

# Mechanical Engineering in Ancient Egypt, Part II: Jewellery Industry (Pectorals)

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**ABSTRACT:** *The objective of this paper is to investigate the evolution of the pectorals industry in ancient Egypt. Ancient Egyptians used pectorals for centuries starting from the 3<sup>rd</sup> dynasty to the 22<sup>nd</sup> dynasty. They used various non-metallic and some metallic materials in producing wonderful pectorals. The paper shows those pectorals were used by Pharaohs, high officials and even by the public.*

**Keywords** –*Mechanical engineering history, Jewellery industry in ancient Egypt, Pectorals industry*

## I. INTRODUCTION

Jewellery industry is one of the outstanding industries of ancient Egypt. This industry was so sophisticated such all the world museums are harriving up in obtaining as much as they can from the ancient Egyptian jewellery through thieves of the antiques locally and internationally. In this second part of this series of research papers I present the jewellery industry in ancient Egypt as a trial to highlight the history in mechanical engineering through the evolution of mechanical engineering in ancient Egypt.

Smith (1960) studied some aspects of the ancient Egyptian art starting from the predynastic period and up to the late period. He presented some artefacts available in the Museum of Fine Arts at Boston with detailed analysis and comments [1]. Scott (1964) studied the Egyptian jewellery available in the Metropolitan Museum of Art including jewellery from the predynastic period, 6<sup>th</sup> dynasty, 11<sup>th</sup> dynasty, 12<sup>th</sup> dynasty, 18<sup>th</sup> dynasty late period and Roman period [2]. James (1972) declared that ancient Egyptians appreciated using gold in in industry and art. He said that objects or parts of objects were found in Egyptian tombs from the 1<sup>st</sup> dynasty made fully or partially from gold. He presented a scene showing old Egyptians melting, casting and working of gold [3].

Bunson (2002) wrote a chronological encyclopaedia about ancient Egypt. He included names of individuals, tombs, temples and places.

He presented some scenes, maps and photos of real artefacts and names and duration of all the Eold Egyptian Pharaohs [4]. Hardwick et. Al. (2003) presented a gallery of ancient Egyptian antiques in the Ashmolean Museum. Readers could search items of interest such as object types, materials, names and historical periods [5]. Bard (2007) introduced the archaeology of ancient Egypt to the world in a well prepared book published in 2007. It is clear from his book that she is an honest lover to the ancient Egyptian civilization. She said that Egypt's monumental tombs and temples decorated with reliefs and hieroglyphs have been the source of awe and admiration for millennia. She studied the hieroglyphs, language and pharanotic chronology, the the environmental background of pharaonic civilization, the Egyptian prehistory, the rise of complex society and early civilization, the old kingdom, other kingdoms up to the Greco-Roman period. She supported her book with too many illustrations from tombs and temples [6].

Troale, Guerra and Maley (2009) presented a technological study of items of Egyptian Jewellery from the collections of the National Museum Scotland including a pendant from the 19<sup>th</sup> century BC, objects from the 16<sup>th</sup> century BC, finger rings from the 14<sup>th</sup> century BC, and pendants from the 13<sup>th</sup> century BC. Thir study illustrated the ancient Egyptian goldsmith's skills in working with wires, granulation and joining techniques [7]. Harrell (2012) defined the gemstones of ancient Egypt including rocks, minerals and biogenic materials used for jewellery, furnature and sculpture. He declared that ancient Egyptians used at least 38 gemstone varieties [8]. Haynes (2013) studied in details the symbolism in ancient Egypt. He investigated using the ancient Egyptians the insects as a sumbolism specially the butterfly. He analysed some scenes , amulets and bracklets with butterfly images [9].

Petrina (2014) discussed pieces of jewellery from ancient Egypt like a chain from Taposiris Magna, a chain from Abuqir Bay, a net-shaped necklace from Assiut and bracelets from Fayum [10]. McCarthy (2015) outlined the exhibit opening of the Metropolitan Museum of Art covering four centuries between the old and new Kingdoms (2030-1650 BC) known as the Middle Kingdom.

