

# **Second archaeological survey of the greywacke quarries of the Wadi Hammamat**

**Institute of Archaeology, University College London and  
in co-operation with the SCA Ancient Quarries and Mines  
Department**

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*View of the Predynastic to Early Dynastic bracelet workshop and settlement (centre of photograph where people are standing) Wadi Hammamat*

## **Final Report to The Supreme Council of Antiquities**

*by*

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## **INTRODUCTION**

The objectives of the second archaeological survey of the ancient greywacke quarries in the Wadi Hammamat were to:

- Continue identifying a chronology of quarrying from documentation and characterisation of: stone extraction techniques, surface survey of associated artefacts such as ceramics, stone tools and other remains
- Continue mapping into their context inscriptions and rock art in the quarries
- Continue making an assessment of the logistics in removing stone from the quarries by identifying and characterising roads, ramps and other features linked with transport
- To delimit the extent of the ancient quarries for the purposes of making boundaries in terms of conservation and future land-use planning
- Continue an assessment of current risks and threats to the quarries and status of preservation

### **The survey team**

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## **1. PRE-DYNASTIC – EARLY DYNASTIC WORKSHOPS AND QUARRIES**

### **BH\_WK1 – major workshop/settlement**

We re-located and documented a workshop/settlement for the production of greywacke bracelets previously recorded by Debono in 1949 (Debono 1951) (see Map 2, BH\_Wk1). Fine bracelets of greywacke are known particularly in Predynastic contexts of the Naqada period, for instance at Tarkhan in the Faiyum (Petrie Museum UC17103).

The workshop/settlement is located on a slightly raised terrace approximately 200m long by 75 m wide and thus above the destructive force of flash-floods through the wadi (Fig. 1). Since Debono's excavations a new road has been built thus rendering a considerable amount of disturbance to the area. There were no settlement remains apart from the imprint of one dwelling that was excavated by Debono (Fig. 2). However, in several places we could identify small work areas where flat discs (Fig. 3) of greywacke were drilled, numerous partially worked and broken bracelets occur in these areas (Fig. 4).

Production of bracelets involved reducing small blocks of greywacke with pick-like stone tools (also of greywacke) (Fig. 5) these slabs were further reduced into discs probably using small pounders. The centre of the disc was hollowed out using chert

crescent-shaped drills (Fig. 6) – such drills are known particularly at the Early Dynastic gypsum quarries in the Faiyum for hollowing out small vessels (Caton-Thompson and Gardener 1934). It is notable that the chert would have been brought to the site, as it does not occur in the immediate vicinity.

The artefacts in chert are of various colours but primarily camel coloured, also dark brown and various shades of brown, and shades of grey (Fig. 7). The range of these lithic artefacts include flake fragments, flakes, bladelet fragments and bladelets, flake borers, crescent borers (as described) and cores. This range of types concurs with that described by Debono (1951).

It is important to determine chert sources; there are limestone outcrops to the east and west of Wadi Hammamat, but the wadis associated with these outcrops do not drain in the direction of Wadi Hammamat, so that chert pebbles could not have been transported to Wadi Hammamat by wadi action. Chert must have been carried to the area by people.

The date range of these workshops from pottery scatters is problematic given the disturbance of the site. However, we established clusters in the central site workshops that were of the Predynastic Naqada II period. These included sherds of storage jars, flat based bowls (mostly burnished red) and rough made bowls. The limited number of types essential to daily subsistence suggests use by the workers on what would likely be a temporary basis.

In the western part of the workshop a concentration of pottery sherds includes recurved rim bowls (some of them are made of Nile silt while the others are made of local marl ware) this indicates that some bowls were brought with the workmen from the Nile valley and others produced at the site. A rim sherd of a conical bread mould and several body shards of a rough made beer jar all date to later 3<sup>rd</sup> and 4<sup>th</sup> dynasties. Again, the limited number of types suggests these were for feeding and cooking purposes of the workmen on a temporary basis.

