

Mechanical Engineering in Ancient Egypt, Part 72: Seals Inscription

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ABSTRACT

This work investigated the evolution of writing in ancient Egypt through studying inscription of seals during the Early Dynastic through the Late Periods. The features of various seal types production are studied through examples including: material, dimensions, inscription, text type and present location (if known). The purpose of each seal is also highlighted (if known). The overall characteristics of the different types of presented seals are outlined.

Keywords: Mechanical engineering, ancient Egypt, Seals inscription, Early Dynastic to Late Periods

INTRODUCTION

This paper is the 72 one in a series of research papers aiming at investigating the evolution of Mechanical Engineering in ancient Egypt through studying the seals inscription during the Early Dynastic to the Late Periods. Padzorski (1988) in her paper about Predynastic Egyptian seals outlined that seals were rare in the archaeological record of Predynastic Egypt. She outlined also that the R. Lowie Museum of Archaeology of the University of California holds three seals from the Egyptian Predynastic Period, two cylinder seals and a hemispherical stamp seal [1]. Shubert (1998) in her Master of Arts Thesis about seal impressions from East Karnak presented clay sela impressions from the 6th Dynasty, 7th Dynasty, 8th Dynasty, 9th Dynasty, 9th-11th Dynasties, 11th-12th Dynasties and 13th-14th Dynasties [2]. Hill (2004) in her book about cylinder seal glyptic in Predynastic Egypt and neighbouring regions focussed on finds from each tomb complex. She assessed the significance of seals as magical objects and as administrative tools [3].

Cooney and Tyrrell (2005) investigated 48 scarabs in the Los Angeles Country Museum of Art. They provided an image for the inscription of each scarab and examined the meaning and function of each scarab [4]. Sparavigna (2009) in her study of the ancient Egyptian seals and scarabs outlined that in ancient times, seals were used for securing bags, baskets, jars, etc. And identified contents or owner. She presented

many examples for seals and scarabs with various scenes and designs [5].

Sparavigna (2013) discussed the presence of symmetries in images engraved on ancient stamp seals. She presented stamp seals from Middle Kingdom and First Intermediate Periods of ancient Egypt [6]. Piquette (2013) in his study of the writing in Lower Nile Valley outlined that portable writing surfaces included over 4000 objects including seals and seal impressions [7]. Colburn (2014) in his Ph. D. Thesis presented a large number of seal impressions from the Palace of Apries at Memphis from the 27th Dynasty, a cylinder seal from Gordion, agate Royal cylinder seal of Darius I [8].

Bussmann (2014) in his study of Egypt in the 3rd millennium BC presented seal impressions from Hieraconpolis mentioning the name of King Sneferu of the 4th Dynasty [9]. Topcuoglu (2015) in his study of the iconography of protoliterate seals presented a cylinder seal and cylinder seal impressions from Uruk of Iraq (3000 BC) [10]. Macarthur (2015) in his study of the conception and development of the Egyptian writing system presented a cylinder seal from the 1st Dynasty, clay seal impression from time of King Narmer, clay seal impression from the 1st Dynasty, jar impression from the 1st Dynasty and clay impression from the 2nd Dynasty [11]. Wikipedia (2016) wrote an article about ancient near Eastern seals and sealing practices. They outlined the use of two main

types of seals: The stamp seal and the cylinder seal who came after the stamp seal [12]. Hassaan (2017) in his study about scarabs in ancient Egypt and their use [presented scarab seals from the 13th Dynasty, 14th-15th Dynasties, 15th Dynasty, Second Intermediate Period and 21st-22nd Dynasties [12]. Wikipedia (2017) wrote an article about King Den seal impressions generated by a cylinder seal found in the tomb of King Den of the 1st Dynasty. The impressions were considered as the earliest confirmed King list from the 1st Dynasty. The impression registered the names of the Kings: Narmer, Hor-Aha, Djer, Djet, Den and Merneith [14]. Wegner (2018) pointed out that sealing techniques first appeared in ancient Egypt about 3600 BC during the time of Naqada II Period. He provided a typological overview of the evolution of seal forms (cylinder, stamp, scarab, and other seal forms) and how the ancient Egyptians used sealing in administration systems [15].

