

Mechanical Engineering in Ancient Egypt, Part 65: Stelae Industry (Second Intermediate Period and New Kingdom)

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Abstract:

This paper is the 65th research paper in a series investigating the evolution of mechanical engineering in ancient Egypt. It investigates the stelae industry during the Second Intermediate Period and the New Kingdom of ancient Egypt. It outlines the design, material contents, features of each stele and present location if known. The scenes characteristics and the text type and style of writing is outlined during each of the two periods under study.

Keywords — Mechanical engineering; ancient Egypt; stelae industry, 2nd Intermediate Period, New Kingdom.

I. INTRODUCTION

This is the 65 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 stelae industry in ancient Egypt during the Second Intermediate to Late Periods.

Teeter (2003) in her book about the ancient Egyptian treasures from the collection of the Oriental Institute of the University of Chicago presented a limestone stele of the household of Sebu from the 13th-14th Dynasties, a limestone stele of Nakht from the 18th Dynasty, stele of Seti I and Ramses II from the 19th Dynasty, stele dedicated to deity Reshep from the 19th-20th Dynasties stele of the hearing ear from 22nd-26th Dynasties, painted wood stele of a lady offering to Horus from the 22nd Dynasty, stele of Queen Amunirdis I from 25th-26th Dynasties, painted wood stele of Priest Harsiese from the 26th Dynasty and Necho II donation stele from the 26th [1]. Exell (2006) analysed more than four hundred stelae dating to the Ramesside Period based on iconographic content and function-related information of the stelae [2].

Kaper (2007) presented a limestone fragment of a hieratic stele from (probably) the 22nd Dynasty and a stele from the reign of Teteloth III from the 23rd Dynasty [3]. Labudek (2010) in his

thesis about Late Period stelae from Saqqara studied a number of stelae including the stele of nh-hnsw, stele of nh-wn-nfr from the 26th Dynasty (reign of Psamtik I), stele of w3h-ib-r from the 26th Dynasty (reign of Amasis), stele of ih-ms and stele of p3-di-hr-m-hb from the 27th Dynasty (reign of Darius) [4]. Cooney (2011) in her Ph. D. Thesis presented a number of stelae from the Third Intermediate Period of Egypt including the donation stele of Niumte, stele of In-Amun-nif-nebu, donation stele of Ker, stele of Tjerpet from the 22nd Dynasty, stele of Ne mateped, stele of Titaru, stele of Ralamun, stele of Tefnakht from 24th Dynasty, stele of Pediset and his sons, Serapeum stele and Pasenhor stele from the 22nd Dynasty [5].

Boraik (2013) presented a funerary stele from the New Kingdom with two scenes from the Book of Dead of Amduat [6]. Darnell (2014) analysed the stele of Usersatet produced during the reign of Pharaoh Amenhotep II from the 18th Dynasty where the text filled most of the surface of the stele [7]. Tomich (2016) presented a stele from the 16th Dynasty for King Bebiankh, a stele for an Egyptian Officer loyal to the ruler of Kush and a stele of Official Horemkhauf from the 16th Dynasty [8]. Wikipedia (2017) wrote an article about the stele of Pasenhor dated to the year 37 of Pharaoh Shshonq V of the 22nd Dynasty (730 BC) found in the Serapeum of Saqqara and now in the Louvre Museum [9]. Dunn (2018) presented a

number of stelae from ancient Egypt and outlined that the votive stelae with large ears were used for the first time during the 19th Dynasty [10]. Hassaan (2018) studied the stela industry in ancient Egypt during a time span from the Early Dynastic to the Middle Kingdom. He presented samples of the stelae produced in each period showing their material, height, shape, inscriptions and present location [11].

