

# SUDAN & NUBIA

The Sudan Archaeological Research Society

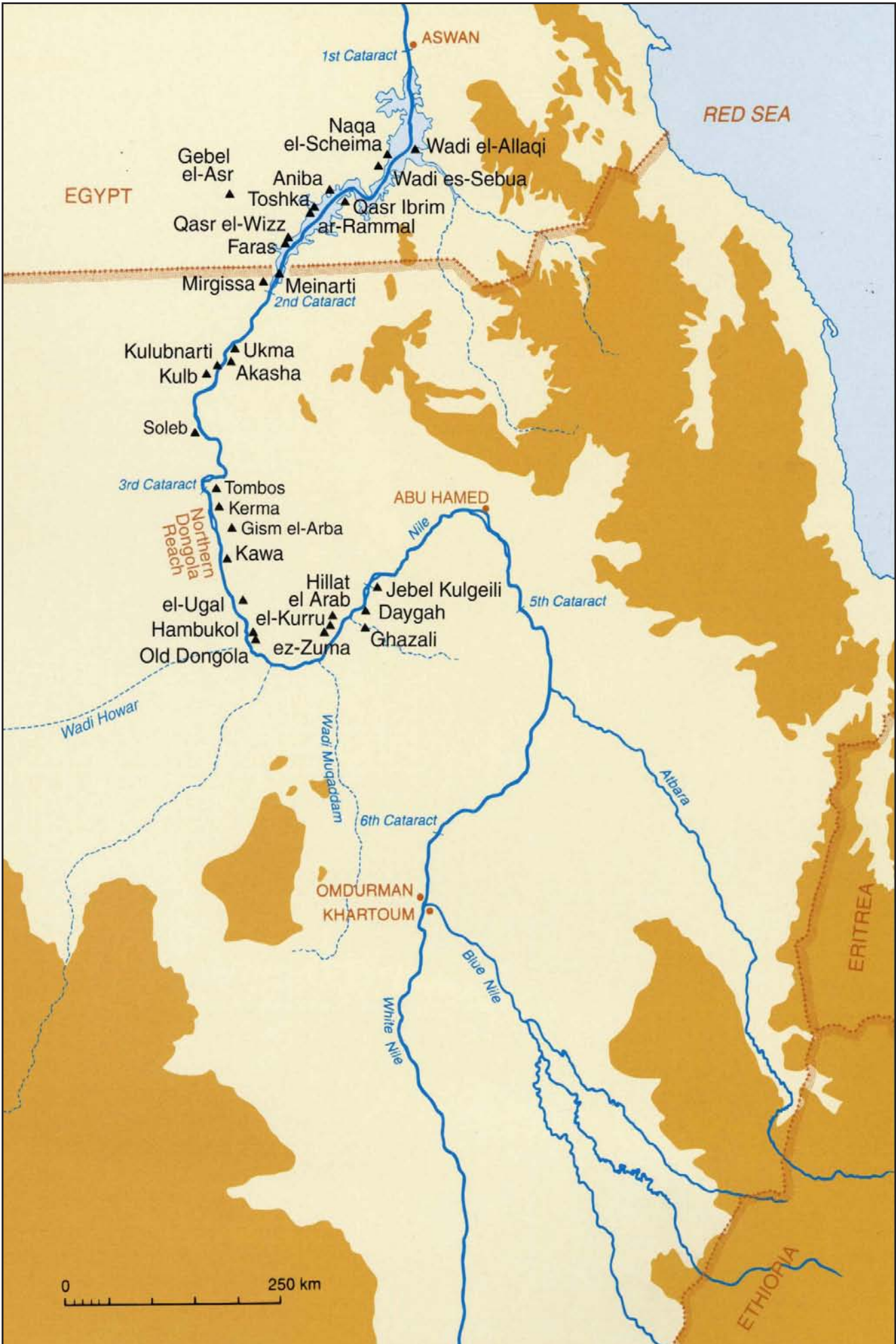


*Bulletin No. 3*

*1999*







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*Front Cover:* Temple of Amenophis III at Soleb visited by  
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## Introduction

As the contents of this year's issue clearly demonstrate, *Sudan & Nubia* goes from strength to strength with a developing international profile. The Society's own work in the Dongola Reach is represented by two papers; the first, based on the analysis of human remains, provides fascinating insights into living conditions during the Kerma Period (Judd); the second outlines progress on the continuing research into the geomorphology of the region (Treves *et al.*). A complementary project, carried out in the same region by a French Expedition, has among other things identified a rare native settlement dating to the period of Egyptian conquest (reported on by Gratien). At Kerma itself, exciting new work, uncovering remains of the Napatan and Meroitic Periods, is dramatically extending the history of the site (Salah Ahmed), while of equal importance historically are the results from Hillat el-Arab (near Gebel Barkal), a cemetery with elite burials of the New Kingdom and very earliest Kushite Period (Vincentelli). Research into quarrying and stones receives fresh impetus from work at Gebel El-Asr in Lower Nubia (Shaw and Bloxam) and in Tombos and Daygah at the Third and Fourth Cataracts respectively (Harrell). Surveys in the latter region, threatened by a new dam, are confirming its great archaeological potential (Abdel Rahman and Kabashy Hussein). Among other possibilities, sites in the Abu Hamed Reach can be expected to shed important new light on Nubian monasticism, until recently a neglected subject (Julie Anderson). Further north, Qasr Ibrim, which has long been partially submerged, continues to repay the Egypt Exploration Society's commitment under difficult circumstances (John Alexander). Far from the Nile Valley, museum basements can also be a source of significant 'discoveries' (Wardley and Davies), as may unpublished archival material and archaeological diaries (Welsby Sjöström).

During the course of the year, SARS suffered a serious blow with the passing of its distinguished President, Sir Lawrence Kirwan. Larry was a source of encouragement, support and inspiration for us all. We salute his memory and his contribution to Sudanese and Nubian archaeology (see Obituary, by Harry Smith). We also regret the loss of Prof. Jack Plumley, a specialist in Christian Nubia, who for many years directed the EES excavations at Qasr Ibrim (see Obituary, by John Alexander).



