

**MECHANICAL ENGINEERING IN ANCIENT EGYPT, PART 47:**  
**STATUETTES OF SCARABS**

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### **ABSTRACT**

This is the 47<sup>th</sup> research paper exploring the evolution of Mechanical Engineering in Ancient Egypt. The paper investigates the production of scarab statuettes in ancient Egypt during the Predynastic and Dynastic Periods. The design of scarab statuettes, the used materials, date and present location are investigated. The analysis outlined the degree of sophistication of the used mechanical technology producing amazing scarab statuettes and applications using different materials available in

the ancient Egyptian society.

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

### **INTRODUCTION**

This is the 47<sup>th</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 had a great appreciation for the scarab insect and depicted this appreciation in various means including statuettes.

Myer, 1894 in his book about scarabs stated that the ancient Egyptians used scarab models as symbol of a new-birth and the future inscriptions related to different periods. He outlined that the oldest scarab model carried the name of King Nrb Ka from the 3<sup>rd</sup> Dynasty made of pottery and glazed a pale green.<sup>[1]</sup> Hall, 1913 in his catalogue of Egyptian scarabs in the

British Museum presented in its first volume 2891 Royal Egyptian scarabs, cylinder-seals, sela-amulets on which the names of Kings were carved from 1<sup>st</sup> Dynasty to the End of the Ptolemies. He announced that the collection of the Royal scarabs was only one fifth of the the scarab collection in the British Museum.<sup>[2]</sup> Wassell, 1991 in her Ph. D. Thesis presented a complete chapter about insects in ancient Egypt. She analyzed the existence in ancient Egypt including scarabeus with detailed presentation of its use and presence in ancient Egyptian texts.<sup>[3]</sup> Arnold, 1995 in her paper about the Egyptian bestiary presented some insects from Egypt including glazed steatite scarabs from the 12<sup>th</sup>-13<sup>th</sup> Dynasties.<sup>[4]</sup> Cooney and Tyrrell, 2005 in their research paper about scarabs in the Los Angeles Country Museum of Art (Part I) studied 79 unprovenanced scarabs and scaraboid amulets in the Museum. They presented 48 colored photos for scarabs and scarab-amulets with their number in the Museum Catalogue.<sup>[5]</sup> King, 2009 in his Ph. D. Thesis presented a useful brief review of insect morphology including mouth parts, types of antennae, wing modifications and abdomen.<sup>[6]</sup>

Sparavigna, 2011 in her article about ancient Egyptian seals and scarabs studied the types of scarabs, religious background, historical importance of scarabs, arts in scarabs, Hyksos scarabs and scarabs and symmetries. She outlined that the scarab seal in ancient Egypt was not only impression seal, but also an amulet with protecting images and symbols. She presented the use of the scarab in signet-rings and as heart-scarabs without any inscription or ornament.<sup>[7]</sup> Bendick, 2014 in his Degree of Bachelor of Art Thesis about ancient Egyptian oculus outlined that the excavations of J. Garstang in 1899 revealed amulets including scarab amulets. He presented the photos of some amulets from the cemeteries of Abysos.<sup>[8]</sup> Wikipedia, 2016 wrote an article about scarabaeus and outlined that the scarab was a popular form of amulets in ancient Egypt.<sup>[9]</sup>

### Predynastic Period

The mechanical technology emerged in the ancient Egyptian society since the Predynastic Period in the form of wide range of wonderful products sustained for thousands of years. The scarab shaped application presented here is a 115 mm length diorite manual-crusher in the form of a scarab from the Naqada II – Naqada III Period (3300-3100 BC) in display in the Ashmolean Museum at Oxford and shown in Fig.1.<sup>[10]</sup> Even though diorite is one of the hardest stones, the carver could produce fully rounded surface according the Mechanical Design Technology of the ancient Egyptians. The scarab-shaped surface make it easy to hold

the crusher without harming the hand while the crushing surface is completely flat having an ovoid shape.



**Fig. 1: Hand-crusher from Naqada II-III.<sup>[10]</sup>**

### The 1<sup>st</sup> Dynasty

The available scarab model available is a 105 mm length limestone scarab belonging to Narmer, the first King of the 1<sup>st</sup> Dynasty in display by ebay Co, UK for sale and shown in Fig.2.<sup>[11]</sup> The back of the scarab was decorated by two carved necklaces with scorpion amulets and another scenes on the scarab head.



