

Extraction and Use of Greywacke in Ancient Egypt

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Introduction

The Quseir – Qift road was the only practical route in the Central Easter Desert as it was the shortest and easiest road from the Nile Valley to the Red Sea, in addition to the richness of the Bekhen stone quarries and the gold mines. Therefore, it was the preferred road by the merchants, quarrymen and miners.

The Bekhen stone quarries of Wadi Hammamat forms an archaeological cluster of inscriptions, unfinished manufactures, settlements, workshops and remaining tools. It seems clear that the state was responsible for the Bekhen stone exploitation, given the vast amount of resources that had to be invested in the organization of a quarrying expedition. Unlike the other marginal areas, the officials leading the missions to Wadi Hammamat show different affiliations in terms of administrative branches. This is probably because Bekhen stone procurement was not the responsibility of the treasury, but these expeditions were entrusted to separate competent officials, graded in a specific hierarchy, forming well – organized missions with different workers for different duties and established wages and functionaries in charge of the administrative tasks.

The greywacke quarries were not constantly or intensively exploited. The fact that the stone was used in private or royal statuary and not as a building stone could have caused its demand to be less than that of other materials such as granite, limestone or sandstone.

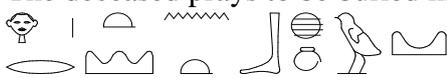
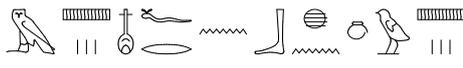
Inscriptions indicated the time lapse between expeditions suggesting that this stone was only quarried when it was needed, which was not on a regular basis. However, the fact that the quarries were exploited over all the pharaonic periods makes it hard to determine the intensity of these activities, the inscriptions represent the base in creating a chronological sequence of Egyptian activities in the area.

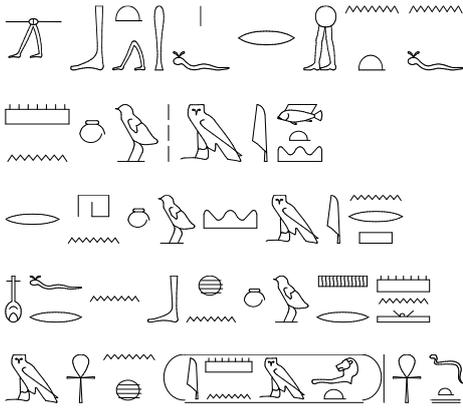
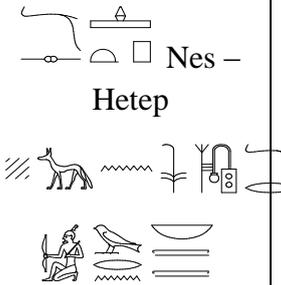
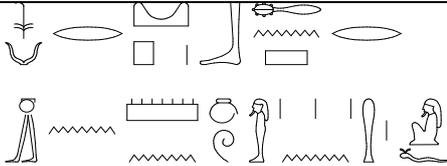
Although inscriptions are not always eloquent about these matters, it seems clear that the missions had to bring tools, supplies and other materials to the wadi and store them during the work. As for the administrative buildings where duties should have been carried out, they were found in other areas and the fact that the modern road follows the same route that the ancient one does, is not helping in terms of preservation of archaeological remains.²

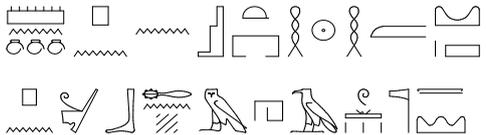
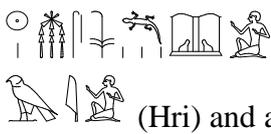
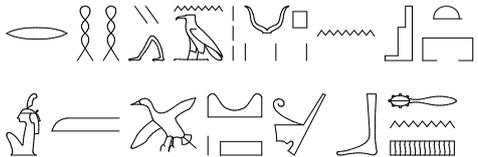
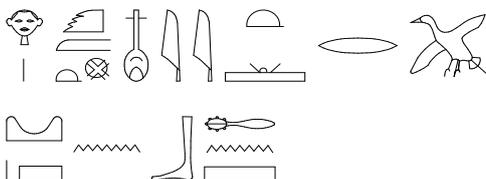
Greywacke in the Ancient Egyptian Texts³

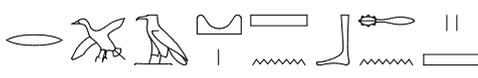
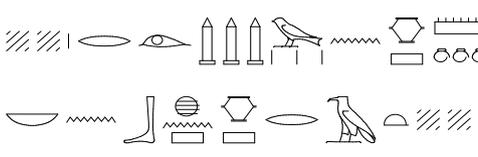
Finding stone classifications in ancient written records is difficult, although there is a consensus that greywacke was known as the bekhen (bxn) stone, from at least the Middle Kingdom onwards, with the topographic term “mountain of bekhen” emerging by the New Kingdom.⁴

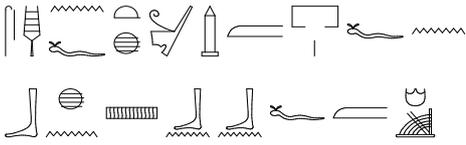
This stone used to be extracted mainly from Wadi Hammamat, the wadi represented in Turin Papyrus and referred to in the ancient times as wadi  “r - hnw”, var. ,  ⁵

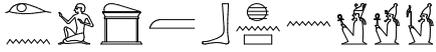
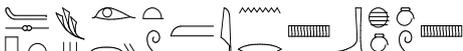
	Document	Date	Text
1	Limestone stela of  (Hr Bxn), preserved in the Louvre Museum. ⁶	12 th Dynasty, Middle Kingdom.	The deceased prays to be buried in  “Hrt nt Bxnw” The tomb of Bekhenw Mountain (Wadi Hammamat).
2	Rock inscription of  (xa wy), overseer of the store room of the controller of works. ⁷	The 14 th year, 4 th month of the first season, day 16 of Senwsert III - 12 th Dynasty, Middle Kingdom.	 (xa wy) was sent to the wadi to bring back some Bekhen stone and left there a record of his work: “His majesty commanded that I should be dispatched to  r - hnw, so as to bring a monument which his majesty had commanded to be made for the god Hry S .f , Lord of Heracleopolis for the sake of the life of the king of upper and lower Egypt, Senwsert III, living forever and ever  m inr nfr n bxnw, monuments of a beautiful block of Bekhenw”
3	Broken stela of a real acquaintance of the king Amenemhat III whose name is missing. ⁸	Amn-em-hat III - 12 th Dynasty, Middle Kingdom.	The text reads:  m inr nfr n bxnw Of the beautiful stone of Bekhenw
4	Rock inscription of Senwsret (), overseer of half of	19 th year, first month of second season, day	The official was sent by the king to remove Bekhen stone for building purposes in the locality called “Ankh Amenemhat (III)” located in the region of Hawara where the pyramid of the king is situated, and the building should be the king’s pyramid temple

