# Third archaeological survey of the ancient greywacke quarries of the Wadi Hammamat

## Institute of Archaeology, University College London in co-operation with MSAA Ancient Quarries and Mines Department

## *19 – 26 November 2012*

*Predynastic – Early Dynastic braclet quarry (foreground) Wadi Hammamat*

**Final Report to the**
**Ministry of State for Antiquities Affairs**
***by***

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## INTRODUCTION

We had to modify the objectives of the November 2012 survey season from the original proposal due to absences of key personnel on the team. Hence, this season's objectives were to carry out the following:-

- Risk assessment and monitoring of road building that had started in 2011
- Inspection of sites close to the road in terms of damage from recent rainfall in the region
- Make a more detailed inspection of quarries already mapped with the purpose of improving their dating by looking for more tool marks, tools, rough-outs, inscriptions, and pottery
- Walking survey in the hills of Bir Hammamat and adjacent hilltops along Wadi Hammamat to locate previously undocumented quarries. Of particular importance is looking for Old Kingdom and Middle Kingdom quarries that so far have yet to be identified
- Locate dolerite tool quarries
- Study of pointillé pits in the Predynastic/Early Dynastic vessel/palette quarries and comparing with those in the Ptolemaic/Roman quarries in terms of identifying differences that can aid in determining a chronology of these
- Detailed mapping of the Late Period-Roman quarry for metaconglomerate between Bir Hammamat and the main metagreywacke quarries (Bekhen Mountain)
- Visit to the Quft magazine for purpose of identifying a stela that relates to quarrying in the Wadi Hammamat

## THE SURVEY TEAM

Dr Elizabeth Bloxam (Field Director) – Institute of Archaeology, University College London
Dr Norah Moloney (archaeologist) - Institute of Archaeology, University College London
Prof James Harrell (geologist) – University of Toledo, USA
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## SITE MONITORING

Reinforcing the road (because flash-flooding was undercutting it) through the Wadi Hammamat had started in 2011 and by November 2011 this had almost reached the main areas of archaeological significance in the greywacke quarrying area (see report Bloxam et al., 2011). Largely based around constructing concrete walls either side of the road to reinforce it, 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.

It is clear that a good result has come from our meeting with the road building contractors, with the assistance of Mr Helal General Director, Red Sea; Yassin Mahmoud, Director Red Sea and Ahmed Morsey, Director Quseir region because they did completely avoid areas of important archaeology such as the rock art panels, main area of hieroglyphic inscriptions and settlement. All these places were undamaged because they had also avoided constructing concrete banks near these features (**Fig 1**). Also, the mechanical digger had clearly not been used in these areas. This is a very good result of how engagement with and showing contractors where important areas of archaeology are can prevent damage. It is still uncertain though how flood waters will re-channel around the concrete walls banks and so repeated and regular monitoring is needed.

**BHWK1: Predynastic workshop**

We returned to this major bracelet workshop (as found by Debono in 1949) to check on occurrences of silicified sandstone and to see if this was where vessels from the quarry *BHWK1* may have been finished. We did find a partial silicified sandstone borer (similar to those found at *BHWK2)* and other fragments of this stone. Although the context is very disturbed, these were found where there is a concentration of Naqada period and Old Kingdom pottery (see pottery report). We also found in the same area 2 rough-outs of deep but small bowls (**Fig 2**) these measured (i) 14.5 cm x 14 (almost circular) by 5.5cm thick; (ii) 13cm x 12 by 4 cm thick.

**BHWK2: Predynastic Bracelet Workshop (Bir Hammamat)**

We re-visited this second, smaller, predominantly bracelet workshop which from analysis of pottery last season dates to the Naqada II period of the Predynastic (see Bloxam et al. 2011). We specifically wanted to look at the siliceous sandstone tools which are a feature of the workshop floor because this material is not local to the area (see Bloxam et al. 2011). The two crescent-shaped borers (see Bloxam et al. 2011 Fig: 16) are significant as they are made from a fine silicified sandstone that may have been transported to the site from some distance. We speculated that these tools could have been made elsewhere and brought to the workshop as part of toolkits? We measured both borers and found them to be almost the same size (i) 60mm x 49mm x 36mm thick; (ii) 66 x 51 x 25 thick.