**Fig. 2: King Narmer scarab from 1<sup>st</sup> Dynasty.<sup>[11]</sup>**

### The Medium Kingdom

There are a number of scarab-based models from the 12<sup>th</sup> Dynasty of the Middle Kingdom (1991-1802 BC) manufactured from different materials as presented below:

- The first example is a scarab-ring manufactured from gold and inlaid by carnelian and lapis lazuli sold by Christies in a sale on 6<sup>th</sup> October 2011 at London for 85,140 US\$ and shown in Fig.3.<sup>[12]</sup> The swiveling bezel took the shape of a scarab with decorations in three colors corresponding to the use of gold, carnelian and lapis lazuli. Fig.3 shows two views of the ring illustrating the swiveling action about a revolute joint. This is one of the master pieces in the Mechanical Engineering Technology in ancient Egypt and as an Egyptian I wonder how the local Egyptian Authority allows such pieces to get out of Egypt through the international mafia of artifacts robbery.

- The second example is a winged scarab from the reign of Senusret II (the 4<sup>th</sup> King of the 12<sup>th</sup> Dynasty, 1887-1878 BC) manufactured from electrum inlaid with carnelian, feldspar and lapis lazuli in display in the British Museum and shown in Fig.4.<sup>[13]</sup> Again, this is a wonderful master piece indicating the high level of the Mechanical Technology in the jewellery industry during the 12<sup>th</sup> Dynasty. The designer showed the scarab spreading its wings and holding the sun disk over its head holding it using two of its legs and resting on a four colored frame using another two legs. The combination of the five colors is more than wonderful using at least four different materials.



**Fig. 3: Scarab-ring from 12<sup>th</sup> Dynasty.**<sup>[12]</sup>



**Fig. 4: Winged-scarab from 12<sup>th</sup> Dynasty.**<sup>[13]</sup>

### The Second Intermediate Period

The Second Intermediate Period comprised five dynasties from the 13<sup>th</sup> to the 17<sup>th</sup> Dynasties covering a time span from 1802 to 1550 BC.<sup>[14]</sup> We have a number of scarab models from this period presented as follows according to Dynasties:

- The first example is a scarab-seal for King Sheshi from the 13<sup>th</sup> Dynasty of the Second Intermediate Period at Lower Egypt in display in the Walters Art Museum at Baltimore and shown in Fig.5.<sup>[15]</sup>
- The second example is a seal-scarab of Wahibre Ibiau, an Egyptian King of the 13<sup>th</sup> Dynasty, who reigned ca. 1670 BC in display in Petrie Museum at London and shown in Fig.6.<sup>[16]</sup>



**Fig. 5: Scarab-seal from 13<sup>th</sup> Dynasty.**<sup>[15]</sup>



**Fig. 6: Scarab-seal from 13<sup>th</sup> Dynasty.**<sup>[16]</sup>

- The third example is a 12.7 mm length steatite seal scarab from the 14<sup>th</sup> – 15<sup>th</sup> Dynasties (1759-1539 BC) on-loan to the Michael Carlos Museum of the Emory University at Atlanta and shown in Fig.7.<sup>[17]</sup> The bottom of the seal is inscribed by a colored-winged-scarab carrying a sun-disk with two legs and one cobra from the left and right side of the disk.



**Fig. 7: Scarab-seal from 14<sup>th</sup>-15<sup>th</sup> Dynasties.**<sup>[17]</sup>

- The fourth example is a 20 mm length glazed steatite scarab amulet from the Second Intermediate Period, Hyksos Period (1648-1539 BC) in display in the Walters Art Museum and shown in Fig.8.<sup>[18]</sup> It is decorated on the whole circumference with S-shaped interfering patterns bounding a central cartouche.
- The fifth example is a 24 mm length steatite scarab seal from the 15<sup>th</sup> Dynasty (1650-1550 BC) in display in the Liverpool Museums, UK and shown in Fig.9.<sup>[19]</sup> It is inscribed by three scenes, a crocodile deity and two vases.



**Fig. 8: Scarab-amulet from 2<sup>nd</sup> IP.**<sup>[18]</sup>



**Fig. 9: Scarab-seal from 15<sup>th</sup> Dynasty.**<sup>[19]</sup>

- The sixth example is a scarab seal belonging to King Maibre Sheshi, the founder of the 15<sup>th</sup> Dynasty in display in the Walters Art Museum and shown in Fig.10.<sup>[20]</sup> The

inscriptions have limited characters and bounded by an ovoid. The designer used two levels of the brown color, pale and dark brown.