II. STELAE INDUSTRY IN THE SECOND INTERMEDIATE PERIOD

The Second Intermediate Period of Egypt covers the 13th to the 17th Dynasties over a time span from 1550 to 1802 BC [12]. We have a number of examples from the Second Intermediate Period tracing the production of stelae during this period. They are presented as follows:

- The first example is a 320 mm height sandstone stela of two women from the 12th-15th Dynasties (2061-1640 BC) in display in the Museum of Fine Arts at Boston and shown in Fig.1 [13]. The stela was of the rectangular design with rounded corners and depicted two ladies facing each other and holding a lotus flower in the right hand for the woman in the left and in the left hand for the woman in the right side of the stela with offerings in between them. There was unclear inscription in a horizontal band above the two women.
- The second example is an 0.64 m height limestone stela of Ameny from the 12th-14th Dynasties (1991-1640 BC) in display in the Museum of Fine Arts at Boston and shown in Fig.2 [14]. The stela was of the rectangular design with sharp corner showing the owner Ameny and his wife engraved twice in the middle of the stela with an offering table in between them. The stela was decorated from its top then came a three horizontal bands full of a hieroglyphic text, then in the bottom of the stela came an offering scene for Ameny and his wife with scripts in different

locations including one text row just before the seated couple.



Fig.1 Two women stela



Fig.2 Stele of Ameny

from 12th-15th Dynasties [13]. from 12th-14th Dyn [14]

- The third example is a 268 mm height painted limestone stela of Siamun from the 12th-13th Dynasties (1981-1575 BC) in display in the Metropolitan Museum of Art at NY and shown in Fig.3 [15]. It was of the rectangular design with a domed top and rounded bottom corners. It was decorated by two Wadjet eyes and a Shen between them within the domed top. Then came six rows of hieroglyphic text followed by a scene for the owner Siamun and his wife.
- The fourth example is a 243 mm height painted limestone stela of Nebiryerau from the 13th Dynasty in display in the Metropolitan Museum of Art and shown in Fig.4 [16]. It was of the same design as that of Siamun (Fig.3) except the owner how was shown seated in the lower part of the stela smelling a lotus flower in front of an offering table and receiving offerings.
- The fifth example is an 0.68 m height painted limestone funerary stela of Tembu from the 13th-14th Dynasty (1750-1650 BC) in display in the Walters Art Museum at Baltimore, USA and shown in Fig.5 [17]. It was of the same design of the stelae shown in

Figs.3 and 4 except the location of Tembu and his wife who came immediately below the Wadjet eyes seated in front of an offering table with a lady offering to them. There was a funerary scene below them and ended with a two lines horizontal text near the bottom of the stele.

- The sixth example is an 0.734 m height limestone stele of Kemes from the 13th Dynasty (1750-1720 BC) in display in the metropolitan Museum of Art (gift of Lila Acheson to the Museum in 2014) and shown in Fig.6 [18]. This stele had a unique feature since it was designed as two-3D parts over each other. The lower part took the shape of a shrine and the top part had false-door design with a figure any be for the stele owner and inscriptions for scenes for the owner. An inverted U-band housed a hieroglyphic text.



Fig.3 Stele of Siamun from 12th-13th Dynasties [15].



Fig.4 Stele of Nebiryerau from 13th-Dynasty [16]

- The seventh example is a stele of King Antef V from the 17th Dynasty (1588-1550 BC) in display in the Egyptian Museum at Cairo and shown in Fig.7 [19]. It was of the rectangular shape type with sharp corners. The inscriptions on its surface depicted the

King striding with scenes for animals around him.

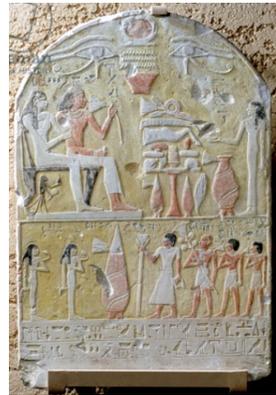


Fig.5 Stele of Tembu from 13th-14th Dynasties [17].



Fig.6 Stele of Kemes from 13th-Dynasty [18]



Fig.7 Stele of Antef V from 17th Dynasty [19].

