

# Mechanical Engineering in Ancient Egypt, Part 61: Symbols Industry in the Third Intermediate and Late Periods

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## Abstract:

This paper is the 57<sup>th</sup> research paper in a series investigating the evolution of mechanical engineering in ancient Egypt. It tries to achieve this purpose through investigating the symbols industry during the Third Intermediate and Late Periods. It outlines the design and application of symbols by the ancient Egyptians. The symbols used are highlighted with reference to material and present location if known. Features of the symbol-based products are outlined as characteristics of Mechanical Engineering in ancient Egypt.

**Keywords** — Mechanical engineering; ancient Egypt; symbols industry, 3<sup>rd</sup> Intermediate Period, Late Period

## I. INTRODUCTION

This is the 61 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 symbols industry in ancient Egypt during the Third Intermediate and Late Periods.

Teeter (2003) presented a limestone statue for Hathor from the Third Intermediate Period with engravings of scenes using some symbols of ancient Egyptians, stele from the 22<sup>nd</sup> Dynasty using Nekhbet, Uraeus, Akhet and Flail symbols, stele of Harsiese from the 26<sup>th</sup> Dynasty using some symbols, stele from reign of Necho II of the 26<sup>th</sup> Dynasty using the Winged sun, Atef crown, Maat Feather, Hathor crown and Pschent symbols. She presented also a scene from a book of dead written during the 31<sup>st</sup> Dynasty including a large number of symbols such as: Crook, Flail, Uraeus and Feather [1]. Eladany (2011) in her Ph.D. Thesis presented a wooden coffin for Irtyru purchased from Saqqara including a large number of symbols such as: Was sceptre, Swty, Nebu and Uraeus. She presented the coffin of Itineb from the Late Period with surface full of colored inscriptions including symbols. She also presented a wonderful cartonnage coffin of Nekhtet Mut from the 22<sup>nd</sup> Dynasty full of

inscriptions including too many symbols and another coffin decorated at the feet area by Ankh and Was sceptre symbols [2].

Moore (2014) in her Master of Arts Thesis about the non-royal female Egyptian coffins in the Third Intermediate Period presented the coffin of Meresamun fully decorated and inscribed with Sun-disk, Shen, Wadjet eye, Was sceptre, Nekhbet, Djed and Tiet symbols. She presented also a coffin for Ankh-Teh fully decorated and inscribed including some symbols such as: Crook, Flail, Sun-disk, Swty, Nekhbet, Sesen and Ba. She also presented the coffin of Henettam fully decorated and inscribed including the symbols: Atef, Sesen, Flail, Crook, Wadjet eye, Shen, Uraeus, Ankh, Pschent, Sekhem, Maat Feather and Sistrum [3]. Gomez (2015) in her Ph. D. Thesis about the personnel of Khonsu during the Third Intermediate Period presented a number of scenes including some ancient Egyptian symbols such as: Atef, Sesen, Crook and Flail. She presented unclear images for coffin from the 21<sup>st</sup> Dynasty [4].

Forguston (2016) showed that 'Maat' was used by ancient Egyptians as a symbol for justice, truth, order, harmony, rightness and true witness [5]. Hassaan (2017) investigated the evolution of Mechanical Engineering in ancient Egypt through studying the symbols industry during the Periods

from Early Dynastic to Middle Kingdom [6] and during the New Kingdom Period [7].

## II. SYMBOLS INDUSTRY IN THE THIRD INTERMEDIATE PERIOD

The Third Intermediate Period of Egypt covers the 21<sup>st</sup> to the 25<sup>th</sup> Dynasties over a time span from 1070 to 664 BC [8]. We have a number of examples from the Third Intermediate Period tracing the continuation of using symbols during this period. They are presented as follows:

- The first example is a faience Wadjet eye from the Third Intermediate Period (1069-945 BC) in display in the British Museum and shown in Fig.1 [9]. Most probably this is an amulet. It was inlaid by three different materials of yellow, black and brown colors.



Fig.1 Wadjet eye from 3<sup>rd</sup> Intermediate Period [9].

- The second example is a golden funerary mask for Pharaoh Psusennes I from the 21<sup>st</sup> Dynasty (1047-1001 BC) in display in the Museum of Valenciennes, France and shown in Fig.2 [10]. However, another source is saying that this mask is in the Egyptian Museum at Cairo [11]. The mask is a golden one and uses the Nemes and Uraeus symbols.
- The third example is a 138 mm height pendant of Pharaoh Psusennes I of the 21<sup>st</sup> Dynasty (1047-1001 BC) in display in the Egyptian Museum at Cairo and shown in Fig.3 [12]. The pendant was

produced from gold, carnelian, lapis lazuli, feldspar and red jasper and used Scarab, Uraeus, Shenu and Akhet symbols.



