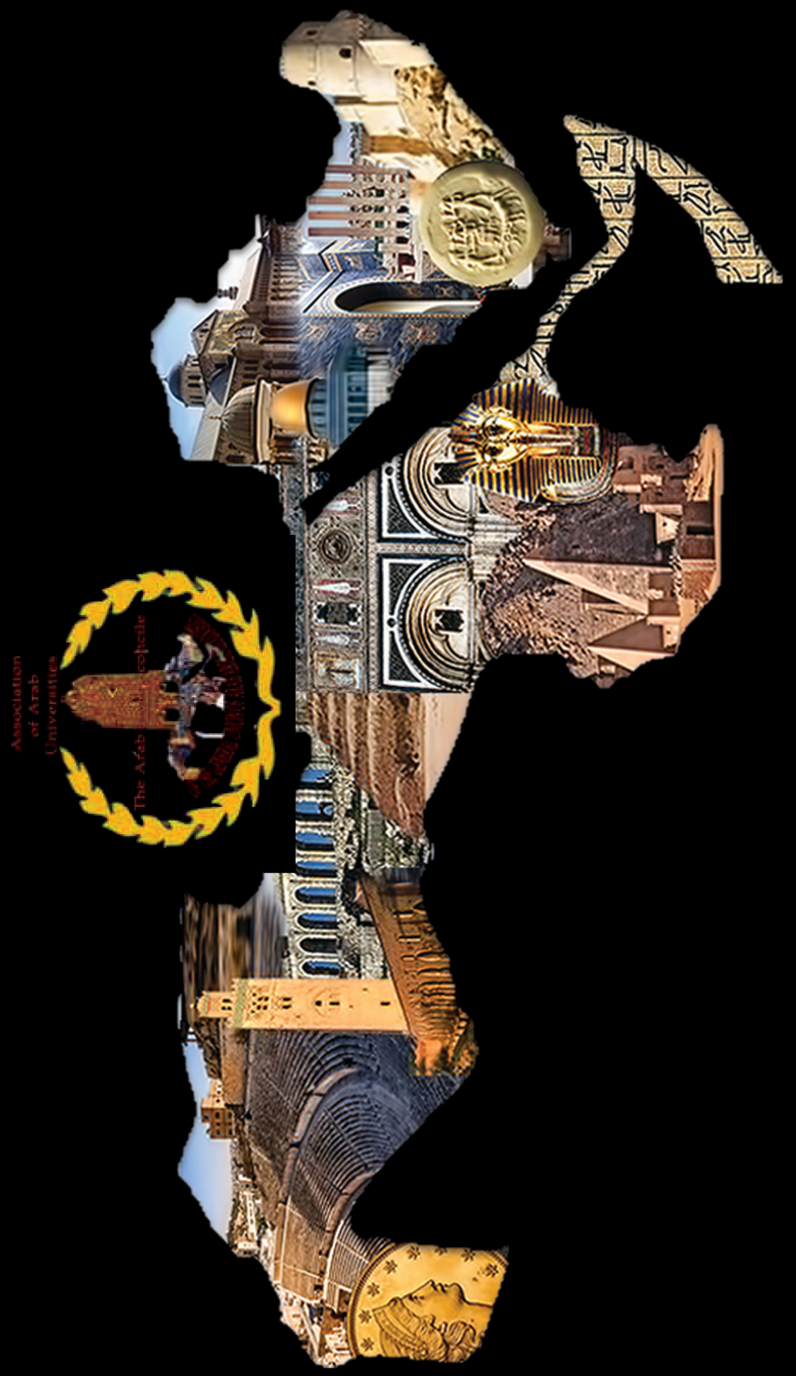

Journal

of the General Union of Arab Archaeologists

JGUAA2 is a semi-annual peer-reviewed academic journal

ISSN:2537-026X

Volume 8/2

Cairo
2023

Journal of the General Union of Arab Archaeologists

(JGUAA2)

Published by

The Arab Council of the General Union of Arab Archaeologists

Emanating from

The Association of Arab universities

S. Lamᶜi & M. El-Kahlawey (eds.)

Volume 8/2

Cairo
2023

New Headquarters in Sheikh Zayed City next to Specialty Sheikh Zayed Hospital10 St. Hassan Hamdy behind al-Mabᶜusin City - first floor- flat Nº. 6.

https://jguaa2.journals.ekb.eg/ **https://www.g-arabarch.com/**
https://digitalcommons.aaru.edu.jo/jguaa/
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Academy of Scientific Research & Technology:

Print ISSN: 2537-026X
Online ISSN: 2537-0278
DOI Prefix: 10.21608

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I. Ancient Archaeology & Egyptology

A PORTRAIT OF A PTOLEMAIC PRINCE FROM KOM EL-LOULI

BY

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ABSTRACT

[AR] **صورة شخصية لأمير بطلمي من كوم اللولي**

صورة شخصية من المرمر لصبي صغير غير منشورة، عُثر عليها بحفائر البعثة المصرية بمنطقة كوم اللولي الأثرية بتونا الجبل، الرأس بالحجم الصغير ويوجد بها تدمير بالجزء الايمن للوجه، ويُعتقد أنها تخص أحد الأمراء في نهاية العصر البطلمي خلال القرن الأول ق.م، نظرا لأسلوب تصفيف الشعر والعصابة المربوطة أعلى الجبهة والاجزاء المتبقية من ملامح الوجه. ويحاول الباحثان تحديد الفترة الزمنية التي تنتمي إليها هذه الصورة الشخصية، وأيضا محاولة تحديد هوية صاحبها بناءً على مقارنة الملامح الشخصية والخصائص الفنية مع الأمثلة المشابهة له.

[EN] The current paper proposes hypotheses the dating and identity of an unpublished alabaster portrait found in Kom el-Louli. Based on similar fragments, comparisons with the portraits of Ptolemy V and Caesareion are established. Although it impossible to make definite conclusions given the poor state of preservation of the fragment, it seems safe to assume that it was used in the private chapel, where it was found, to honor a royal prince of the Ptolemaic family.

KEYWORDS: Alabaster, caesarion, head, Kom al-Louli, prince, Ptolemaic, Ptolemy.

I. INTRODUCTION

Kom El-Louli[1] is located on the eastern edge of Tuna el-Gebel desert[2] at the main entrance of the temple of Osiris-Baboon and the subterranean galleries. Because the great Tuna temple of Thoth to the south eventually became gradually a Greek Serapeum, the name of this site bore the Greek name *«Serapeum Kome»*[3].

The settlement of Kom el-Louli was the place where the priests and workmen of the animal cemetery dwelled. The priests and the craftsmen of this community were the owners of the Ptolemaic and Roman tombs located between the animal cemetery and the house of the priests along the dromos[4].

According to the Egyptian-German joint mission, the main construction phase of the settlement was carried out during the reigns of Ptolemy I and Ptolemy VI, i.e., between 3rd B.C to mid-2nd BC[5].

However, according to the pottery discovered by the Egyptian mission of the Ministry of Antiquities, the settlement rather dates as early as the 26th Dynasty. Thus, based on archaeological evidence at this site, Kom El-Louli included tower houses, cultic houses, and shaft tombs from the Late Period until the end of the Ptolemaic period. A small alabaster head was found at this site. It is the purpose of this paper to examine the

[1]By the beginning of the 20th century (1903), Mohammed Chabân discovered a stone naos within a mud structure that bears cartouches of Nectanebo I ; this is now preserved in the Egyptian Museum of Cairo (CG 70014, JE 39508). Unfortunately, where this discovery was made is unknown, but it could have been a building nearby or at Kom El-Louli. On 17th of June 1910, Tewfik Boulos discovered the cemetery opposite the village, Derwa to the north and close to the western mountain (Kom El-Louli now). Furthermore, he discovered three burial shafts, one of them which was rediscovered by the Egyptian Expedition. In January 1913, W. Honroth continued excavations at the site with cooperation of the German Orient Society (DOG) in Tuna el-Gebel. In 2013, a magnetic and geophysical survey had been carried out by the joint mission of Cairo University and University of Munich in order to discover the processional way of the great celebrations at this site. By 2017, the Egyptian mission of the Ministry of Antiquities headed by Sayed Abdelmaik carried out excavations in Kom El-Louli. The mission divided the site into three sections: the first section comprises group of burial shaft tombs, the second section houses tombs cut in the ground, and the third section contains many houses of different styles; For further details, see: FLOSSMANN-SCHUTZE 2014: 198; LEMBKE 2015: 3-6. & FLOSSMANN-SCHÜTZE 2015: 20.

[2]Tuna el-Gebel necropolis is the main necropolis of Hermopolis Magna (el-Ashmunein) of the New Kingdom and the Late Period. It is situated in Mallawi Province, now in El-Minia Governorate, in Middle Egypt, on the edge of the western desert approximately 300 km south of Cairo. The existence of Tuna el-Gebel was attested during the Saite Period and lasted until Roman times. This remarkable archaeological site extends over for more than 7 km along the cultivated land. LEMBKE & PRELL 2015: 2.

[3]KESSLER 1990: 183-189; KESSLER & NUR EL-DIN 2005: 131-137; KESSLER 2007: 131–152.

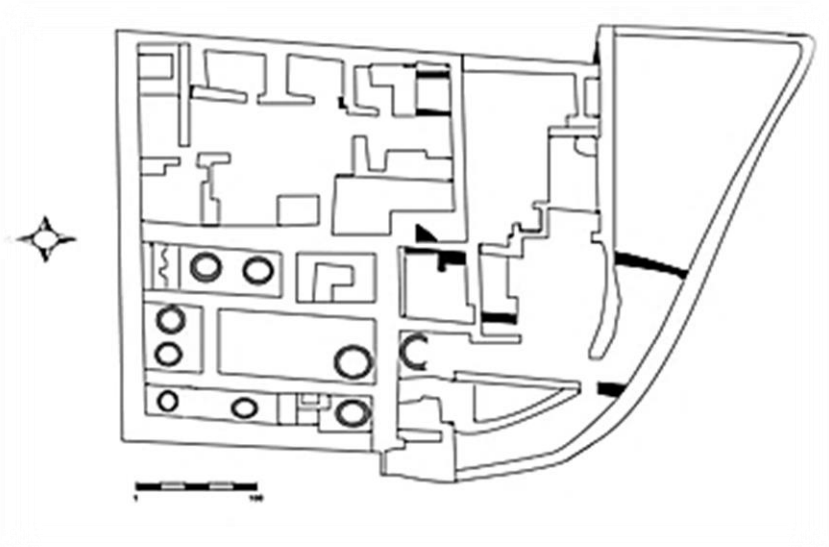
[4]Since 1930, Sami Gabra discovered the catacombs until 1952 on behalf of the Faculty of Arts of Cairo's Fuad el-Awwal University. From 1953 to 1955, The Egyptian Antiquities Service (EAO) continued the work. Extensive surface and underground areas in the necropolis had been excavated at the so-called Great Temple. The excavation team included the architect Alexandre Badawy, the draftsman Jousouf Shoukry, the photographer Ismail Shehab and the excavation assistants. From 1936, Naguib Michail, professor of Egyptology at the University of Cairo, excavated this site. Abd el-Hakam el-Alim did excavation work at the site earlier. For the Demotic inscriptions of Girgis Mattha, see: KESSLER 2011: ff 2.

[5] FLOSSMANN-SCHUTZE 2014: ff 198.

features of this object and to place it in its original archaeological context to determine a probable dating for it.

II. CULTIC HOUSES

These houses are considered cultic due to the presence of a small chapel at the end of the house, which may have been dedicated to ancestors and local deities in some cases. The Egyptian mission headed by Sayed ʿAbdel Malek excavated about three houses its roof is currently destroyed opening to the east. The excavated houses are similar in plan and architectural design. The most important one is House Nº.1 **[FIGURE 1].**



[FIGURE 1]: A plan Illustrator of House Nº 1 in Kom El-Louli© Done by the researchers

This is a rectangular building with a width of 10.75 m from north to south, and a length of 12.20 m from east to west. The house has an entrance located in the middle of the southern wall, which is about 1m in height and 110cm in width from inside a limestone entrance. The entrance leads to a narrow corridor, which opens from the eastern side to a small room. A narrow corridor leads to a large hall in the center of the house (dimensions 6.90 cm X 3.50 cm), where a large quantity of pottery shards has been discovered.

III. THE SMALL CHAPEL

Attached to the central hall on the west side, there is a small rectangular room functioning apparently as a small cultic chapel **[FIGURE 2]**. There was a small offering table made of limestone as well as two steps of a small mudbrick staircase facing the entrance of this chapel on the north side. The dimensions of this room are 3.50 cm from north to south and 1.45 cm from east to west. The entrance of this room is in the middle of the eastern wall. The walls were once covered with a layer of plaster and drawings representing red and black lines, similar to the colors that are in the chapels inside the catacombs of the god Thoth. A small alabaster head (ca. 5 cm height), which is the topic in question, was discovered inside this chapel **[FIGURE 2]**.

[FIGURE 2]: The small chapel inside of House Nº.1 in Kom El-Louli© Taken by the researchers

IV. DESCRIPTION OF DISCOVERED HEAD

1- Face

This head is made of Egyptian alabaster, probably extracted from the Hatnub quarry, near Tuna El-Gebel[6]. This small head represents facial features of a young boy or child. There is an obvious diagonal destruction of the right side of the face as well as the right eye, the right ear, and the lower part of the face, including the nose, and the mouth.

The left eye is in good state of preservation, despite the small irregular shaped hole in the eye. The left eyebrow is almost unrecognizable due to the rough surface of the face, apparently caused by a hard object **[FIGURE 3]**.

[FIGURE 3]: The small head from Kom El-Louli© Taken by the researchers

The left side of the face is in relatively good condition **[FIGURE 4]**, with the left ear heavily damaged by a hard object. The head bears a small narrow forehead. The side fringes of hair appear above the ear, in addition to the part of the left eye and the forehead.

[6]Hatnub Quarry: It was the most famous quarry of alabaster in the Eastern Desert, about 65 km southeast of El-Amarna. The pottery, hieroglyph inscriptions and hieratic graffiti at the site show that it was in use from at the reign of Khufu until the Roman period (c. 2589 BC–AD 300). See: SHAW 1986: 189-212.

[FIGURE 4]: The left side of the face© Taken by the researchers

As for the right side, only the upper part of the right ear and part of the tied diadem are visible **[FIGURE 5]**. It is worth noticing that the right side of the head is damaged in a way that suggests that this destruction was intentional. In other words, the facial features of the head were destroyed on purpose in order to eliminate the identity of the owner.

[FIGURE 5]: The right side of the face© Taken by the researchers

2-Hair and Diadem

The head is tied with a diadem, a ribbon or headband, that is knotted at the back of the head and its streamers hang in the shape of an inverted V **[FIGURE 6]**. The short hair of the head is sculptured at the middle of the scalp, is stylized on the front, and hangs below the diadem in the form of scattered fringes on the forehead **[FIGURE 7].**

[FIGURE 6]: The knotted diadem at the back of the head© Taken by the researchers

[FIGURE 7]: The diadem and hairstyle ©Taken by the researchers

The hair consists of fringes that hang over the forehead, which is also a style that appears in large sculptures[7]. However, the appearance of short fringes of hair under the headdress appeared as early as the second century BC, especially in Egyptianizing portraits. During this era, portraits of Ptolemaic kings such as Ptolemy V and Ptolemy VI bore similar hairstyles accompanied by the Egyptian royal *Nemes* headdress [8]. In official portraits, the headdress was a significant symbol to convey the idea of supreme power enjoyed by a single individual, as it is a symbol of royal status.

With Alexander and his successors, the clearest mark for identifying a member of the royal family was the diadem. It was an unequivocal sign of royalty, thanks to which

[7]For more information about Julio-Claudian dynasty portraits, see: KLEINER 1992: 123-141; BOSCHUNG 1993: 39–79.

[8]RIGGS 2005: 125.

we can come closer to identifying many effigies of the Hellenistic period. Although a Greek symbol that was used by Alexander as a symbol of royalty, the diadem was not adopted by his successors until, at the earliest, 306 BC, when Antigonus was the first to style himself as a king. In due time all the other generals imitated him, including Ptolemy I, who is depicted wearing the diadem in the coinage minted during his reign[9].

The representation of the diadem with streamers might be taken as evidence of a Ptolemaic dating for this head. The diadem is considered one of the Greek features signifying authority and ruler-ship since the time of Philip II, or the 4th century BC. Under the reign of the Ptolemies, the diadem appeared in many royal portraits. It was executed in the Hellenistic style and developed to have more than one form, most notably the twisted diadem and the ribbon type[10].

Furthermore, the title «*Lord of Diadems*» is attested in some Egyptian temples accompanied by the names of Alexander the Great, his brother Philip Arrhidaeus as well as Ptolemaic kings[11].

V. STYLE

The aforementioned head shows a face with obvious childish features, whereas the diadem headband indicates that the head might represent a prince. The most famous childhood Ptolemaic prince portraits belong to Ptolemy V. Despite the fact there is no sculpture of this king in his childhood, as most of them were crafted after he became a king[12], coin portraiture represent him as a child[13]. Examples of coins of Ptolemy V depicting him as a young prince show a headband, a large rounded head, a thin neck, and short hair on his narrow forehead[14] **[FIGURE 8]** [15]**.** Some of these coins might have been minted in the first years of his reign, when the king was still a child and under guardianship[16].

[9]BOSWORTH & BAYNHAM 2002: 246.

[10]STANWICK 2002: 35.

[11]*Lord of Diadems title*: was attested being associated with name of Alexander the Great in many inscriptions. For instance, there is an inscription over the door of a sanctuary built during his time in the festival temple of Tuthmosis III at Karnak. Another Inscription belongs to the sanctuary in the temple of Amenhotep III at Luxor. A third text is the king's dedicatory inscription of Philip Arrhidaeus at Hermopolis Magna, and another inscription relating to the sanctuary built in his reign at Karnak. SETHE 1904: 6-9; LLOYD 2010: 88-90.

[12]KYRIELEIS 1975: 54.

[13]There are some heads of Ptolemy V as a youth. KYRIELEIS 1975: 173, PL.44[3-4].

[14]Coin of Ptolemy V as a child in BMC Ptolemy V 62 164/12 1. 13.

[15]KYRIELEIS 1975: 52, Taf.40[1].

[16]KYRIELEIS 1975: 52.

[FIGURE 8]: Portrait of Ptolemy V.

The slicked-forward hairstyle and the twisted diadem are two remarkable features that were strongly attested through other Ptolemaic royal portraits by the mid of 1st century BC. Such examples appeared as small heads, which have been discovered in large numbers in Alexandria and the Nile Delta and appeared to have been part of the cultic worship of the Ptolemaic royal ancestors[17]. It is possible that they were placed in shrines as votive offerings by private individuals or as figures in household altars[18].

In addition to the assumption that this head might belong to Ptolemy V, it should also be noted that the head discussed in this paper might represent another later Ptolemaic king, namely Ptolemy XV Caesarion (47-30) BC. All sculptures of Caesarion are in Greek-style or Greek-Egyptian style with stylized faces. However, the young man is sometimes shown with a Greek diadem rather than a *nemes* headdress[19].

It should be noted that there are not any multiple examples of the Greek style in the portraits of the late Ptolemies, especially from Ptolemy XIII to XV. Sally-Ann Ashton mentions a few examples that might be dated based on the style of the first century BC[20].

A Greek-style portrait for Caesarion made of steatite provides close example **[FIGURE 9]**[21]. This portrait is also a miniature (5.3 cm in size) and shows carefully sculptured facial features of a young man. The head shows an image of a boy, wearing a twisted diadem over short straight hair from a central spot on the crown of the head and combed forward to form a fringe. The oval shaped head is inclined slightly to the right and is marked with a squared chin. The mouth is straight and the nose has slightly flared nostrils. The eyelids are prominent, and the brows follow the curve of the upper eye-lid, onto a flat forehead[22].

[17] ASHTON 1999: ff 145.

[18] ASHTON & GRAJETZKI 2002: 569.

[19] ASHTON 1999: 114.

[20] ASHTON 1999: 152.

[21] ASHTON & GRAJETZKI 2002, 568, FIG.8.

[22] The head of Ptolemy XV kept in Petrie Museum of Egyptian Archaeology, University College London. UC 49930. ASHTON & GRAJETZKI 2002: 568, FIG.8.

[FIGURE 9]: Greek-style portrait for prince Caesarion made of steatite.

The short hairstyle, as well as the twisted diadem, is also found in a black granite head in Bologna Museum **[FIGURE 10]**. This piece, dating from the 1st century BC, is also thought to represent Caesarion. Aside from minor damages of the diadem, the features are carefully stylized. He eyes are well carved, and the Egyptian uraeus is visible in front of the diadem. The hairstyle is similar to the head found in Kom el-Louli[23].

[FIGURE 10]: Portrait of Ptolemy XV Caesarion Greek-Egyptian, Inv.Nº.KS 1803© Bologna, Museo Civico Archeologico in Italy

Another example is a black basalt portrait of Caesarion **[FIGURE 11]**, which includes the remains of a back pillar. In this example, the prince is depicted wearing a headband and has a straight fringe with less carefully rendered hair at the top of the head. He has a small, slightly down-turned mouth with wide eyes and a prominent chin[24].

[23]The head H: 10 cm, and preserved at Inv.Nº.KS 1803; Janos Kminek-Szedlo 1895.
[24]MICHALOWSKI 1955: 138.

[FIGURE 11]: Portrait of Ptolemy XV Caesarion Greek-Egyptian.

VI. CONCLUSION

This head was found in a chapel inside the house, and based its archaeological context and artistic comparisons with similar examples it is possible that this portrait is part of a successful ruler-cult. A ruler-cult a form of state religion in which a king or a dynasty of rulers is deified as demigods or full deities. The official deification of princes had been gaining popularity ever since the death of Alexander as a Ptolemaic imitation. Later the ruler-cult included those who were deified in their lives and kept their divinity after death: the other Ptolemaic kings, their queens, and princes[25]. Private citizens have kept the statuettes and portraits of royals in the Ptolemaic period[26]. This hypothesis could be confirmed that this head is a cultic head. The head found in Kom el-Louli represents a Ptolemaic prince, its hair conforming to the late Hellenistic style and therefore very close to the known portraits of Caesareion.

This statue may have been originally used in a private chapel to provide support for the ruler cult, a practice that is frequently observed in the Ptolemaic period[27].The identification of this fragment as a head of Caesarion would easily explain the intentional destruction of the right side of the head, which may have occurred after the death of Caesarion. This is consistent with the opinion of Ashton, who thought that the images of Cleopatra and Caesarion were destroyed by or on behalf of Augustus following his conquest of Egypt[28].

[25]ZAKI & AHMED 2021: 2-3.
[26]THOMPSON 1973: 119-20.
[27]THOMPSON 1973: 119-20.
[28]ASHTON 1999: 55.

