



## MECHANICAL ENGINEERING IN ANCIENT EGYPT, PART 41: STATUES OF GAZELLE, BABOON AND HEDGEHOG

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### ABSTRACT

This is the 41<sup>st</sup> research paper exploring the evolution of Mechanical Engineering in Ancient Egypt. The paper investigates the production of gazelle, baboon and hedgehog statues in ancient Egypt during the Predynastic and Dynastic Periods. The design of gazelle, baboon and hedgehog statues, the used materials, date and present location are investigated. The analysis outlined the degree of sophistication of the used mechanical technology producing amazing statues using different

materials available in the ancient Egyptian society.

**KEYWORDS:** History of mechanical engineering, ancient Egypt, gazelle, baboon and hedgehog statues, Predynastic and Dynastic Periods.

### INTRODUCTION

This is the 42<sup>nd</sup> research paper in a series aiming at exploring the evolution of mechanical engineering in ancient Egypt through the different activities of their wonderful civilization. The ancient Egyptians created a wonderful industry for statues of different sizes using different materials for human beings, animals and birds.

Smith, 1960 in his book about ancient Egypt as represented in the Museum of Fine Arts at Boston presented an Amration pottery hippopotamus, a faience hippopotamus.<sup>[1]</sup> Arnold , 1995 in his study on Egyptian bestiary presented a gazelle statue from the 18<sup>th</sup> Dynasty, a three deken weight in the shape of a gazelle from the 18<sup>th</sup> Dynasty, a jackal head from the

Late Period and a hippopotamus statue from Middle Kingdom.<sup>[2]</sup> Stanley, 2008 in his study about snakes stated that the ancient Egyptians had many representations of snakes in their religious manifestations.<sup>[3]</sup> Strandberg (2009) in her Ph. D. Thesis investigated the image and meaning of the gazelle in ancient Egypt art. She presented a gazelle statue from the 18<sup>th</sup> Dynasty standing on a wooden base representing a desert ground.<sup>[4]</sup> Hunt, 2012 presented a description of the tilebia fish from the New Kingdom in display in the British Museum. It is a cosmetic bottle in the shape of a fish from the Amarna Period during the reign of Pharaoh Akhenaten. He clarified that this piece is one of the most striking pieces within the British Museum collection of iconic glass objects created by high technology.<sup>[5]</sup> Wing, 2015 in his Master Thesis in Archaeology presented a number of figurines from the Predynastic era of ancient Egypt including a gazelle knife handle from Naqada II.<sup>[6]</sup>

Reemes, 2015 in her Ph.D. Thesis about the Egyptian ouroboros presented a number of statues, figurines and applications including the right jamb of a doorway in the Djoser funerary complex at Saqqara showing a guardian snake, a miniature limestone 108 mm game-board from the Predynastic Period, a 52 mm diameter lapis lazuli amulet in the form of a coiled snake from the Predynastic Period and a 380 mm alabaster game-board from the Old Kingdom in the shape of a coiled snake.<sup>[7]</sup> Tour Egypt, 2017 wrote an article about glass industry in ancient Egypt and said that the first glass of Egypt returns to the Neolithic Badarian Culture. Among the glass products they presented was the glass bottle in the shape of a 145 mm fish from the 18<sup>th</sup> Dynasty from El-Amarna.<sup>[8]</sup> Wikipedia, 2017 wrote an article about the ancient Egyptian deities. They presenting a statue for a setting baboon from Late Predynastic.<sup>[9]</sup> Hassaan (2017) investigated the evolution of mechanical engineering in ancient Egypt through his study of the statues production of the cats, dogs and lions animals in ancient Egypt<sup>[10]</sup> and statues of jackals, hippopotami and crocodiles.<sup>[11]</sup> He covered a time span from 4400 to 30 BC.

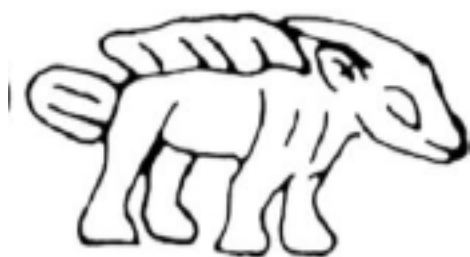
### **Gazelle Statues**

The gazelle lived in Egypt and the ancient Egyptians authorized its existence through a number of activities including the statues production as will be illustrated through the following presentations from the Predynastic and New Kingdom Periods:

- The first example of gazelle statues and figurines is an ivory knife handle from Naqada II of the Egyptian Predynastic Period (3500-3200 BC) from Abu Zaidan in display in the Brooklyn Museum of Art at NY. There are large number of animals carved on the handle.

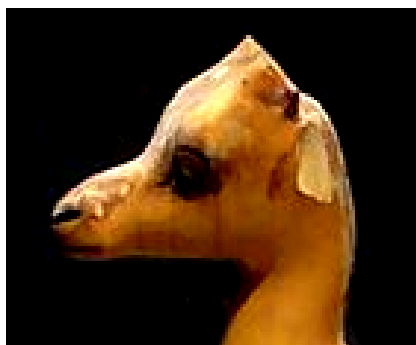
Among those animals is the gazelle shown in Fig.1.<sup>[12]</sup> This authorizes the existence of gazelle in Egypt from more than 5200 years.

- The second example is a calcite gazelle from the Eastern Nile Delta during the Predynastic Period which is an artifact in the State Collection of Egyptian Art at Germany and shown in Fig.2.<sup>[13]</sup> This is a complete statue for the gazelle in a setting position and turning its head to its right. Its body is decorated by engraved patterns and the eyes are marked as shown in the zoomed image of the head and the ears are perforated.



**Fig. 1: Knife handle from Naqada II.**<sup>[12]</sup> **Fig. 2: Calcite gazelle from Naqada II.**<sup>[13]</sup>

- The third example is an ivory gazelle on a wooden base from Thebes during the 18<sup>th</sup> Dynasty (1543-1292 BC) in display in the Metropolitan Museum of Art at NY and shown in Fig.3.<sup>[14]</sup> The designer showed the gazelle striding on a base simulating the desert with some plants painted on it. The eyes, nose and hooves are marked in black.
- The fourth example is a three deben bronze-balance-weight in the shape of a gazelle from the reign of Pharaoh Amenhotep III (1388-1350 BC), the 9<sup>th</sup> Pharaoh of the 18<sup>th</sup> Dynasty in display in the Metropolitan Museum of Art and shown in Fig.4.<sup>[15]</sup> The gazelle was casted in a very smooth mold to produce a smooth weight with filleted surfaces not to harm the used (very high level casting technology and outstanding mechanical engineering thinking and design application since more than 3300 years ago).



**Fig. 3: Ivory gazelle statue from 18<sup>th</sup> Dynasty.**<sup>[14]</sup>



**Fig. 4: Bronze gazelle weight from 18<sup>th</sup> Dynasty.<sup>[15]</sup>**

### Baboon Statues

The ancient Egyptians had a great love and respect for baboons and authorized their existence among them through many ways including baboon-statues since the first Dynasty down to the Late Period as will be illustrated in the following presentations:

- The first example is an alabaster statue for a baboon from the 1<sup>st</sup> Dynasty, reign of King Narmer (3100 BC) in display in the Altes Museum at Berlin and shown in Fig.5.<sup>[16]</sup> The 5100 years old designer showed the baboon setting and putting his both hands between his legs. The material nor dimensions are not assigned.
- The second example is an alabaster vessel in the shape of a monkey from the 6<sup>th</sup> Dynasty of the Old Kingdom during the reign of King Pepi I (2331-2287 BC) having a height 137 mm and in display in the Metropolitan Museum of Art and shown in Fig.6.<sup>[17]</sup> The monkey is inscribed on its left hand and the vessel has its inlet in the head of the monkey while holding its baby using both hands and the baby surrounding his mother by both hands. Very intimate position of the monkey and his baby. This is an example on the generosity of the ancient Egyptian mechanical designers.



**Fig. 5: Baboon statue from the 1<sup>st</sup> Dynasty.<sup>[16]</sup>**



**Fig. 6: Monkey shaped vessel from the 6<sup>th</sup> Dynasty.<sup>[17]</sup>**

- The third example is a 60 mm blue faience baboon amulet from the 18<sup>th</sup> Dynasty (1570-1298 BC) displayed as an item in the Lord Kitchener's collection and shown in Fig.7.<sup>[18]</sup> The baboon in this small dimension was shown playing music.



**Fig. 7: Faience baboon amulet from the 18<sup>th</sup> Dynasty.<sup>[18]</sup>**



**Fig. 8: Faience vessel-monkey from the 18<sup>th</sup> Dynasty.<sup>[17]</sup>**

The opening of the vessel is from its top and the designer showed the monkey setting and putting his right hand on its right knee and eating using its left hand.

- The fifth example is a 153 mm alabaster baboon-headed stopper for a canopic jar from the 19<sup>th</sup> Dynasty, sold in a sale for 11,128 US\$ and shown in Fig.9.<sup>[19]</sup> The design of the stopper is perfect as the monkey head is ideal in holding the stopper and setting it easily of the jar plus it is heavy enough to preserve what is inside the canopic jar.
- The sixth example is a seated monkey amulet from the 19<sup>th</sup> Dynasty shown in Fig.10.<sup>[20]</sup> Most of the data about the artifact is missing such as material, dimensions, location, etc. This may be because of the criminal robbery operations inside Egypt. The designer showed the monkey setting and putting its right hand on its face.



**Fig. 9: Alabaster baboon stopper from the 19<sup>th</sup> Dynasty.<sup>[19]</sup>**



**Fig. 10: Amulet-monkey from the 19<sup>th</sup> Dynasty.<sup>[20]</sup>**

- The seventh example is a black granite seated baboon manufactured during the reign of Pharaoh Ramses II, the 3<sup>rd</sup> Pharaoh of the 19<sup>th</sup> Dynasty (1297-1213 BC) in display in the Manchester Museum at UK and shown in Fig.11.<sup>[21]</sup> The designer showed the baboon having a white hair on its head and shoulders. Thus, the baboon has two distinct colors, black and white. The black color is due to using the black granite. But, what is about the white color ? Is it a paint ?.. Is it another layer using different rock such as an alabaster ?.. The archaeologists have to give an answer ?..
- The eighth example is a 40 mm turquoise glazed cosmetic pot model with monkey acting as a hand from the Third Intermediate Period (1550-702 BC) sold in a sale in 1 May 2013 at London for 3894 US\$ and shown in Fig.12.<sup>[22]</sup> Here is an innovative idea from the mechanical engineering designer to make the pot handle as a monkey. This is not an easy engineering problem since this may create an unbalance problem and the put may fall down.



**Fig. 11: Granite baboon from the 19<sup>th</sup> Dynasty.**<sup>[21]</sup>



**Fig. 12: Turquoise glazed cosmetic pot from 3<sup>rd</sup> Intermediate Period.**<sup>[22]</sup>

- The ninth example is a green faience baboon-amulet of 48 mm height from the Late Period presented in a saleroom in 19<sup>th</sup> November 2014 with a starting price of 400 US\$ and shown in Fig.13.<sup>[23]</sup> The designer showed the baboon setting and putting both hands on its knees. High level integrated decorations are practiced in this amulet as depicted in the zoomed image of Fig.13.
- The tenth example is a 79.4 mm green faience figurine of a baboon from the Late Period (664-525 BC) sold in a December 2002 sale for 107,550 US\$ and shown in Fig.14.<sup>[24]</sup> It has a similar style of the baboon in Fig.13 but with less decorations and depicting a different baboon type.

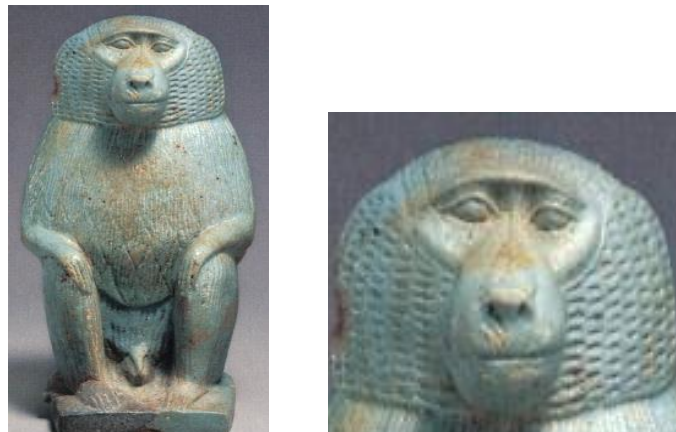


**Fig. 13: Faience baboon-amulet from the Late Period.**<sup>[23]</sup>



**Fig. 14: Faience baboon from the Late Period.**<sup>[24]</sup>

- The eleventh and last example is an 88 mm faience baboon from the 26<sup>th</sup> Dynasty (664-525 BC) in display in the Metropolitan Museum of Art and shown in Fig.15.<sup>[25]</sup> This is another wonderful piece produced from faience illustrating the capability of the ancient Egyptian mechanical engineer to use the available cheap raw material to produce items with high accuracy and with high level of decorations as depicted in the zoomed image of Fig.14.



**Fig. 14: Faience baboon from the 26<sup>th</sup> Dynasty.**<sup>[25]</sup>

### Hedgehog Statues

The ancient Egyptians appreciated the hedgehog animal and used it as a symbol of rebirth.<sup>[26]</sup> Examples of their production of statues and applications for the hedgehog appeared in the 12<sup>th</sup> Dynasty of the Middle Kingdom and continued down to the Late Period. Here are some of the examples:

- The first example is a pottery vessel in the shape of a hedgehog from Abydos during the 12<sup>th</sup> Dynasty (1908-1896 BC) in display in the Ashmolean Museum at Oxford and shown in Fig.15.<sup>[27]</sup> The designer designed the vessel taking the shape of a standing hedgehog

with a small diameter mouth and a decorated body by a plant branch. It has a perfectly spherical body, a conical nose and circular eyes marked in black.

- The second example is a blue porcelain hedgehog from the 12<sup>th</sup> Dynasty (1991-1802 BC) in display in the Egyptian Museum at Berlin and shown in Fig.16.<sup>[28]</sup> The designer showed the hedgehog standing and having two blue-color levels for his skin, head and legs. He succeeded to simulate its irregular skin through the too many spines on its back and show its ears.



**Fig.15: Hedgehog vessel from the 12<sup>th</sup> Dynasty.**<sup>[27]</sup>



**Fig. 16: Porcelain hedgehog from the 12<sup>th</sup> Dynasty.**<sup>[28]</sup>

- The third example is a hedgehog statue from the Late 12<sup>th</sup> Dynasty – Early 13<sup>th</sup> Dynasty (1938-1700 BC) in display in the Brooklyn Museum and shown in Fig.17.<sup>[29]</sup> The material nor the dimensions did not register. It seems that it may be produced from faience or porcelain. The design is similar to that in Fig.16 except the colors in Fig.16 is much better and the intensity of the spines in the design in Fig.17 is less than that in Fig.16. This model was shown standing on an ovoid base and the eyes were marked in black.
- The fourth example is a blue faience hedgehog from Abydos during the 18<sup>th</sup> Dynasty (1567-1320 BC) shown in Fig.18.<sup>[30]</sup> This design is similar to that in Fig.16 with some differences in the skin and head.



**Fig.17 Hedgehog from the 12<sup>th</sup>/13<sup>th</sup> Dynasties**<sup>[29]</sup>.



**Fig.18 Blue faience hedgehog from the 18<sup>th</sup> Dynasty**<sup>[30]</sup>.



- The fifth example is a hedgehog from the reign of Amenhotep III, the 9<sup>th</sup> Pharaoh of the 18<sup>th</sup> Dynasty (1391-1353 BC) in display in the Cleveland Museum of Art at Cleveland and shown in Fig.19.<sup>[31]</sup> The designer designed this professionally produced unit using two levels of the brown color of unquoted material. He showed the hedgehog standing on a base and eating. He didn't use any colors for the spines or the eyes.
- The sixth example is a 25.4 mm hedgehog for Seti I, the 2<sup>nd</sup> Pharaoh of the 19<sup>th</sup> Dynasty (1290-1279 BC) . It was in loan to the Michael Carlos Museum of the Emory University from 2005-2015 and shown in Fig.20.<sup>[32]</sup> The designer showed it setting on a ovoid base and eating. The quality is not as good as that of the 18<sup>th</sup> Dynasty shown in Fig.19.



**Fig. 19: Hedgehog from the 18<sup>th</sup> Dynasty.**<sup>[31]</sup>



**Fig. 20: Hedgehog for Seti I from the 19<sup>th</sup> Dynasty.**<sup>[32]</sup>

- The seventh example is a 16 mm faience amulet with the shape of a hedgehog from the Late Period (664-332 BC) in display in the Metropolitan Museum of Art and shown in Fig.21.<sup>[33]</sup> The designer designed the amulet as a jar taking the shape of a hedgehog with small rimmed-opening and a handle. He showed the hedgehog setting on an ovoid base, simulated its back with different patterns and showed its eyes in black. This is a high technology model of the faience products in the Late Period.
- The eighth and last example is a faience amulet in the shape of a hedgehog in display in the Metropolitan Museum of Art and shown in Fig.22.<sup>[34]</sup> The designer showed the hedgehog setting on a U-shaped base and looking forward. I doubt that this is an amulet because simple no hole to hang it from. I think it is (may be) a figurine.



**Fig. 21: Faience hedgehog amulet from the Late Period.**<sup>[33]</sup>



**Fig. 22: Faience hedgehog amulet from the Late Period.**<sup>[34]</sup>

## CONCLUSION

- The production of gazelle, baboon and hedgehog statues and figurines in ancient Egypt was investigated.
- The ancient Egyptians registered gazelle since the time of Naqada II of the Predynastic Period.
- They designed and produced calcite gazelle since Naqada II.
- They designed ivory and bronze gazelle statues during the 18<sup>th</sup> Dynasty of the New Kingdom.
- They designed a balance weight in the 18<sup>th</sup> Dynasty in the shape of a gazelle taking outstanding design precautions.
- They represented baboons in statues form since the 1<sup>st</sup> Dynasty down to the Late Period.
- They produced an alabaster baboon during the reign of King Narmer of the 1<sup>st</sup> Dynasty.
- They produced an alabaster jar taking the shape of a baboon in the 6<sup>th</sup> Dynasty of the Old Kingdom.
- They produced faience amulets in the shape of a baboon and monkey-shaped vessel during the 18<sup>th</sup> Dynasty.
- In the 19<sup>th</sup> Dynasty of the New Kingdom they designed an alabaster baboon-headed stopper for canopic jars.
- Baboon-shaped amulets continued to appear in the 19<sup>th</sup> Dynasty.
- They used black granite in the 19<sup>th</sup> Dynasty to produce baboon statue during the reign of Pharaoh Ramses II.
- During the Third Intermediate Period, they used the baboon as a handle for a turquoise-glazed pot.

- Faience figurines and amulets of baboon shape continued to appear during the Late Period.
- Models of hedgehog statues appeared starting from the 12<sup>th</sup> Dynasty of the Middle Kingdom and continued down to the Late Period.
- They produced wonderful applications simulating the hedgehog such as pottery vessel and faience amulets.
- Outstanding designs of hedgehog statues appeared in the 18<sup>th</sup> Dynasty and the Late Period.

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