Close to the small dwelling/s excavated by Debono (1951) the area is very disturbed and pottery here covers an enormous date range into the Roman Period. Reasons for this would be due to transport of younger pottery via flash-floods and also modern road construction, given that the region in later phases had a large Roman Period occupation (Cuvigny 2003).

#### **BH\_Q4 – the quarries**

The source of the greywacke used to make the bracelets was local. Several small quarries were located in the hills immediately behind the workshop (at BH\_Q4 – see Map 2). The geological terminology of this variety of greywacke is ‘metagreywacke’ which can be described as slabby dark gray to grayish-green mudrock and thus suitable for the production of bracelets. A sand-filled pit/quarry (see Fig. 8) is a likely extraction place for this type of metagreywacke and it is important to note above the pit Predynastic rock art. Several other panels of rock art occur in association with these quarries. The connection between early quarrying and the location of rock art is significant in understanding the social dynamics that surrounded these activities as important meeting places (Bloxam 2011).

In the same area were several small quarries and work areas with rough-outs of pick/rod-like tools in several phases of reduction (Fig. 9). Each small work area is on a flat terrace where they were targeting what appear to be already loose boulders.

These work areas and quarries extend along the escarpment directly behind the workshop/settlement. Their association with BH\_Wk-1 is evident given the similar tools found in both places and so suggesting a Predynastic – Early Dynastic date, and possibly into the Old Kingdom? It should be noted that the techniques of stone reduction to make these tools is the same as that found in the Wadi Faux in 2010 (Bloxam 2010).

The marks from these tools leave what are termed ‘pointillé pits’ a technique that was previously thought to have originated in the Greek Aegean region during the sixth century BC, but it is now clear that it was being used in Wadi Hammamat at least 2500 years earlier (Fig. 10). This is an extremely significant finding in terms of quarrying technology and means we have to revise how we assess the dating of quarries from such tool marks.

### **BH\_Wk-2 – smaller workshop/settlement**

Another bracelet workshop was located 1.2 km south-west of BH\_Wk-1 and is similarly situated on a slightly raised terrace (Fig. 11). It is unclear if Debono excavated here as no mention is made in his 1951 paper, however, the remains of 3 subterranean dwellings/huts with standing rectangular slabs were disturbed (Figs 12, 13). The characteristics of these dwellings suggest a similarity with those recorded by Debono (1951) at BH\_Wk-1 and thus date from the Pre-dynastic period (Naqada II). Pottery sherds seem to confirm this dating and are of similar type to those found in BH\_Wk-1 suggesting their contemporaneity to the Naqada II period.

The workshop areas present similar material culture, although there is a notable amount of silicified sandstone (quartzite) tools here. Several types of tools were shaped from this material, which, having key abrasive properties was an important stone used for grinding and polishing hard stones. Tool types include pounders (Fig. 14), small rounded-ended tools that may have been attached to a haft (?) (Fig. 15); but most spectacular and rare is a crescent-shaped drill bearing the rings of its use (Fig. 16). There were also some chert artefacts found at the site but no drills were found in this material.

Similar to the chert artefacts at BH\_Wk-1, the silicified sandstone would have been brought to the site from elsewhere as it is not local. It is thus important to determine the source of this material given its implication in understanding the social context and organisation of these activities.

There are many clusters of unhollowed metagreywacke discs ready to be bored (Fig. 17) in a range of sizes up to 7 cms in diameter. We also found what could be partially worked palettes (Fig. 18) – an artefact we did not see these at BH\_Wk-1.

Determining the source of the metagreywacke is more difficult as the quality of the deposits in the immediate vicinity are of poor quality and hence no quarries were found. There are no inscriptions (or importantly rock art) and so this area is rather devoid of evidence relating to humans marking their presence in the landscape. Arguably the supply of metagreywacke could also have come from the quarries behind BH\_Wk-1 (BH\_Q4) given their relatively short distance at 1.5 km away. At the moment we can only speculate in terms of source, but this is a rather crucial question in determining the extent to which the two workshops earliest occupations in Naqada II might reveal subtle differences in terms of work practices, tool use and thus the social organisation.