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LATE MIDDLE KINGDOM FUNERARY STELA OF *intf iḳr ʿnḫw* AT THE BRITISH MUSEUM (EA563)

BY

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ABSTRACT

[AR] **لوحة جنائزية من أواخر الأسرة الثانية عشرة لأنتف إقرعنخو**

تعود هذه اللوحة الجنائزية قيد الدراسة إلى إنتف إقرعنخو والذي كان حامل ختم ملك مصر السفلى، أمين الملك وخزانة *ḏd-bꜣw*، وهي معروضة الآن في المتحف البريطاني، وفقًا لأحمد فخري وبورتر موس فقد كانت هناك لوحة جرانيتية أخرى تعود لنفس مالك هذه اللوحة مع اسم والدته مؤرخة بالعام الثالث عشر من حكم سنوسرت الثالث في وادي الهودي، ووفقً Ilin-Tomich. ، فإن صيغة حتب دي نسو تشير إلى أن تاريخها يعود إلى نهاية الأسرة الثانية عشرة، وبمقارنة هذه اللوحة مع لوحات أخرى من نفس الفترة من حيث أسلوب الكتابة والقاب المالك وصيغة ***ḥtp di nsw Wsir nb*** *ꜣbḏw*, والسمات العامة للوحة إنها تشبه إلى حد كبير لوحات الدولة الوسطى من أبيدوس.

[EN] This funerary stela belongs to *intf iḳr ʿnḫw*, the seal bearer of the king of Lower Egypt, the king's secretary, and *ḏd-bꜣw* treasury. It is now on displayed in the British Museum. According to Ahmed Fakhry and PM, it dates back to the 13th year of Senusret III's reign and is from Wadi al-Hudi. Ilin-Tomich reports that *the ḥtp di nsw* formula could date this stela to the end of the twelfth dynasty. By comparing this stela with other stelae of the same period in terms of the writing style, titles of the owner, the form *ḥtp di nsw Wsir nb ꜣbḏw*, and general features of the painting. It seems evident that it is similar to the Middle Kingdom stelae found in Abydos.

KEYWORDS: Abydos, genealogy, Middle Kingdom, painting, Senusret III, the twelfth dynasty.

I. INTRODUCTION

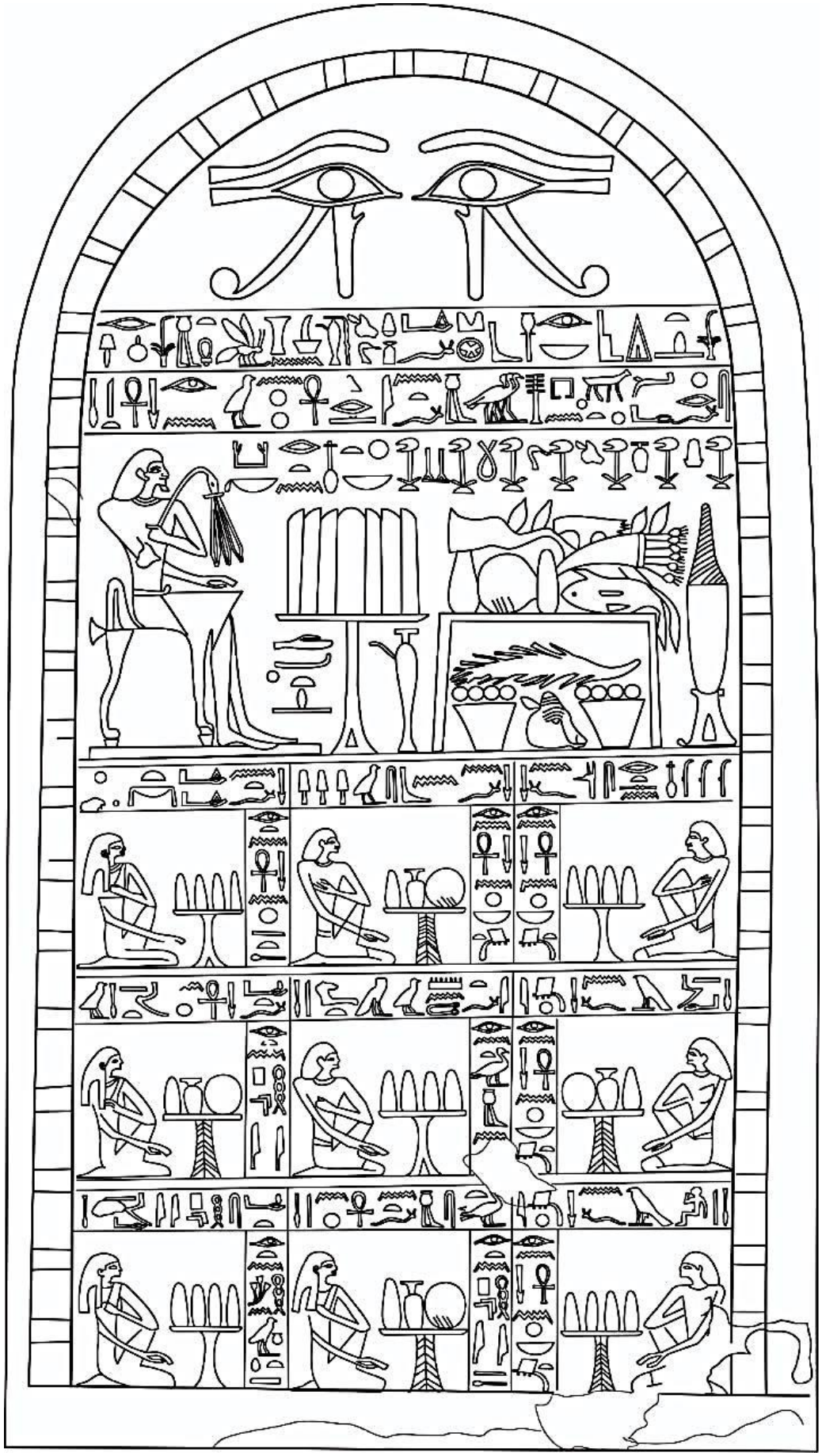
At first, I would like to mention that all figures in this paper are published after the permission of the British Museum in October 2, 2021, Nrº. EA563. The funerary stela in this study belongs to *ỉntf ỉḳr ꜥnḫw*, who seal bearer of the king of Lower Egypt, the trustee of the king, and the chamberlain of *ḏd-bꜣw*. It is now exhibited in the British Museum **[FIGURE 1]**[1].

According to Fakhry and *PM*[2], another granite stela from Wadi El-Hudi, dating to the 13th year of Senusret III, belongs to the same owner and included his mother's name. Ilin-Tomicha A.[3] reports that the *ḥtp dỉ nsw* formula indicates that it dates back to the end of the 12th dynasty. In comparing this stela with other stelae from the same period[4] through the style of inscription, the titles of the owner, the formula of *ḥtp dỉ nsw wsỉr nb ꜣbḏw* and the general features of the stela, the resemblance of this stela to other Middle Kingdom stelae in Abydos is clear[5].

It is noticeable that the owner of the stela attributed himself to his mother, as were all his brothers and sister, although his father *mnt.w m ḥꜣt* was represented on the stela without any titles.

[1] Https://www.britishmuseum.org/collection/object/Y_EA563 **Accessed on 17/11/2021.**
[2]FAKHRY 1952: 16; *PM* 1995: vol.7, 319.
[3]FRANKE 1984: Nº. 147; ILIN-TOMICHA 2011: vol.138, 22, 24;
[4]*CG* 1902 : vol. 4, Nº.20055, 20059, 20105, 20233, 20334, 20718; GRAJETZKI 2001: 15-17.
[5]PETRIE 1925: PL. XXVI- XXVIII.

[FIGURE 1]: Limestone funeral stela EA563© British Museum



[FIGURE 2]: Line drawings to the stela of *intf iḳr ʿnḫw*© Iman Elsaid

II. DESCRIPTION

This rectangular[6] round-topped limestone stela belonged to *intf iḳr ʿnḫw*. The writing is in sunk relief and is surrounded by a colored bamboo-shaped frame. In the upper part of the frame, there are the *wḏ3t* eyes, followed by three horizontal rows of hieroglyphic writing that include the *ḥtp di nsw* titles, and the name of the owner of the stela. Under that, there is a representation of the owner of the stela sitting on a low-back chair with legs in the shape of animals.

He wears a long formal shoulder-length wig, a trim beard and a necklace around his neck. He holds a flail (*nḫḫ*) in his left hand, while his right hand is flat on his right thigh. He also wears a short triangular kilt. Moreover, his body is colored brown, and he is barefoot.

In front of him, there are two offering tables. The first is simple, with one high base in the middle. There are seven vertical loaves of bread on this offering table and a big bowl with a hieroglyphic sign  under it. On the other side,  *dbḥt ḥtp* is written, which means altar or offering a meal. The other offering table is square with a goose, a thigh of an ox, and a banquet of onion and fruits or vegetables, an ox head between two flowerpots above them, and a palm frond under it. Next to the table is a vessel with a high conical cap.

Below the main offering table scene, there are nine square boxes**.** Each holds a representation of one of the owner's relatives sitting before an offering table. Every person sits on his right leg on the floor while raising his left knee toward his chest and leaning his left elbow on it, directing his left palm toward his chest. The right arm extends toward his left thigh. The offering tables are the same on the two sides of each row. The middle box is a different shape.

III. TEXT

The Two Lines Under the *wḏ3t* Eyes

1- 

ḥtp di nsw Wsir nb 3bḏw di.f t- ḥnḳt kȝw 3pdw ḳpḥ snṯr mks[7] *sḏ3wty bity*[8] *in nsw rḫ mnḫ* (*mnḫy*[9])

Offering given by the king (to) Osiris, the lord of *3bḏw*, he gives purified bread, beer, bulls, birds, and incense containers to the seal-bearer of the king of Lower Egypt[10], who was appointed as trusty of the king. (Known and trusted by the king).

[6] Dimensions: 77×47 cm**.**

[7] FAULKNER 1982: 120.

[8] WARD 1982: 170 [1472]

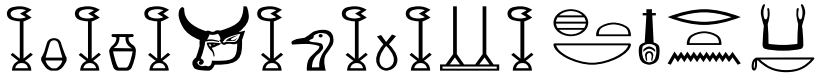
[9] MEEKS 1977: 77, 2271, 79, 1673; FAULKNER 1982:109.

[10] This title which was held by officials and nobles was honorary. The scenes and inscriptions accompanying the title indicate that the bearers of this title were very noble of the upper class. MOHAMED et Al. 2022: 146.

2- 

sḫr.f imy-r ʿḫnw.ty n ḏd- bꜣw[11] *intf- iḳr ʿnḫw ir n sni ʿnḫ mꜣʿt ḫrw*

He assumed as interior-overseer of the Inner Palace *ḏjed Bʿu intf-iḳr ʿnḫw* son of *sni ʿnḫ* true of voice

3- 

ḫꜣ t ḫꜣ ḥnḳt ḫꜣ kꜣw ḫꜣ ꜣbdw ḫꜣ šs ḫꜣ mnḫt ḫꜣ ḫt nb nfrt n kꜣ. k

Thousands of bread, thousands of beer, thousands of bulls, thousands of birds, thousands of alabaster(ropes), thousands of clothes, thousands of every good thing to your soul.

The Line before the Deceased

The Family of *intf- iḳr ʿnḫw* from Right to Left

1- 

sn.f sn wsrt nfr rnpw ir n sn.i ʿnḫ nbt imꜣḫw

His brother *snwsrt – nfr rnpw* son of *sn.i ʿnḫ* the honored lady.

2- 

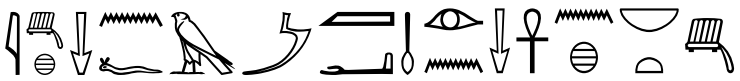
sn.f nbsw 12 ir n sn.i ʿnḫ nbt imꜣḫw

His brother *nbsw* son of *sn.i ʿnḫ* the honored lady

3- 

snt.f dd.t nbw13 irt n sn.i ʿnḫ mꜣʿt ḫrw

His sister *dd.t nbw* daughter of *sn.i ʿnḫ* true of voice

4- 

imꜣḫw sn.f ḥr .i 14ir n sn.i ʿnḫ nbt imꜣḫw

The revered, his brother Hory true of voice, son of *sn.i ʿnḫ* the honored lady.

---

[11]WARD 1982: 17, 93.
[12]*PN* 1935: vol. 1, 1, 193.
[13]*PN* 1935: vol. 1, 14, 403.
[14]*PN* 1935: vol. 1, 18, 245.

5- 

ỉt.f mntṯw m ḥ3t[15] *m3ᶜ ḫrw ỉr n s3t ỉn //////*

His father *mnt.w m ḥ3t* true of voice, son of (his mother) *s3t ỉn //////*

6- 

mwt[16]*.f sn.ỉ ᶜnḫ m3ᶜ ḫrw ỉrt n ḥpy*[17]

His mother *sn.ỉ ᶜnḫ* true of voice, daughter of *ḥpy*

7- 

ỉm3ḫw sn .f ḥr.ỉ šri[18] *m3ᶜ ḫrw ỉr n sn.ỉ ᶜnḫ nbt ỉm3ḫw*

The revered, his brother Hory shery true of voice. Son of *sn.ỉ ᶜnḫ* the honored lady.

8- 

s3t.s ỉnt.f ᶜnḫ m3ᶜ ḫrw ỉrt n ḥpy m3ᶜ ḫrw

Her daughter (his aunt) *ỉnt.f- ᶜnḫ* true of voice daughter of *ḥpy* true of voice.

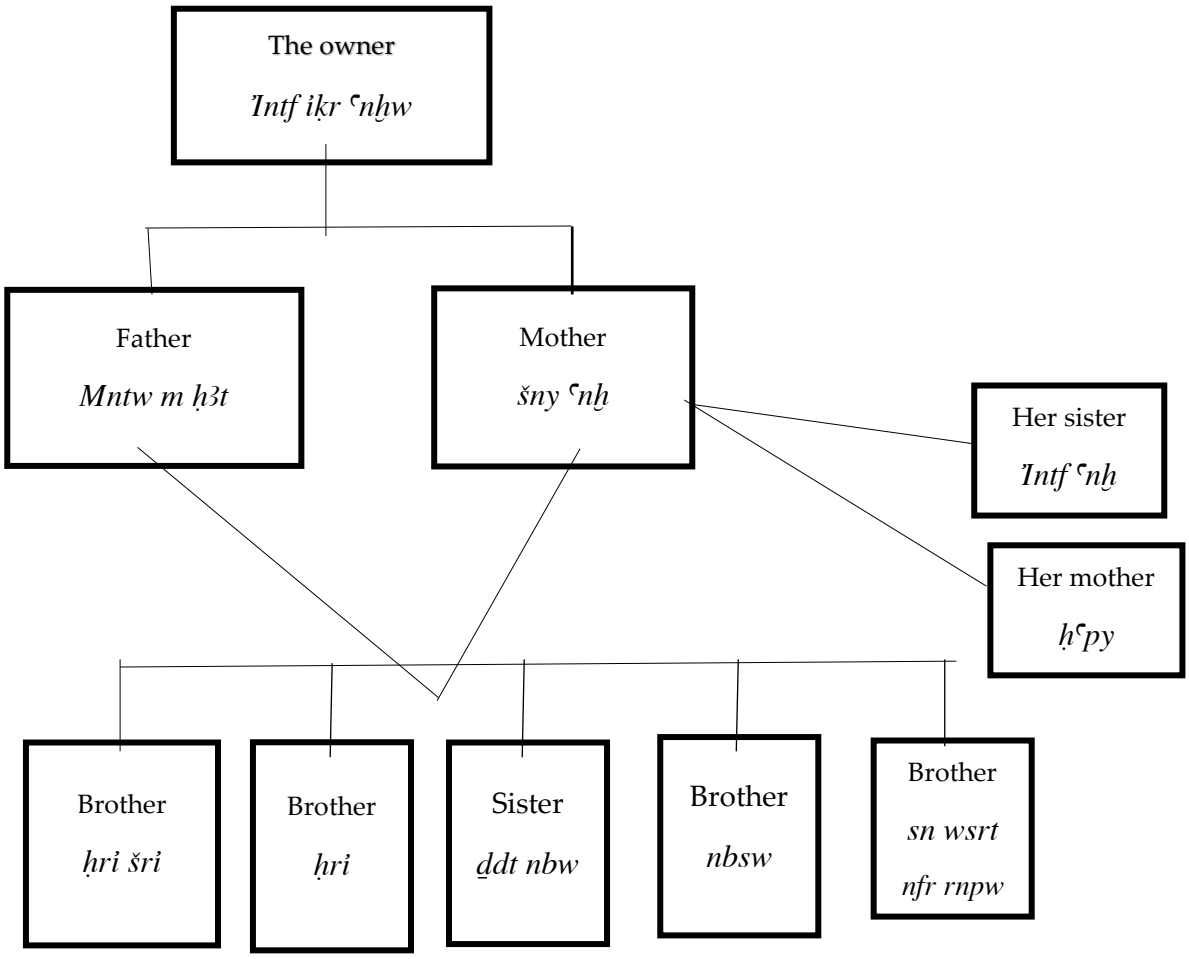
9- 

Mwt.s ḥᶜpy m3ᶜ ḫrw ỉrt n ḥnnwt[19]

Her mother *ḥᶜpy* true of voice daughter of *ḥnnwt*

[15]*PN* 1935: vol. 1, 7, 154.
[16]*WB* 1982: vol. 2, 54.
[17] *PN* 1935: vol. 1, 237 [1].
[18]*PN* 1935: vol. 1, 20, 245.
[19]*PN* 1935: vol. 2, 17, 42.

IV. FAMILY GENEALOGY



[SHAPE 1]© Done By Researcher

V. GENERAL COMMENTARY

Stylistic Notes on the Persons and the Offering Table

A. This stela is well executed. All the details of the stela, including human representations and decorative elements, details of the offering tables and the offerings on it or below it, and hieroglyphs, are precise. However, there is a small broken area at the end of *intf-iḳr ꜥnḫw* father's name, so we do not know his mother's name.

B. The two offering tables before *intf-iḳr ꜥnḫw* are placed next to each other, which is unusual. The offerings were usually put on the table in layers. Otherwise, if there were two offering tables, they were represented one beside the other as if one were above the other. In this stela, the two tables are placed in succession, with a clarification of the details of each of them, and a more precise distribution of the offerings located above, below, and next to each of them.

C. There are two types of offering tables in the nine boxes; on type one, there are four vertical loaves of bread; on the other, there is a vertical loaf of bread, a round loaf of bread, and between them, a pottery jar , arranged and depicted ichnographically. Thus, the two offering tables on the sides of each row are similar, and the one in the middle is different.

Religious Comments

D. *wḏ3t* were the eyes of Ra, which *then be*came the healthy eyes of Horus that were repaired by the god Thoth. It was a symbol of protection and royal power from the god Horus or Ra. The false doors in the Middle Kingdom, i.e., the place of depicting these eyes, were linked with the conflict between Seth and Horus, in addition to collecting the eye parts until it became the healthy *Wḏ3t* eye, which was equivalent to the successor of Horus on the throne. Also, the eyes symbolized the opening the mouth ritual[20]. Thus, the stelae symbolically carried the opening the mouth ritual so that the deceased could receive the offerings depicted on the stela. For example, since the third dynasty the false doors were considered the gate between the world of the living and the dead because the deceased crossed through them. They were used to receive offerings. Eventually, in the Middle Kingdom the stela became round topped in form and depicted funerary images[21]. The eyes of Osiris also help revitalize the scenes. The round top stelae emulated a tomb with a vaulted ceiling and simulated the eternal hill that emerged from the eternal ocean, where the sun shone for the first time. The eyes on the round top help the deceased person to see through them and the spirit to become united with the inscriptions. It also represented the sun, the moon, and the eyes of Horus, who was described as «When he opens his eyes, he fills the world with light, and when he closes them, darkness falls. So they protect the deceased from living in darkness, the place of evil»[22].

Paleographical and Philological Comments

E. In line 1:  *swt→ḥtp→rdi→*God Name. This was the writing order for the formula at the end of the the12th dynasty. Also, the writing of  *k3w 3pdw* without the plural sign ||| was common at the same time[23].

F. Line 2: *imy-r ḥnw.ty n ḏd- b3w:* this title was common in Abydos in the Middle Kingdom[24].

G. *ir.n:* this expression was used in the Middle Kingdom instead of the son of or daughter of. It means born of and is followed by the mother's name.

H. In box Nº.5: The father's name is mostly broken. It was: *mnt.w m ḥ ͨt*  son of *s3t in*[*tf*]*;* (his mother).

I. In box Nº.6 & Nº.9, *mwt* was written by the sign  or  , which appeared in the Middle Kingdom[25].

[20]EL-TOUKHY 2013: vol. 3, 2, 131-137.

[21]SHAW & NICHOLSON 1995: 278.

[22]The *Udjat* eye during the twelfth dynasty reign of Senusret III on a false door in Cairo Museum. GAYET 1886: PL.6; LANG 1902: PL.LII, Nº.20686, and for du Louvre Musée Nº.C7; RIVKA 2003: 7ff.

[23]SATZINGER 1997: vol.5, 177-188.

[24] PETRIE 1925: PL.XXVI; WOLFGANG 1958: 260.

[25] *WB* 1982: vol. 2, 54.

J. The person in box Nº.8*: s3t.s* refers to the sister of the deceased's mother (his aunt). This relationship is clear from both mothers' names[26].

K. There are two important notes about this stela:

1- sons, which means either he was unmarried and did not have sons, or he had another stela with his wife and sons.

2- Although the deceased represented his father on the stela, he acknowledged himself, his brothers, and his sister to his mother without mentioning his father's family. He also is attributed his father to his mother, which was common in the Middle Kingdom[27].

VI. CONCLUSION

Studying this rectangular funeral stela of *intf iḳr ʿnḫw*, which is linked with another granite inscription in Wadi El-Hudi bearing the names of *intf iḳr ʿnḫw* and his mother, illustrates that he was on the head of a troop to the amethyst mines in the 13th year Senusert III's reign. By comparing the *htp dỉ nsw* formula and the stela's sculptural technique with another two stelae from Abydos and Assiut, and currently preserved in the Cairo Museum, it is most likely that this stela was from Abydos. Another important aspect regarding this stela is that the owner documented his mother, brothers, sister, aunt, and maternal grandmother but only referred to his father's name without surnames. Also, he did not mention his wife or sons.

[26]*WB* 1982: vol. 4, 151 [I]; SKUMSNES 2019: 310.

[27]FRANKE 2002: vol.1, 8-9.

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CONTEXTUAL SIGNIFICANCE OF THE *w3* IN ANCIENT EGYPTIAN LANGUAGE

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ABSTRACT

[AR] **الدلالات السياقية لـ *w3* في اللغة المصرية القديمة**

وردت كلمة *w3* في النصوص المصرية القديمة بمرادفات عدة، اختلفت وتنوعت حسب السياق الواردة فيه، حيث أن السياق كان له دور هام في تحديد دلالة الكلمة على وجه الدقة، مما دفع الباحثة إلى تتبع الوجوه الدلالية لل *w3* والوقوف على معانيها، حيث تتناول الورقة البحثية التعريف بال *w3* ومغزاها والمدلولات السياقية المختلفة لهذا اللفظ، وترتكز الورقة البحثية على لعنة ال *w3* وكيفية وقوعها على الأشخاص وأسباب التحاقها بهم، ودوافع البعد وذلك من واقع النصوص.