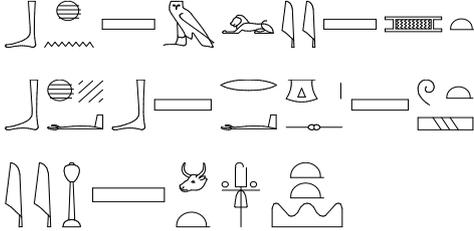
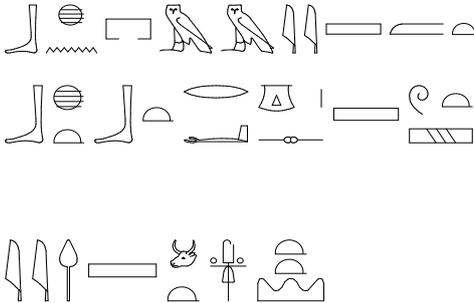
	<p>the Quarrymen.⁹</p>	<p>15 of Amenemhat III - 12th Dynasty, Middle Kingdom.</p>	<p>at Hawara.</p>  <p>sbt Hm .f r int n. f mnw m int r – hnw m inr nfr n bxnw r mn m anx imn – m – HAt anx Dt</p> <p>His Majesty sent to bring for himself monuments from the valley of “Ra-Henew” of beautiful stone of Bekhenw, as far as Ankh Amen – em – hat III, living forever.</p>
<p>5</p>	<p>Model of a temple of Heliopolis of Sety I - Brooklyn Museum.¹⁰</p>	<p>19th Dynasty, New Kingdom.</p>	 <p>txnwy m bxnw smn m iwnwAxt nt pt BAw iwnw Ha n mA.w</p> <p>He made two obelisks of Bekhenw stone, established in Heliopolis, the horizon of heaven; the souls of Heliopolis exult at seeing them.</p>
<p>6</p>	<p>Stela of Nes – Hetep</p>  <p>sAb n sS nsw mr mSa wr n nb tAwy</p> <p>Judge of the royal scribe and great overseer of</p>	<p>Reign of Ramses II, 19th Dynasty, New Kingdom.</p>	 <p>Wp nsw r Dw bxn r in n mnw n Hm .f</p> <p>A Royal mission to the mountain of Bekhen to bring monuments for his majesty.</p>

			Work up gold (extract it) till the end of the mountain of Bekhen.
9	Stela ¹⁴	Second year, second month of first season of Ramses IV – 20 th Dynasty, New Kingdom.	<p>The text contains a reference to a personal visit of the king to the Wadi. The text states that his majesty ordered his officials to make a record of the visit, on the stela, which is referred to as:</p>  <p>Mnw pn n st nHH m Dw pn n bxn m hAw tA nTr</p> <p>This monument of the place of eternity in this mountain of Bekhen, near God's land.</p>
10	Stela. ¹⁵	3 rd year, second month of third season, day 27 of Ramses IV, 20 th Dynasty, New Kingdom.	<p>This monument contains an account of a great expedition to the Wadi.</p> <p>In lines 11 and 12, The king commands two scribes</p>  <p>(Ra msw aSA Hb) and (Hri) and a priest of the temple of Min in Coptos  (wsr mAat Ra nxt).</p> <p>The text reads:</p>  <p>r HHy nA wpw n st mAat m pA Dw n bxn</p> <p>To search the (wepew)¹⁶ of the place of truth, in the mountain of Bekhen.</p> <p>Line 19 reads:</p> <p>There were transported for them (the quarry workers), supplies from Egypt in 10 carts, there being six yoke of oxen to each cart drawing them</p> 

			<p>Hr kmt nfryt r pA Dw n bxn</p> <p>From Egypt until the mountain of Bekhen.</p> <p>8362 workers were employed in the expedition. This number is exclusive of 900 who died from the desert journey and from the labor in the quarry.</p>
11	<p>Rock inscription of an unknown person.¹⁷</p>	<p>Ramses IV – 20th Dynasty, New Kingdom.</p>	<p>A single line of hieratic reading as follows:</p>  <p>r pA Dw n bxny</p> <p>Mouth of the mountain of Bekhenw.</p>
12	<p>Statue of the official  Hr wDA</p> <p>The statue was purchased in Memphis for Petrie collection, London.¹⁸</p>	<p>26th Dynasty, Late period.</p>	<p>The text reads:</p>  <p>imAxw xr nsw bit (wHm ib Ra) mi Ra imAxw xr rpa HAty – a mr aA xAswt Hr wDA Dd .f ink sHn kAt qn Hr Dw n bxn</p>  <p>r ir (t) txnw wrw n mAT mnw nb n bxn r</p> <p>Honored wHm ib Ra, with the king of Upper and Lower Egypt, like Re.</p> <p>Honored by the Hereditary prince, Local prince, overseer of the doors (forts) of the foreign countries, Hr wDA.</p> <p>He says, I was the commander of many works upon the mountain of Bekhen.</p> <p>to make great obelisks of granite and all monuments of Bekhen stone at the</p>

<p>13</p>	<p>Naos of Amasis II, tell Atrib (near Banha) – Egyptian Museum – (lid only), Cairo. Cat. Gen. 70011 JE, 40034 – 43101. ¹⁹</p>	<p>26th Dynasty, Late period.</p>	<p>This monument was dedicated to the god “Km – Wr” by the king who states:</p>  <p>Ir .n .f m mnw .f n it .f km – wr nTr aA xnty sxt Htp kAr Sps m bxn</p> <p>He made (it) as his monument for his father Kem – Wer, the great god who is in front of Sekhet – Hetep, a notable naos of Bekhen stone.</p> <p>“Km – Wr” was the surname of Osiris of Athribis.</p>
<p>14</p>	<p>Green breccia Naos of (Nxt – nb .f) Nectanebo I, Coptos – Cairo, Egyptian Museum. Cat. Gen. 70019. ²⁰</p>	<p>30th Dynasty, Late Period.</p>	<p>The monument which was dedicated to the god “Mn – Hr”, is described as:</p>  <p>kAr m inr n bxn tHn</p> <p>Naos of sparkling stone of Bekhen.</p>
<p>15</p>	<p>Part of frieze of Nectanebo I- Found on the Aventine hil in Rome and preserved now in the Museo Civico in Bologna. ²¹</p>	<p>30th Dynasty, Late period.</p>	<p>A horizontal text on the top of the monument contains the words:</p>  <p>.. m bxn</p> <p>of Bekhen stone</p> <p>It is impossible to indicate in which connection as the beginning of the text is missing.</p>
<p>16</p>	<p>Two small obelisks with missing parts of Nectanebo II – now preserved in the British Museum, no. 523 – 524. ²²</p>	<p>XXXth Dynasty, Late period.</p>	<p>These monuments were dedicated to the god Thot of Hermopolis, and on each of them the king informs us that:</p>  <p>saHa .n .f txn m pr .f n bxn bbn .f m Hmt</p> <p>He has set up an obelisk in his (Thot’s) temple, of Bekhen stone with a pyramidion of black copper.</p>

<p>17</p>	<p>Broken naos of (sn – nww- Sps), an official of Arsinoe, Queen of Ptolemy II (Philadelphus). The naos is discovered in Coptos and preserved in the Egyptian Museum, Cairo. Cat. Gen. 70031 JE. 30770. ²³</p>	<p>283 – 245 B.C., Ptolemaic Period.</p>	<p>The official informs us that among other things:</p>   <p>Ir .n .i kAr m bxn n Hr, Ist, Wsir Hry st wrt nTr aA m kAr .f</p> <p>I made a naos (Shrine) of Bekhen stone for Horus, Isis, and Osiris upon the great throne the great god in his shrine.</p>
<p>18</p>	<p>Broken Altar of Ptolemy XIII. Discovered in Coptos and preserved in the Egyptian Museum, Cairo. JE. 40643, 49103. ²⁴</p>	<p>47 – 44 B.C., Ptolemaic Period.</p>	<p>On one side of the altar and below the sign of heaven, is the following hitherto unnoticed mention of Bekhen stone.</p>    <p>nTr nfr nb tAwy ... ir n .f kAr bxn m inr n mut (.f) st di .s anx Dd wAs Dt</p> <p>The beautiful god, the lord of Upper and Lower Egypt, Ptolemy III. He has made a Bekhen altar, a shrine for his mother Isis, that she may give (him) life, Stability and welfare, forever.</p>
<p>19</p>	<p>Wall inscription of Ptolemy XIII. Great temple of Dendera. ²⁵</p>	<p>47 – 44 B.C., Ptolemaic Period.</p>	<p>The text refers to a receptacle in which was the image of Osiris and from which plants germinated</p>  <p>Hsp ir .tw m inr bxnw</p> <p>A plant receptacle which is made of stone of Bekenw</p>
<p>20</p>	<p>Rock inscription (Lines 14, 15) of</p>	<p>Ptolemaic</p>	<p>The text of this inscription mentions the names of various stones or rocks to be found in the east and</p>