The other siliceous sandstone tools are of a slightly different quality that may have been from more local sources 2-3 kms west – this needs to be further investigated. Another significant tool found this season was a grooved piece of siliceous sandstone used to probably smooth the edge of the bracelets as shown (**Fig 3**). We further noted that the colour of greywacke being worked into bracelets, and some shaping into palettes, is the blueish-green variety – the possible source of this material came from quarry **BH_SQ-8** (described below) under 2 kms away. The next season in April 2013 will entail planning of this workshop floor and its associated small habitations.

**BH_NF-3: Bir Hammamat wadi north of the road**

Traversing a small wadi heading north we encountered a shallow, subterranean feature, surrounded by stones which is most likely a well given its low elevation in

the wadi to access groundwater (**Fig 4**). The rim of a Nubian bowl and other body sherds dating to Naqada II (see pottery report drawing 85, 87, 94, 96) and also of a Ptolemaic amphora (pottery report 95) were found nearby, including a rough-out of a disc-shaped object (bracelet?). However, as all these artefacts lie in insecure contexts and clearly cover a range of dates, they have probably been transported here by floods in the wadi.

**BH_NF-4: Bir Hammamat wadi north of the road**

About 300-500 m up the wadi from BH_NF3 we located another stone feature similar to that found at BH_NF3 that is clearly a large well (**Fig 5**). Nearby we found a nearly completed bracelet (**Fig 6**), several chert cores, flakes and scrapers and pounders consistent with material found in the two other workshops nearby at BHWK1 and BHWK2 (see Bloxam et al 2011). Pottery sherds near the feature date to Naqada II and 100 m north a group of sherds date to the Roman period (see pottery report 91). We could only speculate that this raised terrace area may have been a Predynastic bracelet workshop greatly disturbed by flash-floods and other man-made disturbance. The Roman sherds would be consistent with a continued use of the well given the presence on a more permanent basis of people in this region of the Bir Hammamat.

**Predynastic to Early Dynastic Quarries <u>North</u> of the Bir Hammamat**

In the hills I km north of the Bir are a collection of quarries (BH_NQ-1-3) of roughly the same age (Late Predynastic – Early Dynastic) as those found in 2011 (BH_SQ-2 to -4 and also all the NQ quarries, see Bloxam et al. 2011). In similar fashion the quarries are at high elevations consisting of a collection of small, shallow hillside benches or pits (mostly less than 5 m across and up to 1-2 m deep) that were excavated in the sandy grayish-green variety of metagraywacke (**Fig 7**). All quarries produced deep to mainly shallow circular vessels as indicated by the many rough-outs found within them. Common to this series of quarries is the absence of pottery and so we rely on technological indicators, type of object being produced and other indirect data to date these sites.

With the exception of the similar BH_SQ-12 quarry (see below), the tool marks in the Bir Hammamat vessel quarries are simple percussion pits made by dolerite pounders. A possible source of the dolerite tools used was investigated about 6 km south of Bir Umm Fawakhir in Wadi Abu Fannani (see below). Here the naturally occurring, rounded pieces of dolerite are identical to the pounders found in many of the quarries.

*BH_NQ1*:

Production of vessels (similar to those at the NQ quarries) seems to be the main product being produced here given the stockpile (but may have been put here by previous investigators?) of blanks ready to taken away (**Fig 8**). Two vessel rough-outs had their upper surfaces incised with single signs: ∩ and ⋋. This type of 'graffiti' is extremely difficult to interpret and could either be numbering system, quarry marks and/or other masons marks representing a certain group of craftsmen or individual, or other random signs made by the stone worker.

Only a single dolerite pounder (two-handed) was found near a block with percussion strikes, the position of which indicated splitting into thinner blocks along the cleavage plane. A rough-out of a palette and a few discs (for bracelets?) means this is typologically similar to the NQ quarries 3 km further east. another aspect of all these quarries. Also, few stone tools, in particular no picks.