[EN] The word *w3* appeared in ancient Egyptian texts with several synonyms, which differed and varied according to the context in which it was mentioned. Because context has an important role in determining the exact significance of the word, the researcher was prompted to trace the semantic aspects of *w3* and determine its meanings. The topic of this paper deals with the definition of *w3*, its meaning, and the different contextual connotations of this term. This research focuses on the curse of *w3*, how it affects people, the reasons for its use, and the motives for remoteness, throughout the texts.

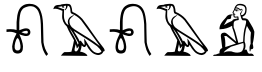
KEYWORDS: Curse, far, furthest, guilty, mortal, remoteness, punishment, *w3*.

I. INTRODUCTION

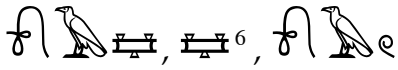
The meanings of the word *w3*, varies according to context, which prompted the researcher to trace its semantic aspects and clarify its identification as a curse, which deprived the deceased of their name, which is an important part of their journey in the other world[1]. To deprive a person of their name would prevent resurrection. The word is a title given to a person and is used in the countryside of Egypt, or as an order of isolation to avoid something.

«**Far»,** is the antithesis of «**near**» and it means «**perished**, **far beyond–far away-farther–away».** The word can also refer to «**damned people**» or «**animosity**» **«bū'dā'**». «Further, damned» is the name given when you curse someone or something. It is said that **« god perished the distant one»** . In the hadith, a man came to the Prophet, may God bless him and grant him peace, and said, «**The mortal» distant one« has committed adultery**» [2].

II. *w3* VOCABULARY

The ancient Egyptian language includes many words that are pronounced *w3* such as «rope», and «thread». Also *w3t* means «road». When wA is written like the following,  ,  ,  , it means «conspiracy, rebellion, and evil intentions towards someone in particular». When the preposition (*r*) or (*m*) is included, the word also embodies  which means «thought, plan, and design».

w3  is a 3-lit weak verb is followed by the preposition (*r*) to give the meaning of «distance from», and in Coptic ⲟⲩⲉ[3]. However, this paper focuses on a specific meaning of *w3* as «**a curse, cursed, a prayer for loss, and a prayer for evil**»[4], as this word began to appear in Middle and New Kingdom texts, accompanied by the prepositions (*r*)ꜥ(*n*)[5], as:

 [6], ,  [7], and in Coptic ⲟⲩⲁ.[8].

It also gave the meanings of «far, remote, far away, far off, far gone, farther [9], farthest, further [10], afar » «ꜥ**ā fār**»[11], and there are many forms of this term as follows:

---

[1]For the name and its role see: ABU DARHAT 2015 :190.

[2]*AL-MŪʿĞAM AL-WASĪṬ* 2004:63; IBNMAKRAM 2003: vol.3, 90; AL-AZHARI 1964: 244; IBNZAKARIA 2008: 268; AL-GOHARI 1990: 448.

[3]BADAWI & KESS 1985: 45; *WPL* 1997: 191; SCHWEITZER 2020: 1529.

[4]*WB* 1926: vol.1, 14-16; *HWB* 2005: 182; MEEKS 1998: 78; BADAWI & KESS 1985: 45.

[5]*WB* 1926: vol.1, 14-16; BADAWI & KESS 1985: 45.

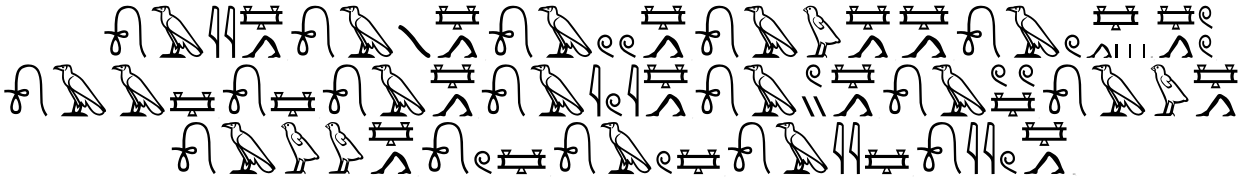
[6]*WB* 1926: vol.1, 14-16; *HWB* 2005: 182.

[7]*HWB* 2005: 182.

[8]*WB* 1926: vol.1, 14-16; BADAWI & KESS 1985: 45.

[9]*WB* 1926: vol.1, 14-16; *HWB* 2005: 182, LESKO 2002: vol.1, 87; MEEKS 1998: 78.

[10]*WB* 1926: vol.1, 14-16; *CD* 2017 :52; *HWB* 2005: 182; LESKO 2002: vol.1, 87; BUDGE 1920: vol.1, 144.



III. Contextual Connotations of *W3*

1. The Curse

According to Helck, a curse intends to damage someone with the aid of supernatural forces, whereas punishment is carried out with the aid of the higher powers[14], According to the following example, *w3* was portrayed in various books to define a curse or to grant it to particular persons to be classified as cursed.

 [15]

d3ir .n. f w3w im .f

He has subdued those who conspired against him-« his cursed» [16]

It was stated in the text of ***s3 nht*** forbidding conspiracy and participation in the rebellion:

 [17]

imi rḫ .f rn .k m šni w3w r ḥm .f

Let him know your name, and don't pronounce a curse against his majesty[18].

W3 was mentioned in this context to mean a curse as it carries the idea of conspiracy and rebellion, which will damage the government. Perhaps the author may have intended to say «make him recognize you without muttering, insulting, or cursing against his majesty», but Allen and Lichtheim translated it as «**let him know your identity as one who inquires about his Incarnation from afar».** While both translate «m» as resemblance and not a negation form of the verb «*imi*», Gardiner considered *w3* as a curse that befalls the name of the person or the person himself[19].

---

[11]Budge 1920: vol.1, 144. « ʿāfār عَفار» is from «al-ʿūfrالعُفُر» far distance, which is the distance and length of the covenant, and from the « al-ʿūfra العُفرَة », also includes the meaning of whiteness mixed with his red and becomes like the color of the Afar al-ʿūfrالعَفَر ». *AL-MŪʿĞAM AL-WASĪṬ* 2004: 610; Also, this term is still used in the Egyptian countryside to insult or curse a person. For instance, one could say « illī itʿafar اللي يتعفر » who does such-and-such. Or when drawing attention to someone other than him, it is said colloquially, this is his shame «دا عليه عفره»meaning he is not normal and uncontrolled in his behavior and work.

[12]Lesko 2002: vol.1, 87.

[13]Budge 1920: vol.1, 144.

[14]Helck 1977: 276.

[15]De Buck 1956: vol.6, 358 b, Spell.728.

[16]Foulkner 1973: vol.2, 358 [277], Spell.728.

[17]Blackman 1972: 22, B74; Koch 1990: 39, B74; Allen 2015: 88. B.74.

[18]Hassan 1999: 48.

[19]Gardiner 1909: 53.

2. Cursing the Name

The reason for this curse to strike certain people is their transgression against the gods, such as stealing from the temples. Other transgressions include spreading sedition and pushing rebellion against authorities. The consequences of such actions include being cursed, being sentenced to death, and erasing or depriving someone of their name.

A. The Distant One Is Called *wꜥ n rn. f*

In the decree of King Intef V, "Nub Khepr Ra", ***w3 n rn. f*** was mentioned in context as a result of an accident during an inspection at the Min Temple in Qift, as follows:-

 [20]

ḫn bin ḥrw- r ḫpr m p3 r pr ṯ3w ḫftyw in w3 n rn .f tti s3 mnw ḥtp

an evil thing happened in this temple, *ḫftyw* was robbed by a distant one is called *tti s3 mnw ḥtp* [21]

The phrase ***w3 n rn. f*** means curse, so its literal translation is the distant one is called, which is followed by the name of the person. This phrase is still used in the Egyptian countryside, where people may say, the distant one «al-bīīyd», the cursed so and so «al-mālʿwn», sometimes the one whom we wish to fail in his life «illī maiwʿāš», and the one who does not have a specific name «illī māitsmāš».

B. The Furthest *w3*

Acts of rebellion against the king would result in punishing a person by not mentioning his name. This curse was mentioned in a text dating back to Queen Hatshepsut, warning rioters that the consequence of disloyalty is death:

 [22]

ḏdt .f ḫt ḏw m w3 ḥmt .s swt mwt .f

The furthest who will speak badly against her majesty will die.

W3 came into this context giving the meaning of «damned» without specifying the identity of a particular person. The context of the word makes it a curse and an epithet given to everyone who has been tempted by rebellion and betrayal against the king.

Likewise, the texts of the Temple of Habu describes Rameses III as the griffin[23] when chasing his enemies, indicating that he evokes fear, warning every enemy who has tempted himself to harm the king, as follows:

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[20]PETRIE 1896: 10; LES 1924: 98; HELEK 1983: 73; ʿABD AL-SALAM 2005: 172-178.

[21]*BAR* 1906: vol.1, §777; WINLOCK 1924: 226; HARARI 1957: 338; LORTON 1977:18-23.

[22]***URK*** 1929: vol.4, 15, 257; MUHLESTEIN 2007**:**120.

[23]Griffin is a Greek word originating from griffin, which means «to fear, scared», and refers to a mythical beast that frequently had a lion's body and a falcon's head with spread wings. It was one of the images of evil that the appearance represented. KHALED 2006: 183.

 [24]

snḏw .tw n wȝi n šfyt twf ʿḥḥ pd nmtt nb dnhwy

(Man) is afraid of the distant, because of his prestige, as he is the genie (griffin) with two wings[25].

It is noted that «the distant» here is an epithet of Ramses as evidence of his strength. The word is not intended to express disdain for not mentioning his name. The word is to compare him to the griffin, as he is far, unknown, and mysterious to everyone who fears him.

IV. Leading Motives to Realize the Idea of Distance

A. Remoteness for Safety

Ptah hotep advises his son to leave and stay away from the man who forgave and reconciled with him in case that man is away from him.

 [26]

swȝ ḥr .f m sḫȝ sw ḏr gr .f n .k

As long as he is silent about you, stay away from him and avoid mentioning him[27].

It is mentioned in the instruction of Khiti to his son in the following context:

 [28]

ir šmt .k m pḥwy smsw m tkn wȝw m rḫ nfr

If you want to attract very prestigious individuals, keep your distance and look at the positive aspects[29].

in spell Nº.60 in the coffin texts inscriptions that depict the deceased waking up to the sound of sistrum and rising with the mummy to travel from death and burial to resurrection and immortality while being guarded by the gods and priests.

 [30]

psḏ ḥrw r wȝw nṯr m writ

The day dawns so that the god departs from the great hall [31].

In Coffin Text spell Nº.148, Hur makes an appearance after his birth and addresses the gods, proclaiming his supremacy over them and his capacity to vanquish his enemy.

---

[24]*KRI* 1983: vol.5, 26, [2-3].
[25]*ARE* 1906: vol.4, 25, §46; *KRIT* 2008: vol.5, 26[1].
[26]Zába 1956: 50[13, 5].
[27]Lichtheim 1973: 71; Lallwett 1996: 340.
[28]Brunner 1944: 190.
[29]Lallwett 1996: 275.
[30]de Buck 1956: vol.1, 252 e, Spell. 60.
[31]Foulkner 1973**:** vol.1, 252, 55, Spell. 60.

 [32]

w3w st .i r stḥ ḫfty ni it.i wsir

my place is far from Seth , the enemy of my father Osiris[33]

 [34]

ink ḥr w3w st r rmṯ nṯrw

I am Horus who is far of place from humans and gods[35].

And in spell Nº.885, the dead speaks to the gods about his refusal to remain in the underworld persisting on urine and feces. The deceased also states he will not live upside down because he has become Horus and can travel on both the ground and the sky.

 [36]

iw w3 r.i

get away from me[37].

Depending on their function, lakes in the other world come in a wide variety of forms. There are lakes that serve to purify, lakes of bliss, lakes of pain, and lakes that combine all of those functions. According to the scriptures, the deceased must go across perilous ponds and lakes on his way to paradise. He must take great care to avoid falling into these hazards because they pose a risk to the condemned dead and the evildoer, which is why the texts forewarn of them[38].

 [39]

s3w .ṯw š wr ir mwt nh .k sw 3b .k w3t r .f

Beware the great lake, as for death, you shall flee it, slow down and stay away from it[40]

It was mentioned in the Book of the Dead, chap 92.

 [41]

n irt .sn ḏwt r.i isi w3t n.i

they won't hurt me, go away from me [42].

[32]DE BUCK 1956: vol , 224 a, Spell. 148.
[33]FOULKNER 1973: vol.1, 224, 126, Spell. 148.
[34]DE BUCK 1956: vol.2, 225 f. Spell. 148.
[35]FOULKNER 1973: vol.1, 225,126, Spell. 148.
[36]DE BUCK 1956: vol.7, 97 c., Spell. 885.
[37]FOULKNER 1977: vol.3, 97, 49, Spell. 885.
[38]ATALLAH 2011: 10-11
[39] DE BUCK 1956: vol.1, 284 f-h, Spell. 67; DE BUCK 1956: VII, 41g, SPELL.839
[40]FOULKNER 1973: vol.1, 284 e-h, 62, SPELL. 67.
[41]BUDGE 1898: 196, 2-3, chap.92.
[42]EL-SAYED 2009: 285.

V. Conclusion

There are multiple written forms of the word *w3*.

All synonyms for *w3* revolve around one idea, which is the idea of distance or remoteness, whether as a curse, as a punishment or as a nickname.

There are various sources from which the verbal synonyms for «*w3*» were obtained. The verbal synonyms for «*w3*» differ depending on the context for which they are intended.

The term «far» or «remote» has continued to be used in certain situations in modern Egypt.

The two leading motives for distancing are different: one is peace, avoidance, and repelling harm, and the other is the infliction of harm or punishment on the individual to be punished.

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THE FAMILY OF AHMOSE, THE OWNER OF THEBAN TOMB 224 [NEW DATA]

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ABSTRACT

[AR] عائلة إعح-مس ،صاحب المقبرة الطيبية 224

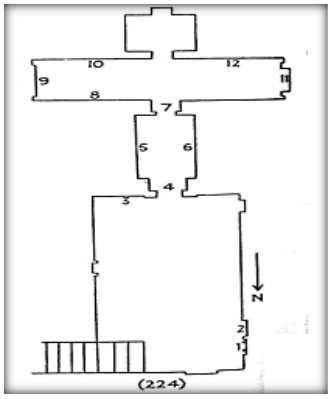
طالما بنيت الحضارة الإنسانية على أساس الأسرة- فقد تكونت الأسرة النواة من الزوج والزوجة والأطفال. أما الأسرة -الممتدة- فتتكون من من خلال وجود علاقات- عائلية مباشرة أو غير مباشرة، مثل الأجداد والأحفاد -الأعمام والعمات- وبنات الأخت وأبناء الأخ وأبناء العم كلها كأمثلة على الأقارب. تحتوي هذه المقالة على معلومات جديدة عن عائلة إعح-مس- المشرف على الحبوب الذي عمل في عهد تحتمس الثالث (الأسرة 18)- وصاحب مقبرة طيبة TT 224، التي تقع في الجبانة السفلية على الضفة الغربية لطيبة- في الشيخ عبد القرنة. و نظرًا لعدم نشر المقبرةTT 224 إلى الان أو فحصها مطلقًا أو الكشف عن مناظر جدرانها، بالإضافة إلى الحالة -السيئة للمقبرة- والجدران المحفوظة بشكل سيء- ونقص المصادر التاريخية عن إعح-مس- فلا يعرف العلماء الحاليون سوى القليل عن حياته وعائلته ومسيرته المهنية. نتيجة لذلك-سيتم إعادة بناء عائلة إعح-مس والتعرف عليهم- باستخدام مناظر ونقوش لم تنشر من قبل من TT 224 بالإضافة إلى الإستعانة بالمناظر والنقوش الخاصة بمقابر أبنائه- وقد كشفت هذه المصادر، إلى جانب جهود فريق الترميم المصري لتنظيف وترميم المقبرة 224 -عن معلومات جديدة حول أفراد شجرة عائلة إعح-مس- مثل الآباء والأشقاء والزوجات والبنات والأبناء- مع التعريف بألقابهم إن أمكن-. كل ذلك يساعد على معرفة إعح-مس وعائلته ومكانته- الاجتماعية ومسيرته المهنية. نتيجة لذلك، يهدف هذا البحث إلى إلقاء مزيد من الضوء على السياق التاريخي وأهمية عائلة مالك مقبرة طيبة 224 - كما تبحث المقالة أيضًا في أبناء إعح- مس- من صلبه- بالإضافة إلى -العلاقة بين إعح-مس و سن نفر-ابنه المزعوم طبقا لمعظم المراجع الأساسية.

[EN] The family has always been the cornerstone of human civilization. The nuclear family is comprised of the husband, wife, and children. The extended family consists of direct and indirect familial relations, such as grandparents and grandchildren. Uncles, aunts, nieces, nephews, and cousins are all examples of relatives. This article contains new information on Ahmose's family, the grainers' superintendent who served under Thutmose III's reign (18th dynasty), and the owner of Theban Tomb (TT 224), which is located in the lower necropolis on Thebes' western bank, at Sheikh ʿAbd el Qurna. Because of the tomb's current condition, which includes its poorly preserved walls, the fact that it has never been published or examined, and the lack of Ahmose's historical documents, current scholars know very little about his life, family, and career. Ahmose's family members -will be identified, and their relationship reconstructed, using previously unpublished scenes and inscriptions from TT 224, which the Egyptian conservation team cleaned and restored, as well as scenes and inscriptions from his sons' tombs. These sources have revealed new information about Ahmose's family tree, including his parents, siblings, wives, daughters, and sons, along with their titles. As a result, this research aims to provide more context about Ahmose's historical position and rank and shed more light on the significance of his family. The article also looks into Ahmose's biological son and the relationship between Ahmose and his alleged son, Sennefer, as indicated by primary sources.

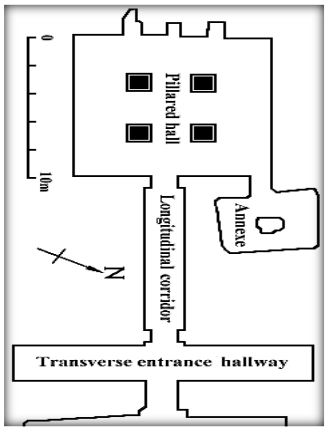
KEYWORDS: Ahmose, Kinship, Ahmose's sons, Ahmose's parents, historical background, revealed texts and scenes.

I. INTRODUCTION

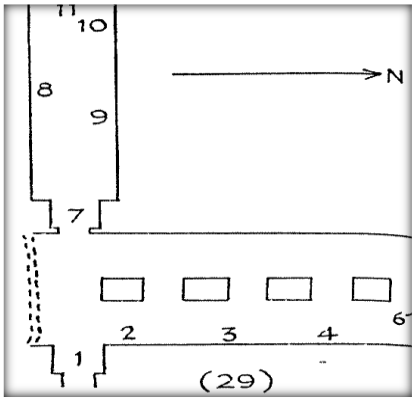
This article sheds light on the family of the tomb owner of TT 224, Ahmose, who lived and worked during Thutmose III's reign (18th dynasty). Ahmose's family tree will be reconstructed using unpublished scenes and inscriptions from TT 224. However, due to the tomb's current state, poorly preserved walls, and a lack of Ahmose's historical materials, such as fragments of Thebes' statues[1] and a doubted[2] funerary cone[3], the researcher was compelled to examine other sources, mainly the tombs of his sons. Notably, the study gathers data from his sons' tombs, texts and scenes rather than studying their previously published tombs. These sources, together with the effort of the Egyptian conservation team to clean and restore the tomb, revealed new data about his family tree, particularly the relationship between Ahmose and Sennefer, his alleged son. The primary sources are as follows: TT 224[4] **[FIGURE 1]**[5], TT 96[6] **[FIGURE 2]**[7], TT 29[8] **[FIGURE 3]**[9]**.**



[FIGURE 1]: TT 224



[FIGURE 2]: TT 96



[FIGURE 3]: TT 29

[1]A fragment of a statue of Hu, and a granite statue of a kneeling man; ROEDER 1899: 88, Nº.3426; WEIGALL 1906: 133[18]; ENGELBACh 1921: 70 [7]; PORTER & MOSS 1960: *PM* II-2: 427.

[2]DAVIES & MACADAM 1957: Nº.94; HELCK 1958: 439; PORTER & MOSS 1960: *PM* I-1: 325; ZENIHIRO 2009: 77; WEST 2019:155.

[3]For more information about the details of the cone Nº.94, PETRIE 1887: 24; DARESSY 1893: 275 (19), Fasc.2; NAGUIB 1987: 75; MUNSELL 1988: 7.5 R 5/8, 7.5R N3/0.

[4]It is located on Thebes' western bank, close to the Ramessuem, at the foot of Sheikh ʿAbd el Qurna. It belonged to Ahmose, the overseer of grainers who lived and worked during Thutmose III's reign. HELCK 1958: 297, 439; PORTER & MOSS 1960: *PM* I-1: 325; KAMPP 1996: 498.WEST 2019:155.

[5]PORTER & MOSS 1960: PM I-1: 325

[6]It is located on Thebes' western bank, high on the hill's southern slope, at Sheikh- ʿAbd el Qurna. It belonged to the mayor of Thebes, Sennefer; HELCK 1958: 297, 439; PORTER & MOSS 1960: *PM* I-1: 325; KAMPP 1996: 498.WEST 2019:155. For the relevant texts. HELCK 1961:Urk IV: 1417-38. For more information about the tomb, see:

«The Tomb of Sennefer»:https://www.osirisnet.net/tombes/nobles/sennefer/e sennefer, 1-9, accessed on 25/05/ 2020.

[7]PORTER & MOSS 1960: *PM* I-1: 196

[8]It is located on Thebes' western bank high on the hill's southern slope, at Sheikh-ʿAbd el Qurna. It belonged to the vizier Amenemopet. The tomb is nearly completely unpublished, while URK1439-40 has the relevant inscriptions. HELCK 1961: *URK* IV: 1439-40; PORTER & MOSS 1960: *PM* I-1: 45-46; KAMPP 1996: 214; STRUDWICK & TAYLOR 2003: 3.

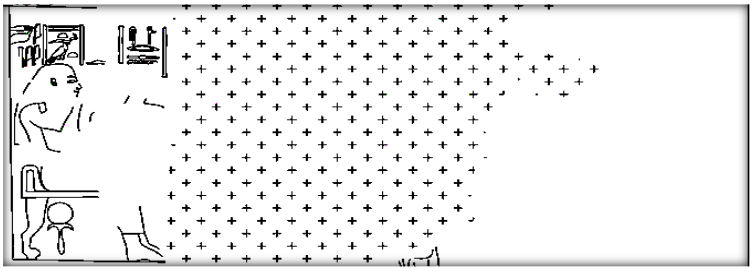
[9]PORTER & MOSS 1960: *PM* I-1: 44.

