excavated. However, it was realised that stones from the temple were reused during the building of the monastery, the church in which Junker dated to the end of the 6<sup>th</sup> century AD. However, Grossmann (2002: 562) suggests a much later date for the construction of the church, at the earliest in the 11<sup>th</sup> century AD (see also brief discussion in Dijkstra 2005: 95). It is unknown to us whether other parts of the complex were built earlier.



*Figure 7: "Isisberg" monastery by Gebel Shihahh, to the south of the new Aswan Bridge, as reproduced from a photo in Junker (1922) after excavation. Inserted is a photo of the monastery today; weathered and covered by sand.*

St. Simeon's monastery (or more correctly Dayr Anba Hadra) is much better preserved than Isisberg (Figure 8). It was mentioned by Jomard (1809: 78), described by de Morgan et al. (1894: 129-139), investigated by Monneret de Villard (1927) and has been subject of many later publications, for instance by Grossmann (2002: 562-5). The latter suggested the 11<sup>th</sup> century AD for the building of the church, although it might have been built earlier, as argued by Dijkstra (2005: 96). The monastic complex certainly has a much longer history, at least from the 6<sup>th</sup> or 7<sup>th</sup> century AD. It was destroyed in the late 12<sup>th</sup> century (Weigall 1909: 171). Together with the "Tombs of the Nobles", St. Simeon's is one of the main tourist attractions at the West Bank; it gives unique insights into many aspects of monastic life in Egypt and several workshops, e.g. for pottery production, are preserved within the complex.

There is also a little known monastery by the tombs at Gebel Gubbet el-Hawa, known as St. George or Deir Mari Girgis. It was investigated by Grossmann (1985) and its church is dated to the 11<sup>th</sup> century AD.





*Figure 8: St. Simeon's monastery as seen from the top of Gebel Saman during a sandstorm. Just beside is the modern "New St. Simeon's monastery", in the background the Nile and Aswan.*



*Figure 9: The inscribed rock at Gebel Tingar or the Tingar Rock – a very significant and visible landmark. In the foreground a field of votive stelae that has been associated with ancient caravan travel.*

## Desert routes and the inscribed rock at Gebel Tingar

Other than the inferred embarkation point of the ancient "Elephantine Road", also called the "Oasis Road" or the road to Kurkur and Tomas, at the inscribed rock of Gebel Tingar (see above and e.g. de Morgan *et al.* 1894: 125ff; Weigall 1909: 169ff, 1910: 438f and Jaritz 1981), and despite Aswan's great importance as a town of trade and travel, the ancient desert routes at the West Bank have never really been described. However, the modern desert route called the "Road to Kurkur", starting in Wadi el-Deir, passing Gebel Saman and Gebel Tingar before heading due west, is marked on many maps covering the region, e.g. in Ball (1907) and Weigall (1907), as well as on a topographical map of Aswan from 1934. On the latter map the road is termed "El-Deir Road" (meaning the "monastery road", probably referring to St. Simeon's monastery or Deir Mari Girgis). Another modern desert route west of Gebel Tingar is named "Sikket el-Agamiya" (literally the "foreign road") on the same map. This route is also located at two places on the US Army maps of North Africa from the late 1950s (1:250.000, sheets NG36 14 and NF36 2).<sup>3</sup> As will be discussed in Chapter 9, these two named modern roads both have ancient origins.

Jaritz (1981) re-investigated the immediate environs of the inscribed rock at Gebel Tingar and made a plan of the stone walls built around the rock. On the basis of these investigations, the inscriptions and the numerous votive stelae nearby, he infers that it was a sanctuary, probably used by *both* travellers and quarrymen, at least from the 18<sup>th</sup> to the 25<sup>th</sup> dynasty. However, the probability that, for example, Harkhuf (6<sup>th</sup> Dynasty) used the "Elephantine Road" (see above) and with the presence of pottery also from the Late Roman period, indicates that this prominent place has a very long history. The tomb of Sheikh Othman near the inscribed rock is also surrounded by votive stelae, probably erected by travellers (*ibid.*). This implies that the site has been important for almost 5,000 years, if not longer.



Figure 10: One of the rock art panels located at Berber, south of Gebel Tingar. This rock art site was described by Schweinfurth (1912).

<sup>3</sup> Available from the Perry Castañeda Map Collection at [http://www.lib.utexas.edu/maps/ams/north\\_africa](http://www.lib.utexas.edu/maps/ams/north_africa).

## Inscriptions and rock art

Excluding tombs and monasteries, ancient inscriptions and graffiti occur scattered along the Nile from Gebel Tingar to Naq el-Fugani, mostly in ancient quarries. The previously known places are listed in table 1:

Place name used in this report	Alternative name	Investigated or mentioned by e.g.	Brief description
The inscribed rock at Gebel Tingar	Tingar Rock, (meaning "west rock"), "Pig Rock"	de Morgan et al. (1894: 126-7); Wilbour (1937: 552-3); Weigall (1907: 438-9); Weigall (1909: 182); Goedicke (1964: 16-7); Habachi (1957: 21); Habachi (1961: 216)	Hieroglyphic inscriptions, mainly from the 18 <sup>th</sup> to 25 <sup>th</sup> dynasty. In addition to an inscription on tribute from Punt and of high-rank "travellers", there are also inscriptions of builders and sculptors, which might be put in connection with the stone procurement in the area.
Gebel Tingar quarries	-	Sayce (1891); de Morgan et al. (1894: 126-7); Fournet (1996)	Mainly Greek inscriptions and quarry marks dated to the Roman period.
The Seti I unfinished obelisk at Gebel Gulab	-	Habachi (1960: 224-234); Brand (1997)	Inscriptions on the broken top of the obelisk (Seti I, 19 <sup>th</sup> dynasty). Note that Habachi erroneously calls the place Gebel Saman.
Gebel Gulab quarries	-	Klemm & Klemm (1993: 289-90, 292); Fournet (1996); Haldal <i>et al.</i> (2005); Bloxam & Storemyr (2005)	Greek inscriptions, as well as quarry marks and graffiti, mostly dated to the Roman period. On the basis of some of these inscriptions Fournet (1996) suggested that the stone used for <i>restoration</i> of the Memnon colossi were quarried at Gebel Gulab in the reign of Septimus Severus around 201-202 AD. Moreover, there are many Pharaonic inscriptions and graffiti.
Gebel el-Qurna	Gebel Shiha, Gebel Chikka	de Morgan et al. (1894: 202)	Undated graffiti, inscriptions and rock-art mentioned
Gebel Shihahh	Isisberg monastery	de Morgan et al. (1894: 202)	"a few Pharaonic and Greek graffiti"
Hagar el-Ghorab (meaning "rock of the crow")	Hagar el-Gharb (meaning "west rock"), Aswan Bridge	Sayce (1894: 174); de Morgan et al. (1894: 202); Gatto & Guiliani (2007)	Several Pharaonic inscriptions and graffiti, Middle and New Kingdom
Naq el-Fugani quarries	Gharb Aswan	de Morgan et al. (1894: 202); Klemm & Klemm (1993: 271)	Quarry marks, "animals", "men" (Ptolemaic?)

*Table 1: Overview of inscriptions and graffiti at the West Bank of Aswan previously published or mentioned. Note that a brief overview also can be found in Porter and Moss (1937: 219, 242).*

Note that some of the places mentioned in Table 1 have been re-studied by QuarryScapes and are partially described elsewhere in the present report (Chapter 10), in addition to the numerous new inscriptions and graffiti that have been found.

The rock art at the West Bank was largely unknown until the QuarryScapes fieldwork. However, Schweinfurth (1912) documented panels with mainly animals at Berber a hundred years ago, in the mouth of a small wadi with the same name just to the south-

east of Gebel Tingar (Figure 10). Moreover, Winkler (1939) discovered a substantial Prehistoric site with geometric figures and animals in Wadi Faras (his site no. 53) and a much younger rock art site in the mouth of Wadi Faras (no. 54). Gatto and Giuliani (2007) briefly mentioned the rock art by the inscriptions at Hagar el-Ghorab by Aswan Bridge, which has been known for a long time, suggesting a mainly Middle Nubian (C-Group) tradition for the pictures. Otherwise, the estimated more than 1500 figures found on c. 200 rock art panels in the survey area will be briefly described later in this report (Chapter 9).

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*From silicified sandstone: head of Nefertiti, Amarna Period 18<sup>th</sup> Dynasty, Egyptian Museum, Cairo*

## **Chapter 4: a history of silicified sandstone use in Egypt from the Middle Palaeolithic to Roman Period**

*Elizabeth Bloxam*

## Introduction

Any discussion into stone use in antiquity is problematic because the record of consumption is fragmentary due to constant stone re-use, mis-classification and loss of archaeological context. For instance, excavation reports may sometimes confuse the gold-yellow varieties of the stone with softer sandstone and hence such errors in documentation can present a distorted picture of use. Moreover, silicified, or siliceous sandstone is often termed "quartzite" or "quartzitic sandstone", or just "sandstone", depending on the context, which has led to some confusion in identifying the stones' source.

In the absence of fresh provenance studies, it is important to stress that at the time of writing it is not possible to assign either elite or utilitarian objects to specific sources, such as those located on the West Bank at Aswan and on the East Bank at Wadi Abu Agag and Wadi Abu Subeira and near Cairo at Gebel Ahmar. Moreover, patches of silicified sandstone occur across areas within the Nubia group, implying that local sources, especially for utilitarian stone, must also be considered. Hence, the overview of silicified sandstone consumption below can only establish major trends in its use in antiquity which would, to a greater or lesser extent, have impacted on exploitation of all these sources. Moreover, the intention is to provide a historical backdrop to these trends as a means to indirectly date and characterise some of the West Bank quarries (see Chapter 6).

## Classification and symbolism attached to silicified sandstone in antiquity: evidence from written sources

Silicified sandstone has generally been termed the most "...solar of the stones of Egypt..." given that its colour covers the spectrum from golden and white to purple-red (Quirke 2001: 76). This solar association attributed to silicified sandstone that was co-opted by successive dynastic kings, is thought to have its origins in the Old Kingdom (3<sup>rd</sup> millennium BC) connected with the emergence of the title "Son of Ra" in royal names by the 4<sup>th</sup> Dynasty (op. cit.). Gebel Ahmar (near Cairo at Heliopolis) is believed to have been of major importance at this time, given its proximity to ancient Iunu (modern Heliopolis), which was the principal sanctuary of the sun-god since the Old Kingdom (op. cit.).

The solar association given to the silicified sandstone has a longevity throughout dynastic Egypt, however, it is not until the New Kingdom (18<sup>th</sup> Dynasty) that a specific name *bi3t* (transliterated from the hieroglyphs) occurs in written sources and on some objects as a commonly used term which also means "marvellous stone" (Harris 1961: 76; Aston 1994: 34; Baines 2000: 32). These hieroglyphs are inscribed on the Colossi of Memnon, perhaps the most impressive and singularly greatest use of the stone known (op. cit.). Although there needs to be some caution in making direct correspondences between modern geological stone classifications with those from ancient Egyptian texts, derivations of the terms used for silicified sandstone tend to suggest a direct correlation with how the stone was used and where it came from. For instance, another term that emerged in the 18<sup>th</sup> Dynasty, although it is suggested as having much earlier origins, is

*inr n bnwt* the primary meaning of *bnwt* is "millstone" (Harris 1961: 75-6). This is particularly important given that one of the most long-lived uses of the stone was for grinding. Another early term *dw dšr* which means the "red mountain" and *inr n dw dšr* "stone of Gebel Ahmar" could refer to the other major source of silicified sandstone in Lower Egypt at Gebel Ahmar, as mentioned above (Harris 1961: 76; Aston 1994: 34). However, some caution might be necessary here with reference to place, given that the West Bank quarries in Aswan had been largely unrecognised as a significant source of silicified sandstone until the early 1980s and unknown as a place of utilitarian stone quarrying until our survey (see Chapter 6).

### **The earliest uses: the Middle Palaeolithic (240,000 – 10,000 years ago)**

The Lower Nile Valley and Eastern Saharan Middle Palaeolithic (Middle Stone Age) spans an enormous time depth between 240,000 – 40,000 years ago (Van Peer 1998: 135), yet it was at this time that silicified sandstone was the sole material used by early Nile Valley dwellers in Upper Egypt and Lower Nubia as tools (Wendorf *et al.* 1965: xxi; Guichard and Guichard 1965: 69). In the area between Aswan and Wadi Halfa, numerous Middle Palaeolithic tool sites have been documented, largely located at the source of the silicified sandstone on the tops of inselbergs and also on their lower slopes where slabs have collapsed (Wendorf *et al.* 1965; Guichard and Guichard 1965: 64-66; Banks 1980; Kobusiewicz and Banks 1980; Roubet 1989). Hence, the Nile Valley margins, including tributary wadis or their flanking heights, would have been preferable places for extracting such stone resources, considering that most show quarries or workshops (see Kleindienst 2000: 108). These stone industries in the Nile Valley have been linked to the use of hunting as a major subsistence base (Van Peer 1998: 120).

Excavations at Wadi Kubbaniya (12 km north of Gebel Gulab at the northern boundary of the survey area) by Wendorf and Schild (Close 1980; Wendorf and Schild 1989) in the late 1970s to early 1980s have been key to tracking the use of silicified sandstone into the Late Palaeolithic (between 18,300 and 17,000 years ago). Transformations in the use of raw materials for tool production tend to diversity at this period in Upper Egypt/Lower Nubia towards a greater range of stone types, in particular chert, quartz and Nile cobbles with a diversification to bladelet industries (Singleton and Close 1980: 229-237; Close 1980: 256-7). It is at this period that silicified sandstone use assumes a major transformation as one of the key materials used in the manufacture of grinding stones, such implements being linked to changing subsistence patterns that broadened from just hunting of large mammals to include a range of local (wild) floral resources such as wheat, barley and wetland nut-grass (Wendorf and Schild 1989: 820-1). (Figure 1)



*Figure 1. Grinding stone found in situ Late Palaeolithic settlement (Site E-78-3) at Wadi Kubbaniya (Close 1989: 455, Figure 23.25).*

Grinding stones in silicified sandstone and some other materials become widespread in Nubia and north into the Upper Egyptian Nile Valley as far as Kom Ombo by 11,000 BC, as specialized tools that were vital to the "economic" activity at the time to produce food at an experimental stage in the domestication of local plants (Wendorf 1968: 940-946; Hoffman 1980: 88). After 10,500 BC grinding stones and other objects related to this "proto-agriculture" disappear from the archaeological record in the Nile Valley, linked to a hiatus in occupation of the Nile Valley between 11,000 and 8,000 BC (Hoffman 1980: 89; Hendrickx and Vermeersch 2000: 31). Reasons for a supposed de-occupation of the Nile Valley have been largely linked to changing environmental conditions during the Holocene Wet Phase that effectively shrank communities dependent on a mixed plant and animal subsistence (Hoffman 1980: 90-98). The idea of the Nile Valley in Upper Egypt being totally abandoned for over 3,000 years is of course doubtful and lack of research and poor preservation of sites so close to the Nile presents a distorted picture (Hoffman 1980: 102; Hendrickx and Vermeersch 2000: 31). Yet, it would seem reasonable to suggest that although there may have been this general population decrease in the Nile Valley, this does not suggest that the use of silicified sandstone for grinding implements or other uses completely ceased.

Grinding stones re-emerge in the archaeological record in the Nile Valley in Epipalaeolithic seasonal camps dating to 7,000 – 6,700 BC at El Kab in Upper Egypt. However, with fishing and hunting as the main subsistence base of these nomadic groups and red pigment found still visible on a number of them, it would seem that there was no return to processing of plant remains at this time (Hoffman 1980: 100; Hendrickx and Vermeersch 2000: 35).

### **Neolithic to Predynastic (6<sup>th</sup> – 4<sup>th</sup> millennium BC)**

It is not until the introduction of agriculture and animal domestication in the mid 6<sup>th</sup> millennium BC that grinding stones in silicified sandstone re-emerge in large quantities in the archaeological record in settlements from Nubia to the Nile Delta. It is the refining of these objects into the more familiar sometimes oval or "boat-shapes" that largely characterizes these later assemblages (see Figs. 2, 3), as opposed to the more crudely worked examples of the Late Palaeolithic at Wadi Kubbania (see Chapter 6). At Hierakonpolis the oval or "boat-shaped" grinding stone in silicified sandstone is recorded amongst assemblages of grinding stones in a range of sizes in Predynastic (Naqada) contexts (Fairervis 1972: 11-12, Figure 6; Hoffman 1972: 52). Also in contemporary Predynastic contexts on the Nile Delta at Tell el-Farkha, the excavators specifically remark on their neatly prepared form and regular shape of the "boat-shaped" grinding stones (Chłodnicki and Ciałowicz 2002: 110). However, speculation still remains as to whether these represent the top "rider" that was moveable, or was the static grinding base. Further is the complication of whether grinding tools in general represent either ornamental or utilitarian functions (Hoffman 1972: 55) or in some cases ritual functions. For instance, there are some occurrences of grinding stones in higher-status burial contexts, such as 5<sup>th</sup> millennium BC Neolithic Kadruka in Upper Nubia (northern Sudan) and Upper Egyptian Badarian culture (O'Connor 1993: 14; Wengrow 2006: 57; Bruton and Caton-Thompson 1928: 16, pl. xx, 16) implying some ritual treatment of these objects. This advises some caution with straight characterization of such objects as only functioning in "utilitarian" contexts.



*Figure 2. Grinding stone, Predynastic 6<sup>th</sup> – 4<sup>th</sup> millennium BC, height 16.7 cms width 8.1 cms. Petrie Museum, UCL, London No. UC73448*



*Figure 3. Grinding stone, Predynastic 6<sup>th</sup> – 4<sup>th</sup> millennium BC, height 17.5 cms width 5.5 cms Petrie Museum, UCL, London. No. UC73449*

During Naqada II (3,500 – 3,200 BC) transformations take place in the crafting of hard stones, particularly into small vessels, that form the prelude to an exponential elaboration of these industries into fully-fledged large-scale stone quarrying and working for monumental architecture (Midant-Reynes 2000: 54). At this time silicified sandstone was not only important in food production and grinding of pigments, but also in the crafting of high status stone objects given its abrasive properties to smooth surfaces and also to hollow hard stone vessels (Stocks 2003).

Increasing social complexity during the late 4<sup>th</sup> millennium BC (late Naqada III ) and the rise of an elite set the foundations for the emerging Egyptian "state" with the elaboration of the funerary monument, or as Wengrow (2006: 173-5) describes, a "technological marvel". Although the use of silicified sandstone in these contexts is rather sketchy and poorly documented, a stone-cut tomb of Naqada III (the earliest of its kind) containing a block of Aswan granite, as well as the crafting of many imported stones at Hierakonpolis sets the stage for this transformation in the use of hard stones in general not only for funerary objects, but as exchange items (Hoffman 1984: 244). Contemporary A-Group culture in Nubia also sees increasing social complexity and exchange of exotic items, such as imported stones in many cemeteries in Lower Nubia (O'Connor 1993: 14-23). Of particular note are objects replicating utilitarian hand-grinders and oval/rhomboidal palettes in exotic stones, such as quartz and porphyry (op. cit: 128), suggesting important cultural antecedents to the early utilitarian use of such forms. It remains unknown and undocumented if such objects also occur in silicified sandstone. Exchange systems involving exotic hard stones are further attested in Lower



Egypt at Maadi, where stones such as "Faiyum" basalt, granite, diorite, and gneiss were found as vessels (Hoffman 1980: 203).

### Early Dynastic to Ptolemaic Period (3<sup>rd</sup> millennium BC – 30 BC)

The first documented occurrence of silicified sandstone as an elite status funerary object (described as "brown quartzite") is that of a shallow bowl found in a pharaonic context the 1<sup>st</sup> Dynasty royal tomb of Djer at Abydos (Petrie 1901: pl.XLVIII, 168). This vessel form is fairly typical of the corpus of Early Dynastic hard stone objects at a time when there was an explosion in the use of exotic hard stones for such objects.

By the 3<sup>rd</sup> millennium BC these early elaborations of the funerary monument set in motion a revolution in the large-scale exploitation of hard stones that reaches its zenith during the "pyramid age" of the Old Kingdom between the 3<sup>rd</sup> – 6<sup>th</sup> Dynasties. Aswan granite, basalt, Chephren Gneiss and silicified sandstone occur in monumental stone architecture and large statuary by the Old Kingdom, particularly between the 4<sup>th</sup> and 5<sup>th</sup> Dynasties. The first known use of silicified sandstone in these monumental forms is that of the life-sized statue of 4<sup>th</sup> Dynasty of King Djedefre and from then on it had a limited use in architectural elements of the pyramid complex of Userkaf as a false door (Aston *et al.* 2000; Verner 2002). The 6<sup>th</sup> Dynasty pyramid complex of Teti sees its greatest use as foundation blocks, basins and pillars, and in the mortuary temple of Pepi II 18 columns are of silicified sandstone (Jéquier 1938; 1940: 22-4; Lauer and Leclant 1972; Lehner 1997: 156; Verner 2002: 370). (Figure 4).



*Figure 4. Head of Djedefra in silicified sandstone, 4<sup>th</sup> Dynasty Old Kingdom*

During the Middle Kingdom elite use of the stone for monumental purposes, such as stelae, statuary, wall linings and lintels was maintained (Aston *et al.* 2000) (Figure 8). However, it was during the New Kingdom that the use of silicified sandstone in monumental architecture, colossal and life-sized statuary, obelisks, lintels, stelae and small statuettes has few parallels (see Kozloff *et al.* 1992; Johnson 2001) (Figure 5). Historical sources suggest that this overwhelming use of silicified sandstone in the New Kingdom, particularly in the 18<sup>th</sup> Dynasty (1390 – 1352 BC) reign of Amenhotep III, was associated with a re-focussing of religious ideas to solarise the major cults of Egypt



whilst simultaneously identifying himself with the creative aspects of the sun god Ra (Kozloff *et al.* 1992: 76, 110). By the following Amarna Period (1352-1336 BC) solarising of the royal cults reached its zenith with the Aten, depicted as the sun disk, whose most essential aspect was light (Van Dijk 2000: 283). Hence silicified sandstone remained one of the principal hard stones used for royal statuary, in particular there seems to be a marked increase in the use of the purple variety (Figure 6). Baines (2000: 36) suggests that this is characteristic of the Amarna period when there was a desire to intensify trends from previous reigns and transform them into new "canons of beauty" that placed greater value on colour. Moreover, it seems that there was a transformation from the monumental-scale use of the stone during the reign of Amenhotep III to generally smaller highly crafted statuettes of the Amarna Period. Of particular note are the several heads of Nefertiti and those of other royal women in the purple and gold varieties (Arnold 1996: 41-84). (Figure 7).



*Figure 5. Colossi of Memnon - Amenhotep III Mortuary Temple 18<sup>th</sup> Dynasty, West Bank, Luxor*



*Figure 6. Small statuettes of the Amarna Period 18<sup>th</sup> Dynasty in the purple variety of the stone. Egyptian Museum, Cairo*



*Figure 7. Head of Nefertiti – Amarna Period 18<sup>th</sup> Dynasty, Egyptian Museum, Cairo*

After a hiatus of approximately 80 years, the consumption record sees a short revival in the use of silicified sandstone for royal ornamental and monumental purposes during the reign of Sety I in the early 19<sup>th</sup> Dynasty (1294 – 1279 BC). Having modelled himself on Amenhotep III (the most prolific user of silicified sandstone), the use of silicified sandstone for obelisks (including a truncated obelisk form that rests on a wider base) and colossi was again sought after (Brand 2000: 128, 360). It is important to note that a number of large building programmes, particularly in the Luxor Temple at Thebes (modern Luxor), were not completed due to Sety's early death (Brand 2000: 365, 384). Evidence related to such unfinished projects may be observed in the West Bank quarries as discussed in Chapter 6.

The New Kingdom era, between 18<sup>th</sup> and early 19<sup>th</sup> Dynasties, represents a period that witnessed the exponential rise and decline of large-scale silicified sandstone use for royal and elite purposes that was never to be repeated in antiquity. Even accounting for poor preservation, silicified sandstone use by the Late Period is dramatically reduced for elite status objects. A small statuette dating to the 25<sup>th</sup> – 26<sup>th</sup> Dynasty in the purple variety of the stone (Figure 8), a bowl described as a shallow mortar (note this may not necessarily be an elite status object) with four lugs and the top of a cosmetic jar are some rare examples (Aston 1994: 35, pl. 6 (c); D'Abbadie 1972: #168). The Ptolemaic Period also sees a very limited use of silicified sandstone for elite objects. The head of a Ptolemaic Queen in silicified sandstone was suggested as exceptional for sculptors of the 4<sup>th</sup> – 3<sup>rd</sup> centuries BC, implying it was a special commission, as similar to the Late Period largely dark stones dominate for elite statuary (Bianchi 1988: 166).



*Figure 8. Statuette of  
Horemakhet, Kushite 25<sup>th</sup>  
Dynasty - Nubian Museum,  
Aswan*

It is important to note that the use of silicified sandstone for grinding stones was continuous throughout the dynastic period. The typical oval/boat-shaped grinding stones (saddle querns) occur in relatively standardized forms at major settlement sites across Egypt. At the multi-period settlement on Elephantine Island in Aswan these objects occur in stratigraphic levels from the Old Kingdom into the Ptolemaic Period. Significant quantities are also recorded at Amarna (Middle Egypt) and in the New Kingdom levels of Kom Rabi"a at Memphis in Lower Egypt. (Giddy 1999) (Figure 9). Used for grinding grains as well as pigments, this activity is numerous reproduced in Egyptian tomb paintings and models of the dynastic period (Figure 10).



*Figure 9. Grinding  
stones found at  
Elephantine  
Island, Aswan*



*Figure 10.  
Middle Kingdom  
figurine of a  
woman grinding  
grain, 11-12th  
Dynasty.  
Rosicrucian  
Egyptian  
Museum &  
Planetarium, San  
Jose, USA.  
[www.egyptianmu  
seum.org](http://www.egyptianmuseum.org)*

### **Roman Period (30 BC – 395 AD)**

There is a return to the large-scale use of silicified sandstone in the Roman Period, particularly the purple variety, given the elite associations attached to this colour (Maxfield and Peacock 2001). However, examples of its use as finished objects remain limited and caution needs to be applied given that large-scale re-use of hard stones occurred at this time. For instance, a large standing statue in the Cairo Museum might suggest re-use of an earlier dynastic (probably New Kingdom) statue (Fig 11). Moreover, with the introduction of the circular or rotary millstone, often made from granite and basalt, this may indicate a subsequent decline in the use of silicified sandstone grinding implements in food preparation (Fig 12). This decline in use for domestic purposes may also be implied from excavations at Elephantine, where the common silicified sandstone oval shaped grinding stones are largely absent from settlement levels after the Ptolemaic Period (Wolfgang Müller pers. comm. 2006). However, use of silicified sandstone in "industrial" contexts on Elephantine Island for grinding of pigments cannot be ruled out. Grinders of "sandstone" for such purposes are referred to in "industrial" contexts of the Early Roman Period (1<sup>st</sup> – 2<sup>nd</sup> cent AD) on Elephantine Island (Rodziewicz 2005: 33, pl 25, nos. 411-415). Given that errors can sometimes be made by archaeologists in distinguishing "sandstone" from "silicified sandstone" (as discussed in the introduction to this chapter) one may speculate that a continued "industrial" use of the stone during this period may have occurred.





*Figure 11. Standing statue of the Roman Period displaying elements of pharaonic style in the torso and Romanesque head suggesting it is of re-used silicified sandstone*



*Figure 12. Partially worked granite circular grinder in the East Bank granite quarries Aswan (March 2007) alongside finished upper stone of rotary mill in granite 26 cms diameter: Petrie Museum, UCL (UC16795).*

## Summary

Silicified sandstone may represent one of only a few raw materials that has had an almost continuous use in antiquity, over 200,000 years, since the earliest tool industries of the Palaeolithic. The transformation in its use for grinding implements by the Late Palaeolithic represents a major and enduring use of the stone for such purposes into the

Roman Period. Its transformation as a material sought after by elites for funerary objects, such as small vessels, developed in the Early Dynastic (3<sup>rd</sup> millennium BC) which set a trend towards its large-scale use by the 4<sup>th</sup> Dynasty of the Old Kingdom for monumental purposes.

Although use of silicified sandstone for largely utilitarian objects was maintained, the ebb and flow of its large-scale use for royal and elite funerary objects in the dynastic period may be connected with the periodic supremacy of religious cults linked to the sun-god. Such associations and their impact on the use of the stone for monumental architecture and large objects reached a zenith in the New Kingdom, between the 18<sup>th</sup> and early 19<sup>th</sup> Dynasties. From this period onwards its large-scale use in elite contexts tends to decline with a possible small-scale re-emergence in the Roman Period, chiefly of the purple variety of the stone.

Outside of the consistent utilitarian use of the stone, linking periods of large-scale use with changes in macro-level religious ideologies has been an important indirect method of dating and characterising the West Bank quarries where large-object quarrying took place. Although these periods of large-scale use had a major impact on transforming the West Bank quarry landscape, these transformations lie hand-in-hand with the manufacture of grinding stones as one of the most significant exploitative practices that began the transformation the West Bank quarry landscape from the Palaeolithic. This theme forms a major area of discussion in the "Significance Report".

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*Cross-bedded sandstone of the Umm Barmil Formation seen in a Graeco-Roman quarry*

## **Chapter 5: geology and stone resources of the Aswan West Bank**

*Tom Heldal, Reidulv Bøe, Axel Müller*

## Introduction

The bedrock geology of the Aswan West Bank is dominated by sandstone and mudstone units of the Nubian Group, unconformably overlaying Precambrian igneous "basement" rocks, of which varieties of the Aswan Granite are most well-known. A layered succession of mudstones, siltstones and sandstones defines the morphology of the area, with the more resistant sandstone beds capping hills and terraces, and escarpments formed where erosion has cut through sandstone beds and into underlying mudstones. Parts of the sandstones have undergone extreme silica cementation, so that they appear much harder than the bulk of the sandstones, and are thus termed silicified sandstone (or erroneously "quartzite"). The silicified sandstone is the most important target for stone extraction in the area, due to its mechanical quality (hardness) and/or aesthetic appearance. The hardness has also caused the silicified sandstone to be much more resistant to weathering than the other rocks, it thus occurs not only in layers capping the hilltops, but also as "blocky remains" of the layers scattered all over the landscape. Also "softer" sandstone varieties have been exploited in the area, but to a smaller extent and mainly in the north, between Gebel el-Qurna and Wadi Kubbaniya. Oolitic iron stone and ferruginous sandstone layers occur in the sedimentary rock succession, and in the central part of the area these have been important sources of hematite and goethite; thus exploited at an early stage for ochre pigment and later for iron ore.

## Stratigraphy of the West Bank

The sedimentary rock succession on the west bank is part of the "Nubian Sandstone" (Rüssegger 1847), which is a term used for the Upper Cretaceous in Sudan and Egypt (Zitter 1883). The term "Nubian Series" (Sandford 1935) has also been in common use, however in more recent times the term "Nubian Group" as introduced by Whiteman (1970) has been accepted by several authors (Klitzsch et al. 1979). The Nubian Group on the Aswan West Bank displays layers of claystones, mudstones and sandstones of Upper Cretaceous age (Turonian – Campanian; Klitzsch 1990). The lower part rests directly on top of Precambrian granitoid rocks ("Aswan Granite", see e.g. Ball 1907), where the contact represents an irregular topographic surface formed by erosion of the Precambrian rocks prior to deposition of the sedimentary rocks. The whole succession has been tilted due to post-Cretaceous tectonic activity, and consequently the rocks are dipping a few degrees to the north. Thus, when moving northwards in the terrain, one climbs higher in the stratigraphic succession.

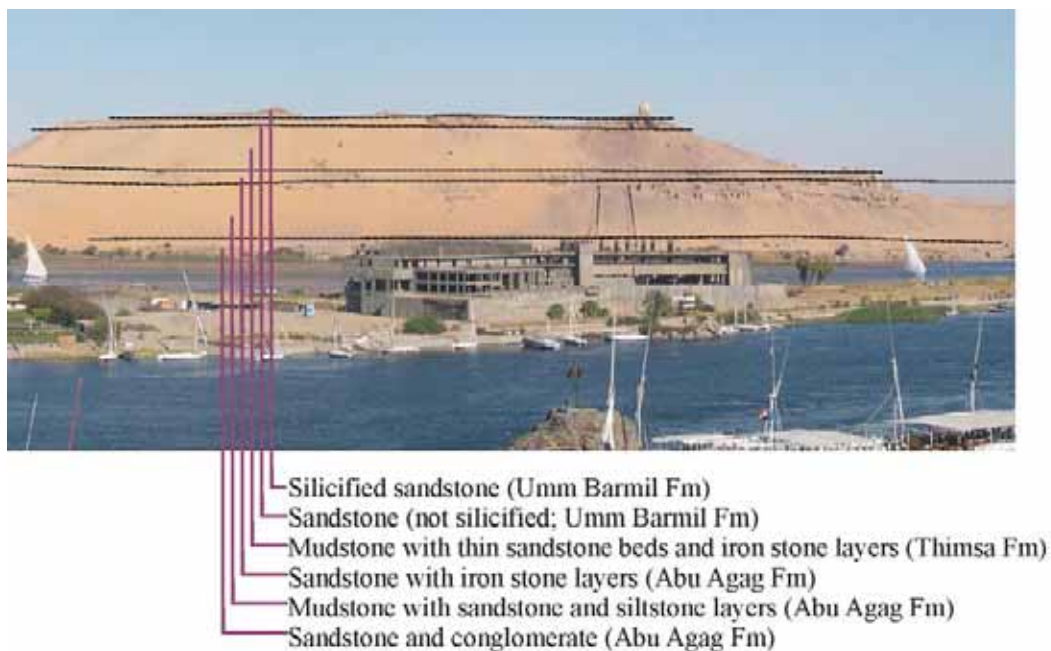
The sedimentary successions in the Aswan area display quite significant lateral variations in thickness and character, and therefore the stratigraphic sections made by different authors do not completely correspond. This is partly due to the fact that they have been studied at different locations, especially at the East Bank. We have chosen to divide the succession into three formations as defined by Zaghloul (1970) and also used in some of the most recent papers, e.g. Klitzsch (1990), namely (from bottom to top) the Abu Agag Formation, the Timsah Formation and the Um Barmil Formation. Basically, we use the same formation boundaries as Endrisewitz (1988). However, we have defined the contact between the Abu Agag Formation and the Timsah Formation slightly higher, corresponding to the Facies 3a-3b transition by Bhattacharyya and Lorenz (1983) and the transition between the Lower and Upper part of Facies 2 by van

Houten et al. (1984). The relationship between some of the different stratigraphic interpretations is given in Table 1.

<i>Present report</i>	<i>van Houten et al. (1984)</i>	<i>Bhattacharryya and Lorenz (1983)</i>	<i>Zaghloul (1970) Klitzsch (1990)</i>
Umm Barmil Formation (uppermost)	Facies 3	Facies 4	Umm Barmil Formation
Timsah Formation	Upper part of Facies 2	Facies 3b	Timsah Formation
Abu Agag Formation (lowest)	Facies 1, lower part of Facies 2	Facies 1, 2a, 2b, 3a	Abu Agag Formation

*Table 1: comparing different stratigraphic sections from the Aswan area*

Most of the stratigraphic section is well displayed on the eastern slope of Gebel Gubbet el-Hawa (Figure 1), where the Tombs of the Nobles are situated. A log of the section is given in Figure 2, and a geological map showing the distribution of the three formations at the West Bank is shown in Figure 3. Many authors (ibid.) have interpreted the succession, and in the present report we will only go briefly through the different facies.



*Figure 1. Stratigraphy of the Gubbet el-Hawa hill seen from the East Bank*

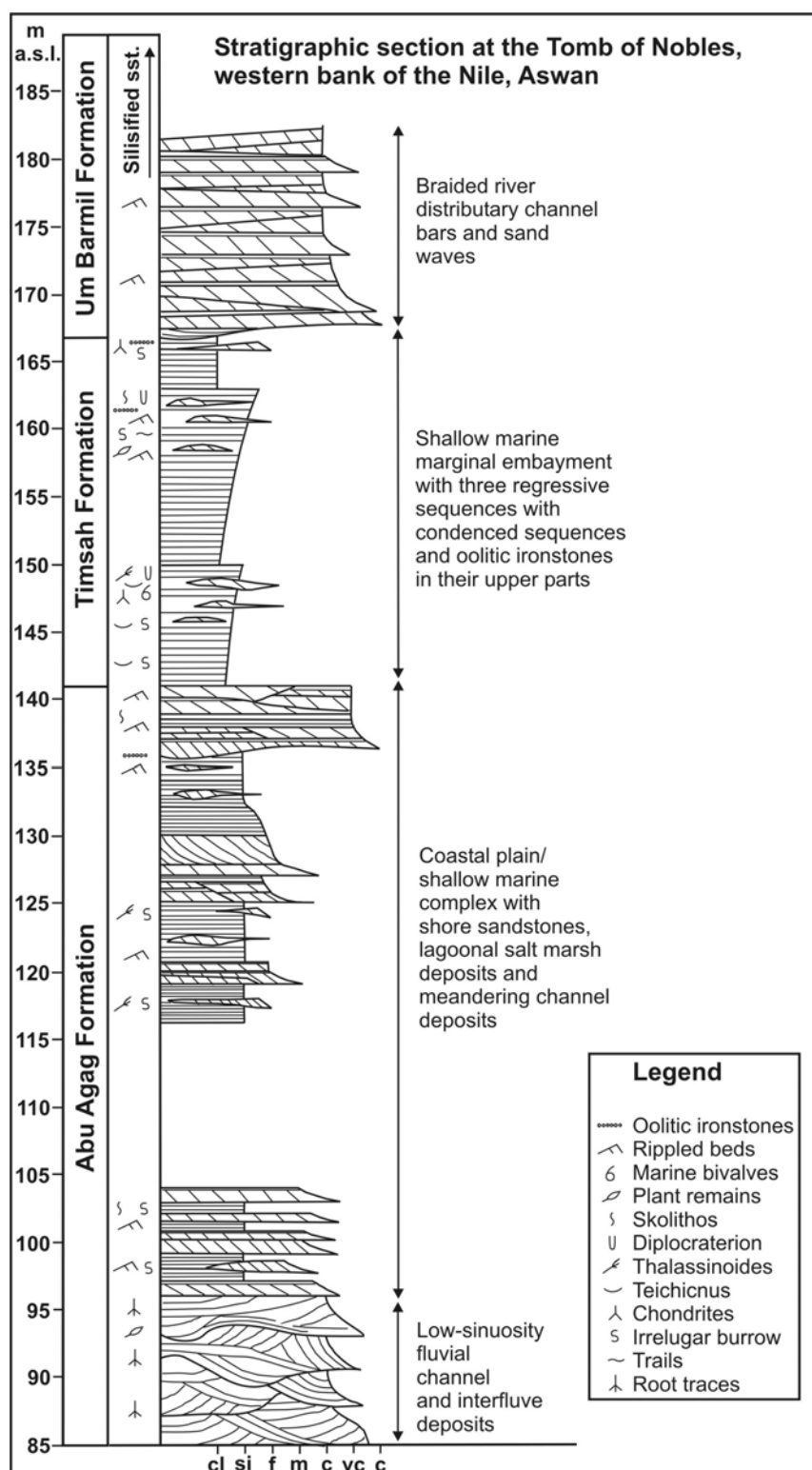


Figure 2. Stratigraphic section of Gebel Gubbet el-Hawa.

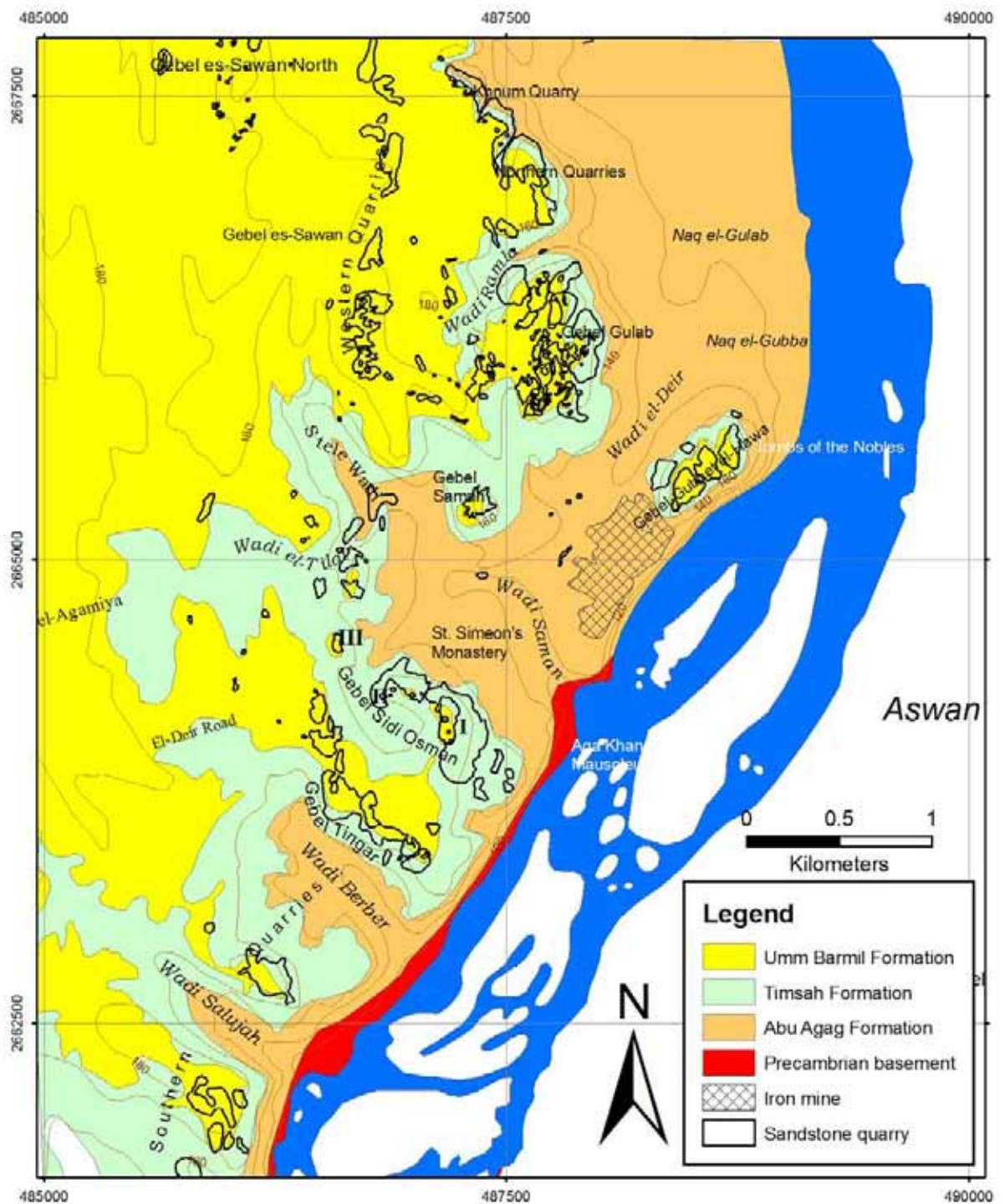


Figure 3. Geological map of the central quarry area, Aswan West Bank. Coordinates in UTM WGS84, grid interval 2,5 km.

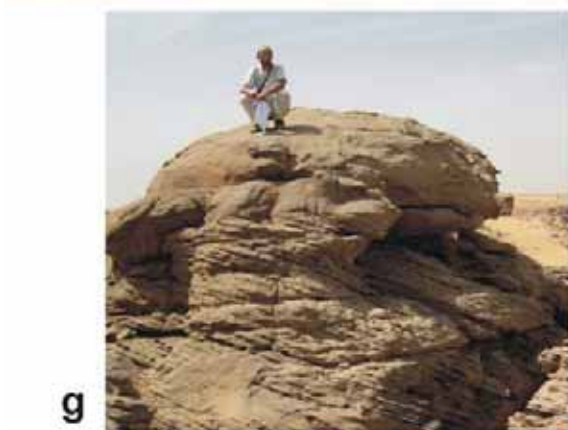
The Abu Agag Formation displays a lower unit of cross-bedded sandstones and conglomeratic sandstones deposited in low-sinuosity fluvial channels, resting directly on the Precambrian rocks (Figure 4a and b). This is followed by a unit of mudstones intercalated by thin sandstone and siltstone beds (Figure 4c and d), interpreted to represent a coastal plain/shallow marine complex with shoreline sandstones and lagoonal salt marsh deposits. In the upper part there is a several metres thick point bar deposit, which probably represents a meandering river channel. The uppermost few metres of the formation consist of shallow marine sandstone beds locally containing oolitic hematite-goethite iron beds, subject to intensive ancient iron-mining south of Gebel Gubbet el-Hawa (see chapter 7). Most of the rock-cut tombs on the West Bank are found in the rocks of the Abu Agag Formation.

The Timsah Formation represents three shoaling-upwards sequences, each containing claystones and mudstones grading upwards to cross- and ripplelaminated sandstone beds. The Timsah Formation contains several thin layers of oolitic iron-stone, predominantly occurring on top of the sandstone beds. The Timsah Formation probably represents shallow marine, lagoonal and strand plain deposits.

The Um Barmil Formation occupies the uppermost part of the topography within the concession area. It lies unconformable on top of the Timsah Formation (Figure 4e), and locally, ferruginous conglomerate is developed along its base (Figure 4f). It consists of two units of tabular cross-bedded sandstones and conglomerates/grits (Figure 4g and h) interpreted as braided river deposits. A ten metres thick unit of claystone, siltstone and rippled sandstone, probably representing lake deposits, occurs between the two sandstone/conglomerate units. Silicified sandstone, which was the most prominent target for ancient stone exploitation, is found in the fluvial sandstone units; the first appearance of it is approximately 4-8 metres above the base of the formation. However, the degree of silification varies laterally so that silicified sandstone occurs as clearly restricted patches. The maximum thickness of silicified sandstone is approximately 8 metres, and the silicified layers are generally considerably thicker in the lower part of the formation.

*Figure 4 (next page). Aspects of the Nubian Group at the Aswan West Bank. a) unconformity (dotted line) between Precambrian basement (below) and fluvial facies of the Abu Agag Formation, b) fining-upward channel sequences in lower part of the Abu Agag Formation, c) the Tomb of the Nobles in silty/sandy mouth bar sequence in upper part of the Abu Agag Formation, d) Uppermost part of the Abu Agag Formation with nodular iron beds, e) contact between the Timsah Formation and the Um Barmil Formation, f) ferruginous conglomerate in the basal part of the Um Barmil Formation, g) planar cross-stratified sandstone of the Um Barmil Formation, h) conglomeratic channels in the Um Barmil Formation*







## Sandstone petrography and silicification

"Silicified sandstone" is a term used for sandstones that, during diagenesis, have become strongly cemented by quartz, thus resembling (in hardness, polish and luster) metamorphic "quartzite". Klemm and Klemm (1993) concluded that silicification took place under low temperature conditions, with silica precipitating from meteoric water. SEM cathode luminescence (CL) confirms this, in that the detrital grains show no signs of higher temperature alteration. The majority of the grains are quartz, of which 70-90% originate from low- to high-grade metamorphic rocks. 10 to 30 % of the grains derive from igneous rocks (Figure 5). Hydrothermal quartz grains occur occasionally. Grains with intra-granular textures, which are comparable with textures observed in quartz in shock-metamorphosed (impact) rocks, were found in two samples. In thin section, clastic grains are predominantly angular to sub-angular (Figure 6).

It is interesting to note that samples from Gebel Ahmar near Cairo, the other major source for silicified sandstone used for construction purposes in Egypt<sup>4</sup>, show similar provenance for the quartz grains. Furthermore, quartz cement seems to have been formed at similar temperature conditions. As pointed out by Klemm and Klemm (1993), there is a tendency for the Gebel Ahmar sandstones to have more rounded grains than the sandstones at the Aswan West bank, thus being more distal to the source.

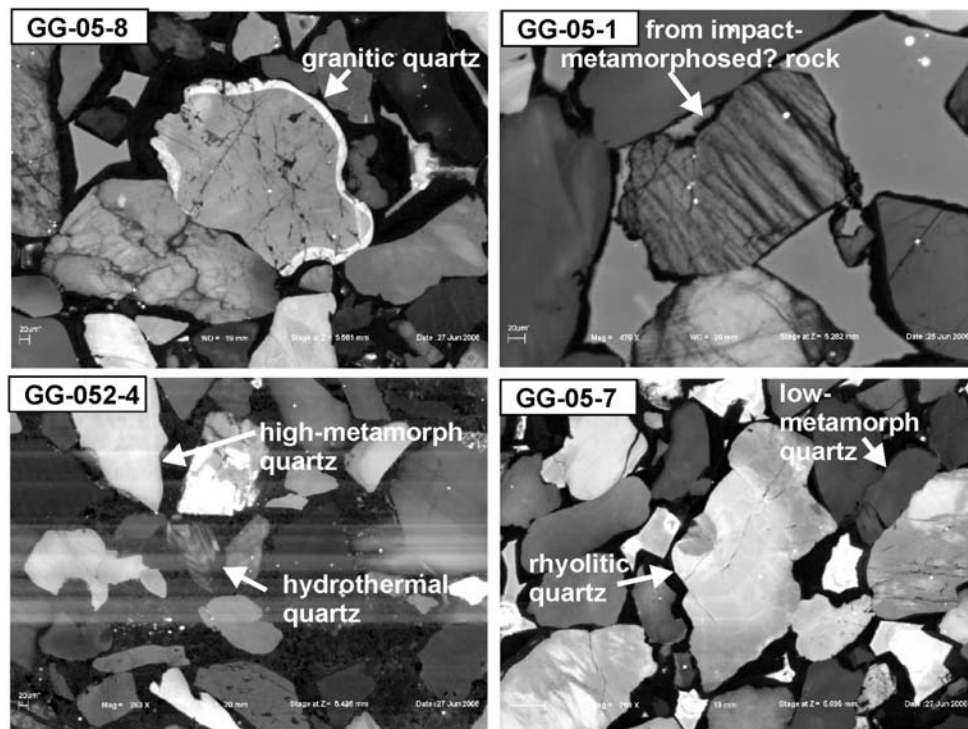


Figure 5. Provenance of quartz grains in the Aswan West Bank silicified sandstone. Photo by Axel Müller, NGU

<sup>4</sup> Samples generously provided by Prof. James A. Harrell, Univ. of Toledo

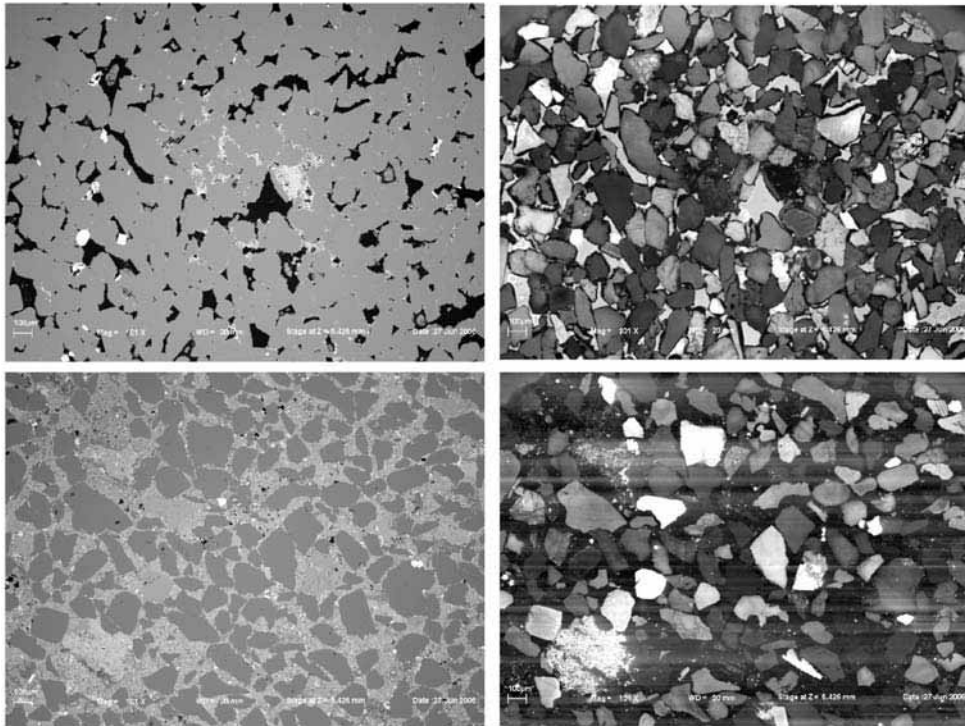


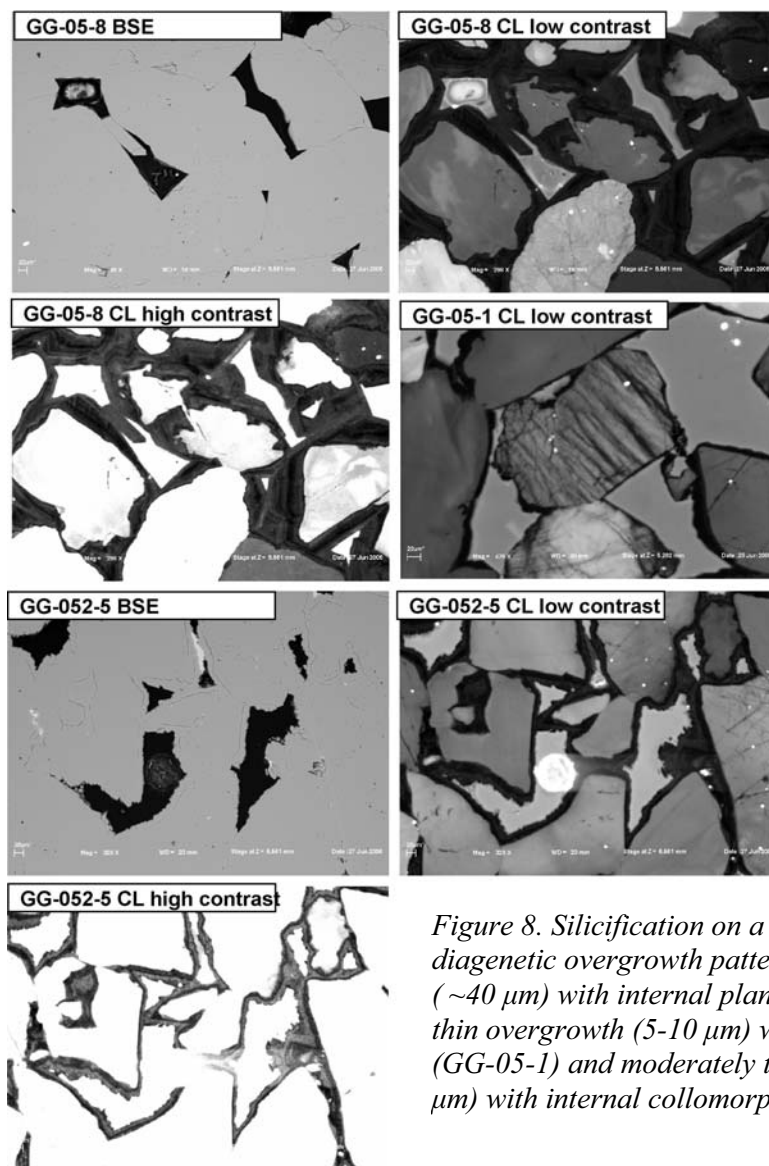
Figure 6. Grain-supported sandstone (upper photos) versus matrix-supported (lower photos). Left: BSE images, right: SEM-CL images. Photos by Axel Müller, NGU



Figure 7. Aspects of silicification on a mesoscopic scale. a) non-silicified spot in silicified sandstone, b) border between purple and yellow silicified sandstone, c) silicified sandstone (darker) in poorly silicified, d) lenticular "flame-structured" zones of purple silicified sandstone in yellow.

The degree of silification varies considerably (Figure 7), from porous sandstone with a very low degree of silification, to highly silicified sandstone, in which the spaces between the detrital quartz grains are almost completely filled with quartz cement (Figure 8). These variations can be observed both laterally and vertically, and even within single outcrops (Figure 7a). The degree of silification influences the hardness and the durability of the sandstone; the more silicified ones being extremely dense and durable, and displaying clear and bright colours.

The colour of the silicified sandstone varies from pure white via yellow and orange to purple red (Figures 7 and 9). The contact between different colours can occur both concordantly or discordantly to the sedimentary layering in the rocks, and may represent deposition of silica cement from more or less iron-rich solutions. The solutions might have originated during tropical weathering/laterite formation or may be related to shallow marine environments or formation of oolitic iron beds/iron crusts, but this topic remains to be studied (see also colour distribution map in Figure 10).



*Figure 8. Silicification on a microscopic scale and diagenetic overgrowth patterns. Thick overgrowth ( $\sim 40 \mu\text{m}$ ) with internal planar zoning (GG-05-8), thin overgrowth ( $5\text{--}10 \mu\text{m}$ ) without internal zoning (GG-05-1) and moderately thick overgrowth ( $\sim 20 \mu\text{m}$ ) with internal collomorph zoning (GG-052-5).*

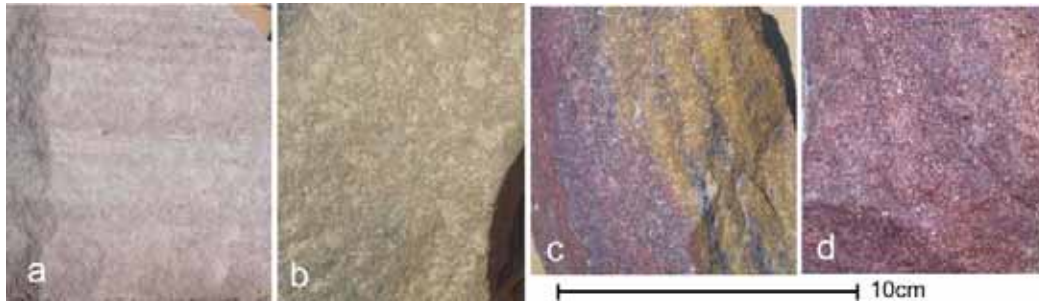


Figure 9. Some varieties of colour in silicified sandstone. a) white – beige, b) beige, c) purple – orange, d) purple

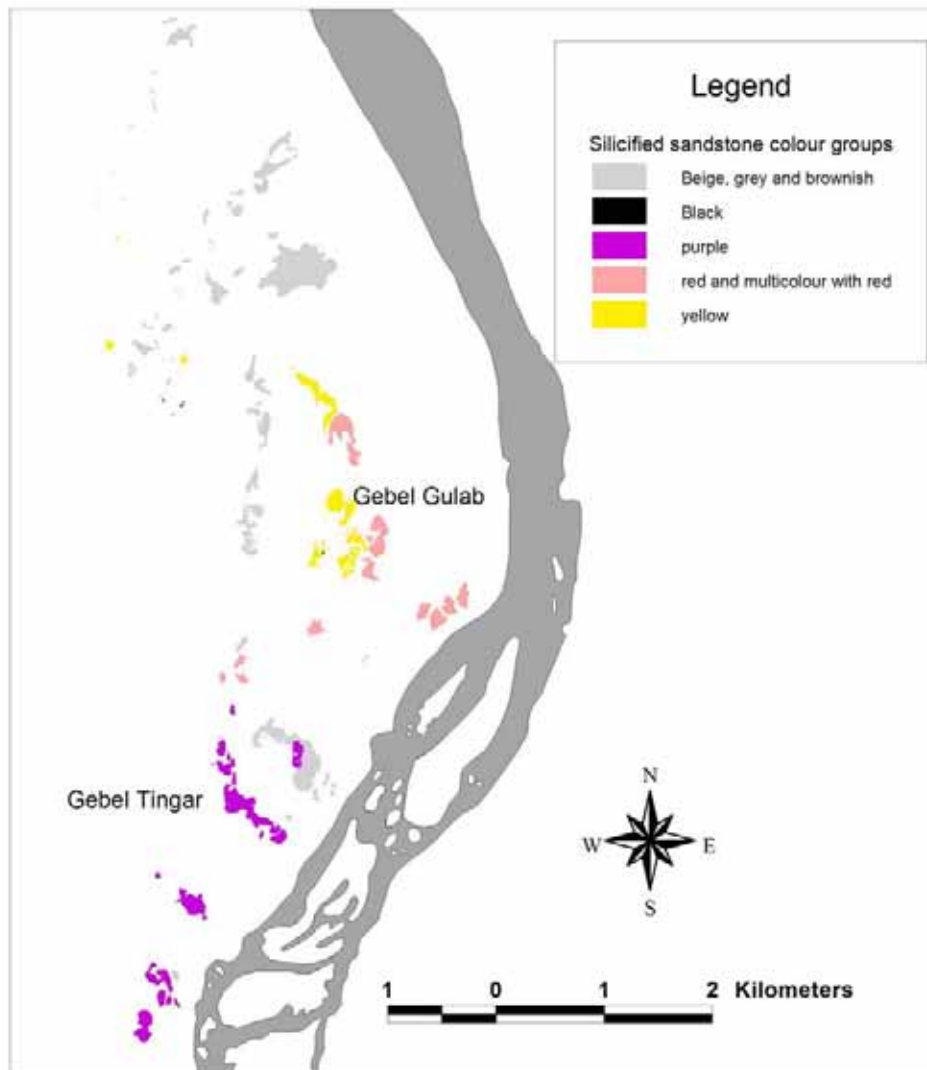


Figure 10. Colour distribution map of silicified sandstone in the central and southern part of the survey area. Since colour may vary much even at one outcrop, the most prominent is given on the map.

