

# Mechanical Engineering in Ancient Egypt, Part 80: Rock Inscriptions

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## Abstract:

This paper is the 80<sup>th</sup> research paper in a series investigating the evolution of mechanical engineering in ancient Egypt. It investigates the inscriptions of rock during a time span from Naqada II to Late Periods of ancient Egypt. It outlines how the ancient Egyptians inscribed rock in deserts with scenes and texts. The script location, type of script used, the inscription type and the carved surfaces were all investigated.

*Keywords* — **Mechanical engineering; ancient Egypt; rock inscriptions, Naqada II to Late Periods.**

## I. INTRODUCTION

This is the 80 paper in a series of research papers aiming at exploring the role of ancient Egyptians in the evolution of mechanical engineering. The paper focuses on the inscription of desert-rocks and how the ancient Egyptians used them as surfaces to register their documentation of the expeditions of stone acquiring or trading purposes.

Darnell et. al. (2005) studied the early alphabetic inscriptions from Qurna of Qena Governorate. They presented two sets of Wadi el-Hol alphabetic inscriptions from the Middle Kingdom and Second Intermediate Period. They outlined the descriptions of the inscription sets [1]. Regulski (2008) in her work about the rock inscriptions at el-Hosh, 30 km South of Edfu presented an inscription mentioning Scribe Pashed, inscription mentioning the Overseer of Troops, Sobekhotep and mentioning the Commander of Troops, Nes-Amon. The site of El-Hosh comprised inscriptions which were considered as the oldest rock drawings in the Nile Valley. She outlined that 169 inscriptions were discovered in five locations in El-Hosh with hieroglyphic and hieratic scripts and texts from the zero Dynasty, Middle and New Kingdoms [2].

Darnell (2008) in his paper about the Wadi of the Horus QA-A outlined that the Theban Desert Road Survey discovered more than 1000 discrete rock art images from earliest Predynastic to the end of the 1<sup>st</sup> Dynasty. He presented rock images from Naqada I, Naqada II, Naqada III, Dynasty 1 and Dynasty 2 [3]. Ibrahim (2009) in his work about the earliest monumental rock inscriptions of the Pharaonic Period in South Sinai outlined that rock inscriptions are a fundamental source for study of mining expeditions sent during the Pharaonic Period. He presented scenes for King Den of the 1<sup>st</sup> Dynasty attacking a Bedouin with his mace in Wadi El-Hamur at South Sinai. He outlined that three inscriptions were damaged during 2004!! [4].

Helany, Negem, Tohami and Heldal (2009) studied a granite quarry survey in the Aswan region. They presented a hieroglyphic script inscriptions for the name of Pharaoh Hatshepsut of the 18<sup>th</sup> Dynasty in the Central Quarries of Aswan, inscriptions including a boat scene from the Predynastic Period in the Southern Quarries. They outlined that many modern quarries are situated on ancient quarries [5]. Darnell (2013) in his study about the Egyptian Wadi El-Hol on the Farshut Road presented rock inscriptions from the Middle Kingdom, Second Intermediate Period, New Kingdom and Third Intermediate Period [6].

Sweeney (2014) in her study of the self-representation in Old Kingdom quarrying outlined that ancient Egyptians left inscriptions at their work sites commemorating their presence ranging from large official texts and reliefs for the achievements and the Egyptian control over their local resources to informal personal texts. She represented an inscription for the seal bearer Ibu from the reign of King Pepi I [7]. Wiczorek (2015) in his paper about rock inscription of Pharaoh Remses IV of the 20<sup>th</sup> Dynasty at Gebelien concerned with an expedition sent to acquisition of stone material for mortuary structure. He presented a rock inscription displaying two Cartouches of the Pharaoh [8].

Davies (2017) in his paper about recording the Egyptian rock inscriptions at Gebel Dosh and Batn El-Hajar presented inscriptions for a viceroy offering to two Deities, scenes of three officials with arms raised and lowered, rock – stela of an official with hieroglyphic script text, carved in two bounded rows, texts inscription for Amenemnekhbu at Debba and an inscription for Henenu at Asruna Island [9]. Ali (2018) in his paper about the characterization and treatment of rock inscriptions in Wadi Nasib in South Sinai presented some inscriptions in the Wadi before and after restoration [10]. Wikipedia (2018) wrote an article about Sehel Island and presented some inscriptions in the granite borders of the Island and rock famine stela with scene and text carved in un-bounded columns [11].