*BH_NQ-2:*

Located on the opposite side of the wadi from NQ-1 in the hills and at roughly the same elevation, is another series of small early quarries. Most notable is their location almost directly above the large well at **BH_NF-4** and what we had speculated as being a workshop (see above). This finding adds more indirect evidence for BH_NF-4 being a workshop for stones being quarried above. There was little material culture associated with these 3 quarries, but the stone is the 'slabby' sandy grayish-green variety of metagraywacke and so good for vessels and also bracelets. However, we only found one vessel blank L31cm x W27cm x D54/61 (**Fig 9**).

*BH_NQ-3:*

Heading north from NQ-2 is another series of 3 vessel quarries, although we only found one recognisable vessel blank at the third quarry. These quarries are extremely difficult to get too from NQ-2 and quarry workers would be working in a very confined space on the edge of the hill (**Fig 10**). We envisage these quarries not yielding many vessels and clearly from the large amount of quarry waste, it was difficult to find good sound blocks. Similarly we found almost no material culture in these quarries but given the product being produced, method of quarrying, etc., we can tentatively date these to the Early Dynastic.

It is interesting that at both NQ2 and NQ3 we find no blanks for palettes or bracelets.

**Predynastic to Early Dynastic Quarries <u>South</u> of the Bir Hammamat**

*BH_SQ-8: Bracelet quarry close to Predynastic workshop BHWK1*

An important discovery was made in this quarry in the form of a blank of a bracelet in the bluish/green variety of greywacke suggesting it as one elusive source for these objects. The proximity of this quarry, within 2 kms, to both Naqada II bracelet workshops (BHWK1, BHWK2) is notable suggesting rough-outs were quarried here to blanks then taken to the workshop for finishing. This is extremely significant and could represent the first quarry of the Predynastic Naqada II period known (**Fig 11**)?

The deposit is slab-like and of the greenish/bluish metagreywacke – we did not see any of the pick-like tools only dolerite pounders and piece of silicified sandstone. Large amounts of waste and many places where the deposit was exploited suggest it being a sizeable quarry. Note that a later hieroglyphic inscription (name?) is at the base of this quarry – but also the base is near large quarries of the later New Kingdom.

*BH_SQ-2*:

This quarry was first located in 2011 and is a sizeable extraction site. Vessel and palette blanks, and other aspects are similar to NQ7 (Bloxam et. al. 2010), in particular a dolerite pounder notched to attach a handle. One vessel blank (26 x 25 x 2.5 thick) had an incised sign:  . As with those described above in NQ1 it is difficult to know what this symbol may mean – although more geometric signs such as this could be an early masons-mark? (**Fig 12**) (see Arnold 1990 for information about these). Palette blanks found here are quite large relative to other similar quarries at: L38.5 x W23 x 2.5 thick.

*BH_SQ – 11:*

An area of workings on the opposite side of wadi to BH_SQ – 3 and SQ-8. Clearly this is part of another large area of quarries that we did not have time to examine in any detail.

*BH_SQ – 12:*

This is another series of quarries for small vessels and pick-like tools that bear a direct relationship with similar quarries at BH_Q4 (see Bloxam et al., 2011). Pathways connect all these quarries that are behind the BHWK1 workshop (**Fig 13**). Vessel rough-outs, fragments of dolerite pounders and partially worked picks are found across a series of quarry pits up to the top of the hill. Note that rough-outs of similar vessels are found in the workshop. These quarries are obviously the source of greywacke being worked in the workshop, although given the picks and products being made in these quarries, they could belong to the Old Kingdom (note we found 3$^{rd}$ – 4$^{th}$ Dynasty pottery in the workshop) rather than the Naqada II period. We did not see any rough-outs of bracelets here.

**BH_NCM: Copper Mine**

About 1.3 km west of Bir Hammamat, we discovered a small copper mine (BH_NCM) with a single pit about 5 m across and originally perhaps 2-3 m deep (**Fig 14**). The copper ore mineral is chrysocolla and occurs here in a hydrothermal quartz deposit. This site is directly north of the much larger copper mine found in 2011 (BH_SCM) on the opposite side of Wadi Hammamat and which dates to the 27$^{th}$ Dynasty (see Bloxam et al. 2011). The tailings of crushed quartz in which the copper mineral occurs are mainly surface mines and of low intensity exploitation in comparison with the 27$^{th}$ Dynasty copper mine found last year.