This covered the pectoral of Princess Sithathor (Pharaoh's daughter), pectorals, crowned bracelets of Pharaoh Amnemhat III of the 12<sup>th</sup> dynasty [11].

## II. PECTORALS FROM EARLIER DYNASTIES

The wear of pectorals appeared during the third dynasty (2683-2613 BC) during the rein of Pharaoh Djoser. Fig.1 shows engineer Amhotep who designed the Djose pyramid in Saqqara wearing a pectoral having seven parallel curved rows with three different colors [12].



Fig.1 Amhotep pectoral at 3<sup>rd</sup> dynasty [12].

From the old kingdom (2780-2263 BC), Fig.2 shows a scene for Nobel Mereruka and his wife. He was a Chief Justice and Vizier in the 5<sup>th</sup> dynasty [13].

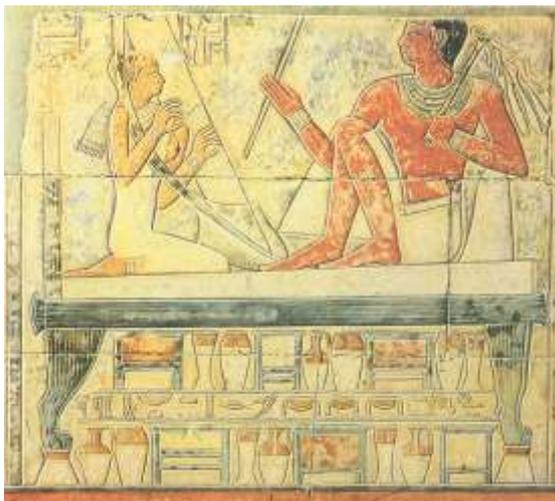


Fig.2 Scene for Noble Mereruka and his wife [13].

He is wearing a pectoral on his chest and both sitting on their bed while his wife is playing the harp.

Another example from the old kingdom is shown in Fig.3 Priestess Meretites and singer Kahai [14]. They lived during the 5<sup>th</sup> dynasty and Kahai was a singer in the pharaoh palace [..]. Both of them are wearing a pectoral on their top chest near the neck.



Fig.3 Priestess Meretites and singer Kahai [14].

As a physical model Fig.4 shows a faience pectoral from the 9<sup>th</sup> dynasty of the first intermediate period (2181-2055 BC) [15].



Fig.4 Faience pectoral from the 9<sup>th</sup> dynasty [15].

The ancient Egyptians continued using the pectorals during the middle kingdom (2055-1650 BC). Fig.5 shows a scene for an Egyptian man setting on a chair and holding his son on his legs. The man is wearing a pectoral [16].

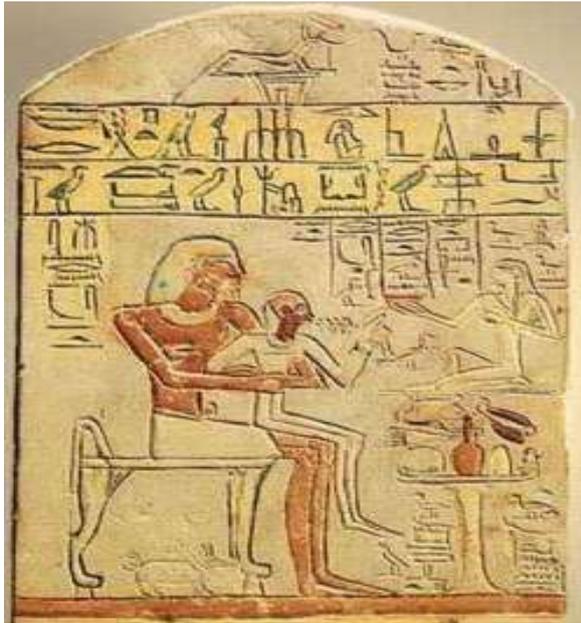


Fig.5 Scene from the middle kingdom [16].