II. AHMOSE'S PARENTAGE AND FAMILY

The family has always formed the cornerstone of any society. The nuclear family consists of the husband, wife, and children. The extended family[10] includes linear connections, such as grandparents and grandchildren, in addition to collateral relations, such as siblings, aunts, uncles, nieces, nephews, and cousins[11]. The researcher will investigate Ahmose's extended family using relevant resources such as tomb scenes and texts.

1. Parents

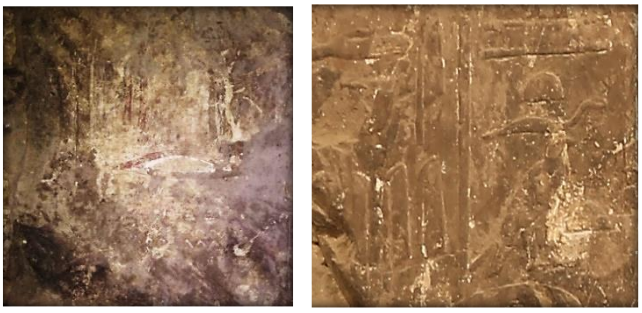
Ahmose's parents, the prominent members of his extended family[12], were depicted in his tomb. However, the severely damaged walls of tomb TT 224, which depicted the parents, were destroyed. Only one scene, - at the end of the right wall of the long hall, the second register, depicts his parents, who are facing Ahmose, their son while in front of a-banquet scene **[FIGURE 4].** Their names were revealed after cleaning the wall.



[FIGURE 4]: Ahmose's parents' images and names on the long hall walls© Photo taken by Researcher.

Father

Name:  [13] *S-n –wsrt*[14] «Senusert», as mentioned beside Ahmose's mother's name on the third register on the right wall of the long hall of TT 224 **[FIGURE 5].**



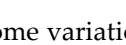
[FIGURE 5]: The names of Ahmose's parents, (father) S-n-wsrt, is shown in Ahmose tomb on the right wall of the long hall before and after cleaning© Photo taken by the researcher.
[Before restoration]

[10]For further information about the family structure. ALLAM, 1977: *LÄ* II: 104-113.

[11]WHALE 1989:240.

[12]WHALE 1989: 259.

[13]LEPSIUS 1970: *Denkmäeler* Text III: 286, Nº. 85.

[14]There are some variations:  , , *s-n Wsrt* «The man of the Goddess Wesret»; RANKE 1935: PN I: 279, Nº.1.

Mother

Name:  [15]*T3-idy*[16] «Ta-idy» as recorded alongside Ahmose's father's name on the third register on the right wall of the long hall of TT 224 **[FIGURE 6].** Interestingly, his parents' titles are not preserved.


[FIGURE 6]: The names of Ahmose's parents (mother) Ta-idy, is shown in Ahmose tomb on the right wall of the long hall before and after cleaning© Photo taken by the researcher. [After restoration]

2. Family

Husband

Name:  *Iʿḥ-Ms* «Ahmose» named Humay [17]. *Ḥmy* «Humy»[18] as a short name[19]. Titles[20]:

 *imy r3 gs-pr* «overseer of the god's wife's estate?»[21] and
 *imy-r3 šnwty n ḥmt ntr Iʿḥ-ms-Nfrtiri*

«overseer of the double granaries of the god's wife (Ahmose Nefertarey)»[22].

Apparently, his name is recorded in his tomb TT 224 and the inscribed tombs of his sons (TT 96, TT 29) In addition, -Ahmose-Humay is called Father and nurse (*it mnʿy*),

---

[15]LEPSIUS 1970: *Denkmäeler* Text III: 286, Nº. 85.

[16]Ranke references Lepsius, who misspelled this example as Idy, and provides other spelling  *T3-idy*? He mentions a daughter of Paheri of el-Kab who does not appear to be the same person. However, the name  appears on the wall of the Ahmose tomb with an unidentified determinative , which could be a determinative of the ear . So, the names could be the article « the»  *t3* and *Idy* «elder»?; Helck referred to her as Idy without &A, whilst Graefe reads *T3 Idy*; RANKE 1935: PN I: 54, Nº.2; 354, Nº.11; GARDINER 1957: 544, Sign-list F; HELCK 1958: 439; ERMAN & GRAPOW 1971: *WB* V: 211 (5); GRAEFE 1981: 17; WHALE 1989: 84.

[17]The owner tombs TT83, TT 121, and TT 241 were also called *Iʿḥ- ms* .PORTER & MOSS 1960: *PM* I-1: 167, 325, 235, 331; GARDINER & WEIGALL 1913: 36; RANKE 1935: PN I: 12, Nº.19; WEST 2019: 155.

[18]RANKE 1935: PN I: 12, Nº.19.

[19]For more short names, see: SETHE 1907: 87-92.

[20]The researcher investigates Ahmose's titles and rank in a separate article which is under the process of publication in *JGUAA2*.

[21]FISCHER 1966: 66, n.39. Another meaning of *gs-pr*; FISCHER 1979: 42.

[22]GARDINER & WEIGALL 1913: 36; PORTER & MOSS 1960: *PM* I-1: 325.

overseer of the ipt-nswt, overseer of the *ḥnwty* (chamberlain), and overseer of Stables-[23] on his funerary cone [Nº. 94][24].

Wife

Name:  *Nbw* « *Nbw*»[25].

Title:  *ḫkrt nsw* « Lady in Waiting» [26].

Nbw, who held the title «Royal Concubine», was Ahmose's wife. She must have been his sole wife, as there is no mention of any other spouses in the tomb. She is prominent in her husband's tomb and is called *ḥmt.f nbt pr* to identify her as the principal wife[27].

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[23]SHIRELY 2005: 249.

[24]DAVIES & MACADAM 1957: Nº.94.

[25]It was a common name that meant «gold », dating from the Old Kingdom until the Late Period; RANKE 1935: *PN* I: 190, NO. 3.

[26]The basic meaning of the title consists of the two elements *nswt* «king» and *ḫkrt* is either as a noun «Jewels» equals «King's Jewels», or it can be translated as «the one that adorns the king», «the king's adorned/the one adorned by the king. «Ornament of the king», «she(one) who is ornamented by the king» « lady in waiting», «Concubine of the king», «kings adorner women of married status as opposed to the *nfrw* or maidens»; Some scholars consider the title *ḫkrt nsw* as a non royal title, synonymous with the title *ḫkrt nsw wʿtt* «lady in waiting of the first ranke», «sole lady in waiting». It is simply an abbreviation version of *ḫkrt nsw wʿtt*;. According to Ward, *ḫkrt nsw* designates for a married woman. He clasified the title among others in the category of intermediate stratum of the society and it is different from *ḫkrt nsw* watt which belongs to the highest stratum. On the other hand, Franke disputes Ward's claim about the title, claiming that the social status of married women with the titles «Sole Lady-in-Waiting» and «Lady-in-Waiting» and their combination is heavily biased because Ward grossly underestimates the dimension of time. As a result, he concluded that the difference in status between the titles «Sole Lady-in-Waiting» and «Lady-in-Waiting» was irrelevant because the titles were recorded at different times. The titles «Sole Lady-in-Waiting» and «Lady-in-Waiting» on the other hand, both refer to the wives of courtiers. During the Thirteenth Dynasty, the term «lady-in-waiting» was reserved for ladies of the royal court, whereas «sole lady-in-waiting» was reserved for women of the higher aristocracy of the provinces in the First Intermediate Period. This is the only difference that remains. There were two groups of women who held the title in the period from the Old to the New Kingdom: One group received the title «adorned the king» it applies equally to daughters, wives and women, who are responsible for certain tasks at court including bringing the king close (as head of Harem, and providing the king with «entertainment» (singing, dancing royal nurse). The second group consists of wives and daughters of counts, simple provincial women, daughters of humble origins and wives of very high officials. The title *ḫkr* nsw is given to this second group without any discernible qualifications and is valid for all women. Therefore, It can only be an honorary or court rank title bestowed by the king;. *ḫkr* as verb means «to adorn». The title has long been debated by Egyptologists. After conducting this brief examination of the title, one could conclude that whatever the reason behind Ahmose wife's title was due to her status as a wife of an important man, Ahmose, who held high- ranking titles, and a mother of sons who were given prominent positions. Furthermore, her title indicates that she was affiliated with the Royal Court, whether in charge of court tasks or received an honorary bestowed by the king. This affiliation with the royal court may have aided Ahmose later in his career when he held the title «Tutor of the King». NORD 1970: 1–16; DRENKHAHN 1976: 59ff; WARD 1982: 143, Nº.1234; WARD 1986: 28; Franke 1990: 229; FAULKNER 1991:205; GILLAM 1995: 227, Nº.178; SABBAHY 1997: 16; JONES 2000: II: 794, Nº.2899; 795, Nº.2900; ESPINEL 2016: 106.

[27]Perhaps for this reason, the wife of the tomb owner is referred to as *ḥmt.f*, to distinguish her from other minor wives or concubines. The title *nbt pr* «Lady of the house» is a very common title that was only

Although Ahmose's wife was a notable lady in her own right, Whale noted that she was not as visible in his tomb as one might expect[28]. Whale further claims that her name occurs exclusively in her son's tombs TT 29[29], TT 96, with no reference to her husband's tomb TT 224, according to Whale[30] .

Although it seems unlikely, the researcher believes she was included with her spouse in most scenes throughout the tomb, but her absence is because of how heavily damaged the tomb is; yet her presence in the tomb may be proven. For example, in the fourth register (near the bottom) of the long hall's left wall painting **[FIGURE 7],** there is a scene representing Ahmose and his wife. The text is as follows:

hmt.f mrt.f n st – ib[*.f*][31] [*Nbw*]

« His wife, his beloved, [his] favorite, [*Nbw*] ».

[FIGURE 7]: Painting of Ahmose's wife *Nbw* on the long hall's left wall.

used by married women and indicated the wife's duties as director of household affairs; it corresponded best to English «Mrs. »; FRANKE 1983: 138ff; WARD 1986: 8; WHALE 1989: 249.

[28]WHALE 1989: 84.

[29]Amenemopet has other tomb Nº.48 in the Valley of the Kings (KV48) near the tomb of Amenhotep II (KV 35) at Thebes; PORTER & MOSS 1960: *PM* I-2: 565.

[30]WHALE 1989: 280, Nº.35.

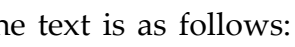
[31]*n st- ib.f* literally means « in place of his heart » his favorite ERMAN & GRAPOW 1971: Wb IV 4(6); WILSON 1997: 947.

In the tomb of her son Amenemopet (TT 29), the text reads:

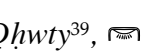
 [32]

Ỉmn m Ỉpt mȝʿ-ḫrw ir (*w*) *n imy- rȝ pr n ḥmt ntr Ḥmy ms*(*w*) *n nbt pr Nbw*

«Amenemopet, justified, begotten by the steward of the god's wife, Humy and born of the lady of the house, *Nbw*»[33].

The text used the phrase *nbt pr* to indicate that his mother was prominent in his tomb[34]. However, the assumption that the mother was more important than the wife in her son's tomb is not supported by evidence from the 18th dynasty[35]. In TT 96[36], she is also referenced. The text is as follows:  [37] *ḥmt.f nbt pr ḫkrt nsw Nbw* «His wife, the lady of the house and royal Concubine, *Nbw*».

Daughters [FIGURE 8]

Unfortunately, no records have been found in the tombs of Ahmose's sons, and most references do not mention Ahmose having daughters. The only reference to Ahmose's daughters is the banquet scene on the right wall of the long hall in TT 224. It is divided into four registers, with Ahmoses' children shown in the second and third registers from the top. In the second register there are nine young women[38]. The distinguishing feature is that the name *sȝt.f mrt.f* «his beloved daughter» is kept for most of them, including  *Sȝt Ḏḥwty*[39],  *Nbw m* [*irit*]*?*[40], and one whose name ends with  *ḥb* [41], *Bȝkt*[42], and *Tti šrit*[43]. Notably, no titles for his daughters have survived**.**

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[32]HELCK 1961: *URK* IV: 1438, 13-19.

[33]HELCK 1961: *Übersetzung*: 97; CUMMING 1984: 136.

[34]There was a definite trend for the title *nbt pr* to occur first, which was the most frequently used title on several monuments, outnumbering other titles to confirm that she is an individual and prominent woman; WHALE 1989: 263, 264; ONSTINE 2005: 129-130, n. 4.

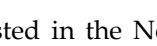
[35]WHALE 1989: 263, 264.

[36]HELCK and other Egyptologists mentioned her as the mother of Sennefer. HELCK 1961: *URK* IV: 1432, 16; the researcher will discuss this in the next pages.

[37]HELCK 1961: *URK* IV: 1432, 16.

[38]PORTER & MOSS 1960: *PM* I-1: 325(6), PLAN 318; ROEHRIG 1990: 190, Nº.602.

[39]It is attested from the Middle Kingdom and means «Djehuty's daughter»; RANKE 1935: PN I: 295, Nº 5.

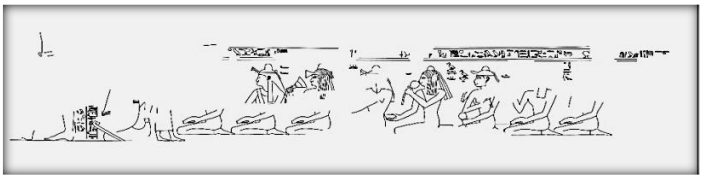
[40]  *Nbw m*// [*irit*] It is attested in the New Kingdom «Gold is comrade (companion)? »; RANKE 1935: PN I: 190, Nº.19.

[41]ROEHRIG incorrectly read the word *ḥȝt* instead of  *ḥb*, and she read the name Rsyt of another daughter, which I did not recognize; ROEHRIG 1990: 190, Nº.602.

[42]It is attested from the Middle and New Kingdom; RANKE 1935: *PN* I: 92, Nº.5.

[43]It is attested from the Middle and New Kingdom and means «the Younger». RANKE 1935: *PN* I: 384, Nº .8.

(A)



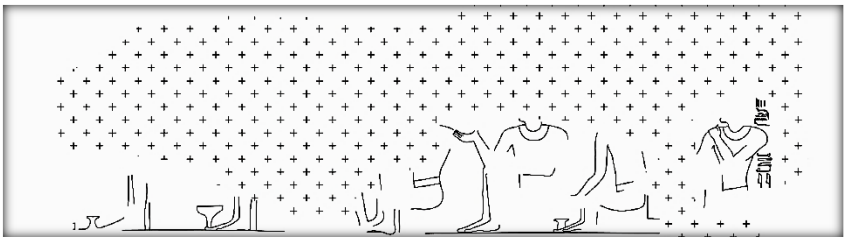
(B)

[FIGURE 8]: The daughters of Ahmose are depicted in the second register on the right wall of the long hall© Photo taken by the researcher

Sons [FIGURE 9]

As mentioned above, the third register of the banquet scene in TT 224 depicts young boys below the daughters in the second register, and there may be up to six sons? whose names or titles are not preserved. They appear to be Ahmose's sons. Humy and his wife are seated in front of an offering table, and both registers are set up in front of them[44]. *Msw.f* «his children» of Ahmose is written in the band between the first and second registers. **[FIGURE 10].**

(A)



(B)

[FIGURE 9]: The sons of Ahmose are depicted in the first register /right wall ©Photo taken by Researcher.

[44]PORTER & MOSS 1960: *PM* I-1: PLAN 318, 325[6]; ROEHRIG 1990: 190, n. 602.

(A) **(B)**

[FIGURE 10]: An inscription naming Ahmose's children are between the first and second registers in the long hall of the right wall© Photo taken by the researcher

However, most references[45] mention that Ahmose, the owner of TT 224, had two sons. The eldest son,  *sn-nfr*[46] «Sennefer», held the chief title  *ḥ3ty-ʿ n Niwt rsyt* «the Mayor of the Southern City (Thebes)» under Amenhotep II[47], and was the owner of TT 96. Moreover, the younger son is  *Ỉmn-m ipt* [48] «Amenemopet», the vizier of Amenhotep II, who owned tomb TT 29, and held the titles of  *iry-pʿt ḥ3ty-ʿ* «Hereditary prince and mayor»[49].

According to Whale, the eldest son is consistently depicted and named first in a row of sons and is the most prominent son in the performance of offerings and rituals for his parents[50]. Unlike Whale, Roehrig claims that the younger son, Amenmopet, is identified as overseer of the granaries of the God's Wife of Amun (*imy-r3 pr n šnwty n ḥmt ntr n Ỉmn*) on the west wall of the long hall and is represented making offerings to Ahmose and *Nbw*[51]. However, Amenmopet does not claim this title on any of his monuments. When applying Whales' claim to TT 224, the researcher explores Sennefer on the tomb's walls, performing rituals in front of Ahmose and *Nbw*. Furthermore, the disappearance of the younger son, Amenemopet, as well as his name, title, and physical description, may be because of the wall damage. He could be one of the sons whose names were lost in the banquet scene. According to the tombs (TT 224, TT 96, and TT 29), two sons were identified:

[45]DAVIES 1913: 16; HELCK 1958: 423; PORTER & MOSS 1960: *PM* I-1: 325; GRAEFE 1981: 15; WHALE 1989: 84,145-6; KAMPP 1996: 499; EATON 1999: 113,1.

[46]Ranke reads it *sn.(i)nfr* «(my) good brother». It is attested from the Middle Kingdom. RANKE 1935: PN I: 309, Nº.5.

[47]For more titles of Sennefer and his rank. EATON 1999: 113; 1; SHIRELY 2005: 249 ff.

[48]It is attested in the New Kingdom. It means «Amun is in Luxor». RANKE 1935: PN I: 27, Nº.18.

[49]DAVIES 1913: 16.

[50]WHALE 1989:256

[51]ROEHRIG 1990: 191, Nº.604.

Sennefer

One of the most challenging aspects for the researcher was confirming the relationship between Ahmose and Sennefer, since most scholars believed that Sennefer was Ahmose's son based on inscriptions in TT 96 and TT 29[52] . however, they should have taken into consideration another crucial piece of evidence.

Nonetheless, the genealogical relationship is nebulous, with much doubt about Sennefer and Ahmose's relationship. This misunderstanding is caused by the following fact, which appears to have gone unnoticed when considering two sets of parents in Sennefer's tomb (TT 96)[53]. According to the inscription on the west wall painting of the inner pillared hall, Sennefer is dedicated in front of his parents. The text is as follows[54]:

 [55] *irt ḥtp di nsw* (*n*) *wʿb sp-sn n it.*(*f*)*imy-rꜣ pr n ḥmt -ntr Ḥmy mꜣʿ ḫrw in ḥꜣty ʿ* (*n*) *Niwt rsyt Sn-nfr*

«Making occasionally Hotp-di-nesu offering to (his) father, the steward of the god's wife, Humy, justified, by the Mayor of the Southern City, Sennefer»[56].

Another couple depicts their parental relationship with Sennefer as shown in the banquet scene on the east wall, north of the transverse hallway. The text is as follows [57] :

 [58] *it.f ḥm ntr 2- Nnw*[59] *n*[*Ḥr*] *nb Ḳsi Nnw mꜣʿ-ḫrw ,mwt.f mrt .f Ḥnw*(*t*) *-iri*[60] *nbt imꜣḫ*

«His father, the second prophet of Horus, lord of Qus[61], Nenu, justified, his mother, whom he loves, the mistress of the house, Henutiry, possessor of the blessed state»[62].

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[52]HELCK 1958: 423; PORTER & MOSS 1960: *PM* I-1: 325; HELCK 1961: *URK* IV: 1432-35; GRAEFE 1981: 15; WHALE 1989: 84, 145-6; KAMPP 1996: 498.

[53]Both occur on Pm plan at (21) and are identified as Amenemopet's parents, and at (22) where Sennefer offers «to his father» (*n it-f*). HELCK 1961: *Urk* IV: 1432(10). For the text, see: PORTER & MOSS 1960: *PM* I-1: 199, PLAN 196; «The Tomb of Sennefer»:https://www.osirisnet.net/tombes/nobles/sennefer/e sennefer_ 1-9. Accessed on 25/05/ 2020.

[54]PORTER & MOSS 1960: *PM* I-1: 199, PLAN 196; «The Tomb of Sennefer»:https://www.osirisnet.net/tombes/nobles/sennefer/e sennefer_ 1-9. Accessed on 25/05/ 2020.

[55] HELCK 1961: *URK* IV: 1432.

[56]CUMMING 1984: 129.

[57]«The Tomb of Sennefer»:https://www.osirisnet.net/tombes/nobles/sennefer/e sennefer_ 1-9. Accessed on 25/05/ 2020.

[58]HELCK 1961: *URK* IV: 1433, A. 15-16.

[59]HELCK & CUMMING read it *Nw*, while it reads *Nnw*, as Ranke mentioned.  *Nnw* appeared in the New Kingdom; ERMAN & GRAPOW also read it *Nnw*, however that writing of  ,  *Nnw* appeared in 21st dynasty. RANKE 1935: *PN* I: 206; HELCK 1961: *Übersetzung*: 94; ERMAN & GRAPOW 1971: WB I: 214 [18-19]; CUMMING 1984: 131; Nº.10.

[60]  , . It is attested in the New Kingdom and means «Its mistress». RANKE 1935: *PN* I: 242, Nº.22.

[61]Qus (*Arabic*: قوص is a city in the modern Qena Governorate in Egypt, located on the east bank of the Nile. In Graeco-Roman times, it was called Apollonopolis *Parva* or Apollinopolis *Mikra* (Greek: Ἀπόλλωνος ἡ μικρά; Ἀπόλλων μικρός), or Apollonos *minoris*; «Qus», https://en.wikipedia.org/wiki/Qus. Accessed on 08/04/ 2022.

[62]CUMMING 1984: 131.

The same couple is recognized as a seated pair on the north wall of the inner pillared hall once more[63]:

 [64] *ḥm ntr 2 -nw Ḥr Wr Nnw mɜʿ-ḫrw ḥmt.f nbt pr Tit- iry*[65] *mɜʿt ḫrw* «The second priest of Horus, the Elder, Nenu, justified. His wife, the mistress of the house, Tit- iry, justified»[66].

The following questions arise: Who are Sennefer's biological parents? What is the most significant evidence that could be found in Ahmose's tomb? Is there anything in the Egyptian inscriptions that supports my point of view? To do so, the researcher will examine what is mentioned about Sennefer's parents and what may be revealed in Ahmose's tomb, TT 224—while keeping in mind the confusion caused by the kinship[67] system's basic terminology, which has both primary and extended meanings[68]. As previously stated, most scholars assume that Ahmose and *Nbw* were Sennefer's genuine parents; nonetheless, several suggestions have been made to identify Sennefer's second pair of parents (Nenu and Henutiry,) as follows:

According to Helck , *Nbw* and Ahmose were the parents of Sennefer, while Nenu and Henutiry were the maternal grandparents of Sennefer and Amenemopet[69]. Then Helck) supports another interpretation in his genealogy of the family of Sennefer and Amenemopet, claiming that they were the parents of Senet- nefret, or Mryet Sennefer's wives, and hence their in-laws[70].