There was no settlement associated with the mine as there was at the 27$^{th}$ Dynasty mine, so further indicative of low intensity sporadic exploitation. The only pottery recovered dates to the Ottoman period – this in the form of an intact vessel (some type of liquid container – see **Fig 15**). It is of course unclear if this is directly associated with the mines. Hence, dating these workings is uncertain.

**Wadi Masq el Bagar (catching of cows)**

*NQ22:*

About 5 km up Wadi Hammamat from the Bir, just inside the Wadi Masaq el-Baqar tributary, we found another Late Predynastic or Early Dynastic quarry for metagraywacke vessels. This site is notable for being the only vessel quarry in the sandy dark grey variety of metagraywacke. It also has a set of tool marks (chisel tracks and pointillé pits made with metagraywacke tools) like those found in the early vessel and palette quarries discovered during the 2010-2011 seasons in Wadi Hammamat's main quarrying area (Bekhen Mountain, see Bloxam et al. 2010, 2011).

These types of tool-marks were found on some vessel blanks for shallow bowls being worked on a terrace beneath the quarry. Although no tools were found it is interesting to note that a line of squared chiselled pits made on one vessel blank (**Fig 16**) might well have been made by the pick-like square-ended stone tools found last year in similar vessel quarries and workshops (noting we also found the quarries to make such tools). The vessel rough-outs show consistency in size with other vessel quarries previously documented; (i) L28cm x W24-28cm x 3.5-6.5cm thick; (ii) 26-29cm diameter x 3-5cm thick (iii) 21-23.5cm diameter x 2-2.5 thick.

*NQE22:*

Another small quarry/work area is distinguished by tool-marks on a large block, but of much younger date (likely Roman period given the nearby pottery sherds – see pottery report 117) and located on the east side of the wadi. A short distance north we notice what appears to be a loading ramp (?) or structure relating to a road. Walking further up the wadi to not find any discernible quarries, although all the surrounding will need to looked at in a future season.

Further up the wadi we found sherds of New Kingdom pottery (see pottery report 115, 116), another well and a walled feature whose function is unclear, although its location may suggest a defence against flood?

**Wadi Abu Fannani**

We walked into this wadi to check on the dolerite dikes there as being a possible source of tools in the greywacke quarries in general (as mentioned above). The dikes extend in a line across low hills, the deposits highly fractured. In places the quality is good for tools and can occur naturally as slightly rounded pieces that could have been immediately used without much shaping. We did not see any tool-marks that would indicate these outcrops being quarried for tools. Some New Kingdom pottery sherds were found in the area, but could have come from the gold mines (now entirely worked out) that are in the area. At the mouth of this wadi is a large gold mining settlement dating to the New Kingdom.

**LITHIC REPORT**

The small assemblage of eight lithic artefacts noted during this season's survey are primarily associated with the greywacke workshop site **BH_NF4**, where 7 pieces were found. The eighth artefact was a stray surface find, located away from the immediated vicinity of BH_NF4. All pieces are of chert, mainly the camel coloured type, but there are also examples of light brown and chocolate brown chert (**Figs. 17 – 20)** all are from site except desilicified variety). One piece is completely desilicified (**Fig. 21**) making it impossible to identify chert colour. Artefacts from the workshop included four flakes, two endscrapers and a small, single platform blade core. The stray, chocolate brown chert is a retouched flake (**Fig. 22**). Flakes tend to be small, between 32-55mm. The core is slightly larger at 61mm. Six pieces have a partially or almost fully cortical dorsal surface, five of which clearly originate from small chert pebbles. When visible, striking platforms vary and include cortical, unifaceted, faceted, and punctiform preparation. Flake scars on the dorsal surface of three flakes indicate previous exploitation of the cores from which they were struck, with the number of scars on two flakes (five and seven) suggesting fairly intense exploition of cores. The dorsal flake scars do not indicate the use of any specific direction of percussion that might suggest manner of core exploitation. The BH_NF4 artefacts include two, steeply retouched round endscrapers with cortical dorsal surfaces (**Figs. 18-19**). Removals on the ventral surface of one suggests ventral thinning (**Fig. 19**).