Fig.2 Golden mask from 21<sup>st</sup> Dynasty [10,11].

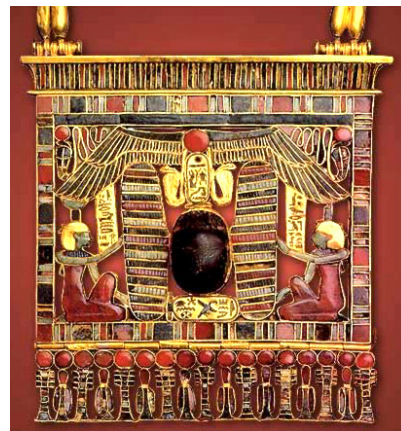


Fig.3 Pendant from 21<sup>st</sup> Dynasty [12].

- The fourth example is a 145 mm height faience lotiform chalice from the 22<sup>nd</sup>-25<sup>th</sup> Dynasties (945-664 BC) in display in the Metropolitan Museum of Art at NY and shown in Fig.4 [13]. The chalice took the form of the Sesen symbol and decorated by scenes including the Maat Feather and Sesen symbols.
- The fifth example is a 140 mm height faience chalice from the 22<sup>nd</sup> Dynasty in display in the Metropolitan Museum of Art at NY and shown in Fig.5 [14]. It

has the same design of the chalice in Fig.4, however the scene decorations are different. There was an extensive use of the Sesen symbol with different sizes.



Fig.4 Chalice from 22<sup>nd</sup>-25<sup>th</sup> Dynasties [13].



Fig.5 Chalice from 22<sup>nd</sup> Dynasty [14].

- The sixth example is a golden bird for the Pharaoh Sheshonq II from the 22<sup>nd</sup> Dynasty (887-885 BC) shown in Fig.6 [15].



Fig.6 Golden bird from 22<sup>nd</sup> Dynasty [15].

This may be a pendant and I could not trace the present location of this artefact. The designer used only one symbol in the design of the pendant which was the Shen. I think the designer used the Shen in this location for purpose of mechanical balance of the pendant when in use such that the bird appears stable in the normal standing position.

- The seventh example is a menat necklace from the 22<sup>nd</sup> Dynasty (870 BC) in display in the Altes Museum at Berlin and shown in Fig.7 [16]. The designer used a large number of symbols in his design such as: Sekhmet, Uraeus, Sesen, Sistrum, Sema, Nekhbet and Sun Disk.



Fig.7 Menat necklace from 22<sup>nd</sup> Dynasty [16].

- The eighth example is a 92 mm height faience amulet from the 25<sup>th</sup> Dynasty (743-712 BC) in display in the Museum of Fine Arts at Boston and shown in Fig.8 [17].



Fig.8 Amulet from 25<sup>th</sup> Dynasty [17].

The designer used a number of ancient Egyptian symbols in his design such as: Atef, Uraeus, Ankh and Sesen symbols.

- The ninth example is a Sphinx of Shepenwepet II, High Priestess of Amun and daughter of Pharaoh Piye from the 25<sup>th</sup> Dynasty (700-650 BC) in display in the Egyptian Museum at Berlin and shown in Fig.9 [18]. The Sphinx symbol was the main element in her statue design with human head and handles holding a baboon.



Fig.9 Sphinx from 25<sup>th</sup> Dynasty [18].

- The tenth example is an 0.73 m length Sphinx of Pharaoh Taharqa from the 25<sup>th</sup> Dynasty (680 BC) in display in the British Museum and shown in Fig.10 [19]. The designer showed the Pharaoh's head with two Uraeus symbols on his forehead. This was a classical design of the Sphinx with only a human head.
- The eleventh and last example is an engraving for Pharaoh Nectanebo I from the 30<sup>th</sup> Dynasty (380-362 BC) in display in the British Museum and shown in Fig.11 [20]. The designer shows the Pharaoh making an offering and wearing a Khat headdress with an Uraeus symbol on his forehead.



Fig.10 Taharqa Sphinx from 25<sup>th</sup> Dynasty [19].



Fig.11 Nectanebo I from 30<sup>th</sup> Dynasty [20].

### III. SYMBOLS INDUSTRY IN THE LATE PERIOD

The Late Period of ancient Egypt covers the dynasties from 26<sup>th</sup> to 31<sup>st</sup> over a time span from 664 to 332 BC [21]. We have a good number of examples for the use of symbols in ancient Egypt during the Late Period presented as follows:

- The first example is a 106 mm height bronze Uraeus from the Late Period (716-30 BC) sold by Sothebys for 11,250 US\$ and shown in Fig.12 [22]. The Uraeus symbol was inlaid by

turquoise, carnelian and lapis lazuli and shown wearing the Atef Crown.