<p>the Famine Stela - Siheil Island, Aswan.²⁶</p>	<p>Period.</p>	<p>west, in the river of Elephantine and in the heart of Elephantine including Bekhen stone that varied in two different publications by Brugsch and De Morgan as follows:</p> <p>Brugsch:</p>  <p>De Morgan:</p>  <p>Bxn, mry / mmy, itbxab / gstb – xtbt, rags, white wtSy / wtSy in the beginning of the east.</p>
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Greywacke quarries of Wadi Hammamat

The ancient quarrying activities in Wadi Hammamat were executed in two quarries that are separated by 1 km.²⁷

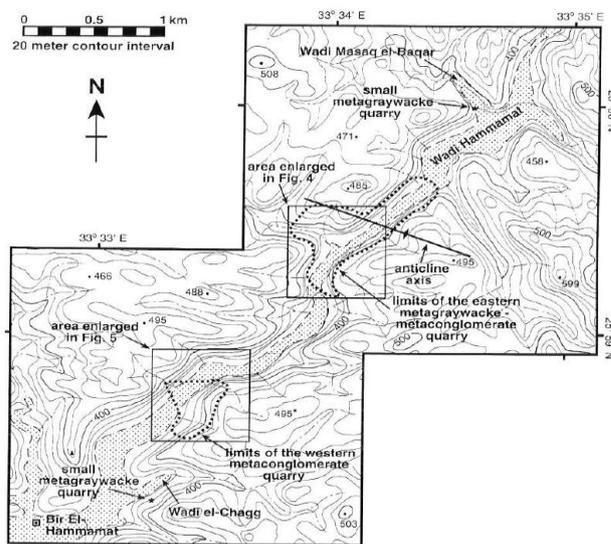


Fig. 1
The Topographic contours of Wadi Hammamat quarries After: J. A. Harrell, V. M. Brown, and L. Lazzarini, "Breccia Verde Antica",

The Eastern Quarry

The easternmost of these (coordinates 25° 59.40' N; 33° 34.05' E), is well known today because of the thousands of extant objects carved from its meta-greywacke and because of the hundreds of inscriptions cut into its walls dating from the early dynastic period (about 2900 BC) through the early third century AD of the Roman period.²⁸

On the west side of the wadi, the only traces of quarrying are seen in bed 2. However, the conspicuous workings seen there today are entirely modern. They date from about 1988 and resulted from a joint quarrying venture of the Egyptian geological survey and mining authority, the "Marmonil" company and another Italian Egyptian company, "Petrobel". The rock that Marmonil currently markets as breccia Fawakhir was apparently obtained from bed 2. This recent activity destroyed much of the evidence of the ancient quarrying in this bed. However Roman wedge holes and inscriptions dating to the reign of king Ramses IV (about 1150 BC) still survive on some blocks, which are probably associated with the only quarrying of this rock during the Twentieth Dynasty.²⁹

Marks were not seen on the bedrock surfaces except at one place in bed 1 where there are few wedge holes. Blocks of stone must have been dislodged mainly by driving iron wedges into natural fractures. Rather than pre-cut holes, and then maneuvered downslope with levers and ropes. The two meta-conglomerate beds in the eastern quarry, lie either flush with or slightly protruding from the wadi walls, and do not look like they have lost much material through quarrying. The vast bulk of the meta-conglomerate taken from Wadi Hammamat must have come from the western quarry.³⁰

The Western Quarry

The western quarry is Located just southwest and within sight of the eastern quarry (coordinates 25° 58.66' N, 33° 33. 40' E). Here there are two especially massive beds of meta-conglomerate with a thickness of 65 m (1) and 80 m (2). These are stratigraphically above the rocks in the eastern quarry and lie on the southwest flank of the same anticline.

The south-westerly dips in the western quarry vary from 40 ° in bed 1 to nearly vertical in bed 2, The area of most intense quarrying is in bed 1 on the east side of the wadi. There are traces of minor activity in this bed on the west side and in bed 2 on the east side. Both between the two meta-conglomerate beds and stratigraphically above them to the west are thick sequences of meta-greywacke, which are occasionally pebbly and contain thin lenses (up to several meters thick) of meta-conglomerate. The latter were extensively worked in the southwest part of the quarry, where there are several Roman slipways. From a few worked blocks near the Roman ruins, some pebbly meta-greywacke was also quarried. Probably from the outcrops above the ruins. Moreover, there is a small previous known meta-greywacke quarry, several hundred meters to the south, near Wadi el – Chagg, which is of indeterminate age.³¹

In bed 1, south of the ruins, the meta-conglomerate is well jointed and tends to naturally separate from the bedrock in sub-rectangular blocks. There are no excavation pits, slip-ways or tool marks in this area. The only indications of quarrying are the numerous sites where light – coloured joint surfaces were exposed after removal of the overlying blocks.³²

Given the evidence of the tool marks and the known use of the meta-conglomerate, it is certain that the settlement was occupied during the Roman Period (first three centuries A.D.). It is also possible, of course, that some of the structures go back to the late period (Eighth through Fourth centuries B.C.).³³

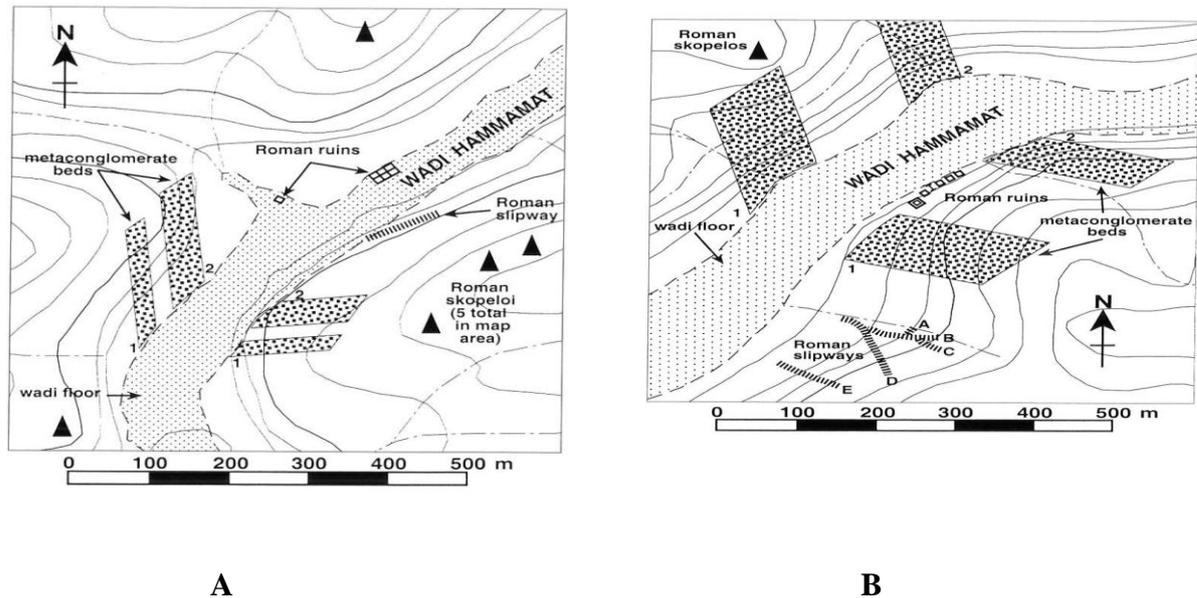


Fig. 2

A. The Eastern Quarry of Wadi Hammama, After: J. A. Harrell, V. M. Brown, and L. Lazzarini, "Breccia Verde Antica", 209, fig. 4.

