

A Preliminary Perspective of Industrial Heritage and Geo-Tourism in the Quarry Site of Bir Hammamat

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Abstract

Bir Hammamat (Persou I) was an important stone quarry for the extraction of greywacke (Bekhn stone) in the Egyptian Eastern Desert that represents a comprehensive image of the stone quarrying process, extraction activities and the life of a quarrymen community. In addition to the archaeological findings, quarrying activities have culturally created a memory of the industrial society .

The paper investigates some historical and cultural aspects related to the technical and industrial heritage of Bir Hmamat that can promote certain types of sustainable tourism and consequently enhance the preservation of ancient quarry site landscape.

Introduction

The paper represents a site description of the Quarrying landform of Bir Hammamat (Known also as Wadi Hammamat). The Quarrying sites that can be considered as geo-tourism and geo-education attractions, an example of a larger area in which geo-tourism concept has not been developed yet .

Unlike other better-known and developed forms of heritage tourism, limited attention has been focused on these attractions that could be included within the broader framework of heritage tourism. This study examines the importance and perception of quarries as foci for industrial heritage tourism focusing on Bir Hammamat which is geologically characterized by the greywacke quarrying activities as evidenced by discarded stone tools and instruments, abandoned working traces and quarries. Therefore, the need to inventory and describe the quarry landscape of Bir Hammamat (Persou I) in terms of general information, geological and geomorphological settings, ecological characteristics, hydrological and hydrogeological features, historical, cultural and aesthetical characteristics, conservation, scientific and tourist aspects in addition to the current use/status of the site.

Industrial heritage investigates industrial technology assets in the near and distant past (heavy industrial equipment, machines, means of transport, traditional products, means of production and production technologies) as well as the social and economic aspects. Industrial tourism not only capitalizes on economic assets, but it also prevents their destruction (Corti, 1991: 11 ff.) and allows tourists to gain an insight into local history (Preite, Maciocco, 2000), therefore, industrial heritage assets or industrial units that had been closed down become a tourist attraction. Technical and industrial heritage assets can be included in the tourist resources, alongside other categories such as archaeological monuments and sites, ethnographic heritage,

museums and collections, commemorating monuments, etc. (Iancu & Stoica 2010: 62 – 63; Khalil, N. & Elgohary, A. 2020: 217-250).

Objectives of the study

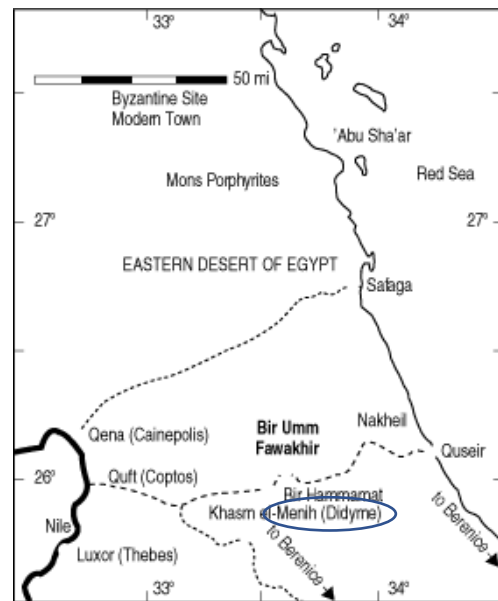
The purpose of this study is to carry out an analysis of industrial heritage assets, in order to define a strategy for their capitalization as cultural tourism attractions. At the same time, industrial tourism can change the public perception about the Eastern Desert quarrying sites and to their status as cultural tourism destinations.

1. Bir Hammamat (Persou I)

The Fort of Bir Hammamat, is located about 81 km from Coptos (Qift) and 95 km from Myos Hormos (Qift). The *praesidia* controls a crossroad of valleys at the western side of the wadi (Fig. 1).

Fig. 1

Bir Hammamat (Meyer et al. 2003: 14, fig. 1).



2. The fort

The fort of Bir Hammamat is a rectangular construction including a well in the center, the southeast corner keeps the remains of the mosque (fig. 2). The clearance has been focused on the enclosure, measuring 53.5 meters, that was once defended by four rounded towers at the corners. The two northern towers have a diameter of 4.15 m, while the southeastern one is 3.75 m. The southern curtain was reinforced in a second phase by a solid rectangular tower measuring (3.30 m x 2.25 m). During the clearance process, a tomb dated back to the Islamic era was discovered to the north of the northwestern tower (Brun 2006: 91 ff.).



Fig. 2: left. Plan of the fort (*Praesidium*) of Bir Hammamat,

Brun. 2006: 150, fig. 59; Zitterkopf. and Sidebotham. 1989: 172, fig. 3 (d).

Middle. The remains of the mosque and the well, (Photo by the author).

Right. Broken Bekhen stone sarcophagi beside the well of Bir Hammamat, (Photo by the author).

The last three lines of the foundation text read: (Prefect of Egypt) who was probably the prefect of Berenice, whose cognomen was most probably "Turbo". The lintels of several *praesidia* of the road commemorate the construction of these forts instigating the prefect of Egypt and the prefect of Berenice (Fig. 3).



 prae]f(ect-) Aeg(ypti) * [
] . bo * prae]f?
 pra]esidium aed]if-
] vac. [

Fig. 3

The foundation text of the *Praesidium*. (Brun. 2006: 152, fig. 65).