The single platform blade core (**Fig. 20**) is on a small pebble the shape of which is conducive to blade production. More blade removals might have been possible, but they would not have been of the same size as those indicated on the core. Blade-like scars on one of the flakes also indicate blade production.

In summary, small chert pebbles were used for the production of some, and possibly all the flakes and blades at BH_NF4, as is evident from the rounded shape of the cortical surface on many pieces. No single technique of manufacture can be determined, apart from the single platform blade core, and the blade-like negative scars on one flake that indicate percussion from a single platform. The two endscrapers are similar in their circular shape, almost fully cortical surface, and size. They may have served a particular function that cannot be determined at this stage. The desilicified flake indicates a difference with the other pieces in exposure to weathering processes; degree of weathering seems light on most pieces and none show desilicified areas. The desilicified piece may have been exposed for a longer period and may not be associated with the workshop activities.

As reported in 2011, (Bloxam et al. 2011) chert must have been transported from outside the Hammamat region as there is no chert in the Hammamat wadis. While there are limestone hills with chert nodules east and west of Wadi Hammamat, wadis in these limestone areas do not drain into Wadi Hammamat. Preliminary study of chert pebbles associated with current road work (**Figs. 23-24** ) indicate a source of camel coloured chert in the Gebel Duwi limestone range which runs roughly about 40-60km east of Wadi Hammamat, and is a closer source of chert than limestone regions in the Nile Valley. Furthermore, the small size of chert pebbles corresponds well with the small size of artefacts found in the survey sites. Given the extent of cortex on many artefacts and the small size of the Gebel Duwi

pebbles, it is possible that the people of BH_NF4 and other sites in the area carried unworked pebbles into the area.

*BH_NF4, BHWK1 and BHWK2*

There are certain similarities between these three sites, albeit that they may not be contemporaneous: predominant exploitation of chert, similarities in chert type as noted by colour (**Fig. 25** ), especially the camel coloured chert, and manufacture of products primarily from small chert pebbles. The extent of cortical cover on many artefacts in the three sites suggests that the first production stage of the operational chain occurred 'in situ'.

There is a greater range of products in BHWK1 than in BHWK2 and BH_NF-4 which is not unusual given that BHWK1 is a larger settlement and production site, whereas the other two sites are smaller working areas (but also show evidence of minimal habitation) for the production of greywacke bracelets. BHWK2 and BH_NF-4 are similar in the presence of circular cortical endscrapers (**Figs. 18-19, 26**), which have not been noted in BHWK1, which suggests a potential similar function that has not been identified.

Further survey and mapping of BHWS2 and BH_NF-4 should fill some of the gaps in our present understanding of the production and use of lithic artefacts at the sites, and any association among and between them and the production of greywacke bracelets.

**RISKS AND THREATS TO THE SITE**

Now that the Wadi Hammamat road is open there is an ever more increasing threat of damage to the site by 'safari tourists'. On most days during the survey small groups, of up to 6, were brought to the site mainly to take photos of the inscriptions. Guards are there, but this new development means that managing the site is more important than ever. Flash floods will still be a problem in the region and so it is important to regularly monitor the site for the effects of these.

**VISIT TO QUFT MAGAZINE**

At the end of the season we visited the magazine at Quft to see if we could find a stela showing people quarrying in the Wadi Hammamat. This stela was believed to have been found in the tomb of Shemai (8$^{th}$ Dynasty) during excavations undertaken in the 1980s by Maha Farid. We looked through the register of finds from the tomb but unfortunately this was not listed.

**SUMMARY**

Despite this being a short season, we added considerable new data to enhance the work undertaken in 2011. In particular, locating more Predynastic and Early Dynastic quarries for the production of vessels and palettes. Finding a quarry less than 2 kms from the bracelet workshops, that was at least one source of the raw material for these objects, was a major finding. More investigations are required, but at this stage we can propose this quarry being the first Naqada II production site for

ornamental objects known in Egypt (?) In addition, as the workshops are located on the ancient trade route through the Wadi Hammamat, it is likely finished objects were traded with those passing through to the Nile Valley. This gives us information into the chain of operation between raw material source and procurement to places of final deposition in usually Nile Valley settlement and funerary contexts of the period, such as: Naqada, Hierakonpolis, Abydos and Tarkhan.

