

MECHANICAL ENGINEERING IN ANCIENT EGYPT, PART 93: INSCRIPTION OF THE 11TH AND 12TH DYNASTIES TOMBS

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ABSTRACT

The objective of this paper is to investigate the development of mechanical engineering in ancient Egypt through the study of the inscription of the tombs of the 11th and 12th Dynasties. This study presents how the ancient Egyptian artists could record their daily-life activities in the form of reliefs and scenes on the walls of their tombs. They inscribed activities such as: hair dressing, fishing, fowling,

weaving, presenting offering tables, receiving foreign delegates and wrestling. The paper highlights the use of the hieroglyphic script to define the activities covered in the tomb reliefs and scenes.

KEYWORDS: Mechanical engineering history, ancient Egypt, tombs inscription, 11th Dynasty, 12th Dynasty.

INTRODUCTION

This is the 93rd part in a series aiming at investigating the mechanical engineering technology in ancient Egypt. It investigates the amazing inscription of the Royal and Elite tombs of the 11th and 12th Dynasties of the Middle Kingdom.

Wild, 2005 declared that Beni Hasan housed 39 Middle Kingdom tombs dated from the End of the 11th Dynasty to the Middle of the 12th Dynasty and the paintings in many of the tombs included detailed scenes of daily life. He outlined also that four of the tombs had scenes related to the textile industry. He presented scenes from the tombs of Khnumhotep II,

Amenemhat, Khety and Baqt III.^[1] Miniaci and Quirke, 2009 in their study of the burial of the Accountant of the Main Enclosure of Deir Abu al-Naga presented inscriptions on some of the items found in the owner's burial chamber. This covered inscriptions on hippopotamus, walking staff, headrest and double scarab.^[2] Karmin, 2009 in her paper about the Aamu of Shu in the tomb of Khnumhotep II studied the various theories related to the scene of Asiatics in the tomb of Khnumhotep II. She presented the colored scene of the Asiatics procession including eight men, four women, three children and two donkeys. She explained in details the different elements in the scene. She presented also the very rich scene in the owner's tomb painted in six bounded rows and inscribed using five bounded columns of hieroglyphic text.^[3]

Arnold, 2010 reviewed a book entitled 'Middle Kingdom tomb architecture at Lisht' by Dieter Arnold published in 2009. He handled the architecture of the tombs and the remains of the reliefs, paintings and inscriptions of the tombs.^[4] Grajetzki, 2014 presented a description for tomb 197 at Abydos from the 12th Dynasty. He outlined that the tomb was found undisturbed and contained several burials.^[5] Hassaan, 2016 investigated the textile industry in ancient Egypt, where he presented scenes from the tombs of the 12th, 18th, 19th and 20th Dynasties related to the textile industry.^[6] In a series of research papers he investigated the women and men clothes giving tomb-scene examples from some of the tombs from the Predynastic to Middle Kingdom,^[7] 18th Dynasty,^[8] 19th and 20th Dynasties.^[9] for women clothing and Early Dynastic to Middle Kingdom.^[10] and New Kingdom to Late Period.^[11] for men clothing.

Novakova, 2017 in her paper about the household of an Egyptian dignitary presented wonderful reliefs from the funerary chapel of Ptahshepses and a procession scene from the tomb of Akhethetep.^[12] Darlow, 2017 in his Ph. D. Thesis about chronological investigation of the Middle Kingdom tombs at Meir presented reliefs from Ukhhotep I and Senbi I, painted scenes from tomb of Ukhhotep III with artist grids.^[13] Hassaan, 2020 studied in details he management activities associated with the transportation project of a colossal statue for Nomarch Djehutihotep from the 12th Dynasty as inscribed in a colored scene in his tomb. He handled its objectives, the lashing process, the pulling force, the project supervision and the project documentation.^[14]

Inscription of the 11th Dynasty Tombs

The 11th Dynasty was the first Dynasty of the Middle Kingdom, covered a time span from 2130 to 1991 BC and ruled by eight Kings.^[15] The 11th Dynasty tombs exhibits a number of sites in Egypt including: El-Tarif in the West bank of Thebes (Luxor),^[16] The Tombs of