EARLY DYNASTIC SEALS AND SEAL IMPRESSIONS

The Early Dynastic Period of ancient Egypt comprised the 1st and 2nd Dynasties over a time period from 3150 to 2686 BC [16]. We have a number of examples depicting the development of the seals industry and seals impressions related to the Early Dynastic Period of Egypt presented as follows:

- The first example is an 84 x 74 x 31 mm clay jar sealing impression of King Aha from the 1st Dynasty (3100-3050 BC) in display in the Liverpool Museums and shown in Fig.1 [17]. The type of seal used was not assigned nor the translation of the impression.



Figure1. Clay jar sealing impression of King Aha from 1st Dynasty [17].

- The second example is a 26 x 24 mm steatite cylinder seal from the 1st Dynasty (3100-2896 BC) in display in the Brooklyn Museum at NY and shown in Fig.2 [18]. The translation of the seal inscription was not available.



Figure2. Steatite seal from 1st Dynasty [18]

- The third example is a 18 mm length cylinder seal impression from the Early Dynastic Period (3100-2650 BC) in display in the Metropolitan Museum of Art and shown in Fig.3 [19]. The seal was rolled twice on the mud producing a clear neat impression. The translation of the impression is not available.
- The fourth example is a cylinder seal impression from the tomb of King Den from the 1st Dynasty (2990-2940 BC) in display (probably) in the National Archaeological Museum (France) and shown in Fig.4 [20]. The seal was considered as the oldest list registering six Kings of the 1st Dynasty: Narmer, Aha, Djer, Djet, Den and Merneith [20]. No dimensions nor material were provided, however most probably it was a clay impression.
- The fifth example is a clay seal impression from the tomb of Seth-Peribsen, the 5th King of the 2nd Dynasty (2890-2686 BC) shown in Fig.5 [21]. The seal was inscribed by the Serikh and Cartouche of the King and a scene (may be) for the King wearing the White Crown of Upper Egypt.
- The sixth example is a 20.4 mm height and 19.4 mm diameter limestone cylinder seal of King Seth-Peribsen shown in Fig.6 [22]. The seal provided an impression for the King's Cartouche and other hieroglyphic scripts as shown below the seal in Fig.6.
- The seventh example is a 48 x 40 x 42 mm clay seal impression of King Sekhemib, who ruled Egypt (probably) after King Peribsen during the time of the 2nd Dynasty (2720 BC) in display in the World Museum at Liverpool and shown in Fig.7 [23]. The impression presents the Serekh of the King and a hieroglyphic text.



Figure3. Cylinder seal impression from the Early Dynastic Period [19].

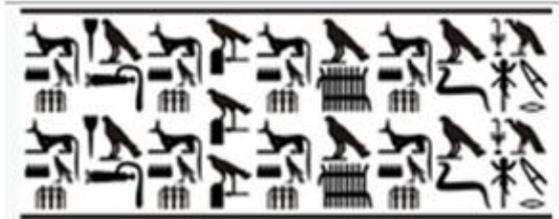


Figure4. Seal impression from King Den tomb, 1st Dynasty [20]



Figure5. Seal impression from King Peribsen tomb, 2nd Dynasty [21].

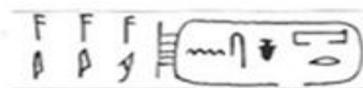
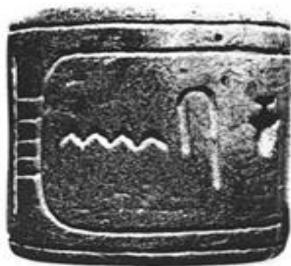


Figure6. Cylinder seal of King Peribsen, 1st Dynasty [22]



Figure7. Jar seal impression of King Sekhemib, 2nd Dynasty [23].

OLD KINGDOM SEALS AND SEAL IMPRESSIONS

The Old Kingdom of ancient Egypt comprised four Dynasties from the 3rd to the 6th over a time span from 2686 BC to 2181 BC [24]. Cylinder seal continued to be used during the Old Kingdom with few live models still existing in some of the international museums as depicted in the following examples:

- The first example is a 64 mm height and 29 mm diameter golden office seal from reign of Djedkare Isesi, the 8th King of the 5th Dynasty (2414-2375 BC) in display in the Museum of Fine Arts at Boston and shown in Fig.8 [25]. The seals was inscribed by the Serekh of the King and hieroglyphic text around it with a central hole through out its length..
- The second example is a 32 x 24 mm clay oval seal impression found in East Karnak of Egypt and produced during the 6th Dynasty (2345-2181 BC) shown in Fig.9 [26]. The details of the inscriptions are not clear enough and the present location was not recorded.