### **Silicified sandstone along the Wadi Kubbaniya**

Along the margins of Wadi Kubbaniya, in the northernmost part of the concession area, a special variety of silicified sandstone occurs. More than being related to the cross-bedded sandstone units of the Um Barmil Formation, this variety seems to follow NW-SE sub-vertical fractures and faults along the wadi. The occurrences are lens-shaped (Figure 11), varying from less than a metre to some tens of metres in length. The sandstone here is fine-grained and has a greyish brown colour. These occurrences have been exploited to a small degree for Prehistoric tools, as described below.



*Figure 11. Sub-vertical faults along the Wadi Kubbaniya carrying lenses of silicified sandstone. Photo taken towards the east.*

### **Rocks and landscape forms**

The geomorphology of the area reflects the varying resistance of the rocks to weathering. Silicified sandstone, being particularly resistant, caps the top of hills where present. In several areas, weathering and erosion have undermined silicified sandstones and removed the underlying strata. In such areas, silicified sandstones occur as collapsed, discontinuous block layers more or less *in situ* in the landscape. However, the further away from their initial stratigraphic position the blocks are found, the smaller in size and more rounded they are (see also discussion below).

The less resistant layers of claystone and mudstone within the Timsah Formation and the Abu Agag Formation are found in the steep slopes, and are often covered with scree from overlying sandstones. A prominent feature of the geomorphology of the area is the formation of large terraces and flats along the iron stone layers, which are highly resistant to weathering. There are several such "black terraces" in the area, but



particularly the iron stones of the upper part of the Abu Agag Formation and the middle to upper parts of the Timsah Formation form large terraces (Figure 12).

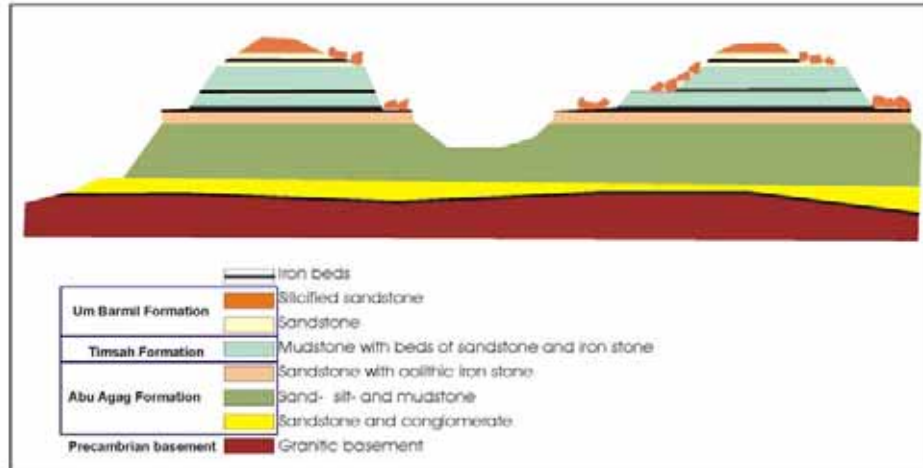


Figure 12. Schematic drawing showing the relations between the morphology and the rocks in the area.

The terrain tends to get less steep and smoother towards the north. This is again reflecting the importance of the silicified sandstone and the iron ore layers in shaping the landscape; the thickest layers of silicified sandstone are observed in the lower part of the Um Barmil Formation in the area between Northern Quarries and Gebel Tingar. Towards the north, occurrences of silicified sandstone get thinner and more scarce. Likewise, iron beds tend to get thinner towards the north.

There are several "cobble hills" in the area, representing remains of the Pliocene "Channel I" of an ancient Nile River (Issawi and Hinnawi 1980), especially a few hundred metres west of Gebel Gulab (called "Pebble Ridge" by us). Although predominantly consisting of vein quartz cobbles, also granitoids and metamorphic rocks are present. Such cobble deposits have occasionally been utilized for tools for working the silicified sandstone (see below).

## **Silicified sandstone deposits and quarrying**

Most of the stone exploitation in the area has targeted the silicified sandstone for utilitarian products (grinding stone and stone tools) and for ornamental stone. The utilitarian use of the stone is due to its technical properties – i.e. it is well suited as a grinding stone. The silicified sandstone displays a range of colours (white, yellow, pink, purple, red) which made it aesthetically attractive for several ornamental purposes (statues, columns, etc.). Sandstones that are poorly silicified display a combination of good workability and aesthetic appearance that seems to have been considered favourable for the extraction of obelisks during the New Kingdom (in the vicinity of the Seti I obelisk extraction area at Gebel Gulab).

The occurrences of silicified sandstone are restricted to a few specific levels within the Um Barmil Formation (starting 4-8 metres above the formation's base) and, as mentioned above, it is only developed within parts of the concession area. Thus, the process of silicification of the sandstone is not evenly distributed, resulting in a pattern of irregular spots of silicified sandstone outcrops. As already mentioned, blocks from this layer also occur at lower altitudes, left behind after erosion of the less resistant, underlying strata. Much of the exploitation of the silicified sandstone has in fact occurred on such loose blocks covering the slopes beneath the outcrop level of the Um Barmil Formation, and even on small and rounded blocks in the wadis.

The areas with thick layers and large blocks of silicified sandstone can be defined as the "core area" for "high intensity" quarrying, including a substantial amount of bedrock quarrying and probably reaching its maximum during the New Kingdom. This is surrounded by a "marginal" resource area, containing smaller and more scattered occurrences of silicified sandstone and smaller blocks, which can be better described as "low intensity" or artisan type quarrying. Most likely, the "high-intensity" quarry areas have obliterated previous "low-intensity" quarries. This division is of importance when discussing possible chronologies of quarrying in the area and will be further treated in the next chapter.

In Table 2, the use of sandstones is related to colour and degree of silification. This shows that the most highly silicified sandstone was extracted predominantly for prestige type objects both in the Pharaonic and the Roman periods. Colour most likely played an important role in both periods (i.e. the similarity between the purple sandstone and the famous porphyry at Mons Porphyrites, Eastern Desert, Maxfield and Peacock 2001). Production of grinding stones, on the other hand, predominantly took place in the slightly less silicified sandstones, probably reflecting a preference for quarrying sandstone of good enough quality (sufficiently silicified) but at the same time not too difficult to work. The obelisk extraction seemed to focus on yellowish, poorly silicified sandstone, the reason for which could be partly the preference for a softer and more easily workable stone and partly the colour (yellow = solar symbolism; see chapter 4). In addition, highly silicified sandstone varieties do not occur in large enough outcrops for extraction of obelisks. The most ancient use of silicified sandstone in the area is for possibly Middle Palaeolithic tools, such as axes and cleavers. Such "quarries" are rare, but the ones present indicate the exploitation of distal, rounded blocks of highly silicified sandstone. Such blocks have been exposed to weathering for a very long time, leaving finished, sound "cores" for tool production.



Degree of silicification	Colour	Grinding stone	Obelisks	Pharaonic ornamental stone	Roman ornamental stone	Building stone general	Tools
Ferruginous sandstone (black silicified)							X
Highly silicified	Purple red, orange	(X)		X	X		X
Silicified	Red, orange, yellow, white	X		X	(X)		
Poorly silicified	Yellowish	X	X	(X)			
Not silicified	Cream, brownish	X				X	

*Table 2. Degree of silicification and colour of sandstones versus different uses.*

### "Soft" sandstone deposits

Apart from the above mentioned exploitation of silicified sandstones, quarrying also occurred in "softer" sandstones, predominantly for building stones or decorative elements, but also for grinding stones. The St. Simeon Monastery is built of local sandstones from the lower part of the Abu Agag Formation (quarries on the site of the monastery). Scattered, small quarries for building stone, probably from the Ptolemaic Period, are found in the lower part of the Um Barmil Formation and in sandstone beds of the Timsah Formation, whilst a characteristic beach sandstone occurring in the upper part of the Um Barmil Formation has been exploited over a large area for grinding stones and possibly other products. Furthermore, a large quarry of possible Ptolemaic age occurs in the upper part of the Um Barmil Formation in the New Aswan city construction area, and several extractions from the Roman Period are seen in the same area. At present, non-silicified sandstones are exploited in several parts of the area for making rubble stones for local housing (Figure 13).



*Figure 13. Artesan quarrying of rubble for local housing. Photo by Elizabeth Bloxam.*

## Sources for Pounders

From the Late Palaeolithic and up to the Graeco-Roman Period, silicified sandstone was worked with "hammerstones" – or pounders. These were preferably sub-spherical in shape. From the earliest exploitation, small pebbles and cobbles of vein quartz, silicified sandstone, igneous rocks and metamorphic rocks were applied, derived from Pliocene river beds (cobble beds) in the area (see above). Later on, when the production of grinding stones started, larger cobbles of silicified sandstone were applied. Further onwards, at least in the New Kingdom, larger amounts of stone pounders of "exotic" rocks from the Precambrian basement were taken into use. These include dolerite, granodiorite, diorite, granite and granitic gneiss. Particularly, the more mafic rock types (dolerite, dark granodiorite) are commonly found. These resemble the tool assemblages found in the unfinished obelisk quarry in Aswan. Many of these pounders are naturally rounded cobbles, collected either from, Precambrian outcrops along the Nile, or (for the smaller ones) perhaps at the cobble terraces mentioned above. No secure observation has been made of clearly pre-fabricated pounders. However, the large amount of mafic poulder fragments in the New Kingdom ornamental stone quarries at Gebel Gulab may suggest a connection to the same source of dolerite tools as used in the Aswan granite quarries. This possible connection between the West Bank and the granite production on the East Bank is also put forward by Klemm and Klemm (1993).

## Other resources

Bands and nodules of oolitic hematite iron occur in the shales and sandstones on the West Bank. Some of these were extracted and transported out, or possibly processed at the site. Particularly, the rich ironbeds in the upper part of the Abu Agag Formation, in the area between Gebel Gubbet el-Hawa and St. Simeon's monastery (e.g. Ball 1907: 66) have been exploited. On their map of the West Bank quarries, Klemm and Klemm (1993: 290) refer to these as "Coptic clay and iron oxide mines". The mines will be briefly described in Chapter 7.

The terrain bears many marks of exploitation of clay for pottery production, and still prospecting activities from local people is going on in the area. Klemm and Klemm (1993) found evidence of ancient exploitation and also mention the possibility of clay extraction in connection to the iron mine. Moreover, de Morgan et. al. (1894) mention similar evidence. In our survey, we have not investigated this issue further.

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*Roman wedge marks in a block of purple silicified sandstone, Gebel Tingar*

## **Chapter 6: the quarries at the Aswan West Bank**

*Tom Heldal, Per Storemyr*

## Introduction

The quarry landscape at the West Bank of Aswan is complex, in the sense that we are looking at a site with several periods of prehistoric and pharaonic quarrying exploiting stone for different purposes, overprinted by later (predominantly Roman) quarrying. During the survey, much effort was put into trying to characterise the quarries based on extraction techniques, tools and tool marks, waste rock characteristics and infrastructure around the extraction sites. Since the silicified sandstone is considerably harder than non-silicified varieties of the same, the extraction methods are quite similar to what is described from the Aswan granite quarries, such as the use of stone pounders in the pharaonic period and wedge splitting in the Roman period (Röder 1965; Klemm and Klemm 1993; Aston *et al.* 2000). Of significance is the evidence of fire setting in the pharaonic period, displayed by charcoal layers in the spoil heaps and broken quarry faces.

The quarrying of silicified sandstone has predominantly taken place on the hilltops and hillsides, of which Gebel Gulab and Gebel Tingar comprise the most prominent quarry areas (Fig. 6). In between these two sites, there are a number of small hills/quarries, such as Gebel Saman and a group of hills collectively named Gebel Sidi Osman. Close to the Nile, quarrying has also taken place at Gebel Gubbet el-Hawa and there are also quite extensive quarry areas north of Gebel Gulab and south of Gebel Tingar. Towards the north, evidence of quarrying can be followed at least to the northern edge of Wadi Kubbaniya. However, the quarries at Gebel Gulab and Gebel Tingar are by far the largest and most complex, displaying many phases of quarrying and the most attractive stone types for monumental use. In particular, the Gebel Gulab quarries are of great value from a research perspective, being more or less undisturbed by modern quarrying or development. Less abundant, but not insignificant, are quarries in non-silicified sandstone. Except for one quarry situated inside the St. Simeon's Monastery which is interpreted to be Old to Middle Kingdom (Klemm and Klemm 1993), these seem to range in time from Ptolemaic to Byzantine (including the sandstone used for building the monastery). The most prominent sandstone quarries are found in the northernmost part of the area, at Gebel Qurna and Naq el-Fugani.

## Quarry typologies

Within an area of 20 x 5 km along the Nile, approximately 60 km<sup>2</sup> has been surveyed. However, when subtracting areas with sand cover and modern development, we are left with approximately 25 km<sup>2</sup> containing archaeological registrations. Quarries within this area have been mapped and are displayed as polygons on the map. A crude characterization of the quarries has been carried out, based on the following aspects:

- quarry spoil material/debitage
- artefacts found in the quarries, especially partly finished or broken products
- infrastructure related to the quarrying, such as ramps and roads for transport of blocks
- technology applied in the quarrying, tools and quarry marks
- rock type or subtype
- other aspects

In total, the quarries cover 1,5 km<sup>2</sup> of the surveyed 60 km<sup>2</sup>. However, in the areas between the mapped quarries, there are also minor traces of exploitation, but in general too small to be worthwhile putting on the map. The quarries and the related features represent the final result of tens of thousands of years of quarrying. Thus, many of them bear signs of exploitation through several time periods, and for different purposes. One single quarry may have several "time layers" on top of each other, of which the last one is the most visible and thus deciding the typology chosen. For example, Roman quarries are always situated on "top" of older ones. Furthermore, when observing different products in one quarry, it is difficult to evaluate whether this represents several "time layers" or simultaneous production of different object types. The mix of utilitarian and more "prestigious" ornamental stone quarrying is in fact a genuine character of the West Bank quarry landscape. Any attempt of putting the quarries into a strict typology is therefore somewhat speculative, but still necessary in order to interpret the chronology and the different products targeted. When choosing typologies for quarries, we use the dominating type of production (thus in many cases the last; see Figure 1).

The most ancient exploitation of the silicified sandstone is the use of it for manufacturing prehistoric tools. Such production sites may date back to the Early Palaeolithic. Such **prehistoric tool quarries** are rarely preserved in the area, due to erosion and sometimes overprinting by later quarrying, and only a few sites have been identified (Map 1 and 2).

The most widespread quarrying activity in the area, both regarding time periods and spatial distribution, is the production of grinding stones, for which the silicified sandstone was particularly suited. The manufacture of grinding implements from the stone has been carried out since the Late Palaeolithic until probably the Roman Period, a time span of 16000 years. In most of the quarries in the area, traces of grinding stone production can be seen. However, such quarries may be difficult to distinguish from production of other small objects, such as statuettes, and the production of utilitarian objects may go hand in hand with small ornamental stone objects. For simplicity, we use the typology **grinding stone quarries**, meaning that the primary target is grinding stone, but not excluding production of other small objects in addition to grinding stones.

In the central part of the area, around Gebel Tingar, Gebel Gulab and Khnum Quarry, there is a group of quarries aimed at the production of larger ornamental stone objects, such as obelisks and statues. Most of these quarries probably relate to the New Kingdom. Such **dynastic ornamental stone quarries** are strongly associated with roads, ramps and other infrastructure made for transporting large blocks.

A later stage of ornamental stone quarrying occurred during the Roman Period, characterized of applying iron tools in the extraction process. Such **Roman ornamental stone quarries** only count for approximately 1% of the quarries, but have still left a significant mark on the quarry landscape regarding quarry infrastructure.

The last typology is **building stone quarries** in the non-silicified varieties of the sandstone. In the northern part of the area, along the sandstone escarpment just to the west of the Nile, there are large quarries mainly of Graeco-Roman age.



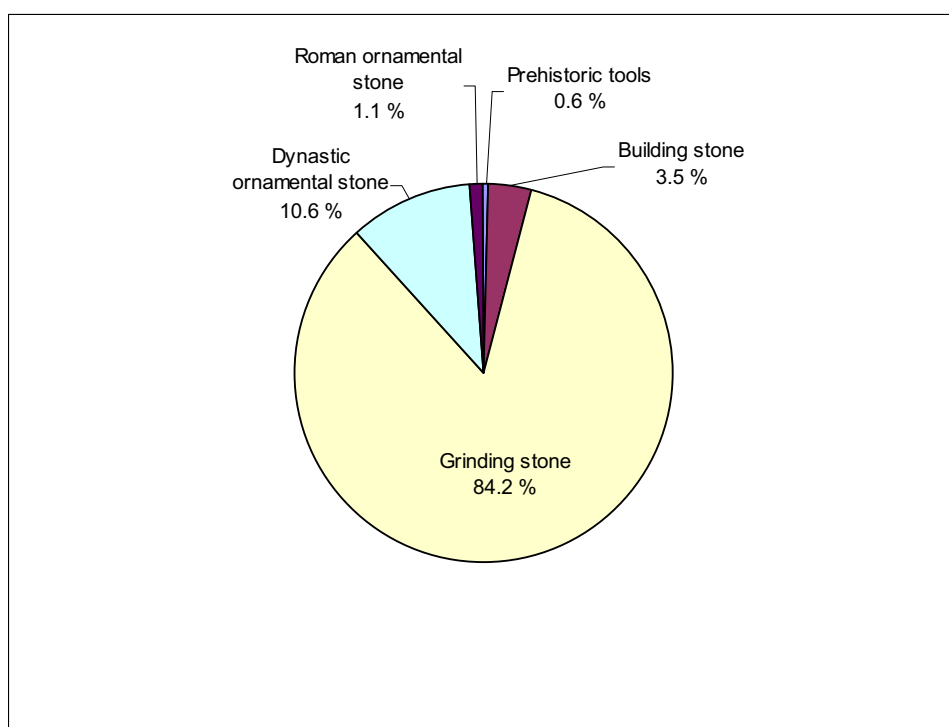


Figure 1. Distribution (area) of different quarry typologies at the West Bank.

### Prehistoric tool quarries

The prehistoric use of silicified sandstone (or "quartzite") for tools is well known in the Sahara region, particularly in the Early and Middle Palaeolithic (e.g. Guichard and Guichard 1968, Marks 1968). In their description of the Dungul assemblages (ranging from Achuelean to Neolithic), which are the closest known prehistoric tool sites, Hester and Hobler (1969) describe two main sources for the stone tools, one being "*outcrops of quartzite occurring as dikes in the Nubian sandstone*" – i.e. silicification along faults and fractures. The other main source is chert nodules in Eocene chalk formations. In addition, they mention some use of "*iron enriched (ferrocrete) sandstone which caps some of the Nubian Sandstone buttes*". At least the Achuelean assemblages were predominantly found in quarries (Umm Shagir, *ibid.*: 69) of silicified sandstone ("*light to red-brown, coarse-textured quartzitic sandstone*"). In addition to working techniques, Hester and Hobler use patination/weathering and material as criteria for dating; i.e. "*younger-looking*" chert assemblages at Umm Shagir are considered to represent deposition by people in the Upper Palaeolithic.

On the Aswan West Bank, debitage and tools of silicified sandstone are found in the various Palaeolithic settlements investigated by Wendorff and Schield (1989). They say little about the earliest industries, except mentioning scatters of Acheulean tools found on terraces near Wadi Kubbaniya. However, they do not mention of which material they are made. In the Middle Palaeolithic, debitage and tools of silicified sandstone are frequently found. In a partly excavated secondary workshop in Wadi Subeira (opposite Wadi Kubbaniya on the East Bank) silicified sandstone constitutes the majority of the debitage. In the Late Palaeolithic, the use of silicified sandstone for sharp tools is

decreasing, substituted by chert from slightly more distal sources and "Egyptian Flint". One exception is Sebilian assemblages (10-12.000 BP) in which particularly ferruginous sandstone is more common.

Our survey revealed several quarries – or "primary workshops of tools" - that may be related to the earliest exploitation of silicified sandstone, probably from Early to Middle Palaeolithic. Such places have been found at Gebel Gulab (very small remains), Gebel es Sawan North and on the southern edge of Wadi Kubbaniya. In addition there are weak signs of debitage in the Wadi el-Tilal area.

### Gebel es-Sawan North tool quarries

These are located approximately 500 metres northwest of Gebel es Sawan (Figure 2), on some low hills and ridges on the eastern slope of a north-south trending wadi, draining northwards toward Wadi Faras. We have identified three quarries – "Chipping Hill", "Bowmen's Plateu" and a very small site 200 metres to the north of the latter.

The "Bowmen's Plateu" (named after a rockart panel) is so far the best preserved and largest site. The workshop area measures 30 x 30 metres. The ground is covered with debitage from the tool working (Figure 3 and 4), cores and small blocks, hammerstones and different types of flakes, more or less recognisable proto-tools. Flakes are also found below a small escarpment at the western edge of the site, indicating that erosion has removed parts of the quarry.

In our survey, we have only investigated the surface scatter, thus probably missing finer debitage from the workings. However, as pointed out by Hester and Hobler (1969) for their Acheulean site Umm Shagir, it may be that only the larger flakes are recognisable due to the very long exposure to weathering. We furthermore have the impression that the debitage surface has been strongly modified, and appears "packed" and mixed with natural debris. The southern workshop, around Chipping Hill, is smaller than Bowmen's Plateu (ca. 10 x 10 metres; Figure 5), but displays basically the same types of debitage, tools and hammerstones. The remaining workshop sites are much smaller, and probably only represent small "test" exploitation.

The raw material used is rounded blocks of silicified sandstone, naturally occurring in the area. Being distal to their source (at least vertically), exposed to weathering for a long period, the blocks are sound and of particularly good quality for tools. Two distinguishable types of silicified sandstone are used, a red variety and a black. The latter is less porous and sounder than the former, and therefore less weathered. This difference seems to have had some importance in the manufacturing of tools. The black subtype has been preferred for making thin flakes, whilst most of the thicker flakes are made of the red subtype.

The following types of artefacts have been found at the three sites:

- Large flakes; oval to oval pointed flakes, up to 15 cm long. Some of them are bifaces, other not. Retouch is coarse and steep. These may represent "blanks" for handaxes. See Plate 1 and 4. One triangular flake ("shark-tooth") has been retouched on one side, whilst the other is the naturally weathered cobble-surface (Plate 2c and 6f).

- Large, cut flakes; half-circle shaped, one biface and one not, could be either broken handaxes or cleavers (Plate 2f-g, 5a-b).
- Thin flakes, scrapers (Plate 2 d, e, h, 5c-d, 6b-e)
- Triangular point (one piece; Plate 2b and 6a)
- Cores; cobble-cores (see Plate 2i), large levallois-cores (Plate 3a) and small discoidal cores (Plate 3b –c).
- Hammerstones – i.e. rounded cobbles of predominantly vein quartz and silicified sandstone, are seen in large quantities within the work area. These have been collected nearby, as they occur naturally in the immediate surroundings

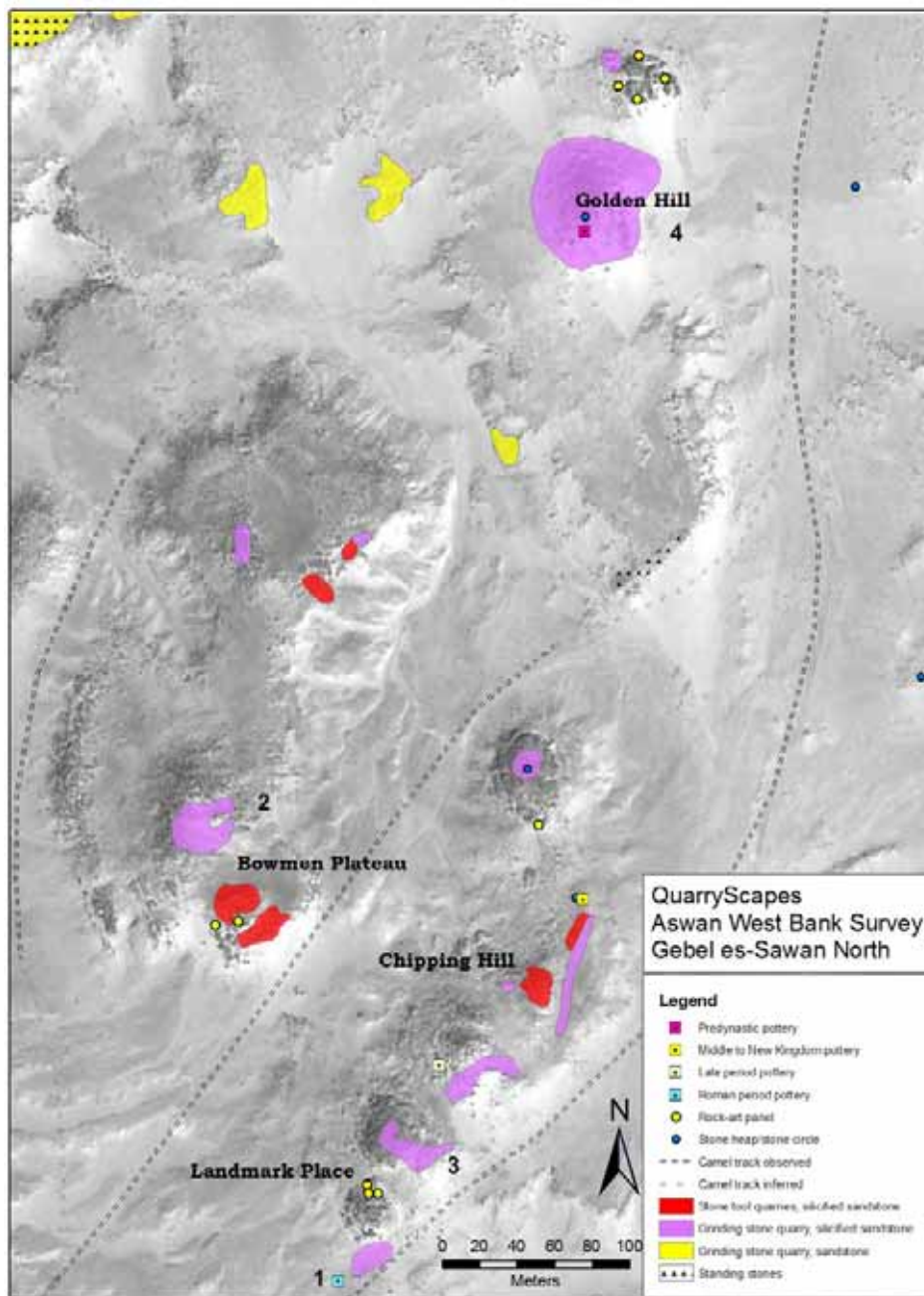


Figure 2. Map of the Gebel es-Sawan North quarries. Numbers 1 to 4 refer to grinding stone quarries (see below)



Figure 3. Left: overview of the "Bowmen's Plateau" tool quarry. Right: chipping ground with flakes and small hammerstones.

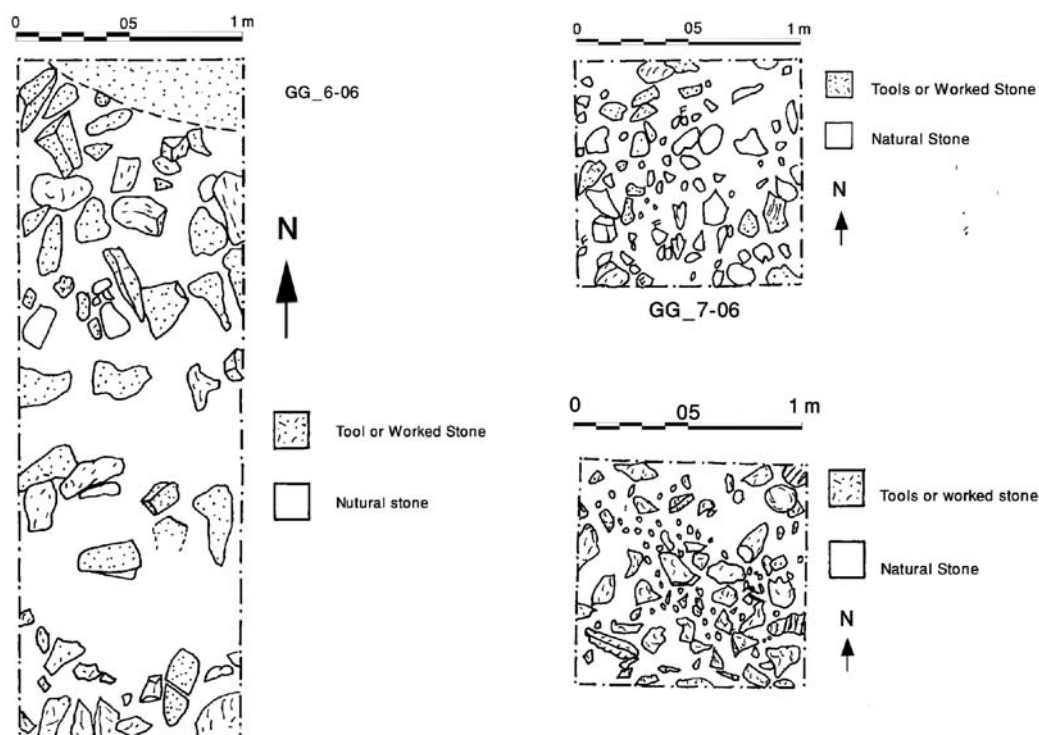


Figure 4. Plans of artefact scatter at the Bowmen's Plateau tool quarry. Drawing by Adel Kelany

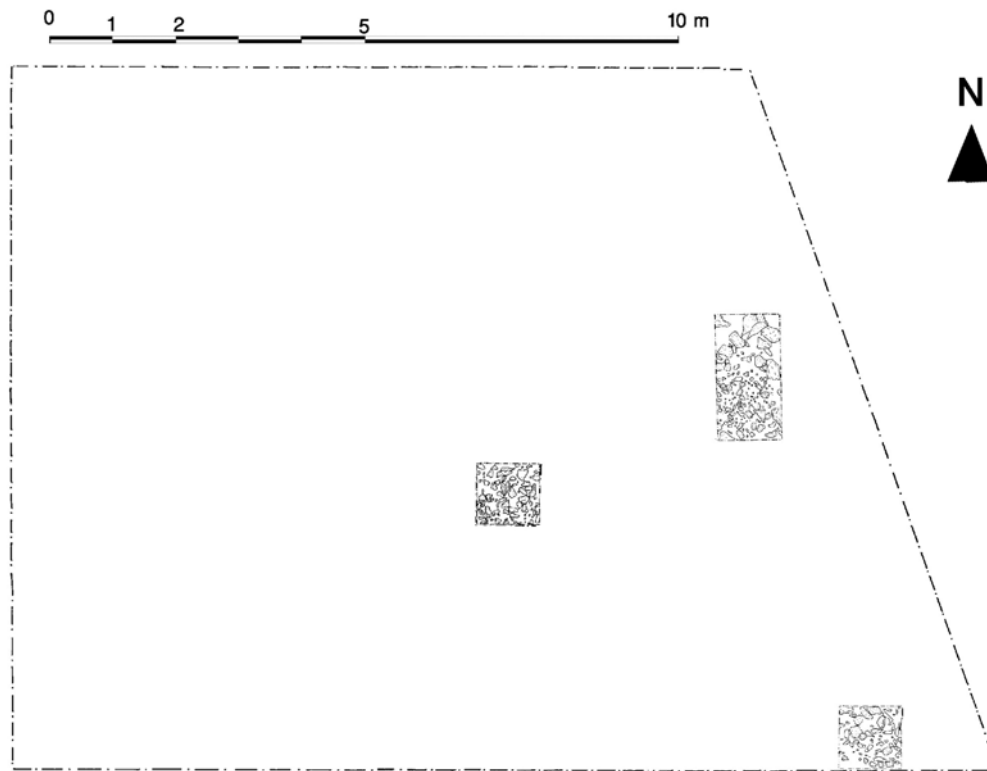


Figure 5. Perimetre of the "Chipping Hill" tools quarry and plans of artefact scatters. Drawing by Ade Kelany

How to interpret these quarries? Our assemblage is too small and incomplete (more rough blanks than actual tools) for proper analyses. However, rough and steep retouch, tendency of bifaces, working of boulder cores as well as the flake typologies could fit with Achuelean or early Middle Palaeolithic assemblages in the region (i.e. Hester and Hobler 1969). We presented photographs of the assemblage to researchers with much higher expertise in this area than us (de la Torre and Coulston, pers. comm.<sup>5</sup>), who indicated a Middle Palaeolithic origin.

Furthermore, the weathering of the artefacts supports this. We compared the surface weathering morphology and patina with debitage from assumed dynastic grinding stone quarries, and the assumed Late Palaeolithic grinding stone quarries at Wadi Kubbaniya (see below). Although the difference is difficult to quantify, it is obvious and considerable. The dynastic debitage show almost no visible surface loss or patina development. At Wadi Kubbaniya, we see weak patina development and tendencies of smoothening of sharp edges and relief formation. The tool debitage at Gebel Sawan North displays a distinct shiny patina, considerable relief formation around large quartz grains and rounding of sharp edges, all signs of considerable longer exposure to weathering than even the Late Palaeolithic quarry at Wadi Kubbaniya. As patina forms in wet climatic periods (see discussion in Chapter 9) we presume that the debitage at the Gebel es-Sawan North quarries has undergone at least one more "wet phase" than Wadi Kubbaniya. However, there are some differences in weathering between the red type and the black one, the former showing a higher porosity due to weathering. It is difficult, though, to establish whether this relates to different age of the flakes or

<sup>5</sup> Ignacio de la Torre, University College London, Sheila Coulston, University of Oslo



lithological differences. The possibility of several periods of tool working may be underscored by the existence of more than one phase of grinding stone production (see below) and the possible presence of Lower Neolithic structures in the area (Chapter 10). As indicated above, the assemblage is small, and our knowledge in this field of research is limited. However, it is not unlikely that some of the production from these quarries has a history back to the Early to Middle Palaeolithic, and thus adding a very early component to the longevity of the exploitation of silicified sandstone on the Aswan West Bank.

### Wadi Kubbaniya tool quarries

Along the southern margin of Wadi Kubbaniya, there are several small quarries or primary workshops in a special variety of silicified sandstone, found as small lenses along steep faults (see description above, chapter 5), probably more similar to the "dike"-type described by Hester and Hobler (1969) than the other silicified sandstone deposits on the West Bank. Similar to the Gebel es Sawan North quarries, the debitage is deeply weathered, displaying a brown patina, surface loss and rounded edges. However, a direct comparison between the two is difficult, since the silicified sandstone deposits are so unlike. The one at Wadi Kubbaniya is clearly less sound and more porous than other silicified sandstone most deposits in the area, and therefore expected to weather more rapidly. We are therefore more reluctant to make any relative dating based on weathering.



*Figure 6. Small tool quarries (left) at the southern edge of Wadi Kubbaniya. Right: detail of debitage.*

Tool workshops are seen around most of the occurrences, and they all appear less disturbed than at Gebel es-Sawan North (Figure 6). There is, however, little evidence of what was actually worked, most of the fragments are non-diagnostic. Some flakes appear similar to some of the ones at Gebel es Sawan (Plate 7a). One object blank may be a partially worked axe of a much more elaborate type (Plate 7f), whilst some of the crudely worked blocks have similar shape and surface as some of the grinding stone bases at the Late Palaeolithic settlement in Wadi Quabbaniya. There are also several thin levallois flakes (Plate 7b,c,e) and cores of various shapes (Plate 7d).

Even though there are quite a number of such deposits along the wadi, only the ones closest to it have been worked. Given the proximity to the Wadi Quabbaniya settlement, it is tempting to suggest a connection, but more work is needed in order to confirm that, especially regarding more detailed studies of the type of rocks found in the settlement.

## Grinding stone quarries

The exploitation of grinding stones and other small utilitarian and ornamental objects represents the most widespread typology of quarries, constituting approximately 80% of the quarried area involved. Such quarries are recognised by the following:

- the spoil from the quarrying predominantly contains small pieces of worked stone, indicating that the reduction of blocks to small objects was the main mechanism of extraction
- there is a complete lack of infrastructure in the form of quarry roads for transporting heavy loads in and around the quarries.
- numerous small work areas are found within the quarries, displaying broken and semi-finished grinding-stone "blanks"

There are a great variety of subtypes within this typology (Figure 7 and 8), which probably can be linked either to different periods of quarrying (and thus technology) and/or amount and quality of sandstone resources. Typically, the quarries in the central part of the area (between Gebel Tingar and Khnum Quarries) are large in size, have tall spoil heaps and are merged together in heavily exploited, "high-intensity" quarry areas. Furthermore, these are the only areas where the extraction has targeted solid bedrock and not only boulders. Many of the marginal quarries are of a different kind, being modest and very shallow extractions of clusters of small blocks of silicified sandstone, or scattered exploitation of single beds of softer sandstone. The maps in Figure 9 and 10 give an overview of the distribution of grinding stone quarries in the area. Through a series of examples, we will seek to give an impression of such subtypes and how they can be interpreted.





*Figure 7. Varieties of grinding stone quarries. Top: Gebel es-Sawan east, Middle: Gebel Gulab, Lower: Northern quarries*



*Figure 8. Overview of some typical grinding stone quarries. Each quarry unit leaves a "ring" of spoil heap around the point where blocks have been extracted.*

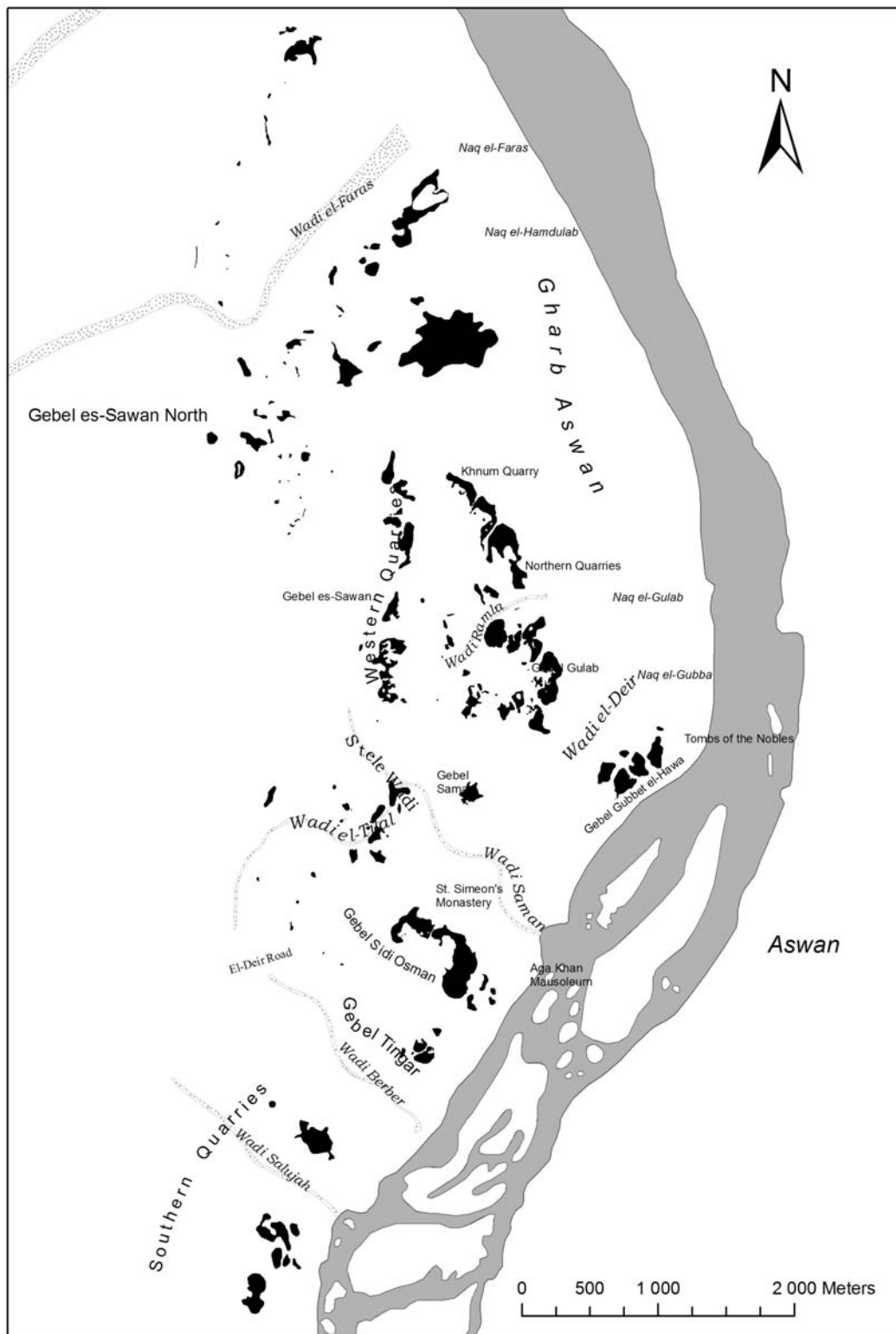


Figure 9. Distribution of grinding stone quarries in the south-central part of the survey area (black).

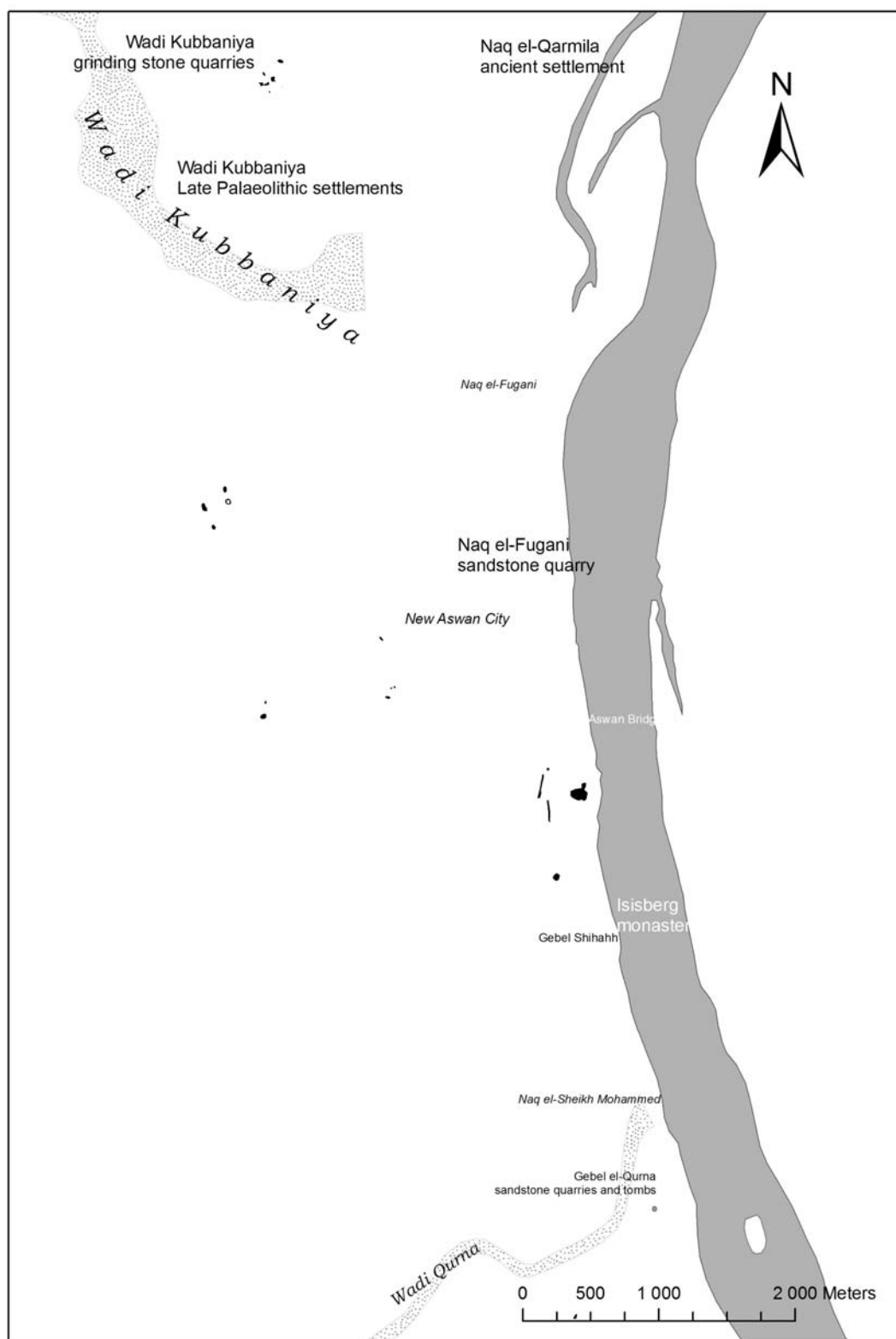


Figure 10. Distribution of grinding stone quarries in the northern part of the survey area (black).

### Artefacts in the quarries

The stone artefacts found in these quarries are only semi-finished, being roughly shaped "blanks", predominantly not showing any kind of surface treatment, or only vague marks of hammering. Consequently, it is probable that these roughly shaped objects represent the final production phase in the quarries, subsequent to finer working being carried out somewhere outside the quarry area.

Varieties of grinding implements are found in all the quarry areas. Most of these "blanks" observed are oval in shape with a flat to slightly concave smooth surface on their upper side, the lower side is keeled or semi-circular in cross section, with signs of only rough working (trimming), thus reminding of a boat-shape (Figure 11). The size of these objects ranges from 15-50 cm in length and between 10-25 cm in width. The largest ones probably represent blanks for lower grinding stones (as for the typical dynastic "saddle-querns"), whilst the smaller ones may usually be upper grinding stones ("riders", "rubbers", "manos", "handstone"), though in early periods these would also have functioned as lower grinding stones (see discussion below). Some oval blanks have a flat lower surface, split along the sandstone bedding plane; it is not clear whether this is intentional or represents unfortunate breakage (see discussions below). The oval shaped grinding stones are found all over the area, and there are no distinct differences in the shapes and sizes of such that can be clearly related to chronology, although some tendencies for increasing standardization of the sizes are seen.



*Figure 11. Oval grinding stone blank (Gebel Sawan North). Flat base (left) and retouched top (right)*

Some larger, rectangular and circular shaped slabs may also represent lower grinding stones, but it cannot be excluded that the circular ones in particular could be blanks for shallow vessels. Small spherical blanks are only found in a few quarries and seem to be small grinding stones ("one-handstones"). Crudely shaped cubic or rhomb-shaped blocks of various size are more difficult to interpret, and can represent anything from roughouts for statuettes to grinding implements. Table 1 sums up the various groups of blank shapes found (see also Plate 8 and 9).



SHAPE	SIZE	POSSIBLE USE
oval, boatshaped	large (>30cm)	lower grinding stone
oval, boatshaped	small (<30cm)	mainly upper grinding stone
oval, slab	large	lower grinding stone
circular, slab	large	lower grinding stone, vessels
rectangular, slab	large	lower grinding stone
spherical	small	upper grinding stone
cubic, rhomb-shaped, rough	small and large	various, including statuettes

Table 1. Groups of blank shapes as found in the grinding stone quarries.

### Example 1: The Wadi Kubbaniya grinding stone quarries

These quarries are the only ones in this subtype that are previously described, and the first grinding stone quarries being recognised in the area (Roubet 1989). They are situated at the northern edge of Wadi Kubbaniya, close to the Late Palaeolithic settlement dating between 18,400 and 18,100 BP (site E-78-3; Wendorf and Schild 1989). The site provides the earliest occurrence of grinding stones in the Nile Valley. Out of 34 grinding stones found *in situ*, 27 in the settlement were of sandstone and the rest were of silicified sandstone (Banks 1980: 241; Roubet 1989: 427-473). As lower grinding stones, diagnostically they occur as oval/suboval, rectangular, circular/subcircular, triangular/subtriangular and irregular shapes (Roubet *ibid.*). Only one oval grinding stone is reported as being made from "quartzite" or "quartzitic sandstone" (Roubet, *ibid.*, p. 475). The perimeter of the grinding (upper) surface basically have similar shapes, whilst the lower surface are divided in stable (flat; 10 of the 27 stones) and unstable (curved; 16 of 27 stones). Three types of morphology of the grinding surface are given: slab (flat to concave surface, grinding in circular motion), saddle (flat to concave surface with grinding motion backwards and forwards) and conical inverted mortar surfaces. Upper grinding stones are small "one-hand" implements, and are made of a wider range of materials – including silicified sandstone and granite.

Roubet links the nearby quarries (Figure 12) to the artefacts (of silicified sandstone) found in the settlement. She describes three basic types of roughouts in the quarry, all for lower grinding stones; a keeled oval shape which constitute the majority of the samples, flat or "plateau" shaped and circular shaped (for mortars). All of them have a flat upper surface, cleft along the sandstone bedding plane, which is not further treated. The latter is an important observation by Roubet; the grinding stones were not finished in the quarry, but at a later stage by the user, which is supported by silicified sandstone debitage found in the settlement. As we will get back to later, this may apply for all the grinding stone quarries at the West Bank.

The grinding stone roughouts are, according to Roubet, made from loose blocks, scattered on the surface, in a process of several steps; first "peeling" the blocks of the weathered skin of non-usable rock by perpendicular blows with hammerstones. Thereafter, splitting the blocks (or "cores") along the bedding plane to make thick slabs – using hammerstones and primitive wedges. Then, "*the periphery of the stone has been*



*carefully prepared by trimming (épannelage) and then regularized by marginal retouch at the level of the grinding surface.*" All stages of this process are seen in the workshop – from virtually untouched blocks, via partially worked "cores" to the roughouts or blanks. There is even one place, which is described as a stockpile of finished blanks. Evidence of the final preparations of the grinding stones (final pecking and roughening of the grinding surface) is not seen in the quarry, but was carried out by the users in the settlement.

The tools (hammerstones) applied are cobbles of hard rocks, such as basalt, diorite and granite, most likely locally found in "cobble terraces" deposited by ancient rivers (see Chapter 5) and/or in the Wadi Kubbaniya riverbed.

Bearing the very detailed work by Roubet in mind, our own visit to the workshop (see Figure 12) did not reveal much news. However, given that Roubet did her work presumably not knowing the massive exploitation for grinding stones in the area in later periods, we are obliged to question if there are possibilities that these quarries are younger than the Late Palaeolithic, due to the similarities with assumed younger quarries. Of course, Roubet and others have clearly demonstrated that there are similarities between the artefacts in the quarries and those found in secured stratigraphic context in the settlement. Although only a minority of the grinding stones found in the settlement are actually made of silicified sandstone, and only one oval form made from this material, there are similarities between the overall typologies found in both places. However, as pointed out by Banks (1980), it is difficult to read a standardization of shapes out from the settlement data. Thus, the shapes and sizes remain more standardised in the quarry than in the settlement.

The quarries are the closest source of silicified sandstone to the Palaeolithic settlement and farther from other known ones from younger periods. A quick study of the weathering of the debitage in the quarries, also support the idea of them being among the oldest in the area; a shiny patina has developed on the surface, and signs of weathering-initiated relief formation and striation is seen, in contradiction to assumed New Kingdom quarries (see below). Thus, although it cannot be excluded that there are younger overprints in the quarries, the evidence of them being exploited by the Late Palaeolithic settlements is reasonably good.

Clearly, this adds an important dimension to the West Bank quarry landscape in general; the use of silicified sandstone for larger grinding implements, and particularly as lower grinding stones, was initiated already in the Late Palaeolithic. Furthermore, some of Roubet's shape typologies (unstable oval in particular) seem to underscore the diagnostic range in the later pharaonic assemblages of such objects.



*Figure 12. Wadi Kubbaniya grinding stone quarries. a) overview of the main workshop described by Roubet (1989), b)debitage in a quarry further to the north, c) collection of grinding stone blanks, d) weathered quarry debitage*

The Wadi Kubbaniya quarries also have some other important implications for interpreting the West Bank grinding stone quarries, being the straw that links a possible early phase of quarrying together. We see the picture of a group of "low intensity" grinding stone quarries, where scattered small blocks of silicified sandstone have been exploited in a similar way as described by Roubet, including the quarries in the area around New Aswan City and also some of the westernmost quarries further south. Far from interpreting all these as Late Palaeolithic, they seem to indicate such an early phase of "low intensity" quarrying, probably strongly related to proximal use in settlements.

### Example 2: Grinding stone quarries at Gebel Sawan

Close to the possible Palaeolithic tool quarries described above, just north of Gebel es-Sawan, there are several small grinding stone quarries. They display different modes of extraction, from very modest to more sophisticated, probably reflecting different periods of quarrying. The quarries are shown in Figure 3 (numbered 1 to 4).

Quarry 1 is hardly a quarry at all, but rather scatters of natural boulders and cobbles in the wadi, of which some are partially worked to an oval shape (Figure 13). The work process seems to involve only three stages; selection of blocks having a suitable shape and size for grinding stones, trimming of these blocks and finally retouching. The worked parts of the blocks are highly weathered, displaying a shiny patina and rounded edges.



*Figure 13. Scatters of loose silicified sandstone boulders of which some have been worked for grinding stones.*

Quarry 2 is located just north of the "Bowmen's Plateau" described above, on the southern slope of a smooth hill (Figure 14). The target for exploitation was clusters of silicified sandstone blocks, measuring up to one metre along the longest axis. Several small work areas are seen, characterised by concentric heaps of debitage around depressions where the exploited blocks have been situated. Most blanks seem to represent lower grinding stones, due to their size. Both circular to semi-circular (approximately 30 centimetres in diameter) and oval (25 – 40 centimetres long) shapes are found. In one of the work areas, a broken granite cobble hammerstone is found, measuring 10 centimetres. Else, the main type of tool applied seems to be rounded cobbles and boulders of silicified sandstone, naturally occurring in the area. In several ways, the quarry is similar to Roubet's workshop in Wadi Kubbaniya, being a "low intensity" quarry exploiting small boulders of silicified sandstone. As pointed out by Roubet, each block is "peeled" by hammering of the weathered rim, resulting in a largely squared "core", which is then split along the sandstone bedding planes into one or few rough-outs. Finally, the blanks were made by trimming and retouching. It is also noticeable that the tools are either small cobbles (from semi-local ancient river beds on the West Bank, as in Wadi Quabbaniya) or local silicified sandstone blocks.



*Figure 14. Grinding stone quarry 2 at Gebel es-Sawan north. a) overview from south, quarry is delineated with white dotted line, b) small work area with debris from quarrying, c) circular blank, d) broken poulder of silicified sandstone*

Quarry 3 is located just south of quarry 1, on a small hilltop. From the roughly squared "core" and onwards, the working process is largely identical to what we see in quarry 2. However, quarry 3 involved several more steps in primary extraction before reaching this stage. Instead of "peeling" small, rounded blocks of silicified sandstone into one core, several cores were made from much larger blocks or more continuous sandstone layers (Figure 15). The first step was primary wedging of large blocks, using natural fractures; these were opened and widened by inserting stones into the cracks. Next step was subdivision of the large blocks into smaller, squared blocks – or "cores", by wedging or splitting perpendicular to the sandstone bedding. Partly, splitting took place by poulder-strokes along the splitting plane. The squared blocks were then turned around, so that the bedding plane became vertical, and further split following the process described by Roubet. Pounders found include a few broken cobbles of granodiorite, slightly larger than in quarry 2, and large cobbles of silicified sandstone. Thus, quarry 3 exhibits the exploitation of much larger primary blocks than quarry 2, involving more steps in the primary extraction.



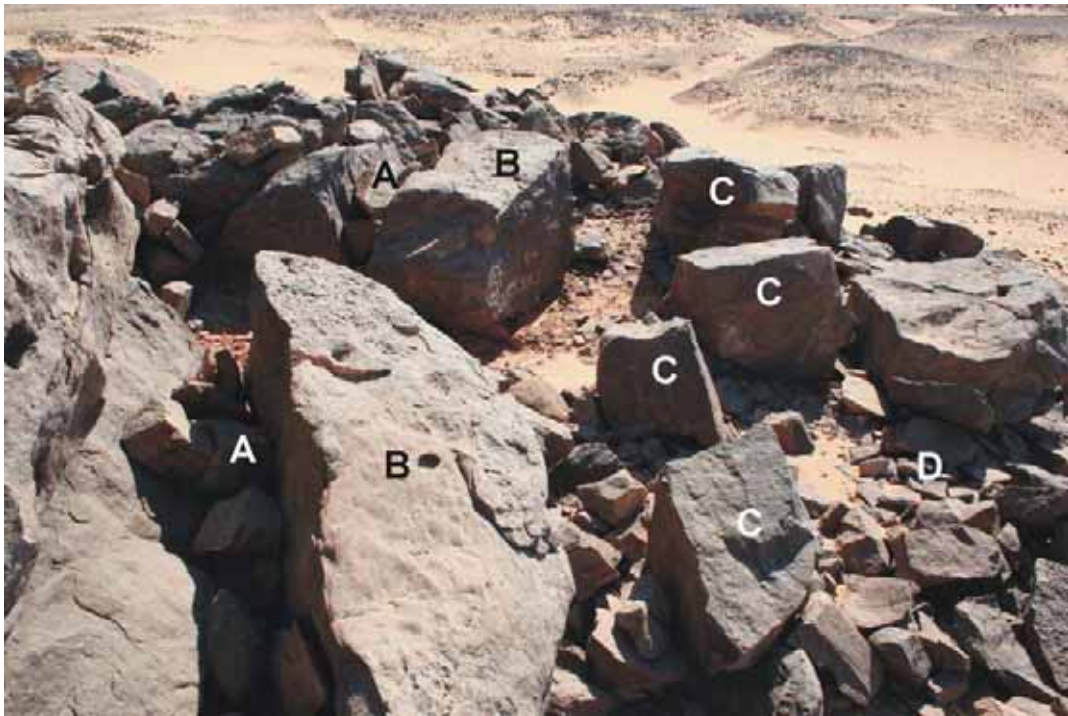


Figure 15. Quarry 3 at Gebel es-Sawan North, showing different stages of block extraction and size reduction. A: primary wedging with stones to open cracks. B: primary blocks. C: secondary split blocks. D: debitage from trimming of grinding stone blanks

Quarry 4 is located 350 metres northeast of quarry 2, on a small, isolated hill (Figure 16a). The silicified sandstone has a characteristic, golden colour, so we named the hill "Golden Hill". There are numerous work areas on the top of the hill and on its slopes (Figure 16b and c). Grinding stone blanks are predominantly of the oval shape, measuring 30-35 centimetres in length. One blank is larger, 55 centimetres and has a semi-oval to rectangular shape, and one broken one could have been as large as 70 centimetres in length and 30 centimetres in width (Figure 16e). The work areas display several stages in the production process; evidence of primary extraction and wedging of large blocks (as in quarry 3) is seen on the top of the hill (Figure 16b). In one work area, the method of secondary splitting/squaring of large blocks perpendicular to the bedding plane is beautifully displayed; repeated strikes with a pounder along a line (*percussion line*) finally produces a straight and even cut (Figure 16d). In several work areas, such squared "cores" are seen (Figure 16c). Fragments of pounders of igneous and metamorphic rocks are frequent (Figure 16f), measuring up to 20 cm. Even though such rocks are found in ancient riverbeds on the West Bank, it is our impression that their large size suggests that they were collected in the outcrop areas of the Precambrian basement rocks, i.e. the East Bank or further south on the West Bank. Such non-local large pounders are much more common than the smaller non-local cobbles and silicified sandstone pounders found in quarry 2, suggesting that they were found more suited to the splitting of large blocks than the silicified sandstone. Quarry 4 bear similarities with quarry 3, in the exploitation of larger blocks and several steps of primary wedging and splitting before producing the squared "core". The main phase of quarrying clearly overprints an earlier phase, shown by the occurrence of debitage which has been exposed to weathering much longer than the debitage from the more "recent" quarrying.

A pottery sherd found in the quarry dates to the Predynastic (el Senussi 2007, Appendix 2), but it is unfortunately difficult to determine its relation to quarrying (i.e. early or late phase) and when in the presumably long time span of quarrying it was deposited. Notably, there is a substantial amount of rock art probably dating from the 5<sup>th</sup> to 4<sup>th</sup> millennium BC, as well as the 2<sup>nd</sup> millennium BC on a small hill only a few tens of metres to the north of the quarry (see chapter 9).