## II. PREDYNASTIC ROCK INSCRIPTIONS

The genius ancient Egyptians expressed themselves through inscriptions on rocks from early times during the Predynastic Period of their history. Here are some example of their rock inscriptions starting from Naqada II (3500-3200 BC), i.e. from more than 5200 years:

The first example is a boat inscription from Naqada II (3500-3200 BC) in Wadi of the Horus QA-A in the Theban Western Desert [12]. The boat had a crescent hull and equipped with an identification animal on its

bow, tent with sitting deck near its middle, thwart in its middle, stowage besides the thwart and may be a small sail to help driving the boat.

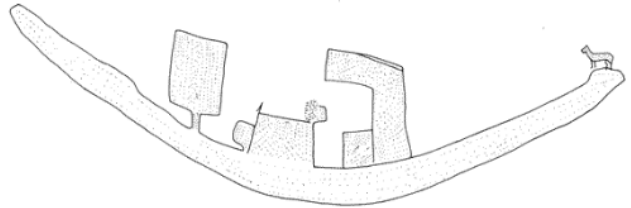


Fig.1 Boat inscription from Naqada II [12].

The second example is a rock inscription from Naqada II (3300 BC) in the Eastern Egyptian Desert of Elkab shown in Fig.2 [13]. The red rock was inscribed by carving a scene of four animals of different sizes and heights.



Fig.2 Animals inscription from Naqada II [13].

The third example is a rock inscription from Elkab Desert in South Luxor for symbols of political power for Late Predynastic Rulers shown in Fig.3 [14].



Fig.3 Symbols inscription from Naqada III [14].

The fourth example is a wall inscription from Naqada III (3200-3000 BC) in Wadi Magar for two boats and two elephants shown (as a line diagram) in Fig.4 [15]. This inscription means that the ancient Egyptians during the Predynastic Period had elephants living among them. The scene of the biggest boat depicted the elaborating shape with an animal-shaped bow on its front, an oscillating pendulum in the animal mouth, two steering rows, a thwart in its middle and a passenger saloon near its middle.



Fig.4 Boats and elephants inscription from Naqada III [15].

The fifth example is a wall inscription from Naqada III (3200-3000 BC) in Wadi El-Birka for a man holding two staffs shown (as a line diagram) in Fig.5 [3]. The scene depicts a disabled man with problems in his knees and using two staffs to help him to walk.



Fig.5 Striding disabled man inscription from Naqada III [3].

### III. EARLY DYNASTIC ROCK INSCRIPTIONS

The ancient Egyptians continued to inscribe rocks in Egypt's deserts during the Early Dynastic Period as will be depicted through the following examples:

The first example is a rock inscription showing a boat and a Serekh for King Narmer of the 1<sup>st</sup> Dynasty (3273-2987 BC) in Wadi El-Homor of the West Desert shown in Fig.6 [16]. The inscription showed the King's Serekh as if it was carried by the boat.



Fig.6 Boat and Serekh inscription from 1<sup>st</sup> Dynasty [16].

The second example is a rock inscription from the Early Dynastic Period (3150-2686 BC) in the Eastern Desert shown in Fig.7 [17]. The inscription consisted of a scene of two Serekhs of one or two kings of this period.



Fig.6 Two Serekhs inscription from the Early Dynastic [17].

The third example is a rock inscription in Wadi Ameyra in Sinai Desert for Neith-Hotep, Regent Queen during the early period of King Djer of the 1<sup>st</sup>

Dynasty (3050-3000 BC) shown in Fig.7 [18]. The inscription was completely for the Queen.



Fig.7 Inscription for Queen Neith-Hotep from the 1<sup>st</sup> Dynasty [18].