Graefe outlines the genealogy of Ahmose's family in a way similar to Helck), with two sets of parents as follows:

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[63]«The Tomb of Sennefer»: https://www.osirisnet.net/tombes/nobles/sennefer/e sennefer_ 1-9. Accessed on 25/05/ 2020

[64]HELCK 1961: *URK* IV: I433, B. 17-18.

[65]Same woman Henutiry; GRAEFE 1981: 17; CUMMING 1984: 131.

[66]HELCK 1961: *Übersetzung*: 94; CUMMING 1984: 131.

[67]My research only goes into a little detail about kinship systems, as several Egyptologists have already done extensive research on this subject. For more extended meaning of kinship terms, see: ROBINS 1979: 197–217; BIERBRIER 1980: 100; FRANKE 1983: 400; FRANKE 2001: 245–248; REVEZ 2003: 123-131; CAMPAGNO 2009: 1.

[68]For example, the kinship term previously mentioned refer to Sennofer's two fathers (8-9), which could also be used to refer to more distant ascending generations' lineal kin; «grandfather» or «ancestor » It can also mean «protector» or «teacher », metaphorically. To put it another way, anyone who embodies the concept of authority has the potential to be it or a «father». It expresses the concept of «spiritual» kinship that fatherhood is much more than the natural biological ties that bind a father to his son; fatherhood can be acquired or relinquished because behavior and attitude play a significant role in defining a father. Leprohon also explains the relationship between the two men of stela BM 2029; they both identify with their father. He states that the word «father» takes on its broader sense of «protector», «patron», or «adoptive father». BRUNNER 1959: 4; LEPROHON 1978: 33-34; REVEZ 2003: 123; CAMPAGNO 2009: 2.

[69]HELCK 1961: *URK* IV: 1433, 13-14; HELCK 1961: *Übersetzung*: 94 (2nd text).

[70]HELCK 1958:424, 439.

Nenu and Henutiry were the parents of *Nbw* Ahmose's wife, while Taidy and Senwesrt were the parents of Ahmose, making them the maternal grandparents of Sennefer and Amenemopet[71].

As suggested by Helck Cumming notes that Ahmose and his wife are Sennefer's biological parents, whereas Nenu and Henutiry are presumably his maternal grandparents [72].

In contrast to previous suggestions, Roehrig argues that Sennefer's biological father was most likely Nenu, the second priest of Horus, the Elder of Qus. Nenu and his wife, Henutiry, are identified as Sennefer's parents at least twice in TT 96.

Sennefer, on the other hand, had other ties to Qus that supported the idea that his biological father was Nu rather than Ahmose-Humy. Sennefer was known as the «overseer of the prophets of Horus Lord of Qus» (*imy-r3 ḥmv ntr n ḥr wr nb Gsy*), indicating that Sennefer had connections to the Qus region even while serving as the mayor of Thebes[73].

Shirley states that Sennefer's biological parents were Nenu and Henutiry, while his uncle and aunt were Ahmose Humay and Nub. Although Sennefer never refers to himself as «born of» (*ir n* or *ms n*) anyone, it appears that Nu and Hunetiry/Ta-iry are Sennefer's parents based on the extant inscriptions and visual composition in Sennefer's tomb TT 96[74].

According to Whale, Nenu and Henutiry are not Sennefer's parents. The extensive use of kinship terms might imply that they were either Sennefre's grandparents or his in-laws, since they were only displayed in the scenes with Sennefer and his wife, Senetnay. She believes they were probably the parents of Senetnay and potentially Sennefer's family if he and Senetnay were cousins[75]. She added that Nenu was known as *ḥm ntr 2 nw n ḥr nb Gsy*, while Sennefer was known as *imy r3 ḥmw –ntr n ḥr nb Gsy*. Perhaps he inherited the title from his father-in-law, who could not bestow it to a son. Another suggestion is that Sennefer, as priest supervisor, married the older second priest's daughter[76].

Fortunately, the inscriptions and scenes on TT 224's walls were visible after being cleaned, revealing the most important information concerning Ahmose and Sennefer's relationship. An image of Sennefer is written before him in three[77] different locations *s3*(*n*) *snt .f* as follows: the first location is on the long hall's right wall, where a small image of Sennefer making an offering to Ahmose and his wife and before him is

[71]GRAEFE, 1981: 16.

[72]CUMMING 1984: 131.

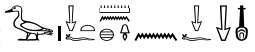
[73]Humy has no titles connected to the city of Qus, nor does his son, the vizier Amenemopet. ROEHRIG 1990:154-155, Nº.497.

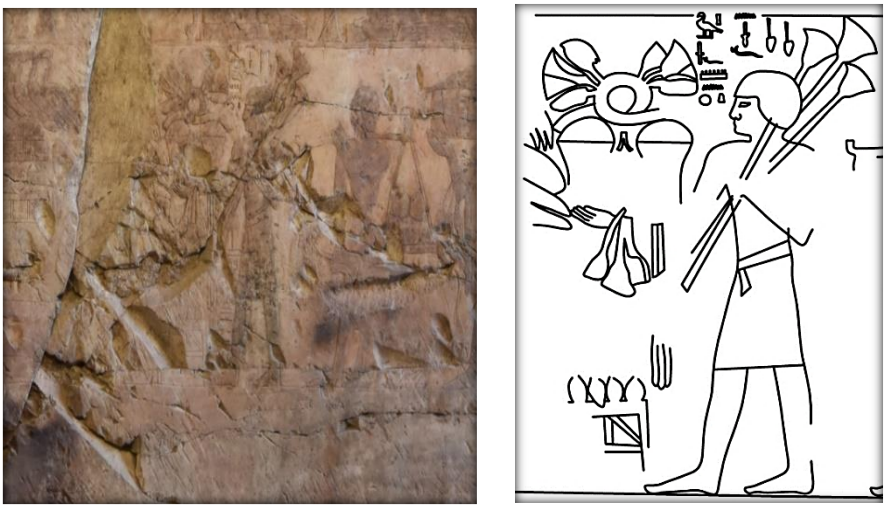
[74]SHIRELY 2005: 241ff.

[75]WHALE 1989: 265.

[76]WHALE 1989: 150.

[77]ROEHRIG was incorrect when she stated that Sennefer appears only twice in (TT224), and she thought the small image on the left wall was for Amenmopet, not Sennefer, and she held the title (*lmy-r3 pr n šnwty n hmt ntjr n Ỉmn*). However, Ahmose himself is the owner of this title. ROEHRIG 1990:190.

inscribed:  *s3(n) snt .f mnḫ n sn.f Sn-nfr* « The son (of) his (Ahmose's) sister, the one who is devoted to his brother, Sennefer» **[FIGURE 11]**.



(A) **(B)**

[FIGURE 11]: The first location of a small image of Sennefer with text is on the right wall of the long hall© Photo taken by the researcher

The second location is on the long hall's left wall, where a small image of Sennefer is carrying a hes vase and an incense burner behind the person who is offering to Humy[78]. Before Sennefer the following words are inscribed:  *s3 n snt. f mnḫ n sn.f Sn-(nfr)* « The son of his sister, the one who is devoted to his brother, Sennofer» **[FIGURE 12]**.

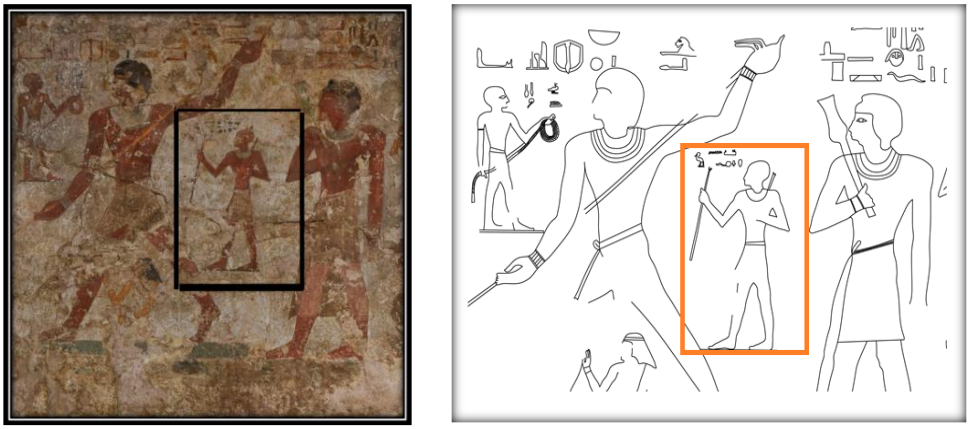
(A) **(B)**

[FIGURE 12]: The second location of a small image of Sennefer with text is on the left wall of the long hall© Photo taken by Researcher.

The third location is in the marsh scene of the second transverse hall[79]. Humy is shown standing on a boat, ready to throw a throwstick. Sennefer, a little figure in front of him, holds a spear with a rope connected to it, and before him is inscribed:

[78]PORTER & MOSS 1960: *PM* I-1:325 [5, IV].
[79]PORTER & MOSS 1960: *PM* I-1:325 [8].

 *s3 (n) //nt. f mnḫ ḥry-ib* [80]*//.f Sn-(nfr)* «The son (of) his sister, the one who is pleasing to the heart (to) his//, Sennofer» **[FIGURE 13].**



(A) **(B)**

[FIGURE 13]: The third location of a small image of Sennefer with text is on the left wall of the second hall© Photo taken by the researcher

Investigating this phrase *s3 n snt.f*, as well as other kinship phrases, demonstrates that there were no specific Egyptian words for multiple-link ties such as with our terms «grandmother» and «uncle»[81]. This kinship was thus expressed through compound phrases like *n ḥmt.f* for "father-in-law» or *sn* (*n*) *mwt.f* for «his mother's brother» or «maternal uncle»[82]. Or, *s3t snt.f* «his sister's daughter»[83]. Based on the preceding, we conclude that the phrase *s3 n snt.f* of relationship in tomb relief indicates a genuine tie rather than a nebulous kinship.

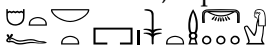
Based on the fresh information found in Ahmose's tomb, should we thus accept two sets of parents who have been named as Sennefer's parents? It is improbable. Since Humy often refers to Nub as his wife (*ḥmt.f*)[84] rather than his «sister» (*snt.f*), this phrase is unlikely to indicate anything other than «nephew ». This new fact is also significant in terms of genealogy. This evidence suggests that Sennefer was Ahmose's nephew, who

[80] *mnḫ ḥr-ib*: it appeared in the middle kingdom and 18th dynasty, which means «pleasing to the heart, splendid of buildings, of workmanship». FAULKNER 1991: 10; ERMAN & GRAPOW 1971: WB II 86[5-11].

[81]CAMPAGNO 2009: 1.

[82]BIERBRIER 1980: 100.

[83]During the reign of Thutmose III, Baketamon, the wife of Amenemhat, the owner of TT82, was described as as *s3t snt.f* «daughter of his sister». This phrase expresses the basic meaning of niece without a doubt, and her husband is her maternal uncle. There are also two cases from Setau's tomb, the high priest of Nekhbet at El Kab (under Ramesses III's reign), where two of Setau's parental brothers were married to their nieces. The evidence is quite clear and unarguable: A married pair is depicted sitting before Setau (South wall), and over their heads, we read: *sn.f h3 n s3t.f*. Next to them is a man described as *sn.f h3 n s3t.f mryt.f….ḥmt.f nbt pr ḥnwt sḫmt*. GARDINER 1911: 50-51; DAVIES & GARDINER 1915: 4.

[84]Notably, we can conclude from the text that Sennefer refers to *Nbw* as. *ḥmt.f* «his wife» rather than *mwt.f* «his mother», a phrase which Sennofer used to refer to his actual mother, *ḥnwt iri*, the text as follows:  *ḥmt.f nbt pr ḫkrt nsw Nbw* «His wife, the lady of the house and royal Concubine», *Nbw*. HELCK 1961: *Urk* IV: 1432. (See the text of his mother Hnewt *iri* 9).

was possibly adopted[85]. Therefore, Sennefer's biological parents are Nu and Henutiry, while his uncle and aunt are Ahmose Humay, and *Nbw*. Sennefer and Amenemopet are cousins. As a result, this part of the study disproves one of the popular misconceptions concerning Ahmose and Sennefer's kinship that most Egyptologists believe.

Sennefer had three wives[86], according to the inscriptions in his tomb[87]; the first one was called Meryt, who held the title:


snt.f mrt.f šmʿyt wrt nt Ỉmn Mryt mȝ-ḫrw

«His sister, his beloved, the great chantress of Amun, Mreyt, justified»[88].

Another wife, Senetnay[89] held the following titles:


snt.f nbt pr mnʿt Nsw Snt-my[90] *mȝʿt - ḫrw snt.f mrt.f nbt pr mnʿt wrt šdt ḥʿw ntrw*

«His sister, the lady of the house and royal nurse, Senetnay, justified. His sister, his beloved, the lady of the house and great nurse who nourished the divine person»[91].

The third one, Senetnefret, with the title:


snt.f mr(t).f mnʿt Nsw Snr nfr(t)

« His sister, his beloved, the nurse of the king, Senetnfrt »[92].

Sennefer also had at least three daughters[93]: Mutnofret, Nefertiry and Muttawy[94]. Mutnofret and Nefertiry were identified as Sennefer and Senetnay's daughters. Mutnofret is known from various sources including a statue of her parents, her father's tomb (TT 96), and the vizier Amenemopet's tomb (TT 29)[95]. She holds the title:

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[85]Sennefer was originally from Qus through his father's family, based on the title (*imy-r3 hmv ntr n ḥr wr nb Gsy*) (See 10). In contrast, his mother's family may have been from Thebes. Sennefer may have been sent to Thebes, where he became close to his mother's family, especially his uncle Humay, who regards him as his father (*it.f*) and relies on him, mainly because he is Ahmose's eldest son, whether alive or dead, and performs all funerary duties for his close uncle. ROEHRIG 1990: 155.

[86]For more information about Sennefers's wives, see: ROEHRIG 1990:150ff; «The Tomb of Sennefer»:https://www.osirisnet.net/tombes/nobles/sennefer/e sennefer_ 1-9. Accessed on 25/05/ 2020 .

[87]HELCK 1961: *URK* IV: 1434.

[88]HELCK 1961: *URK* IV: 1434 [1]; CUMMING 1984: 131.

[89]According to ROEHRIG, Sennefer had two wives, Sentnay, Mreyt, Senetnay and Senetnefrt are the same person. SHIRLEY, on the other mentions Sennefer having only two wives, Senetnay and Senetnefrt. For more details, see: ROEHRIG 1990:150ff; SHIRLEY 2005: 246.

[90]Sethe incorrectly transcribed the name of *šnt-nȝy* as *Snt-my* in *URK* IV 1434[3-4]; ROEHRIG 1990:150, Nº.478.

[91]HELCK 1961: *URK* IV: 1434 [3-4]; CUMMING 1984: 131.

[92]HELCK 1961: *URK* IV: 1434 [6]; CUMMING 1984: 131.

[93]According to Shirley, Sennefer had two daughters. SHIRLEY 2005: 246; «The Tomb of Sennefer»:https://www.osirisnet.net/tombes/nobles/sennefer/e sennefer_p.1-9. Accessed on 25/05/ 2020.

[94]HELCK 1961: *URK* IV: 1434; WHALE 1989: 145.

[95]ROEHRIG 1990:163.

 *šmʿyt nt Ỉmn*

«the chantress of Amun»[96].

While Nefertiry held the previously mentioned title *ḫkrt nsw*[97]. However, some argue that Mutnofret and Muttawy are the same ones who held the same title: *šmʿyt nt Ỉmn*[98].

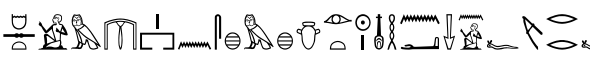
Amenemopet

He served as vizier during the reign of Amenhotep II and married Weret-maatef(?)[99], who held the title *ḫkrt nsw*[100]. Several sources identify him as the biological son of Ahmose and *Nbw*[101] , as revealed in Amenemopet's tomb inscription (TT29) as follows:

 [102] *ỉry-pʿt ḥ3ty - ʿ…Ỉmn -m -ipt ỉry.n ỉmy-r3 pr n ḥmt-ntr Ḥmy msw n nbt pr Nbw*

«Prince and count…Amenemopet, justified, begotten by the Overseer of the god's wife, Humy and born to the mistress of the house, *Nbw*»[103].

Even though most sources[104] refer to Sennefer as *sn.f* «his brother»[105], but when used in an extended sense, Sennefer and Amenemopet are cousins, as previously stated. The text in TT 96 is as follows:

 [106] *ḥms m sh n sḫmḫ-ib ỉrt ḥrw nfr .ḥnʿ sn.f mrr.f …ṯ3ty Ỉmn m ỉpt ḏd n.f P3 Ỉry*

«Sitting in a hall of amusement and spending a good day with his brother whom he loves… the vizier Amenemopet, who was called Pairi»[107].

Another text in Amenemopet's tomb attests to a speech to his brother Sennefer (his cousin). «The text reads as follows:

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[96]HELCK 1961: *URK* IV: 1435[11], 1436[15]; CUMMING 1984: 134.

[97]WHALE 1989: 145.

[98]ROEHRIG 1990:150ff; SHIRLEY 2005: 246.

[99]  According to HELCK's restoration, *Wr*[*t*] [*M3ʿt.f*]*?* HELCK 1961: *URK* IV: 1438(20). However, the researcher needed help finding this name among other names in Ranke's book. However, Helck reads it *wr it.f*? ;. While GRAEFE considers that the name is misread; Amenemopet's wife does not appear to play a very prominent role in his tomb despite her status as *ḫkrt nsw*. HELCK 1958: 439; GRAEFE 1981: 18. Nº.16; WHALE 1989: 265.

[100]The same title as *Nbw*, Amenemopet's mother. HELCK 1961: *URK* IV: 1438, 20.

[101]PORTER & MOSS 1960: *PM* I-1: 325; GRAEFE 1981: 15; WHALE 1989: 152; ROEHRIG 1990:190; «The Tomb of Sennefer»:https://www.osirisnet.net/tombes/nobles/sennefer/e sennefer_.1-9. Accessed on 25/05/ 2020.

[102]HELCK 1961: *URK* IV: 1438, 13-19.

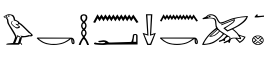
[103]HELCK 1961: *Übersetzung*: 97; CUMMING 1984: 136.

[104]See: 8-9.

[105]The Egyptians only had the terms *sn* and *snt* for sibling relationships and collateral kin in a broader sense. The term was mainly used to refer to ego's «brother" or "sister," but it could also refer to the link with ego's mother/father «uncles» and «aunts», as well as their sons/daughters «cousins», and the sons/daughters of ego's brothers/sisters «cousins» «nephews» and «nieces». CAMPAGNO 2009: 2.

[106]HELCK 1961: *URK* IV: 1424[5-15].

[107]HELCK 1961: *Übersetzung*: 90; CUMMING 1984: 124.

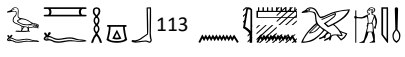
 [108] *iw.k ḥnꜥ sn.k p3(iri) imy-r niwt m hwt.f nḥḥ*

«you are with your brother, Pa(iri), the superintendent of the city in his mansion of eternity» [109].

Whatever their ancestry, Sennefer and Amenemopet had a close bond. Sennefer's parents are recognized as Humay and Nub in his tomb, while Sennefer and his first wife Senetnay, who was a nurse of Amenhotep II, are extensively depicted in Amenmope's tomb[110].

Unfortunately, Ahmose's tomb does not contain any textual references or visual representation of Amenemopet[111]. It could be for one of two reasons: either he was still young and was replaced by Sennefer as the eldest son, or the current tomb's poor condition caused damage to the banquet scene, which depicted Ahmose's sons but did not preserve their names or titles.

In an inscription from Amenemopet's tomb, only one son's name, Paser, (Ahmose's grandson) with his title, is mentioned, which is as follows [112] :

 [113] *s3.f mr.f ḫry-ḥbt n*[*Ỉmn*] *P3-sr m3ꜥ ḫrw*

«his son, his beloved, the lector priest of Amun, Paser, justified»[114].

II. SOME REMARKS ON THE SOCIAL AND ECONOMIC RANK OF THE FAMILY OF AHMOSE

According to the current state of TT 224, most of Ahmose's family members' titles have not survived. As a result, the only sources of his importance and rank were some of his available titles in his tomb, TT 224; Amenmopet's titles and ranks in his tomb, TT 29; and Sennefer's titles in his tomb, TT 96. Sennefer's tomb, on the other hand, provides additional details about him and his family[115].

Ahmose-Humay gained prominence in his administrative role within the gods wife estates. As a result, he was offered jobs that allowed him access to the palatial sphere. It is unclear how he did it. However, when his son, Amenemopet's, and nephew, Sennefer's, careers are examined, it becomes clear that his relationship with the young Amenhotep II facilitated their careers. In order to select a new vizier after ascending to the throne, Amenhotep II chose the son of his tutor. It strongly suggests

[108]HELCK 1961: *URK* IV: 1440, 3-4.

[109]HELCK 1961: *Übersetzung*: 98; CUMMING 1984: 137.

[110]ROEHRIG 1990: 192.

[111]ROEHRIG 1990: 191, see: p.7.

[112]HELCK 1961: *URK* IV: 1439,18.

[113]Incorrect spelling of the word  *ḫry-ḥbt*. TAYLOR 2001: 188, Nº.1841.

[114]For more details about the civil and priestly role of the sons and daughters of Ahmose under the reign of Amenhotep II, see: CUMMING 1984: 137; SHIRLEY 2005: 250ff.

[115]See: the introduction of the article.

that Amenemopet's position almost entirely depended on his father's status and relationship with Amenhotep II[116].

Amenemopet, the vizier of Amenhotep II, and Sennefer, the mayor of Thebes during the reign of Amenhotep II, were Amenhotep II's two most powerful men. Nonetheless, neither tomb mention titles nor details about how they came to hold these positions. Ahmose Humay's connection to the palace as an overseer of the *ipt-nswt* and tutor may be the common thread. Both Amenemopet and Sennefer benefited directly from the power that these positions provided. Furthermore, Ahmose-Humay appears to have used his influence within the estate of the god's wife to bring Sennefer into this domain, possibly shortly after Sennefer's parents died and Ahmose-Humay «adopted» him. Sennefer may have continued to administer the priesthood. Moreover, there is no evidence that Amenemopet would have been promoted in the administration without the assistance of his father[117] .

Furthermore, most women of Ahmose's family had important titles: *ḫkrt nsw*, *mnʿt wrt*, *šmʿyt nt Ỉmn*. It is unclear whether they belonged to the elites due to their husbands' positions or their birthright. However, the titles indicate an important position in the palace and closeness to the royal family during the reigns of Thutmose III and Amenhotep II.