*Figure 16. Aspects of quarry 4, Gebel es-Sawan North. a) the hill seen from south, b) primary extraction/work area, c) squared block (core) in work area, d) block in work area with percussion line for splitting (see arrow), e) broken part of large blank, f) igneous tool fragments*

The four examples of quarries from the Gebel es-Sawan area show interesting variations regarding production methods. Quarry 1, being the "simplest", involved only trimming of natural blocks having a suitable shape for a grinding stone. Quarry 2 is slightly more "sophisticated", where larger blocks were "peeled" into squared "cores", from which a few grinding stone blanks were produced. This quarry bears similarities with the assumed Late Palaeolithic ones at the northern edge of Wadi Kubbania. Quarry 3 and 4 involved several steps of primary wedging and splitting of large blocks before



producing the "core". In quarry 4, there are numerous pounders which probably were brought from the East Bank. It is tempting to interpret the differences between the quarries as being of a chronological nature, showing a development from elementary exploitation, perhaps simultaneous with the Wadi Kubbaniya quarries, towards more and more refined methods and extraction of larger and larger blocks, culminating in quarry 4. Such a long "timeline" of quarrying within this small area is furthermore supported by the difference in degree of weathering seen on the debitage.

### Example 3: soft sandstone grinding stone quarries

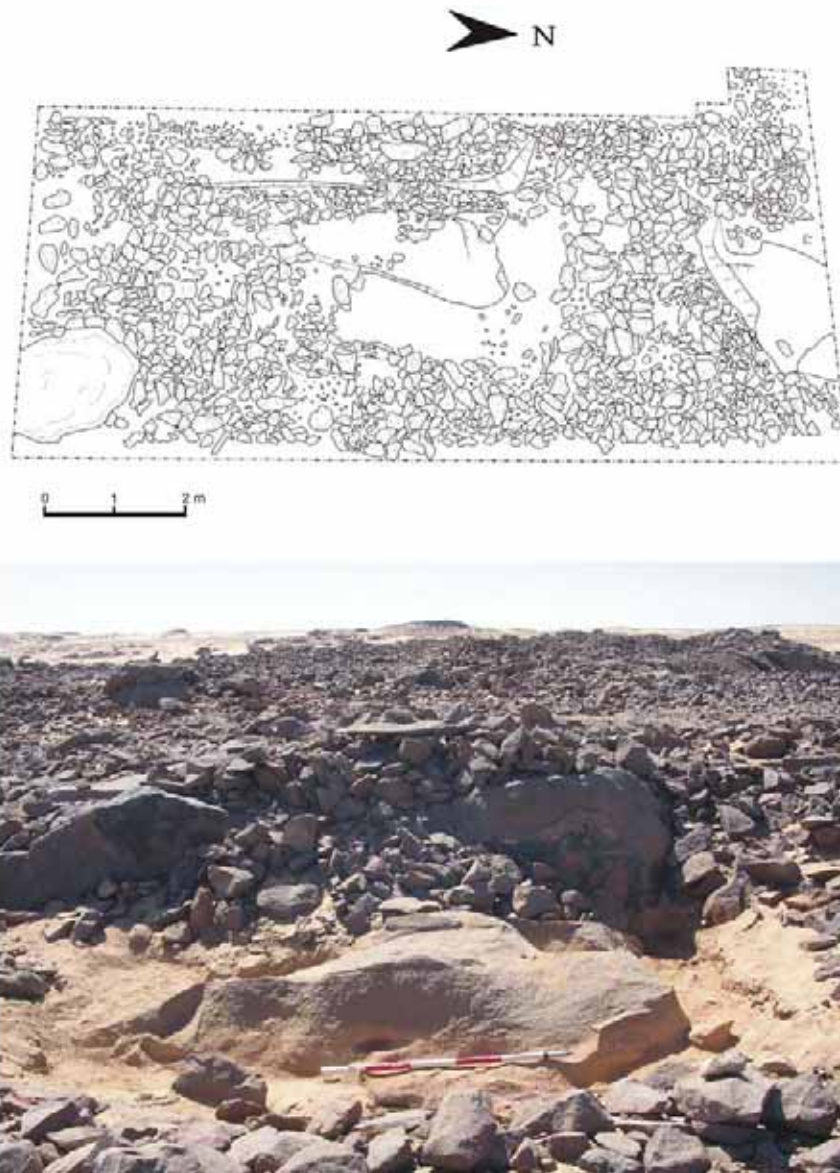
A distinct layer of poorly silicified (or virtually non-silicified) sandstone can be followed within the upper part of the Umm Barmil Formation, from just to the west of Gebel Gulab all the way north to Wadi Kubbaniya. This layer, usually up to 50 cm thick, is capping a thin sequence of mudstones, and occurs along the edges of small escarpments. The sandstone is grey to white, but develops a black to brownish patina during weathering. It is considerably more porous than the silicified sandstone, and thus easier to work, but on the other hand one would expect that grinding stones produced from it would be less durable. The sandstone layer has two distinct joint directions, perpendicular to each other, so that it is naturally broken up into rectangular blocks. Small quarries in this sandstone are common all over the outcrop area. They all bear signs of non-systematic extraction, moving along the edge of the escarpments "scavenging" suitable blocks for further working into grinding stones (Figure 17). Grinding stone blanks observed are all of oval to subrectangular in shape, measuring from 28 to 50 cm in length. Pounders of silicified sandstone are the only type of tools found in these quarries. Due to the complete lack of ceramic evidence, and yet no indications of consumption of this sandstone type, we have no clues regarding when this type of quarrying took place. However, in some quarries north of Gebel es-Sawan, patina on the weathered debitage from quarrying suggests at least two chronological periods of extraction. We may also consider the possibility that "softer" sandstone was preferred for some specific purposes, and/or in specific periods, and that these quarries were worked simultaneously with silicified sandstone.



*Figure 17. Shallow quarry in non-silicified sandstone along escarpment, New Aswan City. Right: detail of quarry, grinding stone blanks in the foreground.*

#### Example 4: Gebel Gulab

A small grinding stone quarry at Gebel Gulab was planned and studied in detail. The quarry is small, measuring only 10 x 5 metres (Figure 18). It is situated in an outcrop of partly silicified, yellowish sandstone, partly bedrock and partly in situ blocks separated by open cracks. In front of the quarry face is a shallow depression, which is floored by an ashy layer. The outer "circle" of the quarry consist of mixed debitage, rarely more than 30 cm in size, thus up to the size of "normal" grinding stone blanks. No obvious blanks are found in the quarry itself, but occur scattered in the near surroundings. Within the debitage heaps, there are small areas, less than a metre in diameter, containing fine chips of debitage, probably representing work areas for trimming blanks. Small fragments of igneous rocks, from pounders, are found scattered within the debitage.



*Figure 18.  
Small  
grinding  
stone quarry  
at Gebel  
Gulab. Top:  
plan of  
quarry,  
drawing by  
Adel Kelany,  
digitised by  
Leif  
Furuhaug.  
Below: photo  
of cleared  
quarry face,  
photo by  
Elizabeth  
Bloxam.*

The remaining part of the worked quarry face displays an irregular morphology, characterized by concave depressions. This indicates that convex flakes, rather than more or less squared blocks, of the stone were broken off in the primary extraction process. These flakes must have been rather small, each supplying material for only one or few grinding stones. This is further supported by the debitage – its uniform, small-sized appearance indicates the lack of steps in a block-size reduction process during quarrying. It is yet not clear how the primary extraction was carried out in detail; in theory, it should be possible to break off convex flakes from outcrops with the use of very heavy pounders alone, and in some of the similar type grinding stone quarries (but not the present one) percussion marks combined with broken faces displaying plumose marks indicate this. However, it is relevant to put forward the possibility that use of fire could have been important in the production of primary flakes from outcrops, supported by the presence of ash layers and charcoal in the present quarry and similar ones. Interestingly, fire setting in the quarrying of grinding stone from silicified sandstone has been documented elsewhere, namely in Aboriginal context in Australia (McBryde 1997). Also in other aspects, these quarries bear astonishing similarities with the grinding stone quarries on the West Bank.

#### Example 5: Northern quarries

Most of the hill north of Gebel Gulab is covered with large spoil heaps from quarrying (Figure 19), and the area exhibits massive exploitation of grinding stones and perhaps also other small objects. Many of the quarries are situated in solid bedrock, others in large *in situ* blocks. Of particular interest is a quarry on the southern tip of the hill (Figure 20). The quarry face, in pink to red silicified sandstone, is approximately 5 metres tall. The surface of the quarry face is irregular, partly "broken" and partly flaked. Pounder fragments of dolerite and granodiorite are frequently found in the spoil heaps and small work areas. Partially worked blocks of different sizes occur, basically showing the same principle of working as in the above mentioned quarries; splitting along the bedding plane (which here planar cross-bedding dipping 20 degrees) trimming and retouching. However, the primary extraction is very different. The solid rock does not exhibit natural fractures which can aid the extraction of rectangular blocks. To the contrary, the quarry face indicates the primary extraction of highly irregular shaped blocks. Were the primary blocks broken off the quarry face by the use of heavy pounders, or were other technologies involved? As in the former example, the spoil heaps contain large amounts of charcoal, again indicating that heating of the rocks with fire was a part of the primary extraction.

Also in the northern part of the hill, where all the quarries have "grown together" by the huge spoil heaps, there are similar quarries with highly irregular quarry faces, although smaller than the former. Compared with the Gebel es Sawan North quarries, the Northern Quarries go deeper, into huge *in situ* blocks and solid bedrock, and appear much more "industrialised". Similar quarrying is also seen in the northern and eastern part of Gebel Gulab and on Gebel Gubbet el-Hawa..





*Figure 19. Large spoil heaps from grinding stone quarrying, Northern Quarries.*



*Figure 20. Irregular quarry face and spoil heaps, Northern Quarries, southern part.*

#### Example 6: Gebel Gulab west

These quarries are located just to the southwest from the large causeway leading to the Seti 1 obelisk. There are numerous extraction sites, most of them targeting huge boulders of silicified sandstone (Figure 21). Most of the blocks have been quarried, so that the quarry area appears as a series of ring-shaped spoil heaps around sand-filled depressions. Oval shaped grinding stone blanks are common, as well as fragments of pounders of igneous rocks. As in the two former examples, the quarry faces in the remaining boulders are irregular and have a broken appearance, and the quarry methods seem to be basically the same. As in example 4, one rarely see the clear steps of block size reduction; it seems that small irregular pieces of rock were removed directly from the large boulders, and further worked to grinding stone blanks. Similar "boulder quarries" are also characterising the quarries at Gebel Sidi Osman 1 and 2.



*Figure 21. View of grinding stone quarries at Gebel Gulab West, displaying ring-shaped structures of spoil heaps around extracted blocks*

#### Example 7: Southern quarries

In the far south of the area, there are several quarries located in large blocks of predominantly purple varieties of the silicified sandstone (Figure 22), and to a lesser extent in beige to grey varieties. The quarrying methods are similar to what we see in the Gebel Gulab west quarries, with irregular quarry faces and little sign of a clear step-like process of block size reduction. These southern quarries deviate, however, in some important aspects. First of all, there are massive amounts of pounders, all igneous rocks from the basement, and all naturally rounded cobbles (Figure 23), up to 25 cm in size. One reasonable explanation may be the proximity of the Precambrian basement further south, where such rounded cobbles should be easy to find. Another aspect is there appears to be very few grinding stone blanks in the purple variety of the stone, given



that most of the blanks observed were in the beige to grey silicified sandstone. On the other hand, there are lots of small, rectangular blocks and some circular "plate"-shaped blocks in the purple sandstone (Figure 24). This could indicate that there was a selective use of the silicified sandstone in the area. The purple variety was an attractive ornamental stone, due to its colour and extreme hardness. Could it be that many of the anomaly blanks found in the southern quarries was meant for some other purpose than grinding stone? From consumption (see Chapter 4), it is known that purple silicified sandstone was used for small statuettes in the New Kingdom, particularly in the 18<sup>th</sup> Dynasty. The only diagnostic pottery found in the southern quarries dates between the 18<sup>th</sup> to 19<sup>th</sup> Dynasty (el-Senussi 2005; Appendix 2) in one of the areas with abundant "anomaly" blanks. The southern quarries, in contradiction to most other quarry areas on the West Bank, have no overprint of later (particularly Roman) pottery, thus indicating that at least part of the quarrying took place during the 18<sup>th</sup> to 19<sup>th</sup> Dynasty. It is difficult to say whether or not the grinding stones were produced simultaneously. However, given that extraction methods are similar and that silicified sandstone grinding stones obviously were used in that period, there is no reason for saying that it did not occur simultaneously and even by the same people.



*Figure 22. Quarry debitage of purple silicified sandstone, Southern Quarries.*



*Figure 23. Broken granite cobble pounder (two faces of the same pounder).*





*Figure 24. Various blanks of purple silicified sandstone, Southern Quarries*

### On the dating of the grinding stone quarries

The silicified sandstone has been used for grinding implements since the Late Palaeolithic to at least the Ptolemaic Period. This gives us a time span of approximately 16.000 years. Since the survey permission did not include excavations and radiocarbon dating, we need to look at other methods for establishing a chronology of quarrying.

Consumption is in many cases useful for chronological interpretations. However, regarding grinding stones it appears more dubious, particularly since there is a lack of a definitive typology of grinding stones in an Egyptian context. Furthermore, the grinding implements were not finished in the quarries, leaving us rough blanks to study, which can only provide vague ideas of sizes and shapes. Most of the (observed) blanks are of the oval type, with semi-circular, keeled or flat base, e.g. boat-shaped. The refining of this shape diagnostic seems to have arisen in the Predynastic (see Chapter 4). From then onwards, well into the Ptolemaic, this seems to remain a well standardized form, in most cases used as upper stones ("riders") for saddle querns. However, as described above, similar shapes, although probably not that well standardized, were in use already in the Late Palaeolithic, though in this period as lower grinding stones. Thus, observations of oval shaped grinding stone blanks alone cannot give chronological indications. But, as will be discussed in the next section, we might see a tendency towards standardization of these through time.

Diagnostic pottery is unfortunately rare in the grinding stone quarries, and the continuous use of the landscape for many different purposes has caused a massive overprint of particularly Roman assemblages (see section below). Furthermore, particularly in the Gebel Gulab and Gebel Tingar areas, it is difficult to establish whether or not the pottery relates to the quarrying of grinding stones or ornamental stones. Only at three sites do we have pottery in a reasonably good context with grinding stone quarrying. A quarry in Wadi Faras dates between Late Predynastic and the First Intermediate Period, and the Southern Quarries and Gebel Sidi Osman 2 date to the New Kingdom. In the New Aswan City area, there are several small, "low intensity" quarries. Pottery has not been found directly in context with these quarries, although the material culture points to a strong Predynastic presence, and may indicate such an age for the quarries. Also, the pottery at Golden Hill, Gebel es-Sawan North, indicates

grinding stone production in the Predynastic period. There are quite a few grinding stone quarries containing pottery from the Roman Period.

From a consumption perspective, the general view is that the boat shaped grinding stones were substituted by rotary handmills already in the Early Roman period (i.e. grinding implements found in the Elephantine settlements; see Chapter 4). Thus, such quarries from that period are not supposed to exist! In many cases, the Roman pottery may be linked to ornamental stone production or other uses across the landscape, such as roads and desert routes, burials and other industrial purposes. However, the apparent good context of some of the Roman pottery with grinding stone quarrying (such as a quarry south of Wadi el-Faras) leaves us open to the possibility that this long tradition of quarrying could have survived into the Roman period. Although rare, the ceramic evidence we do have indicates both a deep time depth in grinding stone quarrying and that some of the most "high intensity" quarries are from the New Kingdom onwards.

This leads us to a technological approach. As summarized in table 2, the grinding stone quarries display different modes of extraction, from a "low intensity" one, exploiting scatters of small blocks of silicified sandstone, to "high intensity" quarries extracting and dividing larger blocks or going deep into the solid bedrock (see also some examples in Figure 25). In case of the Wadi Kubbaniya, the difference in weathering of the debitage with that of the assumed New Kingdom "high intensity" quarries all point towards a chronological development from the "easiest" and shallow mode of quarrying towards deeper, more concentrated and more intensive mode. The "low intensity" quarries seem to have a wider distribution than the latter, and in the marginal areas, exploiting rather poor resources which yielded low quantities of grinding stones. This may, of course, be related to the proximity of the resources to early settlements, such as Wadi Kubbaniya. It was convenient and sufficient to use the most local resources, even though being poorer in volume and perhaps also quality than more distal sources. The tools in such quarries predominantly consist of small cobbles of igneous and metamorphic rocks and larger cobbles of silicified sandstone from local or semi-local sources. Turning more intensive (and possibly more efficient) the need for better pounders grew, and so we see many more fragments of igneous rocks from large pounders, probably brought from the East Bank or from available resources further south on the West Bank (see Chapter 5).

1	2	3	4
		Primary wedging/splitting of large blocks	
	"Peeling" natural blocks to core	Secondary wedging/splitting to core	Extracting irregular core directly from massive outcrop
	Splitting/hewing rough-outs from core		
Trimming of grinding stone blanks			
Retouching and final shaping			

*Table 2. Four modes of extraction in grinding stone quarries; 1) very "low intensity", collecting naturally shaped blocks on the surface, 2) "low intensity" as Wadi Kubbaniya, 3) quarrying involving several steps of primary wedging, 4) quarrying directly from massive outcrops and/or large blocks.*



*Figure 25. Three "high-intensity" grinding stone quarries. Top: irregular quarry face, Gebel Gulab. Middle: typical "half-moon" shaped spoil heap around quarry face, Gebel Gulab. Below. quarry in huge block, Gebel Sidi Osman I.*

One of the problems of establishing a chronology based on technology is the (apparently) complete lack of any development of the final working and finishing of the blanks. Except for minor evidence of using grinding stones in the processing of the sandstone itself (see below), the assumed New Kingdom blanks are left in the same state of finishing as the Late Palaeolithic ones; the final finishing is done somewhere else. This is of course also an interesting aspect of the grinding stone production; the last two stages of working shown in Table 2 (trimming and retouching) have remained the same, and apparently done with the same type of tools, throughout the whole history of quarrying. In other words, Palaeolithic techniques seem to have survived up to Roman times.

### Grinding stone shapes in the West Bank Quarries

As discussed in Chapter 4, upper and lower, oval and boat-shaped grinding stones seem to be present in archaeological assemblages from the Predynastic and onwards, typically for saddle querns. However, saddle querns are of course not the only grinding implements found in these periods. Above, we have discussed the presence of similar boat-like or oval shapes (for lower grinding stones) already in the Late Palaeolithic Wadi Kubbania settlements, although also circular and irregularly shaped stones are common.

In the quarries we see many oval shaped grinding stone blanks of different sizes and to a lesser extent circular, rectangular and other defined shapes (see Plates 8 and 9). However, this is in itself an important limitation. We do not see more irregular shapes, if present, because these are hardly possible to separate from other abandoned pieces of rock. Furthermore, since most of the blanks left in the quarries presumably were wasted, they are hardly representative of the finished products. For example, were blanks with a flat base intended to be like that, or were they intended to be keeled, but broke along the sandstone bedding plane? Adding to this uncertainty is the fact that the grinding stones were not completely finished in the quarries, leaving us with the rough shape alone. For example, it is difficult to separate between intended loaf-shaped and boat-shaped ones! Thus, it is difficult to extract exact data on the variability of shapes that were produced in the quarries.



*Figure 26. Boat shaped lower grinding stone and rider, assumed Middle Kingdom Context (Shaw and Bloxam 1999), Chephren's Quarry.*

However, we have taken a closer look at the measurements of the oval shape alone. But also here, there are problems; given that the upper and lower grinding stones at some stage were produced from basically the same shape, they are difficult to distinguish. We may agree that the larger ones, being too heavy to operate, are lower grinding stones, and that probably the smallest represent upper grinding stones, as shown in an example from Chephren's Quarry in Figure 26. However, there is a large range of sizes where this separation is not possible to make without detailed knowledge about various kinds of application in different periods.

Given that we have made a rough sorting of the quarries according to expected chronological period, we may divide them in three groups – e.g. Wadi Kubbaniya (as the assumed oldest), the marginal, "low intensity" quarries outside Wadi Kubbaniya (assumed highest density of Predynastic/Prehistoric quarries) and the assumed dynastic ones (probably mainly New Kingdom onwards). In Figure 27 we have plotted the length and width of the oval blanks against each other; for Wadi Kubbaniya, we have mainly used the measurements presented by Roubet (1989: 596).

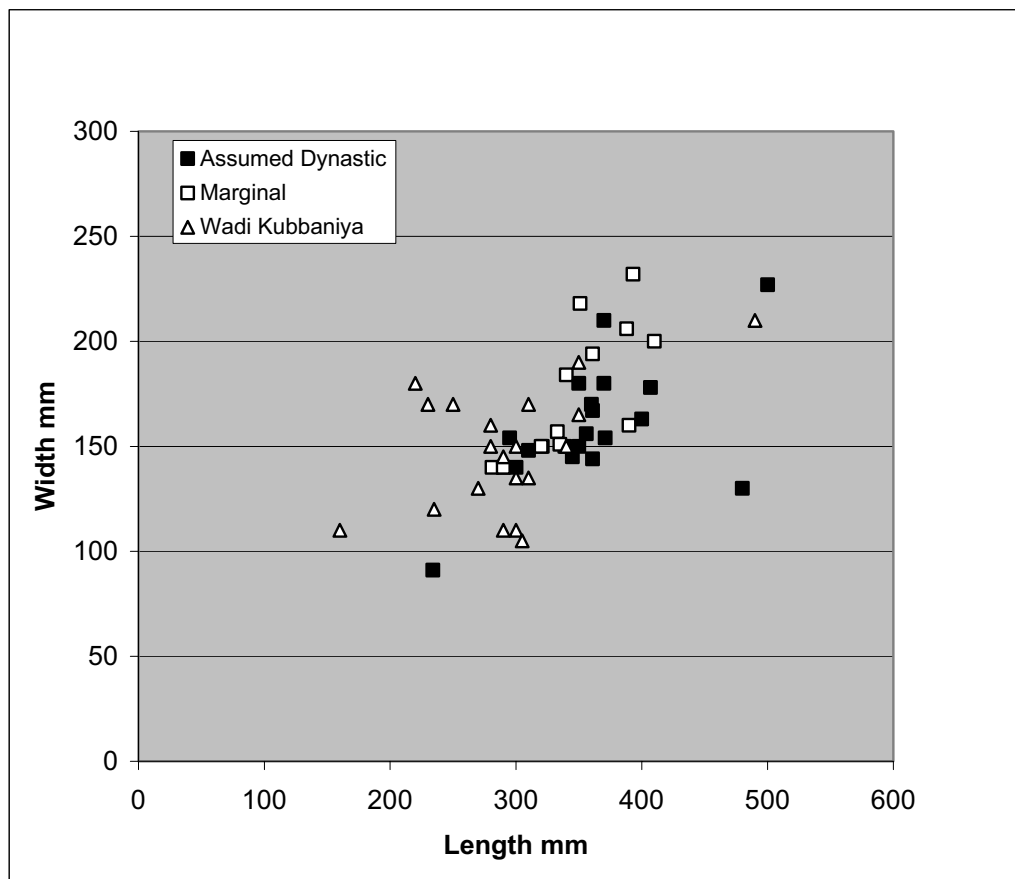


Figure 27. Plots of length and width for the three groups of grinding stone quarries.

As shown, there is no significant development of the oval shape through time. However, with the exception of some odd measurements, the assumed dynastic ones tend to cluster in a smaller area than the two other groups, indicating more standardisation. The larger variance of the assumed earlier quarrying is mainly due to a tendency of lower length/width ratio, in other words generally wider blanks – tending towards pseudo-

circular. Roubet's analysis and our own observations also leave the impression that circular blanks are more common in the early quarries than in the later ones. Thus, although the same shapes are found in early and late quarries, there seems to be a movement in time towards "slimmer" blanks (less circular) and more standardized length/width ratio, which would also be natural, given that in earlier periods such stone would have been used as lower grinding stones for "basin querns" and in later periods mainly/often as upper stones ("riders") for saddle querns (see i.e. Sumner 1967).

## **Dynastic ornamental stone quarries**

The extraction of large objects, such as statues and obelisks, from the silicified sandstone is one of the most striking aspects of the Aswan West Bank quarry landscape. This is not because they comprise the largest amount of quarries, the 39 individual quarries only count for 11% of the total quarry area, but more because of the network of quarry roads they left behind, and the collection of artefacts and unfinished objects within them. They are all located in the central part of the landscape, from Gebel Tingar in the south, up to the Khnum quarries in the north (Figure 28).

The ceramic as well as epigraphic evidence, where present, uniformly suggests that the peak of the dynastic ornamental stone quarrying took place in the New Kingdom, particularly in the 18<sup>th</sup> to 19<sup>th</sup> Dynasties (see Chapter 4). It included extraction of obelisks, which is concentrated at Gebel Gulab, and more spread-out quarrying of other large objects, presumably meant for statues and bases. It should also be remembered that several quarries classified as grinding stone quarries may also have involved procurement of stone for small objects, such as statuettes (see above).

The quarrying technique can be basically described as a seven-step process:

1. Clearing and inspection; removing overburden from blocks or bedrock outcrops, inspection and quality testing, attested i.e. through trial pounder marks.
2. Removing loose and weathered rock – "peeling" with pounders and perhaps also with the aid of fire.
3. Levelling of surfaces and channelling, using pounders and possibly fire.
4. Loosening the object blanks by splitting the base (if made in the solid bedrock)
5. Grinding, honing and carving of the object surface (only observed in two obelisk quarries!)
6. Construction of ramps and roads for transport
7. Moving the object blank (or finished object)

There is evidence of finishing in the quarry in the case of the obelisks; the Seti I obelisk tip at Gebel Gulab is finished, and there is debris from honing in a presumed obelisk quarry further south at Gebel Gulab. However, this stage of finishing seems to be unique for these two quarries. No other evidence of finishing is observed elsewhere. This may suggest that the quarrying of obelisks (or more correctly, the attempt at quarrying obelisks!) was a unique event in the quarrying history at the West Bank.



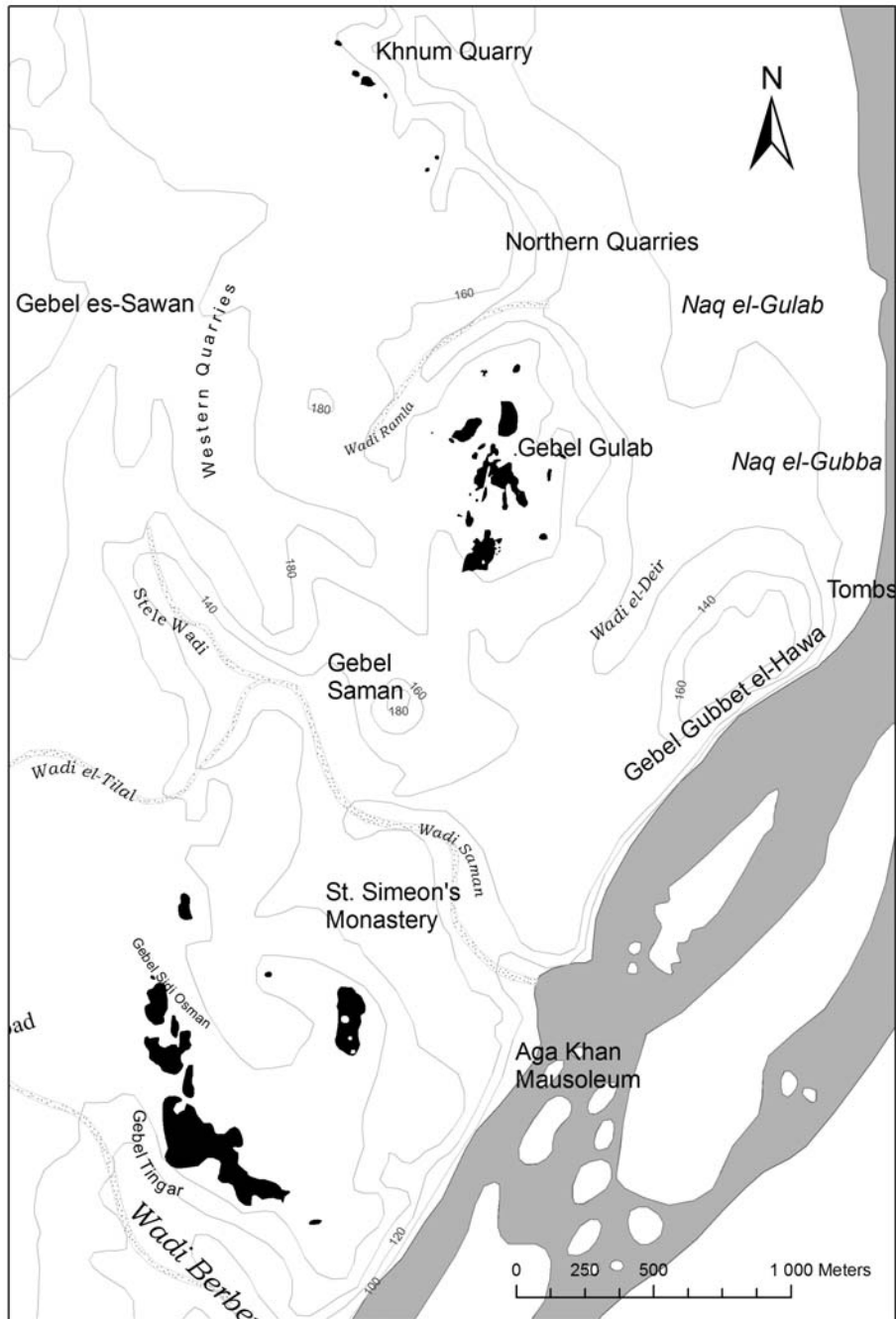


Figure 28. Distribution of dynastic ornamental stone quarries (black).

A typical aspect of all these ornamental stone quarries is the nature of the worked surfaces on quarry faces and blocks. The smooth surfaces are dotted with pick marks from pounders, and channels have often produced rounded corners and concave squares in the channel bottoms, all showing great similarity with the tool marks seen in the "Unfinished Obelisk Quarry" in Aswan (Röder 1965). Other similarities include the occurrence of ash and charcoal in the spoil heaps, indicative of the use of fire in aiding the extraction process.

### The Obelisk quarries at Gebel Gulab

Obelisk quarrying is perhaps the most well-known quarrying activity at the site, due to the presence of the inscribed (dating to Seti I) upper shaft of an obelisk block (Figure 29 and 32). This group of quarries is typically found in the massive outcrops of yellowish, rather weakly silicified sandstone, moving into the bedrock. Six obelisk quarries have been identified at Gebel Gulab, but only in two of them is there evidence that obelisks were actually extracted, the rest displaying stages in *attempted* obelisk extraction.

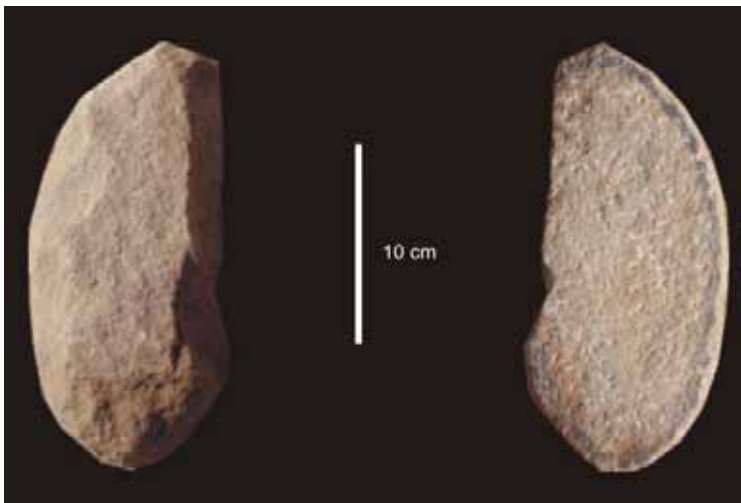
Large ramps and causeways are associated with these two quarries, most significant being the one in front of the Seti I obelisk (Figure 30). The upper shaft of the obelisk (broken and situated in front of the quarry; Figure 29) bears inscriptions on three sides dating to the reign of Seti I (19<sup>th</sup> Dynasty) with depictions of the king kneeling before manifestations of the Heliopolitan sun gods (Habachi 1960: 227-30; Brand 1997: 103). Pottery in this area of the quarry was very limited, however, sherds of Cananite amphorae dating to the mid-late 18<sup>th</sup> Dynasty were identified (el Senussi, 2004; Appendix 2). The height of the finished obelisk would have been approximately 12 metres, and was one of a pair, the second probably being underway when this one broke (Brand 1997: 104). The quarry face displays the familiar pounded surface as seen in the Unfinished Obelisk Quarry in Aswan (Figure 30), where both vertical and horizontal surfaces are evened and smoothed with stone pounders. Several of the latter are found in the quarry, of which most come from basement rocks, the rest being of silicified sandstone. As the obelisk shaft clearly shows, the finishing took place in the quarry. One of the rare examples of a grinding stone that actually has been finished and even used, was found in the Seti I quarry (Figure 31), indicating that it was perhaps used for grinding of the obelisk surface.



Figure 29. The Seti I obelisk shaft.



*Figure 30. Quarry face with typical stone-hammered surface close to the Seti I obelisk.*



*Figure 31. Broken grinding stone, used, probably for the grinding of the obelisk. Note black delineation of the oval surface perimeter.*

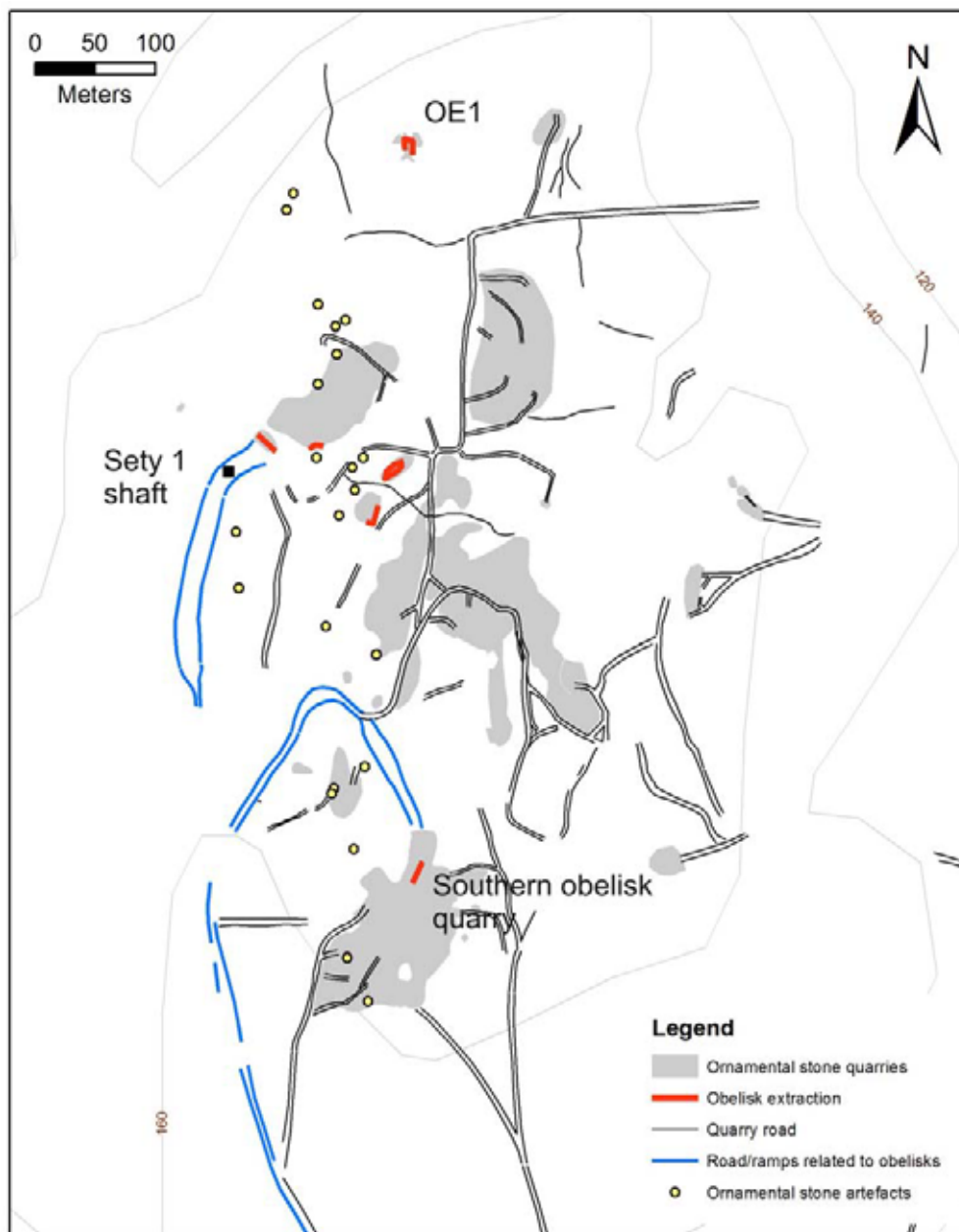


Figure 32. Map of the obelisk extractions on Gebel Gulab and sites mentioned in the text.

Another obelisk quarry is found in the southern part of Gebel Gulab (Figure 32 and 33). There are indications of the extraction and removal of at least one large obelisk (Figure 34). Adjacent to the quarry, there are thick deposits of fine sand intermixed with pieces of waste rock (Figure 35), these being sand deposits from grinding and honing of sandstone. Also, ground pieces of waste rock can be seen, as well as much charcoal. This would suggest that also here at least one obelisk was made and brought away.





*Figure 33. Quarry face, probably from extraction of obelisk(s).*



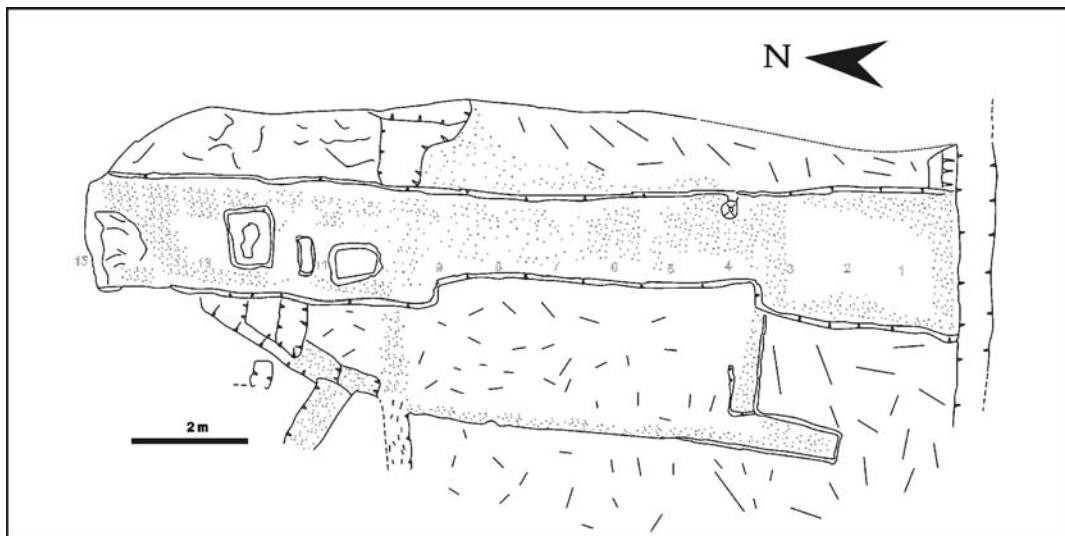
*Figure 34. Debris from grinding of silicified sandstone mixed with pounder fragments.*

The most impressive of the newly discovered obelisk extraction sites is located approximately 500 metres to the north of the Seti I obelisk quarry, although no obelisk has been produced here; this is the West Bank version of the "unfinished obelisk". The area, which has **site code OE1** (see Figure 32), has been investigated in detail, and the archaeology is described in chapter 10. In this part, we will only describe the evidence of extraction methods. The dimensions of the extraction site indicate that the obelisk would have been to a maximum height of 15 metres and with a width at its base of

approximately 2 metres (Figure 35 and 36). However, the site was abandoned well before completion of the obelisk. Pottery scatters found in an ephemeral shelter close to the extraction site are of New Kingdom date (mid to late 18<sup>th</sup> Dynasty).



*Figure 35. The inclined surface of obelisk extraction site seen from the north. Note the pounded surface for levelling.*



*Figure 36. Plan of the OE1 obelisk extraction site. Drawing by Adel Kelany, digitising by Leif Furuhaug.*

The levelled surface of the attempted obelisk is inclined, in order to fit the object as close as possible to the structure of the bedrock outcrop. The surface displays the typical marks from pounders as described above. A closer look at the mainly pounded quarry surface reveals some interesting details; in the northern part, there are some remaining pillow-shaped raised areas (Figure 37), not yet removed in the levelling process, some



of which display a rough split surface on their tops. In the southern part, there is a raw-split surface in level with the pounded one, indicating that such a "pillow" was split away. The height-width ratio (approximately 1:10) of these "pillows" indicate that splitting with wedges (of which there are no visible traces) or strokes with pounders alone would be difficult. It would even have been more difficult to make the almost three metres long split surface just to the west of the levelled surface. One plausible explanation may be that a purely mechanical splitting did not take place. The spoil heaps surrounding the quarry are loaded with ash layers and charcoal, and it is suggested that heating with fire played an important role in the levelling process. For instance, heating the rock on the top and on both sides of a "pillow" might easily generate enough thermic stress to generate a crack underneath it. The use of fire in quarrying is known from many ancient and modern contexts, and also recently discovered in the extraction of the unfinished obelisk in Aswan (Adel Kelany, pers. comm.), a quarry that was active in the same period as the obelisk extraction at Gebel Gulab.



*Figure 37. Detail of the pounded quarry surface, split areas are marked with yellow.*

There are a few other extraction sites at Gebel Gulab, indicating attempts to extract obelisks and/or prospecting activities related to it (clearing of outcrops, test channels; Figure 38). However, it seems that none of these other small quarries actually produced any obelisks.



*Figure 38. The initiation of a corner and a long channel, probably for obelisk extraction. Gebel Gulab.*

### Quarries for statues and other large objects

A group of quarries were designated for extracting large objects other than obelisks. Some of these may be directly related to and are probably contemporaneous with the obelisk extraction (i.e. quarrying of obelisk bases), others seem to be less related, and can represent extraction of statue blocks, reliefs, etc. (Figure 39 and 40). Most of these workings exploited large free-standing blocks, a few are situated in bedrock. The quarries can be divided into the following subtypes:

- Removed blocks; the only visible trace of block extraction are spoil heaps, tool fragments and quarry roads on which the large blocks have been transported
- Cleared blocks; the area surrounding the blocks have been cleared and inspected for quarrying
- "Peeled" blocks, weathered rock have been removed and the blocks appear as roughly shaped, sound "cores" for further working
- Levelled and shaped blocks with the use of pounders (similar as the obelisk extractions)
- Large quarries from which several blocks have been removed

As described above, there is evidence of the use of fire, particularly in the "peeling" process, leaving blocks with flaked and broken surfaces and large amounts of ash/charcoal in the surrounding spoil heaps. Close to the southern obelisk quarry at

Gebel Gulab there is also a quarry face in bedrock displaying a particularly fine example of a cracked and broken surface, presumable due to the use of fire. Pottery scatters in the vicinity date these block quarries to the New Kingdom (mid-late 18<sup>th</sup> Dynasty) (el Senussi 2004, Appendix 2). Also other aspects indicate a close relationship in age with the obelisk quarrying; the extraction methods are almost identical, and the roads and ramps are of the same construction (see below). However, there are no signs of final finishing of these blocks, as seen in the two obelisk quarries mentioned above.



*Figure 39. Partially worked blocks, dynastic. Below right and middle from Gebel Tingar, rest from Gebel Gulab.*

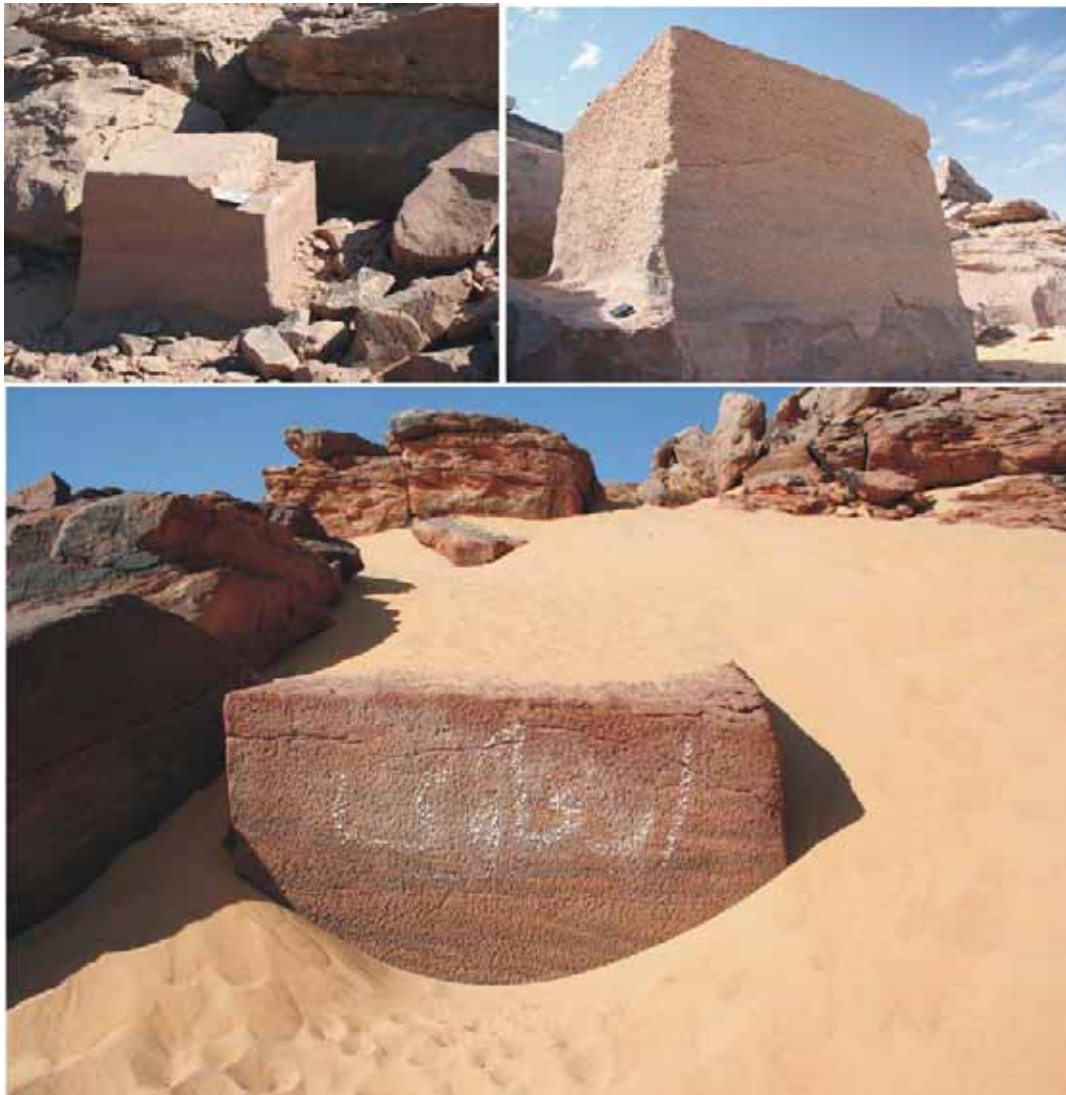


*Figure 40. Block possibly for sunk relief, Gebel Gulab.*

The northernmost of these quarries (**Khnum Quarry**) deviates from the others in not having any established infrastructure related to them. The quarries are situated in yellowish silicified sandstone, not unlike the type found in the obelisk quarries on Gebel Gulab. Five unfinished, cubic blocks are seen, probably intended for obelisk or statue



bases, still fixed to the bedrock (Figure 41). All free surfaces show the characteristic marks from pounding. In addition, there are at least three elongated, worked blocks. Two of them occur side by side in the northern part of the quarry (Figure 42). One of them, in the process of final shaping with pounders, may be interpreted as an unfinished Osiris statue. However, in the early 19<sup>th</sup> Dynasty reign of Seti I, when there was a short revival in the use of silicified sandstone (see Chapter 4), a type of ‘truncated obelisk’ occurs in addition to the typical obelisk form known of this period. Comprising an obelisk shaft, without the pyramidion top, resting on a wider base an example in red silicified sandstone was found in Lower Egypt at Qantara (Brand 2000: 128). Such blanks may also represent stages in the production of such objects. Due to the lack of infrastructure, we doubt that any large blocks were actually transported away from the Khnum Quarries.



*Figure 41. Three examples of possible obelisk bases in the Khnum Quarry.*



*Figure 42. Two elongated blocks, intended for possibly small obelisks or statues (e.g. Osiris).*

At **Gebel Gulab** there are many large block quarries, all linked to the road transport system (see chapter 8). One may be interpreted as an unfinished seated statue. Others are more difficult to interpret, being in a much earlier stage of working (Figure 43), and some have been removed (Figure 43).



*Figure 43. Left: cleared block for extraction of large object(s). Right: empty space after a large block has been worked and removed. Both photos from Gebel Gulab.*

At **Gebel Sidi Osman 3**, the tallest blocks of silicified sandstone are found, c. 8 m high, still resting in situ on the top of the hill (Figure 44). Several large blocks of purple and orange silicified sandstone have been worked and removed from the quarry, as indicated by spoil heaps, ramps for transport and broken tools. However, there are also many grinding stone blanks on the hill, and it is difficult to establish whether this production took place before, during or after the large block extraction. Due to the quarrying, the hill stands out as a noticeable landmark (see Chapter 9).



*Figure 44. Gebel Sidi Osman III seen from the west (left), detail of quarry (right).*

Between Gebel Sidi Osman 3 and Gebel Tingar, there are several small hills, from which blocks have been extracted, indicated by the road network and some remains of worked (pounded) blocks (Figure 39).

Along the ridge of **Gebel Tingar** there are several quarries, of which a large part seems to be from the dynastic Period. However, there is a massive overprint of Roman quarrying and other uses of the area, including burials of probable Late Roman age (see Chapter 10). The silicified sandstone at Gebel Tingar and the surroundings exhibits the most attractive purple variety. From this area, we think the largest amount of large blocks in the dynastic period were extracted and actually removed. Especially the central part of the ridge has been intensively worked (Figure 45), although a few partially worked blocks are still seen (Figure 46).



*Figure 45. The Gebel Tingar ridge seen from north. Note the lack of remaining blocks at central part of the ridge due to intensive exploitation.*



*Figure 46. Cleared and "peeled" ornamental stone block at Gebel Tingar.*



**Gebel Sidi Osman 2** is predominantly exploited for grinding stones. However, on its northwestern part, one single blank of a standing statue (120 cm long, Figure 47) is found, left in the middle of the small workshop. It is, in contradiction to the larger worked objects, not displaying any smooth pounded surface, but is shaped and levelled by trimming with pounders, in the same way as described for the grinding stone production. Being in the middle of a grinding stone production area, this may be the closest technological link we have between utilitarian and ornamental production.



*Figure 47. Statue block (feet to the left) in work area at Gebel Sidi Osman II. Scale is one metre.*

### Dynastic ornamental stone quarries in short

When viewing the dynastic ornamental stone quarrying together, there are some striking aspects. First of all, the huge effort put down in obelisk production and the apparent lack of success, since many of the production sites were never completed, and one of the finished obelisks obviously broke. However, it might be that all the efforts were targeted on just achieving a few objects, and that the traces left behind reflect a "normal" situation of trial and failure within the New Kingdom. This is, of course, difficult for us to evaluate.

Concerning statues and probably other large objects, it seems that at least a dozen or so were brought away from the site, measured in the number of "empty" extraction sites and the road system (see chapter 8). However, it is difficult to find a single extraction site or ramp structure, or even sufficiently large deposit of silicified sandstone that would fit the extraction of giant statues, such as the Colossi of Memnon. Klemm and Klemm (1993) infer that the Colossi may have been taken from the southern tip of Gebel Tingar, but neither the presumed block size, nor the narrow roads in this area would definitely point to the production of such giant objects. With this in mind, in addition to the possibility that the colossi may have been quarried at Gebel Ahmar near Cairo we should recall the very significant dynastic quarrying site for large objects at

Wadi Abu Agag on the East Bank (Harrell and Madbouly 2006). These may even be larger than the West Bank quarries as regards this type of silicified sandstone exploitation. However, as interpreted from satellite images, it would still seem that the quarries at the West Bank show more quarry roads than can be seen at the East Bank, which would point to the West Bank as a key area of large-object production.

Another important aspect is the indication of the use of fire during extraction, for creating cracks in the rock and possibly also for levelling/channelling. The main indices of this are the nature of the quarry faces and the occurrence of ash and charcoal in the spoil heaps. This may represent an important link to the Aswan granite quarries, where there is recent evidence that fire was applied in connection to New Kingdom quarrying. At the present time, research concerning how much and how heating was used in quarrying of siliceous rocks in the dynastic Period is still in its early stages.

In Table 3 the extraction process is summarized.

	Obelisk quarrying	Other Large object quarrying
Preparation	Clearing	
Primary	Peeling of weathered surface with pounders and possibly fire	
Primary/secondary	Levelling and channeling with pounders and possibly fire	
Tertiary	Grinding and honing	?
	Carving	?

*Table 3. Summary of extraction methods in the dynastic ornamental stone quarries, divided in obelisks and other large objects.*

### **Stelae/lintel quarrying**

Several blanks of possibly lintels and/or stela, in sizes ranging in length between 1 m and 1.2 m and with widths between 0.50 m and 0.7 m are found at Gebel Gulab (Figure 48), especially in the northern part. These ‘blanks’ are characterised not only by their shape, comprising a rounded/oval top and square base, but also by pounding marks on their surface (Figure 48). These objects were not only a significant output from the quarries, but also as a possible by-product from quarrying for obelisks and other items. Re-working of abandoned obelisks into such blanks can be suggested from two significant work areas located close to the unfinished Seti I obelisk extraction site (Figure 49). The proximity of these work areas to the inscribed obelisk block suggests that the quarrymen might have re-used the stone from the already abandoned obelisk. This situation might explain why only the inscribed block remains and further suggests a date post the reign of Seti I. There was no pottery in this vicinity, probably due to the collection of it by recent unsupervised visitors coming to view the obelisk block.



*Figure 48. Stele/lintel blocks found at Gebel Gulab.*



*Figure 49. Work area for stele/lintel blocks at Gebel Gulab, by the Seti I quarry. Reworking of the abandoned obelisk?*

### **Roman ornamental stone quarries**

The youngest group of ornamental stone quarries in silicified sandstone dates from the Graeco-Roman Period, presumably mainly Roman, indicated by Roman Pottery assemblages associated with the quarrying. Furthermore, the quarrying techniques applied are usually associated with Roman hard stone extraction, as in the Roman granite quarries in Aswan (Röder 1965; Klemm and Klemm 1993) and elsewhere (especially in the Eastern Desert (Peacock and Maxfield 1997; Maxfield and Peacock 2001). Splitting of blocks has been done by inserting wedges in trapezoidal large wedge holes (Figure 50). Often, the wedge holes are carved in the bottom of a shallow channel, made by heavy picks and/or chisels (Figure 51). Even though traces of this type of quarrying are highly visible in the landscape, due to the extensive roads associated with them, they only constitute 1% of the quarried area. Except for sporadic traces of trial



quarrying and very minor extractions, the Roman quarrying is concentrated in two areas; the southern part of Gebel Gulab and at Gebel Tingar (Figure 52).



Figure 50. Roman wedge holes in purple silicified sandstone, Gebel Tingar.



*Figure 51. Stepped Roman quarry at Gebel Gulab (southern part). Below: details of chiselled channels above wedge holes and partly worked channel on top of the rock surface.*

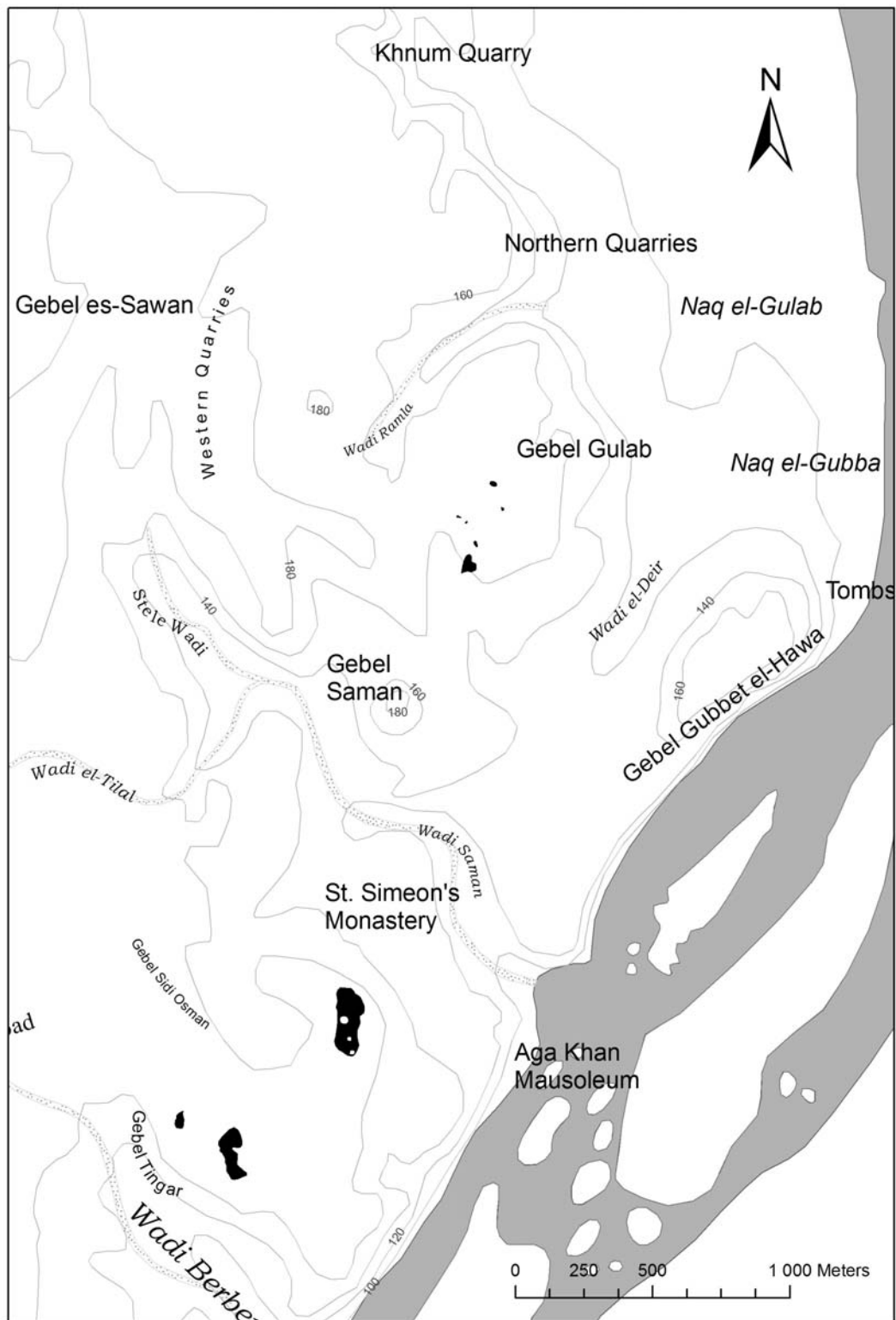


Figure 52. Map showing quarries with Roman workings (black).

In the southern quarries of **Gebel Gulab** (Figure 52) there are scattered traces of Roman quarrying, particularly in the form of reshaping of older blocks from the pharaonic



quarrying intended for large statues. In addition, there are two small Roman quarries in solid bedrock (Figure 51), containing remaining Roman infrastructure such as roads (see Chapter 8) and shelters (see Chapter 10). Scatters of mainly Roman amphorae lie in these quarries (el Senussi 2004; Appendix 2). We have not found any blanks or partly finished products indicating what was actually being sought. Most of the remaining blocks have a rectangular shape and measure up to one metre along the longest axis. However, in a few places extraction marks suggest failed attempts at extracting much larger objects (Figure 53), at least one with a curved outside (Figure 54). A hearth containing pottery dated to Late Ptolemaic – Early Roman period is found close to the largest quarry, beneath a rock face containing Greek inscriptions associated with the quarrying and interpreted by Fournet (1996) as related to the restoration of the Memnon Colossi in the reign of Septimus Severus (c. AD 200).



*Figure 52. Attempt of horizontal and vertical splitting of large block, Gebel Gulab.*



*Figure 54. Large block with chiselled, curved surface.*

The largest Roman quarries are found in the **Gebel Tingar** area (Figure 55), with numerous traces of exploitation of the valuable purple variety of the silicified sandstone. The Roman presence seems much stronger here than at Gebel Gulab, exhibiting numerous temporary shelters, work areas (Figure 56) and road networks. Of particular interest is the discovery of iron smelting slag, indicating that melting of iron (from nearby sources; see Chapter 7) for iron tool production actually took place in the quarries (see chapter 7). Traces of primary and secondary wedging of blocks are common, but there is less evidence of the finishing and the final products. One exception is a small column found in a shelter.



*Figure 55. Roman quarry at Gebel Tingar.*



*Figure 56. Roman work area at Gebel Tingar.*

At **Gebel Sidi Osman 1** there are also signs of extraction of blocks in the Graeco-Roman period (large block extraction), and an assumed Roman quarry road is built up to the top of the hill (see Chapter 8). As at Gebel Tingar, the quarrying has targeted purple to orange varieties of the silicified sandstone, and also in these quarries there is smelting slag.