The fort was reused by the Arabs as a stop on the pilgrimage road to Mecca. During this period, an outdoor mosque was built in the southeastern corner and a large well of about 4 m wide and 26 m deep was dug in 1830. It was provided with a staircase, enlightened by many openings around the well. Moreover, a squared tower was constructed at about 600 m to the north of the fort. The mosque, in the southeastern corner (fig. 4), has not been cleared yet. The western side represents a sandstone mihrab, which is a semi-circular Niche with 0.60 m in diameter. Surveys have been realized on the area outside the door to locate a possible dump. Some accumulations of potsherds were found on the borders of Wadi Hammamat, most probably due to the floods that should have evacuated the ruins from the fort. (Brun. 2006: 93 - 94).



Fig. 4

The mosque of Bir Hammamat.

(Brun. 2006: 154, fig. 71).

3. Quarry landscape

Physical remains of ancient stone quarries, despite loss of materials, are represented in paths, houses, ports, petroglyphs and quarrying materials and instruments. Quarry sites are the result of stone extraction over time leaving multiple traces. Therefore, these layers and types of findings should be identified and characterised as a baseline to assign values (Fig. 5). The heritage value of a quarry site is emphasized through the relationship with relics and landscape features. Therefore, the “quarry complex” is a method to identify different materials that may be related to each other in time, space or function. (Bloxam. and Haldal. 2008; Bloxam. 2014; Mason. 2008).

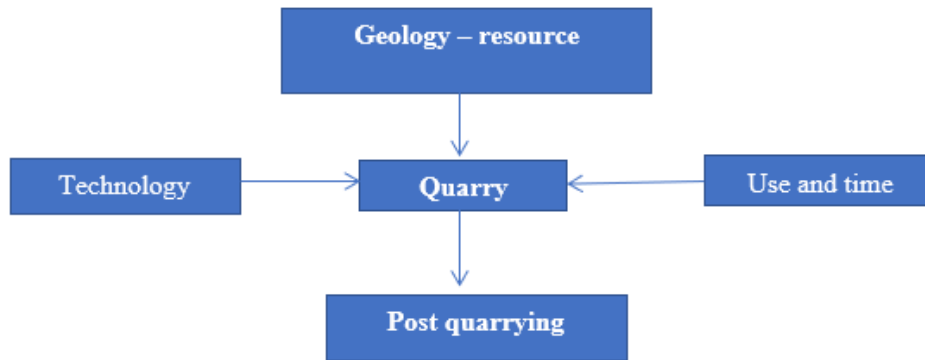


Fig. 5

Elements of the quarry site complex. (Tom and Gurli. 2015).

4. Bekhen stone quarrying in Bir Hammamat

Upon arrival to the quarry site of Bir Hammamat, workers used to initiate the most important stage of the mission which is the extraction and transportation of the stone blocks. Extraction should have been executed through the natural cracks in the stone that made the process relatively easy. The first phase of work would have been carried out by the quarrymen (Ikȳ.w) and the stone masons (Xrty.w nTr). The specialized workforce was unusually high. Once the suitable block was found, the quarrymen used hard-stone pounders or mauls to knock out rock masses following the natural cracks. The block used to be separated from the bedrock with the help of wooden levers and hard – stone hammers (Arnold. 1991: 32 – 33.).

Stone tools, found in the small-block quarries and workshops, indicated a consistent use of both local and regional material tools to extract and elaborate the greywacke products. Locally, two greywacke tool quarries for the production of highly crafted chisels and wedges were identified nearby the small-block quarries. However, dolerite, chert and silicified sandstone tools were produced from non – local materials and therefore they were brought into the quarries. Chert was usually brought from the quarries of Gebel Duwi and from another quarry near Abydos (Bloxam *et al.* 2014: 20–24).

The imported stones were brought either as fabricated tools or raw material that must be fully worked, although preliminary analysis suggested that some of the chert tools were produced in the stone workshops. The crescent-shaped drills might well have been brought into the quarries as elaborated artefacts, as no corresponding debris for this size of object can be identified.

Existing techniques were simply enhanced, rather than being radically transformed. Production techniques deployed local greywacke tools (chisels and wedges) that left the long-lived pointed pit tracks. However, these tools were combined with the characteristic U-shaped holes made by the wedges during the splitting of bigger blocks in the large-block quarries (fig. 6) (Bloxam. 2015: 796 - 799).

Recent discoveries of greywacke wedges represent a contrary perception to the long-held view that the “wedging technique” was a development in quarrying technology linked with the introduction of metal tools/wedges by the mid–late first millennium BC. Correspondingly, the suites of stone tools do not display the diversity in form or materials, however, there is a contraction to just local greywacke and

non-local dolerite which was shaped into hammers and pounders (Shaw. 2010: 109 – 124; Bloxam and Storemyr. 2002: 29 - 31).

Wedging technique is usually connected with later phases of quarrying, around the mid to late first millennium BC, when metal (iron) technology superseded the more “primitive” use of stone tools. Metal wedges were supposedly inserted into ‘u’-shaped holes, then hammered until the rock split. This technique left behind the highly characteristic trapezoidal tool marks/tracks that are mostly seen in the Roman Period spots in the eastern desert and Aswan quarries (Harrell and Storemyr. 2009: 29; Klemm and Klemm. 2008: 247).