B. The Western Quarry of Wadi Hammamat, After: J. A. Harrell, V. M. Brown, and L. Lazzarini, "Breccia Verde Antica", 209, fig. 5.

Chronological List of Greywacke Objects

The following list summarizes a catalogue of greywacke objects preserved in the museums around the world. This catalogue is prepared by the researcher as a part of the recent study to represent the variety of products sculpted from Wadi Hammamat greywacke and their chronological sequence such as:

Palettes: 35 pieces.

Minor arts (Amulets – scarabs – Jewelry - offering tables - Figurines – Ushabtis - Magical stelae): 21 pieces.

Statues: 88 pieces.

Utensils (Vases, tools, dishes, cups, trays, knives, vessels, bowls, Mace – heads): 24.

Sarcophagi: 10 pieces.

Obelisks, Naoi and architectural elements: 3 pieces.

Pre-dynastic and Early Dynastic Period		
No.	Object	Museum
1	Fragment of the Libyan Tribute Palette. Inv. no: (JE 27434 - CG 14238).	Egyptian Museum, Cairo, Egypt.
2	Narmer's Palette. Inv. no: (JE 32169 - CG 14716) Inv. no: (EA35714)	Egyptian Museum, Cairo, Egypt. British Museum.
3	Necklace from the Thinite age. Inv. no: (JE 87499).	Egyptian Museum, Cairo, Egypt.
4	Vase with names of Pharaohs. Inv. no: (JE 88345).	Egyptian Museum, Cairo, Egypt.
5	Basket – Shaped Tray. Inv. no: (JE 71298).	Egyptian Museum, Cairo, Egypt.
6	Statue of Khasekhem. Inv. no: (JE 32161).	Egyptian Museum, Cairo, Egypt.
7	Fish – Shaped Palette. Inv. no: (S.4956).	Egyptian Museum of Turin, Italy.
8	Geometric and Zoomorphic Cosmetic Palettes. Inv. no: (S. 604 - S. 605 - S. 606 - S. 618 - S. 619 S. 634 - S. 4955 - S. 4956 - S. 3959/3 S. 17504).	Egyptian Museum of Turin, Italy.
9	Rhomboidal Cosmetics Palette. Inv. no: (I.6)	National museum of Antiquities, Leiden, Holland - Exhibition in Bologna, Italy.
10	Zoomorphic Cosmetic Palettes. Inv. no: (I.7)	National museum of Antiquities, Leiden, Holland - Exhibition in Bologna, Italy.
11	Bird – Shaped Plaque. Inv. no: (I.8)	National museum of Antiquities, Leiden, Holland - Exhibition in Bologna, Italy.
12	Rectangular Cosmetic Palette. Inv. no: (I.20)	National museum of Antiquities, Leiden, Holland - Exhibition in Bologna, Italy.
13	Rectangular Cosmetic Palette. Inv. no: (I.40c)	National museum of Antiquities, Leiden, Holland - Exhibition in Bologna, Italy.
14	Fish – Figured Greywacke Palettes. Inv. no: (E 22730 - E 22731 - E 24731 - E 32283 E 24728 - E 24724 - E 28061 - AF 6908).	Louvre Museum, Paris, France.
15	A Pre - dynastic Greywacke Palette. Inv. no: (E 27209 - E 14230 - E 17337 AF 6909 - E 10726).	Louvre Museum, Paris, France.
16	Pre – dynastic Greywacke Palettes. Inv. no: (E 24727 - E 24729).	Louvre Museum, Paris, France.
17	Model of a Piece of Meat.	Louvre Museum, Paris,

	Inv. no: (E 17279).	France.
18	Base of a Palette. Inv. no: (E 11256).	Louvre Museum, Paris, France.
19	A Fragment of a Palette with an Ibex. (E 11648).	Louvre Museum, Paris, France.
20	The Hunter's Palette. Inv. no: (E 11254).	Louvre Museum, Paris, France.
21	Greywacke Cup. Inv. no: (AF 9161).	Louvre Museum, Paris, France.
22	Palette Depicting a Pair of Mud Turtles. Inv. no: (10.176.78).	Metropolitan Museum of Art.
23	Greywacke Palette. Inv. no: (10.176.80).	Metropolitan Museum of Art.
24	Carved Ceremonial Palette. Inv. no: (28.9.8).	Metropolitan Museum of Art.
25	Fragment of a Ceremonial Palette. Inv. no: (33.159).	Metropolitan Museum of Art.
26	A Leaf – Shaped Dish. Inv. no: (19.2.17).	Metropolitan Museum of Art.
27	Libation Dish Depicting “Ka” Arms Presenting the Ankh-Sign. Inv. no: (19.2.16).	Metropolitan Museum of Art.
28	Inscribed Greywacke Dish. Inv. no: (68.15).	Metropolitan Museum of Art.
29	Fragment of Rectangular Palette. Inv. no: (05.261).	Boston Museum of Fine Arts.
30	Rhomboid Palette. Inv. no: (11.208).	Boston Museum of Fine Arts.
31	Double – Bird Palette. Inv. no: (11.226a-b - 11.228).	Boston Museum of Fine Arts.
32	Shield – Shaped Palette. Inv. no: (03.1488).	Boston Museum of Fine Arts.
33	Fish-Shaped Palette. Inv. no: (47.1639).	Boston Museum of Fine Arts.
34	Disc – Shaped Palette. Inv. no: (11.202).	Boston Museum of Fine Arts.
35	Sandal – Shaped Palette. Inv. no: (03.1484).	Boston Museum of Fine Arts.
36	Turtle - Shaped Palette. Inv. no: (47.1644).	Boston Museum of Fine Arts.
37	Rectangular Palette. Inv. no: (47.1637).	Boston Museum of Fine Arts.
38	Double Bird - Headed Palette. Inv. no: (47.1640).	Boston Museum of Fine Arts.
39	Rectangular Palette. Inv. no: (11.2496).	Boston Museum of Fine Arts.
40	Fragmented Knife. Inv. no: (UC35710).	Petrie Museum.
41	Group of Tools.	Petrie Museum.

	Inv. no: (UC73456).	
42	Geological Sample. Inv. no: (UC26877).	Petrie Museum.
43	Palette. Inv. no: (UC25510).	Petrie Museum.
44	Palette. Inv. no: (UC26516).	Petrie Museum.
45	Vase. Inv. no: (UC41079).	Petrie Museum.
46	Fragmented Dish. Inv. no: (UC37034).	Petrie Museum.
47	Fragmented Vessel. Inv. no: (UC37042).	Petrie Museum.
48	Plant Leaf Model. Inv. no: (UC35653).	Petrie Museum.
49	Writing palette. Inv. no: (UC2475).	Petrie Museum.
50	Piece of a cup. Inv. no: (UC37048).	Petrie Museum.



Zoomorphic cosmetic palettes: Pre-dynastic period, Naqada IC - II (National museum of Antiquities, Leiden, Holland - Exhibition in Bologna, Italy).

Fish – figured Greywacke Palettes: 3600 – 3200 BC. (Louvre Museum, Paris, France, Nos. E 22730, E 22731, E 24731, E 32283, E 24728, E 24724, E 28061, AF 6908).