In Table 4, the working process in the Roman quarries is briefly summarized.

Chiseling shallow channels for levelling wedge holes
Chiselling trapezoidal wedge holes
Wedging
Chiseling roughouts

Table 4. Summary of Roman ornamental stone quarry techniques.

## Building-stone quarries

As noted in Chapter 3, building stone quarries in non-silicified sandstone have been known in the survey area since Napoleon's *savants* recorded what they saw here and Jacques de Morgan *et al.* (1894) mentioned such quarries. The QuarryScapes survey did not concentrate on non-silicified sandstone quarries, but they were recorded wherever they were seen. There is one concentration of quarries in the south by Gebel Gubbet el-Hawa and beyond, as well as another concentration in the north from Gebel el-Qurna to Naq el-Fugani. No attempt at carefully dating these quarries has yet been undertaken, although tools marks have been compared with those found at Gebel el-Silsila and used by Klemm and Klemm (1993: 260ff) as a rough dating tool. Thus, any interpretation of exploitation periods below must be considered as tentative.

### The southern group of non-silicified sandstone quarries

From the south to the north the quarries that have been recorded and/or previously investigated are:

*St. Simeon's monastery*: Within the monastery (see Chapter 3 and Figure 57a), which is situated on a small hill in a wadi, are several remains of ancient quarry faces, which tool marks point in the direction of the use of pick axes (Figure 57b). Klemm and Klemm (1993: 272-3) interpreted these tool marks as belonging to the Old to Middle Kingdom (but generally suggesting that they are the result of the use of relatively short chisels, see p. 260ff). Due to the overbuilding by the monastery, it is difficult to estimate how large the quarry is, but considering the spoil heaps around the monastery, which may originate from the extraction activities, it must have been a quite substantial quarry. If Klemm and Klemm are correct in their dating of the quarry, it could be suggested that the stone was used for some purpose at Elephantine Island. It should be noted, though, that the monastery is also built from stone of the Abu Agag formation, in the form of coursed rubble, ashlar, quoins and elements for openings and vaulting. Hence, it cannot be excluded that the quarry was (also) used for building the edifice. Although such an interpretation might contradict the dating by Klemm and Klemm, it is also significant

that there are no other clear traces of quarrying in the near vicinity of the monastery, which required much stone for its construction. On the other hand it cannot be ruled out that there are yet to be discovered quarries for this purpose or quarries buried under the sand at places near the building.

*Wadi el-Deir:* Here are about five very small quarries, or perhaps rather explorative projects. The extraction method in most of these quarries show rather narrow channels and associated regular, long chisel marks inclined approximately 70 degrees to the horizontal surface (Figure 57c). These appear to be typical of the Ptolemaic and Roman periods, and are well known in e.g. Gebel el-Silsila (Klemm and Klemm 1993: 260-7). They are also found in other quarries described below. However, according to Klemm and Klemm (ibid.), in some cases it might be difficult to distinguish them from the somewhat less regular and shorter tool marks made in the Late Period, and even from the New Kingdom.

*Gebel Gubbet el-Hawa West:* This quarry is located at the western tip of Gebel Gubbet el-Hawa. It is small and shows the same extraction method as in Wadi el-Deir (Figure 57d). About 100 m to the south of the quarry is an unfinished, abandoned Graeco-Roman capital laying on the sandy surface (Figure 57e). Perhaps it could be suggested that the capital was extracted in the nearby quarry and meant for some purpose at Elephantine?

*Gebel Gubbet el-Hawa East:* This quarry has not been investigated in the QuarryScapes project, but Klemm and Klemm (1993: 271-3, photo p. 273) interpret it as the largest quarry in non-silicified sandstone in the area south of Gebel Gulab/Gebel Tingar. It is located just by the Tombs of the Nobles and the Coptic Deir Mari Girgis monastery. Klemm and Klemm speculate that this area was used a quarry *before* the establishment of the cemetery, which would mean that it could have history back to the Old Kingdom, but conclude that it is impossible to make such inferences today. As for the quarry in St. Simeon's monastery it could also be speculated that the quarries at Gebel Gubbet el-Hawa East were used for building the Deir Mari Girgis monastery.

*Western Quarries* (west of Gebel Gulab): In the area west of Gebel Gulab are several very small and shallow non-silicified sandstone quarries in a somewhat greyish variety of the stone. There are hardly any tool marks in these probably explorative projects, but at one place similar marks as in the Wadi el-Deir quarries and those at the western tip of Gebel Gubbet el-Hawa can be found. Fragments of an unfinished, probably similar capital as described above can also be found in a natural hillside shelter with Roman pottery not far from the extraction areas; perhaps this is a small work area (Figure 57f)? It should be noted that there are also several, very small traces of extraction of non-silicified sandstone around Stele Wadi, not far from the assumed hermitage (cf. Chapter 9).





*a: St. Simeon's monastery. Below the north-facing wall and within the monastery one can see the horizontal sandstone beds which have been subject of ancient quarrying.*



*b: Quarry marks showing the probable use of picks within St. Simeon's monastery*



*c: Small, probably Graeco-Roman quarry in Wadi el-Deir with Gebel Gubbet el-Hawa in the background*



*d: Traces of extraction in the quarry at the western tip of Gebel Gubbet el-Hawa, showing channels with long chisel marks.*



*e: Abandoned Graeco-Roman capital about 100 m south of the sandstone quarry at the western tip of Gebel Gubbet el-Hawa*



*f: Possibly a small work area in a natural shelter west of Gebel Gulab with fragments of a capital and Roman pottery*

*Figure 57. Pictures showing features of the southern group of non-silicified sandstone quarries*



### The northern group of non-silicified sandstone quarries

The northern quarries in non-silicified sandstone are generally much larger than the southern ones. Moreover, they are found in much thicker beds of Nubian sandstone than in the south. They are from the south to the north:

*Gebel el-Qurna*: On this very distinctive elongated hill, a highly significant landmark close to the Nile is a wealth of archaeological features. Unfortunately, time did not permit a closer investigation of this important place, which, curiously enough, appears not to have been previously explored. However de Morgan *et al.* (1894: 202) mention the hill (calling it Gebel Shiha, or Gebel Chikka on the accompanying map) as having large quarries and some inscriptions and rock art. During our brief visit we could observe many rock-cut tombs along the sides of the hill and especially on its flat, plateau-like top. There are also some walls of ruined edifices of unknown purpose. Generally, the tombs would probably mainly date to the Roman period (as much Roman pottery is present), but it cannot be excluded that there are tombs from other periods, as well. The few tombs along the sides of the hill are cut into the walls of the significant quarries opened here. These quarries stretch along almost the entire east face of the hill (almost 500 m), they are perhaps up to 7-8 m high and associated with substantial spoil heaps in front (Figure 58a). The extraction of stone here has given the hill its characteristic "hat-like" appearance. A combination of extraction techniques is found: Since the sandstone beds naturally break up along a rectangular pattern of cracks, these have been taken advantage of in the procurement of large blocks. Lines of Roman-type wedge holes also attest to the use of wedging for procurement of such blocks. Otherwise, there are many stepped faces with regular chisel marks along extraction channels (as described above), especially on the southern part of the hill. There are quite a few inscriptions and a substantial amount of rock-art, probably mostly dating to the Graeco-Roman period, although some are definitely older. However, no analyses have yet been made of this corpus. In summary, these findings point to a mainly Graeco-Roman date of the quarries, but it cannot be excluded that they were in use also earlier.

*Gebel Shihahh*: About two km north of Gebel el-Qurna is the location of the remains of Isisberg monastery and its Ptolemaic temple "precursor" (Figure 58b, see Chapter 3). The cliffs and hills west of the monastery are now heavily exploited for sandstone for modern building purposes, but although the area has not yet been properly investigated, it cannot be ruled out that there are also ancient sandstone quarries in this area. The presence of some Greco-Roman inscriptions that can be related to quarrying activities and tombs of as yet unknown date, points to a general situation rather similar to that of Gebel el-Qurna, albeit at a much smaller scale.

*Hagar el-Ghorab by Aswan Bridge*: Also close to the rock-cut tombs and boulders and cliffs with inscriptions and rock-art by Aswan Bridge (called Hagar el-Ghorab, "the Rock of the Crow" by Sayce 1894: 174 and Hagar el-Gharb or "the west rock" by de Morgan *et al.* 1894: 202; see also Chapter 2 and 9) is a small quarry in non-silicified sandstone (Figure 58c). The quarry is located at the southern end of the cliffs and shows some evidence of extraction of large blocks, partially by the use of wedging, resembling the situation at Gebel Qurna. It should be mentioned that Sayce's party found two small iron wedges in the near vicinity of the Middle and New Kingdom (and later) inscriptions on the cliffs here. He did not know by then of the small quarry at the spot, thus interpreting the wedges to "belong to the age of the hieroglyphic inscriptions"

(Sayce 1894: 174). However, they would quite certainly belong to the Graeco-Roman quarry. It is notable that just above this quarry is an extensive area of grinding stone production in slightly silicified sandstone.



*a: From the top of Gebel el-Qurna as seen towards the north. Note the quarry faces (cliffs) and the spoil heaps in front.*



*b: Gebel Shihahh. Close to the Nile is Isisberg monastery with its two remaining tall walls made from mud brick. In the cliffs behind are tombs and probably small quarries.*



*c: Hagar el-Ghorab by Aswan Bridge. Small sandstone quarry with wedge holes, which can be seen in the front*

*Figure 58. Some non-silicified sandstone quarries between Gebel el-Qurna and Aswan Bridge*

*Naq el-Fugani*: This substantial quarry is situated between Aswan Bridge and Naq el-Fugani, the southernmost of the present villages in Kubbania. It is called "Gharb Aswan" by Klemm and Klemm (1993: 271, photo p. 272) and was at the edge of destruction by construction work for New Aswan City when we started the survey in the area late 2005. At the present time it seems that the quarry will be preserved. The northern part of the quarry has the shape of a circle, its periphery defined by tall spoil heaps (Figure 59). In the central area, remaining tall quarry faces are seen, the most prominent are 5-6 metres high, and defining a free-standing rectangular "block" quarried on all sides (Figure 60). From the horizontal lines on the quarry face defining the extraction levels it seems that block sizes were quite standardized, between 40 and 60 cm in height. Parallel, regular chisel marks along extraction channels are the main tool marks to be seen. Several ramps/slipways lead down from the quarry towards the Nile (Figure 61), and associated with these are postholes in the bedrock, probably designed for fixing logs for aiding the block transport. There are also quarry roads leading westwards from the central part of the quarry. Destroyed dry stone walls, of unknown purpose, are seen in and underneath the peripheral spoil heaps. The quarry continues southwards, forming a long and narrow "tongue" along the escarpment above the present road. The quarry faces here are shallow and stepped, indicating less intensive extraction along the sandstone escarpment. In addition to the chiselled quarry marks typical of the central quarry area, wedge marks of the "Roman type" are sporadically occurring, perhaps indicating a later overprint. Just to the north of the central quarry was a small satellite quarry, at the time of writing destroyed by the construction work. Inscriptions and graffiti are seen on the tallest quarry faces in the central quarry area (see Chapter 10).



*Figure 59. The Naq el-Fugani quarry with its substantial spoil heaps as seen from the north*



*Figure 60. The Naq el-Fugani quarry with its free-standing rock quarried on all sides, as seen towards the north.*



*Figure 61. Slipway leading from the Naq el-Fugani quarry down to the Nile. Along the escarpment is a long "tongue" of extraction areas.*



## **Concluding remarks on the quarries at the Aswan West Bank**

The exploitation of silicified sandstone at the West Bank has a remarkable history, from Palaeolithic tool production to obelisks in the New Kingdom. However, in spite of the monumental traces left behind from ornamental stone extraction in the pharaonic and Roman periods, the most long-lived and extensive quarrying activity was the procurement of grinding stones. Going back as far as the Late Palaeolithic, the production of rough grinding stone blanks has remained a more or less continuous activity for nearly 16.000 years. Except for small changes in the primary extraction techniques, such objects were made in the same way the whole period. Grinding stone quarries of different age constitute 80 percent of the quarries area on the West Bank.

Although smaller in size, the predominantly New Kingdom quarrying of large objects, such as obelisks and statues, has left the most visible marks on the terrain in the central and southern parts of the area, and also the most impressive collection of unfinished objects. The remains of several stages of quarrying and the preserved infrastructure give a unique insight into the New Kingdom quarrying technology and organisation. Later, several of these quarries were re-opened in the Roman period, particularly due to the unique deposits of purple coloured silicified sandstone.

In the northern part of the area, the sandstones are less silicified than further south. The non-silicified sandstone resources were utilised for building stone, probably for nearby monuments and particularly in the Graeco-Roman period. Although the non-silicified sandstone quarries at the Aswan West Bank are very modest as compared to e.g. Gebel el-Silsila, they have left a significant imprint on the landscape. Moreover, their distribution attests to quarrying at almost every suitable outcrop along the Nile or in reasonable distance from the river, the best sandstone beds – sometimes at prominent locations – marking the places of development into more substantial quarries.

Although each of the West Bank quarries alone is not particularly unique compared to all the other impressive quarry sites in Egypt, the totality of the landscape gives us a window into phases of stone acquisition throughout nearly the whole human history, from the earliest flakes of silicified sandstone made in the Middle Palaeolithic onwards. Layer upon layer of quarries show us developments of technologies, and utilitarian quarrying intermingle with elite stone procurement campaigns.

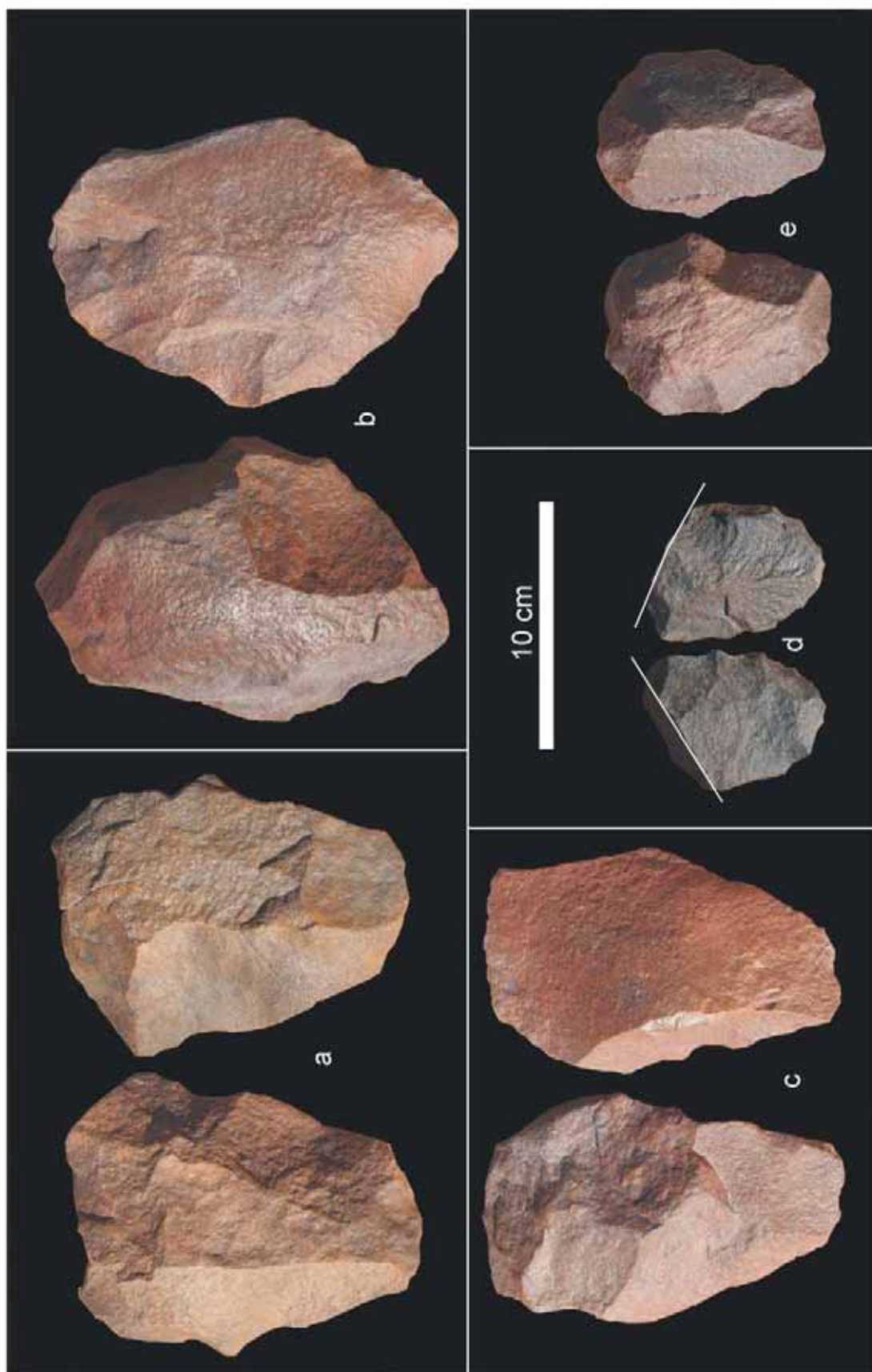
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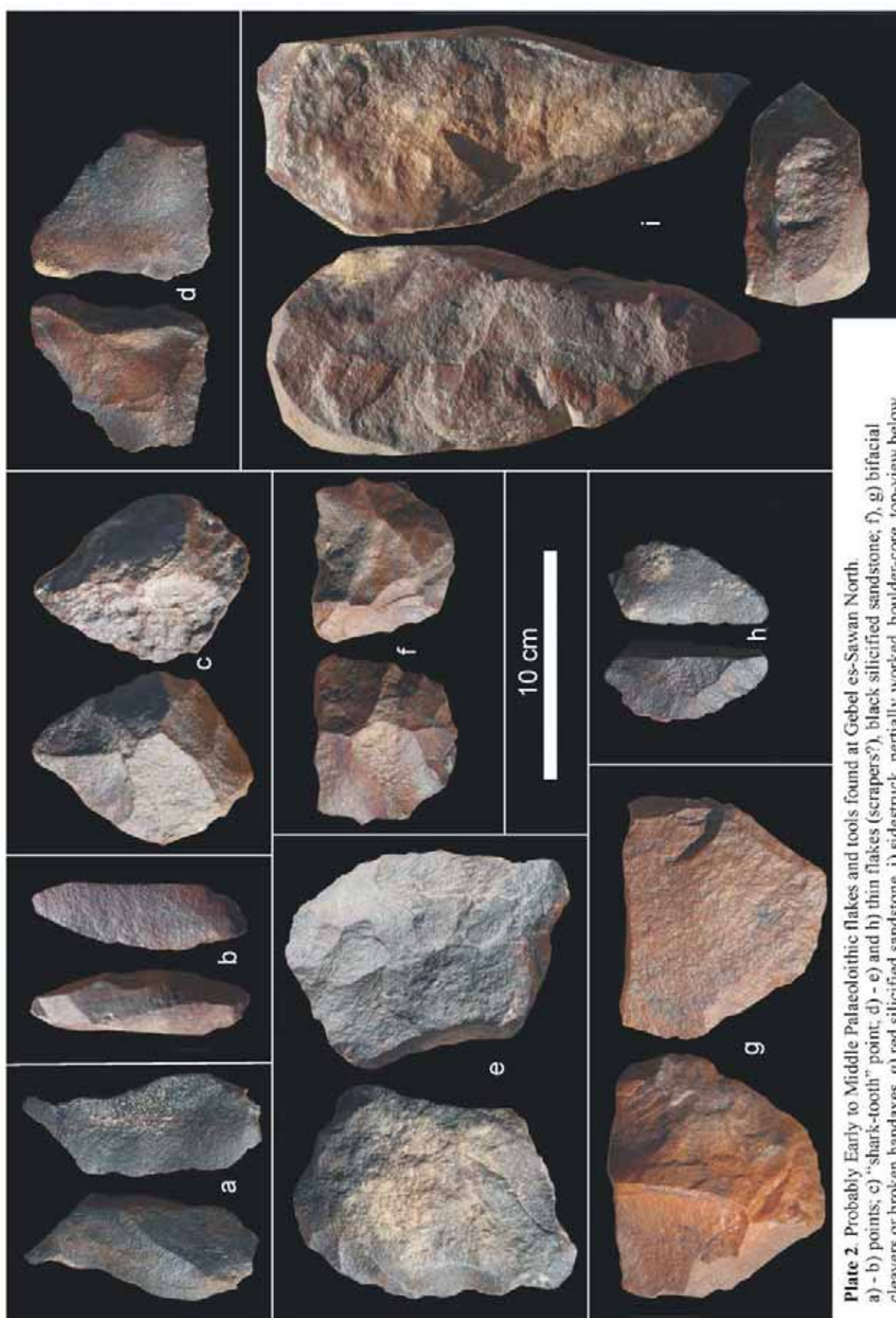


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**Plates 1-9**



**Plate 1.** Flakes and partially worked tools found in the Early to Middle Palaeolithic workshop in the Gebel es-Sawan North area.  
a) to c) - large flakes, may be for handaxes, red silicified sandstone; d) broken, bi-facial handaxe(?), red to black silicified sandstone;  
e) small bifacial



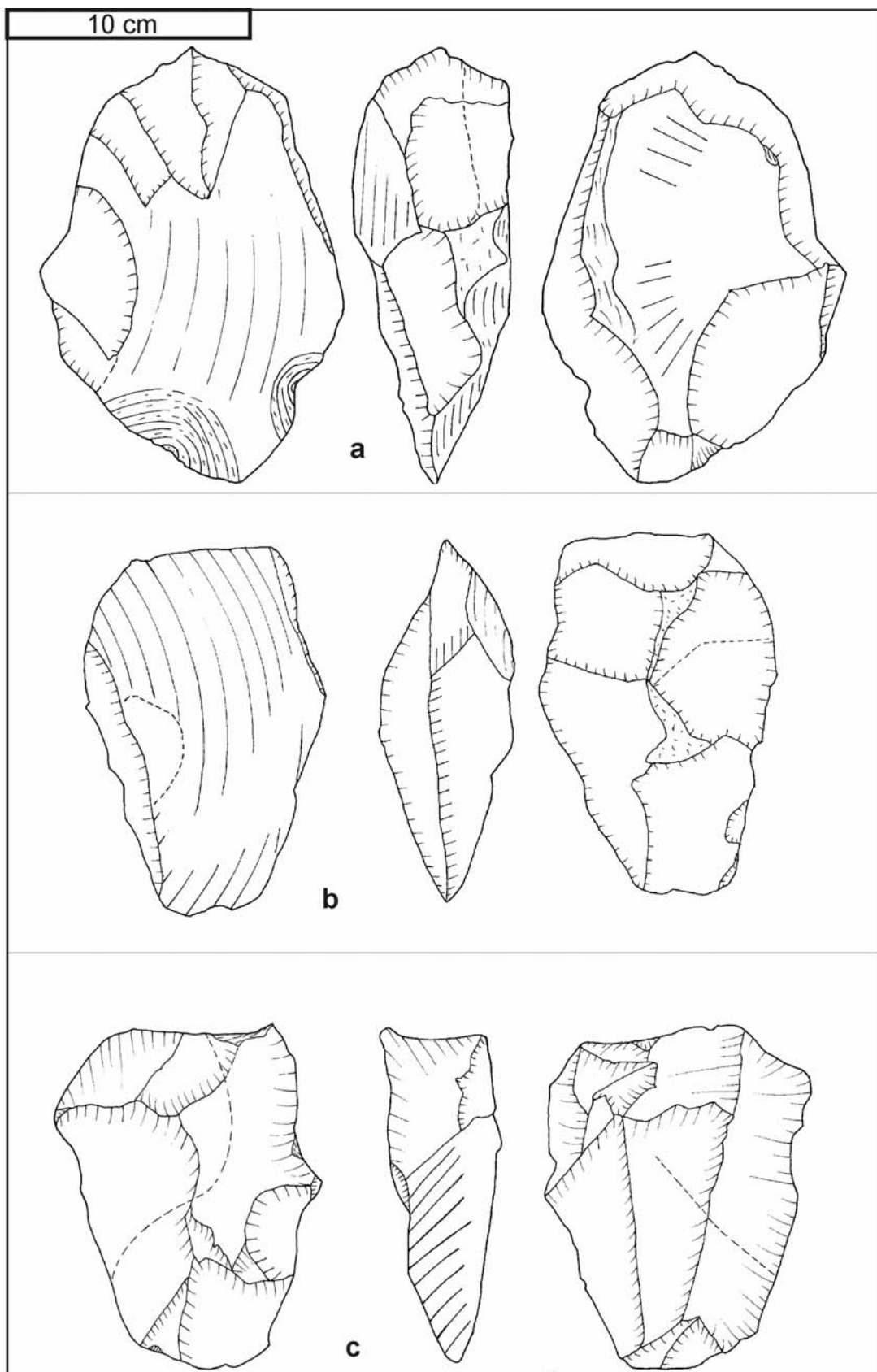




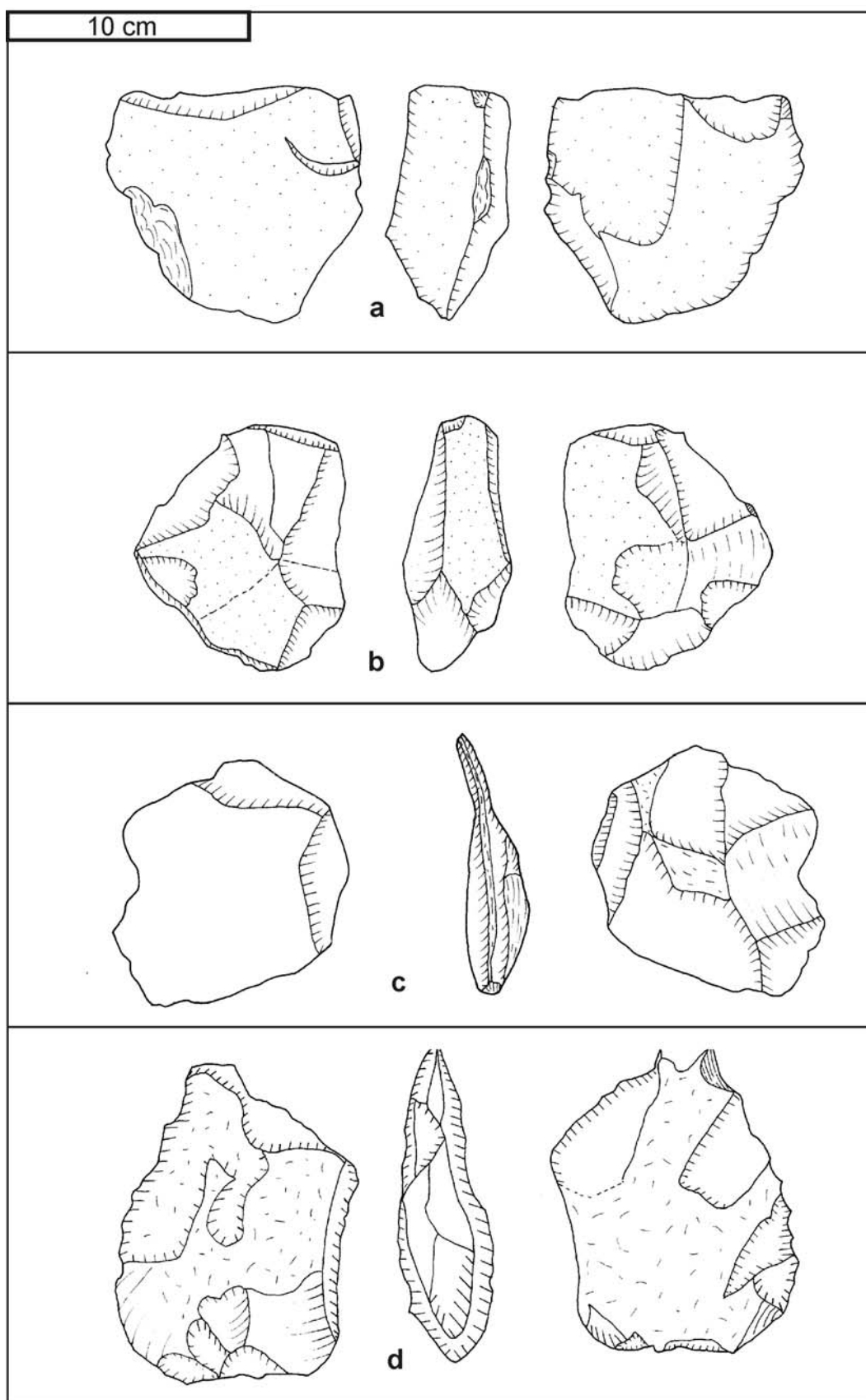
**Plate 3.**  
Cores from Gebel es-Sawan North.  
Top: large core of red silicified sandstone,  
Lower left and right: small discoidal cores of  
black silicified sandstone



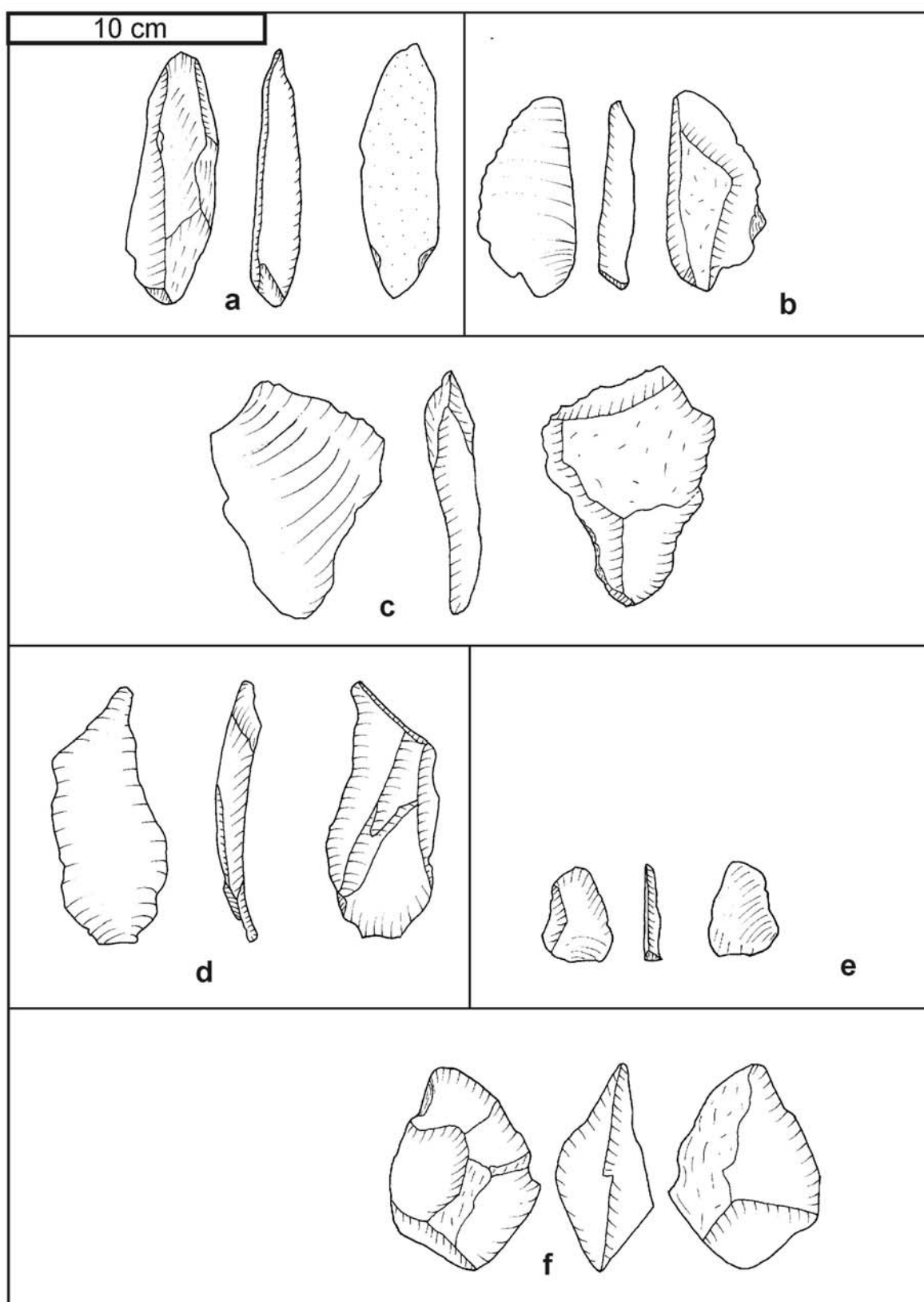




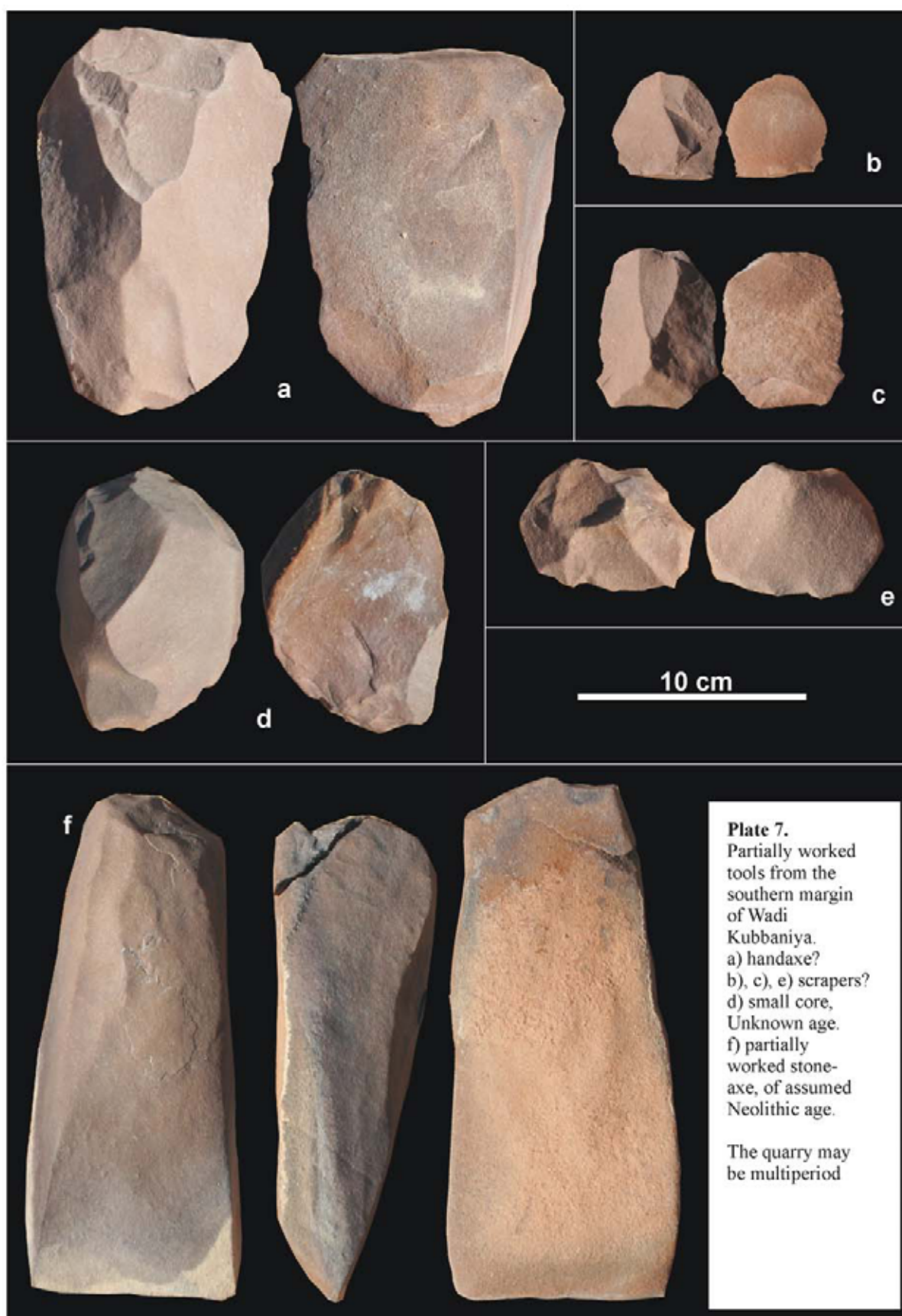
**Plate 4.** Drawings of the Gebel es-Sawan North tools. a) see Plate 1b; b) see Plate 1c; c) see Plate 1a. Drawings by Adel Kelany.

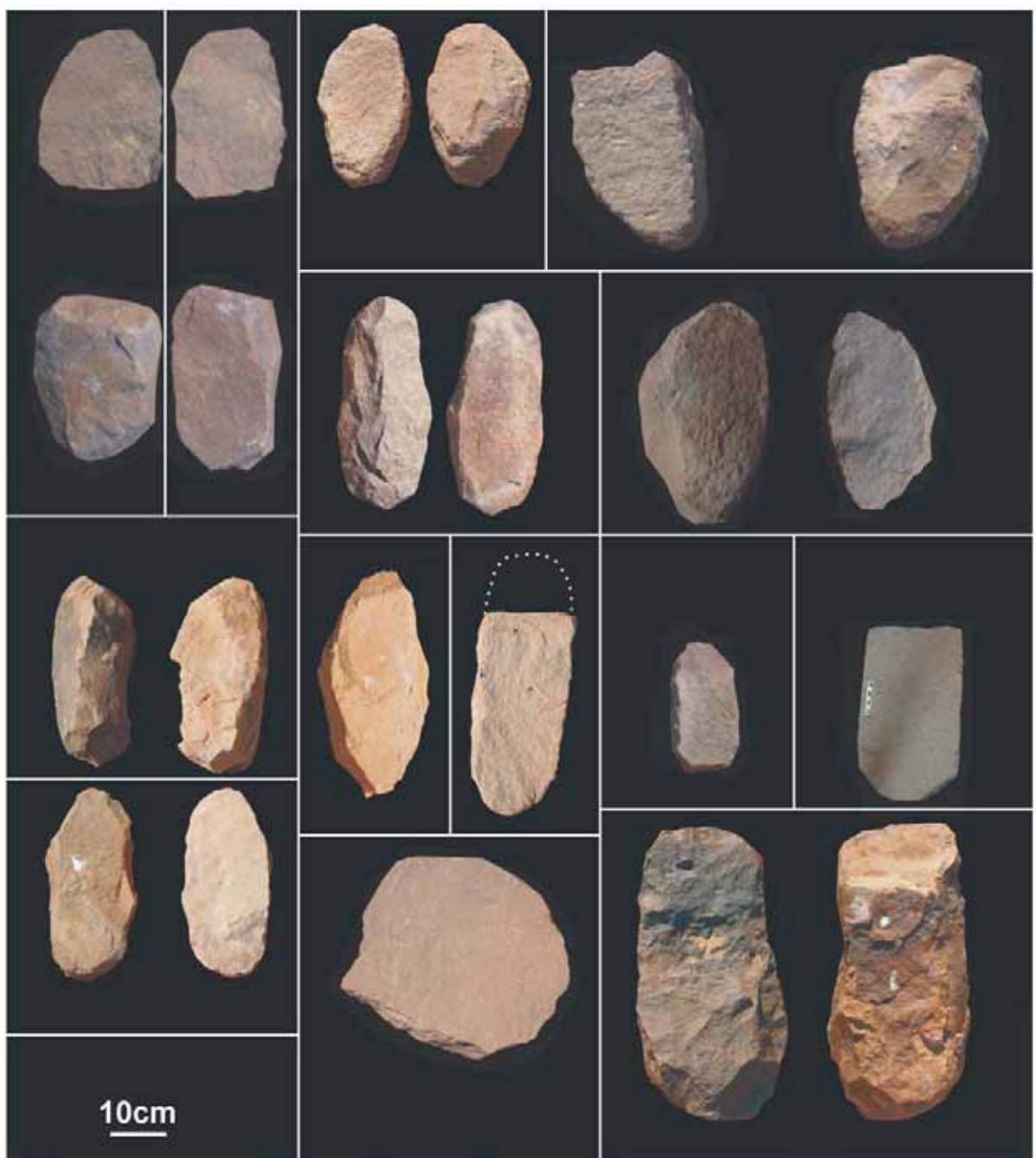


**Plate 5.** Drawings of the Gebel es-Sawan North tools. a) see Plate 2g; b) cleaver, c) scraper, d) scraper; see Plate 2e. Drawings by Adel Kelany.



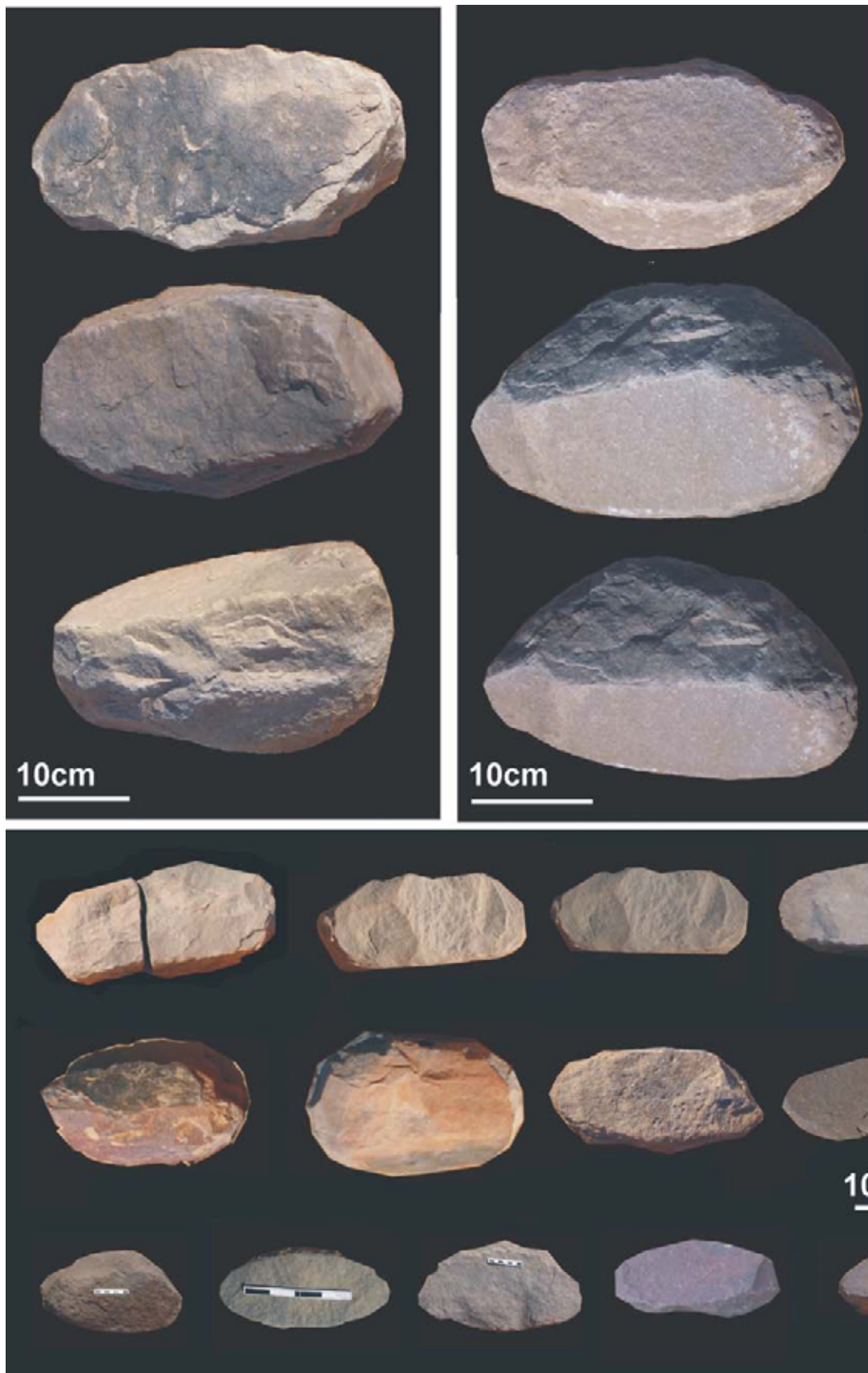
**Plate 6.** Drawings of the Gebel es-Sawan North tools. a) point, see Plate 2b; b) scraper, see Plate 2h; c) scraper, d) point, see Plate 2a; e) small flake, f) point, see Plate 2c. c) scraper, d) scraper; see Plate 2e. Drawings by Adel Kelany.





**Plate 8.** Varieties of grinding stone blanks. The "pairs" represent photos of same stone from different angles (front and back). Drawing/compilation by Leif Furuhaug.





**Plate 9.** Varieties of grinding stone blanks. Upper to rows: Two blanks from Wadi Kubbaniya seen from different angles. Below: varieties of grinding stone blanks. Upper two rows, lower grinding stones; lower row, probably upper stones (riders). Drawing/compilation by Leif Furuhaug.



*Iron mine landscape south of Gubbet el-Hawa*

## **Chapter 7: notes on iron ore mining and smelting, and clay extraction at the West Bank of Aswan**

*Patrick Degryse, Per Storemyr and Tom Heldal*

### The Gubbet el-Hawa iron mine

Iron deposits occur in several forms within the sedimentary succession in the Aswan area, particularly around Wadi Abu Agag on the East Bank of the Nile (e.g. Doering 1990; Mücke 2000). They represent oolitic hematite beds, ferruginous sandstone and conglomerate beds, beds enriched in goethite. In addition, secondary iron formation, such as hematite and goethite occurring along fractures, and as mineralization/cement in some of the silicified sandstone varieties. At the West Bank only one (large) deposit is known, located on the plateau between Gebel Gubbet el-Hawa and St. Simeon's monastery/the Aga Khan Mausoleum, opposite Kitchener's Island and Elephantine (Figure 1). Jacques de Morgan *et al.* (1894: 139-141) paid attention to this deposit and inferred that "millions of tons" of iron ore would have been extracted here. They called it the "Iron mine of St. Simeon", but were not able to date the ore extraction, neither did they find any evidence of a metallurgical infrastructure.<sup>6</sup> The mines were later briefly mentioned by Ball (1907: 66) and on their map of the West bank quarries Klemm and Klemm (1993: 290) refer to them as "Coptic clay and iron oxide mines".



Figure 1. The iron mines as seen from Gebel Gubbet el-Hawa towards the Aga Khan Mausoleum. Note the landscape of numerous pits.

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<sup>6</sup> On the accompanying map in de Morgan *et al.* (1894) the iron mines are located to the west of St. Simeon's monastery, but this must be a mistake, as in the text they clearly state that the mines are found to the east of the monastery (p. 139).





Figure 2. a) Views of the iron mining landscape. In b) Gubbet el-Hawa is seen in the background.

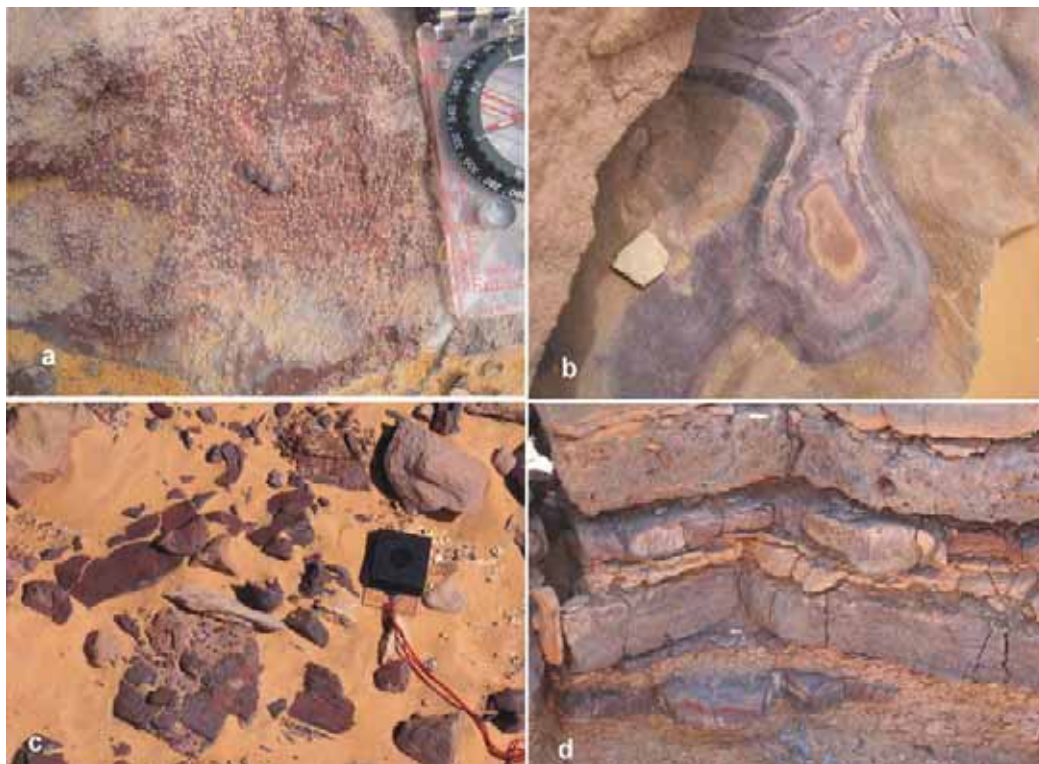


Figure 3. Iron ore deposits. a) Oolitic iron stone, b) goethite, c) scatters of ochre, d) parallel iron beds, the upper one is a ferruginous conglomerate.

Stratigraphically, the mines are found close to the contact between the Abu Agag and the Timsah Formation (see Chapter 5). The mines are clearly visible as an area of dense pits (Figures 1 and 2). A few thick iron stone layers (bands and nodules of oolitic hematite and goethite), occurring within the shale and sandstone, have been exploited (Figure 3). Many roads or road-like structures occur around and across the mines, constructed on levelled sandstone bedrock or paved with sandstone slabs leading towards the steep slope bordering the Nile (Figure 1). Near the end of these roads, large concentrations of extracted banded hematite ore and ochre nodules are located (Figure 4a). Non-diagnostic iron slag and pieces of oolitic hematite ore occur along the extraction sites of the ore. A possible partly molten tuyère or gutter from an iron furnace and clay furnace lining with organic temper was also identified. Just north of the mines,

a possible slag heap is present (Figure 4b), providing evidence of slag cooled inside a furnace load, associated with non-diagnostic ceramics and a possible crucible. Dating of these mines is problematic given that surface scatters of ceramics can range in date from the Old Kingdom to the Islamic Period (see el-Senussi 2005b; Appendix 2).

In conclusion, it seems that ochre and/or iron ore was mined in the area, although probably transported to other locations to be processed, given that iron slag is scarcely present on the surface.



*Figure 4. a) Heap with collected ochre, b) possible slag heap, c) and d) semi-circular structures which may be firing places or furnace-like structures*

To the north of the area, several square structures made of dry rubble walls can be observed, often associated with what appears to be Roman pottery, mostly tablewares. In several cases, cliffs in the bedrock are used as natural walls, made higher with rubble walls. It seems that some sort of occupation or temporary camp may have been set up there. On the highest points to the west of the Gebel Gubbet el-Hawa area, in two locations, semi-circular structures of about 1 meter in diameter can be found. Iron ore can be found around these structures, with some scattered ceramics. Also clay furnace lining is present. These structures may be firing places or furnace-like structures (Figure 4c and d). However, there was no clear evidence of iron working here. It should also be noted that elongated stone heaps are present immediately to the east of the mines (perhaps burials).

The pre-Iron Age pottery found in the mines may be related to ochre production for pigments. In this connection it should be recalled that many grinding stones found on Elephantine are stained with ochre. Moreover, it is interesting to note that in the ancient



Egyptian myth of "The eye of Ra", ochre "from Elephantine" seems to be specifically mentioned (see e.g. Thomas 2001: 38). The small-scale iron smelting that evidently took place in the mines may, however, date to any time between the Ptolemaic and Coptic periods, and even into the early modern era. The same would hold true for ore that was presumably taken away to be processed to iron elsewhere.



Figure 5. a) Tap-slag Gebel Tingar, b) pieces of furnace linings Gebel Tingar, c) site at Gebel Tingar, d) over-fired crucibles Gebel Sidi Osman I

### Iron slag in the quarries

As discussed in the previous Chapter 6, pieces of iron slag are found in sheltered places within some of the assumed Roman quarries. Interestingly, this points at local *on-site* smelting and working of iron in the quarries. Klemm and Klemm (1993) also observed slag in the quarries, relating these occurrences to smithies.

At Gebel Tingar several pieces of molten furnace lining with a black to green translucent glass-like appearance can be observed, next to scattered pieces of free-flowing tap slag (Figure 5 a, b, c). The latter points to the local reduction of iron ore (primary processing) although we did not discover smithing debris such as smithing cakes or iron flakes and hammer-scale (secondary processing).

In the quarries at Gebel Sidi Osman I, a considerable concentration of clay furnace lining with organic temper and pieces of crucibles, often over-fired or partly molten, can be observed (Figure 5d). Remains of charcoal and ashes on the surface are associated

with iron flakes and hammer-scale suggesting iron processing (smithing). Fragments of Roman tiles and some New Kingdom pottery can be found in the area.

The working of iron in the quarries in Roman times is hardly surprising; as this is obviously necessary for frequent sharpening of iron tools, particularly when quarrying the very hard varieties of silicified sandstone. Moreover, smithies are nearly always found in Roman stone quarries in Egypt (e.g. Peacock and Maxfield 1997; Maxfield and Peacock 2001). Also in the Roman period extraction sites at the Aswan granite quarries, there are remains of smithing slag, iron flakes, hammer-scale and even weathered iron bands close to the quarry faces. It is, however, surprising to find smelting slag in the quarries, indicating the actual manufacture of iron tools in the quarries from local iron ore deposits.



*Figure 6. Shallow pits, maybe remains of clay working, at the eastern side of Wadi el-Deir, viewed from Gebel Gulab towards Gebel Gubbet el-Hawa.*

### **Clay exploitation**

Clay from beds in the bedrock formations at the West Bank had been subject to exploitation, as noted by de Morgan *et al.* (1894: 141), who inferred the likely existence of large underground clay mines close to the Tombs of the Nobles at Gebel Gubbet el-Hawa. Unfortunately, we have not been able to confirm this. Klemm and Klemm (1993: 271-3) also noted several ancient and recent places of clay exploitation across the West Bank landscape.



*Figure 7. Diggings in layers of clay at the western side of Gebel Gulab. In the background (right) the causeway towards the Seti I obelisk can be seen.*

The QuarryScapes survey did not pay particular attention to the clay workings, but recorded them wherever they were observed. They are not marked as a special category on the main survey map, but the following observations were made:

*The area around Wadi el-Deir:* especially on the eastern side of Gebel Gulab are a range of shallow depressions (figure 6) interpreted by Klemm and Klemm as "recent clay mines". They are sometimes surrounded by a few stones. Although clay workings may be a reasonable interpretation of the pits, in the absence of excavation it should perhaps not be entirely ruled out that these pits could represent shallow burials, e.g. of a Middle Nubian date. Speaking against such a possibility is the somewhat irregular form of the pits and the complete absence of bones and other archaeological remains, such as pottery.

*The iron mine between Gebel Gubbet el-Hawa and St. Simeon's monastery:* Although we did not observe any traces of clay workings in the iron mines (see description above), Klemm and Klemm (1993) mention Coptic clay pits in the area.

*The western part of Gebel Gulab:* At the western edge of Gebel Gulab, on the eastern side of Wadi Ramla are several diggings that are interpreted as clay workings (figure 7). There are New Kingdom and Roman pottery sherds in the area, but these presumably belong to the silicified sandstone quarries that are located nearby. Given that clay working in a deep pit not far from these diggings was undertaken by local residents at the time of the survey, it might be possible that the diggings are of a very recent date.

*The southern side of Wadi el-Faras:* At several spots along the southern slope of Wadi Faras are signs of clay workings targeting thin beds between more massive sandstone



(figure 8). These may be of an ancient date, but are often heavily overprinted by continuing exploitation of sandstone for modern building purposes in the area.



Figure 8. Typical artisan clay working in thin beds of clay between more massive layers of sandstone (example from the southern slope of Wadi el-Faras)

Recalling that the Aswan area, especially the East Bank, is a very important modern clay mining region, there are probably many more areas of recent clay workings also at the West Bank. Whereas the East Bank features industrial operations for a variety of purposes, the West Bank workings are much more modest (artisan mining) and, according to information from local residents, the clay is used for plastering interior walls in buildings. Whether some of the workings observed are indeed ancient remains open. However, if some workings can be dated to the Coptic period, a hypothesis might be that the clay was used for pottery production in St. Simeon's monastery, which apparently featured pottery kilns<sup>7</sup>.

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<sup>7</sup> see <http://touregypt.net/featurestories/simeon.htm>

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*Road from pharaonic quarries at the southern edge of Gebel Gulab, Aswan West Bank.*

## **Chapter 8: the quarry road network in the Gebel Tingar – Gebel Gulab area**

*Tom Heldal, Elizabeth Bloxam, Per Storemyr, Adel Kelany*

## Introduction

The most conspicuous infrastructure that remains well preserved at both Gebel Gulab and Gebel Tingar are the networks of quarry roads (see also Klemm and Klemm 1993). Gebel Gulab has the most well-preserved roads. Arterial roads lead from the numerous quarries, predominantly from where the larger blocks and obelisks were quarried, down to the wadis and finally towards the Nile. The roads have been characterized according to their surface, width, mode of construction and their connection to quarries. In Figure 1, all the road segments are displayed, divided into the following groups:

- paved roads: roads having a single-layer paving of stone slabs or rubble
- causeway/ramp: built-up roads with multilayer rubble, aimed for evening out irregularities in the terrain
- cleared tracks: roads using a natural hard surface that is cleared for rubble
- slipways: "hollow" roads on steep slopes for lowering stone blocks
- path: footpath or animal path, connected to quarrying

As discussed in Chapter 6, the extraction of large stone blocks (ornamental stone quarries) seems to have been restricted to mainly two periods – the dynastic (assumed mainly New Kingdom) and the Roman Period. The quarry road network reflects the same, an early network of dynastic quarry roads, which is partly overprinted by a Roman road system. Dating roads to either the New Kingdom or Roman Period is difficult, as the ceramic evidence located on or beside these features is representative of both periods (el-Senussi 2004: see appendix 2). However, the overwhelming majority of roads do lead to large-block quarries in which there is no evidence of Roman extraction. This suggests that the roads are predominantly of dynastic age, although it has to be considered that during the Roman Period exploitation some of the dynastic roads were re-used, repaired and rebuilt. For example, the New Kingdom causeway from the Seti I obelisk quarry connects with a main road which is bordered, at regular intervals, with stone cairns which is highly characteristic of Roman Period quarry roads (Peacock and Maxfield 1997; Maxfield and Peacock 2001).

Our interpretation of chronology is thus mainly based on the extraction pattern; roads which form a part of the distribution system from the dynastic quarries, or show morphological similarities with those, are interpreted as being dynastic. Similarly, roads leading from predominantly Roman quarries and roads of similar typology are considered to be of Roman age.

In addition to the two groups of quarry roads, there are several other roads and paths in the area which are not directly related to quarrying. The most important of these is the 10 metres wide track leading from Wadi el-Deir towards the southwest into the desert (the El-Deir road; see Chapter 9). Although this road seems to be contemporary with the Roman quarrying, and could have been used also for transport of stone, its main function is not related to quarrying. Roads and routes not directly associated with the quarries are described in Chapter 9.