## **2. PALETTE AND VESSEL QUARRIES (Late Predynastic to Early Dynastic)**

Small block quarries for vessels and palettes (NQ-4/12, NQ-5 to -7, NQ-11, NQ-17 to -19, SQ-3, SQ-6, BH\_SQ-2 to -4) (see Maps 1 and 2 marked in yellow). The small block or vessel/palette quarries were unknown prior this survey. These date to the Late Predynastic and Early Dynastic periods and contain not only rough-outs of metagreywacke vessels and palettes but also the stone tools used to make them. These tools include the familiar dolerite pounders employed for rough shaping, and a new kind of tool fashioned from the metagreywacke that was used like a chisel for finer carving (as described in BH\_Q4). The vessel/palette quarries are additionally notable for preserving the earliest examples of the use of the pointillé technique in splitting stone (as mentioned above). These quarries were described in the 2010 report (Bloxam 2010). Consumption of palettes and vessels in greywacke (often mistakenly called schist, slate) begins to increase during Naqada I in the form of zoomorphic palettes and for small vessels from Naqada II. Peak of consumption for palettes and vessels occurs during the 1<sup>st</sup> Dynasty with many found in the royal tombs at Abydos (Petrie 1900).

## **3. LARGE BLOCK QUARRIES**

Large block quarries for ornamental objects like statues and sarcophagi (NQ-1 to -3, NQ-8 to -10, NQ-13 to -16, NQ-20 to -21, SQ-1 to -2, SQ-4 to -5, SQ-7 to -9, BH\_SQ-1, BH\_SQ-5 to -7) were noted by earlier investigators, who recognized that they ranged in age from the Old Kingdom through to the Roman period. Based on the quarry characteristics, the survey has determined that the Dynastic quarries are restricted to the east side of Wadi Faux and also just north of this wadi on the west side of Wadi Hammamat whereas the Ptolemaic and Roman workings are distributed throughout the main quarry area (see Maps 1 and 2 marked in red).

The use of fire-setting in extracting large blocks, and also employed in peeling weathered surfaces, was unrecognised until this survey. We have yet to determine the full extent of fire-setting for large block quarrying and also a chronology. To date we have evidence relating to the technology being used from the New Kingdom into at least the Late Period in the main quarries at NQ10 (see Bloxam 2010). At BH\_SQ5 we noted lower terraces thick with compacted layers of burnt stone chips, charcoal within ashy layers (typical fire-setting stratigraphy) (Fig. 19). Pottery impacted into the stratigraphy dates to the New Kingdom 18<sup>th</sup> Dynasty. The terrace is also covered with chips of greywacke from working of larger stone blocks. More investigation through excavation and this terrace is required.

## **4. OTHER ARCHAEOLOGICAL FEATURES**

In addition to the quarries, the survey also mapped other archaeological features, including the ruins of stone buildings (NF-1a and -1b, NF-4, NF-6, SF-7, BH\_NF-1 to -2, BH\_SF-2), a possible well (NF-2), standing stones (orthostats) and stone cairns (NF-3, NF-5, SF-6, BH\_SF-1), constructed quarry ramps and footpath (NF-7 to -8, SF-1 to -2), burials (SF-2 to SF-6), a dressing station for metagreywacke blocks (SF-8), work areas for the manufacture of metagreywacke tools (WF-1 to -2), and work areas for the manufacture of metagreywacke bracelets or hair-rings (BH\_Wk-1 to -2).