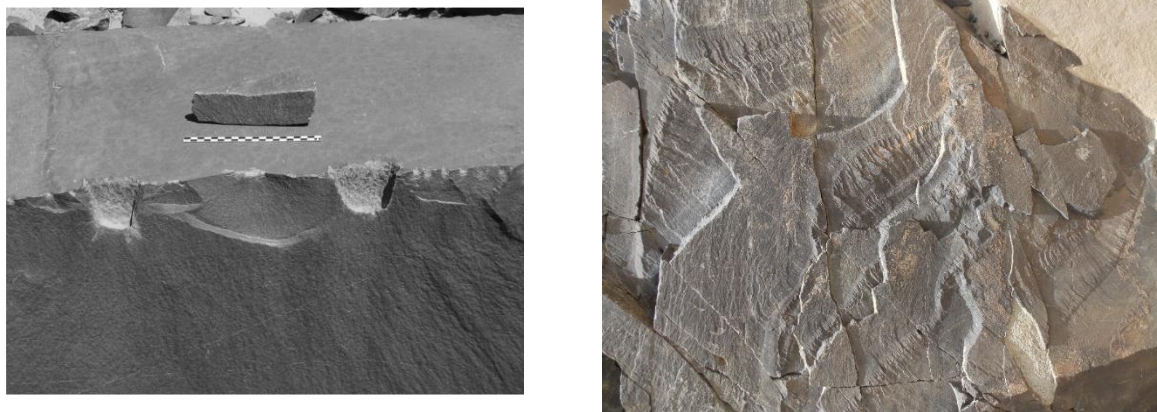


Fig. 6

Different phases of stone splitting and extraction.

Left. (Bloxam, E. 2015: fig. 7).

Right. Photo by the author during the 2015 survey in Wadi Hammamat.

Few evidences of furnaces or other installations relating to the metallurgy in Bir Hammamat were found. Despite, copper was mined in the area, particularly during the Persian Period (27th Dynasty), there is no clear connection with the tool production. The use of fire-setting may have been crucial rather than metal tools that represented the technological transformation to quarry large blocks. Although no precise chronology for the introduction of fire-setting technology was determined, this highly skilled technique was widely deployed to quarry hard stones such as granite (Aswan), gneisses (Gebel el-Asr) and silicified sandstone (Aswan) in Egypt from at least the mid third millennium BC. (Heldal. and Storemyr. 2015: 291 – 295.)

This technique became much more visible during the transformation to large-scale procurement of resources by the early Old Kingdom, it was used to extract, exfoliate and split hard stones into large blocks and rough-outs. The process left behind considerable ashy deposits containing charcoal. In Wadi Hammamat the waste was reused in creating the chapel of Nectanebo for the veneration of the local god Min. After the extraction, blocks used to slide down the hill until they reach the wadi floor, an operation for which the construction of ramps was necessary to facilitate the descent of the blocks. Transporting large blocks out of the quarries means that transport infrastructure used to be ready when objects were no longer finished. Consequently, ramps constructed from quarry waste, rather than paths, became a new aspect of the transformed landscape (Bloxam. 2015: 799, fig. 9.).

5. Chronology of quarrying activities in Bir Hammamat

5.1. The Pre-Dynastic Period

Chronology of the first human populations in Wadi Hammamat is still undetermined. However, the area was a source of greywacke and water, in addition to the strategic location at the midway of the trade route between the Nile Valley and the Red Sea. Early archaeological sites can be dated back to the Badarian Period. A Pre-dynastic workshop for making bracelets and a small settlement were the earliest

traces in Bir Hammamat. Debono's report describes one spot that was referred to in a more recent study as "Workshop 1", located at about 50 m south of the main road (Debono. 1951: 66 – 78.).

A smaller but better preserved second Pre-dynastic workshop (Workshop 2), located at about 1.2 km west of Workshop 1 and 200 m south of the main road, was protected from the effects of modern road building and the ferocity of flash floods. Material culture relating to the production of greywacke, although mainly bracelets, is strewn along a raised terrace of about 0.15-0.20m. The workshop debris was concentrated in a smaller area that formed the main workshop of approximately 270 m². The gully that now separates the "main workshop" from the rest of the site indicates the potentially destructive forces of water run-off from the hills behind. Preliminary observations about Pre-dynastic and Early Dynastic greywacke production and crafting can be determined through the material culture and the quarrying techniques.

Quarry workshops in Wadi Hammamat revealed several industrial local and non-local tools and instruments such as chert borers, microliths and drills, hammers, greywacke chisels, rods, copper needles, knives, crescent-shaped drills, small flake borers, bladelets, cores in addition to circular, cortical and retouched end scrapers, cores, flakes and blade lets (Fig.7 - 11). Moreover, a number of social structures related to human livings and traces such as ceramics, Naqada pottery - jars and bowls clustered near the community settlements at least from the mid third millennium BC onwards with some faunal/floral and domestic remains. The characteristic features of the pre-dynastic workshops and quarry complexes in Bir Hammamat are based on the results obtained by the excavations of Cardiff University, published between 2014 – 2015 (Bloxam. et al. 2014: 19 - 21, Table 1.).