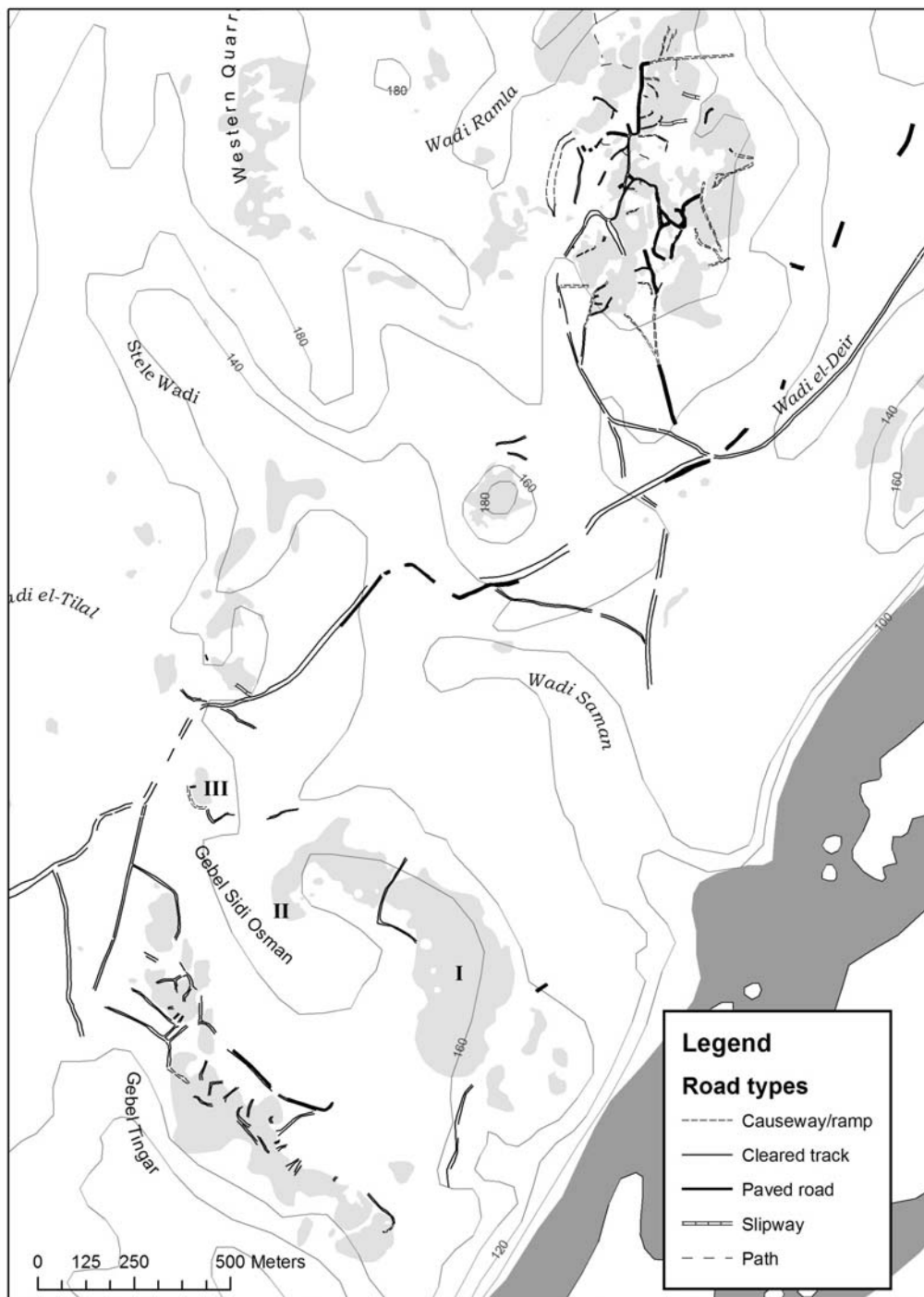


Figure 1. Map showing the different types of road segments surveyed. Quarries are marked with light shading.

## Dynastic quarry roads

These form the lowest visible layer of quarry roads, particularly well preserved at Gebel Gulab (Figure 2). Primary roads lead from each individual quarry to a secondary, more major road artery that traverses the centre of the gebel. These then change character into more ramp-like structures that descend the sides of the gebels down to the wadis, meeting tertiary roads leading towards the Nile. In some instances, primary roads from the quarries lead directly to the tertiary system, depending on the quarry location. The dynastic road network aims at securing downhill or horizontal movement of the blocks (avoiding uphill movement), and within that framework minimize the transport distance. The roads range in width from 2.3 m to 3.5 m, with the exception of some of the larger, built-up causeways.



*Figure 2. Above: Y-shaped roads leading down the southern slope of Gebel Gulab. Partly paved (upper right), and partly cleared with edge alignments of stones (upper left). Below: ramps on the eastern side of Gebel Gulab.*



Paved roads constitute the major part of the dynastic network. They are generally constructed by laying of a single level of stones directly onto the ground surface, securely butted into each other, hence explaining their remarkable preservation (Figure 3 and 4). The paving stones may be uneven or flat, depending on the local availability of materials. On the top of the hills, such as Gebel Gulab, the stones used are predominantly quarry waste rock, and they are often angular and irregular in shape. In some of the wadis, more regular slabs of sandstone are applied where such resources are within the immediate vicinity of the road. The paved roads are most common on horizontal to very weakly inclined surfaces, e.g. on the top of the hills, on terraces and in the wadis.



Figure 3. Paved dynastic roads. Above: paved roads at Gebel Gulab. Below: fragments of the paved road leading from Gebel Tingar to Wadi el-Deir.

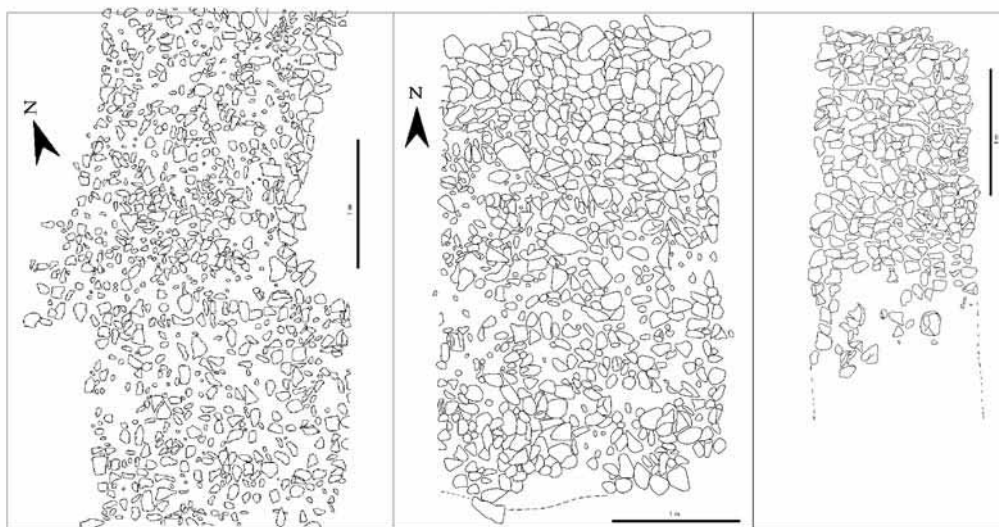


Figure 4. Paved road surfaces at Gebel Gulab. Drawings digitised by Leif Furuhaug.

Cleared tracks of assumed dynastic age are found on some smooth and hard horizontal surfaces, presumably where paving was considered not necessary. Particularly, cleared tracks are found at and near Gebel Tingar. There is, however, some uncertainty concerning these tracks. Although several seem to have a direct link to the quarries, it is expected that the area contains many layers of roads for purposes other than quarrying, i.e. leading to the Gebel Tingar Sanctuary (see chapter 2). Both the cleared and the paved roads may have an alignment of stones on the edges; such alignments are predominantly found on slopes (Figure 2).

Several ramps, which traverse the slopes of Gebel Gulab (Figure 5), are constructed from several layers of stones to overcome the topographical irregularities of the steep incline down to the desert plateau (Figure 5). The causeway that leads from the main obelisk extraction site is a substantial structure (Figure 6), principally constructed to traverse a wadi, similar to the causeways constructed at intervals along the Hatnub quarry road (Shaw 1986, 1987: 160). Considerable labour and expertise was put into its construction, as amply demonstrated by its good preservation. At its widest the causeway is almost 20 m across with a depth of at least 3 m, then narrows to just 4.3 m, where it converges into a paved quarry road that heads in the direction of the Nile. This causeway was clearly constructed to facilitate the transport of obelisks from Gebel Gulab during the New Kingdom.



*Figure 5. Ramps descending the western slope of Gebel Gulab. Naq el-Gubba in the background.*



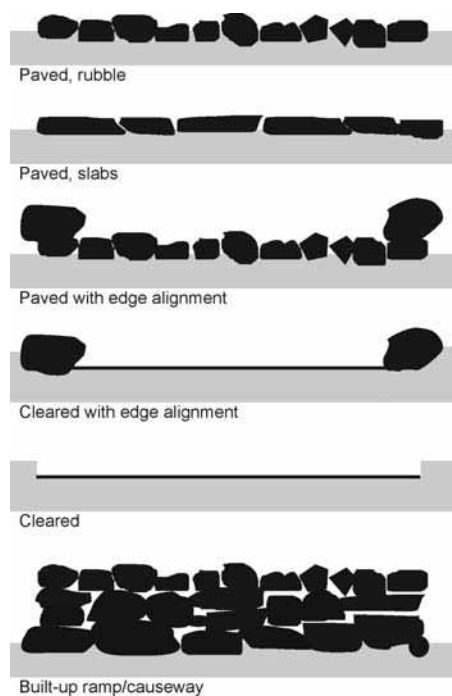
*Figure 6. The large causeway leading from the Seti I obelisk quarry at Gebel Gulab (broken tip of the obelisk is seen in the foreground). Lower right corner: the thickest part of the structure.*

Hollow slipways are less common, and only found in steep slopes intending to facilitate the lowering of blocks down slopes that are too steep for constructing ramps. In addition to the constructed roads, there are several paths in the quarries (Figure 7), of which some may have been pathways for transporting light stone products (such as grinding stones) on animals. The main typologies of dynastic roads are summarized in Figure 8.



*Figure 7. Path at Gebel Gulab – probably Donkey track for transporting grinding stones.*





*Figure 8. Sketch of main dynastic road typologies.*

### New Kingdom logistics

The means by which the stone blocks were moved across the quarry roads remains unknown. The roads show no signs of wear that would be expected if sledges or wagons were used, their narrowness also tends to preclude the use of wheeled vehicles. Furthermore, there are rather sharp standing stones in several places, suggesting that the roads were possibly not constructed for something to be drawn directly on top of them, but rather with something lying inbetween making a separation between the conveyance and the road. Absence of wear marks is also a phenomenon on the Widan el-Faras quarry road and has presented similar problems of interpretation (Harrell and Bown 1995: 78-83; Bloxam and Storemyr 2002: 29-31). Also, the purpose of the stone alignments along the edges of some road segments remains unknown. Such alignments have also recently been seen by us in assumed New Kingdom granite quarries in Aswan.

Another aspect of the dynastic roads is that the ramps, descending the slopes of Gebel Gulab, are built perpendicular to the perimeter of the hill, e.g. following the shortest way downward. It seems that the roads which are climbing sideways towards the top of the hills, in order to reduce slope inclination, belong to the Roman Period (see below).

When we put together the more or less preserved segments of dynastic roads, we start seeing the pattern of the quarry infrastructure in that period (Figure 9). At Gebel Gulab, all the roads lead to a paved road (of which only small and deteriorated segments are preserved) following the northwestern side of Wadi el-Deir towards present Naq el-Gulab. The existence of ancient man-made harbour/quay structures in this vicinity remains unknown, due to poor preservation and over-building. At Gebel Tingar, we can see a similar pattern, a paved road passing the eastern side of the Gebel Tingar ridge and

continuing (passing the Gebel Tingar Sanctuary) down to the Wadi Saman. As in Naq el-Gulab, the wadi is strongly disturbed and no traces of roads or harbours are at present time visible in the lower part of it. Also, roads from Gebel Sidi Osman I and III drain down the same wadi and link up with the road from Gebel Tingar.

The two "logistic units" of Gebel Gulab and Gebel Tingar are linked together by a paved road from the plateau west of Gebel Sidi Osman III to Wadi el-Deir, following the same trail as the el-Deir road, and partly destroyed and cut by it.

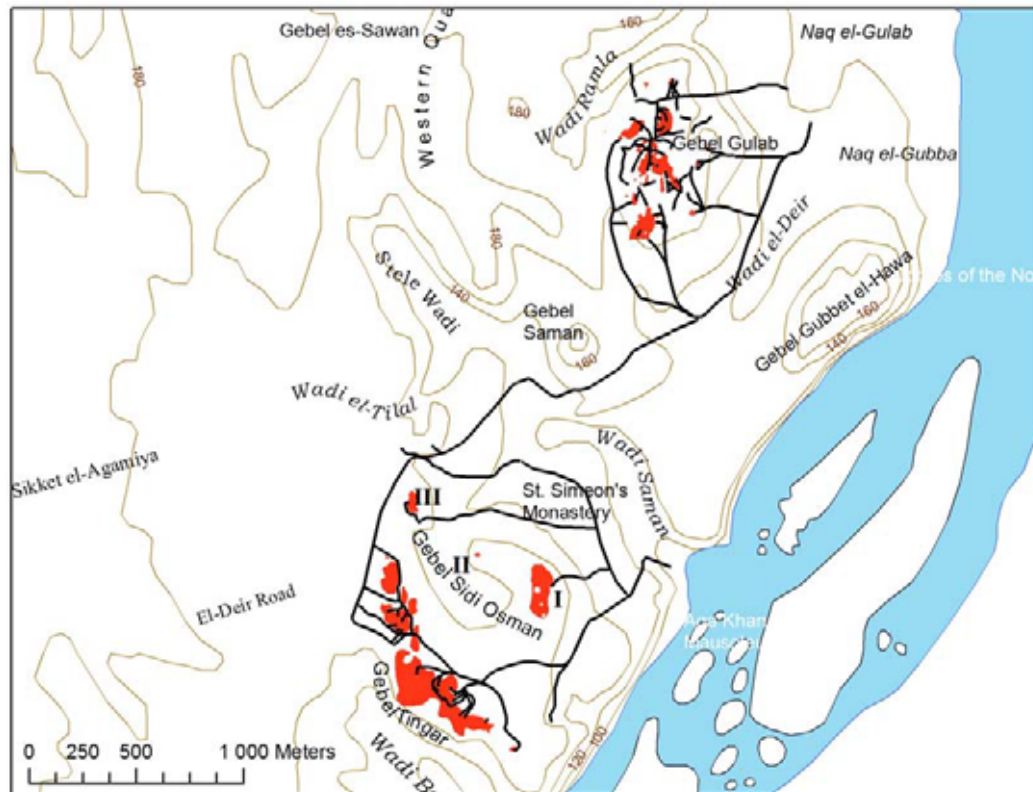


Figure 9. Interpretation of the dynastic quarry road network. dynastic ornamental stone quarries are shown with red colour.

### Roman quarry roads

In the Roman period, many of the old quarry roads were used again, but rebuilt and modified. There was also construction of new roads, more suitable to the mode of block transport in the Roman Period, which might have been wagons (Peacock and Maxfield 1997). The Roman roads are more similar to modern quarry roads than to the New Kingdom ones; they were coarse dirt roads, not neatly paved as the dynastic ones. Even though they tend to follow the old tracks, they cut through the old paving and in many places the old roads have been completely removed. At Gebel Gulab, depressions resembling wheel tracks are seen; however, it cannot be ruled out that these are related to modern military traffic in the area, using the ancient road network.

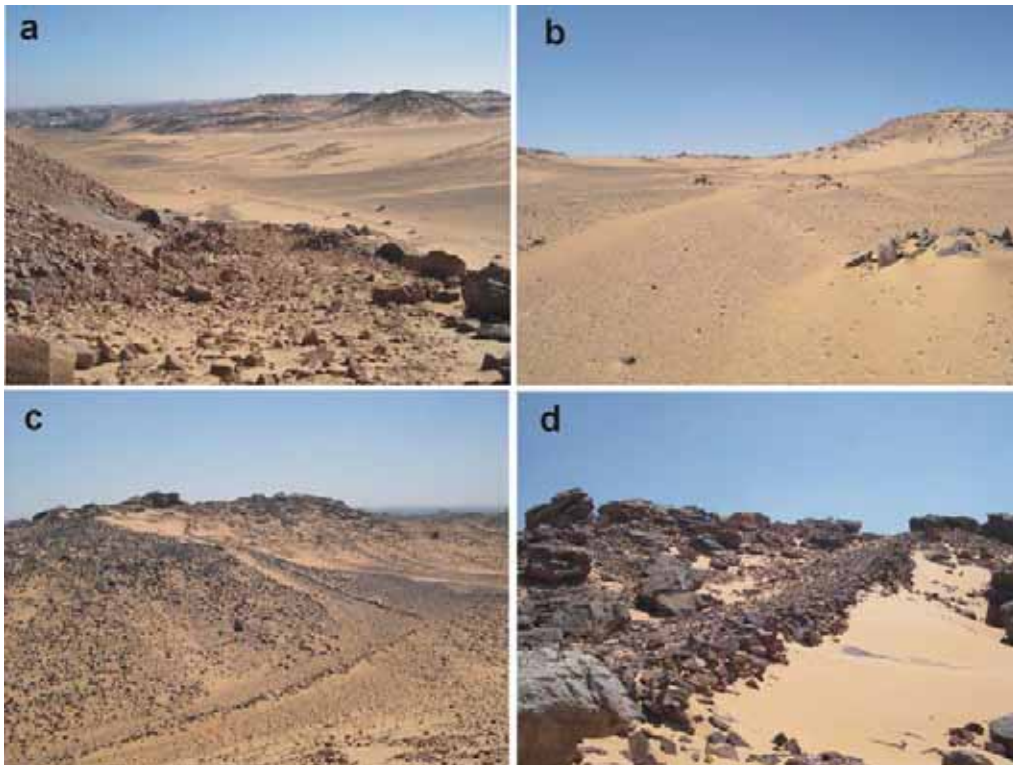
Roads and ramps descending from the hilltops are climbing downwards sub-parallel to the perimeter of the hill, in order to minimize the slope inclination (Figure 10 and 11). This evidence further suggests the use of another type of vehicle to transport the stone at



this time. Heaps of stones are placed at regular intervals on both sides of the roads (Figure 11), similar to those seen in the Roman Eastern Desert quarries, such as Mons Porphyritus and Mons Claudianus (Peacock and Maxfield 1997; Maxfield and Peacock 2001). In addition to lack of paving, these aspects seem to represent the major difference between Roman and dynastic roads.



*Figure 10. Roman road climbing sideways down the western slope of Gebel Gulab (black arrow) towards the larger road in the wadi (blue arrow). A dynastic ramp is marked with red arrow.*



*Figure 11. Aspects of Roman quarry roads. a) same road as shown in Figure 10, note stone heaps along both edges. b) large Roman road leading south from Gebel Gulab (seen in the background). Note stone heaps at regular intervals. c) Assumed Roman road climbing down from Gebel Sidi Osman I. d) Roman ramp at Gebel Tingar.*

When compiling the segments of Roman roads linked to this group of quarries (Figure 12), the Roman quarry infrastructure evolves. Although there are parts of the network linking to the El-Deir road (south of Gebel Gulab and just to the west of Gebel Sidi Osman III), most of the infrastructure points towards Wadi Saman as the main harbour.

At the southern part of Gebel Gulab, there seems to be a Roman "ring-road" passing all the small Roman extraction sites, descending in the continuation of the large Seti I obelisk causeway on the southwestern side. Towards the south, the road splits, one part crossing the El-Deir road and continuing towards the Wadi Saman, another branch joining the El Deir road. A separate branch leads from the largest Roman quarries on the southern tip of Gebel Gulab to this road.

At Gebel Tingar, most Roman roads follow the assumed dynastic network passing the sanctuary and continuing down to the wadi. However, in the northern part, there are indications that some of the Roman quarry roads descend to the plateau towards the northwest, and link up to the El-Deir road further north.

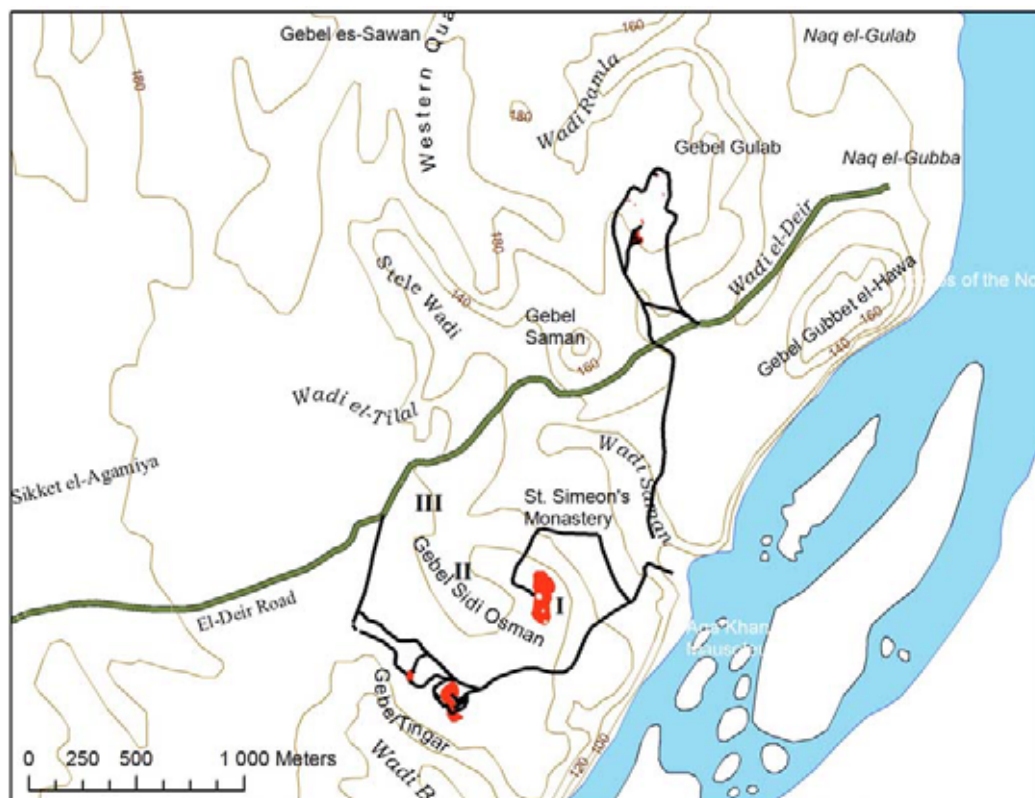


Figure 12. Interpretation of the Roman road network. Quarries with traces of Roman extraction are shown with red colour.

### Unique in Egypt?

Although the dynastic quarry road system in the area is partly demolished and heavily overprinted and destroyed by later use of the area for quarrying and other purposes, it still remains remarkably well preserved, particularly at Gebel Gulab. To our knowledge, perhaps with the exception of Wadi Abu Agag on the East Bank, the dynastic roads

represent a unique insight into the New Kingdom quarry logistics, and can provide great potential for further research addressing methods of transportation of stone blocks.

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*Sandstone slab abraded by wind-blown sand with geometric rock art in the southern part of the survey area. Geometric figures are the most common type of rock art found at the West Bank of Aswan.*

## **Chapter 9: overview of rock art, stone alignments, desert routes and a possible hermitage at the West Bank of Aswan**

*Per Storemyr*

## Introduction

The West Bank of Aswan not only has a record of ancient quarrying, it is also a significant rock art landscape and a place with numerous branches of ancient caravan routes. Moreover, it features many ancient stone alignments or game drives used to hunt animals like antelope and gazelle. Also a system of shelters that might represent temporary dwellings can be found in the landscape. Some of these archaeological features have been recorded during the QuarryScapes fieldwork and will be presented and discussed in a forthcoming publication. In the overview below, some characteristics of these features will be highlighted. Most of the sites mentioned below can be found on the main survey map (map enclosure 1).

## The rock art landscape at the West Bank

As mentioned in Chapter 3, only a few rock art sites at the West Bank were previously known (Schweinfurth 1912; Winkler 1939: sites 53 and 54; Gatto and Giuliani 2007). In the course of the survey, another c. 200 rock art panels with some 1500 figures have been documented between Gebel Tingar and Wadi Kubbaniya. Documentation methods and the notoriously difficult dating problems will be described in the forthcoming publication; at this stage it will suffice to mention that documentation has been undertaken in a landscape perspective (e.g. Chippindale and Nash 2004). Moreover, tentative dating has been attempted on the basis of comparisons with the large body of rock art elsewhere in the Nile Valley and the Eastern and Western Desert (e.g. Winkler 1938, 1939; Dunbar 1941; Resch 1967; Hellström 1970; Cervicek 1974, 1986, 1992; Davis 1984, 1990, 2006; Huyge *et al.* 1998; Rohl 2000; Huyge *et al.* 2001; Huyge 2002; see also critical comments by Wengrow 2006: 111ff). Also visual observation of desert varnish has been used for obtaining age indications. Recognising that varnish forms in wetter periods (e.g. Liu and Broecker 2007), and used with extreme care, the latter method has proved useful at the West Bank because 80% of the rock art panels are located on comparable horizontal Nubian sandstone slabs and bedrock. Tentatively, it may be concluded that very little varnish has formed after the climate deterioration in the 4<sup>th</sup> millennium BC (cf. Chapter 2) and there is practically no varnish in figures made after c. 2000 BC. The method devised for the West Bank at Aswan is not necessarily useful elsewhere (e.g. in the Eastern Desert), since the combination of climate history, geology and exposure conditions is specific for this region of the Sahara.

Table 1 gives a tentative summary of subject matter, and in Figures 1-10 are depictions of a few interesting panels. It is an important feature of the rock art that some 30% of all figures show geometric designs, mainly occurring in the area west of Gebel Gulab and between Gebel es-Sawan and Wadi Faras. They usually have complete desert varnish. Some of the designs form large, as of yet incomprehensible compositions. Most of the geometric figures are tentatively dated to the Neolithic Period; some might belong to the 4<sup>th</sup>-3<sup>rd</sup> millennium BC (Predynastic/Nubian A-Group, Nubian C-Group?); some even to the Late Palaeolithic. Moreover, some of the designs are comparable to those found in the Second Cataract area in the 1960s (Hellström 1970).

Animals, foot prints/sandal prints, boats and human figures, the latter sometimes involved in hunting scenes, are likely to mainly date to the Predynastic/Nubian A-Group period and into the Early Dynastic period. These appear to be the periods with the



highest number of figures and the most varied repertoire, which is also usually the case in nearby regions. Giraffe, crocodile/lizard, cattle and antelope are the most commonly encountered animals. However, much of the cattle appear to date to the Nubian C-Group period (Middle to New Kingdom, around 2000 BC) and some giraffes and crocodiles/lizards might be older than 4000 BC.

Rubbed depressions are important in this landscape of stone quarrying. In fact, most such depressions come with complete desert varnish and are found very close to what has been interpreted as early grinding stone quarries (using small boulders strewn in the landscape, see Chapter 6). In the light of recent discoveries by Dirk Huyge of possibly Late Palaeolithic rock art in the Kom Ombo area<sup>8</sup>, it might be interesting to note that we discovered a significant body of rock art very close to the previously known Late Palaeolithic settlements in Wadi Kubbaniya (Wendorf and Schild 1989) and the associated grinding stone workshop that is tentatively dated to the same period (Roubet 1989, see discussion in Chapter 6). This corpus of rock art does not have the naturalistic depictions of animals like in Kom Ombo, but shows many rubbed depressions, small geometric figures and some stylized animals, all with complete varnish.

Since rock art tentatively dated to the 5<sup>th</sup>-4<sup>th</sup> millennium BC is very often found close to grinding stone quarries that *might* date to the same period, as a hypothesis it might be inferred that there is also a possible socio-cultural relationship here. Perhaps some of the rock art sites from this period were used as shrines by early quarrymen? Although much less obvious, there are also *spatial* relationships between rock art and ancient desert tracks and game drives. However, these features are extremely poorly dated and thus it is unknown whether there are also temporal relationships. There is little rock art at the West Bank from the New Kingdom (c. 1500 BC) onwards, although a few significant sites with boats, cattle and inscriptions are probably connected to New Kingdom ornamental stone quarries in silicified sandstone (Gebel Gulab, Khnum Quarry, see Chapter 10). Offering tables and other symbols, pictures of deities and associated inscriptions are also found in Greco-Roman building stone quarries in Nubian sandstone (e.g. Naq el-Fugani, Hagar el-Ghorab by Aswan Bridge, Gebel Qurna).

Importantly, for the earliest rock art and perhaps into the 4<sup>th</sup> millennium BC, there was a quest for elevated and open places in the desert hinterland, and panels were extremely carefully selected, also with regard to grand vistas and incorporation of natural rock-features in the compositions. That such places acquired significance over time can be elucidated by the fact that many of them were revisited or reused much later, illustrated, for example, by younger cattle-figures at such places. There is, however, also the tendency that later rock art is placed in a more haphazard manner throughout the (quarry) landscape, typically as very small panels with one or a few figures. Chronologically, there seems to be a "movement" towards the Nile, perhaps since the larger and younger quarries are located here? However, there are generally few figures relatively close to the river, which can be explained by geology, as there are few suitable outcrops along the Nile. The only substantial rock art site directly by the river is located by Hagar el-Ghorab by Aswan Bridge (see also Gatto and Guiliani 2007), notably also just beside ancient quarries.

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<sup>8</sup> see <http://egyptology.blogspot.com/2007/05/15000-year-old-palaeolithic-rock-art-at.html>

Rubbed depressions are important in this landscape of stone quarrying. In fact, most such depressions come with complete desert varnish and are found very close to what has been interpreted as early grinding stone quarries (using small boulders strewn in the landscape, see chapter 6). In the light of recent discoveries by Dirk Huyge and collaborators of possibly Late Palaeolithic rock-art in the El-Hosh and Kom Ombo area (Huyge *et al.* 2007), it might be interesting to note that we discovered a significant body of rock-art very close to the previously known Late Palaeolithic settlements in Wadi Kubbaniya (Wendorf & Schild 1989) and the associated grinding stone workshop that is tentatively dated to the same period (Roubet 1989, see discussion in chapter 6). This corpus of rock-art does not have the naturalistic depictions of animals like in Kom Ombo and El-Hosh, but shows many rubbed depressions, small geometric figures and some stylized animals, all with complete varnish.

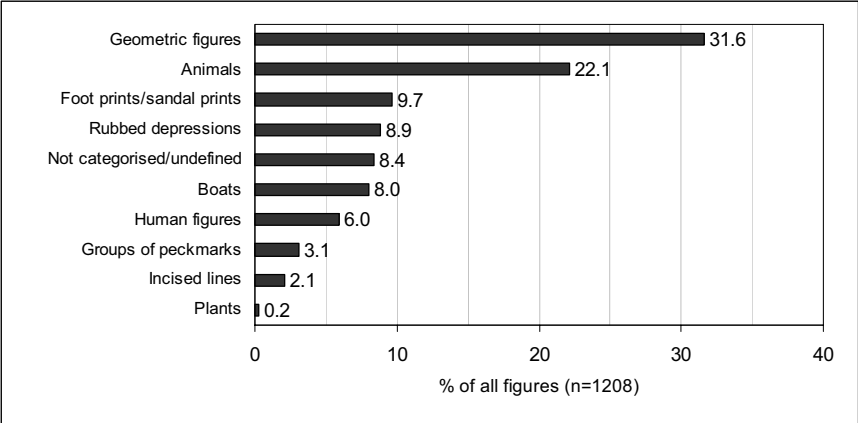


Table 1:  
Rock art at  
the West Bank  
of Aswan.  
Tentative  
overview  
based on  
recorded  
figures in the  
area between  
Gebel Tingar  
and Wadi el-  
Faras

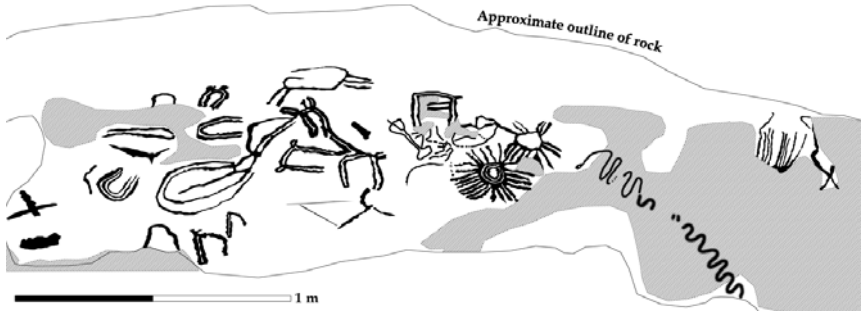


Figure 1: Many early rock art panels offer grand vistas. This panel with geometric figures and symbols might date to the 5<sup>th</sup>-4<sup>th</sup> millennium BC or possibly earlier. It offers the view shown in the panorama photo.



*Figure 2:  
Some geometric compositions are very difficult to interpret. In this impressive drawing, which covers an entire sandstone slab, the vertical lines follow ripples in the rock. Tentative date: Neolithic, with some later superimpositions/ additions.*



*Figure 3:  
Rubbed depressions with complete desert varnish are often found close to early grinding stone quarries. This example is from Winkler's (1939) site no. 53 in Wadi el-Faras. Date uncertain, perhaps Neolithic.*



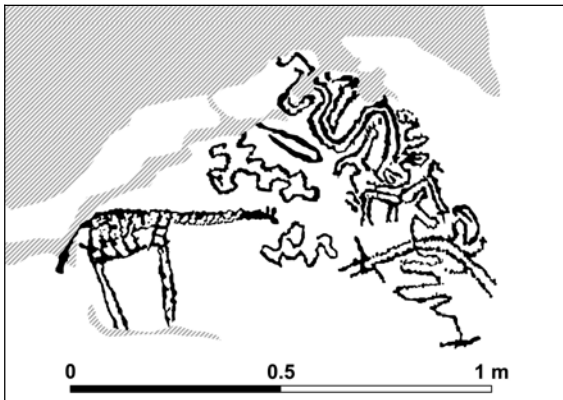
*Figure 4:  
Crocodiles are often depicted at the West Bank. In this case it seems they are drawn as if lying on a "beach", perhaps also attacking another animal. Tentative date: 5<sup>th</sup>-4<sup>th</sup> millennium BC, perhaps earlier.*



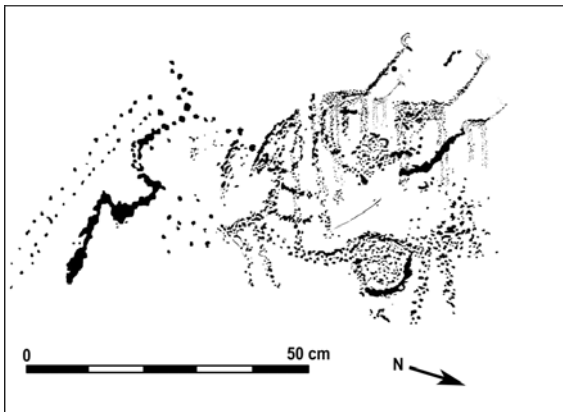
*Figure 5:  
Some few hunting scenes can be found in the survey area. Here is a "Nubian" archer with a penis sheet, followed by his dog. Above are several dogs hunting antelopes. Tentative date: 4<sup>th</sup> millennium BC.*



*Figure 6:  
Some rock art has been vandalised or stolen. This example features mainly cattle (and a fish) and might date to the 2<sup>nd</sup> millennium BC (Nubian C-Group?).*



*Figure 7:  
Geometric figures are sometimes found together with animals like giraffe. In this example there is an intricate pattern of "wavy-lines" that perhaps might have associations to hunting techniques. Tentative date 5<sup>th</sup>-4<sup>th</sup> millennium BC.*



*Figure 8:  
Another example of an incomprehensible geometric composition, which appears to be superimposed on very finely pecked giraffes. Tentative date: 5<sup>th</sup>-4<sup>th</sup> millennium BC, perhaps earlier.*



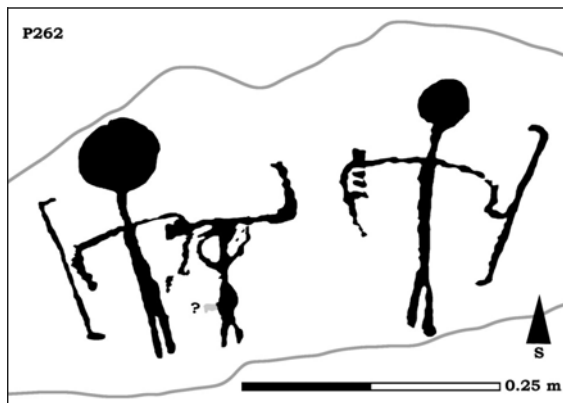


Figure 9:  
Men with very large, round heads and bows. Note the figure in the middle (a female?), which appears to raise its arms, above which a possible boat is depicted. Females with raised arms appear to be typical in the 4<sup>th</sup> millennium BC.

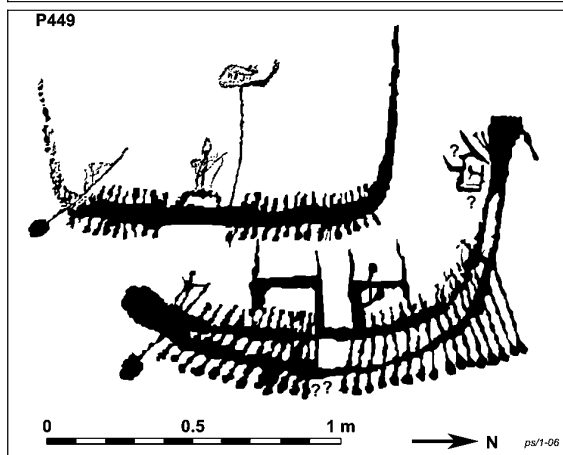


Figure 10:  
Impressive depictions of ships. On the upper ship there is a figure that might be interpreted as wearing the white crown of Upper Egypt. There are views to the Nile from the site where the ships are drawn and several more ships in roughly the same style. Perhaps they commemorate a royal boat procession on the river? Tentative date: early 3<sup>rd</sup> millennium BC (Early Dynastic period).



Figure 11: Stone alignment (upper, right section of picture) in the close vicinity of the grinding stone workshops (around the hills in the foreground) by the Late Palaeolithic settlements in Wadi Kubbaniya. Photo from aircraft.



## Stone alignments or game drives

The stone alignments at the West Bank have not previously been documented. They come as long lines of dry stone walls, up to half a metre high, and are scattered across almost the entire survey area. In total, about 10 km of alignments have been investigated in the field, with at least another 10 km near the survey area that can be seen on high-resolution satellite images (QuickBird, e.g. on Google Earth)<sup>9</sup>. Their construction required thousands of cubic metres of loose slabs and blocks of Nubian sandstone, collected immediately beside the alignments, and thus they represent a large body of "stone architecture" in the survey area.

Very similar alignments were documented by Hester and Hobler (1969: 63-7) in the oases of Kurkur and Dungul by the Sinn el-Keddab scarp, some 60 and 150 km south-west of Aswan, respectively. These authors also mention alignments along the west bank of the Nile in a 120 km stretch from Shellal to Seiyala and another 75 km stretch between Ineiba and the Sudan border (1969: 67-8). Presumably, many of these alignments will now have been drowned by Lake Nasser. Situated along and across wadis and low hills, featuring multiple narrow chutes, Hester and Hobler interpreted these lines as game traps (or game drives), predominantly used for hunting gazelle. The chutes, to which the game was driven, were sometimes associated with pits that represent the actual traps; otherwise e.g. nets or spiked wheel traps may have been used for trapping the animals in/behind the chutes. On the basis of pottery and other archaeological features associated with the alignments, and the fact that many were cut by Roman and later desert tracks, they tentatively dated them to the so-called "Oasis C-Group" (c. 3<sup>rd</sup> to 2<sup>nd</sup> millennium BC), roughly contemporary with the Nubian C-Group.

At Regenfeld in the Great Sand Sea Riemer (2004) documented slightly different stone lines that were also interpreted as game traps, mainly for gazelle. Archaeological and environmental data suggested that they might have been in use in the Early to Middle Holocene, until c. 5000 BC. Parallels are also found at multiple locations in the Middle East, including Syria, Jordan and Sinai (see references to these "desert kites" in Riemer and forthcoming report). Moreover, our own observations on high-resolution satellite images (Google Earth) indicate that rather similar alignments to those of the West Bank at Aswan are located further downstream along the Nile, e.g. in the El-Hosh area, 70 km north of Aswan, but that they might be absent further north.

There is no reason to interpret the stone lines at the West Bank of Aswan in another way than what is suggested by Hester, Hobler and Riemer. There are three large concentrations of alignments just to the west of Gebel Gulab, between Wadi Faras and New Aswan City and on the western side of Wadi Kubbaniya. There are also smaller alignments from Gebel Gulab southwards to the Old Dam, at Gebel es-Sawan north, within New Aswan City and close to the Late Palaeolithic settlements in Wadi Kubbaniya. In some areas with few other archaeological features, such as at the western side of Wadi Kubbaniya, the alignments are very easy to observe. However, in the area west of Gebel Gulab, which has been subject of intensive stone quarrying, it is very difficult to recognise parts of the alignments in the field and satellite images are in such cases extremely helpful for finding their location.

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<sup>9</sup> <http://earth.google.com>



*Figure 12: Stone alignment and associated shelter/lockout to the north of Wadi Faras.*



*Figure 13: Enclosure-like stone alignment close to Wadi el-Tilal.*

All alignments are situated in the hinterland, along and across wadis and small valleys, often cutting these, continuing along the sides of hills and plateaus. Sometimes natural features, such as ridges and valley slopes, seem to be part of their construction. Some groups of lines are very complex, featuring several hundred metre long lines, multiple

chutes, blinds and numerous standing stones "on top" of the lines. Others are very simple, crossing small wadis and valleys and with a chute in the middle. Some form enclosures and feature one or two chutes as well as specifically designed openings or "doorways" of uncertain function. On the basis of the common orientation of chute openings, it may be suggested that most alignments were intended for capturing animals upon their return from drinking and grazing by the Nile or the larger wadis (Faras, Kubbaniya). It should not be ruled out that some of the enclosure-like forms with specific "doorways" might have had a ritual function, e.g. for catching live game intended for animal cemeteries. It must be noted that the alignments forming walls are very different from the many lines of small cobbles scattered across the area, e.g. at Gebel Tingar where they might represent recent property boundaries.

Observations of stone-built shelters and stone circles in close association to many alignments, especially between Wadi Faras and New Aswan City suggest that these could have functioned as look-outs. Otherwise, construction and use of the alignments must have been part of quite substantial communal activities, as also suggested by Hester and Hobler (1969: 63-7). So far, no other archaeological features obviously related to the alignments have been found (e.g. butchering sites). There is pottery of mainly New Kingdom and Roman dates close to some alignments, but this pottery can also be attributed to nearby quarrying activities and posts on desert routes. Moreover, north of St. Simeon's monastery Coptic pottery has been found in very close association to an alignment, which has the form of an enclosure. This lack of observed archaeological features close to the alignments makes them very hard to date.



*Figure 14: Typical chute in a short alignment crossing a small valley at Gebel es-Sawan north*





*Figure 15: Partially destroyed stone alignment along the edge of a grinding stone quarry, possibly of New Kingdom date, to the west of Gebel Gulab.*

Between Gebel Gulab and Gebel es-Sawan some long lines are clearly destroyed by quarrying activities that on the basis of pottery might date to the New Kingdom. Moreover, at some places desert routes in the form of camel tracks clearly crossed – and have partially destroyed – the lines. However, this only means that these alignments may be older than from the Graeco-Roman period. Some alignments have also been destroyed by flash flood, but it is unclear whether this observation is helpful for dating, as such phenomena – though very rare – are also part of the modern climate.

As an hypothesis, and as inferred from the parallels mentioned above, it might be suggested that the history of the alignments is long and complex. They might have been in use since the climate optimum in the Early Holocene (or even earlier?) and into quite recent periods. At some places, such as in the main quarrying areas, their use might have stopped around the New Kingdom as massive stone exploitation would perhaps have forced game away. Further studies ought to aim at, for example, detailed characterisation of the construction of the alignments and desert varnish observation on construction stones, as well as of associated archaeological features. Moreover, interpretations related to environmental history and the presence of game in different periods will be important.

### **Desert routes**

As noted in the Chapter 3 on previous research at the West Bank of Aswan, the area was a very significant starting and termination point of desert routes to Nubia and the

Western Desert oases. Its history as a major embarkation point goes back at least 5,000 years and probably much longer. In the following account three main desert route branches and several sub-branches, as well as associated archaeological features will be briefly described. The sanctuary at Gebel Tingar, certainly related to desert travel, has been described as well as the numerous quarry roads (see Chapters 3, 6 and 10), some of which might be difficult to distinguish from cleared tracks of long-distance desert travel. Possible caravan routes at other places on the West Bank (e.g. in Wadi Kubbaniya) have not been looked for during the survey.<sup>10</sup>

The route called "The Road to Kurkur" (e.g. map in Ball 1907; cf. Jaritz 1981), "El-Deir Road" (topographic map of Aswan 1934, the name preferred by us), "Elephantine Road" or "Oasis Road" (e.g. Weigall 1909: 169ff, 1910: 438f; Goedicke 1981) today features a c. 10 m broad, cleared track, along which numerous camel tracks are preserved, the latter sometimes reaching a total width of 50-100 m (especially just to the west of Gebel Tingar). The cleared track can be easily followed from the upper reaches of Wadi el-Deir, but its course down the wadi towards the "Tombs of the Nobles" is obscure since there are numerous ancient quarry roads and camel tracks, the latter still in use for tourism. The road winds its way to the west on the south side of Gebel Saman, climbs the short valley on the north side of the significant landmark of Gebel Sidi Osman III and continues westwards on the plateau above (Figures 16, 17).



*Figure 16: El-Deir Roman road (right) and associated camel tracks (left) as seen towards the Nile Valley. The marked hill with the "hat" is Gebel Sidi Osman III.*

<sup>10</sup> However, there is an 8 m wide, cleared, but sanded-down track starting by Gebel el-Qurna, traversing the hinterland parallel to the Nile before it is lost in the modern construction work for New Aswan City. It is uncertain whether this is an ancient road, but it is interesting to note that the general route the road takes seems to have been used by Napoleon's *savants* around 1800 (compare the main survey map with the map of the savants in Chapter 3).





Figure 17: El-Deir Roman road as seen towards the west and Gebel Saman (right, and Gebel Sidi Osman III and Gebel Tingar (in the middle).

The road has been followed for a little more than 1 km in the field on the plateau. Using Google Earth (Figure 18), the cleared track has been followed for another 12 km; first due west, then south-west and south towards Aswan International Airport, where it is lost due to modern roads and diggings. However, it seems to reappear close to Lake Nasser by Wadi Kurkur, some 9 km south of the airport (probably close to ancient Dabod or Roman Parembolē, which might have been the termination point for this particular road). It is very likely that this road is part of the Roman road system on the West Bank of the Nile into Lower Nubia, of which the stretch between Kalabsha and Dakka has been described by Hester *et al.* (1970); see also Weigall (1910: 460f). The former authors also give a historical review of the road network. Except for mile-markers, which have not (yet) been found on the West Bank at Aswan, and which are also lacking at some road branches described by Hester and collaborators, the roads investigated at the West Bank are exactly similar to those between Kalabsha and Dakka.

A branch of El-Deir Road seems to lead from the plateau west of Gebel Tingar southwards into Wadi Berber, where it is lost in the sands of the wadi. At the junction on the plateau there is a rectangular stone built hut and Roman pottery, probably a control post. Generally, in this area west of Gebel Tingar there are numerous cairns and shelters on the low hills and an abundance of Roman pottery. These may belong to the cleared track, but also to the accompanying camel tracks.

Another cleared track, called "Sikket el-Agamiya" on the 1934 topographical map, runs partially parallel to El-Deir Road. We followed it from a junction with El-Deir Road about 900 m west of Gebel Sidi Osman III. It is much narrower than El-Deir Road, only 5-6 m wide, but otherwise has the same characteristics as this road, including a cleared area in the middle and heaps/lines of small stone along the sides. From the junction it continues due north for about 600 m, accompanied by simple cairns, before it abruptly turns to the west below a small hill with shelters and pottery dating from the New Kingdom to the Islamic period, as well as some rock art. From here one can follow the road using Google Earth for more than 12 km in a south-westerly direction, straight

towards the Kurkur oasis (Figure 18). About 4 km west of the abrupt turn, on a reconnaissance trip, we discovered a system of ancient wells some 400 m to the south of the road. These might belong to the road and the numerous accompanying camel tracks. Sikket el-Agamiya is bound to meet the ancient and modern route called Darb el-Gallaba, traversing the Gallaba pediplain in a north-south direction, before reaching Kurkur. Darb el-Gallaba links e.g. Hierakonpolis and Kurkur and seems to have been a very important route back to the Neolithic and Predynastic period (Darnell 2005).

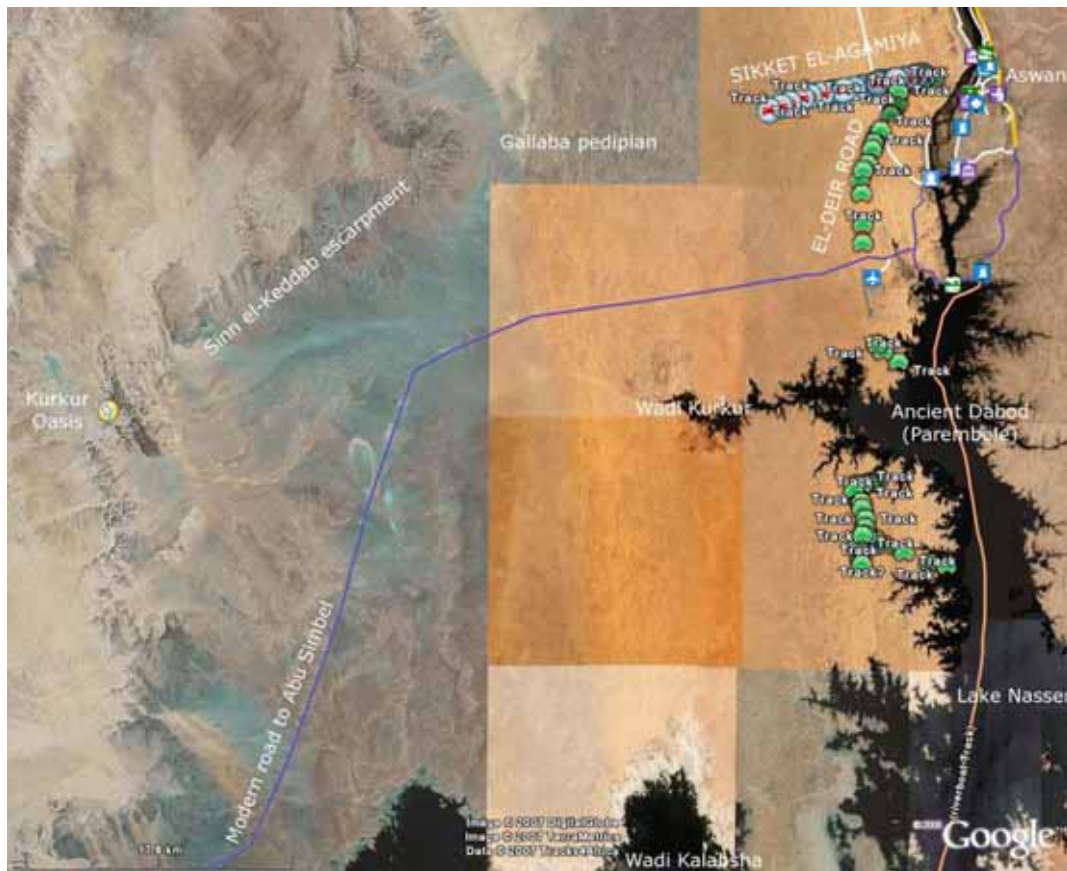
The abrupt turn described above is curious, and it might be suggested that the branch that links El-Deir Road with Sikket el-Agamiya was constructed later than the main route. There are some weak signs of an ancient route from the turn and eastwards down Wadi el-Tilal to the area around Gebel Saman. This might have been the original route. Since the road has not been followed in the field for any great length, it is difficult at this stage to date "Sikket el-Agamiya", although its general layout points to a Roman date. As a route, like El-Deir Road, it would quite certainly have a history as a donkey track much farther back.

The linkage between El-Deir Road and Sikket el-Agamiya (and their accompanying, preserved camel tracks) with the sanctuary/inscribed rock at Gebel Tingar (see Chapters 2 and 10), remains obscure, especially since the sanctuary is located more than one km to the south of the roads. However, it may well be that vanished camel and donkey tracks would have headed in the direction of the sanctuary. If so, the mouth of Wadi Saman (name given by us), just opposite Elephantine, would have been one of the starting/termination points of the route, as inferred by Weigall (1909: 181-3, plate XXXIII; 1910: 438f, 443). Weigall (*ibid.*) observed a paved road immediately to the north of the field of votive stelae by the sanctuary, which he linked with desert travel. This road has been destroyed by a modern track, but it is much more likely that it was connected with stone procurement than with desert travel (see Chapter 8 and also the map of Klemm and Klemm 1993: 290). Weigall's observation is still interesting as it may suggest that stone quarried at Gebel Tingar was taken to the Nile at the mouth of Wadi Saman.

Another route used for desert travel starts/terminates in Wadi el-Faras. This route is much smaller than those in the south, featuring camel tracks only, together reaching widths of some few tens of metres at the most. It ascends the hills in a south-westerly direction from Wadi Faras along at least three sub-branches. These branches have been followed for a few kilometres and it seems some of them are linked with Sikket el-Agamiya and/or El-Deir Road in the area of Wadi el-Tilal. Other branches might head in a more westerly direction, perhaps directly towards Kurkur.

Importantly, coming from the desert, where the branches descend into Wadi el-Faras, there are large fields with enormous amounts of probably votive stelae (Figure 19). These stelae are similar to those found at the sanctuary of Gebel Tingar (see Chapter 3 and 10) and, for example, those connected with ancient desert tracks crossing the Qena Bend of the Nile near Luxor (Darnell 2002: 112). By Wadi el-Faras they have mainly been erected within ancient grinding stone quarries, possibly because suitable stone was easily available here. No pottery or other features that can aid in dating have yet been located at such places. At one place, overlooking Wadi el-Faras, is a feature that perhaps could be interpreted as a sanctuary for desert travellers (Figure 19). It is characterised by a now ruined stone walled, circle-like feature, possibly with a standing

stone within, to which a well-worn path leads. Beside are many other possible votive stelae.



*Figure 18: Picture from Google Earth showing the probable extension of El-Deir Road and Sikket el-Agamiya outside the survey area. These roads can be followed on the high-resolution satellite images (brighter colours). The presumable ancient road on the south side of Wadi Kurkur has the same characteristics as El-Deir Road and probably represents another branch of the Roman road network at the West Bank of the Nile.*

Although it is not possible yet to date the desert tracks descending to Wadi el-Faras, the *preserved* traces certainly are those of camels, which imply that they are Graeco-Roman or younger. The branches may have been in use until the termination of long-distance caravan travel at the West Bank of Aswan less than a hundred years ago (cf. Weigall 1910: 443). The fact that the routes are preserved on modern (1934) maps indicates that it stopped significantly later. Hester and Hobler (1969: 67), referring to McBurney (1960), discuss similar routes between the Kurkur and Dungul oases and maintain that they probably had their heyday in the Middle Ages.

More detailed accounts of the desert routes at the West Bank, including a discussion of the dating problem, using parallels with other caravan routes from the extensive network in the Western and Eastern Desert, will be part of a forthcoming publication. One also awaits publication of results of the "Yale Toshka Desert Survey", which has

investigated the desert routes and other archaeological features around Kurkur and towards the West Bank of Aswan through several seasons<sup>11</sup>.



*Figure 19: Field with standing stones close to where ancient desert routes descend to Wadi el-Faras. In the middle is a stone-walled feature, to which a path leads.*

### **A possible hermitage**

Just to the north of St. Simeon's monastery is a large sand dune, almost 800 m long. To the west of this dune, along a small, northerly branch of Wadi el-Tilal, is another very large field of standing stones or stelae, more than 700 m long (Figure 20). This wadi has been given the name "Stele Wadi" by us. It is not unthinkable that the standing stones are votive stelae erected by desert travellers, but a more likely explanation is that they are connected to a system of shelters along a small secluded hill at the end of the wadi. Many standing stones can also be found on this hill and on others nearby. There are perhaps 7-8 shelters on the hill, some featuring fine dry-stone walls outside natural, cave-like openings, as well as the foundations of a hut-like feature at the eastern side. At a distance of 60-200 m from the hill, on nearby hills and at edges of plateaus are several more shelters. Although not yet investigated in detail, most of these features have pottery of Late Roman date associated with them. Just in front of the main hill, where a gorge enters Stele Wadi, is the ruin of a structure partially built from roughly hewn stones set in mud mortar, which is surrounded by quite large amounts of pottery, mainly dating to the Late Roman and partially to the Coptic period.

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<sup>11</sup> see description at [www.yale.edu/egyptology/ae\\_theban.htm](http://www.yale.edu/egyptology/ae_theban.htm) and the brief report by Darnell 2005





*Figure 20: "Stele wadi", a small northerly branch of Wadi el-Tilal with hundreds of small standing stones. A system of shelters, perhaps a hermitage, can be found along the small hill in the upper right corner of the picture.*



*Figure 21: A stone built hut on the east side of a hill that features several shelters and much Roman pottery; a possible Early Christian hermitage.*

The function of these temporary dwellings remains unknown. There is a possibility that they could represent a camp used by quarrymen, since the nearest (grinding stone)



quarries are just 200 m away (to the east). However, a better explanation is that these features represent a small Early Christian hermitage, perhaps in some way connected to the early history of St. Simeon's monastery (see description and dating in Chapter 3). Although as a hermitage it has very small shelters, it is not unthinkable that it may have been used in very short periods as a retreat or for other temporary purposes by monks. Moreover, it should not be ruled out that the built structure in front of the hill is a small chapel. Supporting an interpretation as a small hermitage is also the large amount of standing stones in Stele Wadi – perhaps they are part of a small pilgrimage path leading from St. Simeon's monastery? Clearly, much more research is needed to determine the nature and function of this temporary settlement or camp, also using possible parallels from other regions of Egypt and Nubia.

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*Stone wall features and standing stela in front of an obelisk quarry, Gebel Gulab*

## **Chapter 10: the material culture of the West Bank quarry landscape: constructing the social context**

*Elizabeth Bloxam, Adel Kelany*

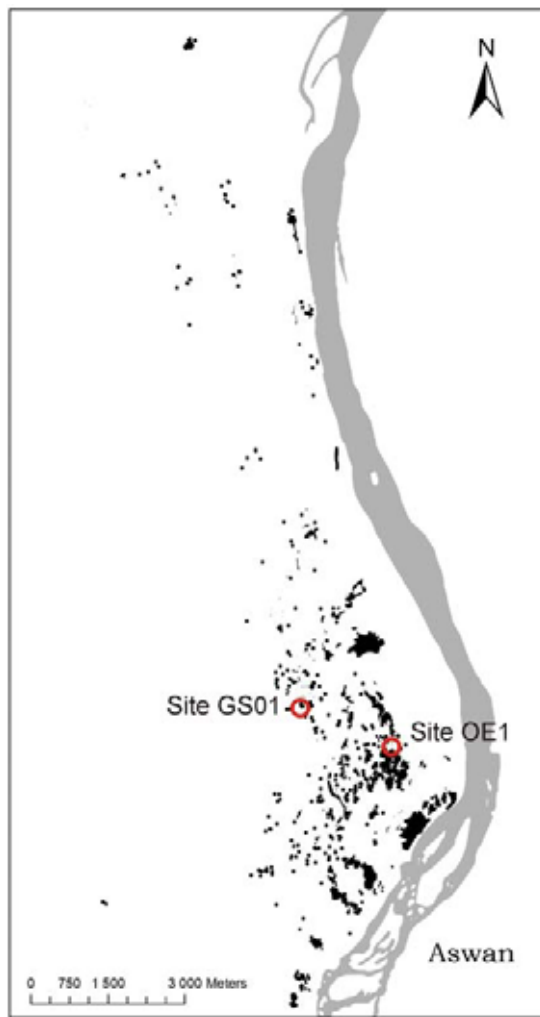
## Introduction

The complexity of the West Bank quarry landscape, as referred to in other chapters of this report, is due to the longevity of stone production and other activities that have left successive overprints of material culture across the survey area. Hence, characterising material remains to specific historical periods is a difficult task, particularly in the absence of radiocarbon dating. In view of these problems, the objective of the archaeological surveys has been to determine a chronology of the West Bank quarries by typological characterisation and indirect dating methods, such as consumption analysis, ceramic analysis, production technologies and studies of the epigraphic data. A key objective has been to construct hypotheses into the social context of quarrying activities across time, from these largely non-monumental and mundane archaeological remains, as the foundation for articulating the significance and value of the West Bank quarry landscape as a whole.

Given the extent of the West Bank quarry landscape of approximately 60 km<sup>2</sup> across which these multi-period archaeological remains are scattered, archaeological survey was undertaken on two levels: (1) preliminary GPS survey of the entire concession area by field-walking to document archaeological features; (2) from those preliminary results demarcate case study areas for more detailed survey. From the preliminary surveys two case study areas were selected: at Gebel Gulab (Site OE1) which represented the largest concentration of archaeological features in the least disturbed area of pharaonic period quarrying; and Gebel es-Sawan (Site GS01) which comprised an area of gebels in close proximity to each other and where 'satellite' quarries, rock art and standing stelae suggested that earlier, perhaps Palaeolithic, quarrying occurred (see map enclosures 1 and 2, Figure 1). The survey methodology included scale drawing of archaeological features, photography, GPS survey, tracing of inscriptions and spot clearing of wind-blown sand in some features. Ceramic analysis was undertaken by a specialist, Ashraf el-Senussi and compiled in separate reports that are included in the Appendices.

The outcome of the Gebel es-Sawan survey is contained in Chapter 6, given that the majority of the material remains relate to tool and grinding stone quarries and workshops. Rock art analysis may be found in Chapter 9. Hence, the focus of discussion in this chapter covers the archaeological findings at the largely pharaonic period site OE1 at Gebel Gulab. Archaeological evidence from Gebel es-Sawan and other areas of the quarry landscape will be discussed where relevant. It is the intention of this chapter to provide a synthesis of this data to construct hypotheses into the social context of ancient quarrying on the West Bank.