Figure8. Office seal from reign of King Isesi from 5th Dynasty [25]



Figure9. Clay seal impression from 6th Dynasty [26].

- The third example is a 67 mm height and 33 mm diameter turquoise cylinder seal of King

Pepi I from the 6th Dynasty (2331-2287 BC) in display in the Metropolitan Museum of Art at NY and shown in Fig.10 [27]. The seal was broken from both sides and inscribed by the Serekh of the King and a text in vertical bounded columns written using the hieroglyphic script.

- The fourth example is a 53 mm height steatite cylinder seal of King Pepi I from the 6th Dynasty (2331-2287 BC) in display in the Metropolitan Museum of Art at NY and shown in Fig.11 [28]. The seal is intact and was inscribed between two bounding lines with the inscriptions engraved in between including the Serekh of the King and a hieroglyphic text..



Figure10. Turquoise cylinder seal of King Pepi I. from 6th Dynasty [27]



Figure11. Steatite cylinder seal of King Pepi I from the 6th Dynasty [28].

- The fifth example is a 22-25 mm diameter granite cylinder seal of King Pepi I from the 6th Dynasty (2331-2287 BC) in display in the Royal Museum of Art at Brussels, Belgium and shown in Fig.12 [29]. The seal was inscribed by the Serekh of the King in an un-bounded area written using the hieroglyphic script.
- The sixth example is a 58.7 mm cylinder seal impression from the 6th Dynasty (2289-2255 BC) in display in the Metropolitan

Museum of Art at NY and shown in Fig.13 [30]. The impression included a Royal Serekh in its beginning and a hieroglyphic text engraved in un-bounded six columns. The third column of the text included a Royal Cartouche. The museum didn't provide a translation for the impression contents.



Figure12. Granite cylinder seal of King Pepi I. from 6th Dynasty [29]



Figure13. Cylinder seal impression from the 6th Dynasty [30].

MIDDLE KINGDOM SEALS AND SEAL IMPRESSIONS

The Middle Kingdom of ancient Egypt comprised the 11th and 12th Dynasties over a time span from 2050 to 1710 BC [31]. The evolution of seals inscription through this historical era is investigated through the following examples:

- The first example is a 32 mm height and 8 mm diameter animal tooth cylinder seal from the 11th Dynasty (2055 BC) in display in the World Museum at Liverpool and shown in Fig.14 [32]. It was inscribed by a hieroglyphic text within a bounded area on the circumference.
- The second example is a double seal impression from the Middle Kingdom (2050-1710 BC) in display in the Metropolitan Museum of Art and shown in Fig.15 [33]. This was a cylinder seal inscribed by a Royal Cartouche and a text written within an un-bounded column all using the hieroglyphic script.



Figure14. Tooth cylinder seal from. the 11th Dynasty [32]



Figure17. Steatite seal of King Senusret I From the 12th Dynasty [35]



Figure15. Double seal impression from the Middle Kingdom [33]

NEW KINGDOM SEALS AND SEAL IMPRESSIONS

The New Kingdom of ancient Egypt comprised the 18th to 20th Dynasties over a time span from 1570 to 1077 BC [36]. The evolution of seals inscription through this historical era is investigated through the following examples:

- The third example is 44.2 mm height and 15.5 mm diameter glazed steatite cylinder seal of Queen Sobekneferu from the 12th Dynasty (1799-1795 BC) in display in the British Museum at London and shown in Fig.16 [34]. It was inscribed by the Royal Serekh of the Queen and a hieroglyphic script text written below and beside the Serekh.
- The fourth example is glazed steatite cylinder seal of King Senusret I of the 12th Dynasty (1956-1911 BC) in display in the Petrie Museum at London and shown in Fig.17 [35]. It was inscribed vertically using the hieroglyphic script. The King Cartouche may be in the back surface of the image shown in Fig.17.