III. CONCLUSION

The importance of TT 224 stems primarily from the textual information and visual representations on the tomb walls. It helped to combine the various pieces of extensive genealogical data about the Ahmose's family. His parents, Senwesrt and Taidy, are mentioned in his tomb, as is common in most Theban tombs to express their respect, but their status is unknown due to the absence of their titles in his tomb.

Nbw was Ahmose's sole wife, as no other spouses are mentioned in his tomb. She bore the title «lady in waiting » ,indicating that she was close to the Royal Court, whether in charge of court tasks or an honorary bestowed by the king. This title may have been facilitated by Ahmose's association with the royal court through the title «Tutor of the King», which he later held in his professional career.

At least nine of Ahmose's daughters were depicted in his tomb (TT224), seven of whom have names but no titles and are unknown to us. His sons are represented in his tomb, but due to the lack of text and wall damage, we are unsure of how many sons Ahmose had.

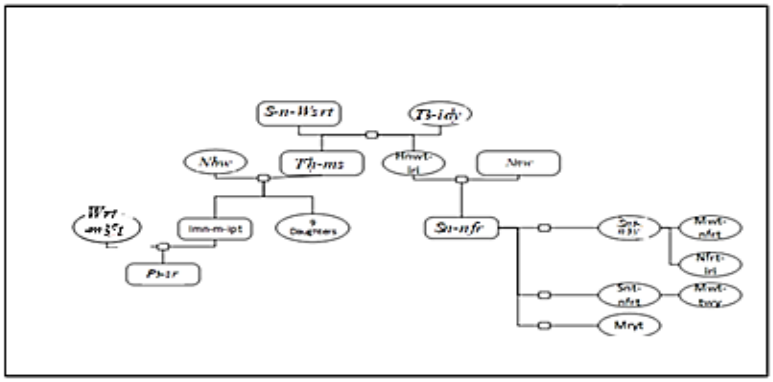
Primary sources confirmed true kinship, specifically the relationship between Ahmose and Sennefer, his alleged son. Sennefer was possibly Ahmose's adopted nephew, who was sent from Qus to Thebes and lived with his relatives (Ahmose and his wife *Nbw*). He trusted him as his eldest son and delegated all funerary duties to him rather than Amenmope (his real son), who was most likely absent from Ahmose's tomb due to his youth. Sennefer's biological parents are Nenu and Henutiry, and his uncle and aunt are Ahmose Humay and *Nbw*, respectively. Amenemopet and Sennefer are

[116]SHIRLEY 2005: 250-1.

[117]HIRLEY 2005: 250ff.

cousins. As a result, this part of the study disproves one of the most widely held misconceptions about Ahmose and Sennefer's kinship among Egyptologists. Amnemopet, on the other hand, has a close relationship with his cousin Sennefer, whom Amnemopet regards as «his brother». His parents are identified as Humay and Nub in his tomb, while Sennefer and his first wife, Senetnay, an Amenhotep II nurse, are prominently depicted.

Amenemopet and Sennefer were Amenhotep II's two most powerful men. Ahmose Humay's connection to the palace as an overseer of the *ipt-nswt* and tutor, and his influence within the estate of the god's wife may be the common thread of gaining their positions. Both Amenemopet and Sennefer benefited directly from the power that these positions provided. According to the researcher, Ahmose's family held a high societal position and was close to the royal family. Here is a simplified version of the researcher's correction of Ahmose's family[119] genealogy **[TABLE 1]**.



[TABLE 1] : Geneaology of Sennefer according to the researcher.

IV. ACKNOWLEDGMENT

This article is part of the researcher's publication of Tomb 224. As a result of the conservation team's efforts, the researcher is grateful to the Ministry of Antiquity for allowing me to reopen, clean, and publish the tomb.

[119]According to SHIRLEY, it differs slightly from Sennefer's family genealogy. SHIRLEY 2005: 246.

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UNPUBLISHED GROUP RELIEFS [PORTRAIT STELAE AND GRAVE SCULPTURE] AT THE ASHMOUNIN STOREHOUSE IN MINYA

BY

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ABSTRACT

[AR] **مجموعة غير منشورة للنقوش البارزة (لوحات جنائزية وشواهد قبور) بمخزن الأشمونين المتحفى بالمنيا**

تتناول هذه الدراسة خمسة نماذج لشواهد قبور ولوحات جنائزية لم تنشر من قبل، ومحفوظة في مخزن الأشمونين المتحفى بالمنيا، وغير معلوم مصدرها، اثنان منهم على هيئة تماثيل بداخل ناووس أو مشكاة، وثلاثة عبارة عن تماثيل جنائزية مستقلة. يهدف هذا البحث إلى تقديم دارسة وصفية لهذه الشواهد واللوحات الجنائزية، تتبع بدراسة تحليلية مقارنة تتناول فيها مادة النحت، وتقديم رؤية واضحة للسمات الفنية لمعالجة تصوير هذه المجموعة، والأسلوب الفني المتبع في تنفيذ تماثيل المتوفين، والمتمثل في ملامح الوجه والزى والوقفة أضف إلى ذلك الكشف عن ماهية ومكانة أصحاب التماثيل، والرموز التي صورت معهم، والغرض منها. كما يعكس موضوع الدراسة صورة واضحة عن المدرسة الفنية التي أنتجت هذه المجموعة، لذا تأتى أهمية هذه الدراسة لتحديد مكان العثور عليها، ووضع تأريخ لها استنادا على كل هذه العناصر السابقة.

يتضح من خلال الدراسة أن شواهد القبور، واللوحات الجنائزية مُنفذة من مواد محلية، ومصورة على الطراز الروماني، ومتأثرة بالروح والأساليب الهلّنستية، كما أنها تنتمي إلى طبقة النخبة في المجتمع المصري خلال العصر الروماني، واتضح أيضا أنها منحوتة بجودة عالية، وخلص إلى أن شواهد القبور الجنائزية موضوع الدراسة تعود إلى العصر الروماني، خاصة في الفترة الممتدة من القرن الثاني إلى بداية القرن الرابع الميلادي. أيضاً تعكس الرموز المصاحبة للتماثيل الجنائزية مدى ارتباطهم بالطقوس الجنائزية، واعتقادهم في الخلود والحماية والحياة الأبدية.

[EN] This study deals with five models of funeral tombstones and statues that have not been published before and are kept in the Ashmounin storehouse in Minya. Their origins are unknown. Two of them are statues inside a niche, and three of them are individual funerary statues. And provides a descriptive study of these funerary grave sculptures and statues, followed by a comparative analytical study dealing with sculpture. One goal is to provide a clear vision of artistic features. Another goal is to address the depiction of this group and its artistic style seen in its facial features, costume, and posture. Additionally, this study hopes to find the identity and status of the owners of the figurines, the symbols depicted with them, and their purpose. The subject of the study reflects a clear picture of the art school that produced the statues. The importance of this study is to determine where the statue group was found and to date it. The tombstones and funerary statues are made of local material, and depicted in the Roman style, which was influenced by the Hellenistic spirit and styles. The high quality of the carving makes it evident that the statues belonged to the elite class in Roman Egypt. The iconography included in the funerary statues reflects their connection with funeral rituals, and their belief in immortality, protection, and eternal life.

KEYWORDS: Ashmounin Storehouse, funerary statues, funeral Wreath, pine cone, grave sculpture, the hieroglyphic sign «sa».

I. INTRODUCTION

Ancient Egyptian afterlife beliefs included those of Greek, Roman, and earlier pharaonic cultures. Grave sculptures marked the transition from the world of the living to the world of the dead, as they were used to determine the place where offerings were left and where funeral rituals, which guided the deceased's soul to his burial place[1], were performed. Therefore, funeral grave sculptures are the key to knowing the culture and world of the deceased outside the cemetery[2], as they reflect the funerary concepts and rituals that prevailed in society during the Ptolemaic and Roman eras in Egypt.

The ancient Egyptian carved a statue for himself and put it in his tomb because he believed that his soul would return to him again in the cemetery. The deceased's soul, or (Ba), must recognize them from their statue. Hence, funerary statues and portrait stelae immortalize the memory of the deceased and his desire to receive offerings and enjoy the protection of idols in the other world[3].

This study deals with five unpublished grave sculptures, which are preserved in the Ashmounin[4] storehouse in Minya. Their provenances are unknown[5]. Two statues are placed within a niche, while three are sculptures in the round. and provides a descriptive analysis of these funerary grave sculptures and portrait stelae, followed by a comparative analytical study that discusses the material from which the statues are carved. An overview of the artistic style, as gleaned from facial features, costume, and posture is provided, along with iconography. The identity and status of the owners of the statues will be addressed. Although these statues are unprovenanced, there will be an attempt to locate the workshops that produced them, and to date them.

II. THE DESCRIPTIVE STUDY

The First Relief: [FIGURES 1/ A, B & C]

A limestone portrait stela of a young boy, Height 72cm, width 35cm, length 60cm. The portrait stela is well preserved, but some fragments are chipped out in the upper part of the niche. The portrait stela takes the form of a rectangular aedicula, and some fragments are missing at the outer partition of the top at the sides **[FIGURE 1/A]**. There is a very high relief figure of a boy standing inside the niche, frontally. The boy's facial features are calm and indicate that he is in the prime of his life. His thick neck supports a round, full face with a small chin. Meanwhile, his forehead is wide with some protruding lines, which indicates the presence of hair strands, although the rest of the head seems untextured. The ears protrude. The pronounced eyebrows are arched over heavy eyelids.

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[1]BRECCIA 1922: 82.

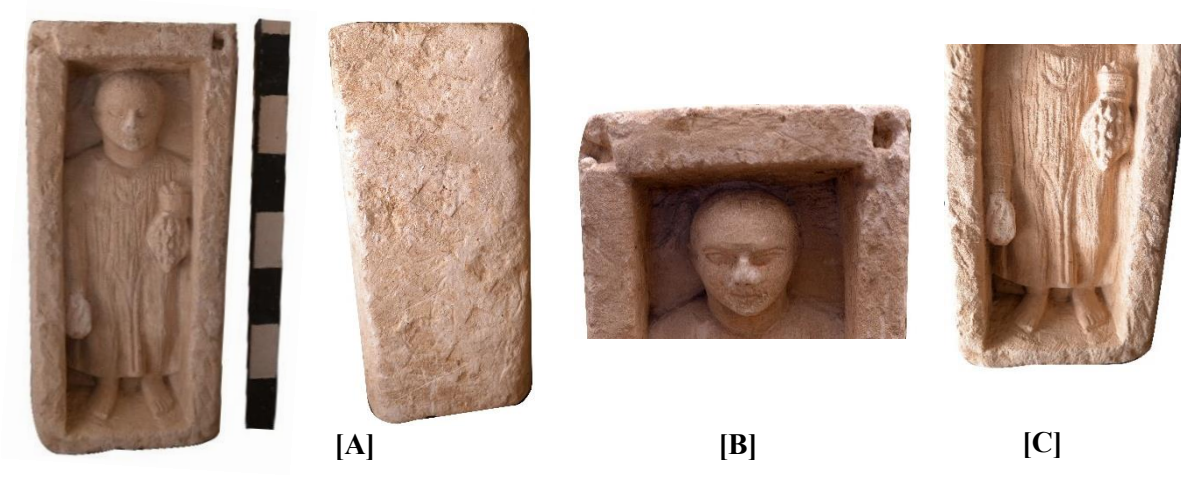
[2]ABDEL HAMID 2004: 1.

[3]THOMAS 2000: 6.

[4]Al-Ashmounin are located on the western shore of the Nile, northwest of Malawi. It was known as «Khamnu» in the ancient Egyptian texts, and «Hermopolis» in the Greek texts, meaning the city of the god Hermes. The area preserves the entrance to the city, and a huge number of stone blocks and architectural and decorative elements stored at the site and in the museum store in Ashmounin. NOUREDDINE 1999 :137-139.

[5]It was found through a seizure, belonging to the Prosecution of Bani Mazar, and it was preserved in the Al-Ashmounin storehouse, in a record of recording the artifacts seized in the cases.

The eyes are wide, bulging, and smooth and do not bear any indication of an iris. The boy's nose is long, with wide nostrils **[FIGURE 1/B]**. The boy wears a long, round-neck tunic reaching the ankle. Right at the tunic's neckline is wide V-shaped folds. The tunic has long sleeves and many pleats that narrow and gathers in the middle between the legs; these folds were executed with a light bas - relief carving. The boy's bare feet show from the bottom of the tunic and are exquisitely carved where the toes are depicted very accurately **[FIGURE 1/C].**



[A] **[B]** **[C]**

[FIGURE 1/ A, B &C]: A limestone grave sculpture with a boy inside preserved as Nº.705 in the Ashmounin storehouse ©Taken by the researcher.

In his left hand, the boy holds a pine-like plant that is conical in shape. In his right hand, which is parallel to the length of the body, the boy holds an object, perhaps a wreath. This grave sculpture can be compared to many other funeral portrait stelae [6]. The first of these examples is a fourth-century AD grave sculpture displayed in the Michigan Museum of Art, which was **[FIGURE 2]**[7] found at Antinopolis «Al-Sheikh Ebada »[8]. The similarities appear in the pose where the figure of the deceased is standing in a niche-shaped chapel. They are both wearing similar clothes and hold a wreath in the right hand.

The main difference is that the ceiling of the niche in this example is rounded but in the stela from Ashmounin, the entryway to the niche is rectangular. Also, the deceased is

[6] Also from the comparison examples: a funerary painting of a boy from Antinopolis, «Sheikh Ubadah», preserved in the Egyptian Museum under the number S. 18110. The boy sits inside a rectangular niche, and from the inside it has a vaulted ceiling. The symbols he holds, as he holds a bunch of grapes in his right hand, while he holds a dove in his left hand. It dates from 300-395 AD; «Stele funeraria di fanciullo con in mano una colomba e un grappolo d'uva», in: https://collezioni.museoegizio.it/it-IT/material/S_18110 Accessed in 2/ 11/ 2022.

Another example was found at Samlout, and is preserved in a private collection in Amsterdam. SCHNEIDER 1975: PL.12-16; «Stele funeraria di fanciullo con in mano una colomba e un grappolo d'uva», https://collezioni.museoegizio.it/it-IT/material/S_18110 Accessed on 2/ 11/ 2022.

[7] «An Egyptian lainted limestone funerary stele», in: https://www.christies.com/en/lot/lot-6067649/ Accessed in 2/ 11/ 2022.

[8] Antinopolis now Sheikh ʿUbāda, is known in Greek texts as Antinopolis (Ἀντινόου πόλις). It is located on the eastern bank of the Nile River, northeast of Mallawi, in Minya Governorate. It is characterized by Roman architecture and archaeological remains. NOUREDDINE 1999:135; «Antinoöpolis», in: https://www.marefa.org/ antinopolis, Accessed in 5/ 12/ 2022.

depicted holding a bunch of grapes in the left hand instead of a pinecone. Stylistically, the Michigan statue differs in that the costume does not have many folds. There are additional differences in the depiction of facial features, such as the eyes, as well as the depiction of hair strands. The Michigan model is also painted, giving this statue a sense of life and realism.

[FIGURE 2]: Comparative example of a grave sculpture with a boy inside a niche Displayed at the Michigan Museum of Art.

[FIGURE 3]: Comparative example of grave sculpture with a boy inside a niche Displayed at the Nelson-Atkins Museum of Art.

The second example is a grave sculpture from Oxyrhynchus, which is displayed at the Nelson-Atkins Museum of Art, and dates to the third to the fourth century AD **[FIGURE 3]**[9]. This grave statue shows a boy standing in a niche supported by Corinthian columns. The similarities can be seen in the pose of the boy, who is standing in the niche with a wreath in the right hand while holding a pinecone in the left hand. Their costumes are also the same, except for the fact that the Nelson Atkin's boy wears a necklace, and his costume has no folds but is decorated from below and at the shoulders. In the Nelson-Atkins statue, the niche has a vaulted ceiling that is decorated with a large flower. Certain facial features are included, such as the iris and pupil of the eye. The hairstyle and figure are colored like the grave sculpture from Michigan **[FIGURE 2].**

There are many parallels to the first relief that date back to the late fourth century and the beginning of the fifth century AD, where there is a grave sculpture from Oxyrhynchus that depicts a boy with similar features, clothes, and attributes. One of these is preserved in the British Museum, Nº.1795. Although the British Museum's example is of inferior quality compared to the others, there is an almost complete absence of Christian symbols, which may suggest an early date in the development of Christianity in Egypt[10]. From the comparative examples, the painted funerary sculpture likely dates the object of study to the third or fourth century AD.

[9]THOMAS 2000: FIGS.68, 71; «Grave Sculpture», in: https://art.nelson-atkins.org/objects/1880/grave-sculpture, Accessed in 18/ 11/ 2022.

[10] BECKWITH 1963: 19, FIG.57.

The Second Relief: [FIGURES 4/ A, B & C]

A limestone funerary sculpture[11] that has Height 43cm, Width 36cm. The upper part of the niche and the head of the figure have been cut away, with some erosion on the sides. The sculpture has a broken niche in its upper section, the inside of which is a headless bust, depicted frontally, and wearing a palliates pallium[12], which is a cloak of the arm-sling type (arm-bearing type). The cloak has vertical folds on the sides, circular folds on the abdominal area **[FIGURE 4/A]**, and below it a tunic with a round neck, with wide folds in the form of a letter V on the chest **[FIGURE 4/B]**. The left-hand rests on the the lower edge of the niche, holding a wreath of flowers **[FIGURE 4/ C]**, while the right hand stretches out to rest on the folds of the cloak.

[A] **[B]** **[C]**

[FIGURES 4 /A, B & C]: A funerary bust inside a niche preserved Nº.483 in the Ashmounin storehouse© Taken by researcher

This sculpture can be compared to one from Al -Bahnasa[13], which is preserved in the Ashmounin Storehouse in Minya Nº.397 [**FIGURE 5**][14]. The Al-Bahnasa sculpture is similar in its representation of costume, especially in the V shape folds on the chest, as well as the oblique folds under the right arm. The inclusion of the funerary wreath is also similar. They differ in that the statue is complete, and the niche indicates that it originally had a pyramidal top.

[FIGURE 5]: A comparative Limestone portrait stela from Bahnasa

[11] Preserved in the Registry of Records and Archaeological Seizures for Case Nº. 7136 of 1993, and preserved under Nº.483 in the Ashmunain storehouse in Minya.

[12] The palliatus type of clothes is well known from Ptolemaic and Roman Egypt, with noticeable concentration in the Roman period. BIEBER 1959: 377.

[13] Al-Bahnasa, A village located 20 km west of the city of Bani Mazar in Minya. It was called in the ancient Egyptian texts «Barammad», meaning the meeting, and was known in the Greek texts as «Oxrynchos», meaning «the fish region», and it was the capital of the nineteenth region of Upper Egypt. NOUREDDINE 1999 :137.

[14] ASHOUR 2010: 66-67, FIG.5.

The second example is a grave sculpture found in Oxyrhynchus «Al-Bahnasa» in Minya, which was later preserved in the Greco-Roman Museum inv. Nº.23375 **[FIGURE 6]** [15]. The similarities are evident in the shape, costume, wreath, and pyramidal roof of the tombstone, which also contains a bust of the deceased. However, the differences are that the tombstone has a high base, a high full pyramidal roof, and a thin wreath. Furthermore, the right hand is holding the cloak, meaning that the fingers are not extended as in the study model.

[FIGURE 6]: A comparative Limestone portrait stela from the Greek and Roman museum, Alexandria

[FIGURE 7]: A comparative Limestone portrait stela© Coptic Museum in Cairo, inv.Nº.8616

The third example is a finished limestone portrait stela with a pyramidal roof. Currently, the portrait stela is preserved in Coptic Museum in Cairo, Nº.8616 **[FIGURE 7]** [16]. The stela is similar in costume and wreath placement but differs in the gesture of the right hand, which is depicted with two fingers intertwined. These fingers appear fully extended and rest on the cloak roll[17], as in the study model **[FIGURE 4]**, and in the comparative example **[FIGURE 5]**.

The limestone portrait stela from the Coptic Museum **[FIGURE 7]** has a pyramidal roof, based on comparative models, and includes a bust of the palliatus type. Its appearance was noted on paintings dating back to the Roman Empire, especially during the late republican and late antique periods[18]. The statue has high-quality carving, as the costume's drapery appears lively and natural; the details of the drapery reflect and fit the position that the statues had for the portrait stelae of the Fourth century AD[19].

[15] BRECCIA 1931-1932: 41, PL. XVII, 83; SCHMIDT 2003: 150, Cat. 167, PL.51

[16] ASHOUR 2010: 105, FIG.12.

[17] This hand is similar to that of the third-century painting depicting a standing woman in the Leiden Museum, in which the hand extends over the role of the cloak with fingers fully open. «Leiden-RMO-07 003 Roman, background fixed to FF9933, ERL11007 », in: https://www.flickr.com/photos/horemachet/2193871128/in/photostream/ Accessed in 8/ 11/ 2022.

[18] BIEBER 1959: 392, FIGS, 25-30.

[19] ASHOUR 2010: 76; TÖRÖK 2005: 208.

The Third Relief: [FIGURES 8/ A, B & C]

A limestone funerary statue of a headless man, standing on a high pedestal[20], Height 47cm, Width 40cm.The statue stands alone without a niche on a high pedestal. The figure wears a long tunic that reaches the ankle of the foot, with the feet peeking out from the bottom of the tunic. The toes are uncarved. The neckline of the tunic is round, and a fold appears at the chest, which takes the form of a widening semicircle. Many folds narrow and gather between the legs. The pallium cloak «Hemation in Greek» of the arm-sling type is worn over the tunic **[FIGURE 8/A]**. There are small circular folds at the shoulders, and circular folds on the abdominal area. The figure's right hand is extended outward and is holding a garland of a folded rope made of small flowers **[FIGURE 8/B]**. Meanwhile, the left hand stretches out and holds a flower **[FIGURE 8/C]**.

[A] **[B]** **[C]**

[FIGURE 8 A, B & C]: A limestone Funerary headless statue of a man preserved Nº.786 in the Ashmounin storehouse©Taken by researcher

The Fourth Relief: [FIGURES 9/A, B & C]

A limestone funerary headless statue of a man. The feet have been broken off [21]. High 50 cm, Width 24 cm. The funerary statue of a man wears a tunic that reaches the middle of the legs and has a wide round neckline. Wide folds ap **[B]** at the chest in the form of the letter V with many **[A]** in the lower part of the tunic. A pallium cloak of the arm-sling type is worn over the tunic, and numerous vertical folds appear at the shoulders on the sides **[FIGURE 9/A]**. The figure's right-hand crosses over the chest to pull the edge of the cloak from the other side **[FIGURE 9/B]**. This gesture is similar to the second model **[FIGURE 4]**. The left hand holds a wreath consisting of a folded rope assembled from small flowers **[FIGURE 9/C]**.