- The seventh example is a 125 mm length faience and steatite scarabs from the 16<sup>th</sup> Dynasty (1600 BC) gift of Mary Goodwin to the Beloit College in display in the Wright Museum and shown in Fig.11.<sup>[21]</sup> It is not clear if those scarabs are from the seal or heart type. The center scarab in Fig.11 is carved from steatite, while the other two are manufactured from faience.



**Fig.10: Scarab-seal from 15<sup>th</sup> Dynasty.**<sup>[20]</sup>



**Fig.11: Scarab from 16<sup>th</sup> Dynasty.**<sup>[21]</sup>

- The eighth example is a 38 mm green jasper heart scarab belonging to Sobekemsaf II, the third King of the 17<sup>th</sup> Dynasty (1590 BC) found at Qurna of Upper Egypt in display in the British Museum and shown in Fig.12.<sup>[22]</sup> The designer housed the jasper scarab in a golden decorated frame supported by a U-shaped golden base decorated by the legs of the scarab and inscribed on all the sides. All the surfaces are rounded following the ancient Egyptian design tradition of surface rounding not to harm the user.



**Fig.12: Heart scarab from 17<sup>th</sup> Dynasty.**<sup>[22]</sup>

### The New Kingdom

This is the most powerful and wealthy kingdom where it was distinguished in all aspects of mechanical engineering as depicted in the previous parts of this series. The evolution of

scarab models industry during this period will be illustrated through a good number of examples starting from the reign of Thutmose II (the 4<sup>th</sup> Pharaoh of the 18<sup>th</sup> Dynasty).

- The first example is a 66 mm length serpentine heart scarab necklace of Hatnefer, Wife of Ramose and mother of Nobel Senenmut, the High Official during the reign of Hatshepsut (the 5<sup>th</sup> Pharaoh of the 18<sup>th</sup> Dynasty) (1492-1473 BC) in display in the Metropolitan Museum of Art at NY and shown in Fig.13.<sup>[23]</sup> The scarab is a housed in a golden base and decorated by two golden bands. The heart scarab acts as a pendant forming the second part of the necklace.
- The second example is a 17 mm length glazed steatite Royal Scarab of Thutmose III, the 6<sup>th</sup> Pharaoh of the 18<sup>th</sup> Dynasty (1479-1425 BC) displayed by the Virtual Egyptian Museum and shown in Fig.14.<sup>[24]</sup> It is a seal scarab carrying information about the Pharaoh inscribed on its bottom flat surface.



**Fig.13: Heart scarab from 18<sup>th</sup> Dynasty.**<sup>[23]</sup>



**Fig.14: Royal Scarab from 18<sup>th</sup> Dynasty.**<sup>[24]</sup>

- The third example is a 15 mm diameter scarab finger ring from the reign of Thutmose III of the 18<sup>th</sup> Dynasty (1479-1425 BC) from Abydos in display in the Liverpool Museums and shown in Fig.15.<sup>[25]</sup> The ring was manufactured from gold and the scarab was carved from jasper and steatite. The ring is of the swivel type using two revolute joints at the ends of the scarab. The scarab was located inside a golden ring with journal at its both ends for the revolute joint. The piece depicts the high level of the mechanical engineering technology attained during the New Kingdom.
- The fourth example is a 3-scarabs necklace of Tutankhamun, the 13<sup>th</sup> Pharaoh of the 18<sup>th</sup> Dynasty (1332-1323 BC) in display in the Egyptian Museum at Cairo and shown in Fig.16.<sup>[26]</sup> The main items in the necklace are three semi-precious stone scarabs. The outer scarabs are carrying the sun disk while the scarab in the middle is carrying the moon symbol above which is a sun disk. The three scarabs are carrying the sun or moon on their heads using their front legs. They resting on a highly decorated stand with inlaid lotus blossoms.



**Fig.15:** Scarab ring from 18<sup>th</sup> Dynasty.<sup>[25]</sup>



**Fig.16:** 3-scarab necklace from 18<sup>th</sup> Dynasty.<sup>[26]</sup>

- The fifth example is a winged scarab pendant of Pharaoh Tutankhamun in display in the Egyptian Museum at Cairo and shown in Fig.17.<sup>[27]</sup> The pendant was manufactured from carnelian, lapis lazuli and glass with a winged-scarab as its main item holding a moon and sun symbols above its head through its front legs and the tip of its wings. The scarab was shown protected by two cobras, one from each side. The scarab was shown resting on a highly decorated base including two different types of plant blossoms in an alternating order. The combination of colors is marvelous and depicts the high level of the assembly technology of components manufactured using different materials. The unit is one of the artifacts representing the top production technology in ancient Egypt during the 18<sup>th</sup> Dynasty.