A physical model from 12<sup>th</sup> dynasty of the middle kingdom is shown in Fig.6 from the rein of Pharaoh Amenemhat III. The model reflects the high level of pectoral design and production. It is mainly manufactured from non-metallic materials with golden falcon heads at the pectoral ends. A counterpoise is used behind the neck to keep it in position. It is consisted of 7 parallel rows of three different colors and has 100 mm width [17].



Fig.6 Pectoral from the 12<sup>th</sup> dynasty [17].

Another example from the middle kingdom is that of Wah from the rein of king Amnemhat I of the 12<sup>th</sup> dynasty. Fig.7 shows the pectoral which is produced from faience of two levels of one color [18].



Fig.7 Pectoral of Wah from the 12<sup>th</sup> dynasty [18].

Gold pectoral appeared in the 17<sup>th</sup> dynasty, the last dynasty in the second intermediate period of ancient Egypt. One of such pectorals is shown in Fig.8 which consists of four rows, each row combines too many gold rings threaded on a core of fiber [19].



Fig.8 Pectoral from the 17<sup>th</sup> dynasty [19].

### III. NEW KINGDOM PECTORALS

The new kingdom was established after the second intermediate period by the great victory of King Ahmose I who conquered the Hyksos and established dynasty 18 the fist dynasty in the new kingdom.

The faience pectoral continued to exist with wonderful designs and production skills in the 18<sup>th</sup> dynasty of the new kingdom. A sample is shown in Fig.9 where the faience took four different colors and beads of different size form four curved rows [20].



Fig.9 Faience pectoral from the 18<sup>th</sup> dynasty [20].

The golden age in the 18<sup>th</sup> dynasty was so clear during the rein of Pharaoh Akhnaten. Fig.10 shows a vulture pectoral of the pharaoh found on his mummy [21]. It simulates the strong bird, the vulture spreading his wings around the neck of the pharaoh.



Fig.10 Vulture pectoral of Pharaoh Akhnaten [21].

Pectoral was also a main endorsement part for the handsome Pharaoh Tutankhamun the son of Akhnaten. Fig.11 shown a complete statue at the Egyptian Museum of Pharaoh Tut wearing a big pectoral covering most of his shoulders [22]. It consists of five main parallel curved rows with six narrows ros of different design.



Fig.11 Pectoral of Pharaoh Tutankhamun [22].

From Pharaohs to some nobles of the 18<sup>th</sup> dynasty. Nakht, one of the officials of the 18<sup>th</sup> dynasty. His tomb number TT52 in Theba allocate too beautiful scans for his activities. Fig.12(a) shows Nakht and his wife presenting offerings and Fig. 12(b) shows Nakht supervising the agriculture process personally [23].

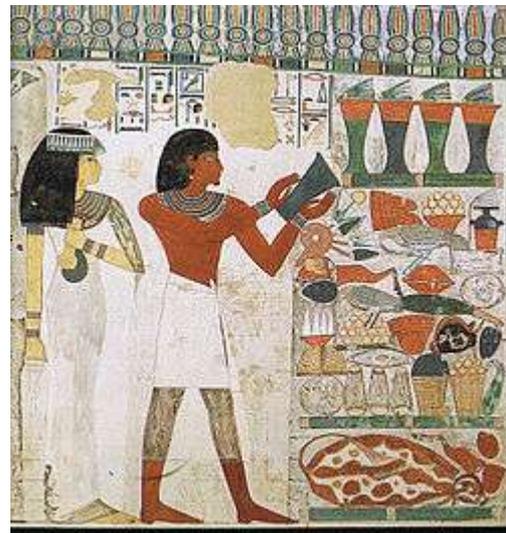


Fig.12 (a) Nakht presenting offerings [23].



Fig.12 (b) Nakht supervising the agriculture process [23].

Another example from the tombs of nobles is for Menna who was a scribe and overseer of Pharaohs Thutmos IV and Amonhetep III of the 18<sup>th</sup> dynasty. Fig.13 shows a scene from his tomb number TT69 at Thebes of Luxor [24]. He is fishing and hunting birds using a boat in the river Nile. He is wearing a wide pendant.



Fig.13 Menna fishing and hunting [24].