Nobles at Thebes,^[17] Badari, Qau and Sedment,^[18] Bani Hassan,^[19] and Deir el-Bahary and Asasif,^[20] The idea of tomb inscription during the 11th Dynasty is explored through five examples as follows:

- The first example is a relief for Queen Neferu II from her tomb at Deir el-Bahri, Wife of Mentuhotep II, 5th King of the 11th Dynasty, 2061-2010 BC in display in the Brooklyn Museum at New York and shown in Fig.1.^[21] The scene depicts the Queen having her hair dressed by a female hair dresser. Both names are carved in front of the head of each of them.



Fig. 1: Relief from the tomb of Queen Neferu II.^[21]

The second example is a scene for a textile workshop in the tomb of Baqet III at Beni Hassan, Governor of Menat Khufu (Modern el-Menya) during the reign of King Mentuhotep II of the 11th Dynasty, 2061-2010 BC shown in Fig.2.^[22] The scene depicts two operations related to the textile industry: Two men spinning the cords and two men weaving it using a horizontal loom. The two operations were supervised by an overseer in the extreme right of the scene giving his instructions.



Fig. 2: Textile scene from the tomb of Baqet III.^[22]

- The third example is a wrestling scene from the tomb of Baqet III at Beni Hassan, 2061-2010 BC shown in Fig.3.^[23] The tomb wall was covered by an elaborated scene presenting the wrestling sport as practiced by the ancient Egyptians. Different wrestling positions were inscribed in four parallel horizontal bands. It may be the first time in the history of this sport to have all those details in one scene and I think it needs detailed analysis from this sport experts to get out by its techniques as practiced by the ancient Egyptians.



Fig. 3: Wrestling scene from the tomb of Baqet III.^[23]

- The fourth example is a relief for a son of Vizier Dagi during the reign of King Mentuhotep II of the 11th Dynasty in display in the Metropolitan Museum of Art at New York and shown in Fig.4.^[24] The relief depicts the son of Dagi holding his right shoulder by his left hand and his right hand holding his left forearm.
- The fifth example is a relief for an offering table in the tomb of Vizier Dagi during the reign of King Mentuhotep II of the 11th Dynasty in display in the Metropolitan Museum of Art at New York and shown in Fig.5.^[25] The relief depicts an offering table with a huge fish on it, storing jars and two stacks of pots. The activity was defined using a hieroglyphic text inscribed in a single row just below the offerings.



Fig.4: Colored relief of son of Vizier Dagi^[24]



Fig.5: Offering table relief from the tomb of Vizier Dagi^[25]

Inscription of the 12th Dynasty Tombs

The 12th Dynasty was the second Dynasty of the Middle Kingdom, covered a time span from 1991 to 1902 BC and ruled by eight Kings^[26]. The 12th Dynasty tombs exhibits a number of sites in Egypt including: El-Lahun,^[27] El-Lisht,^[28] Dahshour,^[29] Abydos,^[30] Sheikh Abdel Qurna,^[31] Beni Hasan,^[32] Deir el-Bersha,^[33] and Meir.^[34] It is well known historically that the 12th Dynasty was one of the greatest Dynasties during the ancient Egyptian history. We will see now how this fact is reflected on their tomb inscription through the following examples:

- The first example is a colored scene for net fishing and fowling from the tomb of Antefoqer, Vizier during the reign of Kings Amenemhat I and Senusret I of the 12th Dynasty, 1991-1926 BC shown in Fig.6.^[35] The scene depicts one of the main day-life activities in the ancient Egyptian society: fishing and fowling. It presents ten fish men busy in pulling a giant net full of different types of fish and birds. The men are divided into two groups (five per group). Each group pulling from one side of the net using a long rope. The scene registers one of the fishing and fowling techniques used in ancient Egypt.
- The second example is a wrestling scene in the tomb of Khety, Chancellor during the reign of King Amenemhat I of the 12th Dynasty, 1991-1962 BC shown in Fig.7.^[36] The scene presents ten wrestling positions authorizing the principles of this popular sport as practiced by the ancient Egyptians.