We also have a good starting point in understanding where to look for changes in procurement strategies that coincide with the emergence of the royal funerary complex. Our understanding of how craft specialisation may have become more centralised in Nile Valley workshops has crucially lacked information from production sites. The workshops we have located can provide us with key information into the extent to which work practices between Naqada II and the Early Dynastic may have been locally based at the source. Also we can address from the 'bottom up' the extent to which social networks through which finished products arrived at Nile Valley sites were the crucial aspect to flows of materials into elite contexts.

The success of working with road contractors in the area through discussions with regional directors of MSAA is proven by the way in which care was taken of the archaeological areas when road reinforcements were in operation. This came from conveying the significance of the archaeological sites in heritage terms to the workmen, who then actively avoided these important areas. This positive outcome shows how important regular monitoring of 'remote' archaeological sites is in terms of conserving these fragile landscapes.

As mentioned above, careful regular monitoring of the site is imperative in light of new emerging threats from random and unsupervised tourists visiting the site, now that restrictions to foreigners travelling along the Wadi Hammamat road have been lifted. Flash floods are of course an unavoidable consequence of climate change affecting this region – thus the need to continue the surveys and in future undertake excavations is necessary in terms of documenting what is becoming an increasingly fragile archaeological site of world significance.

A fourth season of survey is being planned for April 2013 to complete objectives of the November 2012 season which due to team absences could not be undertaken. This will involve detailed planning of the settlement areas, some quarries and photography of pottery.

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**Fig 1. End of road re-inforcing (at red arrow) just before ancient settlement in the Wadi Hammamat greywacke quarries**


**Fig 2. Blanks of small vessels, BHWK1 workshop**

**Fig 3. Silicified sandstone tool uses as an abrasive to smooth edges of bracelets; Naqada II bracelet workshop (BHWK2) Bir Hammamat**

**Fig 4. BH_NF-3: Bir Hammamat wadi north of the road: subterranean feature with dismantled stone walls, function unknown but could be a well given location on wadi floor**

**Fig 5. BH_NF-3: Bir Hammamat wadi north of the road: large well with material culture surrounding suggesting this area was also a bracelet workshop (Naqada II)**


**Fig 6. Nearly completed greywacke bracelet found in disturbed context near large well at BH_NF-3: Bir Hammamat wadi north of the road**