*Figure 1. Survey area with registrations (black) and location of the two case study areas GS01 and OE1.*

### **Gebel Gulab site OE1: a New Kingdom quarry in microcosm**

Dry-stone walled features, stelae, ceramics, epigraphic data, stone tools, object ‘blanks’ in quarries, rock art and roads generally constitute the material culture associated with quarrying across the West Bank quarry landscape. The problematic has been ascribing this material culture to a particular historical period, given that in many instances datable associations, such as ceramics within stone features, occurs sporadically. However, in the environs of an attempted obelisk extraction of the New Kingdom, with its surrounding grinding stone quarries on Gebel Gulab (site code OE1), there is the largest concentration of these material remains that occur in a relatively undisturbed context (see Chapter 6 for a description of the quarries). Although it is unusual not to find a later Roman Period overprint at Gebel Gulab and Gebel Tingar, this has had a lesser impact at site OE1. Hence a detailed survey and some clearing of aeolian sand provided what may be a microcosm of the social context of New Kingdom silicified sandstone quarrying – these features are now described and their distribution across site OE1 can be seen on the site map (Figure 2).

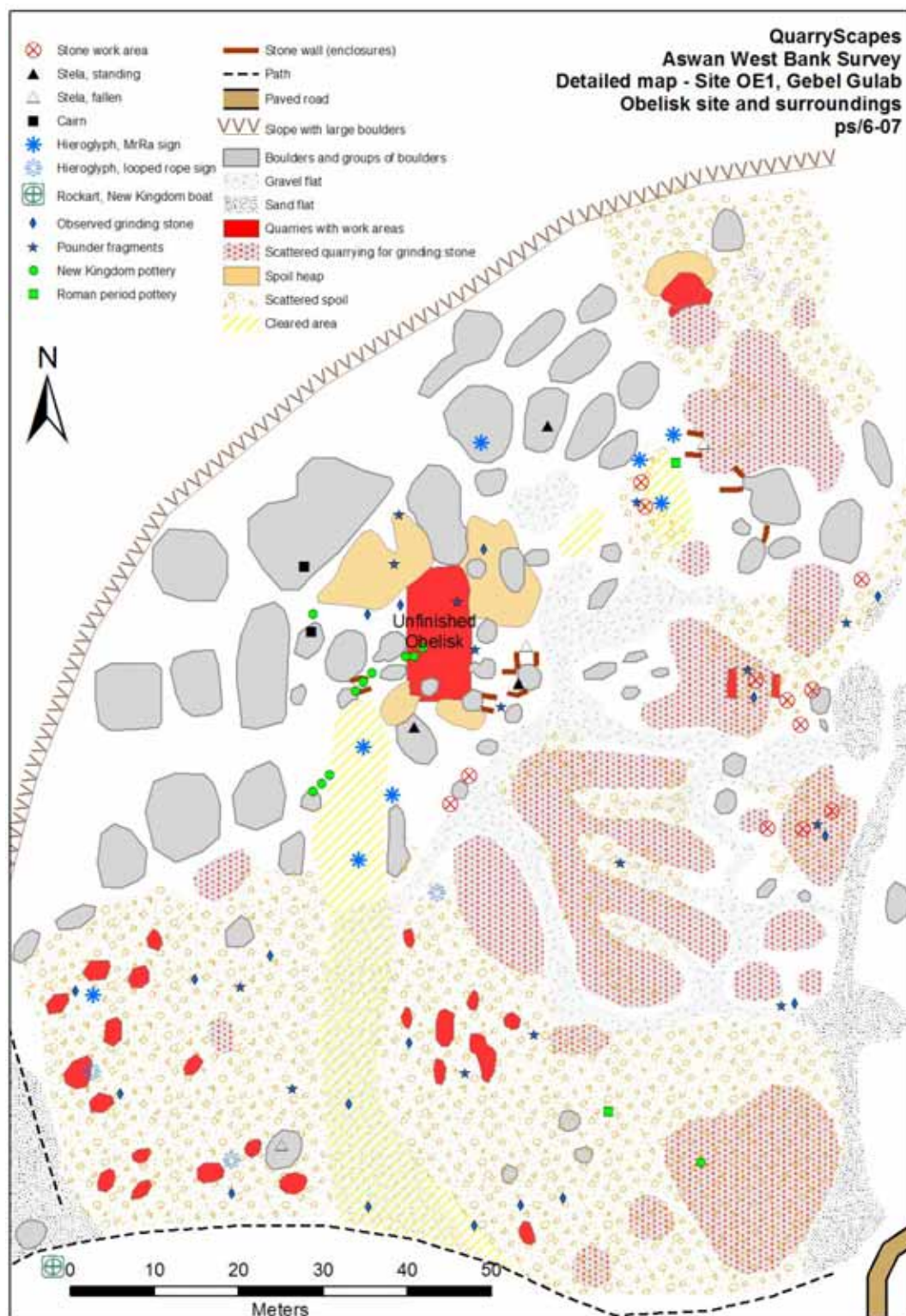


Figure 2. Detailed map of material culture surveyed and documented at site OE1, Gebel Gulab. Mapped and compiled by Per Storemyr.

### Dry-stone Walled Features

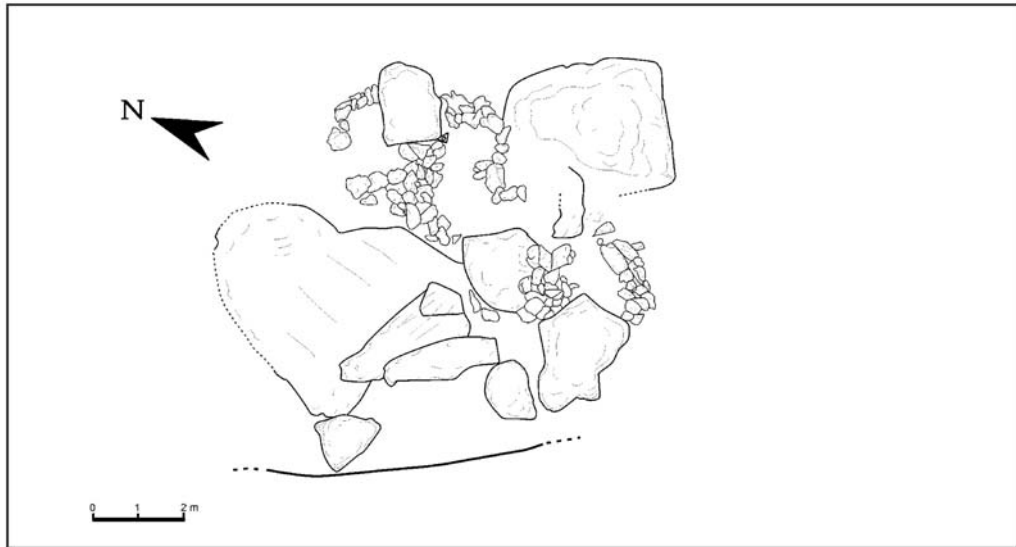
Located within 5 m on either side of the incomplete obelisk extraction are dry-stone walled features butted onto natural rock outcrops which form small enclosures. Such structures are found sporadically across the quarry landscape, although at site OE1 they form rather more distinctive clusters with associated material culture, as discussed below:

OE1/S1-3: This comprises 3 enclosures of up to 3 courses of dry-stone walls, each with an entrance (Figure 3). There is a shared wall between S1 and S2 which are clustered around a natural rock outcrop with S3 located opposite and constructed around another natural stone outcrop (Figure 4). The size of these features is as follows: S1: 3 m x 1 m; S2: 1 m x 2 m and S3: 2 m x 1 m. Standing in the centre of features S1 and S2, and propped up against the natural stone outcrop, is a standing stela of worked silicified sandstone measuring 1.23 m in height and 0.42 m in width. This stela forms a clearly visible landmark to the obelisk extraction site. Another stela shaped stone (Figure 5) measuring 0.55m x 0.30 m lies at the entrance to S2, but was also presumably standing up against the natural stone outcrop. Pottery occurs in small surface scatters in and around the enclosures, which largely date to the New Kingdom, although some surface scatters are of the later Roman Period (el-Senussi 2004, 2005a; Appendix 2) as discussed below. Absolute dating of these features remains problematic, although their close proximity to the obelisk extraction (such objects mainly consumed in the New Kingdom – see Chapter 4), suggests an original New Kingdom date with perhaps later reuse in the Roman Period.



*Figure 3. Three stone features clustered around natural rock outcrop site OE1/S1-3 Gebel Gulab*





*Figure 4. Scale plan (1:20) of stone features at site OE1/S1-3, Gebel Gulab. digitised by Leif Furuhaug from drawing*



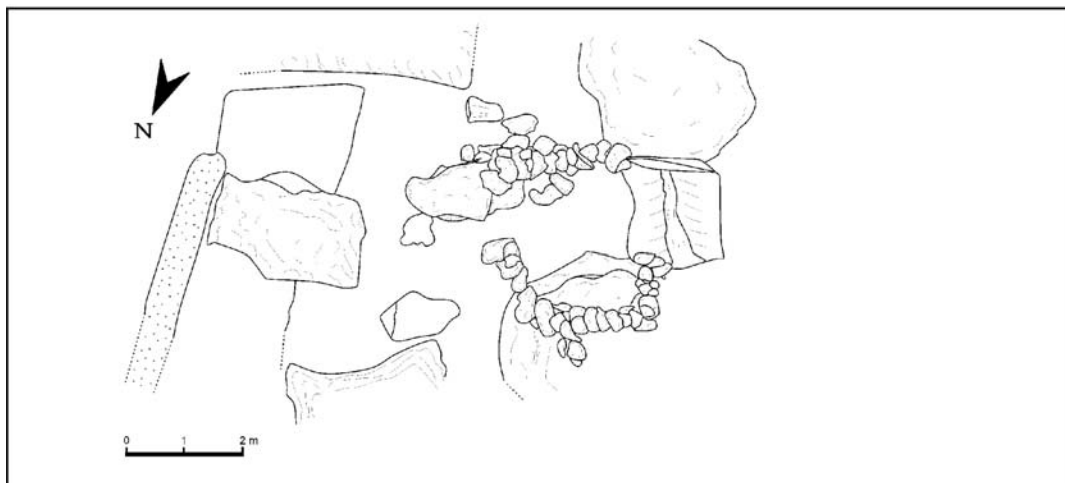
*Figure 5. Stela shaped stone lying at entrance to stone feature at OE1/S2*

OE1/S4: This comprises just one enclosure of 3 courses of dry-stone walls similarly constructed around a natural stone outcrop (Figure 6). The enclosure measures 2.5 m x 1.5 m with an entrance and downward sloping floor into the rock outcrop (Figure 7).

Gaps in the rear of the enclosure have been sealed with stones thus providing a shaded and cool environment, possibly for the storage of food and liquids. Due to disturbance in the area, it remains unknown if a standing stela was ever present here. Ceramic evidence associated with this feature is extremely minimal, consisting of a few body sherds and a rim, these are of New Kingdom date, possibly the Rammeside (19<sup>th</sup> Dynasty) period (el-Senussi 2005a; Appendix 2).



*Figure 6. Cleared stone enclosure OE1/S4 at Gebel Gulab*



*Figure 7. Scale plan (1:20) of stone feature at OE1/S4, Gebel Gulab. digitised by Leif Furuhaug from drawing*



### Standing Stelae

Apart from the standing stelae directly associated with the stone enclosures described above, 7 further stela of worked and unworked silicified sandstone, yet bearing no inscriptions, were located in the environs of site OE1. None are as high as the stela in enclosure OE1/S1-3 and they generally range in height from a minimum at 0.54 m (St9) to maximum 0.95 m (St4) with widths ranging from a minimum 0.09 m (St5) to maximum 0.50 m (St3). These stela are generally located on top of natural stone outcrops, some still standing in between their anchor stones (Figure 8). The stelae tend to be clustered in the immediate environs of the obelisk quarry and can be seen from some distance, particularly when approaching the site from the east (the direction of the Nile).



*Figure 8. Standing stela in site OE1 with anchor stones, Gebel Gulab*

### Hieroglyphic inscriptions, rock art and graffiti at OE1

In the environs immediately surrounding the obelisk quarry there are 8 instances of the hieroglyphic symbols for *mr-Ra* ('beloved of Ra') (Figure 9). The distribution of these symbols can be seen on the site map (see Figure 2). The symbols were found written on flat outcrops in horizontal levels and concentrated in this area (see Heldal *et al.* 2005: 27-8). Other rock inscriptions in the area, sometimes referred to as 'graffiti', are either single characters or single geometric signs that are extremely ambiguous to interpret. These comprise a looped rope and a geometric symbol (Figure 10). Although it is most likely that the *mr-Ra* hieroglyphs are contemporaneous with the pharaonic period quarrying in the New Kingdom, it is more difficult to date these other symbols.

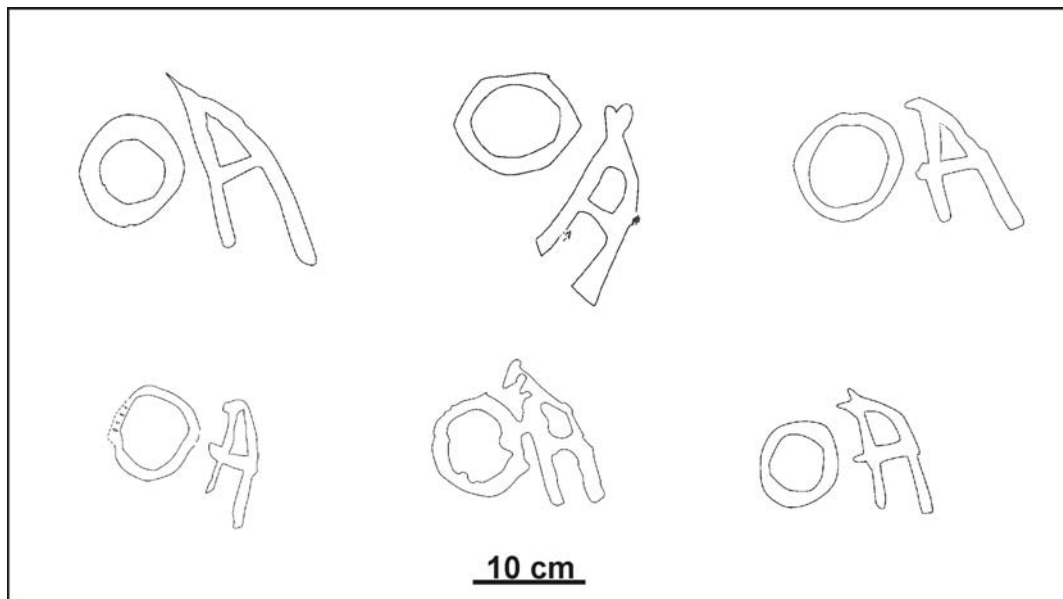


Figure 9. *mr-Ra* (beloved of Ra) symbols engraved into outcrops surrounding obelisk extraction site OE1; digitised by Leif Furuhaug from drawing

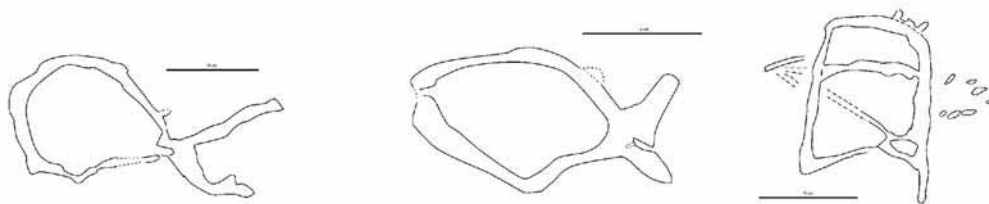
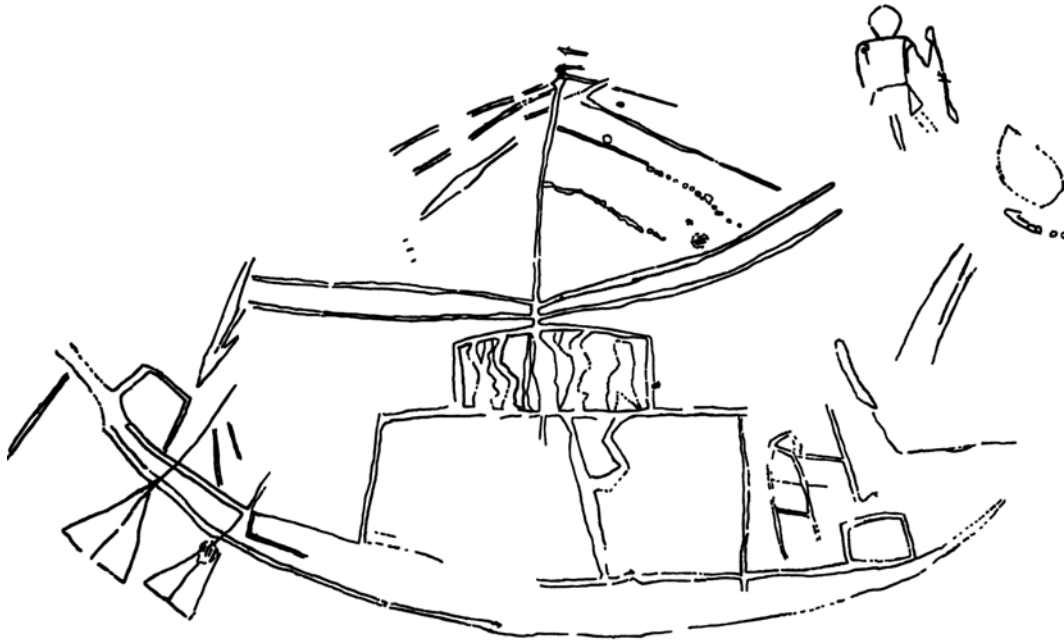


Figure 10. Other graffiti at site OE1; scale 1:1, digitised by Leif Furuhaug from drawing. Line=10 cm

An iconographic depiction of a pharaonic period boat, measuring 1.5 m (long) by 1 m high and previously undocumented, was an important addition to the corpus of rock engravings that date specifically to the 18<sup>th</sup> – 19<sup>th</sup> Dynasties of the New Kingdom (Figure 11). This classic New Kingdom barge with the figure of a man holding a staff, suggesting an overseer, is a known depiction of such vessels that can occur on New Kingdom monumental architecture and is known in other quarries, such as Gebel el-

Silsila (Landstrom 1970; Jones 1995). Although it is open to interpretation if this depicts an actual vessel used to transport stone, it is important to note that boat iconography in rock art occurs in various forms across the West Bank quarry landscape over a deep time depth (see Chapter 9).



*Figure 11. New Kingdom (18<sup>th</sup> – 19<sup>th</sup> dynasty) depiction of a barge. Digitised by Per Storemyr from drawing. 1,5 m long, 1 m high*

#### Determining a chronology of Site OE1: indirect dating from ceramics, inscriptions and consumption

Ceramics across the West Bank quarry landscape are in general extremely few and usually comprise small surface scatters. Pottery analysed at site OE1 was found in surface contexts and also from clearing of the stone features described above (OE1/S4). The majority date to the New Kingdom from mid 18<sup>th</sup> Dynasty to 19<sup>th</sup> Dynasty and similar to samples across site OE1 as whole, comprise a small corpus of utilitarian items such as bases of bowls, rim sherds of beer jars and fragments of Canaanite amphorae (el-Senussi 2005; Appendix 2) (Figure 12). However, there may also be small scatters of later Roman Period amphorae across the site – aspects of this later pottery is discussed below. Of note within the New Kingdom ceramics was the base of a vessel with a hole in the bottom suggesting that its initial function was as a flower pot, then re-used to strain beer. This distinctive type of vessel is typically of 18<sup>th</sup> – 19<sup>th</sup> Dynasty (Figure 13). It is important to note that such a vessel of the New Kingdom was also located in what are the predominantly New Kingdom Southern Quarries (see Chapter 6).

If this data along with the inscriptions and consumption record are combined, then it is feasible to suggest that site OE1 is predominantly an ornamental stone quarry of the New Kingdom, although abandoned, surrounded by probably contemporaneous grinding stone quarries (see Chapter 6). Dating the site to a more specific period of the New Kingdom is more problematic and is discussed later in this chapter. However, although there is a high probability that exploitation for ornamental stone on the West Bank in general may be linked to the peaks of silicified sandstone use in the 18<sup>th</sup> Dynasty, there is a high probability that this incomplete obelisk extraction site at OE1 may well date to the early 19<sup>th</sup> Dynasty reign of Seti I. Not only is his cartouche visible on an obelisk tip at another obelisk quarry on Gebel Gulab, see below and Chapter 6, but there may also be a connection with the many abandoned monumental projects of Seti I due to his early death (Brand 2000: 365, 384 – also see Chapter 4).



*Figure 12. Rim sherd of New Kingdom bowl found in situ on floor level of stone enclosure OE1/S4 (see el-Senussi 2005 report in Appendix 2 for drawing)*



*Figure 13. Re-used flower pot to strain beer with hole in the base, New Kingdom could range from 18<sup>th</sup> – 19<sup>th</sup> dynasty – found amongst spoil heaps close to obelisk extraction site OE1*

## **Stone features, burials, ceramics, roads and epigraphic data across the West Bank quarry landscape: an overview**

### Dry-stone walled features

It is important to stress that man-made features, such as the stone enclosures described above, can be found scattered across the West Bank quarry landscape and may have a range of functions either as work areas related to quarrying, temporary shelters, look-outs or ritual places (see map Figure 1 and Figure 14). Concentrations of these features typically occur in the large quarry areas of Gebel Gulab, Gebel Tingar and Gebel Sidi Osman and along the El Deir road. At Gebel Gulab and Gebel Tingar several clusters have pottery scatters associated with them dating to both the New Kingdom and Roman Period (Figure 15). Pottery scatters whereby later Roman Period pottery may sometimes be found inside the shelter, and the earlier New Kingdom pottery outside, is termed periodic ‘clearing out’ a phenomenon which is also known at Chephren’s Quarry (Bloxam 2003; Shaw and Bloxam 1999). At Gebel Tingar, however, the majority of sherds associated with the shelters date mainly from the Ptolemaic Period to the 5<sup>th</sup> century AD (el-Senussi 2004) (Figure 16).

Two other key areas of dry-stone walled features related to quarrying on Gebel Gulab are located behind the New Kingdom obelisk extraction area (Seti I Quarry), where up to five shelters are clustered in a small group (see Figure 17), and another area where predominantly Late Ptolemaic to Roman Period extractions occur in the southern part of Gebel Gulab (see Chapter 6) (see Figure 1 and 18). In this latter site where there are many Greek inscriptions (see below, Fournet 1996) a hearth was also located, which provides the only evidence of food preparation occurring in the quarries. Amphorae from both the New Kingdom and Roman Period constitutes the bulk of the ceramic corpus, such vessels would have contained liquids (el-Senussi 2004). The most notable absence in the ceramic corpus are cooking vessels and bread moulds and is indicative, along with the absence of substantial settlement evidence, that the labour force did *not* reside in the quarries - as discussed later in this chapter.



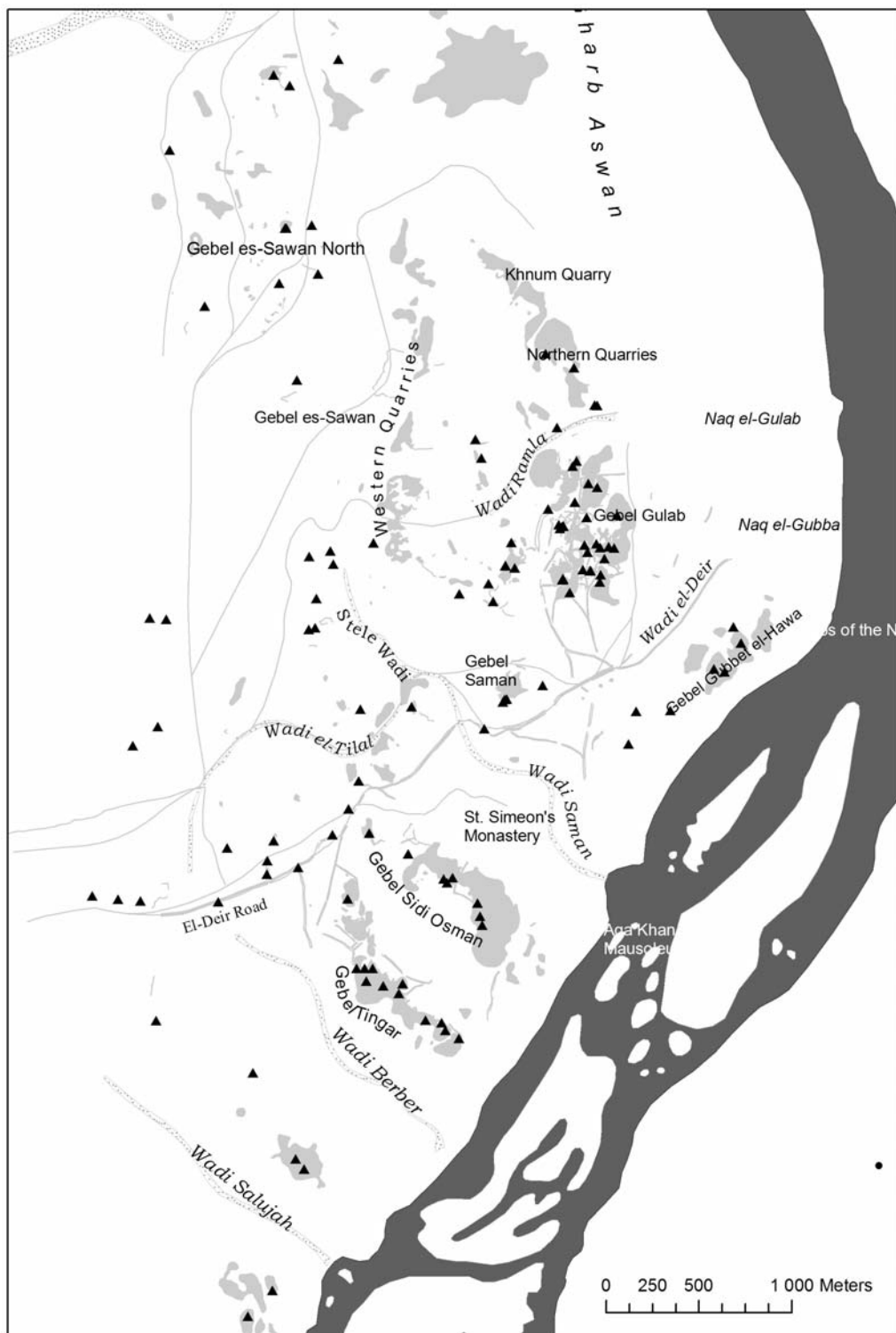


Figure 14. Map showing distribution of stone-walled features/enclosures across the central and southern area of the West Bank



*Figure 15. New Kingdom and Roman Period pottery sherds in same context within a cluster of shelters*



*Figure 16. Hemispherical cup Graeco-Roman Period, Gebel Tingar*



*Figure 17. One of several stone enclosures behind main obelisk extraction site of Seti I – causeway in background*



*Figure 18. Area of Late Ptolemaic – Roman Period shelters – shelter with high wall in background, circular stone feature in foreground is a hearth*



It is important to point out that clusters of dry-stone walled features are not only a phenomenon of the New Kingdom and Roman Period, as they also occur in areas where rock art and ceramics may suggest a Predynastic or Early Dynastic origin. These have typically been identified in the northern areas of the West Bank, in the environs of New Aswan City (Figure 19 and Figures 1, 14). It is extremely difficult to date these features and some may even have been added to and re-used at later dates, given that pottery scatters in the vicinity may cover most historical periods from the Predynastic to Roman Period (el-Senussi 2007; Appendix 2). However, in some instances occurrences of rock art in or near these clusters may suggest an A-Group or Predynastic (4<sup>th</sup>-5<sup>th</sup> millennium BC) date and with their proximity to small ‘low intensity’ grinding stone quarries may have functioned either as work places, temporary shelters or ritual places. Similar features, particularly where the stone walls are constructed from more slab-like stones are known on the Dungul playa in the Western Desert, which Hester and Hobler (1969: 20) have speculated may be of the Neolithic Libyan Culture.

Dry-stone walled features can also occur as free-standing circular constructions and these are most typically found close to ancient desert routes and quarry roads at their junctions or at corners (see Chapters 8 and 9). Moreover, such constructions may be associated with stone alignments or animal traps as possible look-outs in the practice of game hunting – see Chapter 9 for more details on these. Those associated with quarry roads at Gebel Gulab and Gebel Tingar suggests their function may be linked to overseeing the stone transport process (Figure 20). Dating of these features is again problematic as they have tended to either lack any ceramic data, or may show periodic clearing out with both Roman Period and New Kingdom pottery associated. Circular single-level dry-stone walled features that occur at low elevations can often be wells. Eight wells were located close to an ancient desert track and in the vicinity of an isolated hilltop shelter in the western-most fringes of the West Bank survey area (Figure 21). With no ceramics associated with these it is impossible to date them.

In the environs north of St. Simeon’s Monastery more elaborate stone features of later date with built walls of several levels are butted up against rock outcrops and associated with areas of standing stelae (Figure 22). These structures may represent a small Early Christian hermitage associated with St. Simeon’s monastery – for more details on this area see Chapter 9.



*Figure 19. Left: one of a group of stone features surrounding a natural rock outcrop – possibly of Predynastic date, environs of New Aswan City; Right: singular feature of probably Predynastic date constructed from large slabs, New Aswan City*



*Figure 20. Circular stone feature next to main arterial quarry road on Gebel Gulab – date unknown*



*Figure 21. Stone feature, probably a well at low elevation (foreground); small hill with possible shelter on top (background)*



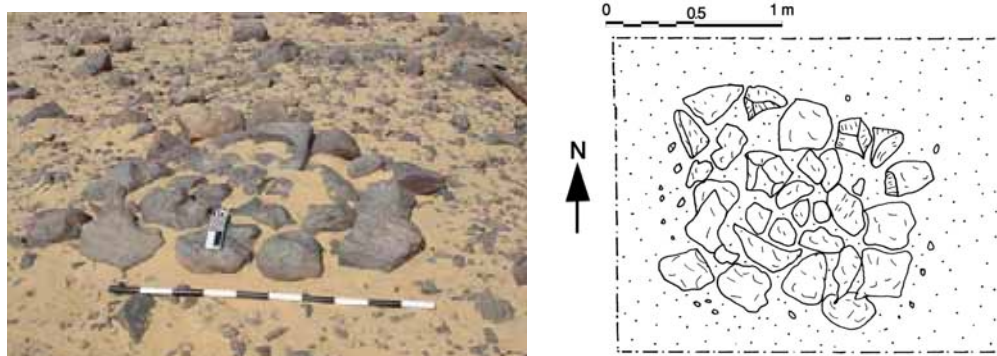
*Figure 22. Stone feature with high walls up against natural rock outcrop, possibly part of Early Christian hermitage*



### Other stone-built features: quarry roads, stone alignments and stone rings

Of all the man-made stone-built features across the West Bank quarry landscape, the network of paved quarry roads and long lines of dry-stone walls termed ‘stone alignments’ make up the most visible man-made infrastructure of antiquity. The quarry roads, mainly of New Kingdom date, are mostly concentrated across Gebel Gulab and Gebel Tingar and make up the single most significant and visible transformation of the landscape (see Chapter 8). The stone alignments are somewhat less immediately visible as they criss-cross the desert hinterland, often disappearing under deep sand cover. Their function and date remains open to speculation, although certainly of antiquity, there is the suggestion from parallels elsewhere that they functioned as animal drives or traps (see Chapter 9). However, assigning a direct connection between these features and ancient quarrying will require further research.

Another curious feature documented at Gebel es-Sawan, near the earliest Palaeolithic tool workshops (see Chapter 6) was a small circular feature, whereby stone pieces are embedded in the desert plateau to form a small area of ‘pavement’ (Figure 23). With no other material culture associated with the feature its function and date remain unknown. However, similar constructions are known on the border of Dungul playa and along the terraces of the Dungul Wadi in the Western Desert (Hester and Hobler 1969: 20). Termed ‘slab pavement’ or ‘stone rings’ and associated with Khargan refuse, Hester and Hobler (op. cit) point out that they may represent some the earliest structural remains in the Dungul region dating to the Late Palaeolithic. This probable Late Palaeolithic date raises questions as to whether the stone ring at Gebel es-Sawan may be contemporary with some of the quarrying activity, in particular that of grinding stones, in this region of the West Bank? Given that no similar features have been identified elsewhere in the survey region, it is interesting to speculate whether they were assigned some kind ritual function associated with the quarries: such questions will be the subject of future research.



*Figure 23. ‘Stone ring’ or ‘slab pavement’ at Gebel es-Sawan, perhaps of Late Palaeolithic age.*

### Burials in the quarries

As mentioned in Chapter 3, cemeteries occur along the riverine stretch of the Nile from Gebel Tingar to Kubaniya. In most cases these large cemeteries are connected with

areas of permanent settlement, either on the West or East Bank. Large areas of burials in the quarries at Gebel Tingar occur in sanded-up and hence concealed cave-like caverns, or extinct extraction sites, suggesting they post-date the main periods of quarrying (Figure 24). Human bones and numerous fragments of coffins lie scattered all around due to their ransacking in recent times. Some of the coffins are made from poor quality mud-brick type material which lies scattered in the quarries, some fragments having the impression of a face and arms (Figure 25). Other coffins were made of sandstone, two of which lie intact around these burial areas (Figure 26). Coptic period pottery and ‘crosses’ associated with these burials suggest that they could represent a burial site connected with the nearby monastery of St. Simeon (el-Senussi 2004; Appendix 2).



*Figure 24. Burials of Late Roman/Coptic period in extinct quarries at Gebel Tingar*



*Figure 25. Impression of face and arms on a coffin lid (in environs of Figure 23) – probably of Late Roman/Coptic period, Gebel Tingar*

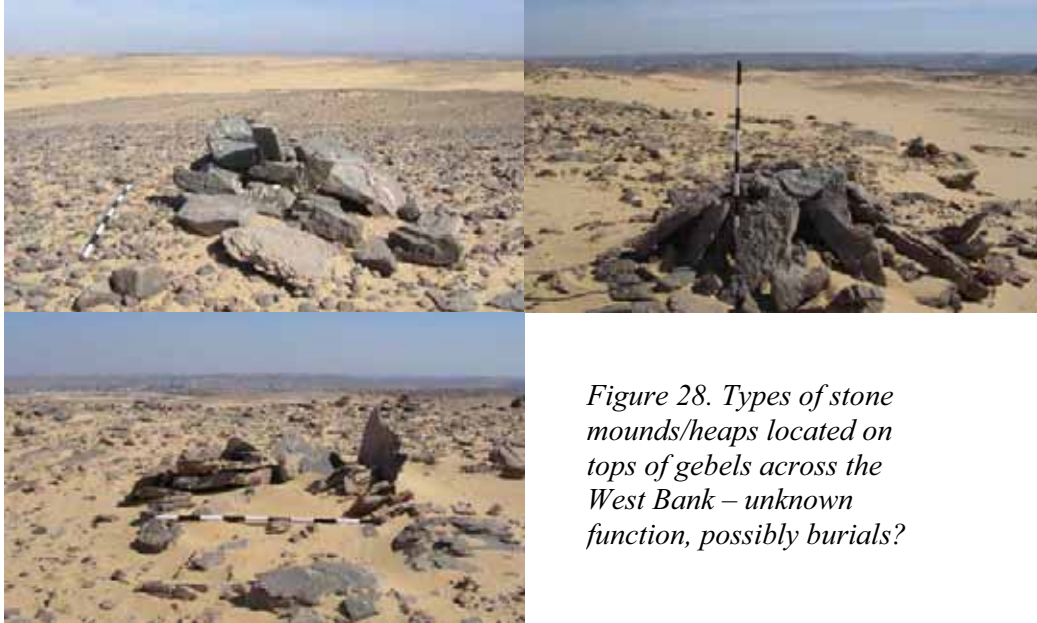
*Figure 26. Sandstone coffins – Late Roman/Coptic Period – Gebel Tingar*

However, the West Bank quarry landscape also tends to be dotted with incidences of small stone mounds and it remains a tricky business, in the absence of excavation, to determine if these are burials. Moreover, is the problematic of assigning a direct connection with these features to ancient quarrying as either burials or some other function. Such incidences of stone mounds may be characterized by a solitary stone mound, such as that located beside a quarry road at Gebel Gulab measuring 4 m in length by 2 m wide, with a 50 cm square entrance that may be a Roman Period burial (Figure 27). Similar features, although not exhibiting this clear entrance but rather resembling stone heaps, can also occur either singularly or in small groups of 4 – 5 on the tops of gebels where there may also be standing stelae and sometimes a small head-stone at one end (Figure 28). Dating of these features is problematic as usually there is no pottery associated and certainly without excavation it can only remain speculation if these are burials.



*Figure 27. Roman Period (?) burial close to road on Gebel Gulab*





*Figure 28. Types of stone mounds/heaps located on tops of gebels across the West Bank – unknown function, possibly burials?*

### Ceramics

A great deal of caution needs to be applied in assigning direct correspondences between dating of features or quarries from these largely small surface scatters of pottery, given that natural and man-made transformation processes can easily take surface pottery out of its original context. Consequently, New Kingdom and Roman Period sherds can often occur together in the same surface contexts and so a somewhat distorted picture can often emerge. As the pottery map indicates (Figure 29; see also Appendix 2) the highest concentrations of pottery occur at Gebel Gulab and Gebel Tingar, which would be expected given that these areas were where most intensive quarrying occurred from the New Kingdom into the Roman Period. Moreover, it would be expected that Roman Period pottery would dominate the corpus, given this was the last phase of quarrying. Although Roman Period ceramics occur across the site, it cannot be said for certain if these were only related to quarrying, particularly as this period accounts for only 1% of the total activity (see Chapter 6). It has to be considered that other mechanisms of deposition may have occurred, such as travellers coming into the quarry landscape along the desert routes from the Western oases (see Chapter 9), or connected with yet unknown permanent Roman Period settlements in the vicinity close to the cemeteries described along the Nile between Gebel Tingar and Kubbaniya (see Chapter 2). In general terms, determining a chronology of the West Bank quarries from ceramics is problematic, however, in conjunction with other material culture such as inscriptions, consumption and quarrying techniques, this has allowed for some broad inferences to be made, as demonstrated at site OE1.

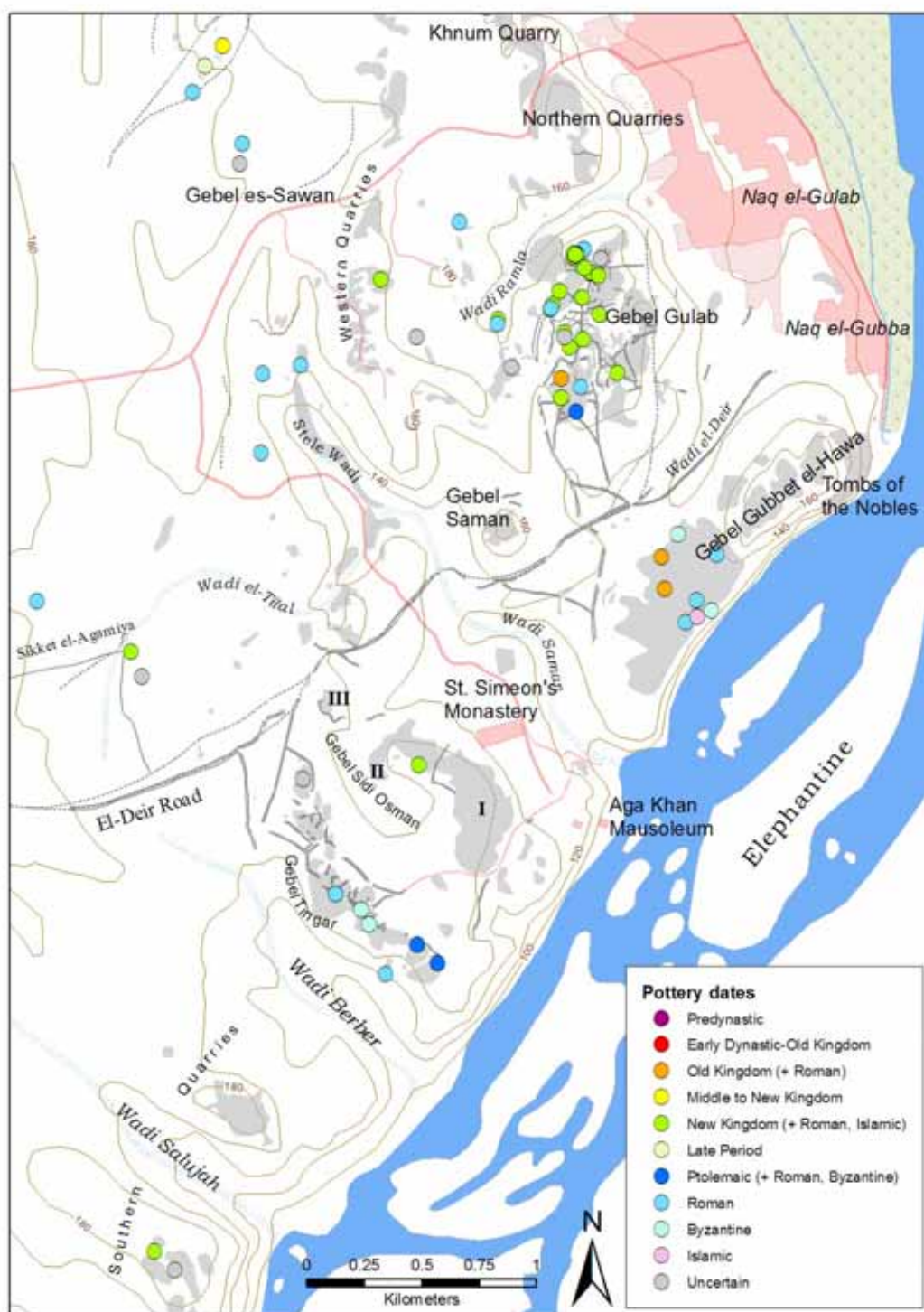


Figure 29a. Distribution of pottery on the Aswan West Bank, southern area. Map drawing by Per Storemyr.



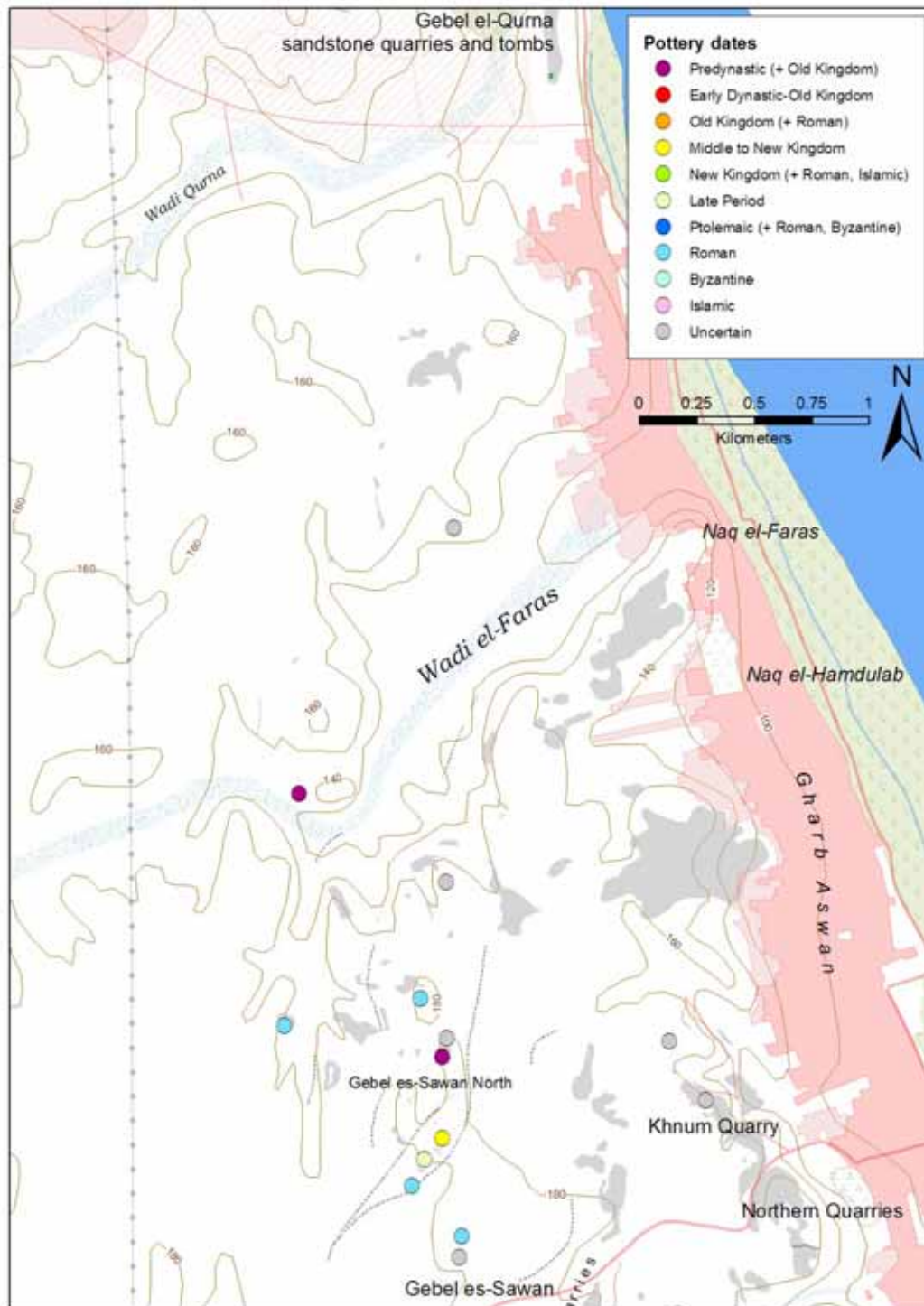


Figure 29b. Distribution of pottery on the Aswan West Bank, central area. Map drawing by Per Storemyr.

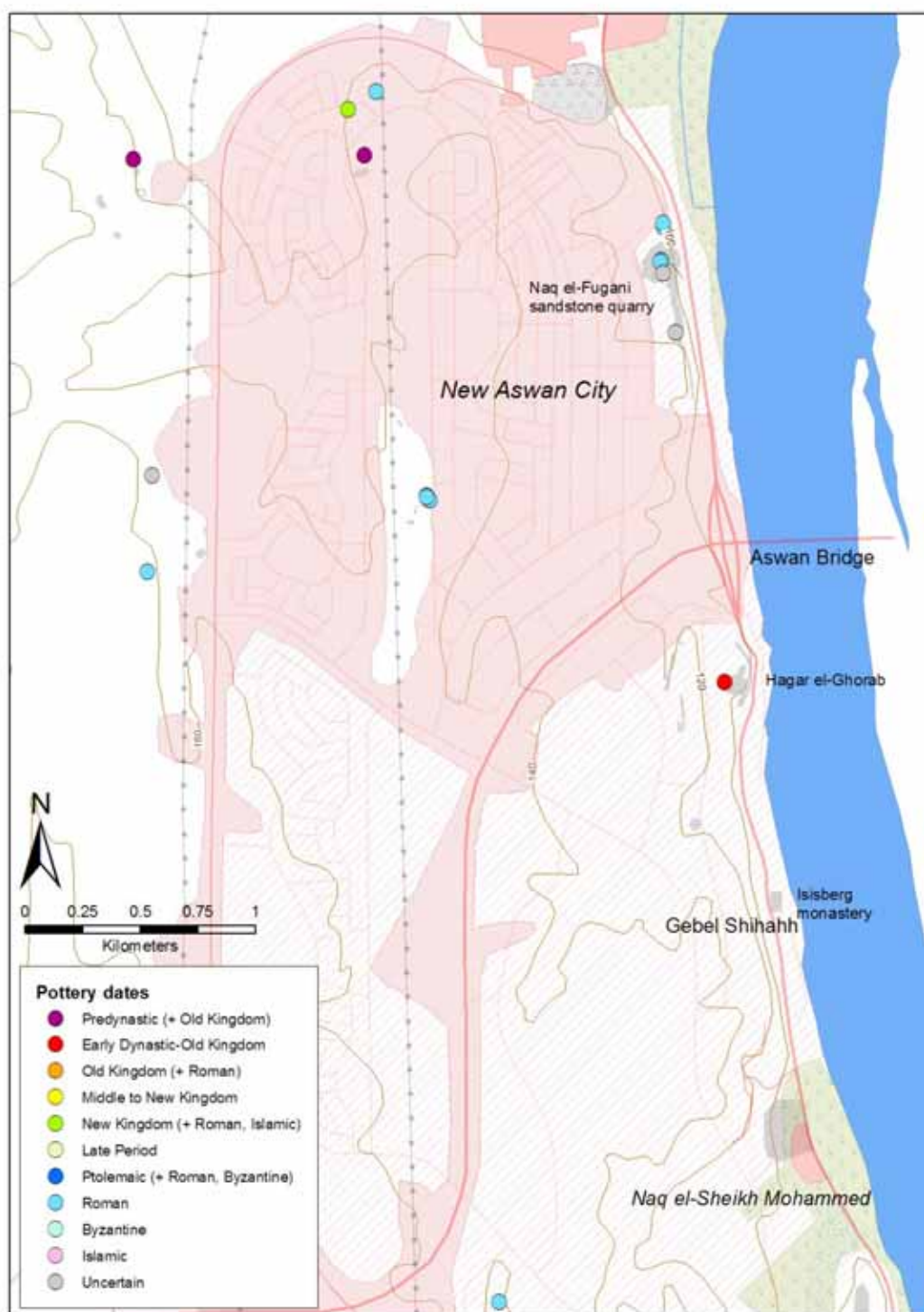


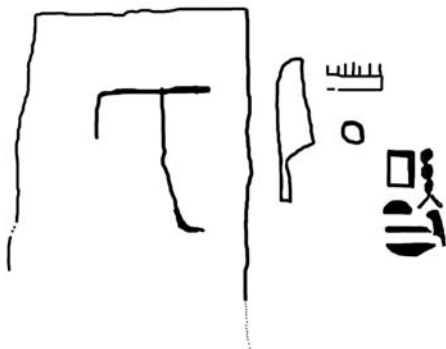
Figure 29c. Distribution of pottery on the Aswan West Bank, northern area. Map drawing by Per Storemyr.

### Epigraphic data: hieroglyphic inscriptions and graffiti

Hieroglyphic inscriptions in quarries are generally concentrated in the environs of Gebel Gulab, Gebel Tingar and Khnum Quarry, bearing in mind that the boundaries are often blurred between what may be considered 'royal' or 'scribal' hieroglyphs from simple rough sketches or graffiti. With this in mind and in comparison with inscriptions found in other quarries in the Aswan region such as Wadi Abu Agag (Harrell and Madbouly 2006) and the East Bank granite quarries and upstream at Gebel el-Slsla and el-Hosh (Legrain 1906), what may be considered 'royal' hieroglyphs are relatively few. Some of the key areas where hieroglyphs and graffiti occur are at Gebel Gulab, particularly at site OE1, yet other incidences are located on cliffs or even attached to some other archaeological structures across the West Bank. A summary of these main occurrences are as follows:-

#### *Gebel Gulab: Seti I obelisk quarry*

The obelisk top in these quarries (see Chapter 6) carries the most elaborate and only 'royal' inscriptions found in the survey region. Occurring as raised relief on three sides of the upper shaft of the obelisk, the king's name Seti I (early 19<sup>th</sup> Dynasty) and image is depicted kneeling before manifestations of the Heliopolitan sun gods, such as Ra-Horakhty (Habachi 1960: 227-30; Brand 1997). To the east of the obelisk shaft, just beside the obelisk extraction trench, a stone block carries the hieroglyphic inscriptions for the gods Amun Ra and Ptah. The hieroglyph *mr-Ra* (the same as those found at site OE1) was found beside the cartouche of the King Seti I of the early 19<sup>th</sup> Dynasty (Figure 30). Some graffiti was also found on other stones in the same area, one being of a standing man (Figure 31).



*Figure 30. Obelisk top with raised relief of the king kneeling before the Heliopolitan gods (above); in the same environs hieroglyphs for mr-Ra with cartouche of King Seti I at Gebel Gulab (below).*

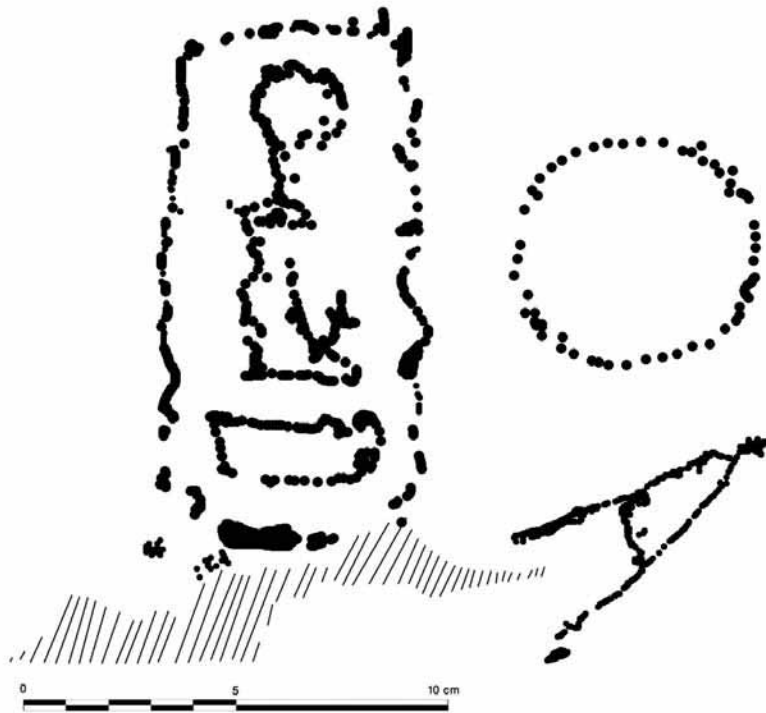


Figure 31. Graffiti in area of Seti I obelisk extraction site, Gebel Gulab.

*Gebel Gulab: Wadi el-Tair (Valley of the Birds)*

Graffiti with inscriptions were found on stone boulders, perhaps as part of a shelter, in the area which was called Wadi el-Tair (see map **enclosure 1 and 2**) because of the bird graffiti found here. Along with the bird graffiti some unclear hieratic inscriptions were found, but due to their highly weathered condition it is very difficult to interpret these (**Fig 32**). There are several other scattered occurrences of pharaonic inscriptions at Gebel Gulab, some of which were documented by Fournet (1996).

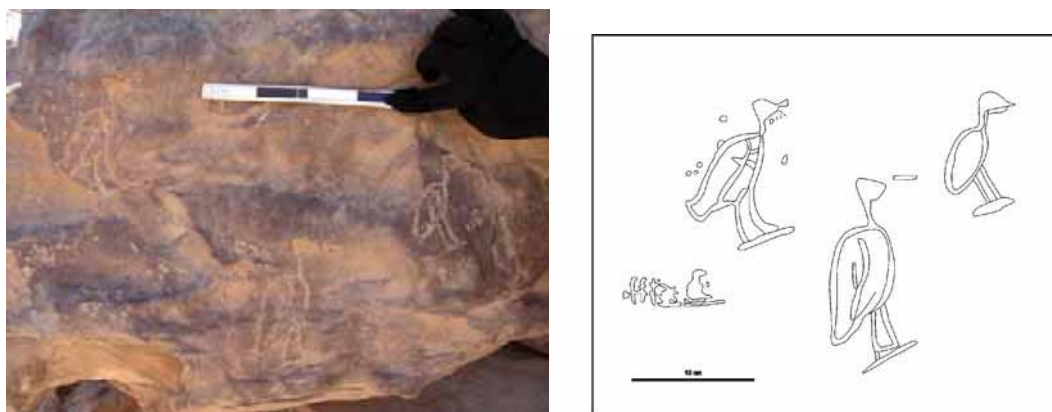


Figure 32. Bird graffiti at Wadi el-Tair, Gebel Gulab. Photo and drawing (right)



### *Khnum Quarry*

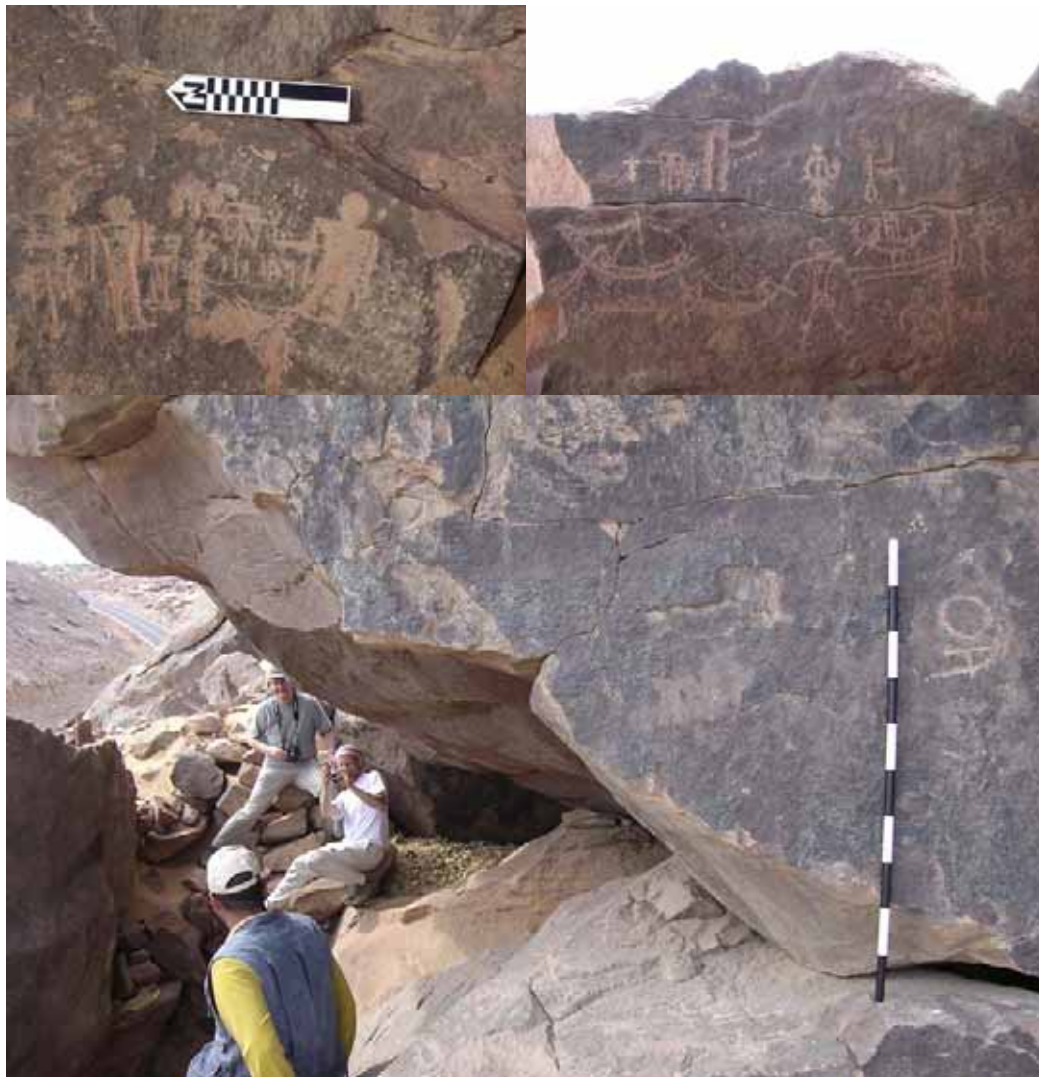
This ornamental and grinding stone quarry area was the other major New Kingdom quarry to have a concentration of hieroglyphic inscriptions and graffiti. On top of the stone cliff at the southern entrance to the quarries is a shelter/overhang between two large stones, on the internal faces there are many inscriptions in different types and size, with some graffiti of boats, ships, fish and images of men and women (**Figure 33**). Another *mr- Ra* sign was found beside the shelter area and also a rare incidence of two personal names :

*Overseer of the Building Jw-Khnumw, true of voice (Fig 34)*

and

*The priest Sd ? (Figure 35)*

Although there are more names that are still in process of translation, these names give an indication about the titles and names of people working in the quarry in dynastic times.



*Figure 33. Panels of graffiti at entrance to Khnum Quarry.*



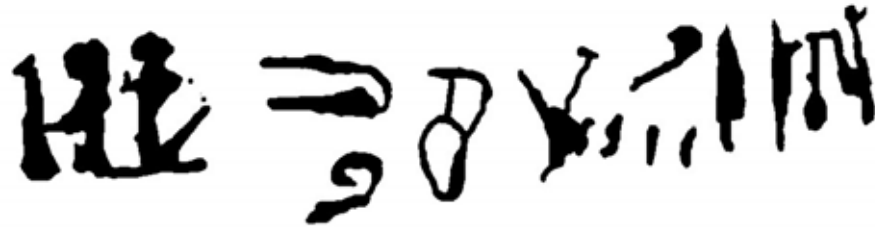


Figure 34. Hieroglyphs of an overseer, Khnum Quarry.