- The first example is a 12 mm height steatite scarab seal from the New Kingdom (1570-1070 BC) in Private Collection in Los Angeles of California and shown in Fig.18 [37]. It was inscribed by a falcon, solar disk and Nefer sign..
- The second example is a 55 mm Mittanian cylinder seal from the 18th Dynasty (1500-1300 BC) was in display by Sands of Time for sale for 6500 US\$ and shown in Fig.19 [38]. The seal was inscribed by a hunting scene and housed inside a golden pendant.



Figure16. Steatite seal of Queen Sobekneferu From the 12th Dynasty [34]



Figure18. Scarab seal from New Kingdom [37].



Figure19. Cylinder seal from the 18th Dynasty [38].

- The third example is a 13.5 mm height faience scarab seal from the joint reign of Pharaohs Hatshepsut and Thutmose III of the

18th Dynasty (1479-1458 BC) in display in the Metropolitan Museum of Art and shown in Fig.20 [39]. The seal had an oval shape and was nicely engraved (may be through casting) inside an oval boundary.

- The fourth example is a 16 mm height steatite scarab seal of Pharaoh Thutmose III of the 18th Dynasty (1479-1425 BC) which is a Private Collection and shown in Fig.21 [40]. The seal had semi-oval oval shape and was nicely engraved inside an oval boundary with the Cartouche of the Pharaoh in the top and a hieroglyphic text under the Cartouche filling the whole area.



Figure20. Scarab seal from 18th Dynasty [39].



Figure21. Scarab seal from the 18th Dynasty [40].

- The fifth example is a 28 mm height glazed steatite scarab seal of Pharaoh Thutmose III of the 18th Dynasty (1479-1425 BC) in display in the Metropolitan Museum of Art and shown in Fig.22 [41]. The seal had an oval shape and was nicely engraved inside an oval boundary with the Cartouche of the Pharaoh towards the bottom end of the area and scenes around the Cartouche including a Sphinx for the Pharaoh.
- The sixth example is a steatite scarab seal of Queen Tiye of the 18th Dynasty (1398-1338 BC), wife of Pharaoh Amenhotep III shown in Fig.23 [42]. The seal had an oval shape and was engraved inside an oval boundary with a scene for the Queen sitting on a chair and her Cartouche in front of her and a hieroglyphic text over the Queen and her Cartouche.



Figure22. Scarab seal of Thutmose III. from the 18th Dynasty [41].



Figure23. Scarab seal of Queen Tiye from the 18th Dynasty [42].

- The seventh example is a 15 mm height glazed steatite scarab seal of Pharaoh Amenhotep III and his Great Royal Wife Queen Tiye of the 18th Dynasty (1388-1351 BC) in display in the Walters Art Museum of Baltimore, USA and shown in Fig.24 [43]. The seal had semi-oval shape and was deeply engraved inside a semi-oval boundary with the name of the Pharaoh and his wife.
- The eighth example is a stamp seal of Pharaoh Ramses II from the 19th Dynasty (1279-1213 BC) found in display in a charity shop in Hertfordshire, UK and shown in Fig.25 [44]. It was inscribed by two Cartouches of the Pharaoh, scene between them and a hieroglyphic text between the Cartouches and below them written in two bounded rows.



Figure24. Scarab seal of Amenhotep III. from the 18th Dynasty [43].



Figure25. Stamp seal of Ramses II from the 19th Dynasty [44].

- The ninth example is a stone scarab seal of Pharaoh Ramses II of the 19th Dynasty (1279-1213 BC) shown in Fig.26 [45]. The seal had semi-oval shape and was deeply engraved inside a semi-oval boundary with the Cartouche of the Pharaoh, scenes for the Pharaoh in a hunting position, gazelle, sun disk, two Uraeus signs, boat and hieroglyphic text.
- The tenth example is a glazed steatite scarab seal of Pharaoh Siptah from the 19th Dynasty (1197-1191 BC) in display in the Walters Art Museum at Baltimore and shown in Fig.27 [46]. It had an oval shape and was deeply engraved by a hieroglyphic text belonged to Pharaoh Siptah.



Figure26. Scarab seal of Ramses II from the 19th Dynasty [45].



Figure27. Stamp seal of Siptah from the 19th Dynasty [46].