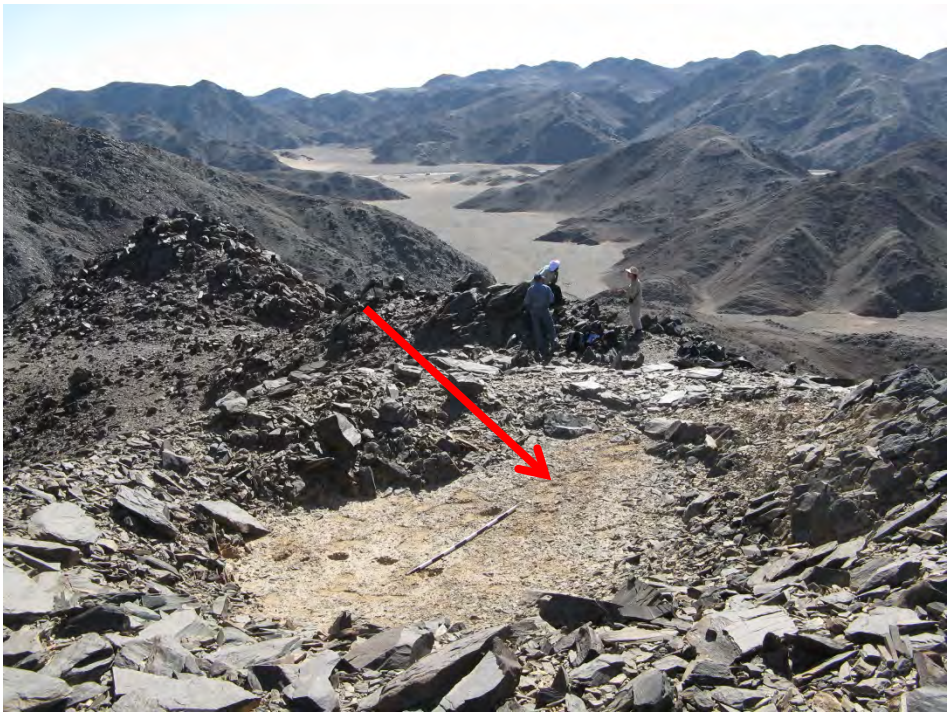


**Fig 7. BH_NQ-1: Early Dynastic (?) Vessel and Palette Quarry, Bir Hammamat north of the road**

**Fig 8. BH_NQ-1: Early Dynastic (?) Vessel and Palette Quarry, stockpile (?) of vessel blanks**

**Fig. 9. Vessel blank BH_NQ-2: Early Dynastic (?) quarry**

**Fig. 10. BH_NQ-3: Early Dynastic quarry situated on gebel top ridge**

**Fig. 11. BH_SQ-8: Bracelet quarry (foreground) close to Predynastic workshop BHWK1 (background)**

**Fig. 12. BH_SQ-3: vessel showing an incised mark – could be a mason's mark?**

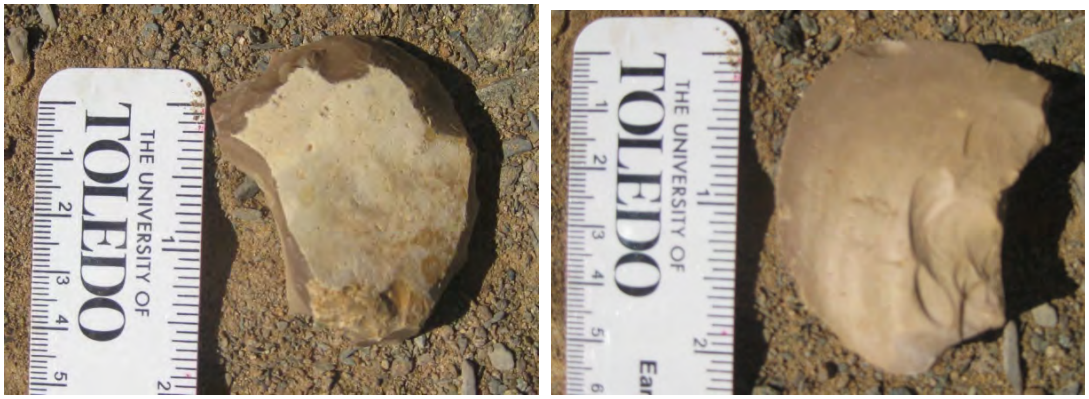
**Fig. 13. BH_SQ – 12 series of quarries for small vessels and pick-like tools behind BHWK1 workshop**

**Fig. 14. BH_NCM: Copper Mine**

**Fig. 15. Ottoman period liquid container: copper mining context – BH _NCM**


**Fig. 16. Vessel blank at NQ22 showing toolmarks made by a pick-like square-ended stone tool**

**Fig. 17. BH_NF4, left – to right: unretouched flake, retouched flake with blade-like scars visible on the dorsal surface, retouched end scraper. Note the extend of cortex on all dorsal surfaces**




**Figs. 18 – 19. BH_NF-4 :left, almost fully cortical dorsal surface of an end scraper; right, ventral surface of the same piece showing removals**

**Fig. 20. BH_NF-4: blade core**

**Fig. 21. BH_NF4: desilicified flake**

**Fig. 22. Chocolate coloured chert retouched piece not associated with BH_NF-4 core**

**Fig. 23. Chert gravels transported for road works**

**Fig. 24. Road chert pebble with removals; with recent fracture showing interior colour of chert next to ancient chert artefact**


**Fig. 25. BHWK1: range of chert (2011 survey)**


**Fig. 26. BHWK2: chert end-scrapers (2011 survey)**