III. STELAE INDUSTRY IN THE NEW KINGDOM

The New Kingdom was a strong and wealthy kingdom of ancient Egypt comprising the 18th, 19th and 20th Dynasties extended over a time span from 1570 to 1077 BC [20] The production of stelae continued during the New Kingdom affected by the power and wealth characteristics of this Kingdom as will be depicted from the following examples:

- The first example is a 495.3 mm painted limestone stele of Pharaoh Ahmose, the founder of the 18th Dynasty (1549-1524 BC) in display in the Museum of Fine Arts at Boston and shown in Fig.8 [21]. The stele was of the rectangular design

with domed-top and rounded bottom-corners decorated by two Wadjet eye and a Shen between them. Underneath Wadjet eyes came a hieroglyphic text written in eight short vertical bands and two short horizontal bands bounding the vertical bands. Then came a scene for the Pharaoh and his wife seated on chairs with long back with an offering table in front of them and an official saluting them. Underneath them came another scene (may be) for the family of the Pharaoh. In the bottom of the stele came a three bonded horizontal text lines.

- The second example is a 127 mm height limestone Ear stele from the New Kingdom (1550-1070 BC) in display in the Museum of Fine Arts and shown in Fig.9 [22]. It was of the same design of the Ahmose stele of Fig.8 except it had no decoration in its top part and had no text. It depicted a carved large ear and a Sphinx symbol.



Fig.8 Stele of Ahmose from 18th Dynasty [21].



Fig.9 Ear stele from New Kingdom [22]

- The third example is 255 mm height alabaster stele from the 18th Dynasty (1550-1292 BC) sold by Christies for 35,512 US\$ and shown in Fig.10 [23]. It

has the same design of the first two stela examples with a text in the top presenting the two deities Ram-headed and Frog-headed deities inscribed under this text. Then came a register for a man presenting an incense burner and perfume poured in a cup. Then a vertical text written in three bounded columns and one horizontal text written in a bounded row.

- The fourth example is a funerary stele from the 18th Dynasty (1543-1292 BC) in display in the State Hermitage Museum at Saint Petersburg, Russia and shown in Fig.11 [24]. It was of the rectangular-shape design with sharp corners showing a deceased before Horus who was shown holding a Was Scepter. A six columns hieroglyphic text was written in the top of the stele.



Fig.10 Alabaster stele from 18th Dynasty [23].



Fig.11 Funerary stele from 18th Dynasty [24]

- The fifth example is a painted limestone (!) stele depicting Pharaoh Amenhotep I from the 18th Dynasty (1524-1503 BC) in display in the Egyptian Museum at Cairo and shown in Fig.12 [25]. The stele was of the rectangular shape with sharp corners and decorated by a hieroglyphic text bounded by a frame-band. The Pharaoh was shown holding a Crook and Flail symbol in his left hand and a staff in his right hand with a

basket hanged in his left arm. Two Cartouche symbols were drawn in front of the Pharaoh's face.

- The sixth example is a 300 mm height painted limestone funerary stele of Vizier Neferrenpot from the 18th Dynasty (1400-1296 BC) in display in the Cleveland Museum of Art at Cleveland, USA and shown in Fig.13 [26]. It had the same design as the stelae in Figs.3, 4, 5, 8 and 9. It was decorated by a winged-sun disk in the domed area. It comprised two scenes over each other and two sets of hieroglyphic texts written in vertical columns.



Fig.12 Amenhotep I stele from 18th Dynasty [25].



Fig.13 Neferrenpot stele from 18th Dynasty [26]

- The seventh example is a limestone funerary stele from the 18th Dynasty (1400-1350 BC) in display in the Walters Art Museum at Baltimore and shown in Fig.14 [27]. The stele of the rectangular-domed type decorated within the dome by a number of symbols and scenes for Anubis. Then came a main scene for the owner and his wife seated on long back chairs with a funerary table in front of them and receiving offerings. The bottom part of the stele housed a hieroglyphic text written in four bounded horizontal lines.
- The eighth example is a 3.6 m height dream stele belonging to Pharaoh Thutmose IV from the 18th Dynasty (1398-1388 BC). This stele is a

reproduction at the Rosicrucian Egyptian Museum at San Jose, USA and shown in Fig.15 [28]. The stele was of the rectangular type and had a unique scene for the Pharaoh offering to the Sphinx-stature of (may be) for himself or of another Pharaoh. It housed a number of Cartouches of the Pharaoh besides another symbols such as Ankh and Djed.