The eleventh example is a 32 mm height faience scarab seal of Pharaoh Ramses VIII of the 20th Dynasty (1129-1126 BC) in display in the Metropolitan Museum of Art and shown in Fig.28 [47]. The seal had an oval shape and was deeply engraved inside an oval boundary with a hieroglyphic text belonged to the Pharaoh



Figure28. Scarab seal of Ramses VIII from 20th Dynasty [47]

LATE PERIOD SEALS AND SEAL IMPRESSIONS

The Late Period of ancient Egypt comprised the 26th to 30th Dynasties over a time span from 664 to 332 BC [48]. The evolution of seals inscription through this historical era is investigated through the following examples:

- The first example is a 54 mm height and 57.2 mm width official clay stamp seal impression from the 26th Dynasty, reign of Pharaoh Psamtik I (664-610 BC) and Pharaoh Amasis (569-536 BC) in display in the Los Angeles Country Museum of Art at Los Angeles and shown in Fig.29 [49]. The stamp seal used was inscribed by the Cartouches of the two Pharaohs and a hieroglyphic text and symbols engraved in three columns.
- The second example is a 45 mm height schist oval scarab seal from the 26th Dynasty sold by Christies in April 2012 at London for 2,615 US\$ and shown in Fig.30 [50]. It was engraved by a Royal Cartouche and a hieroglyphic text under it within an oval boundary.



Figure29. Official clay seal impression from the 26th Dynasty [49].



Figure30. Scarab seal from the 26th Dynasty [50].

- The third example is a 25.4 mm height hematite scarab seal of Pharaoh Psamtic I from the 26th Dynasty (664-610 BC) shown in Fig.31 [51]. It was engraved by two Cartouches for the Pharaoh and a hieroglyphic text in the top of them may be a title for each cartouche.
- The fourth example is a reproduction of a seal impression generated by a scarab seal from the Late Period (646-342 BC) showing a scene for a baboon and an ibis shown in Fig.32 [52]. The designer showed the ibis holding an Ankh symbol while the baboon was watching him.



Figure31. Scarab seal of Psamtic I from the 26th Dynasty [51].



Figure32. Scarab seal impression from the Late Period [52].

CONCLUSION

- The development of the seals inscription during the ancient Egypt era from Early Dynastic to Late Periods was investigated through 32 seals and seal-impression examples.
- The ancient Egyptians during the studied periods from 3150 to 332 BC produced seals having heights between 12 to 74 mm.

- They produced cylinder seals with diameter from 8 to 29 mm.
- The material used in seals production was: limestone, steatite, glazed steatite, gold, turquoise, granite, mittanian, schist, hematite, animal tooth and faience.
- They generated seal impressions on clay (and wax [53]).
- They produced stamp, scarab and cylinder seals.
- They used the hieroglyphic script in the inscription of their seals.
- They registered a list of six Kings from the 1st Dynasty for the first time.
- They referred to their Kings through their Serekh and then through their Cartouche.
- They designed seals having cylindrical, oval and semi-oval surfaces.
- They inscribed seals with scenes, signs, Serekhs, Cartouches and text.
- They could inscribe seals as small as 15 mm height with information related to the Pharaoh and his Great Royal Wife.
- Some of the seals presented more than one Cartouche and inscribed in a number of text lines.

REFERENCES

- [1] P. Podzorski, "Predynastic Egyptian seals of known provenance in the R.H. Lewie Museum of Anthropology", *Journal of Near Eastern Studies*, vol.47, no. 4, pp.259-268, 1988..
- [2] S. Shubert, "Dating by design: Seal impressions from East Karnak", *Master of Arts Thesis*, University of Toronto, 1998.
- [3] J. Hill, "Cylinder seal glyptic in Predynastic Egypt and neighboring regions", *Archaeopress*, 2004.
- [4] K. Cooney and J. Tyrrell, "Scarabs in the Los Angeles County Museum of Art, Part I: Distributed propaganda or intimate protection *Archaeology of Egypt/Egyptology*, vol.4, issue 1, pp.1-14, 2005.
- [5] Sparavigna, "Ancient Egyptian seals and scarabs", *Torino, Italy* 54 pages, 2009.
- [6] Sparavigna, "Symmetries in images on ancient seals", *International Journal of Science*, vol.2, issue 8, pp.14-20, 2013.
- [7] K. Piquette, "It is written ?: Making, remarking and unmaking early writing in the Lower Nile Valley", in K. Piquette and R. Whitehouse (Editors), "Writing as material practice: Substance, surface and medium", *Uniquity Press*, London, pp.213-238, 2013.