Rock art included inscriptions with:

- Graffiti, Hieroglyphs, Hieratic, Greek, Demotic, Aramaic, iconography in the Bekhen-mountain.
- Giraffe, ibex, dogs, ostrich.
- Names and titles (Bloxam. 2015 : 792 – 793 ; Aston. et al. 2000 : 57- 58 ; Aston. 1994).



Fig. 7
Tools in quarries.
(Bloxam et al. 2014: 18, figs. 9–11).



Fig. 8
Right: Tools in quarries.
(Bloxam. 2015: 798, fig. 6).
Left: Chert crescent-shaped drills.
(Bloxam. et al. 2014 : fig. 17).

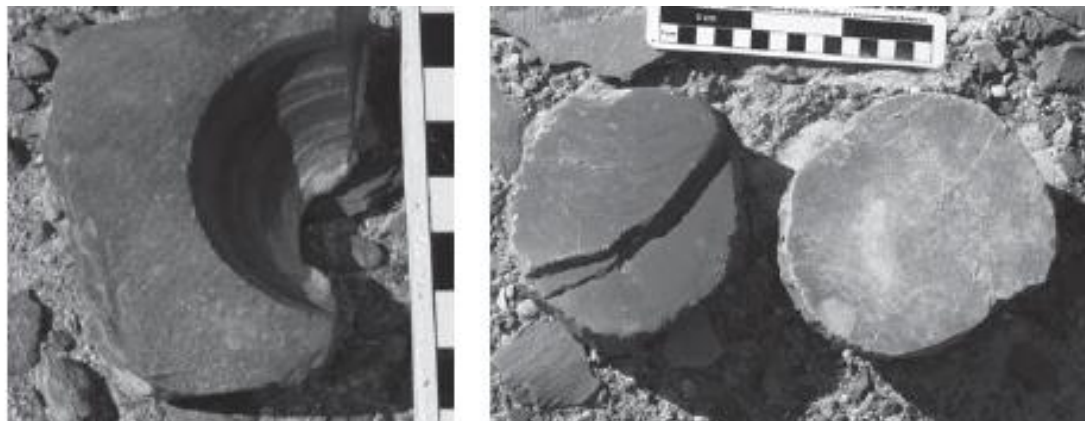


Fig. 9
Left. Broken and partially hollowed out greywacke bracelet showing concentric rings from drilling.
Right. Greywacke vessel rough-outs.
(Bloxam et al. 2014: 22, figs. 18 – 19).

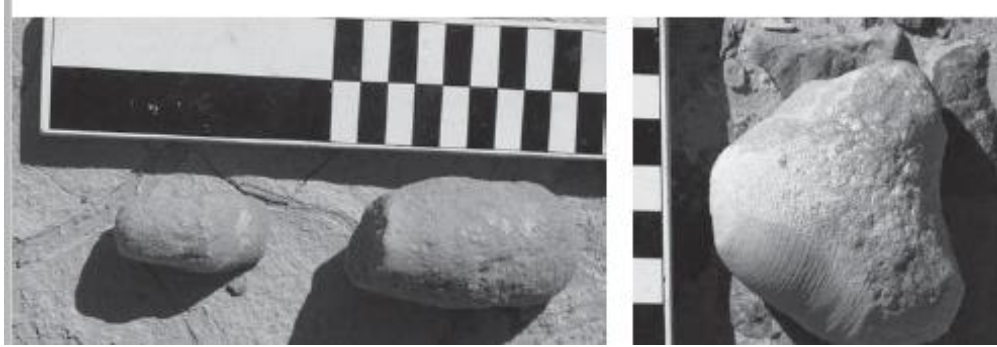


Fig. 10
 Left. Pointed-ended small tools in silicified sandstone,
 Right. Silicified sandstone crescent-shaped borer/drill showing wear marks.
 (Bloxam et al. 2014: 24, fig. 22 – 23).

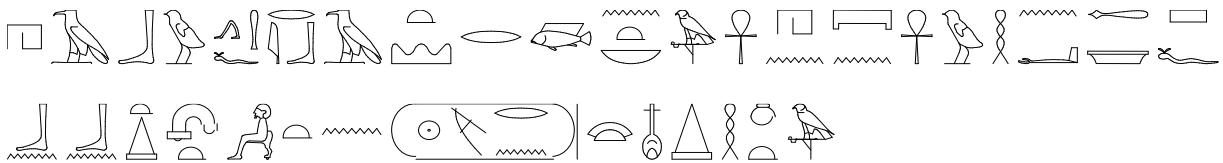


Fig. 11
 Rock cut inscription of ‘*K’i-m-mdw*’ “overseer of stoneworkers”, Wadi Faux (east side) at Bekhen Mountain (Bloxam et al. 2014: 27, fig. 27).

5.2. Early Dynastic and Old Kingdom

During the early dynastic period, greywacke was first employed for statuary and vessels. However, starting from the Old Kingdom, greywacke was employed for large objects such as statuary, stela, sarcophagi and Naoi (Aston et al. 2000: 58; Emery. 1961: 45, fig. 4; Bloxam. 2015: 794, fig. 2.).