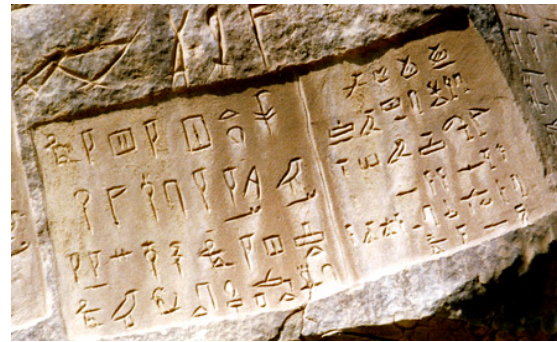


Fig.8 Inscription from the Old Kingdom [19].

#### IV. OLD KINGDOM ROCK INSCRIPTIONS

This period of the ancient Egyptian history comprised the great Kings of the pyramids. They needed to send expeditions to the Egyptian deserts to acquire stones for their pyramids and temples as will be depicted from the following examples:

The first example is a rock inscription on a smooth panel in Elkab in the West Bank of the Nile River 23 km north of Edfu with inscriptions from the Old Kingdom starting from King Sneferu the founder of the 4<sup>th</sup> Dynasty (2613-2589 BC) shown in Fig.8 [19]. The inscription was carved using the hieroglyphic script in a highly professional manner taking the form of a document of two pages with text carved in un-bounded rows.

The second example is a rock inscription in the Elephantine Island of Aswan for Unas, the last King of the 5<sup>th</sup> Dynasty (2375-2345 BC) shown in Fig.9 [20]. It was inscribed by the Cartouche and Serekh of the King and a hieroglyphic text carved in two rows.



Fig.9 Inscription of King Unas from the 5<sup>th</sup> Dynasty [20].

The third example a rock inscription in the Aswan Desert for Pepi I, the third King of the 6<sup>th</sup> Dynasty (2331-2287 BC) shown in Fig.10 [21]. It was inscribed by the Cartouche of the King and a hieroglyphic text carved in a single bounded row.

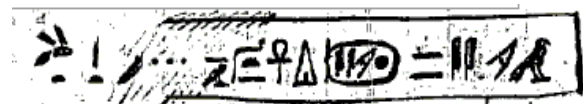


Fig.10 Inscription of King Pepi I from the 6<sup>th</sup> Dynasty [21].

The fourth example a rock inscription in the Aswan Desert for Pepi II, the fifth King of the 6<sup>th</sup> Dynasty (2278-2184 BC) shown in Fig.11 [21]. It was inscribed by the Cartouche of the King and a hieroglyphic text carved in a single un-bounded column.



Fig.11 Inscription of King Pepi II from the 6<sup>th</sup> Dynasty [21].

The fifth example is a rock inscription from Wadi Hammamat in the Eastern Desert mentioning the expedition of Merenre II, the 6<sup>th</sup> King of the 6<sup>th</sup> Dynasty (2184 BC) shown in Fig.12 [22]. The inscription shows the Cartouche of the King and a hieroglyphic text carved in rows explaining the expedition sent by the King.



Fig.12 Inscription of King Merenre II from the 6<sup>th</sup> Dynasty [22].

## V. MIDDLE KINGDON ROCK INSCRIPTIONS

The Middle Kingdom was a rich Kingdom and had strong kings capable of sending expeditions to acquire stones for the ancient Egyptian industries. Here are some of the examples of their monuments as they passed through the Egyptian Deserts:

The first example is a rock inscription for King Intef II, the King of the 11<sup>th</sup> Dynasty (2118-2069 BC) in Aswan Desert and shown in Fig.13 [21]. The inscription showed the King striding between his Cartouche and Serekh and a one row of a hieroglyphic text in the bottom of the inscription.



Fig.13 Inscription of King Intef II from the 11<sup>th</sup> Dynasty [21].

The second example is a rock inscription for Mentuhotep II, the 5<sup>th</sup> King of the 11<sup>th</sup> Dynasty in Gebel El-Silsila and shown in Fig.14 [23]. The inscriptions are not clear enough, however it is clear that the whole surfaces are covered by scenes and hieroglyphic script text.



Fig.14 Inscription of King Mentuhotep II from the 11<sup>th</sup> Dynasty [23].

The third example is a rock inscription of letters with Semitic alphabet carved in a stone cliff West of the Nile River during the 12<sup>th</sup> Dynasty (1900-1800 BC) shown in Fig.15 [24]. Those alphabet

were derived from the hieroglyphic language to simplify its use.