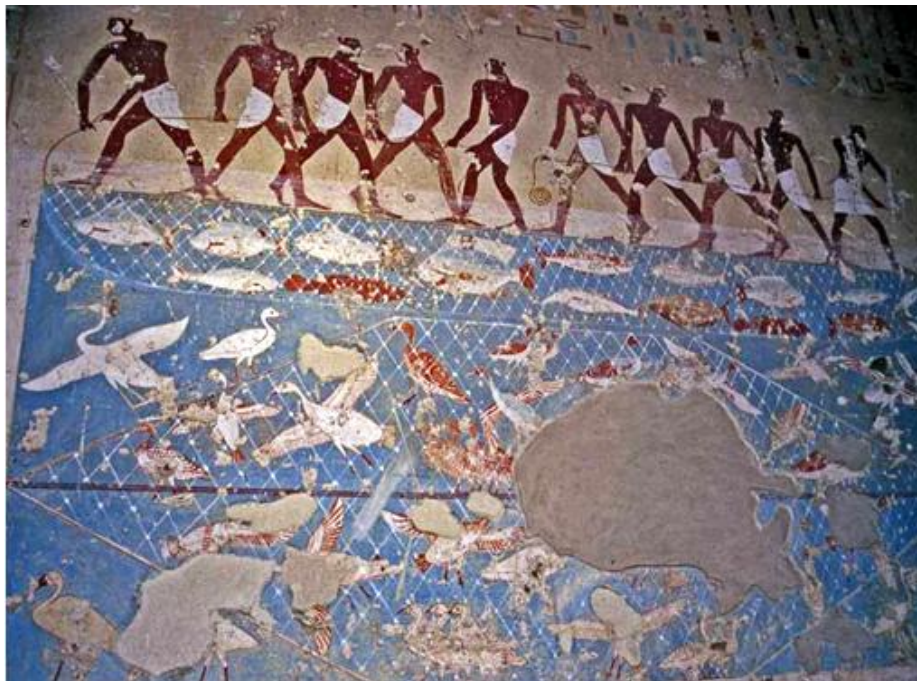


Fig. 6: Colored fishing scene from the tomb of Vizier Antefoqer.^[35]



Fig. 7: Colored wrestling scene from the tomb of Chancellor Khety.^[36]

- The third example is a colored scene in the tomb of Priest Amenemhat and his wife Hemet from the 12th Dynasty, 1976-1794 BC, in display in the Art Museum of Chicago and shown in Fig.8.^[37] The good produced scene of the Priest depicts the tomb owner and his wife praying and presenting an offering table and other offerings including vegetables and different types of vessels. The funerary matter was authorized by hieroglyphic inscriptions in the top part of the scene.
- The fourth example is a scene in the tomb of Sirenput I, Prince of Elephantine during the reign of Senusret I, the 2nd King of the 12th Dynasty, 1971-1929 BC shown in Fig.9.^[38] The scene depicts the Prince seated on a chair before an offering table and receiving a flower branch from a guest. Extensive register was authorized using a hieroglyphic text covering about 35 % of the scene area including two Royal Cartouches.
- The fifth example is a relief for King Senusret I of the 12th Dynasty, 1971-1926 BC in display in the Petrie Museum at London and shown in Fig.9.^[39] The relief depicts the King running while holding a long scepter in his right hand and a flail in his left hand and wearing the Red Crown of Lower Egypt. The matter was registered through two column of a hieroglyphic text one before the King and the other behind him..



Fig. 8: Colored offering scene from the tomb of Priest Amenemhat.^[37]



Fig.8: Colored scene from the tomb of Prince Sirenput^[38]



Fig.9: Relief of King Senusret I^[39].

- The sixth example is a colored wrestling scene in the tomb of Amenemhat, Governor of the 16th Nome of Upper Egypt during the reign of King Senusret I of the 12th Dynasty, 1971-1926 BK shown in Fig.10.^[40] The scene presents some of the wrestling techniques as practiced by the ancient Egyptians more than 3970 years. The sporting activity was authorized using a hieroglyphic text written within a bounded row above the wrestling youth.