<p>Fish – Shaped Palette: Pre-dynastic period (Naqada II 3700 – 3300 B.C.) – (Egyptian Museum of Turin, Italy - no. S.4956).</p> <p>Palette Depicting a Pair of Mud Turtles: Pre-dynastic, Early Naqada II (ca. 3650–3500 B.C.) – (The Metropolitan Museum of Art - no. 10.176.78).</p> <p>Libation Dish Depicting Ka-Arms Presenting an Ankh-Sign: Early Dynastic Period (Dynasty 1, ca. 3100–2900 B.C.) - (The Metropolitan Museum of Art, No. 19.2.16).</p> <p>Basket – Shaped Tray: 2nd Dynasty (2770 – 2649 BC) - (Egyptian Museum, Cairo - Room 43, JE 71298).</p>		
Old Kingdom		
1	Two Unidentified Statues of king Chefred. Room 42.	Egyptian Museum, Cairo, Egypt.
2	Triads of Menkaure. Inv. no: (JE 40678 - JE 46499 - JE 40679).	Egyptian Museum, Cairo, Egypt.
3	Head of Userkaef. Inv. no: (JE 90220).	Egyptian Museum, Cairo, Egypt.
4	Bucket with a hole for suspension. Inv. no: (E 932).	Louvre Museum, Paris, France.
5	Kneeling Statuette of Pepy I. Inv. no: (39.121).	Brooklyn Museum, New York.
6	Model of the "Opening of the Mouth" ritual equipment. Inv. no: (07.228.117a–h).	Metropolitan Museum of Art.
7	King Menkaure and his queen. Inv. no: (11.1738).	Boston Museum of Fine Arts.
8	Bowl. Inv. no: (UC41083).	Petrie Museum.
9	Bowl. Inv. no: (UC17745).	Petrie Museum.
10	Mace-head. Inv. no: (UC19749).	Petrie Museum.
11	Palette. Inv. no: (UC18091).	Petrie Museum.
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>41083</p> <p><small>© 2014 University College London. This work by The Petrie Museum of Egyptian Archaeology UCL is licensed under a CC BY-NC-SA license. Additional permissions may be available from petrie.museum@ucl.ac.uk</small></p> </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>		

<p>Bowl: Old Kingdom, 3rd Dynasty - (Petrie Museum, no. UC41083). Bucket with a hole for suspension: Old Kingdom (2700 – 2200 BC) - (Louvre Museum, Paris, France - No. E 932). Kneeling Statuette of Pepy I: Old Kingdom (6th Dynasty, ca. 2338-2298 B.C.) – (Brooklyn Museum, New York - no. 39.121). King Menkaure and his queen: Old Kingdom (2490–2472 B.C. – 4th Dynasty) - (Boston Museum of Fine Arts, no. 11.1738).</p>		
Middle Kingdom		
1	Head of a Sphinx of Sesostri III / Amenemhat III. Inv. no: (387).	National Archaeological Museum of Naples, Italy.
2	Statue of king Amenemhat III. Inv. no: (N 464).	Louvre Museum, Paris, France.
3	Head of a king. Inv. no: (E 10299).	Louvre Museum, Paris, France.
4	Head of a woman. Inv. no: (E 22756).	Louvre Museum, Paris, France.
5	Head of a man. Inv. no: (E 10757).	Louvre Museum, Paris, France.
6	Iay, Chief of the treasury. Inv. no: (N 870).	Louvre Museum, Paris, France.
7	Seated Statue of King Senwosret I. Inv. no: (25.6).	Metropolitan Museum of Art.
8	Offering table with statuette of “Se-hetep-ib”. Inv. no: (22.1.107a, b).	Metropolitan Museum of Art.
9	Statuette of a striding man. Inv. no: (07.228.180).	Metropolitan Museum of Art.
10	Middle Kingdom reused statuette from Byblos. Inv. no: (68.101).	Metropolitan Museum of Art.
11	Middle Kingdom Head. Inv. no: (28.2.1).	Metropolitan Museum of Art.
12	Figurine. Inv. no: (UC14815).	Petrie Museum.
13	Dish. Inv. no: (UC41369).	Petrie Museum.
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<p>Statue of king Amenemhat III: Middle Kingdom 12th Dynasty (1843 – 1798 BC.) - (Louvre Museum, Paris, France - No. N 464).</p> <p>Statuette of a striding man: Middle Kingdom (mid 12th Dynasty, ca. 1900–1850 B.C.) – (The Metropolitan Museum of Art - No. 07.228.180).</p> <p>Head of a sphinx of Sesostris III / Amenemhat III: Second half of the 12th Dynasty (1870 – 1786 BC) - (National Archaeological Museum of Naples, Italy - No. 387).</p>		
New Kingdom		
1	Standing Statue of Thutmosis III. Inv. no: (JE 38234 Bis – CG 42053).	Egyptian Museum, Cairo, Egypt.
2	Statue of Amenhotep II. Inv. no: (JE 36680 - CG 42077).	Egyptian Museum, Cairo, Egypt.
3	Statuette of the God Amun. Inv. no: (JE 38049).	Egyptian Museum, Cairo, Egypt.
4	Statue of Sety I as a Standard Bearer. Inv. no: (CG 751).	Egyptian Museum, Cairo, Egypt.
5	Statue of Thutmosis III. Inv. no: (JE. 36927 - CG. 42054 - J.2).	Luxor Museum.
6	Statue of Ramses III. Inv. no: (non - catalogued).	Luxor Museum.
7	Statue of a king with “Khat” headdress and Jubilee cloak. Inv. no: (1072).	National Archaeological Museum of Naples, Italy.
8	Scribe Paser and his wife resting on a bed. Inv. no: (E 925).	Louvre Museum, Paris, France.
9	May and Henut-nefer resting on a bed. Inv. no: (E 22144).	Louvre Museum, Paris, France.
10	Pseudo – palette of the vizier “Ptah-Mes”. Inv. no: (N 3026).	Louvre Museum, Paris, France.
11	Stela bearing the figures of the Gods of Thebes, Heliopolis and Memphis. Inv. no: (E 7717).	Louvre Museum, Paris, France.
12	Two Ushabtis of Ramses. Inv. no: (N 768 - N 743).	Louvre Museum, Paris, France.
13	Statue of Ramses IV. Inv. no: (EA1816).	British Museum.
14	Sarcophagus. Inv. no: (EA140).	British Museum.
15	Figurine. Inv. no: (UC14881).	Petrie Museum.
16	Sculpture Inlay. Inv. no: (UC46556).	Petrie Museum.
<div style="display: flex; justify-content: space-around; align-items: center;">    </div>		

Pseudo – palette of the vizier “Ptah-Mes”: New Kingdom, Reign of Thutmosis III (1479 – 1425 BC). (Louvre Museum, Paris, France - no. N 3026).

Stela bearing the figures of the Gods of Thebes, Heliopolis and Memphis: New Kingdom, Reign of Ramses II. (The Louvre Museum, Paris, France - no. E 7717).

Statuette of the god Amun: New Kingdom, End of the 18th Dynasty, about 1320 BC (Egyptian Museum, Cairo, Egypt - Room 12 - JE 38049).



Statue of Amenhotep II: New Kingdom, 18th Dynasty, Reign of Amenhotep II, (1439 - 1414 BC) – (Egyptian Museum, Cairo, Egypt - Room 12, JE 36680 - CG 42077).