Also ladies of the 18<sup>th</sup> dynasty as wives and daughters of high officials have worn pendants. Fig.14 shows a coloured scene of Egyptian ladies in one of the tombs [25]. The pendants have similar design for all the ladies and of a medium width.



Fig.14 Ladies wearing pendants from the 18<sup>th</sup> dynasty [25].

Also low level people used pendants for adorsment. Fig.15 shows a blind singer playing harp from the tomb of Noble Nakht [26]. He is wearing a 2 colours pendant of moderate width.

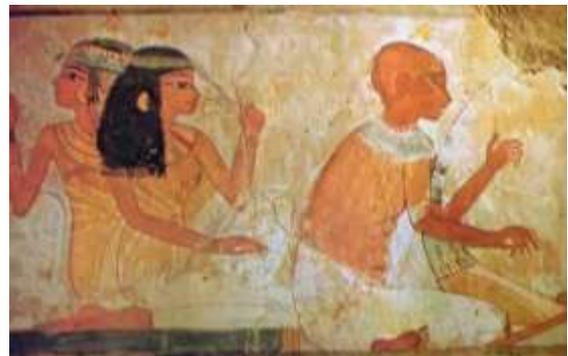


Fig.15 Blind singer playing harp in 18<sup>th</sup> dynasty [26].

Now, we move to the 19<sup>th</sup> dynasty, the dynasty of Ramseses. Fig.16 shows a scene for Great Pharaoh Ramses II of the 19<sup>th</sup> dynasty on a limestone medium from Abydos [27]. His pendant looks to be of three parallel curved rows and of two colours.



Fig.16 Ramses II of the 19<sup>th</sup> dynasty [27].

Also, the nobles of the 19<sup>th</sup> dynasty worn pectorals as shown in the scene of the Commander Userhat who served in the rein of Pharaohs Ramses I and Seti I. Fig.17 shows Userhat and his wife receiving offerings from their lovers [28]. His pectoral is a wide multicolor one.



Fig.17 Userhat and his wife of the 19<sup>th</sup> dynasty [28].

The same transition continued in the 20<sup>th</sup> dynasty where we see in Fig.18 Pharaoh Ramses III the second pharaoh of the dynasty wearing a pendant in one of his scenes [29].



Fig.18 Ramses III of the 20<sup>th</sup> dynasty [29].

#### IV. 3<sup>RD</sup> INTERMEDIATE PERIOD PECTORALS

Going ahead in the evolution of the ancient Egyptian pectorals even during the weak

occupation periods of ancient Egypt, Fig.19 shows a typical mask for Pharaoh Amenemope of the 21<sup>st</sup> dynasty during the 3<sup>rd</sup> intermediate period [30]. The mask represents the Pharaoh in his official dress wearing a wide pectoral of about 12 curved parallel rows.



Fig.19 Mask of Pharaoh Amenemope of the 21<sup>st</sup> dynasty [30].

Furthermore, the pectoral continued to appear during the third intermediate period of the Egyptian ancient history. Fig.20 shows a wide pectoral worn by Queen Karomama, the wife of Pharaoh Osorkon II of the 22<sup>nd</sup> dynasty [31].



Fig.20 Canopic jar of Queen Karomama of the 22<sup>nd</sup> dynasty [31].

#### V. CONCLUSION

- Ancient Egyptians established marvelous jewellery industry.

- The synthesis of a 6 bar – 1 slider planar They could establish a variety of adornment products using a variety of materials.
- They designed and produced pectorals of different configurations.
- They used semi-precious, faience and gold in pectorals production.
- They initiated using pectorals since the 3<sup>rd</sup> dynasty.
- Male, female, Pharaohs, nobles and people wore pectorals of different sophistication.
- Wide golden pectorals were designed and produced for Pharaohs.
- Fantastic multi-colored pectorals were produced from faience in the 18<sup>th</sup> dynasty.
- Pectorals simulating predatory birds were produced in the 18<sup>th</sup> dynasty for Pharaohs indicating power and wealth.
- Pharaohs and Nobles wore pectorals up to the 22<sup>nd</sup> dynasty.

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## BIOGRAPHY



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