Fig.12 Uraeus from the Late Period [22].

- The second example is a glazed faience Scarab from the Late Period (712-342 BC) in display in the Brooklyn Museum at NY and shown in Fig.13 [23]. The wings were made separate where it could be assembled with the scarab body. The design depends mainly on the Scarab symbol.



Fig.13 Winged Scarab from the Late Period [23].

- The third example is a 301.6 mm faience Was sceptre amulet from the Late Period (712-332 BC) in display in the Metropolitan Museum of Art at NY and shown in Fig.14 [24].
- The fourth example is a faience amulet using three combined symbols from the 25<sup>th</sup> Dynasty (700-500 BC) in display in the British Museum and shown in Fig.14 [25]. The designer used the symbols: Ankh, Djed and Was sceptre as the main

body of his amulet in a very nice combination. All the surfaces of the amulet were rounded following the excellent design tradition of the ancient Egyptians in mechanical design.



Fig.14 Was sceptre from Late Period [24].



Fig.15 Combined symbols amulet, 25<sup>th</sup> Dynasty [25]

- The fifth example is a 210 mm bronze statue of Osiris from the 26<sup>th</sup> Dynasty (664-610 BC) sold by Sotheby's for 278,500 US\$ and shown in Fig.16 [26]. The designer showed Ptah wearing an Atef Crown with Uraeus on his forehead and holding the Was sceptre and Djed symbols. The Seba symbol was located near his left hand. Thus, the designer used the symbols: Atef, Uraeus, Was sceptre and Djed.
- The sixth example is a faience Wadjet eye amulet from Late Period (664-332 BC) in display in the Brooklyn Museum at NY and shown in Fig.17 [27]. The amulet design was based completely on using the Wadjet eye symbol produced from a single material.
- The seventh example is a necklace from the 27<sup>th</sup> Dynasty (500 BC) shown in Fig.18 [28]. The necklace was assembled using 16 amulets including eight Djed symbols and the rest were

Deity-symbols. I couldn't trace the present location of this artefact.

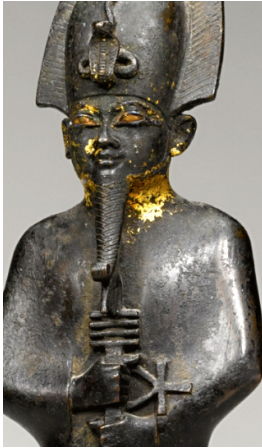


Fig.16 Osiris statue from 26<sup>th</sup> Dynasty [26].



Fig.17 Wadjet eye amulet from Late Period [27]



Fig.19 Psamtik I from the 26<sup>th</sup> Dynasty [29].



Fig.18 Necklace from the 27<sup>th</sup> Dynasty [28].



Fig.20 Amulet from the 26<sup>th</sup>-29<sup>th</sup> Dynasties [30].

- The eighth example is a relief of Pharaoh Psamtik I from tomb of Pabasa from the 26<sup>th</sup> Dynasty (664-610 BC) shown in Fig.19 [29]. The Pharaoh was shown wearing the Double Crown of ancient Egypt (Pschent symbol). The Ankh and Shenu symbols appears also in the relief.
- The ninth example is a 19 mm height golden sheet vulture amulet from the 26<sup>th</sup>-29<sup>th</sup> Dynasties (664-380 BC) in display in the Metropolitan Museum of Art at NY and shown in Fig.20 [30]. The design was based entirely on using the Nekhbet symbol.

- The tenth example is a 12 mm height Cobra amulet from the 26<sup>th</sup>-29<sup>th</sup> Dynasties (664-380 BC) in display in the Metropolitan Museum of Art at NY and shown in Fig.21 [31]. Its design was based entirely on using the Uraeus symbol. As an amulet it has to maintain a vertical position when hanged from the hole clear in the top Fig.21. This required a careful selection of the amulet geometry such that its centre of mass lies on the vertical line going through the hanging hole. I think this is the case here.
- The eleventh example is a 170 mm height golden Uraeus from the Late Period (664-332 BC) in display in the British Museum and shown in Fig.22

[32]. The designer showed the cobra wearing the Red Crown of Lower Egypt. Therefore he used the Uraeus and Deshret symbols in designing this amulet.



Fig.21 Uraeus amulet from 26<sup>th</sup>-29<sup>th</sup> Dynasties [31].



Fig.22 Golden Uraeus from Late Period [32]

- The twelfth example is a 13 mm height faience Shen amulet from the Late-Ptolemaic Period (664-30 BC) in display in the Museum of Fine Art at Boston and shown in Fig.23 [33]. The design was based in using one symbol for the amulet which is the Shen symbol.



Fig.23 Shen amulet from the Late Period [33].