Fig.15 Inscription of Semitic alphabet from the 12<sup>th</sup> Dynasty [24].

The fourth example is a rock inscription in Sehel Island of Aswan presenting scenes for King Senusret III of the 12<sup>th</sup> Dynasty (1878-1839 BC) and King Neferhotep I of the 13<sup>th</sup> Dynasty (1747-1736 BC) shown in Fig.16 [25]. The inscription in the right side was for King Senusret III in front of one of the ancient Egyptian Deities with Cartouche of the King and a hieroglyphic text carved between them. On the left side almost the same image but for King Neferhotep with his Cartouche.



Fig.16 Inscription of Kings Senusret III and Neferhotep I from the 12<sup>th</sup> and 13<sup>th</sup> Dynasties [25].

- The fifth example is a rock inscription in Wadi El-Hol carved by Priest Deduscbeq from the reign of King Amenemhat III of the 12<sup>th</sup> Dynasty (1860-1814 BC) shown in Fig.17 [6]. The inscription comprised scenes in its

right part followed by a hieroglyphic text carved in un-bounded and bounded columns of different lengths.

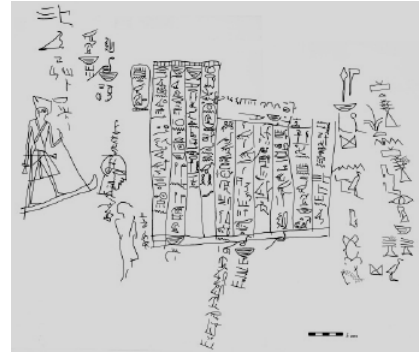


Fig.17 Inscription of Priest Deduscbeq from the 12<sup>th</sup> Dynasty [6].

## VI. NEW KINGDOM ROCK INSCRIPTIONS

As the New Kingdom was the most powerful Period during the ancient Egyptian history, it is expected to have more and more use of the rock faces in Egypt Deserts as an inscription panels as will be depicted in the following examples:

The first example is a rock inscription in the Wadi El-Hol at Aswan for a horse and a rider from the New Kingdom (1570-1067 BC) shown in Fig.18 [6].



Fig.18 Inscription of a horse and rider from the New Kingdom [6].

The second example is a rock inscription in Wadi El-Hol of the Grain Accounting Scribe of Amun, May from the 18<sup>th</sup> Dynasty, reign of Thutmose III (1479-1425 BC) shown in Fig.19 [6]. The text

was carved using the hieroglyphic script in two un-bounded rows.



Fig.19 Inscription of the Grain Accounting Scribe May from the 18<sup>th</sup> Dynasty [6].

The third example is a rock shrine of Pahu, Priest of Amun from the 18<sup>th</sup> Dynasty during the reign of Amenhotep II (1425-1398 BC), Thutmose IV (1398-1388 BC) and Amenhotep III (1388-1350 BC) shown in Fig.20 [26]. The inscription was for Pharaoh Ahmose behind an offering table and a hieroglyphic script text carved in two bounded rows below the Pharaoh.



Fig.20 Inscription in Pahu shrine from the 18<sup>th</sup> Dynasty [26].

The fourth example is a rock inscription in Gebel Akhenaten in Theban Western Desert showing the head of Pharaoh Akhenaten from the 18<sup>th</sup> Dynasty (1351-1334 BC) shown in Fig.21 [27]. The scene depicted the Pharaoh offering to an ancient Egyptian Deity.



Fig.21 Inscription for Pharaoh Akhenaten from the 18<sup>th</sup> Dynasty [27].

The fifth example is a rock inscription of the Viceroy Amenemipet and Governor of South Egypt during the reign of Seti I, the 2<sup>nd</sup> Pharaoh of the 19<sup>th</sup> Dynasty (1290-1279 BC) in Jebel Dosha (in the Western River Bank between Soleb and Sedeingo) shown in Fig.22 [9]. The inscription comprised a scene in the middle and a hieroglyphic text carved in short bounded columns above and below the scene.



Fig.22 Inscription of Viceroy Amenemipet from the 19<sup>th</sup> Dynasty [9].

- The sixth example is a rock inscription at Wadi Hammamat for two Cartouches for Ramses II, the 3<sup>rd</sup> Pharaoh of the 19<sup>th</sup> Dynasty (1279-1213 BC) shown in Fig.23 [22]. The Cartouches were

professionally carved with texts using the hieroglyphic script.



Fig.23 Inscription of Ramses II from the 19<sup>th</sup> Dynasty [22].

The seventh example is a rock inscription at Sehel Island of Aswan for Bakenkhonsu, the High Priest of Amun during the reign of Pharaoh Ramses II of the 19<sup>th</sup> Dynasty (1279-1213 BC) shown in Fig.24 [28]. The inscription comprised a large scene and a hieroglyphic script text carved below the scene.



Fig.24 Inscription of Bakenkhonsu from the 19<sup>th</sup> Dynasty [28].

The eighth example is a rock inscription at Matna El-Barqa for Priest Userhat of Seith during the reign of Ramses III, the 2<sup>nd</sup> Pharaoh of the 20<sup>th</sup> Dynasty (1186-1155 BC) shown in Fig.25 [29]. The inscription was composed of a scene for Deity Seth and a hieroglyphic script text carved in three bounded columns in front of the Deity.



Fig.25 Inscription of Priest Userhat from the 20<sup>th</sup> Dynasty [29].

- The ninth example is a rock inscription at Wadi Hammamat for Ramses IV, the 3<sup>rd</sup> Pharaoh of the 20<sup>th</sup> Dynasty (1155-1149 BC) shown in Fig.26 [22]. The inscriptions were composed of two Cartouches for the Pharaoh and four unbounded columns of hieroglyphic script text and a row of hieroglyphic text below the Cartouches. The inscription reflected the high profession of the carver.



Fig.26 Inscription of Ramses IV from the 20<sup>th</sup> Dynasty [22].

## VII. LATE PERIOD ROCK INSCRIPTIONS

The ancient Egyptians during their last Pharaonic Period (the Late Period) continued to use the huge free rock panels to inscribe their historic events as depicted by the following examples:

- The first example is a rock inscription in Gebel Elsilsila North of Aswan from the Late Period (664-332 BC) shown in Fig.27 [30]. The inscription depicted a



Late Period Pharaoh offering to two of the ancient Egypt Deities and hieroglyphic script texts carved in vertical short columns.



Fig.27 Inscription of Pharaoh offering to Deities from the Late Period [30].

- The second example is a rock inscription in Wadi Hammamat from the reign of Artaxerxes I, the 9<sup>th</sup> King of the Persian 27<sup>th</sup> Dynasty in Egypt (465-424 BC) shown in Fig.28 [31]. The inscription depicted a scene for an ancient Egyptian Deity, two Cartouches for the King and hieroglyphic script texts carved in bounded rows and columns.



Fig.28 Inscription of Artaxerxes I from the 27<sup>th</sup> Dynasty [31].

- The third example is a rock inscription in Wadi Hammamat from the reign of Nectanebo II, the 3<sup>rd</sup> Pharaoh of the 30<sup>th</sup> Dynasty in Egypt (360-343 BC) shown in Fig.29 [32]. The inscription consisted of two parts: the top part was an

extensive scene for many persons with their name carved in front of each of them and a hieroglyphic script scene carved below the scene in bounded columns.



Fig.29 Inscription of Nectanebo II from the 30<sup>th</sup> Dynasty [32].

## VIII. CONCLUSIONS

- The paper investigated the evolution of Mechanical Engineering in ancient Egypt through the rock inscriptions during the Predynastic to Late Periods.
- The ancient Egyptians of Naqada II inscribed a rock authorizing using boats in Egypt with crescent hull design and equipped with sitting deck, thwart, stowage and a flag or sail.
- They inscribed a red rock in Elkab with animals images of different sizes.
- They inscribed a rock in Elkab Desert for some Naqada III rulers.
- They inscribed a rock in Wadi Magar during Naqada III with scenes for boats and elephants and in Wadi El-Birka for a man holding two staffs.
- Rock inscriptions from the Early Dynastic Period appeared in Wadi El-Homor for King Narmer Serekh.
- They left rock inscription in Wadi Ameyra in Sinai for Queen Neith-Hotep of the 1<sup>st</sup> Dynasty.
- During the Old Kingdom, they started inscribing rock from the time of King Sneferu, the founder of the 4<sup>th</sup> Dynasty using the hieroglyphic script and continued in this approach during the 5<sup>th</sup> and 6<sup>th</sup> Dynasties.
- During the Middle Kingdom, rock inscription was performed during the reigns

- of Kings Intef II and Mentuhotep II of the 11<sup>th</sup> Dynasty and Kings Senusret III and Amenemhat III from the 12<sup>th</sup> Dynasty.
- A unique rock inscription for a horse and rider was carved in Wadi El-Hol during the New Kingdom.
  - Private rock inscriptions were carved for the Grain Accounting Scribe of Amun May and Priest of Amun Pahu from the 18<sup>th</sup> Dynasty, Viceroy Amenemipet and High Priest Bakenkhonsu from the 19<sup>th</sup> Dynasty and Priest Userhat from the 20<sup>th</sup> Dynasty.
  - Royal rock inscriptions were carved for Pharaoh Akhenaten from the 18<sup>th</sup> Dynasty, Pharaoh Ramses II from the 19<sup>th</sup> Dynasty and Pharaoh Ramses IV from the 20<sup>th</sup> Dynasty.
  - Royal rock inscriptions from the Late Period were carved for King Artaxerxes I from the 27<sup>th</sup> Dynasty and Pharaoh Nectanebo II from the 30<sup>th</sup> Dynasty.

## REFERENCES

1. J. Darnell, F. Allsopp, M. Landberg, P. McCarter and B. Zuckerman, Two early alphabetic inscriptions from Wadi El-Hol, *Annual of the American Schools of Oriental Research*, vol.59, pp.73-124, 2005.
2. I. Reguluski, The rock inscription at El-Hosh, *British Museum Studies in Ancient Egypt and Sudan*, vol.9, pp.51-67, 2008.
3. Darnell, The Wadi of the Horus QA-A: A tableau of Royal ritual power in the Theban Western Desert, *Proceedings of the Third International Conference 'Origin of the State: Predynastic and Early Dynastic Egypt'*, London, 27<sup>th</sup> July – 1<sup>st</sup> August 2008, pp.1151-1193.
4. M. Ibrahim, King Den in South Sinai: The earliest monumental rock inscriptions of the Pharaonic Period, *ARCHEO-NIL*, vol.19, pp.179-184, 2009.
5. A. Kelany, M. Negem, A. Tohami and T. Haldal, Granite quarry survey in the Aswan region, Egypt: Shedding new light on ancient quarries, in N. Abu-Jaber, E. Bloxam, R. Degryse and T. Haldal (Editors), *Quarry scapes: ancient stone quarry landscapes in the Eastern Mediterranean*, Geological Survey of Norway Special Publication, Number 12, pp.1-19, 2013.
6. J. Darnell, Wadi El-Hol, *UCLA Encyclopedia of Egyptology*, 8547, vol.1, pp.210-226, 2014.
7. D. Sweeney, Self-representation in Old Kingdom quarrying inscriptions at Wadi Hammamat, *The International Journal of Egyptian Archaeology*, vol.100, pp.275-291, 2014.
8. D. Wiczorek, A rock inscription of Ramesses IV at Gebelien: A previously unknown New Kingdom expedition, *Etudes et Travaux*, vol.28, pp.217-229, 2015.
9. W. Davies, Recording Egyptian rock inscriptions at Jebel Dosha and in the Batn El-Hajar, the 2016 season, *Sudan and Nubia Bulletin*, vol.21, pp.59-70, 2017.
10. W. K. Ali, Characterization and treatment of rock inscription in Wadi Nasib in South Sinai, Egypt, *Case study, Middle East Journal of Applied Sciences*, vol.8, issue 1, pp.64-78, 2018.
11. Wikipedia, *Sehel Island*, [https://en.wikipedia.org/wiki/Sehel\\_Island](https://en.wikipedia.org/wiki/Sehel_Island), 2018.
12. J. Darnell, The Wadi of Horus Qa-a: A Tableau of Royal power in the Theban Western Desert, <https://egyptology.yale.edu/expeditions/past-and-joint-projects/theban-desert-road-survey-yale-toshka-desert-survey/alamat-tal/wadi-of-the-horus-qa-a>, 2019.
13. News Yale, Ancient Egyptian graffiti, burial sites discovered by Yale archaeologists, <https://news.yale.edu/2018/07/24/ancient-egyptian-graffiti-burial-sites-discovered-yale-archaeologists>, 2019.
14. Egypt Today, Rock inscription site discovered Southern Luxor, <http://www.egypttoday.com/Article/4/8553/Rock-inscription-site-discovered-southern-Luxor-Ministry>, 2017.
15. Egyptology Yale, The rock inscription of the Wadi Magar, <https://egyptology.yale.edu/expeditions/past-and-joint-projects/theban-desert-road-survey-yale-toshka-desert-survey/qamula/wadi-magar>, 2019.
16. Eyeem, King Narmer rock inscription st Wadi El Homor – Boat with Narmer Serekh, <https://www.eyeem.com/a/14175432>, 2018.
17. Alamy, Rock art showing Early Dynastic Serekhs in the Eastern Desert, <https://www.alamy.com/stock-photo-rock-art-showing-early-dynastic-serekhs-in-the-eastern-desert-of-egypt-39509686.html>, 2019.
18. Ancient Explorers, 5000 years old hieroglyphs rewrites history of Egyptian Pharaohs, <https://ancientexplorers.com/blogs/news/5000-yr-old-hieroglyphs-rewrites-history-of-egyptian-pharaohs>, 2017.
19. Egypt Sites, El-Kab, <https://egyptsites.wordpress.com/2009/02/02/el-kab/>, 2009.

20. Wikipedia, Unas, <https://en.wikipedia.org/wiki/Unas>, 2019.
21. UCL, Rock inscriptions at Aswan and the surrounding area, <https://www.ucl.ac.uk/museums-static/digitalegypt/assuan/rockinscriptions.html>, 2001.
22. Egypt Sites, Wadi Hammamat, <https://egyptsites.wordpress.com/2010/09/14/wadi-hammamat/>, 2010.
23. Wikipedia, Mentuhotep II, [https://en.wikipedia.org/wiki/Mentuhotep\\_II](https://en.wikipedia.org/wiki/Mentuhotep_II), 2019.
24. News BBC, Oldest alphabet found in Egypt, [http://news.bbc.co.uk/2/hi/middle\\_east/521235.stm](http://news.bbc.co.uk/2/hi/middle_east/521235.stm)
25. Common Wikimedia, Neferhotep I, [https://commons.wikimedia.org/wiki/File:Neferhotep\\_1\\_3.jpg](https://commons.wikimedia.org/wiki/File:Neferhotep_1_3.jpg), 2018.
26. Egyptology Yale, The rock shrine of Pahu, <https://egyptology.yale.edu/expeditions/past-and-joint-projects/theban-desert-road-survey-yale-toshka-desert-survey/qamula/rock-shrine>, 2018.
27. Egyptology Yale, The rock inscriptions of gebel Akhenaten <https://egyptology.yale.edu/expeditions/past-and-joint-projects/theban-desert-road-survey-yale-toshka-desert-survey/qamula/geb-el-akhenaton>, 2019.
28. R. Delia, First cataract rock inscription: some comments, maps and new group, Journal of the American Research in Egypt, vol.30, pp.71-91, 1993.
29. Egyptology Yale, The rock inscription of the Matna El-Barqa, <https://egyptology.yale.edu/expeditions/past-and-joint-projects/theban-desert-road-survey-yale-toshka-desert-survey/qamula/matna-el-barqa>, 2019.
30. Luxor Times Magazine, Rock inscriptions at Gebel El Silsila, <http://luxortimesmagazine.blogspot.com/2015/01/rock-inscriptions-and-sphinx-discovered.html>
31. Mnamon, Rock inscription, 27<sup>th</sup> Dynasty, reign of Artaxerxes I, Wadi Hammamat, <http://mnamon.sns.it/index.php?page=Immagini&id=32&img=15&lang=en>
32. Egypt Sites, Wadi Hammamat: The latest hieroglyphic inscription date to the reign of Nectanebo II, <https://egyptsites.wordpress.com/2010/09/14/wadi-hammamat/>

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- Reviewer in some international journals.
- Scholars interested in the authors publications can visit:

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