# Survey and Excavation at the Ancient Pharaonic Gneiss Quarrying Site of Gebel El-Asr, Lower Nubia

*Ian Shaw and Elizabeth Bloxam*

## Introduction

In 1858, Auguste Mariette excavated the valley temple of Khafra at Giza, where he found six life-size statues of the king, all of which were carved from a very distinctive blue-grey metamorphic rock. The best preserved of these statues was in virtually perfect condition and is now one of the masterpieces of the Egyptian Museum, Cairo (Plate 1). It was not until 1932, however, that the source of this unusual stone

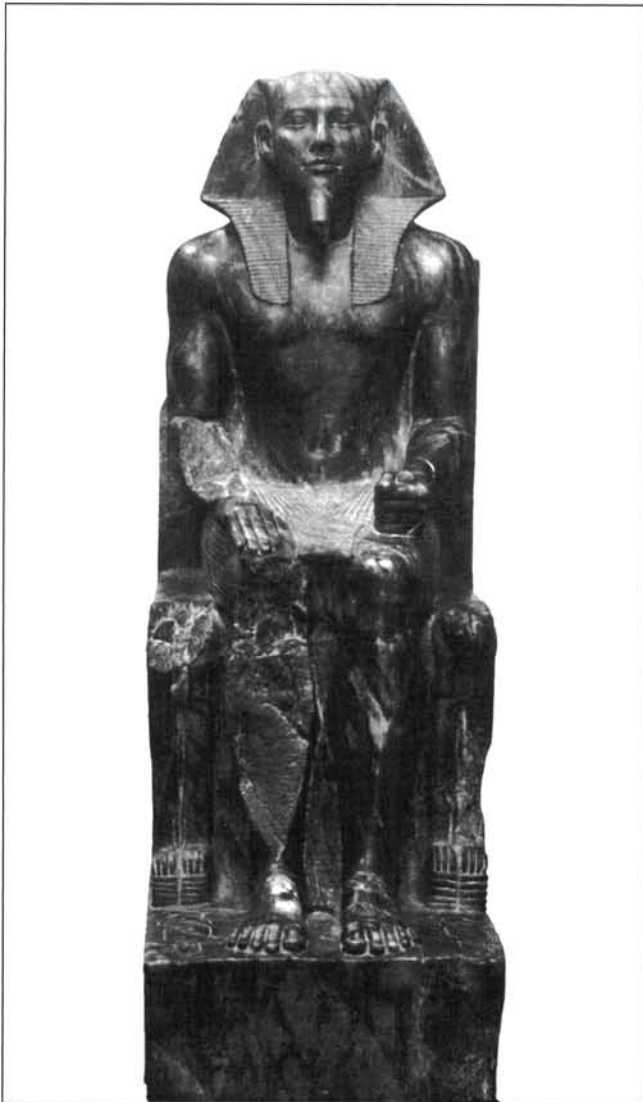


Plate 1. Seated statue of the 4th-Dynasty ruler Khafra (Cairo JE10062). (Photo courtesy Egyptian Museum, Cairo).

was found in Lower Nubia, about 65km northwest of Abu Simbel.

The Gebel el-Asr gneiss quarrying region covers an area of about 120km<sup>2</sup> to the south of Wadi Tushka and to the west of Lake Nasser (see Fig. 1). It consists of a number of individual quarrying areas dating to various periods from the Early Dynastic to the Middle Kingdom (Fig. 2): Quartz Ridge, Khufu Stele Quarry, Chisel Quarry, Loading Ramp Quarry and Stele Ridge. The first four locations are all gneiss quarries, whereas the fifth, Stele Ridge, was evidently a set of amethyst mines exploited in the Middle Kingdom and, judging from the survival of one amphora, briefly visited during the Roman period. The 80-km route linking the quarries with the nearest Nile embarkation point at modern Tushka is the longest surviving Egyptian quarry 'road'.

The Gebel el-Asr gneiss and quartz quarries were rediscovered in 1932 by a British military vehicle as it travelled through the Sahara to the northwest of Abu Simbel during a sandstorm. The discoverers, Spinks Pasha and Colonel Hatton, returned in 1933 with Rex Engelbach, the curator of the Cairo Museum, and took away from the site a number of inscribed stelae, one of the reign of the 4th-Dynasty ruler Djedefra, and another of Amenemhat II, the late 12th-Dynasty ruler (Engelbach 1933). At this time, two sites had been identified: Quartz Ridge, which we now assume to have been the nerve centre of the region of Old and Middle Kingdom gneiss quarrying, and Stele Ridge, an area of quartz mining marked by eight large Middle Kingdom cairns.

In February 1938 a more substantial expedition to the site was organized by Engelbach in collaboration with Gilbert Murray, and it was in this season that the most impressive discoveries were made (Engelbach 1938). On his arrival at the site on February 7, Murray was somewhat unimpressed by his surroundings:

'the first appearance of our landscape was a little disappointing. The cliffs of the Kurkur-Dunqul scarp ... had disappeared below the northern horizon, and we were left in a plain with only the slightest of features. There were neither hills nor definite quarry-faces to look at. Only heaps of boulders emerged from the sand ... with a few mounds of dazzling white quartz .... Quarries is almost too dignified a word for these Egyptian workings'

(Murray 1939: 105-7).

Despite Murray's early misgivings, they went on to make a number of significant finds in the 1938 season, including the discovery of a large area of quarries towards the southern end of the site, with a dry-stone mound in the centre where stone stelae of Khufu and Sahura had been erected. The stele of Khufu, undoubtedly the most impressive of all the inscribed artefacts from the site, is now in the Egyptian Museum, Cairo, but the mound itself is still surmounted by the two gneiss slabs that originally flanked it. At Khufu Stele Quarry, they also found the first of two large dry-stone structures that are thought to have been 'loading ramps' used by

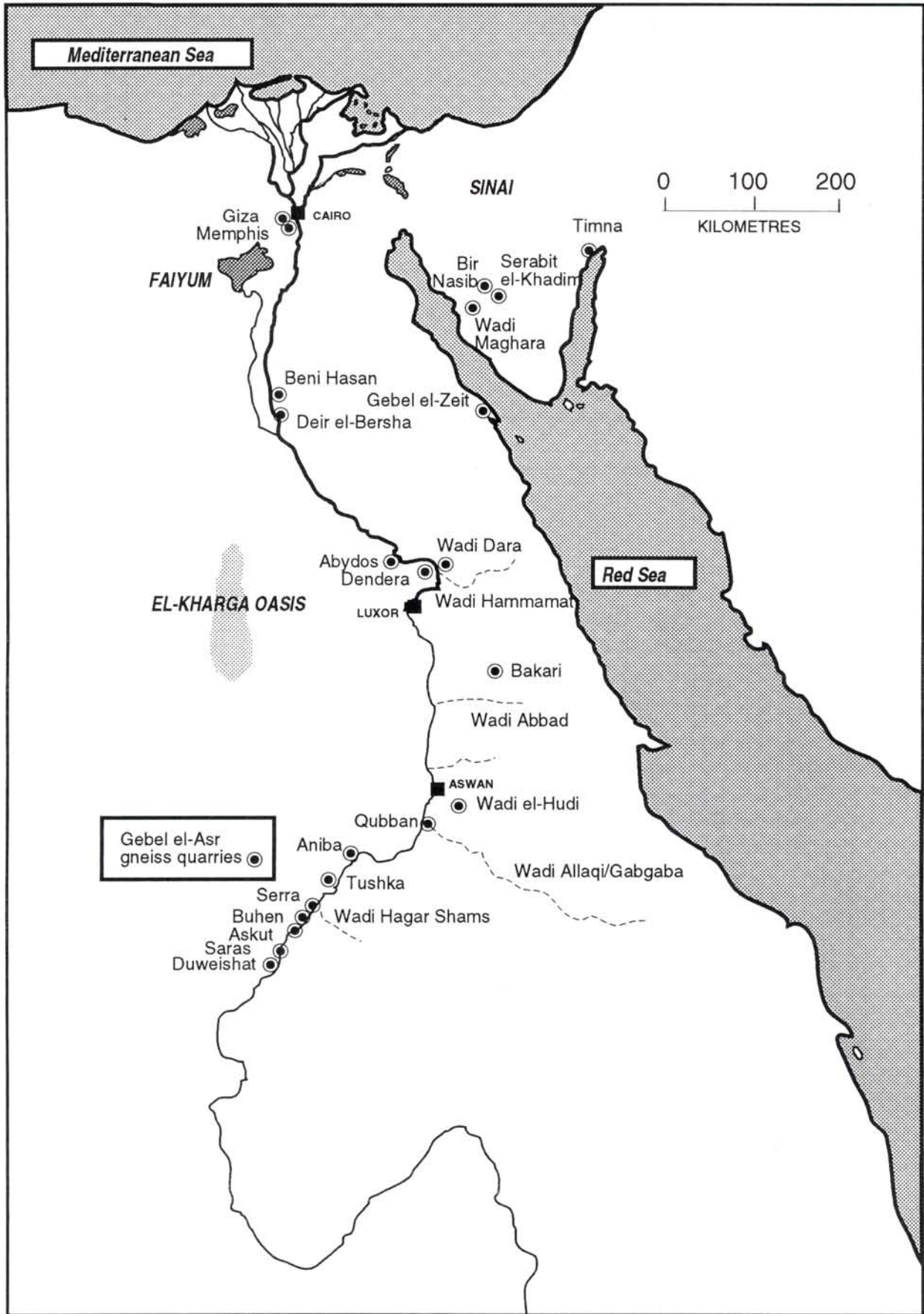


Figure 1. Map of ancient Egypt and Nubia showing the location of the Gebel el-Asr archaeological site (the 'Chephren diorite quarries') and other major quarrying and mining sites.



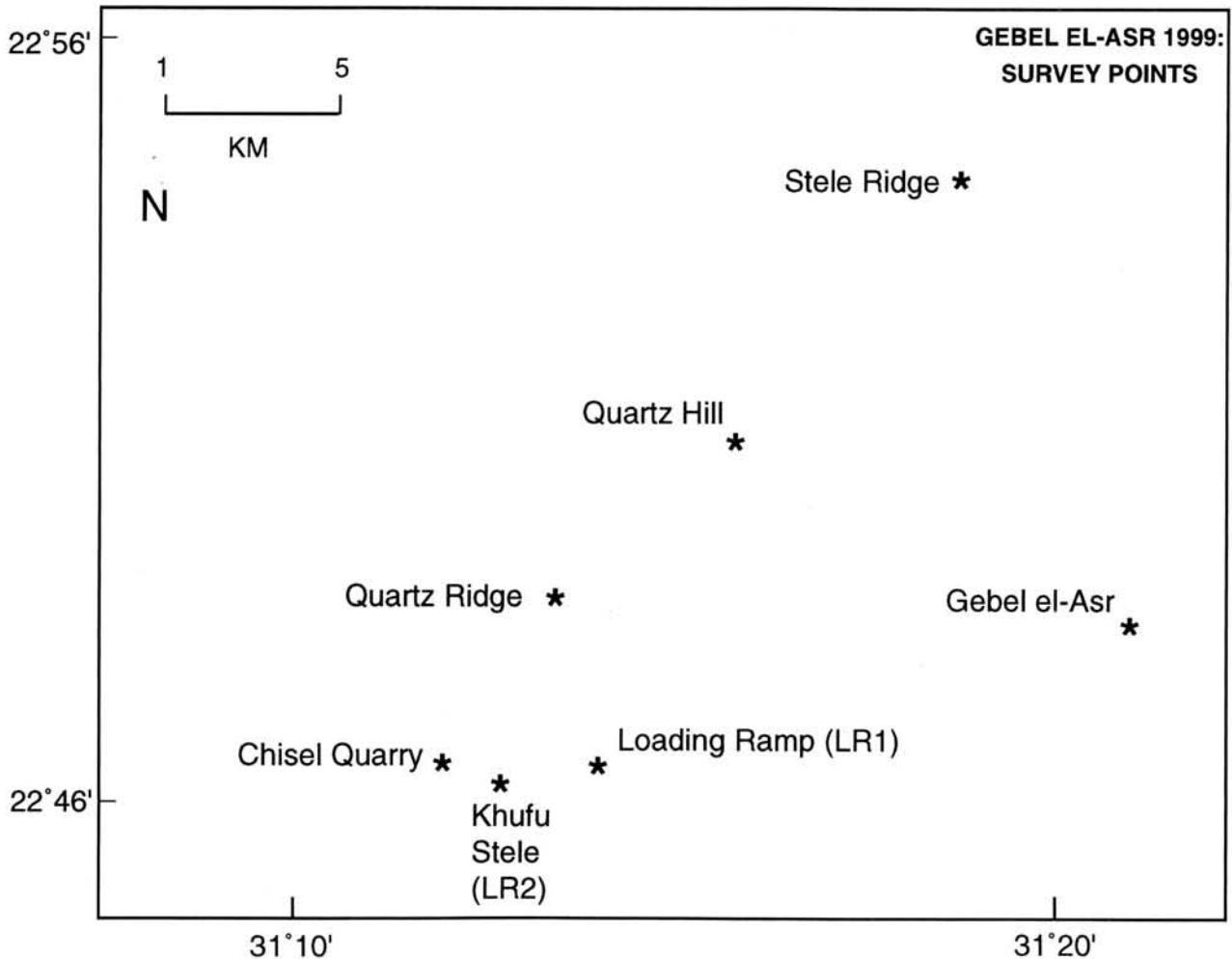


Figure 2. Plan of the Gebel el-Asr region, showing the locations of the various sites mentioned in the text.

the quarry-men to drag the blocks onto vehicles of some kind (see below). A short distance to the northwest, Engelbach and Murray found a further set of workings, which they called Chisel Quarry as a result of the discovery of a large copper alloy chisel or gad (inscribed with hieroglyphs reading 'Kamu: bow watch, southern Libyans'). At Stele Ridge several pieces of Middle Kingdom sculpture and stelae were excavated in the courtyards attached to the cairns - much of this material is now on display in the new Nubian Museum at Aswan. Finally, as they drove away from the quarries, they found a further stele lying face down on the desert surface. This last stele was uninscribed but incised in the middle with two tiny Egyptian military figures.

There was no further scientific activity at the site until 1990, when the geologists James Harrell and Max Brown compiled a more detailed map of the area and examined the geological nature and aesthetic significance of the stone exploited at the site (Harrell and Brown 1994).

The nature of gneiss and its uses in pharaonic Egypt  
The distinctive translucent gneiss procured by the ancient Egyptians in the Tushka region is mainly made up of grey

plagioclase and greenish black hornblende (as well as lesser amounts of biotite, chlorite, magnetite and sphene). There appear to be two varieties of gneiss in the Gebel el-Asr quarries: the banded dark variety (diorite or gabbro gneiss) deriving mainly from the southern quarries and the streaked or speckled light variety (anorthosite gneiss) from the workings in the north, just to the west of Quartz Ridge. Harrell and Brown have suggested that the distinctive iridescence of the gneiss - especially when viewed *in situ* in the afternoon sunlight - was the principal reason that this stone was particularly valued by the Egyptians.

Stone vessels are the earliest objects of gneiss known; these date from the late Predynastic period to the 6th Dynasty, and were particularly common in the 3rd Dynasty. The 2nd-Dynasty king Peribsen had a gneiss stele carved for his tomb at Abydos (British Museum EA 35597). Statues of gneiss were produced during the Old Kingdom and 12th Dynasty, such as the dyad of King Sahura with a figure personifying the Coptos nome (New York, MMA 18.2.4) and the headless torso of a statue of King Senusret I, 12th Dynasty, c.1971-1926 BC (Berlin, ÄM 1205). The few surviving post-Middle Kingdom gneiss statues, such as a 19th-



Dynasty block-statue from Heliopolis (Vienna ÄS 64), may well have been carved from earlier sculptures or blocks. Indeed the comparative dearth of gneiss sculpture surviving from the New Kingdom onwards suggests that the quarries probably ceased to be used by the end of the Middle Kingdom.

The Gebel el-Asr quarries can, therefore, be dated on the basis of two main criteria: first, fluctuations in the extent to which gneiss was used for vessels and/or statuary in different periods, and secondly study of the pottery from different sites within the region as a whole. The former indicates that the quarries were being exploited primarily for vessels in the late Predynastic and Early Dynastic period, and mainly for royal statuary in the Old and Middle Kingdoms. The surface pottery, on the other hand, suggests that the majority of the ancient quarrying activity and settlement dates to the Old and Middle Kingdoms.

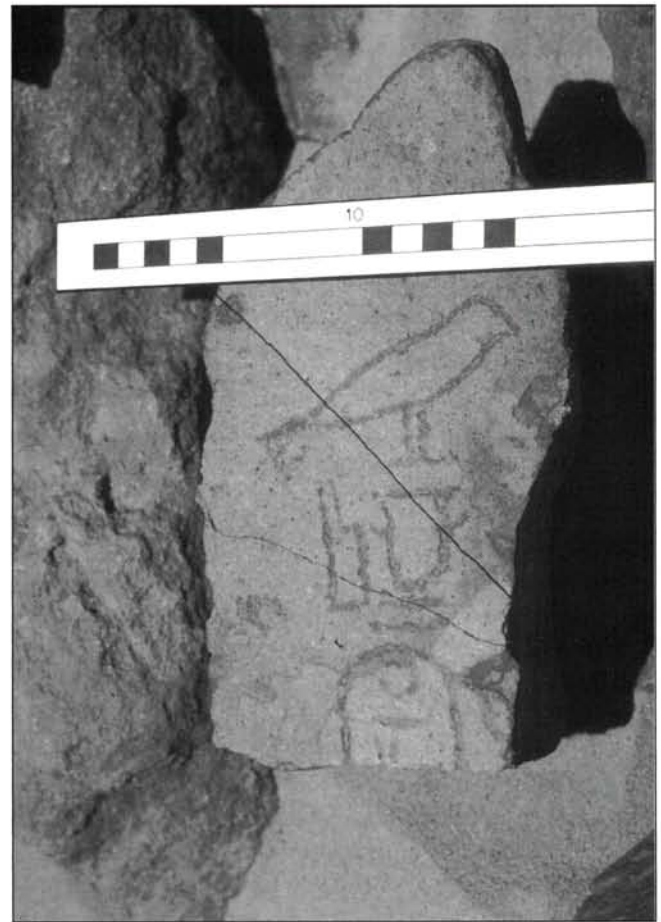
### The ancient route from the Gebel el-Asr quarries to the Nile Valley

The 80-km route between Gebel el-Asr and Tushka was not a built structure, as the roads to the Hatnub travertine quarries and the Gebel Qatrani basalt quarries were; instead it appears to have been simply a cleared track, the course of which was clearly identifiable to Engelbach and Murray as a result of a variety of evidence: pieces of discarded gneiss and potsherds, numerous cairns (including one large example marking the point almost exactly midway between the Nile and the quarries), occasional drystone encampments, and, on the harder ground, well-preserved donkey-tracks along the road itself. Murray (1939, 110) describes the hoof-marks as 'countless parallel trails, too thin and straight for camel tracks, that showed where the donkey caravans had taken provisions up to the quarries and brought smaller pieces of gneiss down'.

The Tushka end of the gneiss quarriers' road proved the most difficult section to discern, but according to Murray (1939, 110) 'it led down firstly to a lozenge-shaped structure about 2 miles out of Tushka, next to the remains of a considerable camp, and finally to a large heap of stones adorned with flags'. Since four Egyptian artefacts dating to the dynastic period (a 1st-dynasty jar-sealing in a C-Group grave, a sandstone block bearing an Old Kingdom inscription, and two Middle Kingdom stelae) were discovered in the vicinity of the modern village of Duki Dawur, William Kelly Simpson (1963, 53) suggests that this area of Tushka West may have been the quarriers' embarkation point. The road as a whole can be dated at least as early as the Middle Kingdom, on the basis of potsherds described by Engelbach (1938, 388). It is possible that the Old Kingdom gneiss quarriers were using some other road, such as the ancient Darb el-Arba'in caravan-route from Sudan to Middle Egypt, which passes a few kilometres to the west of the main gneiss quarries.

The 1997 and 1999 seasons of survey and excavation

In April 1997, with the permission of the Egyptian Supreme Council of Antiquities, we undertook a short season of survey at the Gebel el-Asr quarries. In this preliminary work we had two basic aims: (1) to undertake a survey of the Gebel el-Asr gneiss and quartz quarries, and (2) to investigate the existence of a set of amethyst mines possibly dating as early as the Old Kingdom, at the northern end of the quarries. We examined all the principal sites in the region, taking GPS readings and making small scale EDM surveys, as well as sketch plans. We focused particularly on the area at the north-eastern end of the site, surrounding 'stele ridge', identifying it as an area of multicoloured quartz mines dating to the Middle Kingdom (see Shaw in press).



*Plate 2. Fragment of a rock-cut stele bearing the Horus name (Set-ib-tawy) and part of a cartouche of the 5th-Dynasty ruler Nyuserria, found on the surface at Quartz Ridge, Gebel el-Asr.*

In April 1999 we undertook a further season of work at the site, the principal results of which are outlined below. We would like to thank the Chief Inspector of the SCA at Aswan, Mr Atiya Radwan, and the inspector who assisted us in our work, Mr Mustafa Hassan. The expedition consisted of Dr Ian Shaw, Elizabeth Bloxam, Louise Simson and Richard Lee (archaeologists at the Institute of Archaeology,



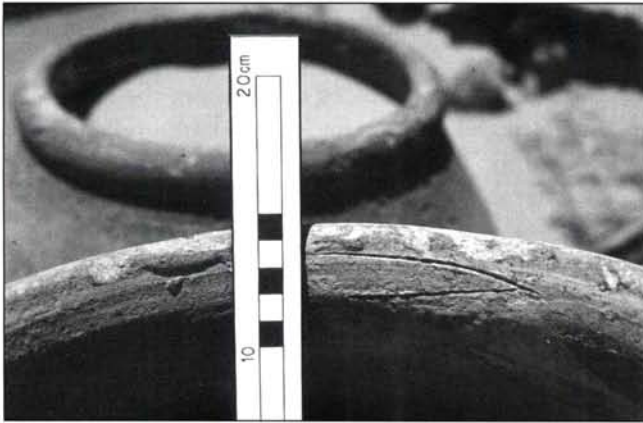


Plate 3. A pre-firing pot-mark on one of the 12th-Dynasty storage jars at Quartz Ridge.

University College London), Dr Judith Bunbury (a geologist currently employed in the Earth Sciences Department of the University of Cambridge) and Dr Deborah Darnell (ceramicist, from Chicago House, Luxor).

In the 1999 season we had three basic aims: (1) excavation of a set of dry-stone huts at Quartz Ridge, (2) excavation of the two dry-stone structures identified as 'loading ramps', and (3) geological survey of the region as a whole (using a 1:200,000 Russian map as the basis).

#### The quarry-workers' settlement at Quartz Ridge

Quartz-ridge is a long strip of high ground roughly following a southwest-northeast axis, punctuated by four stone cairns (one of which is composed of fragments of quartz, hence the name given to the ridge by Engelbach and Murray). As a result of the flatness of the general terrain in the Gebel el-Asr region, the prominence of the ridge itself and the presence of the cairns (which are assumed to date back to the pharaonic period or earlier), Quartz Ridge is a highly visible feature in the landscape. Since there is also a considerable amount of anorthosite gneiss in the immediate vicinity, it is not surprising that this ridge seems to have formed a kind of operational focus and supply base for the Old and Middle Kingdom quarrying.

The group of dry-stone huts at Quartz Ridge, identified by Engelbach and Murray as the site of the main quarry-workers' settlement, is the one area of the site where significant quantities of surface pottery have survived. It represented an obvious target for excavation, promising to provide information on the chronology of the expeditions as well as crucial details concerning living conditions and supplies. Compared with other major Old and Middle Kingdom quarries, such as those at Hatnub and Wadi el-Hudi (see Shaw 1986; 1994), the settlement remains at Gebel el-Asr are very limited in extent, suggesting both that the duration of the expeditions might have been fairly short and that the numbers of workers might not have been very great. The best interpretation of the Quartz Ridge huts was that they constituted the headquarters from which the scattered groups of

quarriers were coordinated and supplied.

In the 1999 season we excavated four rooms in a large dry-stone hut that appeared to form the nucleus of the 'settlement'. Our finds included ceramics ranging in date from the Early Dynastic period to the Middle Kingdom, a fragment of a 5th-Dynasty stone stele bearing the Horus name and cartouche of Nyusera, a king who had not previously been attested at the site (Plate 2), a set of 22 intact 12th-Dynasty pottery flat-bottomed storage jars (Colour Plate VIII), and two smaller intact Middle Kingdom vessels (Plate 4).

The capacity of one of the large storage jars was measured at 76.5 litres. Many of them bear pre-firing pot-marks on the insides of rims (Plate 3) and post-firing numbers incised on their shoulders. Similar large Middle Kingdom marl C storage vessels have been found at Lisht, Qasr el-Sagha, Dahshur, Haraga, Tell el-Dab'a and Abu Ghalib, and the best parallels for a large group of this type were the 22 vessels (also with pre-firing marks inside their rims) found in the so-called 'South wall deposit 1' at Lisht (Arnold 1988, 113). Vessels of this type, probably produced in the Memphis-Faiyum region, were particularly suited to the transportation and long-term storage of dry substances such as grain. The peak period of use was in the mid-12th Dynasty although examples at Tell el-Dab'a were found in strata dating to the late 12th to mid-13th Dynasties.

Since we were only able to excavate half of the large room in which the storage jars were kept, the total number will not be clear until we resume excavation at the site, but the 22 vessels represent a significant amount of storage in support of the quarrying expeditions, and may ultimately prove to be useful evidence in terms of evaluating the numbers of workers involved in the Middle Kingdom work at Gebel el-Asr.

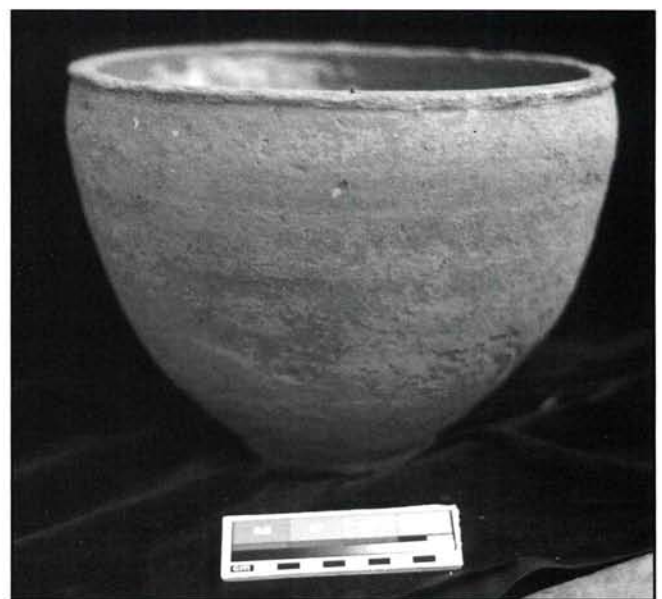


Plate 4. Small intact Middle Kingdom vessel excavated from Room 1 at Quartz Ridge, Gebel el-Asr.





## The two stone-built 'loading ramps'

Associated with the Old Kingdom quarrying activity in the Gebel el-Asr region are two stone-built loading ramps. Loading Ramp 1 (LR1) is located in an isolated area of diorite gneiss workings at the south-eastern edge of the quarrying region (about 5km south of Quartz Ridge). Loading Ramp 2 (LR2) is situated in an intensive area of quarry workings identified by numerous spoil heaps at the Khufu Stele Quarry, about 2km to the west of the LR1 quarry. Both of these structures are unique to the Gebel el-Asr site. Their external surfaces were made up of large blocks of discarded diorite gneiss, while their interiors were composed of spoil fill, quantities of which were readily available from the surrounding quarry workings.

The 1999 excavation of the loading ramps involved the removal of up to half a metre of wind-blown sand deposit to expose the face of each ramp to the original ground surface. When the original ground surface was reached, two parallel tracks were clearly visible emanating from the faces of the ramps (Colour Plate IX). During removal of the wind-blown sand, potsherds dating to the Old Kingdom were found close to the tracks. No pottery dating to later periods was found. In both instances the tracks are of similar dimensions at approximately 750mm wide and 330mm deep. The exposed face of LR1 rises to 1.22m and from the base of each track to 1.63m. The height of LR2 is slightly shorter at 1m, and the height from the base of the track rises to 1.32m. In both cases, the base of each track appears to be a harder surface than the surrounding original ground surface.

Excavation of the tracks leading from LR2 revealed numerous deep grooves and slots within the base of the tracks at approximately 5m from the face of the ramp, which could indicate the possible use of levers to elevate the vehicle up onto the original ground surface. It was also notable that the

sides of the tracks do not show the kind of marks of abrasion that might be expected if the tracks were simply worn away by constant traffic of vehicles to and from the ramp. We therefore deduced that the tracks from both loading ramps had been artificially cut to accommodate the runners of the vehicle and most probably to bring the platform of the vehicle flush with the top of the ramp, thus enabling the easy transference of the blocks onto the transportation vehicle.

The fact that the tracks were dug rather than eroded would explain why they disappear 9m away from the faces of the ramps, indicating that once the vehicle was drawn up onto the original ground surface, which is covered only by a thin deposit of wind-blown sand, the tracks would easily have weathered away.

Given the unusual height of the loading ramps, the process of identifying the type of vehicle used to transport large blocks of stone from the quarry to the Nile has proved problematic. The height of the ramps is a problem that was first encountered by Engelbach and Murray (1938) who thought that their height was excessive for loading sledges, which are principally known to operate as haulage vehicles on construction sites and in quarries. In the archaeological record the largest surviving wooden sledge is a Middle Kingdom example found at the 12th-Dynasty Dahshur pyramid of Senusret III. This sledge is 4.2m long and 1m wide, with crossbeams over two runners 120mm high by 200mm wide. The most detailed depiction of a sledge being used to convey stone from quarries forms part of a wall-painting in the 12th-Dynasty tomb of Thuthotep at Deir el-Bersha, which shows a complete travertine colossal statue of the deceased being hauled on a sledge by 172 men on its way from the travertine quarries at Hatnub. Old Kingdom depictions of sledges functioning purely as haulage vehicles are so far unknown.

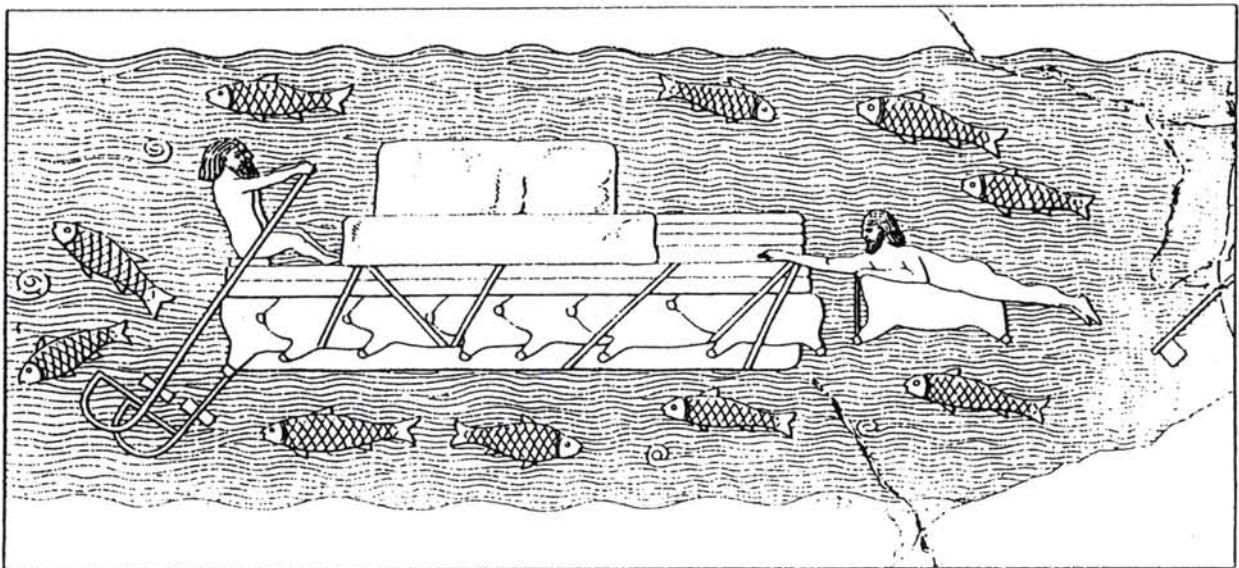


Figure 3. Assyrian relief from the palace of Sennacherib at Nimrud, c.700 BC, showing the use of an early kelek-style raft to transport a large block of stone.



Evidence from the excavation implies that a substantially larger vehicle was employed to transport the quarried stone and that the ramps were purpose-built to accommodate it. Research is currently being undertaken to re-evaluate the methods used to transport the stone in the Old Kingdom in the light of new data from the quarry (see Bloxam 1998). In the context of Gebel el-Asr flexible transportation processes would be required given its isolated geographical location of some 65km from the Nile.

It would seem feasible to suggest that a vehicle other than a conventional sledge could have been employed to transport the stone. The only representation of a vehicle other than a sledge being used to transport stone in antiquity is shown on an Assyrian relief from the palace of Sennacherib at Nimrud, dating to the 1<sup>st</sup> millennium BC (Casson, 1994; Fig. 3). This vehicle comprised a light wooden frame, laced together with withies, cords or thongs over which animal hides were stretched. Rafts of this type, known as *keleks*, are still used to navigate the Tigris river, and are said to be ideally suited to shallow tributaries and rocky rapids. A similar raft-like vehicle on runners may have been used to transport stone from Gebel el-Asr, constructed from a variety of locally available materials such as acacia and tamarisk wood. It is interesting to note that the Assyrian relief shows the use of inflated animal hides to provide buoyancy. Animal hides identical to those depicted are still used in the northern Sudan for transporting water from wells and such devices could also have been used to transport water from wells at the quarry. Some support for the use of such rafts on the Nile during the pharaonic period is provided by a painted relief in the tomb of Min, an 18th-Dynasty chief treasurer, whose

career spanned the reigns of Thutmose III and Amenhotep II. One scene in this tomb (Fig. 4) shows an encounter between Min (accompanied by a group of soldiers and servants) and some merchants from Punt, the latter depicted on board raft-like conveyances, which, according to Bradbury (1996), may be interpreted as *kelek*-style conveyances.

The concept of a raft on runners in the context of Gebel el-Asr also requires an evaluation of the original ground surface. Samples of the original ground surface were taken for analysis and preliminary results indicate that the Old Kingdom ground surface was hard, compact, and possibly lateritic or calcrete (but now obscured by deposition of wind blown sand) that would have facilitated the dragging of any sledge-like vehicle without the need of a purpose-built road or rollers.

The present geomorphology of this area may bear no resemblance to that of the Old Kingdom, due primarily to the deposition of wind-blown sand. Ball (1927) and Haynes (1980) have speculated that the prominent depression of the Wadi Tushka to the north east of the quarries might have formed a tributary system extending to the Nile. This would bring a water source to within about 10 miles (16km) from Gebel el-Asr. Harrell (1995) points out that the siting of ancient working quarries is related to access to permanent water. It is thus suggested that the transportation of stone from the quarry during the Old Kingdom utilized a closer access to water than the 80-km route identified by Engelbach and Murray between the quarries and the Tushka region of the Nile. The latter may instead simply be the remains of a Middle Kingdom supply route, and it is clear from the geomorphology of the surrounding terrain that the

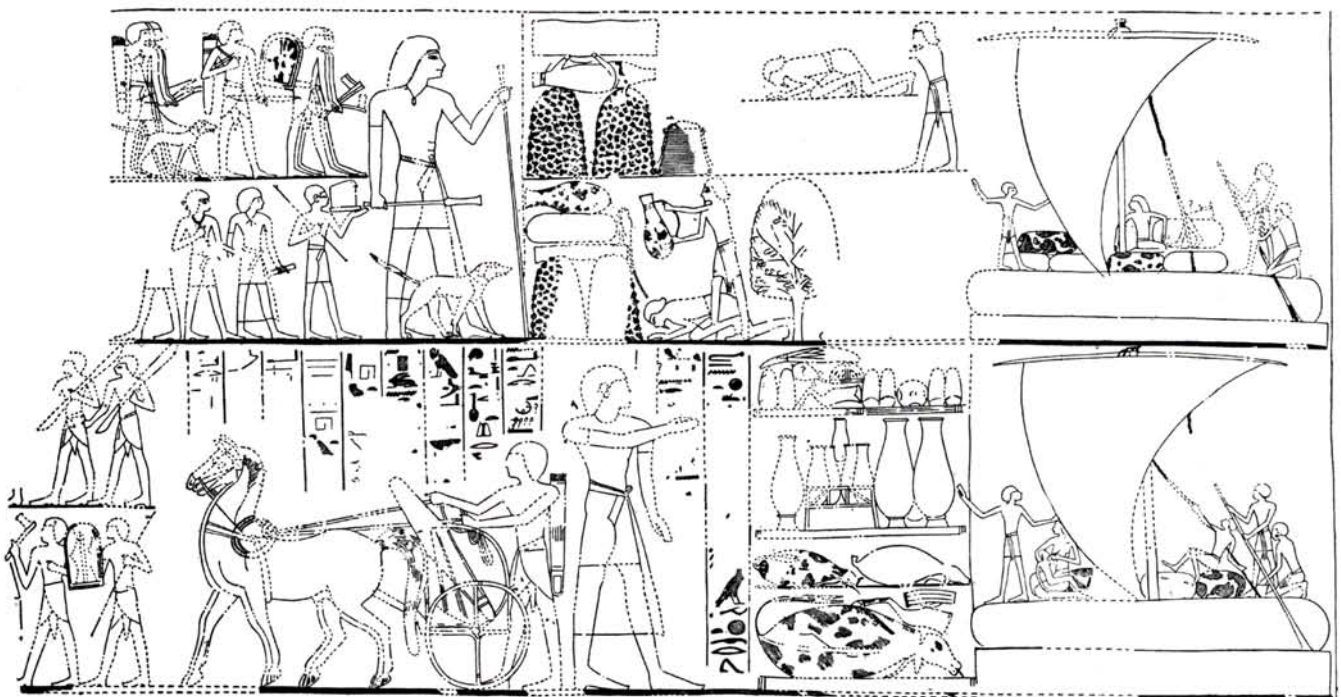


Figure 4. Relief from the 18th-Dynasty tomb of the Theban official Min (TT143), showing an Egyptian encounter with Puntite merchants travelling on rafts.





transportation of blocks of stone weighing several tons along this particular path would have been a considerable undertaking in both time and human resources.

Both the time and effort that were put into constructing the loading ramps and the tracks leading from them suggest that they were made specifically in order to accommodate a very specialized type of vehicle. The height of the ramps is greater than that required to load a normal sledge. An amphibious vehicle on runners would provide flexibility and obviate the need to unload the stone onto another craft. The raft could have been hauled by oxen and/or manpower to the area of water that was closest to the quarry (perhaps the seasonally flooded Wadi Tushka), and it could then have been steered independently or towed down the Nile to Giza in Lower Egypt.

It is interesting to note in this context that the designation and organization of quarry labour gangs is attributed to a ship's crew. Additionally, Andreu (1997, 29) notes that 'expedition troops had been assimilated to a naval battalion, with a port crew and starboard crew, the rowers having been replaced by the quarrymen'.

## Conclusions

The results of the 1997 and 1999 expeditions to Gebel el-Asr indicate its importance as a source of evidence for Egyptian activities in Nubia during the early pharaonic period. Unfortunately, however, it is becoming increasingly clear that these archaeological remains are severely threatened by the Tushka hydrological project. Stele Ridge, the north-eastern part of the Gebel el-Asr quarrying site, has already been damaged in recent years during the course of construction work associated with the new road to Gebel Uweinat. Over the last two years agricultural land has begun to be cultivated along the banks of the newly flooded Sadat Canal and Wadi Tushka and it seems clear, judging from the survey points that have now been laid out across most parts of the site, that the entire archaeological site of Gebel el-Asr will now need to be actively protected from future agricultural and construction projects.

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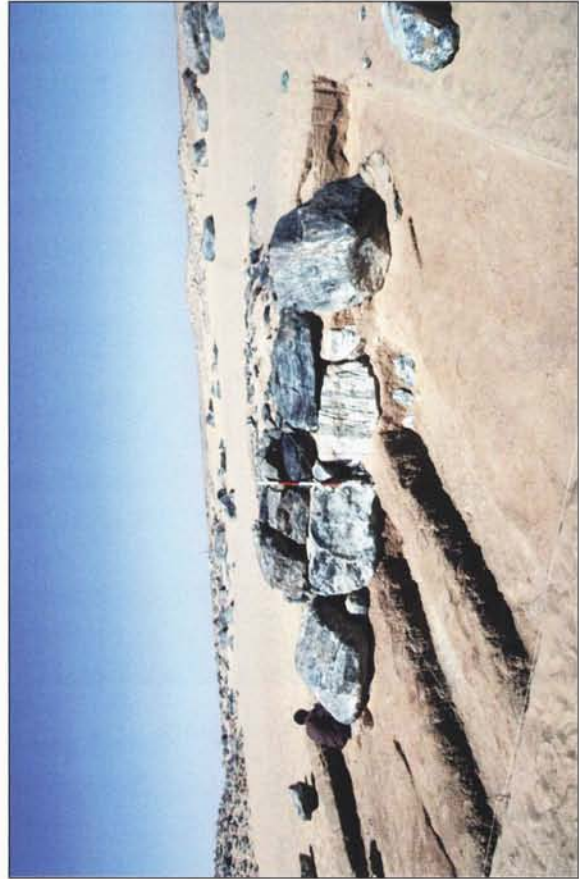


Plate IX. Gebel el-Asr. View of "loading ramp 2" at the 'Khufu Stele' quarrying site, showing the deep track-ways cut into the ancient ground surface in front of the ramp.

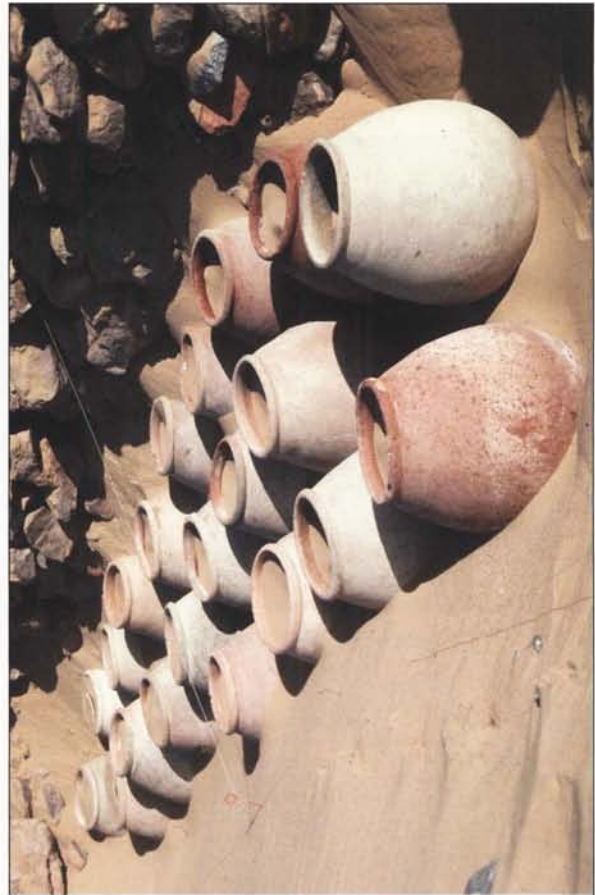


Plate VIII. Gebel el-Asr. The 12th-Dynasty storage jars, as excavated at Quariz Ridge.