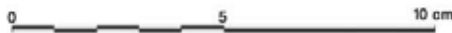
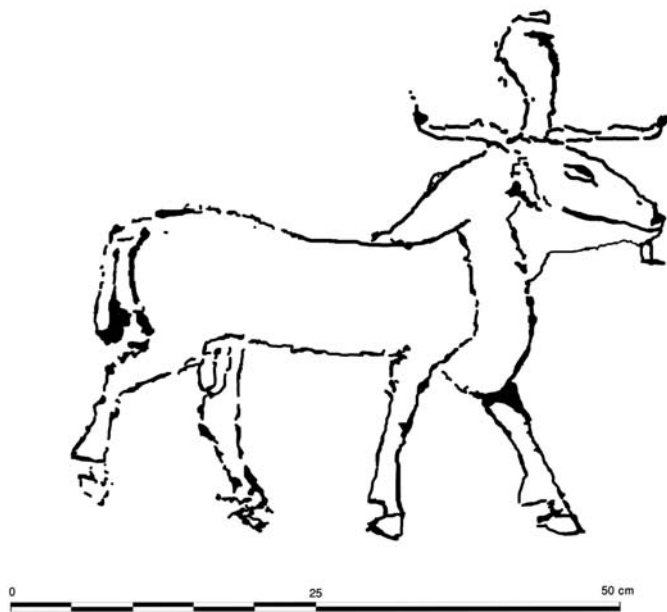


Figure 35. Hieroglyphs of a name, Khnum Quarry.

Local gods and goddesses of the Aswan region are also represented at Khnum Quarry, such as Khnum and Satet. The goddess Satet's name was found many times in the graffiti, one between two standing men who are offering something to her with the word *mry*, *beloved* beside it. A line engraving of the god Khnum, in the shape of a ram, was found in the upper part of the stone shelter/overhang and hence why the survey team named this quarry 'Khnum Quarry' (Figure 36). Other graffiti in Khnum Quarry depicts the baboon, a sacred animal with antecedents to the Predynastic and often associated with solar worship, as well as taking the form of the god Thoth when travelling in the Nubian desert (Pinch 2002: 113-4) (Figure 37). The baboon is depicted sitting on a high base inside a small chapel with a decorated roof and facing two offering tables on one of which there are flowers. At the back of the baboon a small word of demotic script is written. Another graffiti, located south of the baboon depiction, represents either a lion or lioness. Although this may be the animal form of many gods, which if a lioness of New Kingdom date then could be Mut (daughter of the sun god), they can also function as manifestations of the wrath of the sun god (Pinch 2004: 133, 168) (Figure 38). There are at least three other occurrences of pharaonic inscriptions and graffiti in the Khnum quarries, but these are not yet analysed.



*Figure 36. Engraving of the god Khnum as a ram*



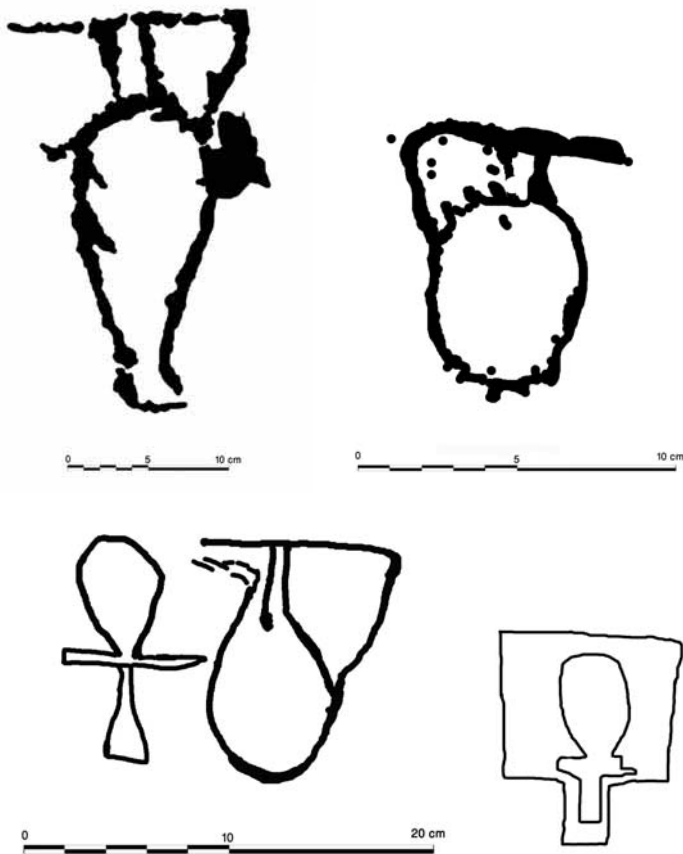
*Figure 37. Engraving of a baboon, Khnum Quarry: associated with solar worship and also takes the form of Thoth when travelling in the Nubian Desert*



*Figure 38. Engraving of a lion/lioness, Khnum Quarry: can be associated with Mut in the New Kingdom or as a manifestation of the wrath of the sun god*

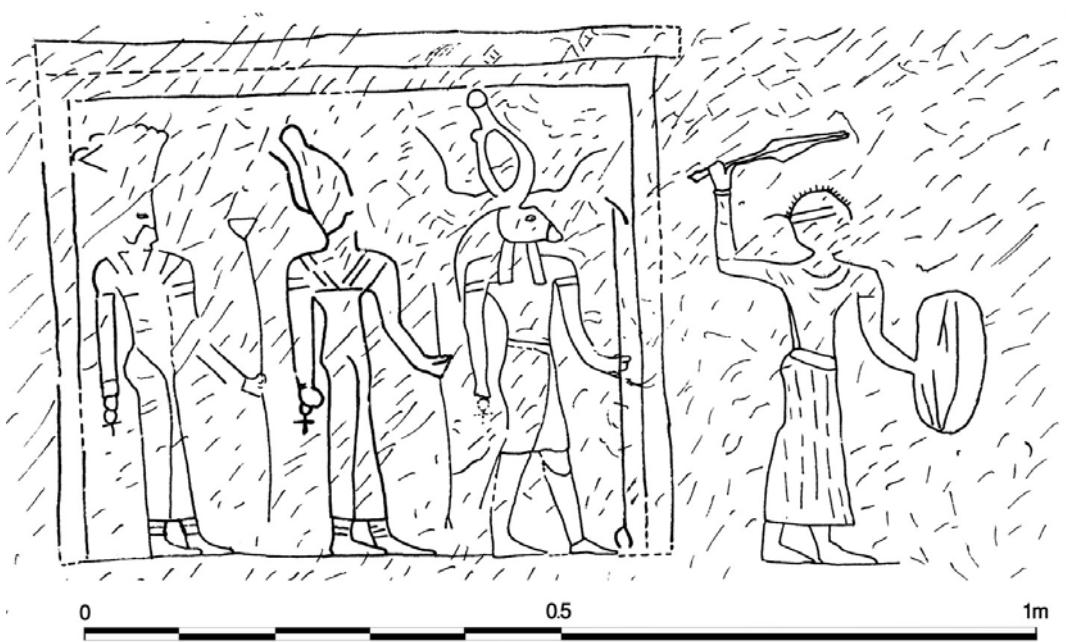
#### *Naq- el Fugani quarry*

In the predominantly Ptolemaic period quarry of Nag-el Fugani (see Chapter 6) and also on quarry faces nearby, many graffiti were found. Some of these were published by (de Morgan.*et al.*, 1894: 204). The main type of these graffiti are the stone jug with handle which occur in different sizes and shapes, often with other graffiti (Figure 39). On the lower part of the southern quarry face small areas of graffiti were also found, of particular note is the depiction of the local Aswan triad of cataract gods and goddesses, Khnum, Satet and Anukis in a small shrine. It is interesting that outside the shrine a standing man is depicted facing away, bearing the typical headdress associated with Nubian groups, carrying a shield and raising his sword (Figure 40). This may indicate the continuing Nubian/Merotic influence on the West Bank into these later periods, as indicated by Gatto and Giuliani (2007).



*Figure 39. Examples of graffiti found in Naq-el Fugani Quarry, West Bank.*





*Figure 40. Depiction of the local Aswan triad with standing man (Nubian/Meroitic) possibly of the Late Period*



#### *Other pharaonic inscriptions across the West Bank quarry landscape*

Most of these were found attached to some different archaeological sites, such as those dating between 18<sup>th</sup> and 25<sup>th</sup> Dynasties, around the small shrine on the stone land mark at Gebel Tingar perhaps used by both quarrymen ("builders and sculptors") and travellers along the desert routes into the Late Roman Period (Weigall 1909: 181-83; 1910: 438; Heldal *et al.* 2005; Jaritz 1981:19; de Morgan *et al.* 1894 (see also Chapter 3 and 9). At Gebel Qurna there are substantial Graeco-Roman quarries, rock-cut tombs and many inscriptions and graffiti in the form of signs and drawings of animals and men (some mentioned in de Morgan *et al.* 1894:202. Inscriptions near the cemeteries and monasteries in the environs of the Aswan Bridge have been documented by de Morgan *et al.* (1894: 204f) and Sayce (1894: 174), see also Porter & Moss (1937: 219). Located on a large sandstone block, which Sayce (1894: 174) called "Hagar el-Ghorab" meaning "the rock of the crow" just a few meters west of the asphalt road, there are many inscriptions. The eastern face of this block carries inscriptions dating from the Middle and New Kingdoms and shows various names and titles. The cliff behind this large block also has different types of inscriptions and rock art, partly published by de Morgan (1894: 204-5). Although these are probably mainly of Middle Nubian date (Gatto and Guiliani 2007), there is the likelihood that some may also date from earlier times, such as Nubian A-Group. Moreover, there may be a connection between these occurrences and the many burials, pottery and quarries found in the vicinity, perhaps dating from the Middle Nubian onwards (Gatto and Guiliani 2007).

#### *Greek (Demotic) Inscriptions*

The Greek inscriptions at Gebel Gulab, described by Klemm and Klemm (1993) and interpreted by Fournet (1996) tend to be concentrated in the mid-southern areas of the quarries where Late Ptolemaic and Early Roman Period quarrying is most evident (Figure 41). Fournet (1996: 144) suggests that these inscriptions are the last testimony of activity in the quarries, that may be connected with repairs that were made at this time to the 18<sup>th</sup> Dynasty Colossi of Memnon at Thebes. Although many of these graffiti probably refer to the names of quarry workers, one is particularly interesting as it refers to an architect with the name 'Prepalaos son of Orestês forgeron of Memnon'. Fournet (1996: 144-6) suggests that Prepalaos may have been sent to the West Bank to quarry for silicified sandstone restoration blocks, on the orders of Roman Emperor Septimie Sévère, to repair the colossi of Memnon between the end of 2<sup>nd</sup> century to early 3<sup>rd</sup> century AD. Other Greek inscriptions and graffiti in the quarries at Gebel Gulab and Gebel Tingar are also known in quarries to the north at el-Hosh, between Gebel Silsila and Edfu, where there is often a mingling of both Greek and Egyptian characters (Legrain 1906). These have been interpreted as either names of individuals, stone cutters marks, or could suggest private ownership of certain parts of the quarry in this later period (de Morgan *et al.* 1894; Legrain 1906; Dworakowska 1983; Fournet 1996).



*Figure 41. Greek inscriptions near small area of stone enclosures, southern Gebel Gulab*

#### *Rock art*

An overview of the rock art across the West Bank quarry landscape can be found elsewhere in this report (see Chapter 9), although it is important to point out that there could be a connection between some of the earliest rock art and procurement of silicified sandstone for grinding stones. For example, rock art occurs very close to the Late Palaeolithic grinding stone workshops in Wadi Kubbaniya and beside the grinding stone quarries at Gebel es-Sawan North. In the former case a Late Palaeolithic date of the rock art can be tentatively suggested; in the former case a Neolithic to Predynastic/Nubian A-Group date. The long cultural-historical antecedents that may be evoked from these occurrences and in particular their possible relationship with the earliest phases of grinding stone quarrying in the Late Palaeolithic, may suggest a range of associations linked to certain stone sources in respect of ancestry amongst kin-groups and/or as places where ritual activity occurred. This issue is discussed below.

## Discussion

As discussed in other chapters of this report, silicified sandstone exploitation on the West Bank has a history from at least the Middle Palaeolithic. From an archaeological perspective, the material remains described above present an extremely fragmentary picture of this long history of quarrying which has presented enormous challenges in extrapolating the chronology, social context and organisation of these activities. In the absence of radiocarbon dating, site OE1 presented the best and least disturbed area where some inferences can be made into the social context of these activities in the New Kingdom, inferred from indirect dating of associated material culture and consumption. The objective of the following discussion of these elements, along with similar features across the quarry landscape, is to construct hypotheses relating to the social dynamics behind silicified sandstone quarrying on the West Bank, paying particular attention to the New Kingdom.

### Dry-stone walled features/enclosures: dwellings for the quarry workers?

Usually occurring as clusters around natural rock outcrops or sometimes as single instances, the dry-stone walled features, or enclosures, as described above are common structures in ancient quarries in Egypt. Until recently these have often been interpreted as dwellings for the labour force (Shaw 1994, Harrell and Bown 1995). However, from excavation of comparative features in other ancient quarries in Egypt, such as Chephren's Quarry in Lower Nubia, it has become clear that in many instances these may have a range of functions such as wells, storage areas, ritual places or ephemeral shelters/workplaces (see Bloxam and Shaw 1999; Shaw and Haldal 2003; Bloxam 2003; Bloxam 2007). Determining the function of the range of stone enclosures found across the West Bank is difficult, although inferences can be made from their context in the landscape. For instance, as look-outs if they are located beside roads, wells if they occur at low-levels in or near wadis and perhaps work places/shelters if they are located in the quarries and have stone debitage associated with them.

As indicators of more permanent occupation, this may only be implied from the high-walled enclosures of the possible small Early Christian hermitage located in the environs of St. Simeon's Monastery. However, in the majority of cases the low-stone walled enclosures in the quarries, typically at Gebel Gulab and Gebel Tingar, would *not* suggest any form of permanent dwellings given the minimal amount of ceramics associated with them and their small size. Even in the one instance where there is a hearth, in an area of Late Ptolemaic to Early Roman Period shelters on the southern tip of Gebel Gulab, this would only suggest temporary habitations. In essence, unlike the large settlements that are associated with Roman Period quarrying in remoter parts of the Eastern Desert at Mons Claudianus (Peacock and Maxfield 1997) and Mons Porphyrites (Maxfield and Peacock 2001) there are no known purpose-built settlements linked to quarrying on the West Bank.

### Where might there be permanent settlements on the West Bank?

Habitations associated with the earliest phases of tool production in the Middle Palaeolithic are suggested as not being located on the hilltops where the workshops occur, but rather at the base of these in the surrounding wadis and along the peripheries of the floodplain (Butzer and Hansen 1968: 162). Such early dwellings or windbreaks,

2 – 4 metres in length and 70 cm high constructed from rock slabs, are known at Wadi Halfa and Abu Simbel (Butzer and Hansen 1968: 159, 162; Guichard and Guichard 1965: 86-111). The location of such features associated with the Middle Palaeolithic tool workshops at Gebel es-Sawan on the West Bank, may well lie under the deep accumulations of wind-blown sand directly beneath these production sites in the wadis.

Late Palaeolithic settlements on the West Bank are known at Wadi Kubbaniya (Wendorf and Schild 1989) and those of the Predynastic recently located at Nag el-Qarmila (A-Group/Naqada I-II) (Gatto and Guiliani 2007). Although permanent habitations dating between the Old and New Kingdom are largely unrepresented, this may be due to little investigation of the West Bank (see Chapter 2). However, since the Late Predynastic period onwards Elephantine Island and Aswan on the East Bank clearly assumed an importance as areas of permanent settlement into the modern era (Seidlmayer 1996; Kaiser, 1998; Kopp 2006). Hence, certainly during the dynastic phases of quarrying it is likely that these places were where quarry labour forces probably resided.

#### Stone enclosures with standing stelae in quarries: symbolic and ritual places?

One aspect of the stone enclosures in the West Bank quarries, particularly those at site OE1, is their association with standing stelae. To date this is unknown in stone quarrying contexts, although well-known in copper and gemstone mining sites in other parts of Egypt (Bloxam 2006). At the Serabit el-Khadim turquoise mines in the Sinai, dating to the Middle and New Kingdoms, Petrie and Currelly (1906: 64-7) recorded similar enclosures or courtyards containing standing stelae. At Serabit el-Khadim the stelae are generally inscribed with names of officials and evoke the goddess Hathor, the patroness of mining expeditions (op. cit.). Enclosures with inscribed stelae, usually evoking the goddess Hathor, were also recorded at the Middle Kingdom carnelian mines at Stela Ridge in the environs of Chephren's Quarry (Engelbach 1933: 70 –74); and at the Gebel Zeit galena mines (Castel and Soukiassian 1988; Castel and Soukiassian 1989). Yet, gods associated specifically with quarrying are few with only the god Min, the local deity of the Wadi Hammamat in the Eastern Desert, being evoked on quarry inscriptions in the region (see Bloxam 2006).

With no inscriptions on the standing stelae at Gebel Gulab, although these may have weathered away, evocation of gods from inscriptions in the environs of OE1 suggest that Ra was the most prominent deity associated with New Kingdom quarrying. Whereas at Khnum Quarry, Khnum and Satet, the local gods of Aswan are also evoked, suggesting a mingling of both local and 'state' religious ideologies. Whether private rituals and offerings to the sun god were made by quarry workers in these enclosures remains open to conjecture. However, in general terms, there seems to be a connection between silicified sandstone extraction at Gebel Gulab with the rise of the solar cults in the 18<sup>th</sup> Dynasty. These solar connections are discussed further below.

#### Standing stelae

Determining the function of standing stelae associated with extraction sites, in particular those that do not occur in or near stone enclosures, is problematic due to the *absence* of contextual data around them. The first suggestion, given their positioning in close proximity to the obelisk quarry at site OE1, is that they are visual markers/cairns to

demarcate the quarry. This obelisk quarry, unlike the larger Seti I quarry (which has no known visual markers), is small and quite difficult to find which may have necessitated the need to mark it, particularly when approaching from the east (the direction of the Nile). Alternatively, these stelae might have had some symbolic significance given their concentration in the 'royal' obelisk quarry, or could even be some kind of levelling, planning or measuring devices to do with the obelisk extraction process. Furthermore, we also have to take into account the use of standing stelae in contexts not specifically connected with quarrying, but maybe as symbolic markers of presence and/or associated with rituals. Stelae functioning in this context have been recorded in many instances across the West Bank: in the vicinity of Predynastic rock art, as votive markers to the embarkation point of the ancient desert route to Kurkur at Gebel Tingar (Jaritz 1981), near to possible burials and as markers of presence that form a processional way to a possible Early Christian hermitage (see Chapter 9).

### Symbolism attached to silicified sandstone: evidence in the quarries?

As mentioned in Chapter 4 the solar symbolism attached to silicified sandstone comes particularly to the fore during the dynastic period, given its 'glittering' visual appeal which became specifically sought after during periods when solar cults became prominent in religious and political ideologies. Symbolism linked to elite acquisition of other hard stones, such as basalt (black) and Chephren Gneiss (blue) in the Old Kingdom (3<sup>rd</sup> millennium BC), are also suggested as being wrapped-up in macro-level religious ideologies and cults of the time which attached great importance to the colour of these stones (see Hoffmeier 1993; Aston 1994; Aston *et al.*, 2000; Bloxam 2003). Although written sources suggest the solar symbolism attached to silicified sandstone use in dynastic times and the consumption record similarly may suggest this (see Chapter 4), is there archaeological evidence in the quarries to support such an hypothesis?

Site OE1 does tend to suggest a connection with religious change and the solar symbolism attached to silicified sandstone, given the cluster of hieroglyphs for '*mr-Ra*' ('beloved of Ra') occurring around the obelisk extraction site. These hieroglyphs also occur to a lesser extent at nearby Khnum Quarry and at Seti I Quarry, where the symbol also occurs with the royal cartouche of the king. In one instance "...beloved of [Amun-Ra]..." is written on a striding statue in the purple variety of silicified sandstone (now in the Luxor Museum) of Amenhotep III (Kozloff *et al.* 1992: 132, 134, 163 Fig v.14 and v. 15) - a form which resembles a partially worked statue blank found in the Gebel Sidi Osman quarries (see Chapter 6). This may also support an 18<sup>th</sup> Dynasty date for these quarries, specifically to the reign of Amenhotep III. However, it is important to remember that continuous non-elite grinding stone production occurred in all these quarries, which questions whether it is feasible to associate these religious/ritual symbols *only* with elite ornamental stone quarrying and simply the forwarding of 'state' religious ideologies. For instance, *mr-Ra* symbols placed on unworked blocks could be part of ancient surveying looking for useful stones, and/or could be the name of a team of quarry workers. Moreover, these connections with the solar cult may have much longer antecedents associated with the source of the stone. Such issues will be part of discussions in the 'Significance Report'.



### The social organisation of New Kingdom quarrying on the West Bank

In essence, site OE1 presents a microcosm of New Kingdom ornamental and grinding stone quarrying from which inferences can be made into the social organisation of these activities in the dynastic period. Levels of state involvement in these operations are key questions to address, particularly whether there is any validity in separating the organization and mechanics of quarrying for elite ornamental stone from that of utilitarian objects. For instance, to what extent was there 'state' involvement in organizing the work force for 'elite' projects and/or utilitarian quarrying. Were the quarries owned or monopolized by centralized government during the New Kingdom? Was grinding stone production a controlled activity? Moreover, is it possible to separate elite ornamental stone quarrying from that of utilitarian production?

#### Written sources as evidence of elite driven campaigns

Written sources, in particular the quarry inscriptions of the Wadi Hammamat in the Eastern Desert of Egypt dating to the Middle and New Kingdom's, have been used to address such questions (see Bloxam 2003, 2007; *et al.* in press). For instance, an expedition ordained by Senusret I to acquire greywacke for sphinxes and statues, records over 18,000 people being involved and organized along strict hierarchical lines (Goyon 1957). Such inscriptions have been interpreted as suggesting that quarrying for elite objects was only a state controlled activity, often to monopolized resources. However, from the archaeological evidence in ancient quarries of the Old Kingdom, surveyed within this project and before, it has become clear that there is a large disparity between the written version of events with the archaeological evidence (Bloxam 2003, 2006, 2007; *et al.* in press).

There are *no* written sources that specifically relate to quarry campaigns on the West Bank being driven by the elite or ordained by the king. However, there is one possible exception, that is the inscription of Bak and Men of the 18<sup>th</sup> Dynasty New Kingdom inscribed on a standing stela found in Aswan, although *not* in a quarrying context. Both Bak and Men have titles, 'overseers of works' and 'chief of the sculptors of the Red Mountain' which could refer to the silicified sandstone quarry at Gebel Ahmar in Lower Egypt (Habachi 1965). There is the implication that Bak and Men were sent to Aswan from Lower Egypt to oversee the quarrying of monuments for kings Amenhotep III and Akhenaten. Although this corresponds with the period of most intensive exploitation of the resource on the West Bank, it remains unclear if such sources can be taken literally and indeed these names are not known in the quarries. This issue is discussed further below.

#### Who owned the resource?

Archaeological evidence that would be expected if the source was monopolized, such as signs of ownership from inscriptions, or any constructions to restrict access, are unknown across the West Bank quarry landscape as a whole. A similar situation is presented at most ancient quarries and even at gemstone mines in Egypt prior to the Roman Period (Bloxam 2006). This absence of evidence would suggest relatively free access to the resource on the West Bank, so undermines previously held assumptions that stone sources exploited for elite objects were state monopolies. Moreover, with no purpose-built settlement that may give an indication of social hierarchies, this may

suggest that these activities were more loosely-structured within low-levels of social organisation.

The inscriptional evidence and graffiti in the quarries also tends to back this hypothesis up, given there are no official's or royal inscriptions (apart from those on the obelisk shaft at Seti I quarry) at the West bank quarries that would indicate exploitation being only a state organised activity. The absence of these types of inscription could suggest that a large part of the West Bank quarries were 'public' quarries not 'government/state' ones, suggesting that production for grinding stones and even for elite ornamental stone may not have been officially or state controlled, but perhaps more a local kin-based activity. Mechanisms to co-opt local labour forces for elite project quarrying, rather than monopolising the resource, may be integral to the social dynamics of stone quarrying here - an hypothesis that has been forwarded in relation to gemstone mining in the 2<sup>nd</sup> millennium BC (Bloxam 2006). Perhaps practice of this kind, outside of an over-riding state control of the resource, could reflect the continuous use of these quarries from earlier times as mainly situated within local kin-based groups. Hence 'ownership' of the resource was far more nuanced and possibly wrapped-up in social dynamics that linked the source with ancestry – the implications of this in regard to the significance of the West Bank quarry landscape will be discussed in more detail in the 'Significance Report'.

*Production evidence and other infrastructure: is it possible to separate the organisation of grinding stone production from that of ornamental stone quarrying?*

With dynastic ornamental stone quarrying representing only 10.6% of exploitation practices, concentrated between Gebel Tingar in the south and Khnum Quarries in the north, its visible transformation of the West Bank quarry landscape comes largely from the laying down of roads (see Chapter 8). The construction of this extensive infrastructure may suggest some different organisational apparatus coming into play, as clearly the construction of purpose-built roads and ramps would have required more labour-intensive work and possibly greater organisation. Whereas grinding stone quarries in general do not have such an elaborate infrastructure associated with them. Yet, it is interesting to note in respect of Khnum Quarry where ornamental quarrying took place, that there are no paved roads or ramps. This might imply a more flexible approach to the laying down of infrastructure suggesting this may only have happened when objects were completed, given that none of the ornamental objects in Khnum Quarry were finished. Hence, there may need to be some caution applied in assuming that the road construction necessarily implies a transformation to a strictly centralized and organized operation when it comes to ornamental stone quarrying. This is particularly apparent when compared with the rigid planning, forethought and organization associated with Roman Period resource exploitation, whereby such infrastructure, even housing, may often be constructed prior to extraction, as seen in the emerald mines in the Eastern Desert.

Production of large objects, in particular with the use of fire (see Chapter 6) may imply the introduction of additional stone production techniques associated with just ornamental quarrying, although some nearby grinding stone quarries also attest to the use of such a technology. In the Southern Quarries, grinding stone extraction and ornamental production for small objects specific to the New Kingdom suggests a blending of extraction techniques. Although there are difficulties in regard to assigning

contemporaneity, it is notable that stone selection related to colour is keenly observed, with the purple variety of the stone being specifically marked for ornamental purposes and the rest for grinding stones (see Chapter 6).

The type of stone tools used in the extraction processes are also important. For instance, were these locally acquired or were they brought to the site from elsewhere? It might be assumed that imported stone tools, perhaps pre-fabricated, may represent a more centralised and organised operation. Again there is a blurring of such boundaries as the use of locally occurring hard rocks, often as natural cobbles, are found in quarries across the West Bank, from the Late Palaeolithic into the New Kingdom. The largely New Kingdom Southern Quarries are of specific interest in this regard, given the high proportion of large naturally rounded cobbles of igneous rocks used in the extraction of both grinding stones and presumably ornamental objects. This would be related to the proximity of the Precambrian basement as a source. But there are exceptions, particularly where intensive quarrying took place at Gebel Gulab and Gebel Tingar, where there is a high density of "black" igneous rocks (dolerite and dark granodiorite) among the fragments of stone tools, that might have the same origins as the tools used in granite extraction on the East Bank. Given that these are largely fragments, it is hard to say how many of these were pre-fabricated. Moreover, it may be suggested that such tools were brought to the quarries by the labour force who resided close to such sources, such as the igneous outcrops on the islands and the East Bank and hence may have been more easily accessible than the gathering of river cobbles further to the south and north.

In essence, it seems that stone tools were mostly sourced from naturally occurring deposits that were in close proximity to where the stone was being extracted at any particular time. This further implies the difficulty of making a strict separation between the social organisation of ornamental stone quarrying as being something state 'centralised' with expeditions brought to the quarries from elsewhere specifically to extract ornamental stone, to that of quarrying for largely locally used grinding stones.

#### *Size of the labour force*

The inscriptional evidence in the quarries gives no idea of the size of a quarry labour force and with no permanent settlement it is extremely difficult to determine how many people were involved in these activities at any one time. Only inferences can be made from the material culture at site OE1 which suggests that relatively few people worked here, given the minimal amount of ceramics. Moreover, if the stone enclosures functioned as some form of temporary shelter, then certainly not more than 20 people could have resided here at any one time (see Bloxam 2003 for discussion on these aspects in other ancient quarries). It seems more feasible to suggest that during the dynastic period (and probably into the Roman Period) quarry workers traveled to the quarries on a daily basis from the permanent settlements at Elephantine and Aswan, or from other yet unknown settlements on the West Bank. Given the absence (except in one instance) of food preparation areas across the quarry landscape, this is further evidence for a largely small non-resident work force.

Although the evidence in the quarries may attest to small labour forces involved in quarrying, it would appear that during the periods when there was a considerable laying down of roads associated with ornamental stone quarrying, that this would have required a much greater investment of labour. However, some caution may be necessary

before jumping to such a conclusion because we only see the West Bank quarry landscape as a totality, or the ‘finished product’. The transformation of the landscape (still ongoing) represents the successive layering of material culture and other interventions across many millennia. Hence, with ornamental stone quarrying in the New Kingdom covering a period of approximately 80 years, and if a number of quarry roads were constructed only when an object was ready for transport, then this puts a slightly different perspective on the issue. Moreover, it is necessary to take into account later Roman Period re-building and repairs of these roads. In simple terms, the road networks we see today were probably not laid down in one single operation, but represent a layering of infrastructure across time. Hence, road construction over 80 years of New Kingdom ornamental quarrying may not necessarily have required any significant transformation to high levels of social organization or even substantially larger labour forces.

#### Long cultural and historical antecedents attached to silicified sandstone quarrying on the West Bank

Although macro-level ideologies and the quest for large objects in silicified sandstone may have led to the most significant transformations of the West Bank quarry landscape in the New Kingdom, particularly by road building, its shaping from stone quarrying is one that has antecedents to at least the Middle Palaeolithic (see Chapter 6). The longevity attached to exploitation of the resource on the West Bank is of key significance, given that continuous use of the resource for predominantly grinding stones represents approximately 80% of quarrying on the West Bank. It appears that this continuum was only occasionally punctuated by comparatively short-lived episodes of ‘royal’ acquisition, particularly in the New Kingdom. Moreover, even during periods of elite appropriation there appears to have been no significant separation or curtailing of the use of the stone for non-elite purposes. This situation is mirrored in the majority of hard stone quarries whereby utilitarian use of the stone ran hand-in-hand with elite appropriation (see Bloxam 2003; Bloxam and Heldal in press).

The social dynamics behind these practices and the role of kin-groups in such activities may be a long-lived social construct, given that the material culture across the landscape gives no indication of specific social transformations during periods of elite appropriation. For instance, built features such as shelters show no significant structural change, ceramics are minimal and remain only for basic utilitarian use with little or no evidence of food production. Even though quarrying for ornamental stone required additional techniques in technologies of extracting large stone blocks and the building of roads, rather than permanently transforming and revolutionising the social context of stone quarrying on the West Bank, it appears to have had rather a minimal impact. In other words, in comparison with the social and technological transformations that may be associated with the aftermath of the revolution to large-scale quarrying in the Northern Faiyum in the Old Kingdom (Bloxam and Heldal in press), these are not really visible on the West Bank during or after the New Kingdom.

It is significant that the technology of grinding stone production shows little difference in procurement techniques used across a deep time depth from the Late Palaeolithic to the Roman Period (see Chapter 6). Moreover, the ubiquitous oval-shaped grinding stone shows no significant development from the earliest forms, with only a small

movement towards a more standardised typology in the dynastic period. Hence, the more visible transformations of the West Bank landscape that may be associated with macro-level ideologies and the intervention of the 'state' in such activities may not be all that they seem. What there appears to be is an invisible underlying dimension to all these activities that situates its significance in the social dynamics and embeddedness in the landscape that may be extremely long-lived. Rock art, graffiti, inscriptions, stone enclosures, stone alignments, stone rings and the marginal quarries are all markers of a presence that to a greater or lesser extent may be linked to exploitation of this resource since the Palaeolithic, the implications and significance of which form a major part of the discussion in the 'Significance Report'.

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*Surveying the West Bank. Naq el Gulab and Aswan in the background*

## **Chapter 11: conclusions**

*Elizabeth Bloxam, Tom Heldal, Per Storemyr*

## **The Aswan West Bank quarry landscape: more to it than meets the eye**

In the QuarryScapes project description, we wrote about our survey at the Aswan West Bank:

*...perform an in-depth investigation of a complex and large quarry landscape*

At this stage, we can conclude that the quarry landscape is more complex and much larger than foreseen. As discussed in the previous chapter, the longevity of the production of largely utilitarian and non-elite stone products within a limited area is astonishing and has presented many challenges in interpretation – in that the West Bank as whole includes material culture from more or less all periods in the history of mankind. Moreover, it challenges the previous perception that we can view the quarries in isolation from other uses of the landscape. In fact, the possible integration of quarrying with other human activities forms one of the most interesting aspects of the research potential of the West Bank, but one that is highly demanding and truly multidisciplinary.

During our first visits to the area, we only saw the highly visible traces of ornamental stone quarrying and its infrastructure. However, we have concluded that this activity, although almost "monumental" in visibility, only constitutes a minor part of the quarry landscape. The term "peoples quarry" seems right, particularly as ancient quarrying, in an Egyptian context, is very often looked upon as the prestigious achievements of an elite. The Aswan West Bank may serve as an example of the opposite, the invisible but highly important stone acquisition for every day life. Using a modern analogy, most rocks and minerals exploited today are used for every-day "invisible" products, only a fraction of it reaches prestige buildings.

Seeing the most invisible quarries was one of the greatest achievements in the project; the more invisible, the farther back in time. We have used the term "neglected" about ancient quarries in general, due to their "underdog" position in archaeology and geology. Bringing it further, we have learnt that perhaps the most significant of the quarries easily become the "neglected among the neglected", thus reminding us of the need for a very careful and open approach when investigating such areas in general. This has also opened a new door to us in viewing quarry landscapes; how the subtle and discrete traces of ancient exploitation go hand-in-hand with the more visible and "monumental" quarries, in shaping the longevity of a landscape.

## **The West Bank – and the other side**

The West Bank of Aswan has been chosen as a case study area in QuarryScapes, although it is neither the most "impressive" quarry site in Egypt nor in Aswan. In fact, the exploitation of silicified sandstone on the East Bank was probably larger in volume, and when also counting the granite quarrying and mining activities east of the Nile, the West Bank remains the "little brother" within the huge "industrial" landscape that comprises ancient Aswan and its surroundings. However, the West Bank is still remarkably well preserved, which is important for studying the less visible and

monumental sides of a quarry landscape. The preservation of its complexity, still to a little extent broken up by modern development, is perhaps the main reason for its value as a case study area in the project: the ancient landscape, with its quarrying activities through thousands of years and the many other traces of human activity, is still visible.

### **On meeting objectives and the general application of methodology**

This work package can be described as a two-fold process; first, *deconstructing* the quarry landscape into its different elements as far as we have been able to, characterising the different elements of it based on several criteria. Then, *reconstructing* it as a means to see the longevity of the integrated landscape and how the elements in it play together. We still have a way to go on the latter, and see many challenges in further research.

However, the primary characterisation phase of the project ("deconstructing") and particularly the mapping methodologies and characterisation schemes were of crucial importance to enable interpretation of the site to aid in its future preservation. *Characterisation and interpretation* were among the main goals for this work package, and we believe we have reached as far as we could in doing so; in finding and mapping different typologies of quarries, interpreting chronological aspects and not least the social organisation of the ancient quarrying – the human dimension. Furthermore, we have included many features that could have a more indirect relationship to quarrying, such as rock art.

We believe the survey methodology can easily be transferred to other quarry landscapes, and contribute in unravelling such landscapes. Particularly, the importance of seeing not only a quarry face, but all the elements which are related to the exploitation and how these interact, cannot be underestimated. In research of ancient quarry sites there are some crucial points which, although put forward by many authors, are key issues:

- Realising that most quarries are multi-period and many are exploited for several product groups
- The importance of establishing typologies of quarries based on debitage analysis, quarry marks, logistic analyses, indirect or exact dating and artefact analyses
- The importance of knowing the geology of the resource that has been exploited
- The importance of extrapolating the social context of these activities
- The importance of consumption, or use of the stone, in its historical context, which again implies good provenance studies. Such are lacking for silicified sandstone in Egypt and is a key problem in determining consumption from various sources.

As an aid in trying to resolve such key questions, we found it very useful to combine a sufficiently accurate "hi-speed" survey with pre-designed GIS databases, which easily can be applied for different thematic maps and for spatial analyses of different datasets. Thus, the structure described in Appendix 1 can easily be transferred to other similar sites.



### **Important issues for conservation**

The first step in conservation of such a site is to know the different elements in it and the exact location of them. This is largely achieved in the project so far, and the GIS database, when "translated" to a form that is usable in heritage management, make the foundation for moving further – literally putting it on the map.

However, the next step is less easy. The West Bank quarry landscape is huge, and it is hardly realistic to preserve all of it. In the northern part, large construction work has already destroyed large parts of this landscape, and modern infrastructure and building activities are gradually eating its way into the rest of it. So, how to deal with such a large cultural/quarry landscape which is in acute danger of being destroyed?

This leads us to a big question: how important is the site? Which part of it is most important? And how can we evaluate its significance? There are no "monumental" stone quarries attracting loads of tourists such as the "unfinished obelisk" in the East Bank Aswan granite quarries, although a certain "monumentality" may apply for parts of the area, such as Gebel Gulab. However, most of the quarry landscape constitutes rather mundane archaeological remains which are largely non-monumental in character - the significance of the quarry landscape seems to lie in its less visible attributes which collectively constitute one of the world's most long-lived cultural landscapes transformed by stone quarrying. Hence, we need to develop methodologies to draw out and articulate the significance of the socially constructed landscape and its relationship with stone quarrying in other ways and this will be addressed in the forthcoming and last report of this work package.

Another important step towards conservation is analyses of risks to the quarry landscape. Importantly, how and where such risks may have the largest impact on key elements of it and how these may compromise its significance. This will be addressed in Work Package 5 in a forthcoming report in the autumn 2007.

# **Appendix 1: documentation of the QuarryScapes Aswan West Bank field survey: GIS and databases**

*Per Storemyr, Tom Heldal*

# 1 Introduction

The GIS and database system for the QuarryScapes Aswan West Bank Archaeological and Geological Survey consists of several modules:

**Satellite images and topographical maps:** Various satellite images (KH7, Landsat, Ikonos, QuickBird) and topographical maps (Egyptian 1:50.000 series etc.) provide the basis for field recording and map-making

**Topography:** Features such as contours, the Nile, place names etc. are recorded as polygons, lines and points and stored in several shapefiles for use in ESRI ArcMap GIS

**Geology:** Bedrock geology – lithological units – is recorded as polygon shapefiles. Some key observations of geological features are recorded in point shapefiles.

**Archaeology:** *Point recording:* Features and themes recorded as points (usually with GPS) are stored in an MS Access relational database, which can be accessed using ESRI ArcMap GIS (but not edited in GIS)

*Polygon and line recording:* Features and themes recorded as polygons and lines are stored in several shapefiles for use in ESRI ArcMap GIS

**Modern development:** Modern development includes themes such as built areas, construction zones, power lines, roads etc. and are stored in polygon and line shapefiles showing the status in 1965, 1990 and 2005 (actually until 2006), respectively

**Various:** Themes such as an outline (polygon shapefile) of all ancient quarry areas in Aswan and typical tourist sites (point shapefile) are also part of the system.

**Table 1** gives an overview of all shapefiles in the system (excluding geology; see below).

**Table 1:** *Overview of shapefiles in the GIS*

aswan_ancient_quarries_outline.shp
aswan_tourist_sites.shp
awb_archaeology_general_line.shp
awb_archaeology_general_poly.shp
awb_archaeology_mrta_obelisk_line.shp
awb_archaeology_mrta_obelisk_point.shp
awb_archaeology_mrta_obelisk_poly.shp
awb_archaeology_roads_interpret.shp
awb_archaeology_surveyarea.shp
awb_modern_1965_line.shp
awb_modern_1965_poly.shp
awb_modern_1990_line.shp
awb_modern_1990_poly.shp
awb_modern_2005_line.shp
awb_modern_2005_poly.shp
awb_topo_contours_10m.shp
awb_topo_contours_20m.shp
awb_topo_contours_5m.shp
awb_topo_placenames.shp
awb_topo_waterfeatures.shp

Note that the described version of the database and GIS-system is intended for research purposes only. All digital files are stored in the archive of the Geological Survey of Norway.

Other documentation of the survey, such as photos, special catalogues, plans and drawings, and SCA-reports are also stored with the Geological Survey of Norway.

**Note that the GIS and databases are designed for use in the coordinate system UTM WGS 84 (Zone 36R)**

## 2 Satellite images

Satellite images have been provided from the following sources:

### **KH7**

This is a declassified satellite image from 1965 with originally 2-3 m resolution. It has been obtained from the USGS as a large photo, which was scanned at the Geological Survey of Norway. The image has the original code "KH7\_DZB00401800058H035001". Since it has been shot at a very oblique angle, it has been difficult to rectify.

### **Landsat**

This is an ETM+ Pansharpened image with ca. 14 m resolution. It has been obtained for free at the USGS website (info at [http://eros.usgs.gov/products/satellite/landsat\\_ortho.html](http://eros.usgs.gov/products/satellite/landsat_ortho.html)). Data acquisition was undertaken around 2000 (+/-1 year). The downloaded original image package has the file name epp176r040\_7f20001010.tar. The image comes ortorectified (UTM WGS 84) and terrain corrected as a geotif. The accuracy is good enough for overview map-making.

### **Ikonos**

This image was shot in 2000 and has ca. 1 m resolution. It was generously provided as a geotif from the Swiss Institute in Egypt. The probable scene ID at [www.spaceimaging.com](http://www.spaceimaging.com), who sells such images, is 2000006898400THC.

### **QuickBird**

This image has 0.6 m resolution. It was originally provided as an ortorectified geotif (UTM WGS 84) from [www.digitalglobe.com](http://www.digitalglobe.com). The image consists of several scenes shot in 2005 (scene coverage can be seen at Google Earth).

### **Google Earth**

In addition, Google Earth (<http://earth.google.com>) is a very good source of satellite image data. High-resolution QuickBird images (included in Google Earth) for the Aswan area have been available since 2005-2006. For the New Aswan City area, a patchwork of scenes taken from Google Earth has been put together for the GIS-system.

Due to general difficulties of rectification, provided satellite images have usually been split up and rectified to cover particular areas with good to reasonable accuracy (1-15 m). The following satellite image files are part of the system (see also **fig. 1**):

**kh7\_1965\_[awb].tif**

This Image is not very accurate in the southern part (Gebel Tingar-Gebel Gulab), but good in the northern part (Wadi Kubbaniya). Can be used for overview map-making and gives a very good impression of the actual state of the area (infrastructure, roads etc.) in 1965.

**kh7\_1965\_[gulab].tif**

This image was rectified for particular use in the Gebel Gulab-Gebel Tingar area.

**landsat\_2000.tif**

Image covers the whole area

**ikonos\_2000\_[gulab].tif**

Rectified for particular use in the Gebel Gulab area, but accuracy is quite good also towards Gebel Tingar in the south and Gebel Sawan in the north

**quickbird\_2005\_[sawan\_newaswancity].tif**

Rectified for general use in the area between Gebel Sawan and the southern tip of New Aswan City. Accuracy is within 5 m or so, but the following images are of even better accuracy.

**quickbird\_2005\_[faras\_n].tif**

Rectified for the area just to the north of Wadi Faras. Very good accuracy.

**quickbird\_2005\_[sawan\_n].tif**

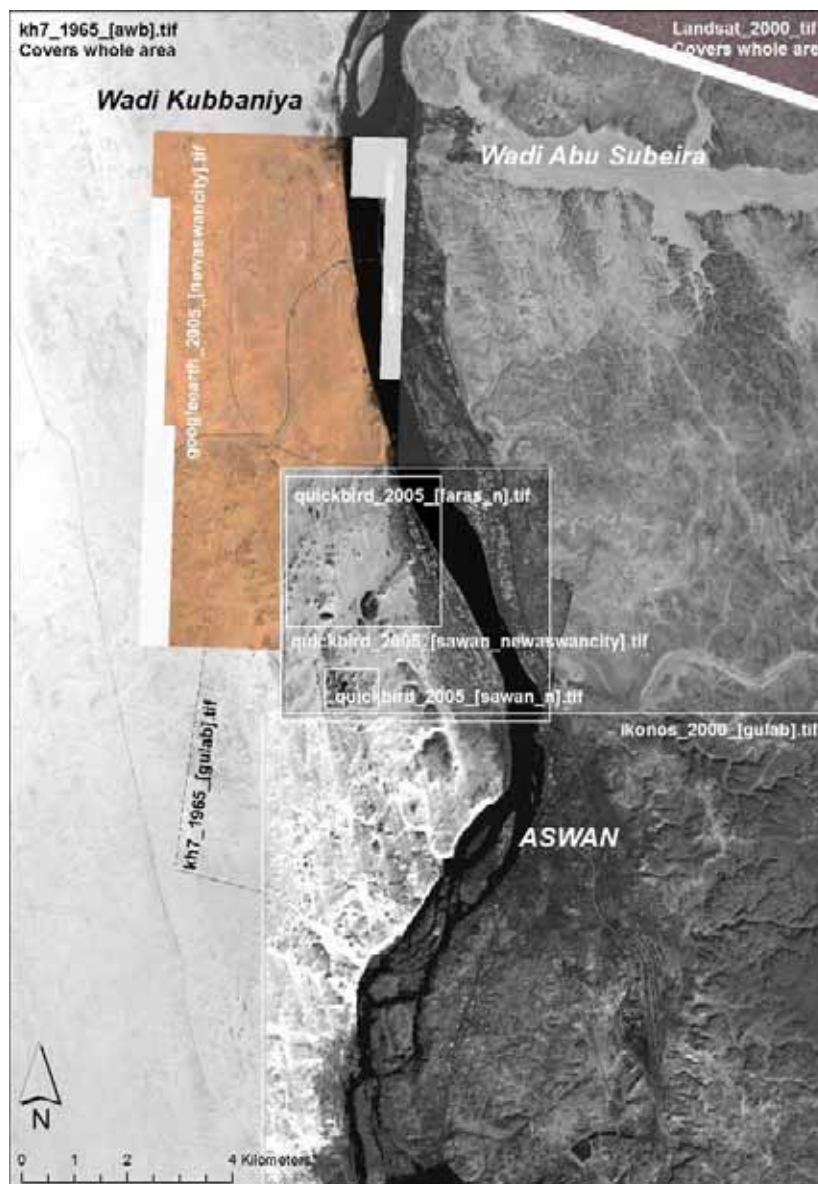
Rectified for a small area of the north part of Gebel Sawan. Very good accuracy.

**googleearth\_2005\_[newaswancity].tif**

A patchwork with resolution of some 1-2 m and accuracy within 10-20 m. Some patches do not align properly. Can be used to monitor the development in and around New Aswan City.

In addition to these satellite images, a range of other detailed images from Google Earth have been used as an aid in the recording process.





**Fig.1:** Overview of satellite images in the GIS

### 3 Topographic maps

The following maps are included in the GIS (**fig. 2**):

#### [aswan\\_1991\\_1\\_50000.tif](#)

Sheet "Aswan" in the Egyptian 1:50.000 series, 20 m contour interval (NG36B3b), published in 1991 by EGSA

#### [aswan\\_1934\\_1\\_25000.tif](#)

Part of sheet "Aswan" (portions of sheets 15/795 and 15/810 Egypt), 1:25.000, 10 m contour interval, published in 1934, second edition in 1941, reprinted with corrections

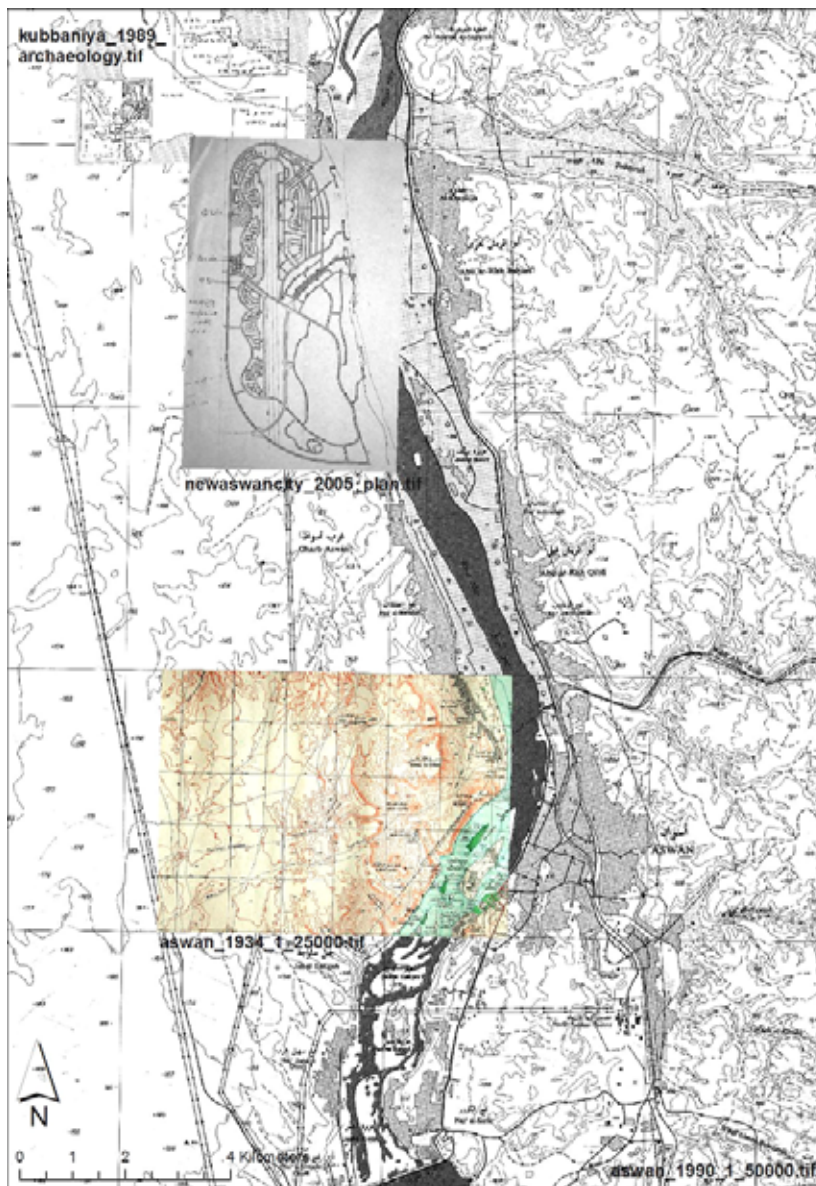
in 1949. The map has been roughly rectified, and its value is in particular related to the location of desert roads and routes.

**[kubbaniya\\_1989\\_archaeology.tif](#)**

Overview map of Palaeolithic sites excavated in Wadi Kubbaniya in the late 1970s and early 1980s. The map has been taken from: Wendorf, F. & Schild, R. (editors): The Prehistory of Wadi Kubbaniya, Dallas: Southern Methodist University Press, 1989, Vol. 2, p. 3. The map has only been roughly rectified due to the lack of reference points.

**[newaswancity\\_2005\\_plan.tif](#)**

Map of the planned extension and road system in New Aswan City, generously provided by the New Aswan City Authority in Aswan.



**Fig.2:** Overview of maps in the GIS

## 4 Topography

The following shapefiles describe the topography:

[awb\\_topo\\_contours\\_5m.shp](#)

[awb\\_topo\\_contours\\_10m.shp](#)

[awb\\_topo\\_contours\\_20m.shp](#)

These shapefiles (line) only contain contours, which have been taken or interpreted from topographic maps. The files are self-explaining.

[awb\\_topo\\_waterfeatures.shp](#)

This shapefile (polygon) contains an outline of the Nile, (dry) wadi courses and a natural spring. Due to variations in the Nile level, the outline of the river is only approximate. The file is self-explaining.

[awb\\_topo\\_placenames.shp](#)

This is a shapefile (point) with place names in the area at the West Bank. Sources of place names are topographic maps, local residents, and a few names have been given by the survey team. The file is self-explaining.

## 5 Geology

[awb\\_geo\\_units.shp](#)

[awb\\_geo\\_points.shp](#)

Distribution of the main geological units in the area and key observations.

## 6 Archaeology

The database and GIS recording of archaeological features was only fully developed in November 2005. Most of the data collected in the preceding field seasons in March 2004 and March 2005 has been reconstructed to fit the database and GIS-format. For further information field notes can be consulted. Documentation of the archaeological survey can be found in the following files:

### 6.1 Survey area shapefile

[awb\\_archaeology\\_surveyarea.shp](#)

This shapefile (polygon) documents the actual surveyed area. The survey has been classified in the following types (classes):

- *Reconnaissance*: visiting areas with known or assumed sites, partial recording
- *Extensive*: Systematic field walking, often aided by satellite images; locating and recording sites. An attempt has been made to cover as much as possible of the surface archaeology.
- *Intensive*: Complete or near-complete coverage and recording of the surface archaeology, occasional planning and clearing of sand

- *Detailed*: Detailed investigation of selected areas, planning, some clearing of sand. Otherwise, the content of the shapefile is self-explaining.

## **6.2 MS Access point database – archaeology general**

### **awb\_archaeology\_general\_points.mdb**

The MS Access database is divided in three modules (see also **fig. 3**): 1) General point database; 2) Rock-art database; 3) Plans database:

The **general point table (name: AWB\_Point)** is based mainly on GPS-recording of surface archaeological features with a limited extent, such as pottery scatters, rock-art panels, shelters etc. Some locations have, however, been taken from the rectified satellite images. In **annex 1** is a detailed description and explanation of the database, including classes, subclasses and dating. The features recorded can be visualised in ESRI ArcMap GIS, using the command "Display XY data". There is no two-way connection between the database and the GIS, and thus records cannot be edited in ArcMap. This option has not been included due to update and security reasons.

The **rock-art table (name: Rockart)** is related to the general point database (via Survey ID numbers), and describes in detail the characteristics of recorded rock-art panels (individual panels have been used as the primary entity during surveying), such as type and number of figures, setting in the landscape etc. The database also includes various statistical overviews of rock-art. This table will be described in detail in a forthcoming QuarryScapes report.


The **plans table (name: Plans)** is not related to the other databases; it gives an overview of small areas in which detailed planning and drawing have been made during the survey:

<b>Field</b>	<b>Description</b>
Sitecode	Site code given to the survey area
Relations	Relationships with features recorded and documented in the general point database and shapefiles (using SurveyID numbers)
X	X coordinate (Easting), UTM WGS 84, Zone 36 R
Y	Y coordinate (Northing), UTM WGS 84, Zone 36 R
Class	Class of feature such as grinding stone workshop/quarry, tool workshop etc.
DrawingNo	Numbers of all plans and drawings made
ReportNo	(if applicable)
PhotoNo	Photos taken of the planned or drawn areas
RecordingDate	Date of the work
Descript	Further description of the work



Start : Formular

### QuarryScapes Aswan - Gebel Gulab/West Bank Survey



**Go to:**

General point database

Rockart database

Plans database

**Update:**

1 Update rockart summary

2 Update rockart summary ind

3 Update rockart summary tot

4 Update rockart summary all

**Fig. 3:**

A glimpse at the MS Access database.

Top: Main navigation panel

Middle: The general point database

Bottom: The rock-art database (this database is not described in detail in this appendix)

AWB\_Point

### QuarryScapes Aswan - Gebel Gulab/West Bank Survey: Point registration

Save New Rec.

**Identification**

SurveyID: P209

Old\_ID: P121A

Loc\_ID:

**Coordinates:**  
UTM WGS 84,  
Zone 36 R

X (Easting): 487229

Y (Northing): 2665862

Z (Elevation):

**Classification**

Class: man-made feature

Subclass: ephem structure

**Information on Subclass**

For artefact: grindstone, ornstone, large ornstone, standstone, pounder, other  
For pottery: no subclass  
For man-made feature: elab structure, ephem structure, stone heap, loading ramp, other  
For epigraphic: rockart, inscription, combination, other  
For other: no subclass

**References**

Photo reference: GG04\_533-535, 539; GG05\_406, 734-35; PS Nov 2006: 5124-5

Drawing/Plan reference:

Report reference Link:

**Features**

Amount: scatter

Estimated Period: uncertain

Interpretation:

Conservation state:

**Information on Amount**

For artefact: Actual number (for ornstone), otherwise single, scatter, assemblage  
For pottery: single, scatter, assemblage  
For man-made feature: single, scatter, assemblage

**Information on Interpretation**

For artefact intention, e.g. statue  
NB! For pottery: Dating using special codes (NL, PD, ED, OK, MK, NK, LP, FP, RP, BP, IP)  
For man-made feature: e.g. dwelling, shelter, work place, symbolic enclosure

**Description**

At least 3 collapsed, rather elaborate stone circles, made from quite large stones, some still standing. Difficult to interpret function, they do not seem to be burials. Earlier interpreted as a stele area, but this does not seem to be correct.

**Recording date**

06.03.2005

Datensatz: 186 von 456

Rockart

### QuarryScapes Aswan - Gebel Gulab/West Bank Survey: Rock-art recording

SurveyID: P227

Old\_ID:

Loc\_ID:

X: 486788

Y: 2665625

Z: 168

Subclass: rockart

Topo: terrace

Sitetype: slab

Orient: w

Shade: open

Hor\_ver: semihorizontal

Rock: sandstone

NatSurf: netsurf

Varnish1: weathered

Varnish2: weather

Method1: opecked

Method2: wpecked

Method3:

PresQuer: not relevant

Cons\_stat: verypoor

Condition: no

NatRisk: windsand

Rec\_date: 13.03.2005

DiscovBy: ps

Up\_Date: 28.03.2005

UpdateBy: ps

**Number of individual figures, symbols and other features**

Elephant: ☐ Dog: ☐

Giraffe: ☐ Fox: ☐

Croc\_liz: 2 Ostrich: ☐

Ante\_gez: ☐ Bird: ☐

Ibex: ☐ Butterfly: ☐

Cattle: ☐ Snake: ☐

Ass: ☐ Zoo\_unkno: 1

Fish: ☐

GeoComp: 4 Curvline: ☐

GeoFig: ☐ LongLine: ☐

ConcGeof: 1 RainLine: ☐

Sun: ☐ Gameboard: ☐

ConcSun: ☐ OfferTabl: ☐

Circle: 1 Foot: ☐

ConcCirc: 5 Sendal: 1

Line: 4 GeoUndef: ☐

Sicklebt: ☐ Uncertain: ☐

Squarebt: ☐ Crack: ☐

Sailbt: ☐ Edge: ☐

Scoop: ☐ Ridge: ☐

Peckmark: ☐ Ripples: 1

Incised: ☐ Depress: ☐

Humfig: ☐ Colour: ☐

Plants: ☐ NatOther: ☐

**Amount: medium**

Photo\_ref: GG05: 1173-86, 1196-97; PS Nov 2006: 5111-3

Drew\_ref:

Reprt\_ref: Rock-art catalog and special database

Repr\_Link:

**Description:** Large geometric compositions, following ripples in stone. Some discontinuous, pecked lines probably younger than bulk.

**Notes:**

Datensatz: 73 von 199



### **6.3 Polygon and line shapefiles – archaeology general**

#### **awb\_archaeology\_general\_poly.shp**

This shapefile (polygon) documents extensive archaeological surface features, such as quarry areas, large areas with standing steles, cemeteries, built structures etc. A detailed description and explanation of classes and features can be found in **annex 2**.

#### **awb\_archaeology\_general\_line.shp**

This shapefile (line) documents linear surface features such as quarry roads, desert tracks and stone alignments. A detailed description and explanation of classes and features can be found in **annex 3**.

#### **awb\_archaeology\_roads\_interpret.shp**

This shapefile (line) contains an *interpretation* of quarry and desert roads, based on the documentation in "awb\_archaeology\_general\_line.shp". The file is self-explaining, but see **annex 3**, if required.

### **6.4 Polygon, line and point shapefiles – archaeology details**

An area at the north tip of Gebel Gulab was subject to a very detailed GIS-based surface survey in March 2005. The place in question is at and around the so-called "MrRa obelisk area", also designated with the site code "OE1". The following shapefiles document the survey:

#### **awb\_archaeology\_mrRa\_obelisk\_poly.shp**

#### **awb\_archaeology\_mrRa\_obelisk\_line.shp**

#### **awb\_archaeology\_mrRa\_obelisk\_point.shp**

The files should be reasonably self-explaining, but consult **annex 1-3** in case of questions. Note that these three shapefiles cannot be projected together with other shapefiles or points, as they duplicate many features in awb\_archaeology\_general\_poly.shp, awb\_archaeology\_general\_points.mdb and awb\_archaeology\_general\_line.shp.

### **6.5 Comments to the recording of archaeological features**

#### **Accuracy**

The accuracy of point recordings with GPS is normally in the order of +/- 3-5 m, occasionally +/- 10-20 m. For polygon and line features the accuracy is normally as good as the accuracy of the satellite image used as a basis for drawing the features in GIS – usually in the order of +/- 5-20 m. This does not apply to polygon and line features that were originally recorded using GPS tracklogs (or GPS connected to handheld computers with ESRI ArcPad), in which cases the accuracy is +/- 3-5 m.