Wadi Hammamat Bekhen stone quarries were attested to be a quarry for the needed stones to make royal sarcophagi as the inscriptions of Weni states:



hAb w(i) Hm .f r ibhA.t r int nb anx hn n anx (w) Hna aA .f Hna
 bnbn (t) xtm (t) Sps(t) n(mr - n - ra) xa nfr Hnw. (ty)

Translation: his majesty sent me to “Ibhat” to bring back the sarcophagus “Chest of Life” and its lid, as well as a costly and noble pyramidion for the pyramid of Merenre, my mistress (Wissa. 2011: 223).

Weni mentioned a toponym called “Ibhat” that most probably referred to a quarry source where the stone of the Royal sarcophagus, the lid and the pyramidion were extracted (Zibelius 1972).

The text describes a double unique mission to “Ibhat” and Elephantine where no one had never worked before (WB, I: 46, 1 – 6; Aufrere.1991: 247, 284, 316, 548, 784, 819; Barguet. 1953: 25).

This text together with the analysis of many Sixth Dynasty sarcophagi confirmed the use of Bekhen stone (greywacke) during this period (Wissa. 1994: 379 – 387).

5.3. Middle Kingdom

Wadi Hammamat appeared in the Middle Kingdom inscriptions as (RA - Hnw) giving a clear link between the Wadi and the Red Sea (Gasse 2009: 134).

During the Middle Kingdom, the officials sent to Wadi Hammamat described themselves and their work with a number of epithets in a context composed of the titles of the king after an introductory statement that began with (Now, his majesty commanded me to go to Ra – Henu “Wadi Hammamat” to bring the monuments) (Leprohon. 2001: 124 – 146).

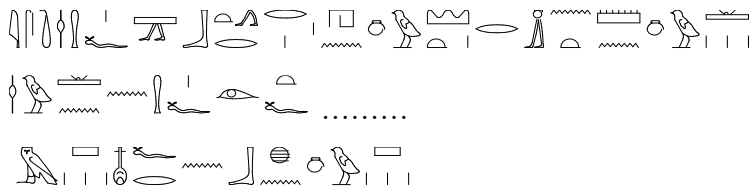
The link between Wadi Hammamat and the Red Sea appeared in two inscriptions from the 11th Dynasty that mentioned wAD wr (the Red Sea).

The first inscription dates to year 8 of Montuhotep III’s reign, when the administrator Henu was sent to bring incense from Punt through the port of Mersa Gawasis and in his way back he returned via Wadi Hammamat (The toponym (RA - hnw) was mentioned in Line 35, Couyat and Montet 1912: 81 ff., no. 114; Leprohon. 2001: 128).

- The second Inscription dates to year 2 of Montuhotep IV, when Seankh went to Wadi Hammamat for an inspection in the desert until he reached the Red Sea, that was mentioned here as a border. Therefore, Wadi Hammamat was a stopover along Seankh’s way to the harbor most probably due to the bekhen stone quarries that were a destination for numerous expeditions during his period (Farout 2006: 229 – 247; Couyat and Montet 1912: 32, no. 1).

5.3.1. Middle Kingdom inscriptions in Wadi Hammamat.

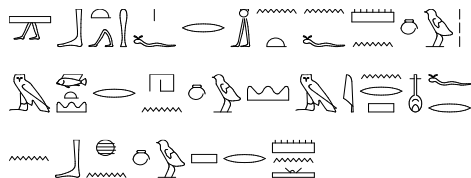
5.3.1.1. Inscription of Senusert III (Line 2 - 5)



Ist wD Hm .f sbt r RA - hnw r int mnw wD .n Hm .f irt .f m
inr nfr n bxnw.

His majesty has sent an expedition to (Ra - Hnw), Wadi Hammamat to bring the monument that he ordered to make of the good Bekhen stone (Cuyat and Montet 1912: no. 47; Seyfried. 1981: 253 – 254).

5.3.1.2. Inscription of Amenemhat III (Line 2 - 3)



sbT Hm .f r int n .f mnw m int RA -hnw m inr nfr n bxnw r mn

His majesty has sent an expedition to bring a monument made of the good Bekhen stone for him from (Ra - Hnw), Wadi Hammamat (Cuyat and Montet 1912: no. 48).

It is worth mentioning that the Middle Kingdom inscriptions engraved in Wadi Hammamat are all quite large and they provide extremely detailed texts revealing that these expeditions enrolled sizeable companies which could count until 17.000 men (Goyon 1957: 61).

5.3.1.3. Title “wHmw Imny” in the inscriptions of the (Herald Ameny)

The title (**wHmw**) is one of the most prominent epithets mentioned and repeated in the Middle Kingdom inscriptions of Wadi Hammamat as a part of the expeditions' logistic administrative system (Leprohon. 2001: 134; Farout. 1994: 149 – 151.).

Concerning the title “wHmw”, Ameny was the high official appointed to form the head of judgment and to practice the juridical activities between the participants in the mission that can be understood through the epithet “nty m sry .t Hr wp .t tA pn mi qd.f” that means “The one who embodies the judiciary, in the whole country”. He held the title “wHmw” in most of the inscriptions bearing his name which is not a rarity during the Middle Kingdom as the same title was repeated as well in:

- Inscription of the head of works Mry: year 19 of Amenemhat III.
- Inscription of (wri qr sA wr): year 11 of Senwesret II.
- Stela of an unknown: year 19 of Amenemhat III (Coyat and Montet. 1912: 41 – 42, no. 19: 72 – 73, No. 104: 76, No. 108).