Fig. 10: Colored wrestling scene from the tomb of Governor Amenemhat.^[40]

- The seventh example is a colored scene in the tomb of Khnumhotep II, Nomarch of the 16th Nome of Upper Egypt during the Kings Amenemhat II and Senusret II of the 12th Dynasty, 1929-1878 BC shown in Fig.11.^[41] The scene presents the arrival of a Hyksos procession to Egypt in a visit gifts to the higher authority of the state. The scene depicts the Chief of the Tribes walking in front of the procession. It depicts the glory and strength of the state during this period. The matter is inscribed in an unbounded column of a hieroglyphic text.

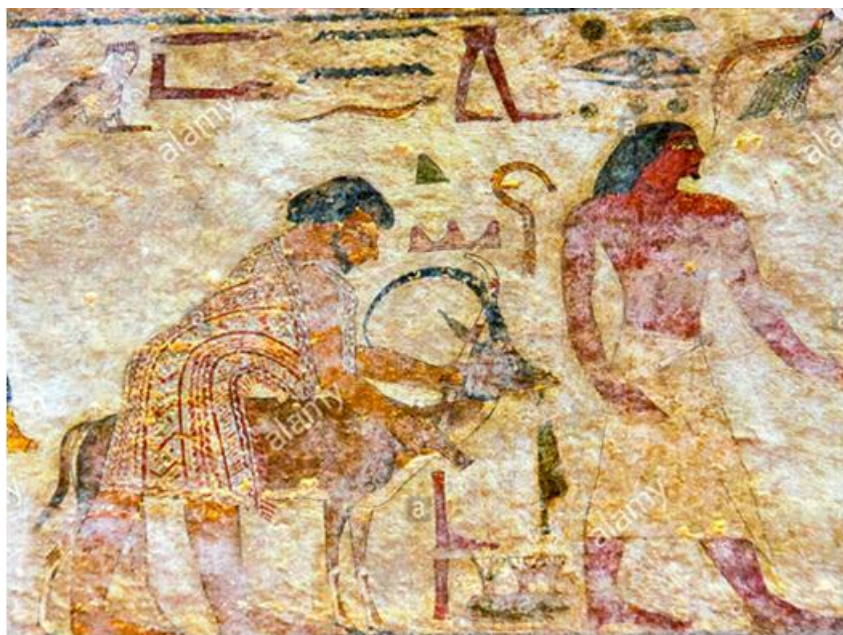


Fig.11: Colored scene from the tomb of Nomarch Khnumhotep II^[41]

- The eighth example is a colored statue transportation scene from the tomb of Djehutihotep, Nomarch of the 15th Nome of Upper Egypt during the reign of Amenhotep II, 3rd King of the 12th Dynasty, 1929-1897 BC shown in Fig.12.^[42] The scene depicts the genius ideas applied by the ancient Egyptians to overcome difficult civil engineering

problems. They applied high-level management techniques to transmit a colossal statue of the tomb owner.^[14]

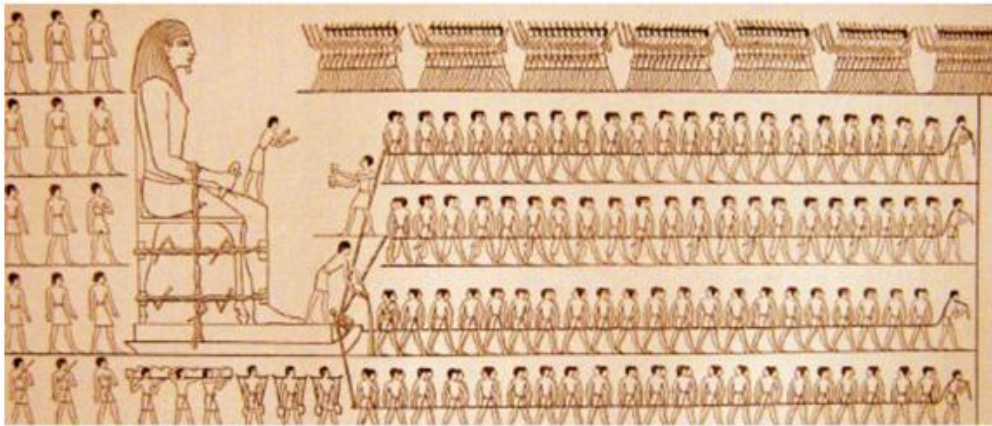


Fig. 12: Colored statue-transportation scene from the tomb of Nomarch Djehutihotep.^[42]