- [8] H. P. Colburn, "The archaeology of Archaemenid rule in Egypt", *Ph. D. Thesis*, University of Michigan, 2014.
- [9] R. Bussmann, "Sealing the state: Egypt in the Third millennium BC", *Archaeology International*, vol.17, pp.79-93, 2014.
- [10] O. Topcuoglu, "Iconography of Protoliterate seals", in C. Woods (Editor), "Visible language", *Oriental Institute Publication No. 32*, pp.29-33, 2015.
- [11] E. Macarthur, "The conception and development of the Egyptian writing system", in C. Woods (Editor), "Visible language", *Oriental Institute Publication No. 32*, pp.115-136, 2015.
- [12] Wikipedia, "Ancient near Eastern seals and sealing practices", https://en.wikipedia.org/wiki/Ancient_Near_Eastern_seals_and_sealing_practices, 2016.
- [13] G. A. Hassaan, "Mechanical Engineering in ancient Egypt, Part 47: Statuettes of scarabs", *World Journal of Engineering Research and Technology*, vol.3, issue 3, pp.441-457, 2017.
- [14] Wikipedia, "Den seal impressions", https://en.wikipedia.org/wiki/Den_seal_impressions, 2017.
- [15] J. Wegner, "The evolution of ancient Egyptian seals", in M. Ameri, S. Costelb and G. Scott (Editors), "Seals and sealing in the ancient world", *Cambridge University Press*, pp.229-257, 2018.
- [16] Wikipedia, "Early Dynastic Period (Egypt)", [https://en.wikipedia.org/wiki/Early_Dynastic_Period_\(Egypt\)](https://en.wikipedia.org/wiki/Early_Dynastic_Period_(Egypt)), 2018.
- [17] Liverpool Museums, "Jar sealing with seal impression of King Aha", <http://www.liverpoolmuseums.org.uk/wml/collections/antiquities/ancient-egypt/item-295385.aspx>, 2018.
- [18] Brooklyn Museum, "Cylinder", <https://www.brooklynmuseum.org/opencollection/objects/20549>
- [19] Metropolitan Museum, "Cylinder seal", <https://www.metmuseum.org/art/collection/search/547402>, 2018.
- [20] Wikipedia, "Den seal impression", https://en.wikipedia.org/wiki/Den_seal_impressions, 2017.
- [21] Crysta Links, "Clay impression from tomb of Seth-Peribsen, 5th King of the 2nd Dynasty", <http://www.crystalinks.com/dynasty2.html>
- [22] Xoomer, "Cylinder seal of Peribsen", <http://xoomer.virgilio.it/francescoraf/hesyra/pribsn.htm>
- [23] Liverpool Museums, "Jar sealing with seal impression of King Sekhemib", <http://www.liverpoolmuseums.org.uk/wml/collections/antiquities/ancient-egypt/item-303859.aspx>, 2018.
- [24] Wikipedia, "Old Kingdom of Egypt", https://en.wikipedia.org/wiki/Old_Kingdom_of_Egypt, 2018.
- [25] MFA, "Seal of office", <https://www.mfa.org/collections/object/seal-of-office-150473>, 2018.
- [26] S. Shubert, p.57.
- [27] Metropolitan Museum, "Cylinder seal with the name of Pepi I", <https://www.metmuseum.org/art/collection/search/572011>, 2018.
- [28] Metropolitan Museum, "Cylinder seal with the name of Pepi I", https://www.metmuseum.org/art/collection/search/571903?sortBy=Relevance&when=8000-2000+B.C.&where=Egypt&ao=on&ft=*&offset=60&rpp=20&pos=62, 2018.
- [29] Global Egypt Museum, "Cylinder seal of Pepy I", <http://www.globalegyptianmuseum.org/detail.aspx?id=1249>
- [30] Metropolitan Museum, "Cylinder seal", <https://www.metmuseum.org/art/collection/search/327200>, 2018.
- [31] Wikipedia, "Middle Kingdom of Egypt", https://en.wikipedia.org/wiki/Middle_Kingdom_of_Egypt, 2018.
- [32] Liverpool Museums, "Writing, Middle Kingdom", <http://www.liverpoolmuseums.org.uk/wml/collections/antiquities/ancient-egypt/item-295378.aspx>, 2018.
- [33] Metropolitan Museum, "Cylinder seal", https://metmuseum.org/art/collection/search/327202?rpp=30&pg=2&rndkey=20140525&ft=* &what=Seals&pos=42, 2018.
- [34] Ancient Egyptian, "Glazed steatite cylinder seal of Sobekneferu", <http://ancientegyptian.soup.io/tag/12th%20Dynasty>
- [35] Ancient Egypt, "Cylinder seal with Senusret I", [http://www.ancient-egypt.co.uk/petrie%20museum/pages/petrie%20museum%20\(ucl\)%20171.htm](http://www.ancient-egypt.co.uk/petrie%20museum/pages/petrie%20museum%20(ucl)%20171.htm), 2017.
- [36] Wikipedia, "New Kingdom of Egypt", https://en.wikipedia.org/wiki/New_Kingdom_of_Egypt, 2018.
- [37] Ancient Resource, "New Kingdom steatite scarab seal", http://www.ancientresource.com/lots/egyptian/egyptian_scarabs.html
- [38] Sands of Time, "A rare mittanian cylinder seal, 18th Dynasty", https://www.sandsoftimedc.com/products/mj1303?utm_campaign=Pinterest%20Buy%20Button&utm_medium=Social&utm_source=Pinterest&utm_content=pinterest-buy-button-027e6fdb0-728c-4131-a8bf-b6b1f6208e97, 2018.
- [39] Metropolitan Museum, "Scarab", <https://www.metmuseum.org/art/collection/search/550515?where=Egypt&=&pg=17&=&rpp=20&=&pos=339>, 2018.
- [40] Jenny, "Egyptian scarab, New Kingdom, 1549-1070 BC, steatite", <https://www.pinterest.com/pin/382031980873013468/>
- [41] Metropolitan Museum, "Scarab of Thutmose III", <https://www.metmuseum.org/art/collection/search/554543?rpp=90&pg=4&rndkey=20151108&ft=%2A&deptids=10&where=Egypt&what=Sculpture&pos=344>, 2018.