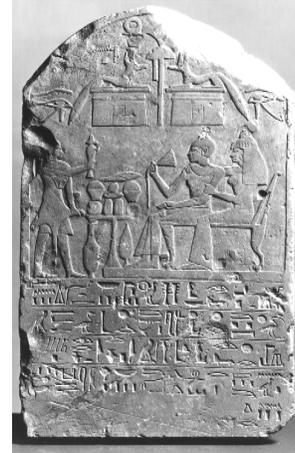


Fig.14 Funerary stele from 18th Dynasty [27]



Fig.15 Dream stele of Thutmose IV from 18th Dynasty [28].

- The ninth example is a 425 mm height painted limestone votive stele of Userhat from the 18th Dynasty (1353-1323 BC) shown in Fig.16 [29] The stele depicted Userhat and his wife worshipping and the rest of the stele surface area was full

of hieroglyphic text written in horizontal and vertical bounded lines.



Fig.16 Stele of Userhat from 18th Dynasty [29].

- The tenth example is a painted limestone stele of an Asiatic Soldier from the 18th Dynasty during the reign of Pharaoh Akhenaten (1353-1336 BC) in display in the Egyptian Museum at Berlin and shown in Fig.17 [30]. The stele was of the rectangular type with large-fillet rounded corners. It depicted the soldier seated on a stool in front of a woman and sucking a wine or beer from a wine bottle on a small table. In the top of this scene came a hieroglyphic text written in seven bounded columns.
- The eleventh example is an 0.508 m limestone fragment of a stele of Queen Nefertiti and two princesses from the 18th Dynasty, reign of Pharaoh Akhenaten (1351-1334 BC) and shown in Fig.18 [31].

In this stele fragment, two of the Queen princesses were shown playing Sistrum behind their mother while hieroglyphic text was written in three vertical bounded columns in the top and one horizontal bounded row in the bottom of the stele.

- The twelfth example is a 250 mm height limestone stele of Hatiay from the 18th Dynasty (1336-1295 BC) in display in the Metropolitan Museum and shown in Fig. 19 [32]. The stele was of the rectangular type with sharp corners with broken bottom. It depicted the owner and two of his family worshipping and a hieroglyphic text written in ten bounded columns covering the rest of the stele surface around the scene.
- The thirteenth example is a 290 mm height painted limestone stele of Scribe Iry from the 18th Dynasty (1300 BC) in display in the Calcuste Gultenian Museum at Lisbon, Portugal and shown in Fig.20 [33]. The stele was of the rectangular type with rounded bottom corners and domed top. The stele depicted two scenes. The top scene was for Pharaoh Ahmose I and his Great Royal Wife seated on their thrones with an offering table in front of them. The lower scene was for Scribe Iry kneeling and praying with a hieroglyphic text written in vertical bounded columns in front of him.



Fig.17 Asiatic soldier stele from 18th Dynasty [30].



Fig.18 Nefertiti stele from 18th Dynasty [31]

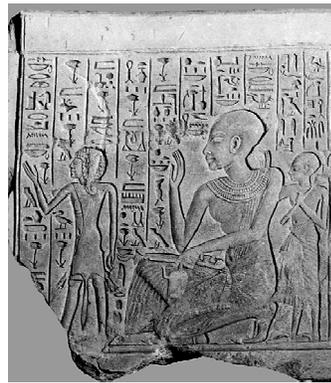


Fig.19 Hatiay stele from 18th Dynasty [32].



Fig.20 Nefertiti stele from 18th Dynasty [33]