- The ninth example is a colored scene from the tomb of Knumhotep II, Nomarch of the 16th Nome of Upper Egypt during the reign of King Amenemhat II, 1929-1897 BC shown in Fig.13.^[43] The scene depicts two activities. The one in the top presents a labor irrigating a flower vase with two overseers behind him. The bottom register presents three labors working in (probably) papyrus production with one overseer supervising their work and holding a papyrus sheet in his left hand and a band of papyrus plant in his right hand. The activities are authorized by hieroglyphic text inscribed in bounded columns and in U-shaped unbounded structure.



Fig. 13: Colored scene from the tomb of Nomarch Khnumhotep II.^[43]

- The tenth example is a colored scene from the tomb of Khnumhotep II Nomarch during the reign of King Senusret II of the 12th Dynasty, 1897-1878 BC shown in Fig.14.^[44] The scene depicts four women involved in the textile industry where one woman (may be) preparing the yarn for spinning, one woman spinning the yard, two women weaving the yarn using a horizontal loom and one woman supervising the work. The weaving process was documented using a hieroglyphic text written in unbounded columns.

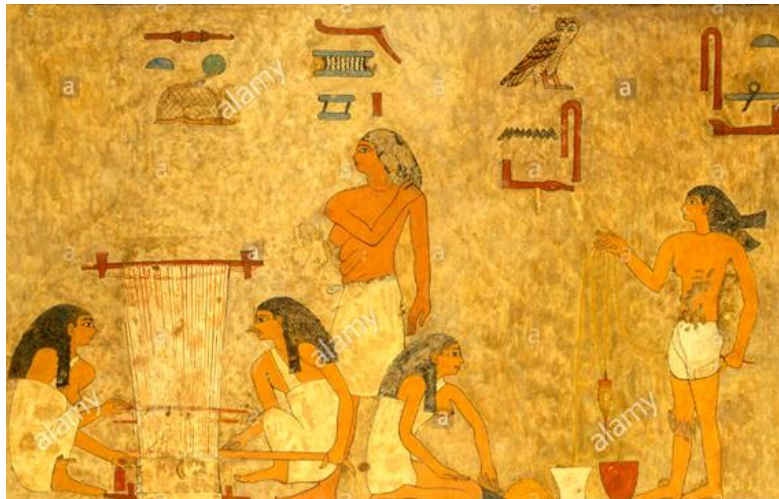


Fig. 14: Colored weaving scene from the tomb of Nomarch Khnumhotep II.^[44]

- The eleventh example is a colored fowling in the marshes scene from the tomb of Khnumhotep III Vizier during the reign of King Senusret III, the 5th King of the 12th Dynasty, 1897-1878 BC shown in Fig.15.^[45] The scene depicts the Vizier fowling in the marshes using a papyrus boat and accompanying his family with him. Hieroglyphic text inscribed in four bounded columns authorizes this matter. The importance of this scene is great since it presents the history of fowling in the marshes in ancient Egypt. This sport was extensively registered during the New Kingdom but with wonderful colors than that originated here during the 12th Dynasty.
- The twelfth example is a line diagram of a fowling in the marshes scene from the tomb of Djehutihotep II Nomarch during the reign of King Senusret III of the 12th Dynasty, 1897-1878 BC shown in Fig.16.^[46] The scene depicts the Vizier fowling in the marshes using a papyrus boat and accompanying his family with him. Hieroglyphic text inscribed in eleven bounded columns authorizes this matter and set the origination of this type of sport in ancient Egypt with that in Fig.15.