The most frequent variant of the title was developed under the form “wHmw n arry.t” that means “deputy of the courtroom” who was a form of a judge in the quarrying site. The mission of the “wHmw” can be concluded in supervising and judging the members of the expedition with an immediate direct execution of the sentences (Ward. 1982: no. 744; Berlev. 1971: 36). Moreover, the term “wHmw” can be translated as a “substitute”, the holder of such title was considered the substitute of the judge or who embodies the court in the quarrying site (Farout. 1994: 166 – 167).

Greywacke Quarrying activities during the Middle Kingdom

The following table summarizes the inscriptions that mentioned the number of members who participated in some expeditions (Gonzalez – Tablas. 2014: 51; Sweeney. 2014: 275 – 291).

No	Date	Name / mission leader	Bibliography	Expedition members
1	Montuhotep III (8 th year)	Imy - r pr .wy hD	Coyat, J. and Montet, P. 1912: 114.	3.000
2	Montuhotep IV (2 nd year)	TAty	Coyat, J. and Montet, P. 1912: 1;40;55;105;110;113;191;192;205;241. Goyon, G. 1957: 52;53;54;55;56;57;58;59;60;140.	10.000
3	Senusert I (16 th year)	Imy - ra mSa	Coyat, J. and Montet, P. 1912: 120;121;123;124. Goyon, G. 1957: 64.	5.000
4	Senusert I (38 th year)	wHmw	Coyat, J. and Montet, P. 1912: 87. Goyon, G. 1957: 61;62;63.	17.000
5	Amenemhat III (19 th year)	wHmw n arryt	Coyat, J. and Montet, P. 1912: 17;19;48;108.	2.000

5.4. New Kingdom

The New Kingdom is poorly represented at Wadi Hammamat, however royal statuary continued to be sculpted from the greywacke. Expeditions were sent to the stone quarries to obtain building materials and stone for statues and vessels. Blocks of greywacke were separated by means of stone hammers. The main area of quarrying the Bekhen stone was concentrated between Bir Hammamat and Bir Umm Fawakhir.

Textual evidences allow a much better insight into the organization and work of the expeditions through 36 N.K. inscriptions, carved mostly on the southern side of the Wadi while quarrying activity took place

on the North Slope, leaving space for the inscriptions and preserving them from damage. These inscriptions evidence the convoys along this route to the Red Sea coast and the shipping activities from there to the Sinai. The earliest New Kingdom inscription dates back to the reign of Thutmose III, by Sn – nfr, the overseer of the gold country of Amun, that should have been inspecting the gold mining activities rather than the stone mining according to his title.

the successive text dates back to the reign of Amenhotep IV, when May, the high priest led an expedition composed of nearly 253 soldiers to Wadi Hammamat to bring the greywacke for a statue of the king. Then probably, quarrying activities stopped till the end of the 18th Dynasty as the following textual evidence appears in the form of cartouches and depictions of Sety I (who reused an earlier inscription of Amenhotep IV) as well as his son Ramses II who is only represented in a rock – carved cartouche. However, 12 inscriptions attested the fifth-year expedition of Sety II, that was followed by a time gap of 40 years until Ramses IV had sent a mission to Wadi Hammamat (Hikade. 2006: 153 - 156).



Fig. 12

Left: Sety I offering in front of Min in Wadi Hammamat. (Photo by the author).

Right: Cartouches of Ramses II in Wadi Hammamat. (Photo by the author).

5.4.1. Expeditions of Ramses IV

Ramses IV sent four expeditions to Wadi Hammamat that date from his the first to the third regnal year (Peden. 1994: 15; PM, I: 323 – 324; Harrel and Brown. 1992: 87).

5.4.1.1. Stela of Ramses IV

Once the fourth expedition arrived to Wadi Hammamat, a huge rock stela was sculpted taking the classical form of a round – topped stela with a small depiction of the king accompanied by Min, Horus son of Isis and Isis while offering Maat to the Triade of Karnak (Amun – Mut - Khonsu).

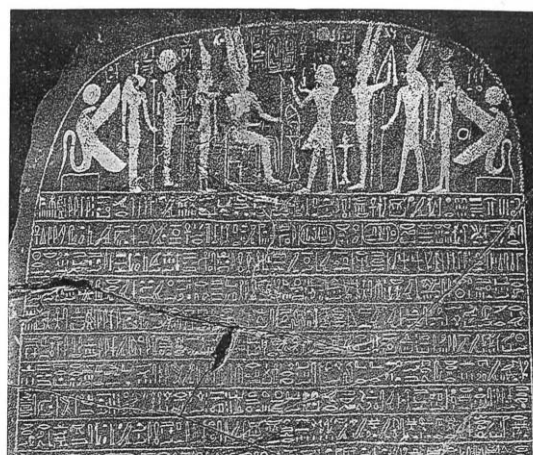
The text is structured in several paragraphs as follow:

First, the date and the royal titles followed by the eulogy stating the divine legitimacy of the king, his enthronement and his power in securing Egypt's borders against the Asiatic. Thus, he guarantees order and prosperity for the whole Egyptian territory. Then, comes the section that describes the king's journey to "tA – nTr", where a precious mountain lies and where the stela should be carved. Finally, large parts are dedicated to the participants of the enterprise and this part seems to have been copied from an administrative document. The leader of the expedition was (Raw – ms – sw – nxt) the high priest of Amun and overseer of all works, supported by a staff composed of five sub leaders (Polz, D. 1998: 257 – 293.).