[20] Preserved in the record of records and archaeological seizures of case 3 Ahwal, for the year 1997, and preserved under Nº.786 in the Ashmounin magazine in Minya.

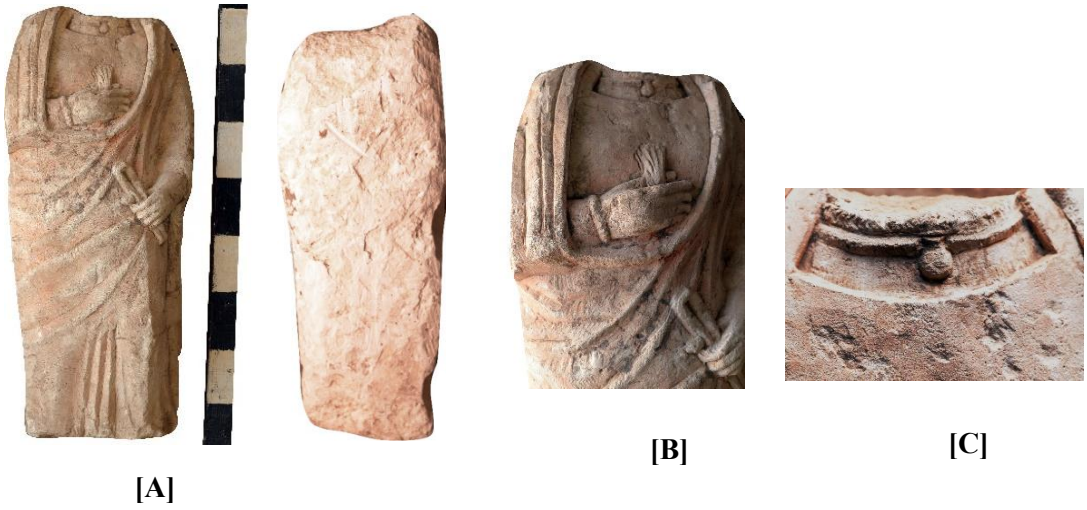
[21] Preserved in the Registry of Records and Archaeological Seizures for Case Nº.8083 of 2001, and preserved under Nº.681 in the Ashmounin storehouse in Minya.

[A] **[B]** **[C]**

[FIGURE 9 A, B & C]: A limestone Funerary headless statue of a man preserved under Nº.681 in the Ashmounin storehouse© Taken by researcher

The Fifth Relief: [FIGURES 10/A, B &C]

A limestone funerary statue of a lady missing head and feet[22]. Height 75cm, Width 32cm. The statue depicts a standing lady wearing a Roman Bala cloak, under which is a long tunic with a semicircular neckline. The vertical folds of this outfit eventually gather in the middle between the legs in three longitudinal lines. The cloak wraps around the body **[FIGURE 10/A]**. The folds are depicted as vertical lines at the right shoulder but are more curvilinear around the abdominal area **[FIGURE 10/B]**. The right arm comes out of the cloak and holds what appear to be palm leaves carved with longitudinal lines. There is an undecorated, smooth, circular bracelet on the right wrist. The left arm holds up a wreath of a folded rope assembled from small flowers **[FIGURE 10/B]**. The figure wears two necklaces; the upper one has relief decorations consisting of a row of stacked rhombuses, and the lower necklace is a collar from which a circular pendant hangs **[FIGURE 10/C]**.



[A] **[B]** **[C]**

[FIGURES 10/A, B & C]: Funerary statue of a Lady missing head and feet Preserved Nº.679 in the Ashmounin storehouse© Taken by researcher

[22] Preserved in the Registry of Records and Archaeological Seizures of Case Nº.1901 of 2010, and preserved under Nº. 679 in the Ashmounin storehouse in Minya.

III. DISCUSSION AND ANALYTICAL STUDY

Materials: The funerary statues were made of creamy white colored limestone, which was taken from the quarries of Saqqara. The Saqqara quarries have limestone that is light brown-white in color.

The artistic skillfulness of this sculpture group reflects the skill and ingenuity of the artist, specifically in his ability to formulate and highlight the anatomical features of the face and body. For example, the artist was interested in depicting the deceased in the first tombstone **[FIGURE 1].** The detailed features of the deceased's head include its roundness and the visibility of the ears. The hair was depicted as a large mass, but also with careful detail in depicting individual tresses, which were carved out by small chisel work. This method of hairstyle is somewhat similar to the cap because the hair appears with a single clump over the head, or what is called Carlotta[23]**.**

The artist's accuracy is also shown in the details of the toes of the funerary statue in the first tombstone, which was carried out very carefully **[FIGURE 1]**. However, the artist did not succeed in carving the third funerary statue **[FIGURE 8]**, where the feet appeared without toes, and the fingers of the right hand of the statue in the first tombstone hand were unclear **[FIGURE 1]**. However, he succeeded in carving the fingers of the left hand, which holds a pinecone. As for the fingers of the hand in the funerary statues **[FIGURES 4, 8, 9, 10]**, the artist excelled in carving them very accurately, and in showing them in natural form.

The architectural design of the niche in the first tombstone **[FIGURE 1]**, appeared completely rectangular, and there is no possibility of designing the upper part of it in a pyramidal shape. The linear upper surface of the niche makes it a truly distinctive shape. But the niche in the second tombstone **[FIGURE 4]** has its upper part broken, which makes it likely that the missing part was pyramidal, as in the comparative models **[FIGURES 6-7]**.

As for the clothes **[TABLE 1]**, the cloak and tunic look Greek. In terms of technique and style the formulation and shape of graceful folds are executed with skill, accuracy, and flexibility. It is clear here that we are facing the realistic style that characterized the Alexandria school during the Hellenistic era and until the Roman era [24].

The funerary statue appears in the first relief **[FIGURE 1]** wearing a long tunic with long sleeves, while the funerary statues **[FIGURES 4, 8-9]** were wearing the Roman palliates for men «Greek Hemation» of the arm-bearing style, and the Pallas in **[FIGURE 10]** for women, a type that became famous in Ptolemaic and Roman Egypt. The Pallas was more commonly worn in Roman times, where it is predominantly associated with

[23] This new method of hairdressing appeared after the death of Caracalla, and continued throughout the third century AD, and thus the single, prominent, dense tufts, which were executed by means of a drill, disappeared. AZIZA 2010 :177.

[24] BAKER 2007: 28.

intellectualism and urbanity. Because the Romans used to depict their dead in uniforms[25], the use of this classical style emphasizes Hellenistic ethnicity and origin[26].

The artist was also interested and excelled in showing the folds of the costume naturalistically. He only depicted deceased children and ladies in a robe from everyday Roman-era life. This type of robe is represented by the folds of the pallium cloak, which continues from right to left, while the edge of the cloak hangs from the left shoulder with clear creases. Some folds indicate that there is a tunic below the cloak. The clothing is depicted precisely, and the artist has succeeded in showing the folds naturalistically. In the second and fifth reliefs **[FIGURE 4 &10]**, the fabric is shown with a thin, elastic quality.

For the first, third, and fourth reliefs **[FIGURES 1 &8-9]** the folds are thick and numerous, reflecting the thickness of the fabric used in the manufacture of the cloak, which probably fits the environment of the Ashmounin region.

The jewelry in the fifth relief **[FIGURE 10]**, varies between two necklaces and a bracelet. For the two necklaces, the upper is a row of stones in a rhombic shape, and the lower necklace is a collar with a circular pendant **[TABLE 2]**. A painted example of this jewelry is seen in a portrait from Philadelphia in Fayoum dated from 175-200 AD; it is now preserved in the J. Paul Getty Museum in Los Angeles **[FIGURE 11]** [27]. In the portrait, a lady wears two necklaces with different decorations. The bottom pendant takes the shape of a rhombus and has a round, gold pendant in the middle of it, which makes it likely that the pendant in the study model is also made of gold.

[FIGURE 11]: Comparative example Necklace on Portrait of a Lady from Philadelphia.

The bracelets[28] were one of the oldest types of ornaments known to the ancient Egyptian and lasted until the Ptolemaic and Roman eras **[TABLE 2]**. There are comparative models of the bracelet on the wrist of the fifth statue **[FIGURE 10/B]**, including:

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[25] The military were depicted in tunics, military uniforms, and tools of war, while civilians were depicted in tunics, toga cloaks, and palliums, and women were depicted in their long robes with a cloak over them. AL-SHAHAT 2006: 57.

[26] ASHOUR 2010: 75.

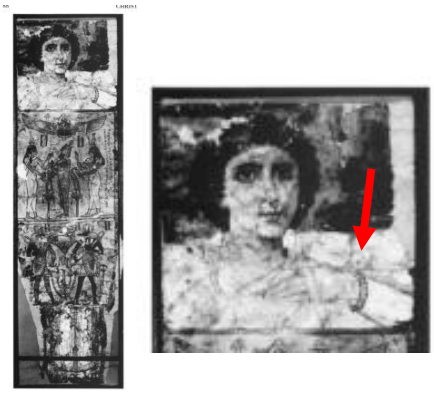
[27] THOMPSON 1982: 58-59 ; SVOBODA 2020: 114, FIG.11[2].

[28] The ancient Egyptians adorned themselves with bracelets since the beginning of the Neolithic period. It is intended to decorate the arm around the wrist, or the upper arms; Most of the bracelets were worn on the upper right arm because it was the subject of honor. Both men and women are adorned with it; The large number of bracelets is due to their use as a talisman more than for decoration, and the shapes of the bracelets evolved, as they were at first round rings, then they became wide, and their sides were round. ARMAN & HERMANN 1987: 237.

-A funerary stela of a lady wearing the same bracelet kept in the Ashmunin storehouse with number 156 and dated from 275 -300 AD **[FIGURE 12]**[29].

[FIGURE 12]: A comparative example of the bracelet on a funerary stela Nº.156 preserved in the Ashmunein Magazine

Also, the bracelet is depicted on a shroud of a woman named Tashret and Johor «Tasherytwedjahor» from Assiut and is currently preserved at the Museum of Fine Arts in Boston with an accession number of 54.993, and dating back to the first century AD [FIGURE 13][30].



[FIGURE 13]: Comparative example of the bracelet on the first century AD, which is preserved in the Museum of Fine Arts in Boston

Symbols Accompanying Funeral Statues, [TABLE 3].

Pine Cone:[31]

There are many funeral tombstones depicting the deceased holding a bunch of grapes, as shown in the comparison models **[FIGURES 2&3]**, but the funerary painting in the subject of the study **[FIGURE 1]** shows that the deceased is holding a pinecone instead[32].

[29] ASHOUR 2010: 65, FIG.1.

[30] RIGGS 2002: 88, FIG.2.

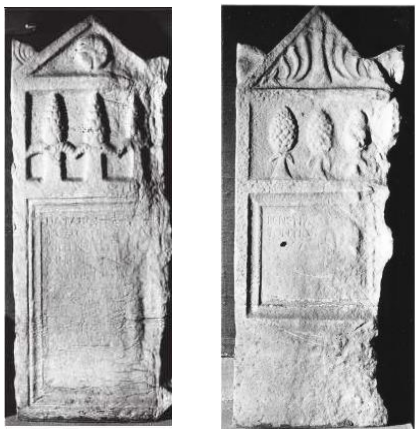
[31] Pine trees are evergreen woody trees with a distinctive aromatic scent. The pine tree consists of a large main trunk with horizontal branches growing on its sides, gradually getting smaller towards the top, giving it a conical shape.

The pinecone is conical in shape and has a trunk that the deceased holds from above, clearly showing all the constituent elements of this plant. The pinecone also consists of several lobes(bracts), unlike grapes that take a circular shape. The pine is associated with Roman funerary rituals, and many pinecones and their remains have been found in Roman temples and cemeteries in Britain[33]. The pinecone was used as an offering presented to the gods inside the temples, and the remains of a spinecone were found in the temple of Mithras at Carrawburgh in London, which dates to the early third century AD[34].

The pinecone is of great importance to the Egyptians, where in some Egyptian papyri the souls of the dead are shown entering the Hall of Osiris with pinecones on their heads. In Greece, there is a pinecone on top of the stick of Dionysius or Bacchus «thyrsus» symbolizing prosperity, fertility, and pleasure. Among the Babylonians, the pinecone represents the holy water of life for the Assyrians. The pinecone is also a reference to the third eye and the pineal gland, which was so named because it is similar in shape to a pinecone. Accordingly, the pinecone also symbolizes immortality and knowledge[35].

Romans saw the pinecone as a symbol of immortality, and although the pinecone was frequently used in most ancient Near Eastern Arts, it was not used much in Coptic art, especially on textiles[36] except in a few rare cases.

There are models of funerary tombstones on which three pinecones are depicted in the full form of Volkov. These are preserved in the Archaeological Museum of Skopje, Macedonia **[FIGURE 14/ A&B].**[37]



[A] **[B]**

[FIGURES 14/ A, B]: Comparative examples of pine cones on grave sculpture in Volkovo preserved in the Archaeological Museum of Macedonia

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[32] Pine nuts are called Pinus in Latin, and there are five species of pine nuts found throughout the Mediterranean region. YILMAZ 2013: 135,142, 145.

[33] The pine cone can tolerate a lack of oxygen, so large quantities of it were found in Roman tombs, and samples were taken in the 1970s, where charred pine cones and whole cones were found. LODWICK 2014: 58.

[34] More about the Temple of Mithras in Karoo burg. MAYERS 2017.

[35] AL-SALIHI 2022: 3-4

[36] There is a thin piece of tapestry kept in the storehouse of the Coptic Museum, on which a pine fruit is woven as a single decorative unit. It is similar in shape to the pine cone in the hand of the boy on the funerary stela, which is the subject of the study. It is dated to the fourth or fifth century AD. EL-SHARKAWY 2008: 348.

[37] PROEVA 2017: 153, FIG.7.

Also depicted is a solitary pinecone made of limestone, which is preserved in the Metropolitan Museum **[FIGURES 15&16]**[38]This limestone pinecone is similar to the pine cone held by the deceased in the first model [FIGURE 1] in the form of lobes(bracts) and in the protruding part above, which the boy holds.

It should be noted that this funerary symbol, which is likely to be a pinecone, did not appear in statues and portraits dating back to before the third century AD.

[15] **[16]**

[FIGURES 15&16]: Comparative examples of limestone pine cones preserved at the Metropolitan Museum

Funeral wreath:

The funeral wreath is a bouquet decorated with various types and shares of flowers **[TABLE 3]**. There was controversy about the symbolism and interpretation of the wreaths found in the, the wreath in the first and second tombstones **[FIGURES 1& 4]**. One opinion is that the wreath is actually a leather money bag.[39]

Others believe that it is a bouquet[40], or a fist of wheat spikes[41] since the presence of rows taking the shape of wheat spikes is evident in some examples. Another interpretation is that it is a plant wreath with a funerary tint[42]. The researcher agrees with the second and fourth opinions, which is that it is a bouquet or a floral wreath with a funerary tint. The deceased has been shown carrying flowers since the Ptolemaic era, and a common ancient Egyptian influence appears especially in the paintings of Kom Abobello, which depict the deceased carrying a bunch of flowers[43].

In the first half of the third century AD, another form of the plant wreath appeared on the Fayoum[44] images and appears in the study models **[FIGURES 5-7]** where it took a different form. The wreath is a group of flowers gathered in a folded rope held by the deceased, which sometimes takes a braided form below. The plant wreaths sometimes consist of bay leaves and solid fruits «Dom» or ivy or from buds and blooming flowers. It seems that the wreath was braided with its various elements into a single unit, perhaps

[38]«Limestone votive pine cone », in: https://picryl.com/media/limestone-votive-pine-cone-b0d536. Accessed in 18 /12/ 2022.
[39] BOTTI 1936: 32.
[40] BRECCIA 1939: 97-8.
[41] COLLIGNON 1911: 357.
[42] DYGGVE 1942: 230; IBRAHIM 1992: 490.
[43] EDGAR 1903: 45.
[44] DYGGVE 1942: 102,157-159.

making a special wreath for the deceased using evergreen plants, «Bay, Ivy, and Dom»; these are all plants symbolizing eternal life. Wreaths were also used in funeral rituals in cemeteries and are commonly depicted on sarcophagi in Rome and Alexandria.[45]

There is a comparative example of the folded funeral wreath on a tombstone preserved in the Ashmonin storehouse Nº.678, which dates to the end of the second century and the beginning of the third century AD **[FIGURE 17]**[46]. The tombstone depicts a lady holding a large, folded wreath in her left hand. Another image of a large wreath is seen in the left hand of a lady depicted on a grave sculpture dating back to 160 AD, and which is now preserved in the Harvard Art Museum **[FIGURE 18]**[47].

[FIGURE 17]: Comparative example of a wreath of a folded rope on a Tombstone of a Lady Preserved in the Ashmonein storehouse

[FIGURE 18]: Comparative example of the large-scale a wreath of a folded rope on a tombstone of a lady preserved in the Harvard Art Museum

Also, the wreath was depicted in a large, folded form in Fayoum portraits, such as in a painting dating from 200-230 AD, in which a boy holds a folded wreath of flowers in

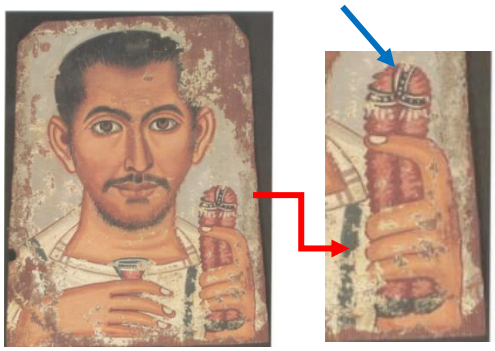
[45] IBRAHIM 1992: 529.
[46] SAAD 2022: 129, FIG.1.
[47] VERMEULE 1990: 162, FIG.148.

his left hand and a cup in the other. This painting is now kept in the Brooklyn Museum. **[FIGURE 19]**[48].

[FIGURE 19]: Comparative example of a wreath of a folded rope on a Portrait of a Boy from Fayoum preserved at the Brooklyn Museum.

[FIGURE 20]: The SA sign, a symbol of protection, is a hieroglyphic sign made of papyrus

It is clear from the previous examples that the wreath is large in size, but the wreath in the study models **[FIGURES 8- 10]** takes a thin size **[TABLE 3]**. Therefore, it is noted that the folded funeral wreath was different in thickness and size. In some portraits of Fayoum, the wreath's shape is similar to the Hieroglyphic «SA» sign  , which symbolized protection and was made of papyrus plant **[FIGURE 20]**[49]. It is likely that the folded form of the wreath is taken from this sign. A fourth-century AD portrait from the J. Paul Getty Museum depicts a person from Philadelphia shows him holding a folded wreath in his left hand, similar to the «SA» sign in the form of beams located on the top and sides **[FIGURE 21]**[50]. There is also a portrait of a lady, dated to 150 AD who has a thin folded wreath similar to the hieroglyphic sign of SA, in her right hand **[FIGURE 22]**[51].



[FIGURE 21]: A model of a wreath of a folded rope resembling the S-a sign on a portrait of a man©preserved at the J. Paul Getty Museum

[48] SVOBODA & CAROLINE 2020: 72, FIGS.7,5.

[49] One of the distinctive emblems of the statues of the god Bess, as a sign of magical protection, and it was also specific to the goddess Tawert, the goddess of childbirth, and was found as an independent symbol on some magic wands that date back to the Middle Kingdom era. LUERKER 2000:149.

[50] THOMPSON 1982: 56-57.

[51] «An Egyptian Painted Wood Mummy Portrait of A woman », in: https://www.christies.com/en/lot/lot-6136508 Accessed in 6/ 12/ 2022.

[FIGURE 22]: example of a wreath of a folded rope on a Portrait of a Fayoum Lady at the Brooklyn Museum

Flower[52]

The symbols depicted with funerary figurines **[TABLE 3]**, as in the third model **[FIGURE 8]** where flowers were of great importance for funeral rituals, were depicted on walls ceilings, and facades of most cemeteries. Special feasts with flowers and flowers, which symbolized fertility, were held, and the Romans put roses on their graves and offered the souls of the dead food from roses[53].

Palm Fronds

Palm fronds were considered a symbol of victory over death in Egyptian funerary rituals during the Ptolemaic and Roman eras, but especially during the Roman era. This symbol complements the pharaonic significance of palm fronds as a symbol of eternal life offered by the gods to kings in Egyptian temples. Palm fronds were painted on a few Greek mummy portraits as one of the religious symbols[54] and were also held by the deceased to ensure rebirth, and to overcome death. From the Nineteenth Dynasty until the Roman era palm branches in cemeteries guaranteed the deceased another life in the underworld. This is why the whole palm was placed in the grave of the deceased during the Greek and Roman eras. Palm leaves were also put in his hands to secure his rebirth[55], so, likely, what the lady is holding in the fifth model [FIGURE 10] is palm leaves. There is a similar model on a Fayoum portrait preserved at the Dijon Museum of Fine Arts, dated to the third century AD **[FIGURE 23]** [56]. In this portrait, the figure holds a small green, palm leaf with a small, folded pink wreath in his right hand, while holding an olive branch in his left hand.

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[52] Flowers are among the common and favorite shapes of the ancient Egyptians, as well as in the Greek and Roman decorations, as they are among the designs that are easy to carve and decorate, in addition to the many symbolic meanings and connotations that refer to them. EL-SHARKAWY 2008: 315.

[53] SYRING 1992: 302.

[54] QUAEGEBEUR 1978: 240

[55] KAPLAN 1999: 118.

[56] «Portrait d'homme barbu », in: https://commons.wikimedia.org/wiki/File:Portrait_d%E2%80%99homme_barbu.jpg Accessed in 6/ 12/ 2022.

[FIGURE 23]: Model of Palm Fronds on a Portrait of a Man from Fayoum at the Dijon Museum of Fine Arts

The nature of funeral statues is determined by some indicators and connotations, such as the costume represented by the tunic and the pallium cloak, which became a funerary religious symbol indicating that the wearer is a pious, humble man when standing before the gods of the other world[57]. The clothing may indicate that the deceased **[FIGURES 8-9]** may be a priest, as there is a comparative example in a statue of the emperor's priest. This comparative statue is in Kyzikos, in the Museum of Istanbul, no. 582[58]. This statue uses the classical type to stress his Hellenic ethnicity and intellectual abilities. The jewelry in the fifth relief **[FIGURE 10]**, and funerary symbols such as the funeral wreath indicate the importance and high social status of the deceased.

Where to find tombstones and funerary statues: The source is unknown, as it was found through a set, but through the comparison models the first tombstone **[FIGURE 1]** was likely found in Antinopolis «Al-Sheikh Ebada», since the comparison models **[FIGURE 2- 3]** are very similar to it. The second tombstone **[FIGURE 4]** is likely from the Oxyrhynchus area «Al-Bahnasa», due to the great similarity of the costume and wreath with the comparison models **[FIGURE 5-6],** which were found in Al-Bahnasa. It is also likely that they were made in the same artistic workshops. The funerary statues shown in FIGURES 8, 9, and 10, likely came from Fayoum, as evidenced by comparisons to symbolism seen in other Fayoum portraits.