- The fourteenth example is limestone stele from the 19th Dynasty (1295-1186 BC) in display in the British Museum and shown in Fig.21 [34]. The stele had a rectangular design with sharp corners at its bottom while it top had a triangular shape. It depicted one scene of a couple seated on chairs facing each other with a table between them and holding a lotus flower. A hieroglyphic text was written in six vertical bounded columns within the triangular area.
- The fifteenth example is a 270 mm height limestone stele of Nebuefer from the 19th Dynasty (1292-1187 BC) in display in the Egyptian Museum at Turin, Italy and shown in Fig.22 [35]. It was of the rectangular type with domed top and small-fillet rounded corners in its bottom. The stele was decorated by a number of symbols including two Wadjet eye and Shen symbols within the domed area and 12 Uraeus symbols below the domed area. In the bottom of the stele came a scene of the owner kneeling and praying by raising both hands with her funerary table behind her and a hieroglyphic text in front of her written in three vertical bounded columns.
- The sixteenth example is a 160 mm height limestone stele dedicated to the 'Great Cat' from the 19th Dynasty (1292-1189 BC) in display in the Egyptian Museum at Turin and shown in Fig.23 [36]. This stele was of the rectangular type with domed top and large-fillet rounded bottom corners. Within the domed area two cats were engraved facing each other seated on a base. In the rest of the stele surface came a hieroglyphic text written in five vertical bounded columns.
- The seventeenth example is a 300 mm height painted limestone stele of Amenemope, the servant in the 'Place of Truth' dedicated to Pharaoh Amenhotep I and his mother Queen Ahmose-Nefertari during the reign of Pharaohs Seti I and his son Ramses II (1290-1213 BC) in display in the Egyptian Museum at Turin and shown in Fig.24 [37]. The design of the stele is similar to that of Fig.23 except the wonderful colouring of this stele. It depicted the Pharaoh and his mother seated on thrones with a Cartouche in front of each one and a vertical text behind the Queen. In the bottom comes the dedicator (may be engraved twice or with his wife) kneeling and praying with hieroglyphic text written in vertical bounded columns above them.



Fig.21 Stele from 19th Dynasty [34].



Fig.22 Nebuefer stele from 19th Dynasty [35]



Fig.23 Cat stele from 19th Dynasty [36].



Fig.24 Amenemope stele from 19th Dynasty [37]

- The eighteenth example is a 460 mm height limestone stele of Baki from the 19th Dynasty, reign of Seti I and Ramses II (1290-1279 BC) in display in the Egyptian Museum at Turin and shown in Fig.25 [38]. The stele was of the rectangular type with domed top and rounded bottom corners. It was decorated by a winged sun-disk engraved within the domed area with two Uraeus symbols below it and hieroglyphic text above and below them, Then come a scene for two Crowned rams facing each other with a fan at the Middle of each of them. In the bottom came a scene for Baki kneeling and praying with a hieroglyphic text behind and before him written within nine vertical columns bounded by red lines.
- The nineteenth example is a 2.22 m height black sandstone stele of Bentrash, the sister in law of Pharaoh Ramses II of the 19th Dynasty (1279-1213 BC) in display in the Louvre Museum and shown in Fig.26 [39].



Fig.25 Baki stele from 19th Dynasty [38].



Fig.26 Bentrash stele from 19th Dynasty [39]

This stele had the standard domed-top design and housed carved inscriptions for: winged son-disk in the domed area, scene for Pharaoh Ramses II offering incense for Khonsu of Thebes and a 28 horizontal lines hieroglyphic text telling the story of Bentresh.

- The twentieth example is a 310 mm limestone stele fragment of Vizier Neferrenpet from the 19th Dynasty (1279-1213 BC) in display in the Metropolitan Museum at NY and shown in Fig.27 [40]. It was of the classical domed top design with a scene for the owner making offerings to a deity with hieroglyphic text written in the domed area in vertical bounded columns.
- The twenty first example is a 180 mm height stele of a Vizier dedicated it to Pharaoh Ramses II (1279-1213 BC) in display in the Louvre Museum and shown in Fig.28 [41]. This stele was of the rectangular design with sharp corners and inscribed from both sides. One of the sides depicted the Pharaoh in the childhood stage seated on a stool with his Cartouche in front of him.



Fig.27 Neferrenpet stele from 19th dynasty [40].



Fig.28 Vizier stele from 19th Dynasty [41]

- The twenty second example is a 1.685 height sandstone stele of Pharaoh Ramses II from the 19th Dynasty (1279-1213 BC) in display in the Brooklyn

Museum and shown in Fig.29 [42]. It was of the standard rectangular type with domed top and small-rounded bottom corners. It has two sets of scenes and a hieroglyphic text in between. The top scene registered the Pharaoh and Amun-Re offering to each other while the bottom scene registered some Egyptians praising the Pharaoh. The text was written in five horizontal lines.