- [42] Y. Gaber, "Egyptian steatite scarab of Queen Tiye, 18th Dynasty", <https://www.pinterest.com/pin/509891989045354182/>
- [43] Walters Museum, "Amulet with the name of Amenophis III and Queen Tiye", <https://art.thewalters.org/detail/1920/amulet-with-the-names-of-amenophis-iii-1388-1351-1350-bc-and-queen-tiye/>
- [44] Dailymail, "Ancient Egyptian seal believed to show Ramesses the Great", <http://www.dailymail.co.uk/sciencetech/article-2965390/Now-S-bargain-Ancient-Egyptian-seal-believed-Ramesses-Great-discovered-charity-shop-costing-12.html>
- [45] Pinterest, "Scarab artefact, Rameses II", <https://www.pinterest.com/pin/426082814716877404/>
- [46] Walters Museum, "Scarab with the name of King Siptah", <https://art.thewalters.org/detail/28766/scarab-with-the-name-of-king-siptah-1194-1193-1186-1185-bc/>
- [47] Common Wikimedia, "Scarab, Ramesses VIII, MET", https://commons.wikimedia.org/wiki/File:Scarab,_Ramesses_VIII_MET_66.99.117.jpg, 2018.
- [48] Wikipedia, "Late Period of ancient Egypt", https://en.wikipedia.org/wiki/Late_Period_of_ancient_Egypt, 2018.
- [49] Van Haeften, "Seal impression of an official of the 26th Dynasty", <https://www.flickr.com/photos/wikimediacommons/16439077645/in/photostream>
- [50] Christies, "An Egyptian green schist heart scarab, Late Period", <https://www.christies.com/lotfinder/ancient-art-antiquities/ancient-egyptian-green-schist-heart-scarab-late-5546804-details.aspx>
- [51] Bruce, "An Egyptian hematite scarab inscribed for Psamtik I, Late Period", <https://www.pinterest.com/pin/542402348841360326/>
- [52] Shmoop, "Reproduction of a seal impression from a scarab of Thoth, Late Period", <https://www.shmoop.com/thoth/photo-it-me.html>, 2018.
- [53] Liverpool Museums, "Seal impression", <http://www.liverpoolmuseums.org.uk/wml/collections/antiquities/ancient-egypt/item-634086.aspx>, 2018.

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