Fig. 15: Colored fowling scene from the tomb of Vizier Khnumhotep III.^[45]

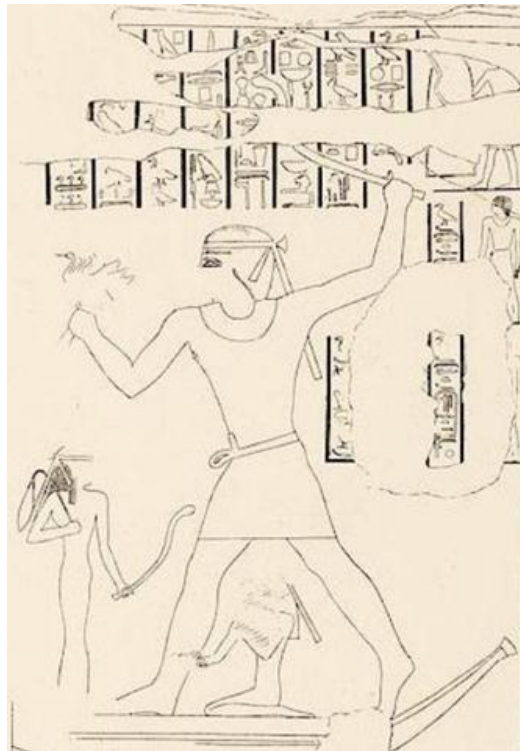


Fig. 16: Fowling scene from the tomb of Nomarch Djehutihotep II.^[46]

CONCLUSION

- This paper investigated the evolution of mechanical engineering in ancient Egypt through the study of tomb inscription during the 11th and 12th Dynasties.
- Wonderful reliefs were inscribed during the 11th Dynasty for Queen Neferu II in her tomb at Deir el-Bahri.

- The ancient Egyptians paid great attention to the textile industry. They recorded the spinning and weaving stages of this important industry in the tomb of Governor Baqet III from the 11th Dynasty and in the tomb of Nomarch Khnumhotep II from the 12th Dynasty.
- Wrestling was a popular sport during the Middle Kingdom. They registered some of its activities in colored scenes in the tombs of Baqet III from the 11th Dynasty, tomb of Chancellor Khety from the 12th Dynasty and tomb of Governor Amenemhat from the 12th Dynasty.
- They recorded the ceremony of '*offering table*' in the tombs of Nobles of the Middle Kingdom such as the tomb of Vizier Dagi from the 11th Dynasty, tomb of Priest Amenemhat from the 12th Dynasty and tomb of Prince Sirenput from the 12th Dynasty.
- They were keen to register some of their daily life activities through tomb inscription such as:
 - Net fishing and fowling in the tomb of Vizier Antifoqer from the 12th Dynasty.
 - Fowling scenes in the tomb of Vizier Khnumhotep III and Nomarch Djehutihotep II from the 12th Dynasty.
- Some very special activities were also inscribed in the Noble tombs of the Middle Kingdom such as:
 - Receiving foreign delegates in the tomb of Khnumhotep II of the 12th Dynasty.
 - Transportation of a colossal statue of Nomarch Djehutihotep from the 12th Dynasty.
 - Unique funerary relief for King Senusret I of the 12th Dynasty running and holding scepter and flail symbols by his hands and wearing the Red Crown of Lower Egypt.
- All the reliefs and scenes were supported by hieroglyphic texts authorizing the activities and personnel involved.

REFERENCES

1. Wild, J.P. (Editor) "Archaeological textiles newsletter", Number 41, Autumn, 2005.
2. Miniaci, G. and Quirke, S. "Reconceiving the tomb in the Late Middle Kingdom. The burial of the Accountant of the Main Enclosure Neferhotep at Deir Abu al-Naga ", BIFAO, 2009; 109: 339-383.
3. Kamrin, J. "The Aamu of Shu in the tomb of Khenomhotep II at Bani Hassan", Journal of Ancient Egyptian Interconnections, 2009; 1(3): 22-36.
4. Arnold, D. "Middle Kingdom tomb architecture at Lisht", Journal of the Society of Architectural Historians, 2010; 69(3): 440-441.