**Fig.17:** Winged-scarab from 18<sup>th</sup> Dynasty.<sup>[27]</sup>

- The sixth example is a scarab-based necklace of Pharaoh Tutankhamun in display in the Egyptian Museum at Cairo and shown in Fig.18.<sup>[28]</sup> The designer showed the scarab as the main element of the pendant with a cobra from each side, rising the sun disk by its front legs and resting with the two cobras on a boat. The two thick strands of the necklace

comprised two (or three) scarabs and highly decorated with multi-colored patterns. Again, this product reflects the level of the high technology attained during this period.



**Fig.18: Scarab-necklace from 18<sup>th</sup> Dynasty.<sup>[28]</sup>**

- The seventh example is a scarab-bracelet of Pharaoh Tutankhamun in display in the Egyptian Museum at Cairo and shown in Fig.19. The designer showed a cloisonné scarab resting on the top of the bracelet while the bracelet itself is highly decorated by elements of changing size from carnelian, lapis lazuli, turquoise and glass <sup>[29]</sup>. The clip in the bottom means that the bracelet is composed of two parts joined with each other using a revolute joint (not clear in the view of Fig.19).
- The eighth example is a 25 mm length glazed faience scarab amulet from the 18<sup>th</sup>-19<sup>th</sup> Dynasties (1333-1279 BC) in display in the Walters Art Museum and shown in Fig.20 <sup>[30]</sup>. The designer used a cheap raw material to manufacture this unit and inscribed it by a scarab, a Pharaoh-sphinx wearing the Double Crown of ancient Egypt and another symbol in front of the Pharaoh.



**Fig.19: Scarab-bracelet from 18<sup>th</sup> Dynasty.<sup>[29]</sup>**



**Fig.20: Scarab amulet from 18<sup>th</sup>-19<sup>th</sup> Dynasties.<sup>[30]</sup>**

- The ninth example is a 33 mm width faience winged scarab from the New Kingdom (1539-1070 BC) in display in the Brooklyn Museum at NY and shown in Fig.21.<sup>[31]</sup> The wings were decorated by three adjacent layers of feathers of gradually changing length.
- The tenth example is a 15 mm length steatite Royal Scarab of Ramses II, the 3<sup>rd</sup> Pharaoh of the 19<sup>th</sup> Dynasty (1297-1213 BC) from a private collection of Albert Griffith in 1926 from Cairo and shown in Fig.22<sup>[32]</sup>. It is of the scarab-seal type inscribed by three characters.



**Fig.21: Winged-scarab from New Kingdom.**<sup>[31]</sup>



**Fig.22: Ramses II scarab from 19<sup>th</sup> Dynasty.**<sup>[32]</sup>



- The eleventh example is a 15 mm length glazed steatite Royal Scarab belonging to Seti II, the 5<sup>th</sup> Pharaoh of the 19<sup>th</sup> Dynasty (1203-1197 BC) from the collections of Harmer Rooke from NY and shown in Fig.23.<sup>[33]</sup> The back of the scarab was engraved by the head of Hathor with cobra from each side, while its bottom was inscribed by the throne name of Seti II.<sup>[33]</sup>



**Fig.23: Seti II scarab from 19<sup>th</sup> Dynasty.**<sup>[33]</sup>

### The Third Intermediate Period

The Third Intermediate Period of ancient Egypt comprises the 21<sup>st</sup> through the 25<sup>th</sup> Dynasties between 1070 and 664 BC.<sup>[34]</sup> We have a number of scarab examples from this period presented as follows:

- The first example is a 38.6 mm length diorite heart scarab from the 21<sup>st</sup> Dynasty (1069-945 BC) from the private collection of Albert Griffith in 1926 and shown in Fig.24.<sup>[35]</sup> The designer selected of the hardest rock (diorite) to produce this scarab) and carver master his work by showing the details of the scarab head and back.
- The second example is 15 mm height glazed steatite scarab amulet from the 21<sup>st</sup> – 22<sup>nd</sup> Dynasties (1070-736 BC) in display in the Walters Art Museum and shown in Fig.25.<sup>[36]</sup> The scarab was professionally carved with body parts marked symmetrically in black.



**Fig.24: Heart scarab from 21<sup>st</sup> Dynasty.**<sup>[35]</sup>



**Fig.25: Scarab amulet from 21<sup>st</sup>-22<sup>nd</sup> Dynasties.**<sup>[36]</sup>

- The third example is a serpentine heart scarab from the 21<sup>st</sup>-22<sup>nd</sup> Dynasties (1070-730 BC) is a property of the Western Reserve Historical Society and shown in Fig.26.<sup>[37]</sup> The inscriptions on the bottom of the scarab are statements from the '*Book of the Dead*'.



**Fig.26: Scarab-seal from 21<sup>st</sup>-22<sup>nd</sup> Dynasties.**<sup>[37]</sup>

### The Late Period

The Late Period of ancient Egypt comprised the 26<sup>th</sup> to the 31<sup>st</sup> Dynasties over a time span from 664 to 332 BC.<sup>[38]</sup> The evolution of scarab production during this period is investigated through the following examples:

- The first example is a winged scarab amulet from the Late Period of ancient Egypt (664-332 BC) in display in the Australian Museum and shown in Fig.27.<sup>[39]</sup> Most probably this unit was manufactured from faience of glazed steatite. It is possible to be from both materials since the wings have bale blue color while the body has a dark blue color. This winged scarab is a continuation of the designs appeared in the Middle Kingdom (Fig.4) and continued in the New Kingdom (Fig.21) except the wings here are straight and the feathers design and arrangement is completely different than that in Fig.21.
- The second example is a necklace with 15.87 mm length steatite scarab pendant belonging to the 26<sup>th</sup> Dynasty of the Egyptian Late Period (664-535 BC) from the British collection and shown in Fig.28.<sup>[40]</sup> The scarab was inscribed from its bottom by three scenes.
- The third example is a jasper heart scarab from the 26<sup>th</sup> Dynasty (664-525 BC) shown in Fig.29.<sup>[41]</sup> There are no details about the dimensions, inscriptions or present location.
- The fourth example is a 17 mm length turquoise glazed steatite scarab necklace from the 26<sup>th</sup> Dynasty (600 BC) shown in Fig.30.<sup>[42]</sup> The scarab by carving of steatite stone, then glazing using turquoise. The designer could display the details of the body and head in the available small area (only 17 mm length).



**Fig.27 Winged scarab amulet from Late Period.**<sup>[39]</sup>



**Fig.28 Scarab necklace from 26<sup>th</sup> Dynasty.**<sup>[40]</sup>



**Fig.29: Heart scarab from 26<sup>th</sup> Dynasty.**<sup>[41]</sup>



**Fig.30: Scarab necklace from 26<sup>th</sup> Dynasty.**<sup>[42]</sup>

- The fifth and last example from the Late Period is a 100 mm length red stone heart scarab from the 26<sup>th</sup> Dynasty (600 BC) given to the Beloit College as a gift by Miss Hazd Bartlett and shown in Fig.31 <sup>[43]</sup>. This is relatively a large scarab carved professionally from a red un-assigned stone with small round surfaces following the tradition of the ancient Egyptian mechanical design technology.



**Fig.31: Heart scarab from 26<sup>th</sup> Dynasty.**<sup>[43]</sup>

## CONCLUSION

- The production of scarab statuettes in ancient Egypt was investigated.
- The ancient Egyptians registered scarab since the time of Naqada II/III of the Predynastic Period.
- They produced hand-crushers taking the shape of a scarab during the Predynastic Period.
- In producing scarab statues and applications they used a number of local materials including: faience, limestone, steatite, diorite, serpentine, carnelian, lapis lazuli, feldspar, jasper, gold and electrum.
- They produced Royal Scarab statuettes since the 1<sup>st</sup> Dynasty and continued up to the 19<sup>th</sup> Dynasty.
- They started producing winged-scarabs since the 12<sup>th</sup> Dynasty and continued through the New Kingdom and the Late Period.

- They could produce miniature scarab statuettes as small as having 12.7 mm length..
- They could produce large scarab statuettes as large as 125 mm length during the 16<sup>th</sup> Dynasty.
- To improve the appearance of the scarab statuette produced using soft stone, they used the glazing process.
- They inscribed seal-scarabs in the Second Intermediate Period using winged scarab and cobras.
- They scarab statuettes as main elements in jewellery production specially during the 18<sup>th</sup> Dynasty. This continued will less profession during the Late Period.

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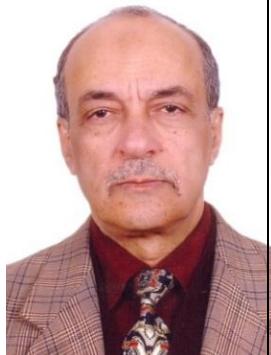
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