Fig. 13

Stela of Ramses IV at Wadi Hammamat.

(Christophe 1949: pl. 1).



5.4.2. Hierarchy between the first and the fourth campaigns of Ramses IV (1150 B.C.)

The fourth expedition was the most extensive and it took place in the third year of his reign. The expedition was composed of 9000 men (fig. 14) (Hikade 2006: 158 – 159).

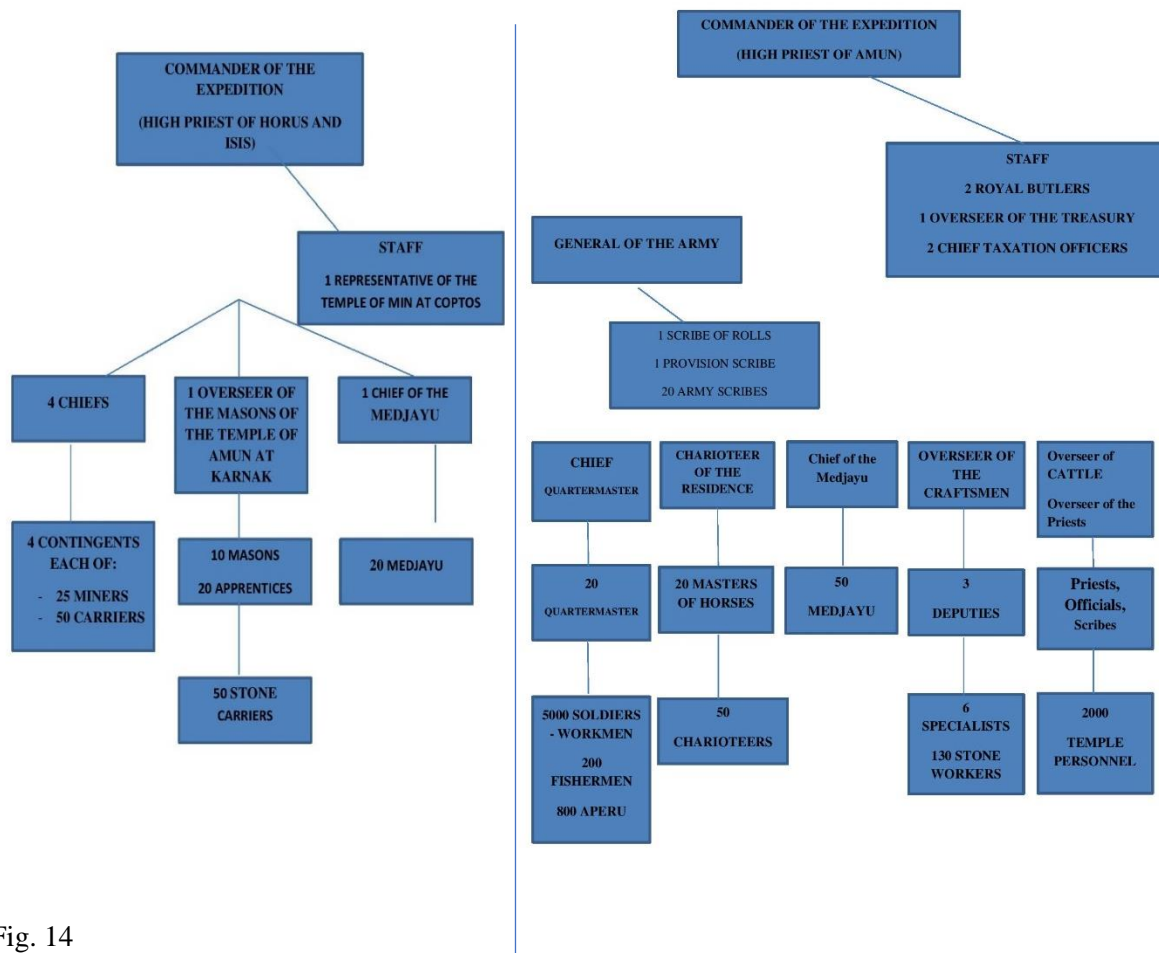


Fig. 14

Left: Members of the first campaign of Ramses IV.

Right: Members of the fourth campaign of Ramses IV. (Hikade 2006: 160, fig. 2 – 3).

6. Inventorying the quarry site landscape of Bir Hammamat

Quarry site industrial activities left a series of marks with certain cultural and historical values that can be promoted through industrial tourism, a sustainable method to preserve and enhance the industrial

heritage of the quarry site of Bir Hammamat in order to highlight the site, which at a first glance can seem obscure and apparently devoid of esthetical and cultural meanings.

The strategy to promote the site as a tourist destination must be concentrated on the local Eastern Desert quarrying identity, highlighting its particular cultural, historical and social features. Abandoned quarries should be included in a large-scale process of preservation and they should be converted into theme museums (eco-museums) that illustrate the quarrying industry from the economic, social, cultural and technological perspectives and to increase numbers of tourists interested in the industrial heritage assets. This type of Industrial tourism allows the establishment of a close link between the cultural heritage of the area, tourism and the cultural system, eco-museum, that can be defined as a museum of the territory, an outdoor museum of technology or site museum that enable the approach of people interested in discovering industrial heritage. (Severcan, Barlas 2007: 678, Stuart 2008: 9).