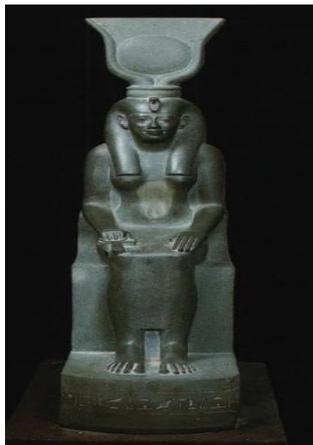
Third Intermediate Period - Late Period

1	Cube statue of “Hor” son of “Ankh-khonsu”. Inv. no: (JE 37150).	Egyptian Museum, Cairo, Egypt.
2	Statue of Hathor and Psamtek. Inv. no: (CG 784).	Egyptian Museum, Cairo, Egypt.
3	Statue of Osiris. Inv. no: (CG 38358).	Egyptian Museum, Cairo, Egypt.
4	Statue of Isis. Inv. no: (CG 38884).	Egyptian Museum, Cairo, Egypt.
5	Statue of Taweret. Inv. no: (CG 39194).	Egyptian Museum, Cairo, Egypt.
6	Statue of the Vizier “Nespaqashuty”. Inv. no: (JE 36665).	Egyptian Museum, Cairo, Egypt.
7	Statue of “Ahmes” son of “Nespanebdjed”. Inv. no: (JE. 37075).	Egyptian Museum, Cairo, Egypt.
8	Head of Osiris. Inv. no: (J. 143).	Luxor Museum.
9	Bust of a High Official. Inv. no: (C. 3075).	Egyptian Museum of Turin, Italy.
10	Bust of a Male Statue. Inv. no: (C. 3078).	Egyptian Museum of Turin, Italy.
11	Bust of a Private Statue.	Egyptian Museum of Turin,

	Inv. no: (C. 1393).	Italy.
12	Lid of the Sarcophagus of “Ibi”. Inv. no: (C. 2202).	Egyptian Museum of Turin, Italy.
13	Sarcophagus of the vizier “Gem-en-ef-her-bak”. Inv. no: (C. 2201/1-2).	Egyptian Museum of Turin, Italy.
14	Statue presenting a shrine (Naophore) of Royal Herald “Hor”. Inv. no: (C. 3026).	Egyptian Museum of Turin, Italy.
15	Inscribed Scarab. Inv. no: (C. 5993).	Egyptian Museum of Turin, Italy.
16	Statue of Osiris. Inv. no: (C. 30).	Egyptian Museum of Turin, Italy.
17	Head of a Royal Statue (Psmatik I). Inv. no: (S. 1225/2).	Egyptian Museum of Turin, Italy.
18	Head of a king wearing a “Nemes” headdress. Inv. no: (Unidentified).	National Archaeological Museum of Naples, Italy.
19	Portrait Head of an official. Inv. no: (388).	National Archaeological Museum of Naples, Italy.
20	Torso of an accountant scribe of the temple of Neith. Inv. no: (1067).	National Archaeological Museum of Naples, Italy.
21	A Fragment of a statue of “Shabaka”. Inv. no: (N 2541).	Louvre Museum, Paris, France.
22	Inscribed Fragment. Inv. no: (N 520).	Louvre Museum, Paris, France.
23	Statue of a man dedicated to Horus. Inv. no: (E 10709).	Louvre Museum, Paris, France.
24	Statue of a priest. Inv. no: (E 10777).	Louvre Museum, Paris, France.
25	Psamtik presents an image of Osiris. Inv. no: (E 9417).	Louvre Museum, Paris, France.
26	Selkis bearing Osiris. Inv. no: (E 20060).	Louvre Museum, Paris, France.
27	Two Statues of Osiris. Inv. no: (N 3952 - E 9418).	Louvre Museum, Paris, France.
28	Statuette of Isis breastfeeding Horus. Inv. no: (N 3991).	Louvre Museum, Paris, France.
29	Statue of “Ankh-ef-en-sekhmet”, Tutor of the king. Inv. no: (E 25459).	Louvre Museum, Paris, France.
30	Chief of the court “Iahmes - sa – Neith”. Inv. no: (E 25390 - E 25475).	Louvre Museum, Paris, France.
31	Statue of a man presenting an effigy of Osiris. Inv. no: (E 4299).	Louvre Museum, Paris, France.
32	Lid of the sarcophagus of “Djed – Hor”. Inv. no: (D 9).	Louvre Museum, Paris, France.
33	Statue of “Horoudja”. Inv. no: (N 2452).	Louvre Museum, Paris, France.
34	Statue of the steward “Hekat – ef – nakht” presenting Osiris. Inv. no: (E 25499).	Louvre Museum, Paris, France.

35	Head of Osiris. Inv. no: (E 10706).	Louvre Museum, Paris, France.
36	Block statue of the priest “Imnemptditipy”. Inv. no: (E 10366).	Louvre Museum, Paris, France.
37	Sarcophagus of “Tenet – Hapy”. Inv. no: (D 39).	Louvre Museum, Paris, France.
38	Head of a shaved man. Inv. no: (E 25577).	Louvre Museum, Paris, France.
39	Torso of king Nectanebo I. Inv. no: (E 25492).	Louvre Museum, Paris, France.
40	Statue of “Shepsesirdis”. Inv. no: (E 18967).	Louvre Museum, Paris, France.
41	Head of one of the believers of “Ptah”. Inv. no: (E 10710).	Louvre Museum, Paris, France.
42	Fragment of a votive monument. Inv. no: (E 32648).	Louvre Museum, Paris, France.
43	Heart Scarab. Inv. no: (08.480.168).	Brooklyn Museum, New York.
44	Fragment of the Feet and Base of a Statue. Inv. no: (79.31).	Brooklyn Museum, New York.
45	Head of King Amasis. Inv. no: (2007.81).	Metropolitan Museum of Art.
46	Naophorous Block Statue of a Governor of Sais, Psamtik (Seneb). Inv. no: (1982.318).	Metropolitan Museum of Art.
47	Sarcophagus of “Harkhebit”. Inv. no: (07.229.1a, b).	Metropolitan Museum of Art.
48	Statue of “Harbes” called “Psamtik-Nefer”, son of “Ptah-Hotep”. Inv. no: (19.2.2).	Metropolitan Museum of Art.
49	Kneeling statue of “Amen-em-opet-em-hat”. Inv. no: (24.2.2).	Metropolitan Museum of Art.
50	Antelope Head. Inv. no: (1992.55).	Metropolitan Museum of Art.
51	Man, holding a Shrine Containing an Image of Osiris. Inv. no: (25.2.10).	Metropolitan Museum of Art.
52	Head of a Male Priest. Inv. no: (49.101.2).	Metropolitan Museum of Art.
53	Bust of an anonymous scribe. Inv. no: (25.2.1).	Metropolitan Museum of Art.
54	Torso of a High General. Inv. no: (1996.91).	Metropolitan Museum of Art.
55	Magical Stela. Inv. no: (50.85).	Metropolitan Museum of Art.
56	God Horus Protecting King Nectanebo II. Inv. no: (34.2.1).	Metropolitan Museum of Art.
57	The Shabako Stone. Inv. no: (EA498).	British Museum.
58	Dish. Inv. no: (EA23831).	British Museum.
59	Vessel Model. Inv. no: (EA18559).	British Museum.
60	Plaque. (EA27571).	British Museum.
61	Broken Head of a Statue. Inv. no: (EA97).	British Museum.
62	Architectural Element of Nectanebo I.	British Museum.

	Inv. no: (EA22).	
63	Bath-tub / Sarcophagus / Religious/ Ritual Vessel. Inv. no: (EA10).	British Museum.
64	Greywacke Obelisks of Nectanebo II. Inv. no: (EA 523 - EA 524).	British Museum.
65	Statue of Osiris. Inv. no: (2000.973).	Boston Museum of Fine Arts.
66	Statue of Vizier "Bakenrenef". Inv. no: (1970.495).	Boston Museum of Fine Arts.
67	Head of "Ankh-khonsu". Inv. no: (04.1841).	Boston Museum of Fine Arts.
68	Head of a Priest (The Boston Green Head). Inv. no: (04.1749).	Boston Museum of Fine Arts.
69	Grain rubber, Polisher. Inv. no: (UC29898f).	Petrie Museum.
70	Scarab. Inv. no: (UC29867).	Petrie Museum.
71	Amulet. Inv. no: (UC2413).	Petrie Museum.
72	Broken bust of Statue. Inv. no: (UC14634).	Petrie Museum.
73	Amulet. Inv. no: (UC52074).	Petrie Museum.
74	Figurine. Inv. no: (UC42553).	Petrie Museum.