## **5. COPPER MINES**

One kilometre southwest of the Predynastic workshop/settlement high in the hills bordering the road we discovered a cluster of copper mines with an associated settlement (see Map 2). The mines consist of a linear belt of workings up to 150 m wide and extending 450 m. The workings are concentrated in the southeast one-third of the belt and also in the northwest one-third where a small settlement with two multi-room stone huts are found (Fig. 20). The mine workings are open-cut pits that sometimes extend deep (over 10 m) underground (Fig. 21). The copper comes from chrysocolla (a copper silicate mineral) that occurs along fractures in mainly metaconglomerate but also, to a minor extent, in metagreywacke. The only tool seen was a granite pounder found in one of the huts. Pottery is abundant in the settlement and some sherds can also be found in the mine workings, these were dated to the Late Period 27<sup>th</sup> Dynasty.

Given that the 27<sup>th</sup> Dynasty is period when mining is largely unrepresented in the archaeological record, the 2012 season will undertake a more detailed survey of this area.

## **6. SURFACE SURVEY OF LITHIC ARTEFACTS**

### **BH\_Wk1 – major workshop/settlement**

A range of lithic artefacts were found during a surface survey of the area. These include flake fragments, flakes, bladelet fragments and bladelets, flake borers, crescent borers, and cores. This range of types concurs with that described by Debono (1951).

The artefacts are in chert of various colours but primarily camel coloured, also dark brown and various shades of brown, and shades of grey ( see Fig. 7). As mentioned above, chert must have been carried to the area by people as it is not local. There are a very few pieces in quartz which may be local. Quartz is present in some of the outcrops, but appears to be poor quality. It is often difficult to securely determine human fracture of quartz; there are a few such flakes, but the many small blocks in the area are probably the result of natural fracture as seen among rocks in the wider area. All pieces are fairly small with larger flakes about 45mm. Crescent pieces are well worked and seem to have wear on the inner crescent edge. Crescent pieces are much larger than other tools (c.> 50+mm). Many pieces retain cortex; 3 pieces from the collection gathered for colour are from small pebbles. A few examples are weathered and some pieces show pitting that is probably related to thermal action (heat or cold) although there does not seem to be indications of association with fire. However, most of the collection shows limited evidence of weathering; edges are generally quite sharp with little indication of rolling.

Much of *chaine opératoire* is evident from the collection: pieces with cortical cover, debris, cores and small fragments suggest onsite working. A few pieces indicate removal from small pebbles; there is no evidence of large chunks of chert. However, crescents would have come from larger chert blanks.

### **BH\_Wk-2 – smaller workshop/settlement**

A surface survey of the area revealed a number of lithic tools: thick, steeply retouched end scrapers, bladelets, flakes, flake fragments, and cores. Comparison with

BH\_Wk-1 reveals some differences. The number of end scrapers, often circular, with steep retouch appears to be significant; few of these were found on BH\_Wk-1. The range of tool types is greater in BH\_Wk-1 than BH\_Wk-2. However, in both areas, camel coloured chert is the primary raw material, and the presence of cortex on many pieces, including fully cortical dorsal surface flakes, suggests onsite production. The rounded shape of cortex suggests the exploitation of fairly small pebbles.

## **7. MAIN SETTLEMENT IN WADI HAMMAMAT – pottery survey**

The settlement has already been described in the 2010 report (Bloxam 2010). The settlement has only been partially excavated by a French mission in late 1990s (Cuvigny 2003) during a survey of the Roman Period use of the Wadi Hammamat route from Myos Homos on the Red Sea coast to the Nile valley. We undertook a short pottery survey here and we were able to collect some sherds in secure contexts that confer the long occupation of the settlement from the Late Period (27<sup>th</sup> Dynasty) to Late Roman Period (6<sup>th</sup> century AD). Excavation would be the only way to determine any older levels because as yet settlement relating to preceding expeditions, in particular Old Kingdom to New Kingdom, remain elusive.

## **8. INSCRIPTION/ROCK ART DOCUMENTATION**

Inscriptions of Wadi Hammamat quarries are well known and are one of the major (and rare) sources of written records associated with ancient quarrying in the world. There are two main publications and catalogues of these by Couyat and Montet (1912) and Goyon (1957). There are also limited publications relating to specific interpretations of some inscriptions, for instance by Debono (1951) and Goedicke (1964).