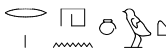

Modern Name	Bir Hammamat (Wadi Hammamat)
Ancient Egyptian Name	 r Hnw,  IbhAt, r IbhAt.
Ancient Greek Name	Persou I.
Sector / area	Red Sea Governorate, 95 km from Quseir (Quseir – Qift Road).
Coordinates	Wadi Hammamat (25° 59'25'' N; 33° 34'05'' E) The eastern quarry (25° 59'40'' N; 33° 34'05'' E) The western quarry (25° 58'66'' N, 33° 33' 40'' E).
Typology	Greywacke quarrying site – Hydreuma.
Chronology	Pre – Dynastic period till the Roman Period.
Description	A stopover in the way between Myos Hormos (Quseir) and Coptos (Qift), the site is figured out in two Bekhen stone (greywacke) quarries in addition to the Hammamat <i>hydreuma</i> , the wadi contains many carvings and inscriptions dating from the earliest Egyptian Dynasties to the modern era, including the only painted petroglyph known from the Eastern Desert and drawings of Egyptian reed boats dated to 4000 B.C.
Archeological material	Turin Papyrus, quarrying site, Epigraphic material, Hydreuma, Meta-greywacke.

Table. 1

Inventory sheet of Wadi Hammamat. (The Author).

The investigated site is important from the geo-tourism, geo-conservation and geo-education perspectives which are based mainly on the potentials and the industrial quarry landform. These potentials are not fully recognized and some sites can even be endangered. Therefore, the need for a preliminary identification emerged during the author's PhD research and after a site survey, an inventory sheet (table 1) and a site panel (fig. 15) were created.

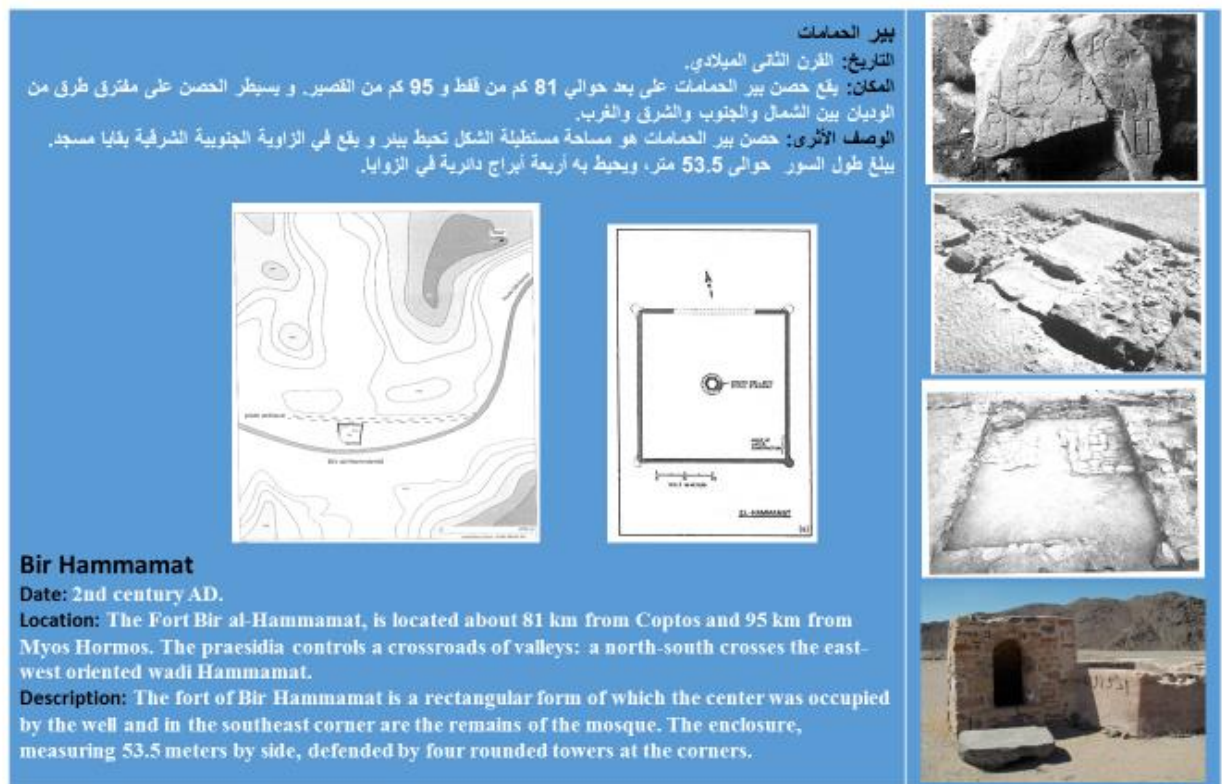


Fig. 15

Site panel of Bir Hammamat (Persou I). (The Author).

Conclusion

The development of geo-tourist activities (especially the implementation of the geo-path represented in the greywacke quarries, the rock profiles as well as the installation of information panels) can contribute in creating a better image of the site. Sustainable site development will improve the actual community life conditions in terms of road layouts, traffic control, education, health facilities and work environment and vacancies.

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