- The thirteenth example is a 135 mm height terracotta amulet from the Late Period (664-332 BC) in display in the

KMKG Museum at Brussels and shown in Fig.24 [34]. The designer used the Djed as the main unit in his design and selected the Atef Crown to be on its top part.

- The fourteenth example is a turquoise Djed amulet from the Late Period (600 BC) in display in the British Museum and shown in Fig.25 [35]. The designer used a single symbol for his amulet (the Djed) . Even though the turquoise stone has a moderate hardness of 5-6 on Moh's scale [36], the ancient Egyptian carver could generate this complex shape unit with smooth and rounded corners.



Fig.24 Djed amulet from Late Period [34].



Fig.25 Djed amulet from Late Period [35]

- The fifteenth example is an 11 mm height golden Scarab amulet from the Late Period (664-380 BC) in display in the Metropolitan Museum of Art and shown in Fig.26 [37].



Fig.26 Golden Scarab amulet from Late Period [37].

- The sixteenth example is a 3.1 m length quartzite Sphinx of Pharaoh Psamtik II from the 26<sup>th</sup> Dynasty (595-589 BC) in display in Kom el-Dikka Open-Air Museum at Alexandria and shown in Fig.27 [38]. The sphinx design follows the same design concepts of Sphinx appeared during the 4<sup>th</sup> Dynasty of the Old Kingdom [6].



Fig.27 Psamtik II Sphinx from 26<sup>th</sup> Dynasty [38]

- The seventeenth example is a 110 mm bronze statuette of Pharaoh Amasis from the 26<sup>th</sup> Dynasty (570-526 BC) in display in the Metropolitan Museum of Art at NY and shown in Fig.28 [39]. The designer used the Nemes and Uraeus symbols in designing the Riyal statuette.
- The eighteenth example is a 29 mm length Obsidian Wadjet eye amulet from the 26<sup>th</sup>-30<sup>th</sup> Dynasties (664-30 BC) in display in the Metropolitan Museum of Art at NY and shown in Fig.29 [40]. There are four Uraeus symbols on the top of the amulet and there are no details clear in the amulet image of Fig.29.



Fig.28 Amasis statuette , 26<sup>th</sup> Dynasty [39].



Fig.29 Wadjet eye amulet , Late Period [40]

- The nineteenth example is a 66 mm faience Ankh amulet from the 27<sup>th</sup> Dynasty (486-466 BC) sold in a sale and shown in Fig.30 [41].
- The twentieth example is a 300 mm height granodiorite head of Nectanebo II, the last native ruler of ancient Egypt during the 30<sup>th</sup> Dynasty (362-343 BC) in display in the Museum of Fine Arts at Boston and shown in Fig.29 [42]. The Pharaoh was shown Khat Crown with an Uraeus symbol on his forehead.



Fig.30 Ankh amulet , 27<sup>th</sup> Dynasty [41].



Fig.29 Nectanebo head , 30<sup>th</sup> Dynasty [42]

#### IV. CONCLUSIONS

- The paper investigated the evolution of Mechanical Engineering in ancient Egypt through the symbols industry during the Third Intermediate and Late Periods.
- The ancient Egyptians registered the use of symbols through statues, statuettes, jewellery, tomb engravings and chalices.
- They continued to produces Wadjet-eye amulets during the Third Intermediate and Late Periods.
- They continued to produce funerary masks with Nemes and Uraeus symbols during the 21<sup>st</sup> Dynasty.
- They continued to use the Scarab symbol in producing pendants during the 21<sup>st</sup> Dynasty and Late Period.
- The Uraeus symbol continued to be used in many applications during the Third Intermediate and Late Periods.



- They continued to use the Shen symbol during the 22<sup>nd</sup> and Late Period.
- They continued to use the Ankh symbol during the 25<sup>th</sup> and 26<sup>th</sup> Dynasties.
- They continued to use the Atef symbol during the 25<sup>th</sup> Dynasty and Late Period.
- They continued to use the Sphinx symbol during the 25<sup>th</sup> and 26<sup>th</sup> Dynasties.
- They continued to use the Was Scepter symbol during the 25<sup>th</sup> Dynasty and Late Period.
- They designed and produced multi-symbols amulets during the 25<sup>th</sup> Dynasty.
- They continued to use the Pschent symbol down to the 26<sup>th</sup> Dynasty.
- They continued to use the Shenu symbol during the 21<sup>st</sup> and 26<sup>th</sup> Dynasties.
- They continued to use the Nekhbet symbol during the 26<sup>th</sup> to 29<sup>th</sup> Dynasties.
- They continued to use the Djed symbol during the 25<sup>th</sup> Dynasty and Late Period.
- They continued to use the Nemes symbol during the 21<sup>st</sup> and 26<sup>th</sup> Dynasties.

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