It should be noted that it may be very difficult to find the actual border of quarry areas and other area features; thus the accuracy is certainly also determined by interpretation in the field.

### **SurveyIDs and site codes**

Most recorded archaeological features have a SurveyID based on the person who originally recorded the archaeological feature plus a running number (e.g. AK200):

AK: Adel Kelany  
EB: Elizabeth Bloxam  
PD: Patrick Degryse  
P: Per Storemyr  
T: Tom Heldal

For various reasons, on quite a few occasions new SurveyIDs have been given to features during entering of data into the database and GIS-system. In such cases the old IDs are usually kept in a special field ("OldID").

A few places have been given special site codes, especially those at which planning and drawing was undertaken. For these areas, the best overview can be found in the plans database in awb\_archaeology\_general\_points.mdb.

### **Notes to the survey, GIS and databases**

Quite a few archaeological sites known before the survey started have been represented in the polygon shapefile (awb\_archaeology\_general\_poly.shp) with a short description and reference to former surveys, investigations and excavations. This does not apply to the survey of the central quarry areas at Gebel Gulab, Gebel Saman, Gebel Sidi Osman and Gebel Tingar by Klemm & Klemm: *Steine und Steinbrüche im Alten Ägypten*, Springer, 1993. Moreover, there are no references to former investigations for the most well-known sites, such as the rock-cut tombs at Gebel Gubbet el-Hawa, St. Simeon's monastery and various hieroglyphic inscription sites along the Nile by New Aswan City. For reference to such sites, see e.g. Porter & Moss: *V. Upper Egypt Sites*, Oxford: Clarendon Press, 1937.

At the central part of Gebel Gulab, at Gebel Saman, Gebel Tingar, as well as at (and around) the ancient hermitage north of St. Simeon's monastery, ephemeral shelters and stone enclosures are marked as polygons (as "shelter area"). In other areas such features are recorded as points in the general point database ("ephemeral structure").

The field recording of artefacts and stone tools does not give a representative picture when plotted in the GIS. The reason for this is that many (quarry)areas have such an enormous amount of such features; thus they are rather described in the respective polygon recordings. Very detailed recording of artefacts and tools by EB (Elizabeth Bloxam) has often been classified as "other" in the Access point database. Pottery distribution is best represented at Gebel Gulab, but quite well in other areas, too (except in areas with archaeological sites known before the survey started, at which pottery has only rarely been recorded).

For pottery recording in the general point database: When the recording date is not known, the following approximations have been used: 1.3.2004 means March 2004, 1.3.2005 means March 2005, 1.11.2005 means Nov 2005.

Only lower-case letters have been used when entering data in the Access database and GIS shapefiles, except in the description field.

## 7 Modern development

The following shapefiles give an overview of the development of modern infrastructure in the survey area:

[awb\\_modern\\_1965\\_line.shp](#)  
[awb\\_modern\\_1965\\_poly.shp](#)  
[awb\\_modern\\_1990\\_line.shp](#)  
[awb\\_modern\\_1990\\_poly.shp](#)  
[awb\\_modern\\_2005\\_line.shp](#)  
[awb\\_modern\\_2005\\_poly.shp](#)

These shapefiles (line and polygon) show the infrastructure (built areas, construction zones, power lines, roads etc.) in 1965, 1990 and 2005, respectively. The data are taken from the Aswan 1934 topographical map and the 1965 KH7 satellite image (for 1965), from the Aswan 1991 topographical map (for 1990) and from Quickbird images, Google Earth images and observation/survey (2005). In **annex 4 and 5** are detailed descriptions of fields and classes in the shapefiles.

### Notes to the modern development shapefiles

The shapefiles give a rather coarse overview of the infrastructure. Accuracy is sometimes poor, especially for data taken from the 1991 Aswan topographical map.

Note also that many modern vehicle tracks in the desert have not been drawn; there are especially many at and around Gebel es-Sawan and Gebel Tingar, and to the west of Tingar. Some modern quarries can be seen on the 1965 KH7 satellite image, but most such quarries are so small (or so recent), that it is not possible to really follow the development for such quarries. However, most modern quarries are part of the 2005 shapefile (polygon), except where it is very difficult to distinguish between modern and ancient quarries, in particular in the area just to the SE of Wadi Faras.

## 8 Various shapefiles

### [aswan\\_ancient\\_quarries\\_outline.shp](#)

This shapefile (polygon) gives a rough overview of known quarry areas in the Aswan region (from the Old Dam in the south to Wadi Kubbaniya/Khor Abu Subeira in the north). The file is self-explaining.

### [aswan\\_tourist\\_sites.shp](#)

This shapefile (point) includes a few tourist sites in the Aswan region. The file is self-explaining.

## Annex 1: MS Access database – table: **AWB\_Point**

Field	Classes/Explanation	
Survey_ID	Survey ID for single objects/features, scatters and assemblages. Every person uses its own “running ID-system”, e.g. EB345 and AK234	
Old_ID	Cross-reference to possibly old ID if the object/feature has been (partially) recorded earlier	
Loc_ID	Code of the location (if any). This is defined by discussion after fieldwork. Should be filled in when necessary/applicable	
X	Easting in UTM WGS84, Zone 36R	
Y	Northing in UTM WGS84, Zone 36R	
Z	Elevation above mean sea level (from GPS data, rather inaccurate)	
Class	<b>artefact, pottery, man-made feature, epigraphic, other</b>	
Subclass	<i>for artefact (finished or under production)</i>	
	<b>grindstone</b>	Grinding stone, all types, also bases
	<b>ornstone</b>	Ornamental stone, such as stela. Such objects do not need elaborate infrastructure for transportation
	<b>large ornstone</b>	Large ornamental stone, such as obelisk, statue etc. Such objects are generally larger than 0,5 m3 and need elaborate infrastructure for transportation (roads, ramps)
	<b>standstone</b>	Standing stone of all types, typically single (or scatters of) simple stela. Not to be confused with standstone area/stele area, which generally cover larger areas (registered as polygons)
	<b>pounder</b>	Pounders and pounder fragments, stone type not found in-situ or in immediate vicinity, such as granite, dolerite. Only few of these are actually registered, since they are so numerous at the Aswan West Bank.
	<b>stone tool</b>	stone tool other than pounder
	<b>stone vessel</b>	e.g. small stone "bowls"
	<b>other</b>	
	<i>for pottery:</i>	No subclass
	<i>for man-made feature</i>	
	<b>elab structure</b>	Typically elaborate shelters with well-built stone walls, dwellings
	<b>ephem structure</b>	Stone enclosures of all kinds, wall fragments, overhangs possibly used as shelters etc. Not intended for dwelling
	<b>stone heap</b>	All types of stone heaps, such as possible burials, cairns etc.
	<b>loading ramp</b>	Loading ramp for stone transportation, not to be confused with causeway

	<b>other</b>	
	<i>for epigraphic:</i>	
	<b>rockart</b>	rock-art and graffiti from all periods (although modern graffiti are not normally registered, only when it seems suitable). Also including scooped-out depressions and peckmarks
	<b>inscription</b>	typically hieroglyphs and Greek inscriptions
	<b>combination</b>	combination of rock-art/graffiti and various types of inscriptions
	<b>other</b>	
	<i>for other</i>	“Dump”, in which e.g. quarries registered as points are entered. Remember good description!
Amount	<i>for artefact:</i>	<b>Actual number</b> (for ornstone), otherwise <b>single, scatter, assemblage</b>
	<i>for pottery:</i>	<b>single, scatter, assemblage</b>
	<i>for man-made feature:</i>	<b>single, scatter, assemblage</b>
	<i>for epigraphic:</i>	<b>few</b> (1-5 single figures and/or inscriptions), <b>medium</b> (6-20), <b>many</b> (>20)
Interpret	<i>for artefact:</i>	for what the artefact was intended for, e.g. Osiris statue (when applicable)
	<i>for pottery:</i>	Dating of the pottery, according to analyses by pottery expert. <ul style="list-style-type: none"> <li>• <b>NL</b>: Neolithic</li> <li>• <b>PD</b>: Predynastic</li> <li>• <b>ED</b>: Early dynastic</li> <li>• <b>OK</b>: Old Kingdom</li> <li>• <b>MK</b>: Middle Kingdom</li> <li>• <b>NK</b>: New Kingdom</li> <li>• <b>LP</b>: Late Period</li> <li>• <b>PP</b>: Ptolemaic period</li> <li>• <b>RP</b>: Roman period</li> <li>• <b>BP</b>: Byzantine period</li> <li>• <b>IP</b>: Islamic period</li> <li>• <b>MP</b>: Modern (19<sup>th</sup> c. and later)</li> <li>• <b>uncertain</b></li> </ul> In case of multiple dates, use "/" for division, e.g. NK/RP
	<i>for man-made feature:</i>	e.g. dwelling, temporary shelter, work place, symbolic enclosure
	<i>for epigraphic:</i>	
Est_period	Estimated period (educated guess!): <b>palaeolithic, neolithic, (prehistoric), predynastic, dynastic, graeco-roman, byzantine, islamic, modern</b> (from the 19 <sup>th</sup> Century onwards), <b>multiple</b> . Note! This is a pure date estimation, and has not necessarily anything to do with cultural affiliation (e.g. A-Group, C-Group).	



Cons_stat	<b>vandalism, theft, modern graffiti, modern quarry, mass movement, vehicle traffic, other</b>
Photo_ref	Reference to the personal photographs taken (digital). It is important to note the personal number of the photos taken already in the field.
Draw_ref	Reference to drawing/sketch made (reference typically based on locality and IDs, as well as name)
Reprt_ref	Reference to report (internal or external, also paper, if applicable). Reference typically based on locality and IDs, as well as name
Rec_date	Date of field recording
Descript	Here it is important to add everything of interest!

## Annex 2: Shapefile – awb\_archaeology\_general\_poly.shp

Field	Classes/Explanation	
Survey_ID	Survey ID. Every person uses its own “running ID-system”, e.g. EB345 and AK234.	
Old_ID	Cross-reference to possibly old ID if the object/feature has been (partially) recorded earlier	
Loc_ID	Code of the location (if any). This is defined by discussion after fieldwork. Should be filled in when necessary/applicable	
Class	<b>quarry, mine, work area, collection area, shelter area, standstone area, stone heap area</b> (meaning undefined stone heaps), <b>built structure, settlement, cemetery, other</b> (spoil heap was also used earlier, but should be avoided, record as part of quarry; shelter areas recorded as polygons, single/few shelters recorded as points.)	
Subclass	<b>for quarry:</b>	
	<b>small toolstone</b>	Scattered production of stone tools, but no working floors
	<b>toolstone</b>	Quarry/workshop for production of stone tools (prehistoric)
	<b>small grindstone</b>	Grinding stone quarry, very small, scattered production from small boulders, no visible quarrying pits
	<b>grindstone_smallornstone</b>	Grinding stone, all types, also bases, can also include small ornamental stone
	<b>ornstone</b>	Ornamental stone, such as stela. Such objects do not need elaborate infrastructure for transportation
	<b>large ornstone</b>	Large ornamental stone, such as obelisk, statue etc. Such objects are generally larger than 0,5 m3 and need elaborate infrastructure for transportation (roads, ramps)
	<b>building stone</b>	Mainly various types of building blocks
	<b>combination1</b>	Combinations of all types of quarries.
	<b>combination2</b>	Combinations of ornstone, large ornstone and building stone
	<b>clay</b>	clay quarrying/mining (open pit and underground)
	<b>other</b>	Including stone for unknown purposes
	<i>for mine: (also clay mine)</i>	
	<b>open pit</b>	Typically the iron mine by Gebel Gubbet el-Hawa
	<b>underground</b>	Typically clay mines
	<b>combination</b>	Open pit and underground
	<b>other</b>	

	<i>for work area:</i>	
	<b>grindstone</b>	
	<b>stela</b>	squared blocks for probable use as stela
	<b>other</b>	
	<i>for collection area:</i>	
	<b>grindstone</b>	
	<b>stela</b>	squared blocks for probable use as stela
	<b>other</b>	
	<i>for standstone area:</i>	
	<b>stele area</b>	Of similar types as at the Sanctuary by Gebel Tingar
	<b>other</b>	
	<i>for stone heap area:</i>	
	(no subclass)	Could be e.g. burials or cairns etc.
	<i>for built structure:</i>	
	<b>monastery</b>	standing or ruins
	<b>temple</b>	standing or ruins
	<b>other</b>	uncertain function
	<i>for settlement:</i>	
	<b>excavated</b>	Only used for the excavated seasonal prehistoric settlements in Wadi Kubbaniya
	<i>for cemetery:</i>	
	<b>rock-cut tombs</b>	
	<b>mounds</b>	stone or other types, from very large to hardly visible
	<i>for other</i>	
	(no subclass)	
Technology	<i>for quarry:</i>	
	<b>stone smallblock</b>	Pounders, with or without firesetting and/or levering, working of small natural boulders
	<b>stone</b>	Pounders, with or without firesetting and/or levering
	<b>wedging</b>	Iron tools, typically Graeco-Roman and later
	<b>chisel</b>	Mainly use of iron chisels an/or picks, typically Graeco-Roman and later
	<b>other</b>	
Material	<b>sandstone</b>	

	<b>silsand</b>	Silicified sandstone
	<b>poorsilsand</b>	Poorly silicified sandstone
	<b>iron</b>	
	<b>clay</b>	
	(etc.)	
Colour	for stone: <b>purple, red, pink, brown, beige, yellow, white, grey, multicoloured</b> , (etc.)	
Amount	<i>(Not used)</i>	
Interpret	for all: interpretation that is not supported by other fields	
Period	Estimated period (educated guess!): <b>palaeolithic, neolithic, predynastic, dynastic, graeco roman, byzantine, islamic, modern</b> (from the 19 <sup>th</sup> Century onwards)	
Cons_stat	<b>vandalism, theft, modern graffiti, illegal digging, modern quarry, mass movement, vehicle traffic, other</b>	
Photo_ref	Reference to the personal photographs taken (digital). It is important to note the personal number of the photos taken already in the field.	
Draw_ref	Reference to drawing/sketch made (reference typically based on locality and IDs, as well as name)	
Reprt_ref	Reference to report (internal or external, also paper, if applicable). Reference typically based on locality and IDs, as well as name	
Rec_date	Date of field recording	
Descript	Here it is important to add everything of interest!	

### Annex 3: Shapefile – [awb\\_archaeology\\_general\\_line.shp](#)

Field	Classes/Explanation	
Survey_ID	Survey ID. Every person uses its own “running ID-system”, e.g. EB345 and AK234	
Old_ID	Cross-reference to possibly old ID if the object/feature has been (partially) recorded earlier	
Loc_ID	Code of the location (if any). This is defined by discussion after fieldwork. Should be filled in when necessary/applicable	
Class	road, road broad, road inferred, track, track inferred, path, stone alignment, other (quarry face and wall also used infrequently) NB! Roads are shown with double lines (for showing widths)	
Subclass	<i>for road:</i>	
	<b>cleared</b>	Typically with “lines” of stone and pebble at the sides
	<b>paved</b>	Paved with (usually) flat stone, not or only slightly raised (< 10-50 cm)
	<b>causeway</b>	Raised road (> 50 cm), typically bridging wadis, depressions, small valleys, depressions, or built up along slopes. Can be paved with flat stone, but not necessarily.
	<b>slipway</b>	
	<b>other</b>	
	<i>for track:</i>	
	<b>camel</b>	Typically several semi-parallel winding “paths” (camel, not to be ruled out that some may also be donkey tracks)
	<b>other</b>	
	<i>for path:</i>	
	<b>donkey</b>	Typically single path, probably also used by humans
	<b>foot</b>	Certain footpath
	<b>other</b>	
	<i>for stone alignment:</i> (NB! The lines made from pebbles and small stones are not included; they are probably mainly modern (cf. Tingar) and intended for borders/house building.	
	<b>single level</b>	Typically long rows of medium-sized stones, mainly one level
	<b>multi level</b>	As above, but two or more levels of stone
Amount	<i>(Not used)</i>	
Interpret	for all: interpretation that is not supported by other fields	



Period	Estimated period (educated guess!): <b>palaeolithic, neolithic, predynastic, dynastic, graeco roman, byzantine, islamic, modern</b> (from the 19 <sup>th</sup> Century onwards)
Cons_stat	<b>vandalism, theft, modern graffiti, modern quarry, mass movement, vehicle traffic, other</b>
Photo_ref	Reference to the personal photographs taken (digital). It is important to note the personal number of the photos taken already in the field.
Draw_ref	Reference to drawing/sketch made (reference typically based on locality and IDs, as well as name)
Reprt_ref	Reference to report (internal or external, also paper, if applicable). Reference typically based on locality and IDs, as well as name
Rec_date	Date of field recording
Descript	Here it is important to add everything of interest!

#### Annex 4: Shapefile – [awb\\_modern\\_xxxx\\_poly.shp](#)

xxxx = year

Field	Classes/Explanation	
Object ID		
Loc_ID		
Class	<b>modern quarry</b>	
	<b>modern mine</b>	
	<b>gravel pit</b>	
	<b>garbage dump</b>	
	<b>construction zone</b>	Ongoing building of infrastructure, including building activity, road building, gravel pits, mass movements, excavations etc.
	<b>agricultural zone</b>	mainly, can also include buildings and roads
	<b>built areas</b>	mainly, can also include agricultural areas and construction zones
	<b>single buildings</b>	scatters of single buildings
	<b>cemetery</b>	
Subclass	<i>for modern quarry:</i> <b>artisan quarrying, large-scale quarrying</b> <i>for modern mine:</i> <b>open pit, underground</b>	
Year	Year of observation (does not correspond to year of origin/construction)	
Activity	At the time of observation (yes, no, unknown)	
Source	E.g.: KH7 (1965), Topographic map (1991), Ikonos (2000), Landsat (around 2000) Quickbird (2005), (own) observation (several sources can be mentioned)	
Photo_ref		
Reprt_ref	Reference to report (internal or external, also paper, if applicable). Reference typically based on locality and IDs, as well as name	
Rec_date	Date of the field recording (when applicable)	
Descript	Here it is important to add everything of interest!	

## Annex 5: Shapefile – [awb\\_modern\\_xxxx\\_line.shp](#)

xxxx = year

Field	Classes/Explanation	
Object_ID		
Loc_ID		
Class	<b>important asphalt road</b>	
	<b>important dirt road</b>	
	<b>road under construction</b>	
	<b>vehicle track</b>	
	<b>power line</b>	
	<b>canal</b>	
	<b>wall</b>	
Subclass	for important asphalt road: <b>highway</b> <i>for power line: single, multiple</i>	
Year	Year of observation (does not correspond to year of origin/construction)	
Activity	At the time of observation (yes, no, unknown)	
Source	E.g.: KH7 (1965), Topographic map (1991), Ikonos (2000), Landsat (around 2000) Quickbird (2005), (own) observation (several sources can be mentioned)	
Photo_ref		
Reprt_ref	Reference to report (internal or external, also paper, if applicable). Reference typically based on locality and IDs, as well as name	
Rec_date	Date of the field recording (when applicable)	
Descript	Here it is important to add everything of interest!	

**Note that all roads and power lines are associated with up to more than 100 m of diggings and mass movement beside.**



## **Appendix 2: reports of pottery found at the Aswan West Bank, 2004 - 2007**

*by Ashraf el-Senussi*

### **Pottery from Gebel Gulab "Aswan": Report 2004**

As a result of the EES survey to the quarry of Gbel Gulab "Aswan" the following is the contexts (where the shards were found) and its suggested chronology. Most of the collected shards were found inside the huts or around it, the examined shards fall into four chronological groups:-

- 1- Only one rim shard from Old Kingdom period was found in context 17.
- 2- New Kingdom period, in more details mid to late 18<sup>th</sup> dynasty, this group of shards seem to be used by the workmen's quarry.
- 3- Ptolemaic to early Roman period, the shards of this period found in most cases inside the huts referring to the activity of that period visitors to the site.
- 4- Late Roman period, mainly from 5<sup>th</sup> to 7<sup>th</sup> century AD.

### **Contexts and the suggested chronology.**

- C1: Rim, base and body shards of a New Kingdom Cananite Amphora, together with early Roman body shards of Brown Amphora.
- C2: a rim shard found inside a hut located west of the obelisk's blank, and a base of large size basin, both shards date to the New kingdom, together with early Roman body shards.
- C3: about 50 meter to the west of the obelisk's blank, small fragments of fine Aswan ware(probably of the same bowl) date to the early Roman period 3<sup>rd</sup> to 4<sup>th</sup> century Ad.
- C4: a site where a lot of lat Roman shards observed mostly of brown Amphora include base, handle and body shards and some body shards of red slipped Aswan ware.
- C5: round shaped hut where a base of late Roman Amphora was found.
- C6: Out of the latest mentioned round shaped hut a group of New Kingdom Cananite Amphora shards (which seem to be all of one vessel) and rim and base of out sloped rim bowl were found
- C7: inside a round shaped hut a group of one vessel, Roman (Aswan red slipped ware) were found together with a probably New Kingdom Nile silt body shards, some of the Roman shards found out of the hut.
- C8: from the latest context out of the hut a rim of large size open mouth jar was found, date to the New Kingdom.
- C9: From inside a hut some body shards of Cananite and Nile silt ware were found all date to the New Kingdom.
- C10: out of a round shaped hut, rim shard and a base of water Qados and a rims of bowl, both date to the Roman period, together with rim shard of marl ware bowl, painted by a black row of triangular element around the inner rim, rim of Nile silt, out sloped rim bowl and handle of a Cananite jar, all date to the New Kingdom period.
- C11: from inside a rectangular shaped hut, rim and body shards of a Nile silt, New kingdom storage jar.



- C12: rims and base of a Nile silt bowl and shards of Cananite Amphora, all date to the New Kingdom period together with thick wall shards of late Roman human shaped sarcophagus.
- C13: shoulder shard of Ptolemaic Amphora.
- C14: Nile silt rims of jar and bowl and body shards with rope impression, all date to the New Kingdom period.
- C15: a body shard of Marl C fabric and a rim shard of tow handled jar with open mouth, both date to the New Kingdom.
- C16: body shards and a round base of bowl or jar, the date is not certainly confirmed, probably New Kingdom.
- C17: Rim shard of rough made offering jar (beer jar) date to the Old Kingdom and a base of late Roman Amphora.
- CIS: A group of coarse Nile silt body shards and tow bases of jars, all date to the New Kingdom, to the west of this context a Roman body shards were found.
- C19: many shards and a base of Roman Amphora.
- C20: Many Roman shards of Brown Amphora and red slipped Aswan ware.
- C21: round base of New kingdom, Nile silt jar with red slipping on the outer surface.
- C22:
- C23: rim shards of Amphora and small bowl of Aswan red slipped ware, date to the late Ptolemaic period.
- C24: a base of Aswan red slipped Amphora and body shards of Aswan red slipped, and Nile silt ware, all date to the late Roman period.
- C25: A complete profile of Aswan ware hemispherical bowl and some shards of brown Amphora, all date to the late Roman period.
- C26: rim shard of Aswan ware hemispherical bowl, in addition to many body shards of brown Amphora, gray ware and Aswan red slipped ware, all date to the late Roman period.
- C27: Base and body shards of Nile silt storage jar, date to the 7<sup>th</sup> century AD.
- C28: rim shard of Aswan ware hemispherical bowl, date to the 5<sup>th</sup> century AD. and a nick of pitcher, date to the Ptolemaic period.
- C29: late Roman rim shard of Aswan ware bowl.
- C30: Nile silt base of storage jar, the date is not certainly confirmed, probably New Kingdom.
- C31: a New Kingdom Nile silt Rim and base shards of medium size storage jar together with body shards of Cananite Amphora.

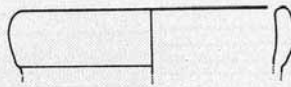
## The Catalogue

No	Shape	Fabric	Surface treatment	Notes
1	Rim shard of Cananite jar.	Cananite ware in brown fracture mixed with sand and quartzes.	Inner surface is plain light red, the outer is slipped by pale yellow.	Late 18 <sup>th</sup> -19 <sup>m</sup> dynasty.
2	Base of Cananite jar.	Cananite ware in dark gray fracture with sand and decomposed limestone.	The outer surface is slipped by pale yellow, the inner is plain dark reddish gray.	
3	Flat bottomed, out slopped, plain rim bowl.	Nile silt B2 in fracture of gray core between yellowish red.	Slipped by red.	Late 18 <sup>th</sup> -19 <sup>m</sup> dynasty.
4	Rim shard of large size jar.	Marl A2 in red fracture.	Slipped out by pale yellow, the inner is plain light red.	Late Roman period of 5 <sup>th</sup> century AD
5	Ledge rim shard of water Qados.	Aswan ware mixed with sand and red rocks.	Plain light red.	Late Roman period of 7 <sup>th</sup> -8 <sup>th</sup> century AD.
6	Ledge rim shard of small size casserole.	Aswan ware mixed with sand and red rocks.	Plain light red.	Late Roman period of 5 <sup>th</sup> century AD.
7	Inner thickened rim shard of bowl.	Hard Nile silt B2 in brown fracture.	Slipped by pale yellow and decorated by red line around the rim.	Late 18 <sup>th</sup> -19 <sup>th</sup> dynasty.
8	Plain upright rim of storage jar.	Nile B2 in reddish brown fracture.	Plain weak red.	New kingdom.
9	Rim shard of short necked storage jar.	Nile B2 in reddish brown fracture.	Plain weak red.	New kingdom.
10	Rolled rim shard of open mouth jar with 2 handles.	Marl A2 in red fracture.	Slipped out by pale yellow, the inner is plain light red.	New kingdom. <sup>1</sup>
11	Ledge rim shard of rough made traditional offering jar	Coarse Nile silt B2 in a fracture of black core between reddish brown.	Plain surface of light brown.	Late 5 <sup>m</sup> and early 6 <sup>m</sup> dynasty period.
12	Base of amphora	Aswan ware mixed with sand and red rocks.	Plain light red.	Date to the Ptolemaic period.
13	Rolled rim shard	Aswan ware mixed	Plain light red.	Date to the

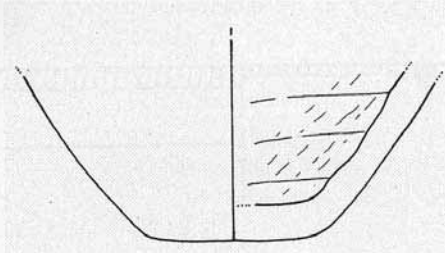
<sup>1</sup> For the complete shape of this type see, Holther., *New Kingdom Pharaonic sites. The pottery*. SJE vol. 5.1. Lund. 1977. P122 type AO4.

	of Amphora.	with sand and red rocks.		period.
14	Rim shard of pitcher.	Aswan ware mixed with numerous amount of red rocks.	Plain light red.	Date to the Ptolemaic period.
15	Rim shard of small size bowl.	Aswan ware mixed with numerous amount of red rocks.	Plain light red.	Date to the Ptolemaic period.
16	Complete profile of small size hemispherical cup.	Aswan ware mixed with sand and red rocks.	Plain light red.	Late Roman period.
17	Rim shard of ribbed bowl.	Aswan ware.	The inner slipped and burnished by red, the outer is plain light red.	Range in date from the late 4 <sup>th</sup> century to
18	Footed base of large size storage jar.	Nile silt B2	Slipped by red.	Date to the late Roman period of 7 <sup>th</sup>
19	Out ledge rim of carinated bowl.	Hard, dens Marl ware in light red fracture (probably imported).	Burnished by red.	4 <sup>th</sup> 5 <sup>th</sup> century Ad.
20	Complete profile of storage jar.	Nile B2 in brown fracture.	Plain light brown.	Variation of the type fu2,see(Holther

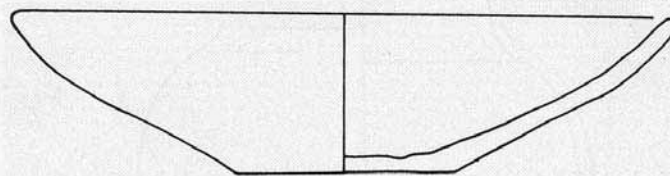
Pottery shards from Gebel Gulab



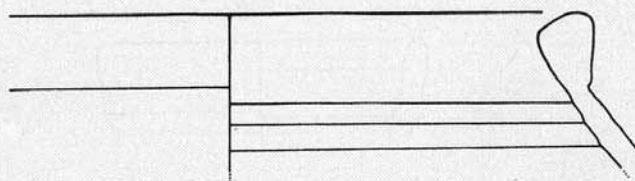
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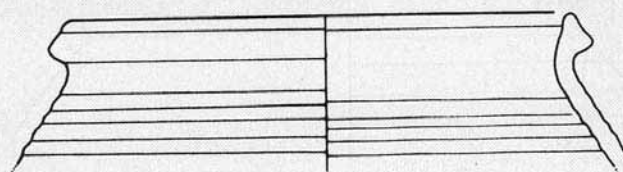
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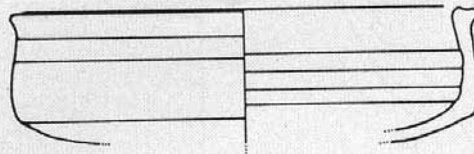
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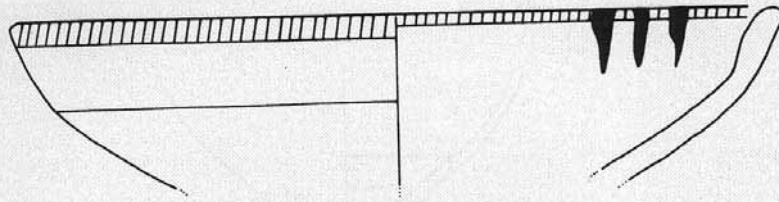
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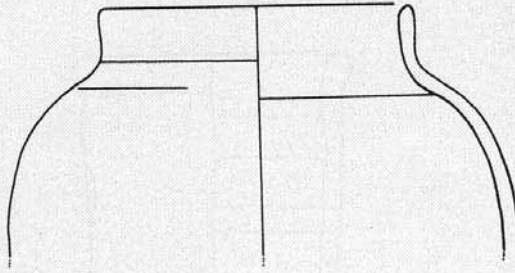
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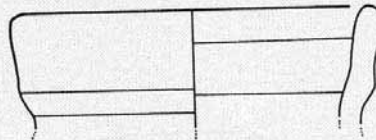
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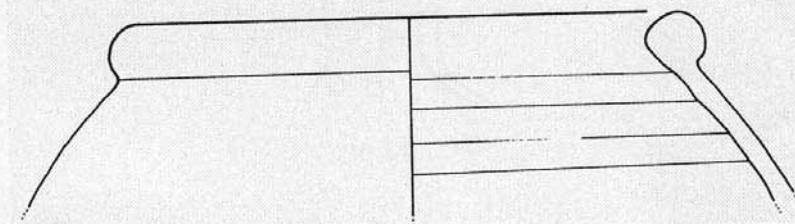
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No.8

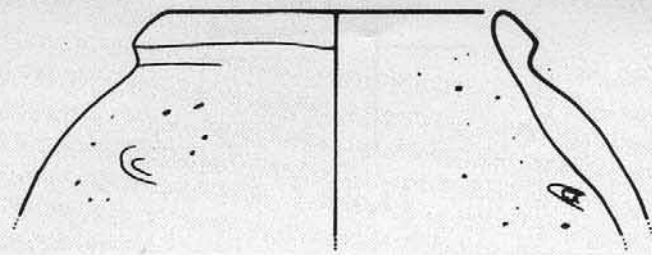


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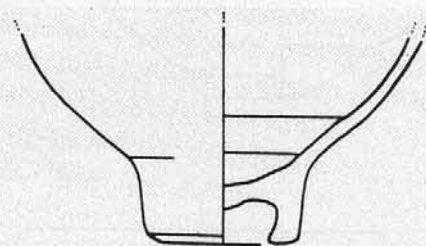


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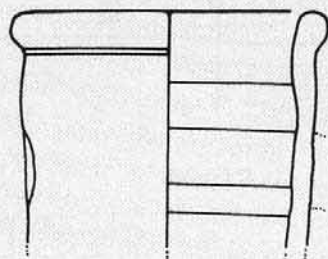




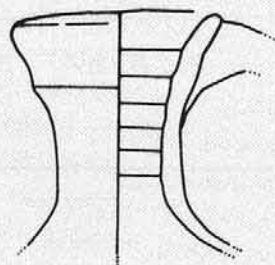
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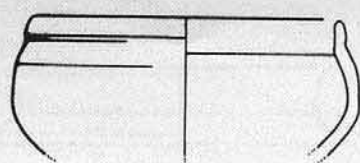
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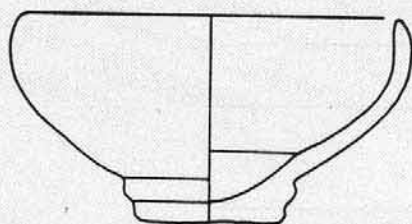
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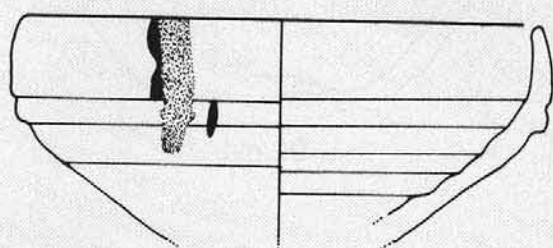
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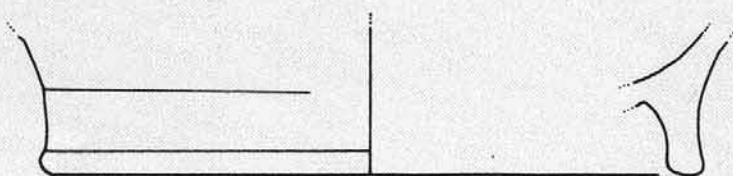
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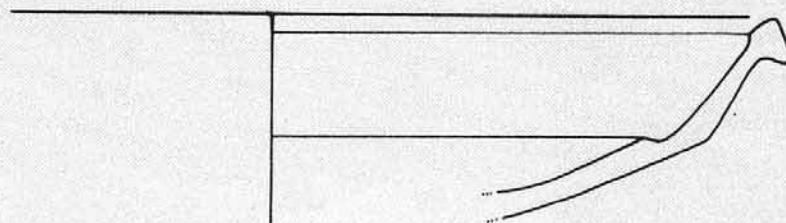
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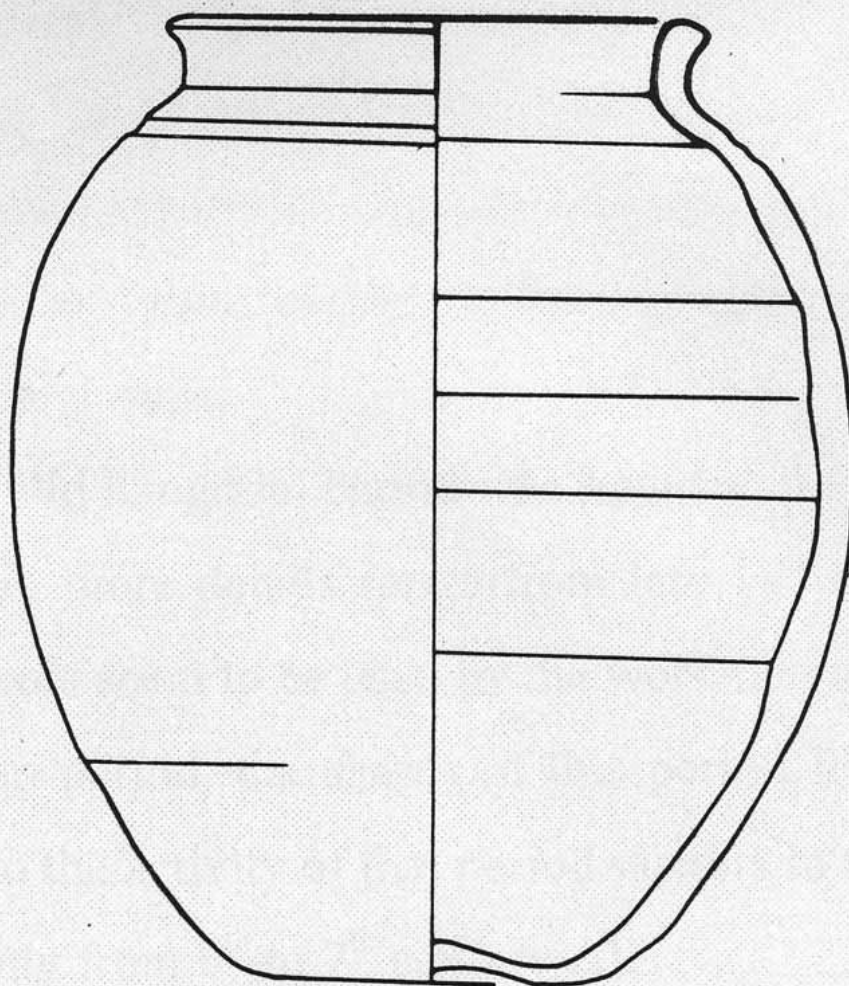
No.17



No.18



No.19



No.20

### Pottery of Gebel Gulab season March 2005

Continual of last season's work in Gebel Gulab the following are the investigated pottery shards which collected during the recent season:

- C 33, a round base and 4 body shards of large size, round-bottomed jar with out flaring rim, made of Nile silt B2 in coarse inclusion, the outer surface is slipped by red the inner is plain, date to New Kingdom. [OE1/ north-east tip of GG - work area ]
- C33 a, a body shard of the pervious vessel, new kingdom [as above]
- C 34, A rim shard, Shoulder and body shards of medium size jar with probably Hat base and out extend rim (beer jar), made of Nile silt B2 in reddish brown fracture, both surfaces are plain reddish brown, date to New Kingdom<sup>12</sup>. [environs of OE1]
- C 36, base of flat-bottomed jar with hole on the bottom of the base presumably used as strainer for making beer, made of Nile silt B2 with lots of Mica and few of fine limestone particles, both surfaces are plain reddish brown, date to New kingdom<sup>13</sup>. [in spoil heaps at western tip of obelisk extraction]
- C 37, A rim shard of flat-bottomed, carinated bowl, made of fine Nile silt B2 in reddish brown fracture, the inner surface is slipped by red while the outer is plain reddish brown, date to New Kingdom<sup>14</sup>. [close to main road and standing stela St9]
- C 38, A body shard of thick wall, slightly burnished in reddish brown color, made of Nile silt B2 (not clear to identified). [Western Quarries]
- C 39, body shard of Nile silt B2 similar in fabric and fracture component of what were found in contexts 40, 41, accordingly could be of the same chronology.
- C 40, round base probably of the type found in context 41. [cleared area]
- C 41, A rim shard of less neck jar with round base, ovoid body and out rolled rim, made of Nile silt B2 with lots of fine limestone particles, the outer surface is burnished by red color while the inner surface is plain light reddish brown, date to New kingdom<sup>15</sup>. [cleared area]
- C 42, a rim and body shards similar to what found in context 44, New kingdom. [shelter/enclosure OE1/S4 that was cleared]

<sup>12</sup> Date to the Rammasied period (Aston and Brock, 1998, No. 30 and P. 146) to dynasty 19 (Aston 1999, PL 1 No. 8)

<sup>13</sup> because the preserved part of the vessel is only the base, it could be a flower pot date to 18\* dynasty (Aston, 1997, PL 1 No. 7) or it could be a base of beer jar with hole which used as a strainer date to late new kingdom (Aston, 1999, PL 3 No. 60 and P. 27)

<sup>14</sup> date to Rammasied period, (Aston and Brock, 1998, PL 7 No. 69).

<sup>15</sup> Holther, 1977, PL 40 No. 185/248.2

- C 43, 4 body shards three of them of large size jar, similar to what was found in Context 44 which date to New Kingdom. [shelter/enclosure OE1/S4 that was cleared]
- C 44, A rim and body shards of round-bottomed funnel necked jar, made of Nile silt with lots of fine strew, the outer surface is slipped by red color, date to New kingdom<sup>16</sup>. [shelter/enclosure OE1/S4 that was cleared]
- C 45, A rim shard and body shards of flat-bottomed bowl with plain rim, made of Nile silt B2 in brown fracture, the outer surface and a band on the inner part of the rim are slipped by red color, the rest is plain reddish brown, date to new kingdom<sup>17</sup>. [cleared area]
- C 46, body shard of large size basin of jar (not identified), made of coarse Nile silt C, the outer surface is slipped by red color, most likely date to New kingdom. [area of highly organised grinding stone extractions on eastern tip of GG]
- P 249, A knob base of Amphora and two body shards of the same vessel, Aswan red slipped ware, date to Roman period.
- P 299, a body shard of Canaanite ware with lots of Quartz particles, date to New Kingdom.
- P 306, two body shards, one of Aswan ware, the outer surface is washed by red, the inner is plain light reddish brown, the other is a body shard of ribbed brown, Egyptian Amphora, both date to the late Roman period.

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- Aston, D. Teil Hebwa IV, in: Ägypten und Levante VI, Cairo.
- Aston, David and Barbara and E, Brock, Pottery from the Valley of the Kings, tombs of Merenptah, Ramesses III, Ramesses IV, Ramesses VI, and Ramesses VII, Ägypten und Levante VIII, Cairo, 1998.
- Dorner, J. and Aston, D. Pottery from Hebua IV south, CCE 5, Le Caire, 1997.
- Holther, R. New kingdom Pharaonic sites, the pottery, SJE 5, 1977.

<sup>16</sup> For comparison see, (Aston and Brock, 1998, PL 23 No. 221 and P. 156, date to Rammasied period), (Holther, 1977, PL 17 No. 185/511.71).

<sup>17</sup> date to mid 18\* dynasty, (Aston, Ägypten und Levante, VII, Tafel 1 No. 4) see also (Holther, 1977, PL 25 No.185/511.2)



### Pottery shards from Gulab November 2005

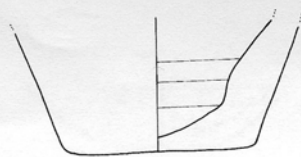
The collected shards from this season have a variation of chronology, the following is a list of the location and it's pottery description:

- **139:** base of flat bottomed bowl, totally weathered, made of Nile silt, the outer surface is plain reddish brown 2.5YR4/4 while the inner surface is plain black. whoever the date is not clear but the shape of the interior of the base - for my knowledge - could be similar to the base of the old kingdom, flat bottomed, flared side bowl. (drawing No.1).
- **134:** 2 body shards, rim of jar (drawing No.2), rim of bowl (drawing No.3) knob of lid (drawing No.4) all made of Aswan ware in plain pink surface of 5 YR7/4, date to late Roman period - a body shard of Nile silt (not clear to identify).
- **132:** 2 body shards, 2 rims of ledge rim bowl (drawing No.5) made of Aswan ware, both surfaces are plain reddish yellow 5YR6/6 with a dark band on the outer rim, date to late 4<sup>th</sup> Century AD - rim of cup (drawing No.6) made of Aswan ware, the surface is slipped by light brown 7.5YR6/4, the shape is similar to a round base, white slipped cup from Brenike date to Roman period. - flat base of probably bowl, made of Aswan ware in plain pink surface of 5YR7/4.
- **145:** 5 body shards of different vessels and a rim shard of ledge rim bowl made of Aswan ware, both surfaces are plain reddish yellow 5YR6/6 with a dark band on the outer rim, date to late 4<sup>th</sup> Century AD.
- **146:** body shard of Egyptian brown Amphora made of sandy Nile silt with gritty surface - a body shard and a neck of filtered water jug (drawing No.9) made of gray ware (Ballas ware) in plain pale yellow surface, the form is common in the Islamic period, similar shape and fabric was observed in Elquseir fort date to the Ottoman period.
- **140:** 2 body shards of rough ware, coarse Nile silt, seem to be parts of Old kingdom traditional offering beer jar according to the well visible finger marks on the outer and the inner surface, fabric is also familiar to that kind of type.
- **142:** a body shard of large vessel, made of Aswan ware in a surface slipped with thick layer of white color - a body shard and rim of ledge rim bowl, made of Aswan ware and slipped with red color 10R5/8, date between 5<sup>th</sup> and 7<sup>th</sup> Century AD (drawing No.10), ring base of bowl, made of Aswan ware, the outer surface is plain reddish brown 2.5YR5/4, while the inner surface is slipped by yellow 2.5Y7/6 (drawing No.11)
- **136:** a body shard of rocky fabric, such a fabric normally finds in the desert which characterized with a numerous amount of different kinds of rocks usually visible on the fracture and on the surfaces, similar fabric was found in North Sinai date to late Roman period.
- **EB 107:** 2 body shards of the same vessel, made of Aswan ware, the outer surface is decorated by black and red color while the inner surface is plain reddish yellow 7.5YR6/6 (drawing Nos. 12-13) date to 14<sup>th</sup> Century AD (Whitcomb and Johnson 1979, fig 45 Nos. F and G) - round base of jar or

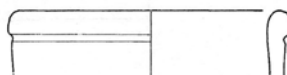
bottle, made of coarse Nile silt, the outer surface is plain reddish brown 2.5YR5\4 while the inner surface is plain in black color (drawing No. 14) the date is not certain but it is not Roman it might be base of New kingdom, large size jar.

- **EB 123:** rim shard of deep basin made of coarse Nile silt and slipped with reddish brown color (drawing No.15), date to late dynastic period, dynasties 26-27 (see, Aston 1999, Pl.6ON0. 1947)
- **EB 128:** a body shard of Nile silt with ribbed surface (not clear to identify).
- **EB 129:** handle of late Roman Amphora, made of Aswan ware, slipped with light red 2.5YR6\6 (drawing No. 16)
- **EB 140:** a body shard of jar made of sandy Nile silt and decorated with a red line on white surface. (characterize of the late Roman or Byzantine water jug).
- **EB 141:** ring base and upper part of hemispherical bowl, made of Aswan ware in plain pink surface of 5YR7\4 with a brown band around the outer rim (drawing No. 17) date to the late Roman period.
- **EB 143:** rim shard of open mouth jar made of hard Nile silt in plain red surface of 10R5\6 (drawing No. 18) date is not clear.
- **EB 145:** rim shard of water jug or pitcher, made of gray ware, in plain pale yellow surface of 2.5Y7V3 with red band on the inner rim. (drawing No.19) date to 3<sup>rd</sup> and 4<sup>th</sup> Century AD).
- **EB 146:** rim shard of ribbed body cooking pot, made of Aswan ware, slipped by light brown of 7.5YR (drawing No. 20), date to late Roman period.
- **EB 147:** rim shard of large size cooking pot, made of Rocky fabric (desert fabric) in plain red surface of 10R5\6 (drawing no. 21) according to the fabric it could be date to the late Roman period.
- **AK 320:** rim shard of bowl, made of Aswan ware and slipped with red color 10R5\8 (not illustrated) date to late Roma period.
- **400 F:** a body shard of Nile silt ware, not clear to date.
- **402:** a body shard of jar, made of yellow marl ware, the outer surface is decorated with incised wavy line (drawing No.23) according to the decoration it could date to Byzantine period.
- **Valley of birds:** flat base of coarse Nile silt, beer jar in plain light brown surface of 7.5YR6V4 (drawing No. 24) date to 19 dynasty (see for comparison, Aston 1999, Pl. 1No.4).

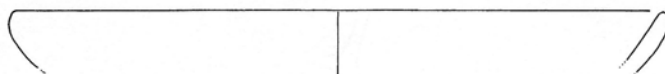
**Plats**



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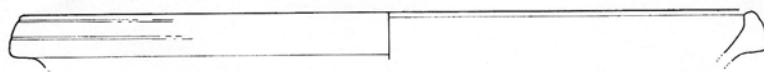
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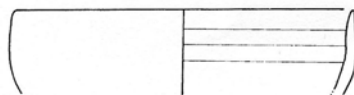
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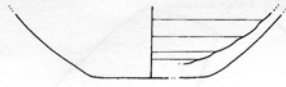
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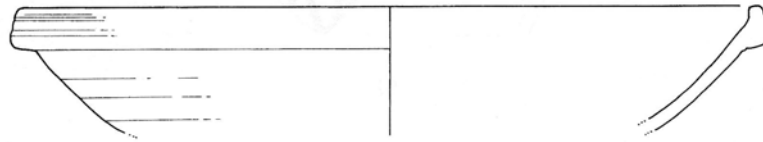
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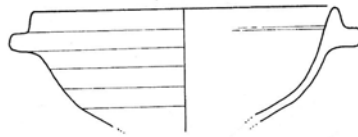
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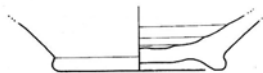
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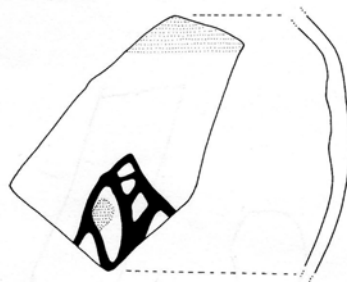
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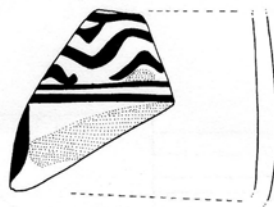
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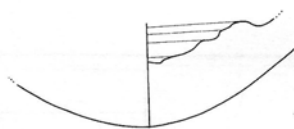
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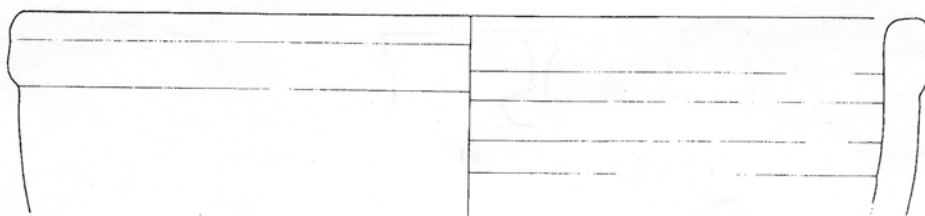
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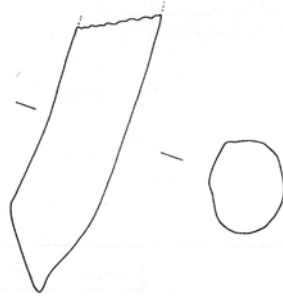


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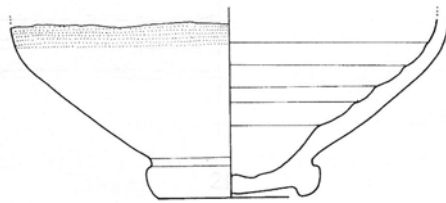


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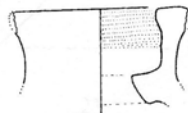
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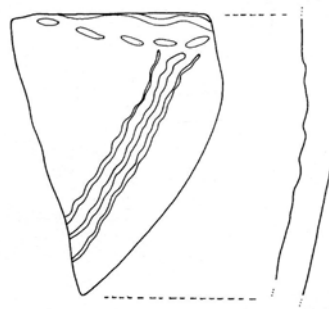
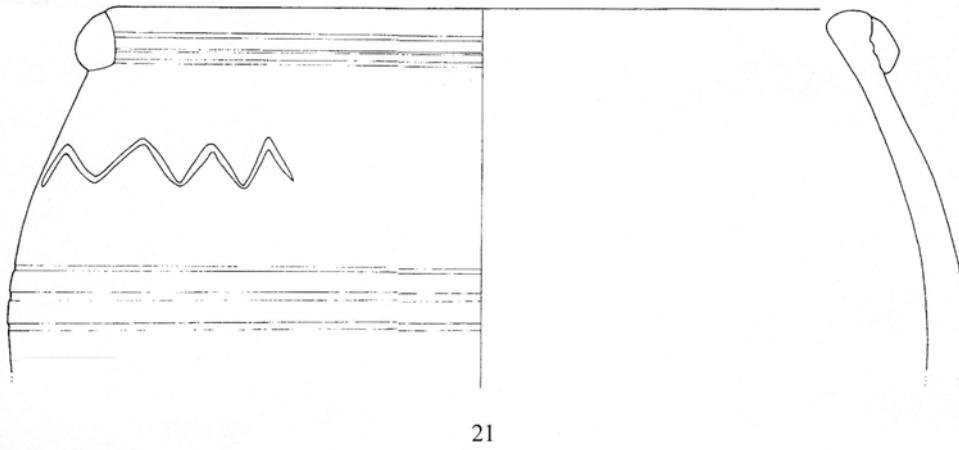
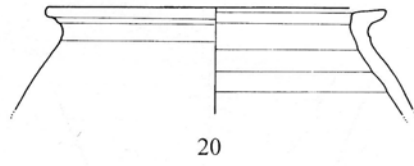
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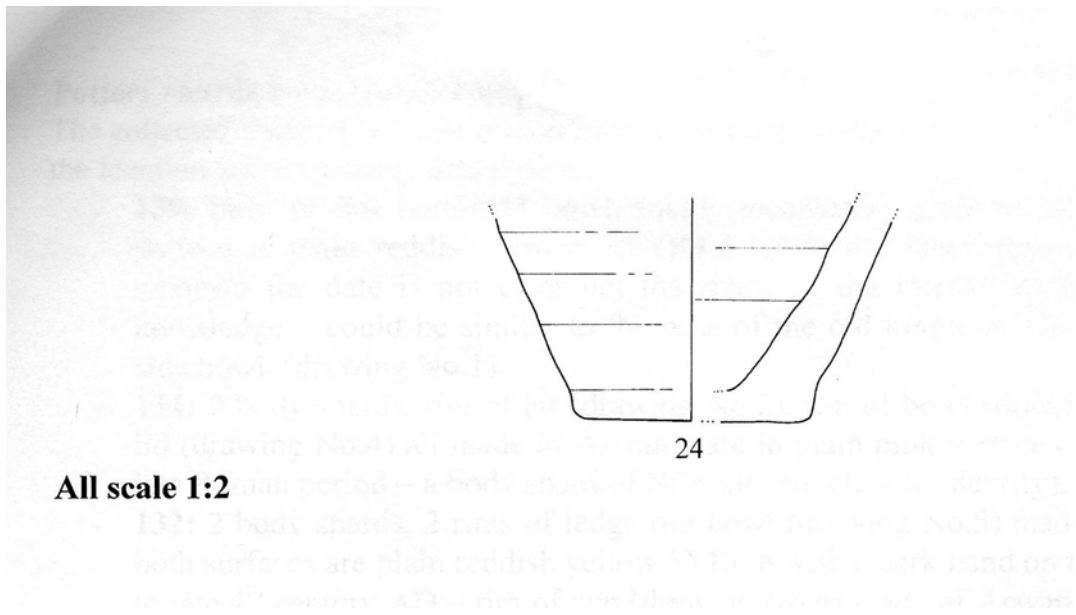


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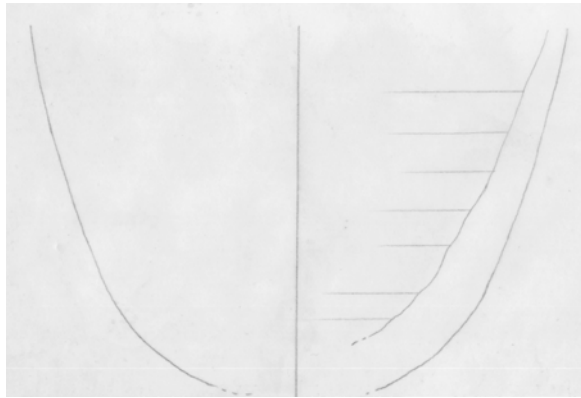


### **Pottery shards from Aswan's Quarries Seasons 2006 and 2007.**

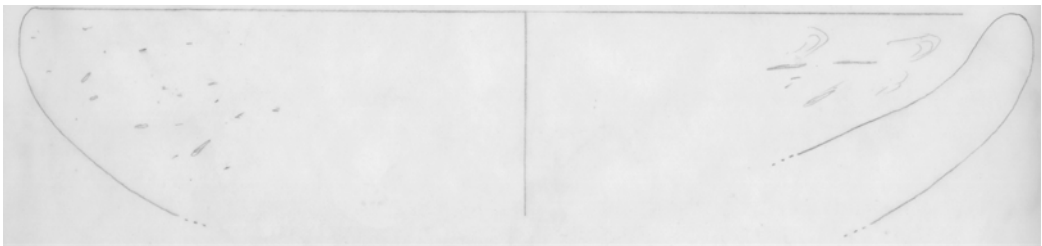
- **P. 029.** 2 rim shards of large size basin and a body shards obviously of storage jar with red slip, all are roughly hand made, date to per-dynastic period. (drawn No. 1 )
- **P 62.** a body shard of rough made Nile silt ware (not clear to identified).
- **GG06, GS01, feature 1, WP 68, 6\11\2006.** a round base of Nile silt, probably of large storage jar, for chronology it might be Pharaonic period between middle and new kingdom. (drawn No. 2).
- **GG06, WP 153, 9\11\2006.** a rim shard of rough made basin, date to the pre-dynastic period. (drawn No.3) Golen Hill
- **FG06, GS WP 170, 6\11\2006.** a rim shard of Roman cooking pot. (drawn No.4)
- **P 609, New Aswan, 18\3\2007.** 4 body shards of Roman Aswan ware.
- **P 610, New Aswan, 18\3\2007.** 2 body shards of rough Aswan ware and a piece of oil lamp, both date to the Roman period.
- **P.619.** 6 body shards of Nile silt ware (not clear to identified) – 2 body shards of marl ware, one of them of Roman imported Amphora – a body shard of mixed clay with pale yellow slip, due to this character it date to the New Kingdom – a piece of stone part of eye copper mould date to the New Kingdom period (drawn No.5 ).
- **P 613.** a body shard of Roman Aswan ware.
- **P 617, New Aswan, 18\3\2007.** a rim shard and a body shard of the same vessel, rough made bowl, made of what so called desert ware which occurred in Sinai and the eastern Egyptian desert, this kind of ware distinguished with its marl fabric and tempered with lots of red grog or rocks, date to the pre-dynastic period in Sinai and not clear in the eastern desert as it been found with late Roman sites. (drawn No.6 )
- **New Aswan P. 620, 19\3\2007.** a body shard of large size jar , hand made (paddle and anvil method), made of Nile silt with decomposed limestone and considerable pieces of grog, for my knowledge this character of fabric occurred during the early periods, for examples it occurred in Weddan el-Faras which date to the early Old Kingdom but in local fabric there for and due to the technique I suggest that this shards date to the early period and not exceed the end of Old Kingdom.
- **P 628.** a body shard of Nile silt ware, Not clear to identified.
- **Down the southern quarry, 19\3\2007.** a body shard of rough made, crumbly Nile silt, date to the pre-dynastic period.
- **GG07\080 Tom GPS, southern quarry.** 5 body shards of the same vessel of thin wall, Nile silt pot and a rim shard of bowl, both could be date to the Pharaonic period, due to the technique they could be later than the Old Kingdom, more likely Middle Kingdom. (drawn No.7).
- **New Aswan, NA 22, 19\3\2007.** a body shard of Nile silt, Middle Kingdom beer bottle.
- **AI 29, New Aswan, 10\3\2007.** 2 body shards of marl ware, not clear to identified.
- **GPS AK 164, New Aswan 18\3\2007.** 3 body shards of marl ware, not clear to identified.
- **NA 13, Tom , New Aswan, 18\3\2007.** a handle and a body shard of Nile silt ware, probably Roman period date.



(1)

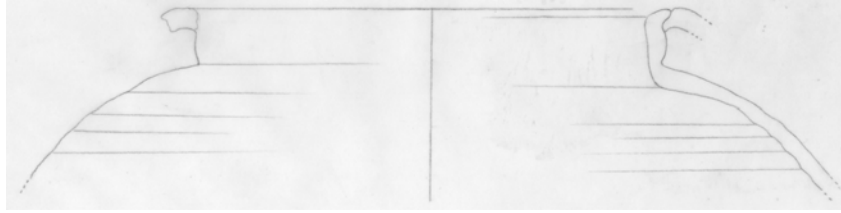


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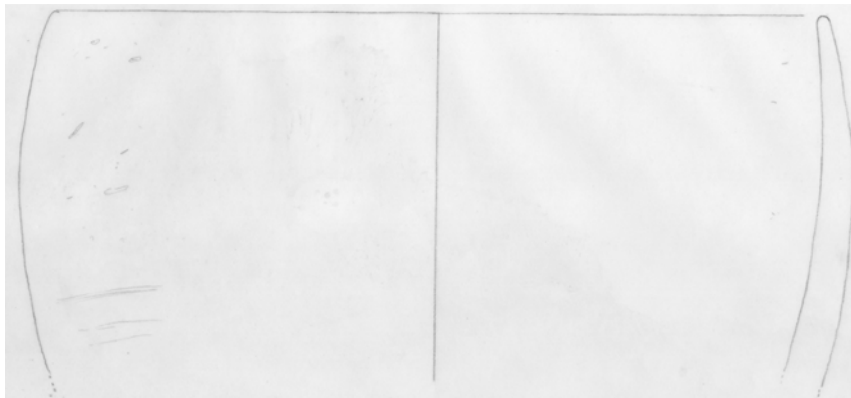




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**All scale 1:2**