Historiography

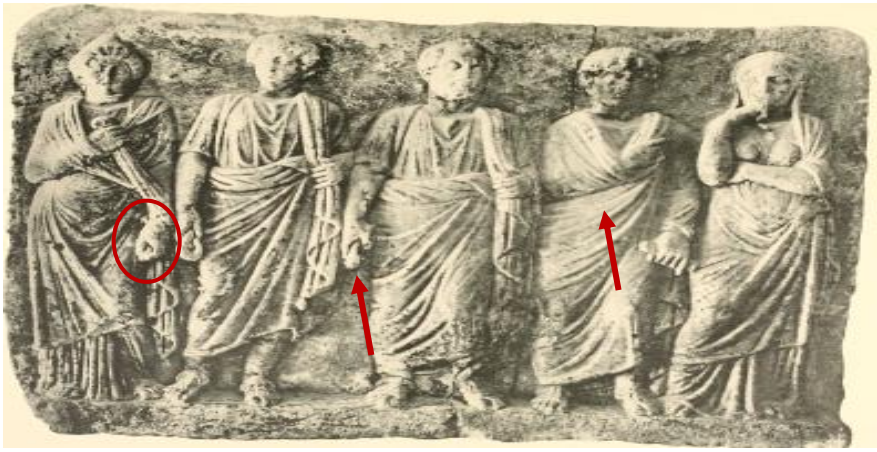
The funerary tombstones of the study date back to the Roman era, specifically from the second century to the late fourth century AD. This period was characterized by the emergence of a new artistic style that encouraged a return to ancient culture. There was a cultural revival and a renaissance of ancient Roman artistic values[59]. The most important anchors on which one relies to chronicle these funerary tombstones and statues are the following:

The tunic seen in these portraits underwent developments and changes due to Roman influence on the societies they controlled, starting from the first century AD. First,

[57] AL-SHAHAT 2006: 89.
[58] BIEBER 1959: 398-399, FIG.39.
[59] RAMAGE 1995: 262.

the tunic was short and reached to the knees, but in the last quarter of the second century AD, the tunic extended to the middle of the legs; this is clearly shown in the statue of the deceased **[FIGURE 9]**. By the middle to the end of the third century, the tunic became wider, and longer, reaching the ankles[60], as seen in the study models **[FIGURES 1, 4, 8, 10]**.

The clothes, including the tunic, and cloak, were widespread in the late classical and Hellenistic era and gained popularity at the end of the second century BC. This clothing is also seen in the Roman era, especially during the reign of Emperor Antonius Pius, where there is a comparative model of a tombstone that features a group of the royal family, who wears the same clothes, «Tunic- Pallium cloak- Pala», as the study models and holds the folded funeral wreath **[FIGURE 24]**[61].



[FIGURE 24]: A wreath of a folded rope over and Clothes of a Tombstone Depicting the Royal Family of Emperor Antoninus Pius

Also, it is evident after comparing similar models with study models that the hairdressing method of the first model, **[FIGURE 1]** «Calotta», began immediately after the death of Caracalla and continued throughout the third century AD[62].

[60] AL-SHAHAT 2006: 89.

[61] A rectangular tombstone made of marble, preserved in the Egyptian Museum under Nº.27568, in the middle is Antoninus Pius, on the right is Marcus Aurelius, on the left is Seuss Verus, and next to Marcus stands Faustina the Younger, and on the other side is Faustina the Great. EDGAR 1903: 54, PL. XXVI.

[62] ʿAZIZA 2010 :177.

IV. CONCLUSION

The funerary sculptures were carved in local material and were depicted in the Roman style, which was influenced by Hellenistic art.

The funerary tombstones and statues belonged to the upper class of Egyptian society during the Roman era, where the costume and funerary symbols indicated the high social status of the deceased.

It is clear that the carving of the funerary statues was of high quality, which is shown in the lines representing the folds of clothing. The lively and natural depiction of the drapery reflects and fits the position that the statues had for the models of the third century AD.

The clothes of the deceased were carved out in the realistic style that characterized the Alexandria School from the Hellenistic era until the Roman era.

The symbols accompanying the funerary statues alternated between the pinecone, which symbolized eternity and knowledge, and the various types of funeral wreaths. The wreaths take distinctive shapes, shown as a folded rope held by the deceased, as well as flowers and palm fronds.

The symbols accompanying the funerary statues reflect how much they were associated with funeral rituals, and their belief in immortality, protection, and eternal life.

The tombstones and funerary statues may have been found in the area of Antinopolis «Al-Sheikh Ebada », and Oxyrhynchus «Al-bahnasa».

It is concluded that the funerary tombstones of the study date back to the Roman era, especially in the period from the second century to the beginning of the fourth century AD.

Funerary Statues	The Clothes	The Description	The Date
The first funerary statue		A long tunic that reaches the ankle of the foot, has a widened round neck, wide folds in the shape of a letter V, has long sleeves, and has many folds that narrow and gather in the middle between the legs. These folds are executed with a slight recessed carving	From the third to the fourth centuries AD
The second funerary statue		Pallium palliates "hemation" in Greek "arm-sling type, with vertical pleats on the sides, circular pleats on the abdomen, a tunic with a round neck, with wide V-shaped pleats on the chest	Mid third century AD
The third funerary statue		A long tunic that reaches the ankle of the foot and has a widened circular neck. There are many folds at the bottom of the tunic that narrow and gather between the legs.	Mid third century AD
The fourth funerary statue		A tunic that reaches the middle of the legs, has a widened round neck, and wide folds in the shape of a letter V appear on the chest. Thelower part of the tunic appears has many folds. A pallium cloak is worn over the tunic and many vertical folds, which appear on the shoulders on the sides. The abaya is characterized by many folds	The last quarter of the second century AD
The fifth funerary statue		The Roman pala cloak, underneath which is a long tunic with a neck in the shape of a semicircle. The folds of this costume are designed in a vertical manner, and the folds gather in the middle between the legs in three longitudinal lines	Mid third century AD

[TABLE 1]: The clothes on the funerary statues, the subject of the study ©Done by the researcher

Funeral Statue	Ornaments and Jewelry	The Description	The Date
The fourth funerary statue	 two necklaces	The upper one is decorated with a row of stones in the form of lozenges lined up in a row next to each other. The lower necklace is a collar from which a circular pendant hang.	From the second century to the third century AD
	 bracelet	Simple, smooth round bracelet with no embellishments.	From the second century to the third century AD

[TABLE 2]: Ornaments and jewelry of the funeral statue of the lady© Done by the researcher

Funerary Statues	Associated Symbols	The Definition	Its Symbolism
The first funerary statue		-Bouquet decorated with flowers -Leather money bag. -Funeral wreath.	It symbolizes eternal life and immortality
		A pine cone, with a trunk held by the deceased from above, consists of lobed bracts in a conical shape.	A symbol of eternity because it is an evergreen woody tree.
The second funerary statue		Funeral wreath	It symbolizes eternal life and immortality
The third funerary statue		A group of flowers collected in a folded rope held by the deceased. It consists of laurel leaves and hard fruits or ivy, or open buds and flowers, and its various elements are braided into one unit.	It symbolizes eternal life and immortality
		A blooming flower, as flowers were of great importance to funeral rituals.	It symbolizes fertility

Funerary Statues	Associated Symbols	The Definition	Its Symbolism
The fourth funerary statue		Palm fronds with prominent lines	The deceased holds it to secure a permanent and youthful life for him, to overcome death and resurrection again, and to secure his rebirth.
		A folded floral wreath that resembles the hieroglyphic sign for Sa.	It symbolizes protection
The fifth funerary statue		A folded floral wreath that resembles the hieroglyphic sign for Sa.	It symbolizes protection

[TABLE 3]: Symbols associated with funerary statues, the subject of the study© Done by the researcher

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THE RELIGIOUS FUNCTION OF OILS IN ANCIENT EGYPT

BY

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ABSTRACT

[AR] **الوظيفة الدينية للزيوت في مصر القديمةِ**

يكشف البحث عن أهمية «الزيوت السبعة المقدسة» من خلال الطقوس الدينية التي كانت تجري في معابد الآلهة و الطقوس الجنائزية التي كانت تجري للمتوفي لاستدعاء الروح. فقد كانت الزيوت السبعة المقدسة أعلي مكانة من سائر القرابين؛ فقد تم مساواتها بعين حورس المقدسة التي عظم شأنها علي مدار الحضارة المصرية القديمة. كما يبرز البحث العلاقة بين الزيوت المقدسة و الثعبان الملحق بالتاج الملكي و الآلهة و مركب أوزيريس (نشمت). قسم البحث إلي ثلاثة أجزاء: ففي الجزء الأول يتحدث البحث عن الزيوت النباتية الشائعة فى مصر القديمة، و ذلك من خلال مشاهد قوائم تخزين الزيوت و كذلك من خلال النصوص التابعة لمشهد «وحدة تخزين الزيوت» في مقبرتي حيسيرع» و «ني-عنخ-خنوم و خنوم –حتب» في سقارة. أما الجزء الثاني من البحث فهو يذكر أسماء «الزيوت السبعة المقدسة» التي عرفت منذ عصر ما قبل الأسرات و العصر العتيق، ثم وثقت هذه الزيوت العطرية المقدسة بوضوح منذ عهد الأسرة الثالثة من خلال مشهد الزيوت لمقبرة «حيسيرع» بسقارة. ثم ذكرت «الزيوت السبعة المقدسة» في المشاهد الجنائزية الخاصة بقوائم القرابين المرتبطة بطقسة «فتح الفم». كما تعد« نصوص الأهرامات» المصدر الديني الرئيسي لأسماء «الزيوت السبعة المقدسة» ووظيفتها الدينية. يلي ذلك عرض للطقوس الدينية التي تتم من خلال دهن جبهة تمثال المعبود في قدس الاقداس لاستدعاء روح الاله أو روح المتوفي. الأمر الثاني هو "حدث تجلي المتوفي" من خلال دهن جبهته في طقسة «فتح الفم» لتحويل روح المتوفي إلي «نور». الأمر الثالث هو مساواة «الزيوت المقدسة» الأساسية مع عين حورس التي عملت ضد قوى الشر والتي تتمثل في المعبود «سيث». يتم تحضير هذه «الزيوت المقدسة» في مختبرات المعابد بتوجيه من الإله تحوت. فقد كانت تعاويذ الإله «تحوت» هي التي تمنح الطاقة الفعالة للزيوت المقدسة المستخدمة في الطقوس الدينية. أما عن الجزء الثالث من البحث، فهو يتحدث عن طقسة دهن الحية (*Uraeus*) المرتبطة بتاج الملوك والآلهة. إن التمثيل الجداري الأساسي لمعبد دندرة (قاعة حورسماتاوي) الذي يصور «زهرة اللوتس» داخل مركب أوزوريس «نشمت» مع الثعبان السام (*Uraeus*) الخارج من «زهرة اللوتس» والإله الصقر حورس يشير إلى وحدة إلهية لاهوتية يعمل ضد قوى الشر. فيهدف البحث إلى الكشف عن الأهمية الدينية «للزيوت المقدسة» على وجه التحديد و العلاقة بينها وبين جنات أوزيريس.

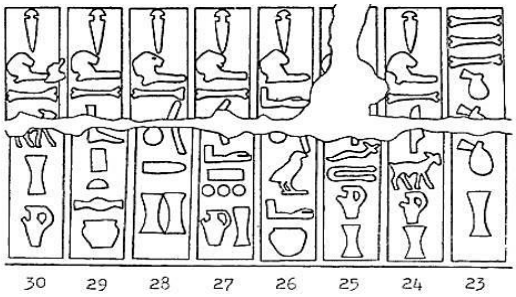
[EN] This paper explores the significance of the «Seven-Sacred-oils» and burning incense in religious and funerary rituals. The sacred Oils were more frequent than all other offerings. They were divine and equated with the «Eye-of-Horus». The first part of this research indicates that common vegetable oils were included in the tomb's oil-storage lists. The second part mentions the names of the Seven Sacred Oils. The Pyramid Texts are the main source of the names of the «Seven-Sacred-Oils» and their religious function. The Offering lists related to the «Opening-of-the-Mouth» ritual are recorded as well. Cult rituals were performed in the temple-sanctuary, which involved anointing the forehead of the cult-image. This ritual was prominent among the religious rituals. A transfiguration of the deceased happened through the anointment of his forehead in the «Opening-of-the-Mouth» ritual. These sacred oils had been prepared in the temple laboratories under the directions of the god Thoth. The spells of Thoth consecrated the sacred oils that were used in religious rituals. The third part of the research clarifies the anointment of the serpent (*Uraeus*) attached to the crown of the kings and gods. A mural in the chamber of (*Ḥr-Sm3-T3wy*) ꜥt Denderah temple depicts the fragrant «Lotus Bloom» inside the «Neshmet-bark of Osiris», with the poisonous serpent (*Uraeus*) coming out of the «Lotus-flower» and the falcongod Horus. This image indicates a divine unit that functions against the evil powers of Seth's realm. This research aims to reveal the prominent religious importance and divinity of the sacred-oils.

KEYWORDS: Cult-image, *Neshmet* –bark, oils, oil-jars, oil-lists, opening of the mouth, purification scenes, ritual, sacred-oils, *Uraeus*.

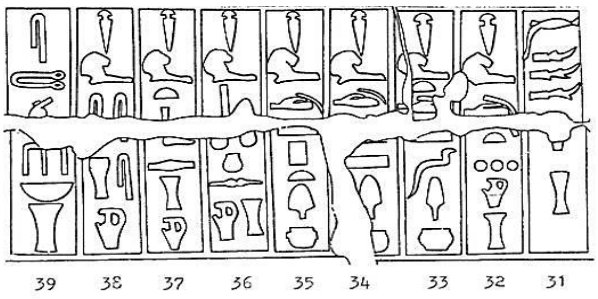
I. INTRODUCTION

Names of Vegetable Oils in Storage Lists [Pre-dynastic, Archaic Period and Old Kingdom]

Oil-storage lists are recorded at Saqqara in the 3rd dynasty tomb of Hesire and the 5th dynasty tomb of Niankhkhnum and Khnumhotep, where it is painted on stucco in two pictorial registers on the east wall of the elongated tomb corridor. Professor Hartwig Altenmüller compares the representation of the oil-magazine that the British Egyptologist James Edward Quibell discovered in the *mastaba* of Hesire with the oil-storage representation of the *mastaba* of Niankhkhnum and his brother Khnumhotep. The oil-magazine includes pictures of the funerary household and consists of explanatory inscriptions on ointment jars that were placed in a storage unit **[FIGURES 1/A&B] & [FIGURE 2]**[1]



[FIGURE 1/A]: Oil storage unit in the tomb of *Niankhkhnum and Khnumhotep* in Saqqara. ALTENMÜLLER 1976: 18, FIG.5.



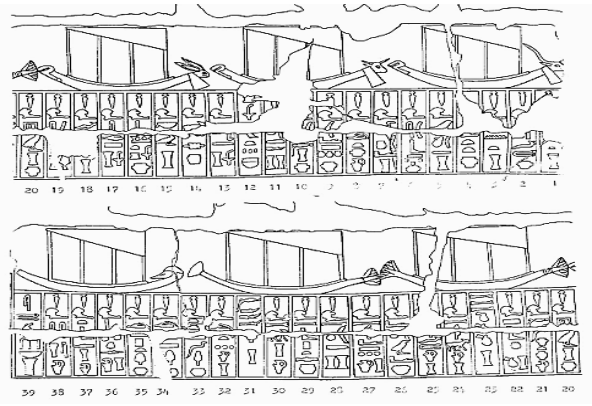
[FIGURE 1/B]: Oil storage unit in the tomb of *Niankhkhnum and Khnumhotep* in Saqqara, 5th Dynsaty. ALTENMÜLLER 1976: 25, FIG.7.

Ointment jars with specific oil are placed in each individual compartment. However, the names of the different oils are often difficult to interpret. The oil list in the tomb of «Niankhkhnum and Khnumhotep» in Saqqara (at the foot of the causeway- of Unas Pyramid complex) from the 5th dynasty represents an essential aid for the interpretation of the «Hesire» list. It lists the same oil designations as the «Hesire» list, but does not show the ointment cabinet. The oil-list of «Nianckcknum and Khnumhotep» tomb is located on the west wall of the entrance-hall. It stands 3.60m high. These oil storage lists are independent of pictures of the tomb owner (Niankhkhnum and Khnumhotep) and have no relation to offering bearers; they are therefore identified as a «Magazine-List» or «Oil-storage List».

The setting of the number «seven» of oils represented in the scene of the oils-cupboard may have ritualistic or magical-religious significance. A comparable number of seven oils appeared during the 4th dynasty as well: *stj-ḥɜb; ḥknw; sf̱t; nẖnm; twɜwt; ḥɜtt-ʿš; ḥɜtt-t̠ḥnw*. The names of some of these «Holy Oils» of the Old Kingdom are preserved in the «Oil-Magazine» of Hesire and in the «Oil-List» of Niankhkhnum and Khnumhotep, but not in the later canonical order. The interpretation of the various designations remains unclear[2]. The title preceding the oil-names is *tpj ḥɜt* = «first» or «best»[3] anointing-oil **[FIGURES 1/ A & B]**.

[1] ALTENMÜLLER 1976: 3, FIG.1.

[2] FRANKFORT 1929: PL. 9; ALTENMÜLLER 1976: 12.



[FIGURE 2]: The «Oil-Magazine» scene in the tomb of *Niankhkhnum* and *Khnumhotep* in Saqqara

Names of Oils in storage magazine

1- *ṯpj ḥɜt sfṯ*: The oil *sfṯ* is one of the seven holy oils from the Old Kingdom. It is obtained from the resin of the *ʿš* –pine tree (of Lebanon). *Sfṯ* is mentioned in Hesire's magazine in connection with foreign oils **[FIGURE 1A, Nº.25]**. This kind of oil is encountered in medicine alongside *jb*(*r*). *Sfṯ* is an oil, a product of «pine tree» (*ʿš*), and used as a substance in ointments. It seems that this oil has a special sacredness.

The first documentation of this product dates back to the Second dynasty, precisely to the reign of Khasekhemwy. Since that time, *sfṯ* is mentioned in the ritual texts as oil; its aromatic properties are underlined. It appears mainly in tomb offering lists. Textual sources underline the healing and aromatic properties of this substance. *Sfṯ* is mentioned as one of the «Seven Sacred Oils» in the Pyramid and Coffin Texts. It has been used as a resin as well as oil in the mummification process. Burning *sfṯ*-resin in the place of incense was also practiced during the funerary rites[4].

Sfṯ in Papyrus Salt

Papyrus Salt clarified the religious meaning of fragrant-oils. The oil *sfṯ* is «from the fallen blood of the god Geb»[5]. Column II of Papyrus reads: «When Horus weeps, the water that falls from his eyes turns into the gum (*ʿntjw*)[6] myrrh. Geb lets blood fall from his nose; it turns into **cedar trees**, and (*sfṯ*) -oil. When Shu and Tefnut weep copiously and let their tears fall to the ground, the teardrops change into plants that produce **incense**. When Re weeps a second time, and water falls from his eyes, his tears turn into **flies that build (bees)**, and these working in the flowers of every garden turn into **wax** (*mnḥ*)[7] and **liquid honey**. The sweat that falls from the members of *Ra* when he is weary turns into the **water-flood**, Column III, and the water that flows from him when he is exhausted turns into **papyrus plants** (*ṯwfj*) »[8]. «Every herb, plant or substance that was used in magical ceremonies was believed to be of divine origin»[9].

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[3] HANNIG 1995: 925.

[4] KAPIEC 2018: 201f.

[5] BUDGE 1910-1923: vol.2, Nº.3[19-20] (Papyrus Salt 825), Second Series/Nº.3[10051], COL.1-3.

[6] *WB* 1926: vol.1, 206, 7-14, 207, 1-3 (resin named «myrrh», in the form of «oil», ointment, and incense).

[7] HANNIG 1995: 340.

[8] HANNIG 1995: 950.

[9] BUDGE 1910-1923: vol.2, 19-21.

2- *ꜥḏnt*[10]: Name of oil known since the Old Kingdom; oil[11].

3- *ṯpj ḥɜt ṯḥnw stj-wr*: «Fragrance oil of the Elite»[12]. The «throwing-stick» sign placed between *wr* and *stj* indicates the foreign origin of the oil, which is probably «Libya»[13]. The following contents of ointments and oils in the storage list are titled «Fats of Good Fragrance» *ꜥḏw stjw*.

4-*ṯpj ḥɜt ꜥḏ jb*(*r*): The substance *jb*(*r*) on which the fragrant fat is based has been documented as an ointment since the archaic period[14] **[FIGURE 1/A, Nº.24].** This ointment is possibly the same as the later mentioned *ḥɜtt* (*nt*) *ꜥš* «Best Cedar-oil»[15], which belongs to the seven holy oils of the Old Kingdom. The basic substances of this pine tree oil were imported directly from Lebanon in the form of red lumps during the New Kingdom. The «throwing-stick» sign in the name indicates «Libya» as the country delivering this «fragrant fat»; this complicates an interpretation of the original land producing this substance. Probably, Libya was an intermediate supplier for this «pine tree oil» *ꜥš* that was originally produced in Lebanon[16]. *Jbr* is used for preparing ointments (*wrḥ* and *rdj*), hair remedy, and eye remedy (ophthalmic agent)[17].

5-*ṯpj ḥɜt ṯḥnw … mḥ* (destroyed) The fragmented oil name designates a Libyan oil of unknown composition, perhaps from northern Libya.

6-*ṯpj ḥɜt ꜥḏ ṯḥnw ꜥš* «Fat of the pine» **[FIGURE 1/A, Nº.27].** Although the raw materials '«pine tree fats»'[18] certainly come from Lebanon, the designation of origin of the ointment indicates that it is a Libyan import. The fat from the pine obtained in Lebanon could have been transshipped and possibly refined in Libya.

7-*ṯpj ḥɜt ꜥḏ ṯḥnw* «Libyan[19] Oil» was one of the «seven holy oils» known since the Old Kingdom. *ꜥḏ* signifies the product as «fat» for preparing an ointment[20] **[FIGURE 1/A, Nº.28]**. *ꜥḏ* is used in wound treatment, in preparation of ointments (*gs*, *wrḥ*, *mrḥ*), in smoking substances (incense), and in Coptic medicine[21].

8-*ṯpj ḥɜt stj šmꜥj* «Nubian Oil»[22]: Oils brought from the 1. Upper-Egyptian Nome (Nubia). *šmꜥw* «Oil of the South»[23]; *stj šmꜥj* «Oil»[24]; *tɜ stj* =designation of the 1st Upper Egyptian Nome[25].

9- *ṯpj ḥɜt jb sɜ*: This name is used several times in the archaic oil lists and refers to a kind of oil that may have been extracted from fruit, leaves or wood of an Upper Egyptian bush

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[10] *WB* 1926: vol.1, 242, 4.
[11] HANNIG 1995: 167.
[12] KAPLONY 1963: vol.1, 312.
[13] ALTENMