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The evidence for amethyst mining in Nubia and Egypt

Introduction

This paper examines the archaeological and textual evidence for the mining of amethyst in Nubia and Egypt from the Predynastic period onwards. The study is based primarily on fieldwork undertaken at two sites: Wadi el-Hudi (Shaw and Jameson 1993) and Gebel el-Asr (the so-called "Chephren diorite quarries", Harrell and Brown 1994; Shaw et al. forthcoming).

Amethyst is a translucent violet-coloured, macrocrystalline form of quartz (silicon dioxide, Si02) in which the colour is produced by the presence of trace amounts of ferric oxide. The term "amethystine quartz" is sometimes used to describe a form of amethyst that is streaked and banded with milky quartz. It is difficult to determine the precise character of the amethyst mined at Wadi el-Hudi and Gebel el-Asr, since the stone is now completely worked out, but judging from the surviving Middle Kingdom jewellery incorporating amethyst beads, it was of a dark violet hue. It should be noted, however, that the amethysts reported by Engelbach at the Gebel el-Asr gneiss quarries appear to be of a much paler colour, and according to Ogden (1982:107) "some Egyptian amethysts are so pale they could almost pass for rose quartz".

Amethyst is primarily used as a gemstone, and it was almost entirely restricted to items of jewellery dating either to the Middle Kingdom or the Roman period, although there are a few instances of its use for beads and small vessels between the late Predynastic period and the end of the Old Kingdom. It was, however, also occasionally used for small vessels (in the Predynastic and Early Dynastic periods) or small amulets (mainly in the Old Kingdom). There is a certain amount of evidence for the trading of amethyst with Crete from at least the Middle Kingdom onwards (perhaps in exchange for such products as animal horns, oils and lichen, see Warren 1995:5-10). In the New Kingdom, amethyst

was less commonly used for personal adornment, and it is even possible that there was a temporary dearth of known sources. By the Roman period, however, they had apparently regained their popularity (or availability), and, apart from site 12 at Wadi el Hudi, there are Roman amethyst quarries in the Safaga region near Gebel Abu Diyeiba (midway between the phosphate mines of Wasif and Umm Huetat, see Fig.1), where the amethyst has formed in cavities in the red granite following the courses of quartz veins reportedly extending for hundreds of metres. In modern Egypt the natural reserves of amethysts appear to have been virtually exhausted, and they now have to be imported from South America.

The Wadi el-Hudi mines

The Wadi el-Hudi region, covering an area of c. 300 square kilometres in the Eastern Desert, c. 35 km south-east of Aswan, was the primary location for amethyst mining in Egypt from the 11th Dynasty until the end of the Middle Kingdom, during which time the use of amethysts in jewellery reached a peak of popularity (see Fakhry 1952; Sadek 1980-85; Shaw and Jameson 1993). It has been exploited for its minerals (including barytes, gold, amethyst and possibly also mica) since at least the early 2nd millennium BC, and modern miners and quarriers are still extracting hematite and building stone from the immediate area. The amethyst occurs in cavities in the granite.

The mines at Wadi el-Hudi were rediscovered by the geologist Labib Nassim in 1923 (Nassim 1925), but the first proper archaeological examination of the site did not take place until 1939, when it was visited by G. W. Murray and Ibrahim Abdel AI of the Egyptian Topographical Survey (see Rowe 1939). Sites 5, 6 and 9, in the western part of the region, constitute an area of intense Middle Kingdom mining activity (see Fig. 2).

Site 5 consists of a hilltop miners' settlement and an adjacent amethyst mine. The L-shaped amethyst mine at site 5 - perhaps better described as an open-cut quarry - is located at the southern end of the hilltop settlement. The deposits of amethyst appear to have been completely worked out in the Pharaonic period. Incorporated into the walls of the adjacent settlement are numerous rock-carvings and inscriptions, five of which are securely dated to the first two years of the reign of Nebtawyra Mentuhotep IV, the last ruler of the 11th Dynasty. The pottery, present in large quantities throughout the settlement, also dates mainly to the early Middle Kingdom. Site 9 is a large rectangular stone-built fort, probably dating to the l2th Dynasty. To the north-east of the fort are two amethyst mines, while to the north-west there is a short, well preserved section of ancient road. Roughly midway between sites 5 and 9 is a conical hill, the summit of which is decorated with many inscriptions and rock-carvings, mainly dating to the Middle Kingdom (site 6).

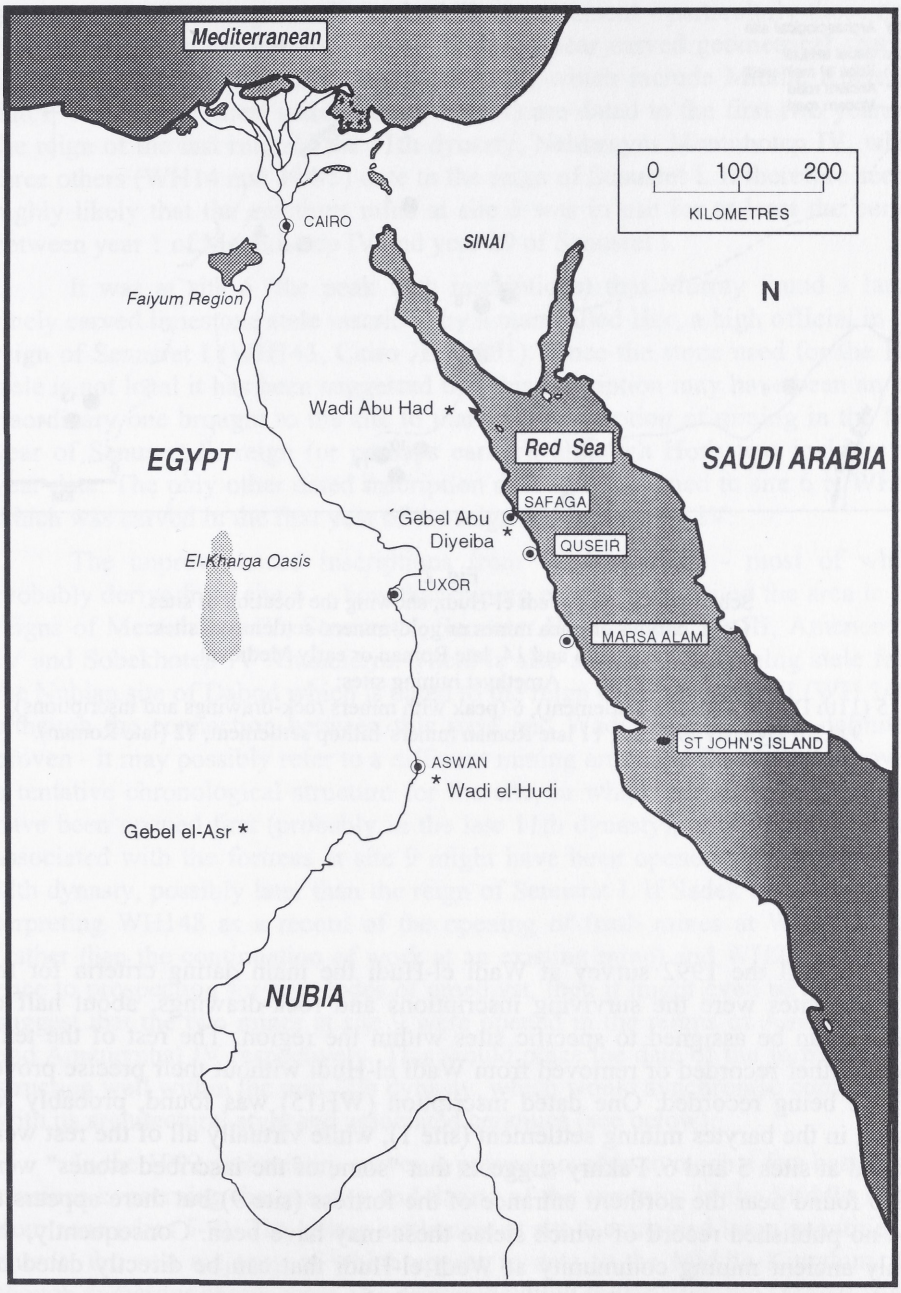

Fig. 1. Map of Egypt and Nubia showing the locations of identified amethyst mines.

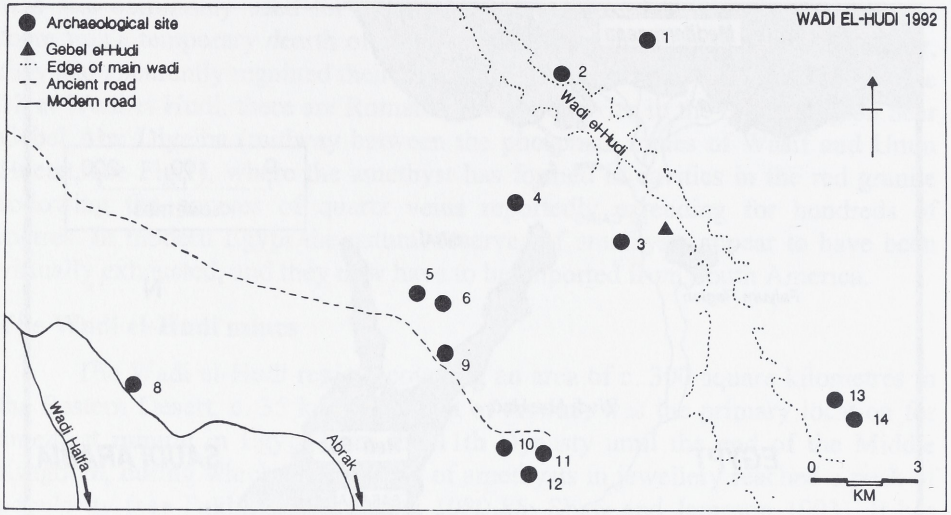

Fig. 2.
Schematic map of Wadi el-Hudi, showing the location of sites.
Gold, barytes or mica mines or gold-miners' settlements sites:
1-4, 8, 10, 13 and 14, late Roman or early Medieval.
Amethyst mining sites:
5 (11th Dynasty hill-top settlement), 6 (peak with miners rock-drawings and inscriptions),
9 (12th Dynasty fortress), 11 late Roman miners' hilltop settlement, 12 (late Roman).

Until the 1992 survey at Wadi el-Hudi the main dating criteria for the various sites were the surviving inscriptions and rock-drawings, about half of which can be assigned to specific sites within the region. The rest of the texts were either recorded or removed from Wadi el-Hudi without their precise provenance being recorded. One dated inscription (WH15) was found, probably re-used, in the barytes mining settlement (site 1), while virtually all of the rest were found at sites 5 and 6. Fakhry suggests that "some of the inscribed stones" were also found near the northern entrance of the fortress (site 9) but there appears to be no published record of which stelae these may have been. Consequently, the only ancient mining community at Wadi el-Hudi that can be directly dated by textual evidence is the hilltop settlement at site 5.

Many of the larger rocks in the hilltop settlement - particularly those near the summit or on the eastern side of the hill - bear carved geometrical shapes, figures and hieroglyphic inscriptions, seven of which include Middle Kingdom dates. The three earliest inscriptions (WH2-4) are dated to the first two years of the reign of the last ruler of the 11th dynasty, Nebtawyra Mentuhotep IV, while three others (WH14 and 144-5) date to the reign of Senusret I. It therefore seems highly likely that the amethyst mine at site 5 was in use for at least the period between year 1 of Mentuhotep IV and year 29 of Senusret I.

It was at site 6 (the peak with inscriptions) that Murray found a large, finely carved limestone stele inscribed by a man called Hor, a high official in the reign of Senusret I (WH143, Cairo JE 71901). Since the stone used for the Hor stele is not local it has been suggested that this inscription may have been an extraordinary one brought to the site to mark the resumption of mining in the 17th year of Senusret I's reign (or perhaps earlier), although Hor's text includes no year-date. The only other dated inscription definitely assigned to site 6 is WH 1, which was carved in the first year of the reign of Mentuhotep IV.

The unprovenanced inscriptions from Wadi el-Hudi - most of which probably derive from site 6 - show that mining expeditions visited the area in the reigns of Mentuhotep IV, Senusret I, Senusret III, Amenemhat III, Amenemhat IV and Sobekhotep IV Khaneferre. There is also an amethyst-mining stele from the Nubian site of Dabod which is dated to the reign of Amenemhat II (WH 148), although the connection between this stele and Wadi el-Hudi is not definitely proven - it may possibly refer to a different mining area. The inscriptions provide a tentative chronological structure for the site, in which the site 5 mine would have been opened first (probably in the late 11th dynasty), while the two mines associated with the fortress at site 9 might have been opened some time in the 12th dynasty, possibly later than the reign of Senusret I. If Sadek is correct in interpreting WH148 as a record of the opening of fresh mines at Wadi el-Hudi (rather than the continuation of work at an existing mine) and WH21 as a reference to prospection for new lodes of amethyst, then it might even be possible to suggest that the two mines at site 9 were opened in the reigns of Amenemhat II and Amenemhat IV respectively. This would place the date of the fortress's construction well within the mid-12th dynasty, which would synchronise comfortably with its architectural style and associated ceramics (see below).

In the 1992 preliminary survey it proved possible to reach a few basic conclusions concerning the quantity and dating of the ceramics in the Middle Kingdom zone (sites 5-9). The hilltop settlement at site 5 contained large quantities of sherds, the vast majority of which appear to date to the Middle Kingdom. Although numerous sherds were also scattered within the walls of the fortress at site 9, there were far fewer concentrations compared with the hilltop settlement. The

pottery scattered inside the fortress included pharaonic sherds (probably of late Middle Kingdom date) as well as some sherds considered to date to the Roman period, suggesting that there may have been a later re-use of the fortress. The ceramic evidence so far obtained is therefore broadly in line with that of the inscriptions. There already appears to be a small amount of ceramic data to suggest that the hilltop settlement was in use earlier than the fortress, but this suspicion can only be corroborated by a much more detailed analysis of the ceramics at both sites.

There is some evidence for the continued exploitation of amethyst at Wadi el-Hudi after the Middle Kingdom: site 12, for instance, is almost certainly an amethyst mine of the Roman period. During the late Middle Kingdom the principal Egyptian amethyst mines were probably located at the northern end of the Gebel el-Asr gneiss quarries (see below).

The quarrying of gneiss and quartz at Gebel el-Asr

The Gebel el-Asr gneiss and quartz quarries, 65 kilometres northwest of Abu Simbel, were rediscovered in 1932 (see Engelbach 1933, 1938; Murray 1939). The gneiss quarries, dating from the late Predynastic period to the Middle Kingdom, are usually described as the "Chephren diorite quarries" because they are the source of the blue-grey metamorphic rock from which the magnificent seated statue of the 4th-Dynasty pharaoh Chephren (2520-2494 BC) was carved. Our 1997 survey of the site was the first archaeological expedition to the quarries since 1938, when Reginald Engelbach undertook his second season of survey and excavation in the region, including a detailed examination of the ancient road leading to Tushka. More recently, the geologists James Harrell and Max Brown produced a more detailed map of the area and examined the geological, aesthetic and religious significance of the type of gneiss exploited at the site.

