

Mechanical Engineering in Ancient Egypt, Part 86: Diadem Industry

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Abstract:

This paper is the 86th research paper in a series investigating the evolution of mechanical engineering in ancient Egypt. It investigates the head-diadems industry during a time span from Naqada II to New Kingdom Periods of ancient Egypt. It presents samples and characteristics of diadems from Naqada II, Old Kingdom, Middle Kingdom and New Kingdom. The type, design, ornaments and present location are all investigated.

Keywords — Mechanical engineering, ancient Egypt, diadem industry, Naqada II to New Kingdom Periods.

I. INTRODUCTION

This is the 86 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 production and use of diadems in ancient Egypt.

Durham (1946) in his paper about Egyptian diadem of the Old Kingdom presented a diadem in the Museum of Fine Art found in the chief burial chamber of a mastaba south of the tomb of Prince Khufu-khef from the 5th Dynasty. He presented the side ornament of the golden-copped diadem before and after restoration and complete view of the diadem. He also presented a diadem found near the S[henx and dated to Late 4th/Early 5th Dynasties made from heavy gold [1]. Kitagawa (2008) studied the presence of deer in ancient Egypt. He presented evidences of the presence of deer in ancient Egypt. He quoted an electrum diadem found in Eastern Delta and dated to the Hyksos Period and comprising five deer heads [2].

Hassaan (2016) in his investigation of the Mechanical Engineering in ancient Egypt through studying the statues industry in the Predynastic to Old Kingdom Periods presented the famous limestone statue of Nofret, wife of Prince Rahotep, son of King Sneferu of the 4th Dynasty in the

Egyptian Museum at Cairo. The designer shoed Nofret wearing a simple colored diadem [3]. Harris (2018) in his Master of Arts Thesis presented the bust statue of Queen Nefertiti, wife of Pharaoh Akhenaten of the 18th Dynasty with a simple diadem on her tall blue crown. He presented a carved relief for an Old Kingdom Princess wearing a floral diadem, a head diadem from the End of Naqada II (3200 BC), line diagram of a diadem from the 5th Dynasty, relief for Sit-hedj-Hotep and sit-kheper-ka wearing diadems from the 12th Dynasty, and other examples from the Old, Middle and New Kingdoms [4].

Reddit (2018) wrote a good article about the top five ancient Egyptian diadems. They displayed diadems from the 17th, 18th and 19th Dynasties [5]. Wikipedia (2019) wrote an article about diadem where they presented diadem samples from the Greek Empire, Indian culture and ancient Egypt [6].

Lendering (2019) wrote an article about diadem where she presented diadem samples from the Persian Empire, Greek Empire and Roman Empire [7]. Wikipedia (2019) wrote an article about Nefertiti bust and presented her bust in display by the Neues Museum at Berlin. The Queen were shown wearing a colored diadem on her crown [8]. Wikipedia (2019) wrote an article about Nofret, wife of Prince

Rahotep from the 4th Dynasty. They presented Nofret's statue in display in the Egyptian Museum at Cairo showing Nofret wearing a decorated colored diadem on her hair [9].

diadems during the 4th to 6th Dynasties presented as follows:

II. DIADEM PRODUCTION DURING NAQADA II PERIOD

The ancient Egyptians practiced using diadems on their heads since more than 5000 years where evidences showed that they used diadems during the time of Naqada II (3500-3200 BC). Here, two examples will be presented from this historical era:

- The first example is a 167 mm length diadem produced from serpentine, lapis lazuli and glazed steatite from Naqada II (3500-3300 BC) in display in the Metropolitan Museum of Art and shown in Fig.1 [10]. The ancient Egyptian mechanical designer could select materials for his product providing different natural colors with variable dimensions over the axial centreline of the diadem.



Fig.1 Diadem from Naqada II [10].

- The second example is a diadem from Naqada II (3300 BC) in display in the British Museum at London and shown in Fig.2 [11]. It was constructed from beads manufactured from turquoise, garnet, malachite and gold with beads arranged in 10 sections. Four of the sections took the shape of composite loops while six sections has straight circular design with uniform diameter. The four materials provided four natural colors as depicted in Fig.2.



Fig.2 Diadem from Naqada II, 3300 BC [11].

- The first example is a diadem of Nofret, wife of Prince Rahotep, Son of King Sneferu, the founder of the 4th Dynasty of ancient Egypt (2613-2589 BC) in display in the Egyptian Museum at Cairo and shown in Fig.3 [13]. It had a slit design with colored plant motifs.



Fig.3 Diadem of Nofret from the 4th Dynasty [13].