Fig.29 Ramses II stele from 19th dynasty [42]

- The twenty third example is an 0.71 m painted limestone fragment stele of Iniua and his wife Yui found in their tomb from the 19th Dynasty (1279-1212 BC) shown in Fig.30 [43]. It was of the rectangular type with sharp corners. It depicted the owner and his wife kneeling and praying for two of the ancient Deities of ancient Egypt with hieroglyphic text written in between them.
- The twenty fourth is a 1.76 m height limestone stele of the Royal Scribe Paser from the 19th Dynasty (1250 BC) in display in the British Museum and shown in Fig.31 [44]. It was of the rectangular shape with domed top and sharp bottom corners. It depicted two scenes and five horizontal rows of

hieroglyphic text in between them. The first scene presented Paser and his brother praying to three deities, followed by the text then comes the second scene for the owner and his wife seated behind an offering table and receiving offerings from their relatives.



Fig.30 Vizier stele from 19th Dynasty [43]

- The twenty fifth example is a 3.18 m height granite victory stele of Pharaoh Marenptah of the 19th Dynasty (1213-1203 BC) in display in the Egyptian Museum at Cairo and shown in Fig.32 [45]. This giant stele took the standard design of rectangular shape and domed top with big radius bottom corners. The scene in the domed area presented the Pharaoh with some of the ancient Egyptian Deities. Under the scene came a hieroglyphic text written in horizontal lines and covered the rest of the stele surface area describing the battles of the Pharaoh against the Libyans and the sea people.



Fig.31 Pacer stele from 19th dynasty [44].



Fig.32 Merenptah stele from 19th Dynasty [45]

- The twenty sixth example is a 170 mm height limestone stele with ears from the 19th Dynasty (1292-1187 BC) in display in the Egyptian Museum at Turin and shown in Fig.33 [46]. The stele was of the rectangular shape with rounded corners. It depicted four ears engraved inside a bounded rectangle with a hieroglyphic text written in a vertical and horizontal bounded bands forming the shape of an inverted T.



Fig.33 Four ears stele from 19th Dynasty [46].

- The twenty seventh example is a year 4 stele of Pharaoh Setnakhte, the founder of the 20th Dynasty (1189-1186 BC) shown in Fig.34 [47]. It had a trapezoidal shape with domed top and rounded bottom corners. In the top part of the stele came a scene for the Pharaoh kneeling and praying to one of the ancient Egypt Deities with his Cartouches around him. Under which came a hieroglyphic text written in 17 bounded rows . A second scene for the praying Pharaoh was carved in the left bottom corner of the stele.. Even though the stele belonged to a Royal person, I could not trace the present location of the stele and a lot of data are missing !. It normal display has to me in the Egyptian Museum at Cairo !!!.



Fig.34 Setnakhte stele from 20th Dynasty [47].

IV. CONCLUSIONS

- The paper investigated the evolution of Mechanical Engineering in ancient Egypt through the stelae industry during the Second Intermediate Period and the New Kingdom.
- The ancient Egyptians registered their knowledge on stone and wood stelae in the shape of scenes and hieroglyphic text.
- They produced stelae of height ranging from 127 mm to 3.6 m.
- They used sandstone, limestone and alabaster as materials for stelae production.
- Most of the stelae produced during this period were of the rectangular shape with or without domed top.
- Not only men but also women used stelae for tombs of offering to temples.
- Wonderful paintings were an important characteristics for some of the stelae produced during the Second Intermediate Period and New Kingdom.
- Most stelae comprised both scenes and text.
- 3D-stele appeared during the 13th Dynasty of the 2nd Intermediate Period.
- Some stelae did not include any text.
- Some stelae were decorated by ancient Egyptian symbols such as Wadjet eye and Shen.

- Stelae were extensively used during the New Kingdom by Royal, Nobles or Public.
- Non-Egyptian citizens produced their own stelae during the 18th Dynasty.
- Triangular-topped stele appeared during the 19th Dynasty.
- The Uraeus symbol continued to appear in the stelae scenes during the New Kingdom.
- Animal scenes were depicted in some of the stelae of the 12th – 15th, 17th and 19th Dynasties.
- Ear stelae appeared during the New Kingdom.
- A large number of stelae depicted the pose of the ancient Egyptians (Royal and public) during praying (worshipping) through kneeling raising both hands.

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