In 1997 we examined all the principal sites in the region (the locations of which are shown in Fig. 3), taking GPS readings and making small EDM surveys, as well as sketch plans. We focussed particularly on the area at the north-eastern end of the site, surrounding Stele Ridge, where Engelbach (1933:69) and Little (1933:77) had reported the existence of a set of amethyst mines possibly dating to the Old Kingdom, at the northern end of the quarries. These would be the earliest amethyst mines in Egypt, predating the Middle Kingdom Wadi el-Hudi mines. In our 1997 survey, however, we were able to identify only Middle Kingdom and Roman pottery in the Stele Ridge part of the site, suggesting that this area of amethyst and multi coloured quartz mines may not have been used as early as the Old Kingdom and instead were probably roughly contemporary with - or perhaps even slightly later than - the Wadi el-Hudi mines.

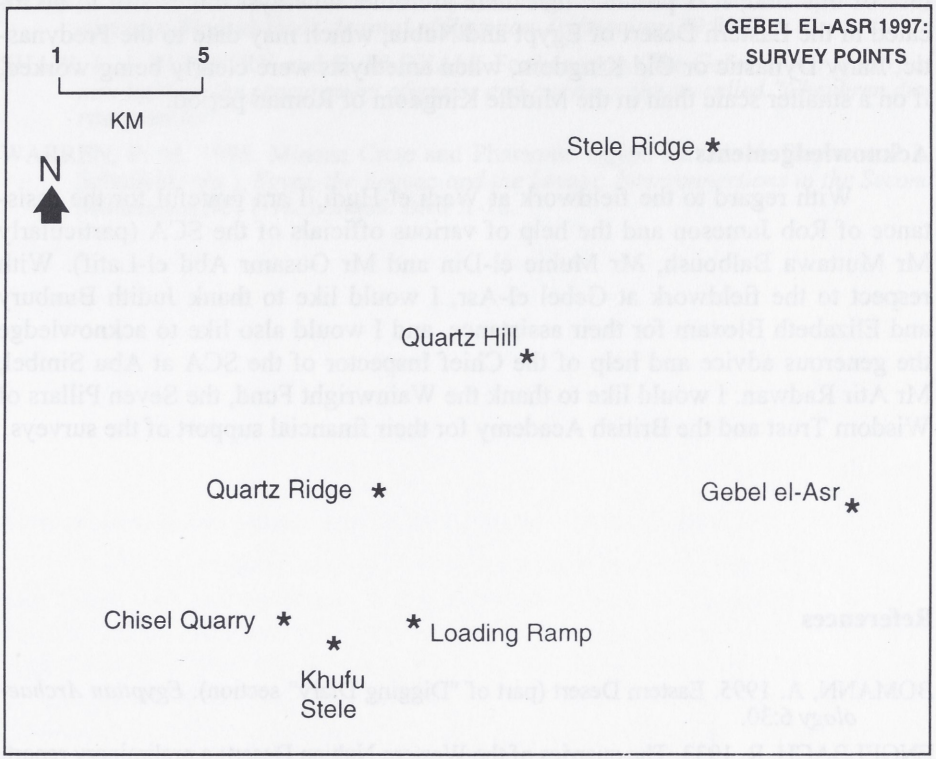

Fig. 3.
Sketch-plan of the Gebel el-Asr region, showing locations of the principal regions of gneiss procurement (Kufu Stele, Quarz Hill, chisel quarry) and the quarz mines (Stele Ridge).

Although Stele Ridge has very recently been rather badly affected by construction work associated with the new road to Gebel Uweinat, there are nevertheless sufficient surviving traces of cairns, ceramics and quarried stone to provide a good indication of the date and major characteristics of the site.

Pre-Middle Kingdom Egyptian and Nubian sources of amethyst

Amethysts were being used for jewellery and small vessels from the late Predynastic period onwards, but the principal identified mines described above date to the Middle Kingdom or the Roman period. However, in recent years another source, dating at least as early as the 1st Dynasty (judging from the associated pottery), has been revealed in the course of a survey of the Wadi Abu Had, in the northern part of the Eastern Desert (Bomann 1995). Given the chance na-

ture of this find, it is possible that there are other amethyst mines still to be located in the Eastern Desert of Egypt and Nubia, which may date to the Predynastic, Early Dynastic or Old Kingdom, when amethysts were clearly being worked, if on a smaller scale than in the Middle Kingdom or Roman period.

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