III. DIADEM PRODUCED DURING THE OLD KINGDOM

The Old Kingdom of ancient Egypt comprised the 3rd to 6th Dynasties over a time span from 2686 to 2181 BC [12]. We have examples of using

- The second example is a relief for Queen Meresankh III, wife of Khafre, the 4th King of the 4th Dynasty (2558-2532 BC) in display in her mastaba G7530 and G 7540 shown in Fig.4 [14]. The unclear diadem in the tomb scene was clarified by a line diagram illustrating the details of the Queen's diadem presented by Harris [15]. The diadem has a slit design decorated by

plant motifs, a tie and two long bands coming out from the tie.



Tomb scene [14]



Line diagram [15]

Fig.4 Queen Meresankh III from the 4th Dynasty [14,15].

- The third example is a golden adult lady diadem from a tomb near the Sphinx found in 1930 and dated to the 4th/5th Dynasties (2613-2345 BC) in display in the Egyptian Museum at Cairo and shown in Fig.5 [16]. The diadem was of the slit type decorated by three flower and birds-based motifs.



Fig.5 Diadem from the 4th/5th Dynasties [16].

- The fourth example is a golden diadem from the 5th/6th Dynasties (2450-2350 BC) shown in Fig.6 [17]. I could not find the present location of this diadem. It was decorated by plant flowers-ornaments and four bands (two yellow bands in the front side and two black bands in the back side).



Fig.6 Diadem from the 5th/6th Dynasties [17].

- The fifth example is a drawing of a restored diadem from the 5th Dynasty (2420 BC) in display in the Museum of Fine Arts at Boston and shown in Fig.7 [18]. It is expected that the diadem had an elaborated ornament scheme consisting of flower elements, birds and Ankh sign with five different colors used to this wonderful piece more than 4400 years ago.



Fig.7 Restored diadem from the 5th Dynasty [18].

- The sixth example is a 185 mm diameter gilded copper diadem from the 5th Dynasty (2465-2323BC) in display in the Museum of Fine Arts at Boston and shown in Fig.8 [19]. This may be a complete version of the front ornament shown in Fig.7. The diadem is of the slit type with two side guides and a front ornament of the details shown in Fig.7.



Fig.8 Diadem from the 5th Dynasty [19].

IV. DIADEM PRODUCED DURING THE MIDDLE KINGDOM

The Middle Kingdom of ancient Egypt comprised the 11th to 13th Dynasties over a time span from 2130 to 1649 BC [20]. We have a

number of examples of using diadems during the Middle Kingdom of ancient Egypt presented as follows:

- The first example is a mummy mask of a High Official from Asyut dated to the 11th Dynasty (2000 BC) in display in the Walters Art Museum at Baltimore and shown in Fig.9 [21]. The designer showed the official wearing a diadem on his headdress. The diadem was a decorated slit type with flower ornaments on the owner's forehead.



Fig.9 Mummy mask from the 11th Dynasty [21].

- The second example is a diadem of Princess Khnumet, daughter of Amenemhat II, the 3rd King of the 12th Dynasty (1897-1878 BC) in display in the Egyptian Museum at Cairo and shown in Fig.12 [24]. The diadem has a complex design of plant and bird elements with colored inlay produced from semiprecious stones.



Fig.10 Diadem of Khnumet from the 12th Dynasty [22].

- The third example is a golden diadem of Princess Khnumet from the 12th Dynasty (1929-1891 BC) in display in the Egyptian Museum at Cairo and shown in Fig.11 [23]. The diadem was fully decorated by flowers ornaments and 6-cross-shaped ornaments with inlay from its outer surface using lapis lazuli, carnelian and turquoise.



Fig.11 Diadem of Khnumet from the 12th Dynasty [23].

- The fourth example is a golden diadem of Princess Sithathor-Yunet, daughter of Senusret II, the 4th King of the 12th Dynasty (1929-1891 BC) in display in the Egyptian Museum at Cairo and shown in Fig.12 [24]. The diadem was decorated by a number of flowers on its circumference, an Uraeus (cobra) at its front, a double feather extending upward at its back end and three dual-bands at its back and side ends.



Fig.12 Diadem of Sithathor Yunet from the 12th Dynasty [24].

- The fifth example is a golden 565 mm circumference diadem of Princess Senebtisica from the 12th/13th Dynasties (1859-1770 BC) in display in the Metropolitan Museum of Art at New York and shown in Fig.13 [25]. The diadem was produced from a golden wire coiled in three strands and joined together at their ends.



Fig.13 Diadem of Senebtisica from the 12th/13th Dynasties [25].

- The sixth example is a colored scene in the tomb of Sit-hedj-hotep lived during the reign of King Amenhotep III of the 12th Dynasty (1850 BC) shown in Fig.14 [26]. The scene shows two persons wearing a flower-based diadem of two levels with a tie and long band at its back-end.



Fig.14 Diadem of Sit-hedj-hotep from the 12th Dynasty [26].