Although the early recording of Wadi Hammamat inscriptions was done in a meticulous fashion in terms of copying and translation, these documentations do not include all of the epigraphic data, and importantly, lack any kind of contextualization into the landscape. Hence, to date we have no clear overview of the relationship between the inscriptional data and quarrying, or indeed their general association within the landscape as a whole.

### **Survey goals:**

- documenting the epigraphic data via drawing, photography and GPS location on the satellite map
- re-numbering the whole epigraphic corpus for compilation in a database (this attached to the GIS map)
- survey of quarry areas for new epigraphic data and along the main transport route through the Wadi Hammamat

### **Methodology:**

In 2010 and 2011 inscriptions, graffiti and rock art in the main quarry areas have been surveyed by taking GPS readings with short descriptions as well as photos. All this data is put onto an Excel spreadsheet as a first step for later conversion and digital attachment to the GIS map. We continue to add significant new inscriptions, graffiti and rock art to those already recorded by Couyat, Montet and Goyon. 105 inscriptions and graffiti have been recorded this season, these mostly located along the main wadi, north and south of the tarmac road. Further petroglyphs were also recorded along adjoining small wadis near areas of quarrying.

Our key finding concerning the location of inscriptions, graffiti and rock art is that they usually occur in association with quarrying activities, even if the stone quality was not particularly good for their engraving. Although more analysis is required, we can suggest that quarry areas were marked with inscriptions or graffiti to show who did this work. Given that many of these inscriptions can be dated, this is going to be extremely important evidence to aid in determining the chronology of these quarries. In other incidences however, a few inscriptions and rock art panels seem to be attached more to the main thoroughfare through the Wadi Hammamat implying notation by travellers passing through the region.. Some also occur close to wells.

The number of inscriptions, graffiti and rock art recorded now is over 500, and still this task is not completed.

## **9. CURRENT RISKS – MAJOR ROAD REINFORCEMENT AND FLASH-FLOODS**

The increasing amount of flash floods in the Wadi Hammamat region (sometimes twice a year), is, as mentioned in the report from 2010, the most major threat to the archaeology of the site (Bloxam 2010, Bloxam et al. 2010). Other consequences of increasing floods is the washing away of the main tarmac road that is the major thoroughfare for goods and traffic between the Red Sea and Nile Valley. Reinforcing of the tarmac road is done by constructing concrete walls either side of it (Fig. 22). The main destructive element of this work is the use of a mechanical digger to clear a trench each side of the road for the concrete. Hence, disturbance spans approx 4 metres each side of the road.

The narrowing of the wadi in the quarries meant that this work would impact on the archaeology, in particular the main area of settlement and inscriptions. We conducted meetings with the works manager, construction manager ('Nile Company') and later with Mr Helal General Director, Red Sea; Yassin Mahmoud, Director Red Sea and Ahmed Morsey, Director Quseir region. During these meetings we showed them the areas of archaeology that were of key significance. An agreement was made that when they reach the first panel of rock art (this demarcates the eastern boundary of the site) they will dig the trenches by hand and that reinforcing concrete will be horizontal at 2.75m at each side of the road and 20 cms deep (Fig. 23). Such procedures should alleviate any damage to the archaeology. Local SCA guards will be monitoring this work.

The unknown consequence of the road reinforcing is how the flood water will re-channel itself around the concrete walls? This will be monitored and reported after the third season in November 2012.

### **Other threats/risks**

*Desert Safaris:* this increasing type of tourism that does not require permission from SCA is greatly problematic because it is unchecked. Outlying archaeological sites such as Nabta Playa, Chephren quarries (Gebel el Asr), Widan el-Faras, are all seeing loses of artefacts from such groups randomly collecting objects. Notably 2 such groups arrived during our time in the quarries and see this type of unsupervised tourism as an increasing problem for these 'remote' sites.



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