5. Grajetzki, W. "Tomb 197 at Abydos, further evidence for long distance trade in the Middle Kingdom", *Agypten und Levante*, 2014; 24: 59-170.
6. Hassaan, G. A. "Mechanical engineering in ancient Egypt, Part XIX: Textile industry" , *International Journal of Advanced Research in Management, Architecture, Technology and Engineering*, 2016; 2(12): 11-20.
7. Hassaan, G. A. "Mechanical engineering in ancient Egypt, Part XXII: Women clothing (Predynastic to Middle Kingdom)", *International Journal of Recent Innovation in Engineering and Research*, 2016; 1(4): 1-12.
8. Hassaan, G. A. "Mechanical engineering in ancient Egypt, Part XXIII: Women clothing in the 18th Dynasty", *World Journal of Engineering Research and Technology*, 2016; 2(5): 29-43.
9. Hassaan, G. A. "Mechanical engineering in ancient Egypt, Part XXIV: Women clothing in the 19th and 20th Dynasties", *International Journal of Advanced Research in Management, Architecture, Technology and Engineering*, 2016; 2(8): 77-84.
10. Hassaan, G. A. "Mechanical engineering in ancient Egypt, Part XX: Men clothing (Early Dynastic to Middle Kingdom)", *World Journal of Engineering Research and Technology*, 2016; 2(5): 1-17.
11. Hassaan, G. A. "Mechanical engineering in ancient Egypt, Part XX: Men clothing (New Kingdom to Late Period)", *International Journal of Engineering and Techniques*, 2016; 2(4): 36-45.
12. Novakova, V. "The household of an Egyptian dignitary-the case of Ptahshepses", *PES*, 2017; 19: 95-109.
13. Darlow, S. "A chronological investigation of the Middle Kingdom tombs at Meir", Ph. D. Thesis, Faculty of Arts, Macquarie University, 2017.
14. Hassaan, G. A. "Mechanical engineering in ancient Egypt, Part 89: Management of a colossal statue transportation project", *World Journal of Engineering Research and Technology*, 2020; 6(4): 38-48.
15. Wikipedia, "Eleventh Dynasty of Egypt", https://en.wikipedia.org/wiki/Eleventh_Dynasty_of_Egypt#:~:text=The%20Eleventh%20Dynasty%20of%20ancient,p art%20of%20the%20Middle%20Kingdom., 2020.
16. Wikipedia "El-Tarif", <http://en.wikipedia.org/wiki/El-Tarif>, 2020.
17. Osiris Net, "Tombs of Nobles at Luxor (Thebes)", https://www.osirisnet.net/tombes/nobles/e_nobles.htm.

18. Wikipedia "Eleventh Dynasty of Egypt", https://en.wikipedia.org/wiki/Eleventh_Dynasty_of_Egypt#:~:text=The%20Eleventh%20Dynasty%20of%20ancient,part%20of%20the%20Middle%20Kingdom., 2020.
19. Egypt Gate "Tombs of Bani Hassan", <https://egypt.eggate.com/index.php/destinations/sites/tombs-bani-hassan>, 2019.
20. Theban Project "The Middle Kingdom Theban Project", <https://thebanproject.com/en/>, 2020.
21. Brooklyn Museum, "Sunk relief of Queen Neferu", <https://www.brooklynmuseum.org/opencollection/objects/3599>.
22. Egypt Sites "Beni Hasan", <https://egyptsites.wordpress.com/2009/02/14/beni-hasan/>, 2009.
23. Wikipedia "Baquet III", https://en.wikipedia.org/wiki/Baquet_III, 2020.
24. Arts Summary "Ancient Egypt transformed: The Middle Kingdom at the Metropolitan Museum of Art", <https://artssummary.com/2015/10/25/ancient-egypt-transformed-the-middle-kingdom-at-the-metropolitan-museum-of-art-october-12-2015-january-24-2016/>, 2015.
25. Metropolitan Museum "Relief depicting an offering table and part of inscription", <https://www.metmuseum.org/art/collection/search/100000197?rpp=20&pg=14&ft=Egypt+tomb&pos=280>, 2020.
26. Wikipedia "Twelfth Dynasty of Egypt", http://en.wikipedia.org/wiki/Twelfth_Dynasty_of_Egypt, 2020.
27. Brunton, G. "Lahun I: The treasure", Bernard Quaritch, London, 1920.
28. Wikipedia "Lisht", <https://en.wikipedia.org/wiki/Lisht>, 2020.
29. Wikipedia "Dahshur", <https://en.wikipedia.org/wiki/Dahshur>, 2020.
30. Wikipedia "Abydos, Egypt", https://en.wikipedia.org/wiki/Abydos_Egypt, 2020.
31. Wikipedia "TT 60", <https://en.wikipedia.org/wiki/TT60>, 2020.
32. Wikipedia "Beni Hasan", https://en.wikipedia.org/wiki/Beni_Hasan, 2020.
33. Egypt Sites, "Deir el-Bersha", <https://egyptsites.wordpress.com/2009/02/14/deir-el-bersha/#:~:text=The%20most%20famous%20and%20most,Overlord%20of%20the%20Hare%20Province'.>, 2009.
34. Nomad for Now, "Tombs of Meir", <https://nomad4now.com/articles-egypt/tombs-of-meir/>.
35. Osiris Net, "TT60- Antefoqer and Senet", https://www.osirisnet.net/tombes/nobles/antefoqer/e_antefoqer_01.htm.

36. Wrestlings Best, "Amateur wrestling works of art gallery", <http://www.wrestlingsbest.com/gifs/wrespictart01.html>.
37. Commons Wikimedia "Wall fragment from the tomb of Amenemhat and his wife Hemet", https://commons.wikimedia.org/wiki/File:Egyptian_-_Wall_Fragment_from_the_Tomb_of_Amenemhet_and_His_Wife_Hemet_-_Google_Art_Project.jpg, 2018.
38. Ancient Egypt Info, "Tomb of Sirenput I", <http://www.ancient-egypt.info/2013/10/tombs-of-middle-kingdom-c-1980-1920-bc.html>.
39. Sultan, A., "Egypt's Middle Kingdom: The real and the ideal", <http://altoonsultan.blogspot.com/2015/11/at-met-egypts-middle-kingdom-real-and.html>
40. QC Images Search, "Necropolis Beni Hasan: Tomb of Amenemhat", <https://qc.images.search.yahoo.com/images/view>.
41. Alamy, "Beni Hasan, the tomb of Khnumhotep II" <https://www.alamy.com/middle-egypt-beni-hasan-the-tomb-of-khnumhotep-ii-dates-from-the-middle-kingdom-and-contains-the-famous-scene-called-arrival-of-the-hyksos-image337911179.html>.
42. Science News (2014), "Ancient Egyptians transported large objects over wet sand", <http://www.sci-news.com/physics/science-ancient-egyptians-wet-sand-01894.html>
43. Alamy, "Beni Hasan: The tomb of Khnumhotep II dates from the Middle Kingdom", <https://www.alamy.com/middle-egypt-beni-hasan-the-tomb-of-khnumhotep-ii-dates-from-the-middle-kingdom-religious-rites-image337911408.html>.
44. Alamy, "Weavers as depicted on the walls of the tomb of Khnumhotep", <https://www.alamy.com/egyptian-tomb-scene-illustration-this-scene-shows-weavers-as-depicted-on-the-walls-of-the-tomb-of-khnumhotep-it-dates-from-the-middle-kingdom-dyn-image335301814.html>.
45. Kunst Fuer Alle, "Wild fowling in the marshes from tomb of Khnumhotep III", <https://www.kunst-fuer-alle.de/english/fine-art/artist/image/unbekannt/6454/1/66596/wildfowling-in-the-marshes-detail-from-a-wall-painting-in-the-tomb-of-khnumhotep-iii-egyptian-old-to-middle-kingdom-c-1900-b/index.htm>.
46. Wikipedia Ar., "Djehutihotep II", https://ar.wikipedia.org/wiki/%D9%85%D9%84%D9%81:Djehutihotep_II.jpg.