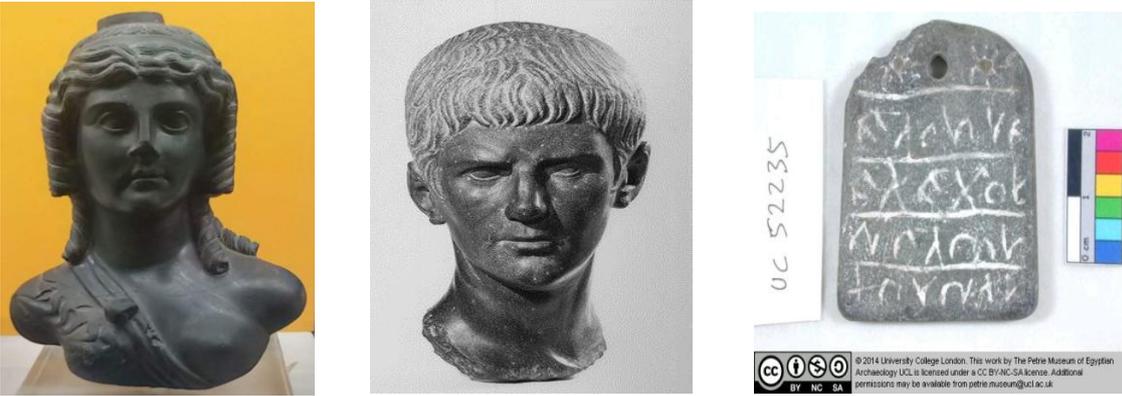
Statue of Isis: End of the 26th Dynasty (first half of the 6th century BC), (Egyptian Museum, Cairo, Egypt, Room 24 - CG 38884).

Inscribed fragment: 26th Dynasty (664 – 525 BC.) - (Louvre Museum, Paris, France - No. N 520).

Lid of the sarcophagus of Djed – Hor: IV century BC. (Louvre Museum, Paris, France - No. D9).

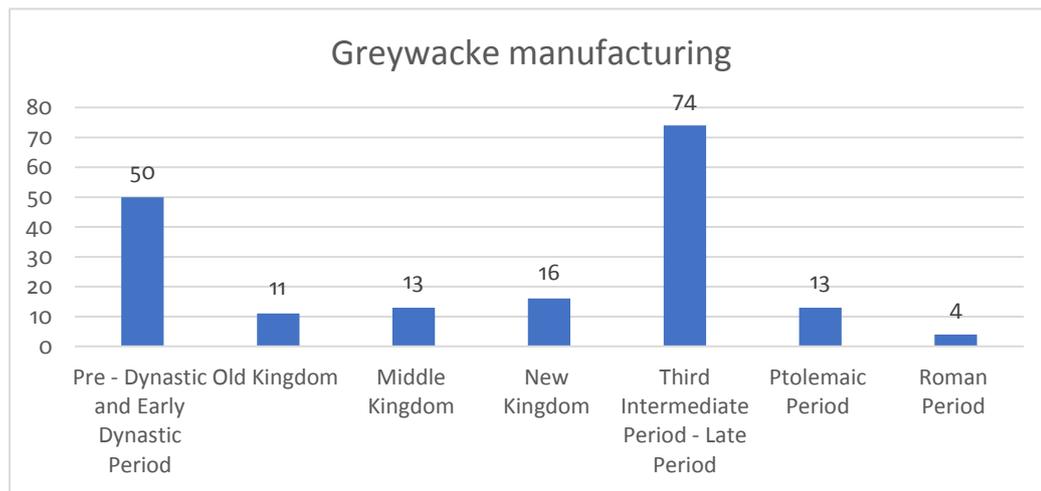


<p>Bust of a private statue: Late Period, 26th Dynasty, reign of Psamtek I, II, III (664 – 525 BC.). (The Egyptian Museum of Turin, Italy, no. C. 1393).</p> <p>Inscribed Scarab: Third Intermediate Period (1076 – 722 B.C.), (The Egyptian Museum of Turin, Italy, no. C. 5993).</p> <p>lid of the Sarcophagus of Ibi: Late Period, 26th Dynasty, reign of Psmatek I (664 – 610 BC), (The Egyptian Museum of Turin, Italy, no. C. 2202).</p>		
Ptolemaic Period		
1	Stela of Horus on crocodiles. Inv. no: (CG 9401).	Egyptian Museum, Cairo, Egypt.
2	Head of Ptolemy II. Inv. no: (C. 1399).	Egyptian Museum of Turin, Italy.
3	Theophorous Statue. Inv. no: (Unidentified).	National Archaeological Museum of Naples, Italy.
4	Sarcophagus of “Ank-hapy”, The priest of king Sneferu and the god Ptah. Inv. no: (D 13).	Louvre Museum, Paris, France.
5	Sarcophagus of the Priest “Ankh – mr – wr”. Inv. no: (D 7).	Louvre Museum, Paris, France.
6	A Ptolemaic king offering Maat to Amun – Ra, Mut and Khonsou. Inv. no: (C 121).	Louvre Museum, Paris, France.
7	Fragment of a Naos inscribed with a Royal decree. Inv. no: (N 274 - C 123).	Louvre Museum, Paris, France.
8	Sarcophagus of the Greek – Egyptian Tisicrates. Inv. no: (D 40).	Louvre Museum, Paris, France.
9	Statue of Imhotep dedicated by “Wah – Ib - Re”. Inv. no: (N 4541).	Louvre Museum, Paris, France.
10	Broken Statue of a Ptolemaic Prince. Inv. no: (54.117).	Brooklyn Museum, New York.
11	Feet from statue of Musician of Amun Tasherithkonsu. Inv. no: (55.51).	Metropolitan Museum of Art.
12	Face attributed to Ptolemy II Philadelphos or a contemporary. Inv. no: (12.187.31).	Metropolitan Museum of Art.
13	Portrait Head. Inv. no: (1926,0415.15).	British Museum.
<div style="display: flex; justify-content: space-around; align-items: center;">    </div>		

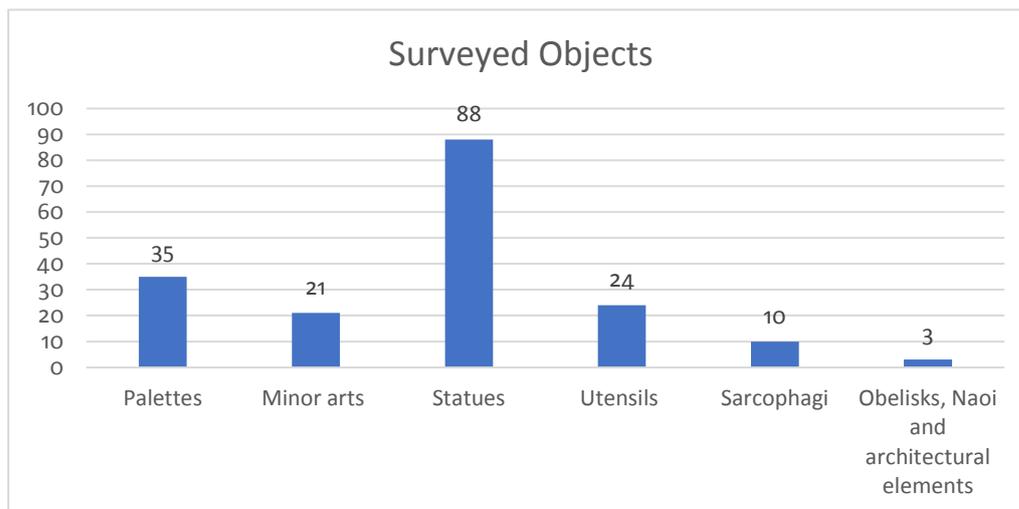
Head of Ptolemy II: Ptolemaic Period (284 - 246 BC.) – (Egyptian museum, Turin, No. C. 1399).		
Broken Statue of a Ptolemaic Prince: Late Ptolemaic Period (50-30 B.C.) – (The Brooklyn Museum, New York, no. 54.117).		
Sarcophagus of the Priest (Ankh – mr – wr): 3 rd – 2 nd century BC. (Ptolemaic Period) - (The Louvre Museum, Paris, France - no. D 7).		
Roman Period		
1	Statue of Isis. Inv. no: (635).	National Archaeological Museum of Naples, Italy.
2	Portrait Head of Young Man. Inv. no: (66.65).	Brooklyn Museum, New York.
3	Uninscribed Scarab. Inv. no: (04.2.359).	Metropolitan Museum of Art.
4	Amulet. Inv. no: (UC52235).	Petrie Museum.
		
<p>Statue of Isis: Roman Period (30 BC – 395 AD) - (The National Archaeological Museum of Naples, Italy, no. 635).</p> <p>Portrait Head of Young Man: Roman Period (10 B.C. - 20. AD.), (The Brooklyn Museum, New York - no. 66.65).</p> <p>Amulet: Roman Period. (Petrie Museum, No. UC52235).</p>		

Conclusion

- The catalogue of greywacke objects preserved in several museums around the world prepared by the researcher resulted a total of 181 well-dated objects related to the quarrying and use of greywacke through the different historical phases.



- Bekhen stone represents a variety of uses such as:
 - I. Small objects (vessels, palettes, bracelets, beads).
 - II. Large objects (statues, coffins, sarcophagi, naoi) usually found in burial and votive contexts.
 - III. Tools (chisels and wedges) primarily connected with the quarrying process.



This survey indicated that:

- The pre – dynastic and early dynastic period witnessed intensive quarrying activities of greywacke reflected in a huge number of sculptures, mainly palettes. This should have been due to the primitive tools and quarrying techniques that helped in obtaining small dimensions of quarried stones in this early period.
- The mass quarrying activities occurred during the Late Period (Third Intermediate Period) of which the manufactured greywacke objects reached 74 pieces of mainly statuary (Standing statues – Cube statues – Heads – Busts and torsos), sarcophagi, magical stelae, obelisks, amulets and figurines.
- The low quarrying and consequently sculpture rate is applied on the Roman Period (4 pieces), most probably due to the fear of the “Blemmy’s” tribes mentioned in the Roman

resources, the unsafe situation in the Eastern Desert during this period or the interest of extracting and sculpting other types of stones such as the *porphyrites* of Mons Claudianus.

- The period extending from the Old Kingdom till the New Kingdom then the Ptolemaic Period witnessed a stable medium rate of use and interest towards the greywacke.
- Wadi Hammamat quarries were inherently centers of social interaction, as well as places where technology could be transmitted and maintained across generations. The instances where rock engravings are associated with quarries can provide additional insights into the ways in which production landscapes were socialized overtime. As a social activity, engraving on rocks might not only define access and control of specific landscapes and resources, but also represents how visual “art” became an enduring medium of expression related to shared experience and group identity that linked the past with the present, as well as the future.

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¹ Lecturer of the Ancient Egyptian Language and Civilization in The High Institute of Tourism, Hotel Management and Restoration, Abu Qir, Alexandria, Egypt. This article is a survey executed during the researcher’s PHD thesis work in the Università degli Studi di Padova, Italy.

Ahmed Othman, *Evaluating the Cultural Heritage and landscape of Quseir - Qift Road: with a special focus on the gold mines and greywacke quarries*, (PHD Thesis, Università degli studi di Padova, 2017).

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³ Alfred Lucas and Alan Rowe, “The Ancient Egyptian Bekhen Stone”, *ASAE* 38, (1938), 127 – 156.

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⁵ LÄ II, col. 894; Wb, II, 398.

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¹⁰ A. Lucas, and A. Rowe, “The Ancient Egyptian Bekhen Stone”, 133, text (F); James Henri Breasted. *Ancient Records of Egypt*, III, (Chicago, 1908), 99 – 101.

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¹³ Adolf Erman, *Life in Ancient Egypt*, (London, 1894), 446; A. Lucas, and A. Rowe, “The Ancient Egyptian Bekhen Stone”, 134 – 135, fig. 12.

¹⁴ J. Couyat, and P. Montet. *Les Inscriptions Hiéroglyphiques*, 112, No. 240; H. Gauthier. *Dictionnaire des Noms Géographiques*, VI, 24.

¹⁵ J. Couyat, and P. Montet. *Les Inscriptions Hiéroglyphiques*, 34, No. 12; A. Erman, *Life in Ancient Egypt*, 472 – 475.

- ¹⁶ Referred to as of uncertain meaning in A. Lucas, and A. Rowe, “*The Ancient Egyptian Bekhen Stone*”, 136, footnote, 4.
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- ¹⁸ William M. Flinders Petrie, *A Season in Egypt*, (London, 1888), 26, pl. XXI, Fig. 5.
- ¹⁹ A. Varille, “Quelques données nouvelles”, 98, no. 6.
- ²⁰ A. Varille, “Quelques données nouvelles”, 94 - 95, no. 1.
- ²¹ A. Varille, “Quelques données nouvelles”, 94 - 100, no. C.; Giovanni Kmínek – Szedlo, *Catalogo di Antichità Egizia del Museo Civico di Bologna*, (Torino, 1895), 165 – 166, No. 1870.
- ²² George Long, *The Egyptian antiquities in the British Museum*, I. (London, 1846), 50, 324 – 328; Harry Reginald Hall, *Introductory Guide to the Egyptian Collections in the British Museum*, (London, 1930), 395, fig. 218; A. Varille, “Quelques données nouvelles”, 95; For further readings cf, Labib Habachi, *The obelisks of Egypt: skyscrapers*, (Scribner: New York, 1977).
- ²³ William M. Flinder Petrie, *Koptos*, (London, 1896), 21; A. Varille, “Quelques données nouvelles”, 99.
- ²⁴ A. Lucas, and A. Rowe, “*The Ancient Egyptian Bekhen Stone*”, 143, Text (R).
- ²⁵ August Mariette, *Denderah*, Vol. IV, (Paris, 1873), pl. XXXV, line 14.
- ²⁶ A. Lucas, and A. Rowe, “*The Ancient Egyptian Bekhen Stone*”, 144 - 146, Text (T); Heinrich Brugsch, *Die biblischen sieben Jahre der hungersnoth*, (Leipzig, 1891), pls. XIV, XV.; Jacques De Morgan, et al. *Catalogues des monuments et inscriptions de L’Egypte*, Serie I, Vol. I, 1894, 79 – 82.
- ²⁷ J. A. Harrell, V. M. Brown, and L. Lazzarini, “Breccia Verde Antica: Sources, Petrology and Ancient Uses”, *ASMOSIA VI*, June 2000, (Venice, 2002), 209.
- ²⁸ Rolf Gundlach, “Wadi Hammamat”, in *LÄ*, VI, (Wiesbaden), 1986, col. 1099 – 1113.
- ²⁹ J. A. Harrell, V. M. Brown, and L. Lazzarini, “Breccia Verde Antica”, 210.
- ³⁰ J. A. Harrell, V. M. Brown, and L. Lazzarini, “Breccia Verde Antica”, 210.
- ³¹ Georges Goyon, *Nouvelles inscriptions rupestres du Wadi Hammamat*, (Paris, 1957), 337 – 392, fig. 14.
- ³² J. A. Harrell, V. M. Brown, and L. Lazzarini, “Breccia Verde Antica”, 210.
- ³³ J. A. Harrell, V. M. Brown, and L. Lazzarini, “Breccia Verde Antica”, 211 – 213; for more about Hammamat greywacke, cf, R. Grothaus, D. Eppler, and R. Ehrlich. “Depositional Environment and Structural Implications of the Hammamat Formation”, *Annals of the Egyptian Geological Survey*, Vol. 9, (Egypt, 1979), 456 – 590.

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