V. DIADEM PRODUCED DURING THE NEW KINGDOM

The New Kingdom comprised the 18th, 19th and 20th Dynasties over a time period from 1550 to 1077

BC [27]. In the following examples we present some presentations of how the ancient Egyptians used diadems during this powerful and strong Kingdom:

- The first example is a golden diadem of one of the three foreign wives of Thutmose III, the 6th Pharaoh of the 18th Dynasty (1479-1425 BC) in display in the Metropolitan Museum and shown in Fig.15 [28]. The diadem was decorated by two gazelle heads on its front end with a curved band behind them, two thin bands descending down from the sides and six flower motifs on the diadem ring and the curved band inlaid by carnelian and turquoise.



Fig.15 Diadem of one of Thutmose III foreign wives from the 18th Dynasty [28].

- The second example is a diadem of Queen Nefertiti, the Royal Great Wife of Akhenaten, the 10th Pharaoh of the 18th Dynasty (1351-1334 BC) depicted on her bust in display in Neues Museum at Berlin and shown in Fig.16 [29].



Fig.16 Bust of Queen Nefertiti from the 18th Dynasty [29].

The designer showed the Queen wearing a slit diadem over a Modius Crown. The diadem was decorated by alternating red and green bands with a symbol on its front end.

- The third example is a diadem of Tutankhamun, the 13th Pharaoh of the 18th Dynasty (1332-1323 BC) in display in the Egyptian Museum at Cairo and shown in Fig.17 [30]. The Royal diadem of Tut was of the slit type decorated by an Uraeus in the front, another Uraeus from one of the sides downward and three descending bands. The internal surface of the diadem was decorated by adjacent flowers. The top uraeus and the flowers were inlaid by semiprecious stones.



Fig.17 Tutankhamun's diadem from the 18th Dynasty [30].

- The fourth example is a golden diadem of Pharaoh Tutankhamun from the 18th Dynasty (1332-1323 BC) in display in the Egyptian Museum at Cairo and shown in Fig.18 [31]. The diadem was inlaid by motifs taking the shape of flowers, Nekhbet and Uraeus all inlaid by semiprecious stones.



Fig.18 Tutankhamun's diadem from the 18th Dynasty [31].

- The fifth example is a headdress with diadem from the 19th Dynasty (1292-1186 BC) in display in the British Museum and shown in Fig.18 [32]. The diadem was of the slit type decorated by an Uraeus descending from its back. The external surfaces of the diadem and Uraeus were decorated by bands of red, green and yellow colors.



Fig.18 Headdress with diadem from the 19th Dynasty [32].

- The sixth example is a statue of Queen Meritamun, the wife of Pharaoh Ramses II of the 19th Dynasty (1279-1213 BC) in display in the Egyptian Museum at Cairo and shown in Fig.19 [33]. The designer showed the Queen wearing a headdress with Crown and diadem. The diadem was of the slit type decorated by two Uraeus on its front end.



Fig.19 Statue of Meritamun from the 19th Dynasty [33].

- The seventh example is a golden Royal diadem of Queen Twosret, wife of Seti II, the 5th Pharaoh of the 19th Dynasty (1203-1197 BC) shown in Fig.20 [34]. The diadem comprised 16 golden flowers kept in place by a thin golden wire. The flowers were inscribed by the name of the Pharaoh and his wife inside Cartouches.



Fig.15 Diadem of Twosret from the 19th Dynasty [34].

VI. CONCLUSIONS

- The paper investigated the evolution of Mechanical Engineering in ancient Egypt through the production of head-diadems.
- The study covered the historical era from Naqada II to New Kingdom Periods.
- The ancient Egyptians started producing diadems since 3500 BC.
- They used gold and semiprecious stones in producing complex –shaped diadems during the time of Naqada II based on using beads.
- During the Old Kingdom, they designed slit-type-diadems with motives based on plant elements.
- They designed diadems during the 4th Dynasty comprising decorated bands and flower-shaped-tie.
- They produced and used pure golden diadems and gilded-copper diadems during the 4th and 5th Dynasties.
- They continued to use the slit-design for diadems produced during the 11th and 12th Dynasties of the Middle Kingdom.
- Flower ornaments continued to be used during the Middle Kingdom with creative-

diadem-designs specially during the 12th Dynasty.

- Creative motifs based on bands from the four sides of the diadem were practiced during the 12th Dynasty.
- Golden-wire diadem was designed in the End of the Middle Kingdom.
- Golden-slit diadems continued in production during the New Kingdom.
- Slit-diadems were used by the Wives of Pharaohs Thutmose II and Akhenaten of the 18th Dynasty, Wives of Pharaohs Ramses II and Seti II of the 19th Dynasty.
- Pharaoh Tutankhamum of the 18th Dynasty used diadems with elaborated designs decorated by Royal Symbols and semiprecious stones inlays.

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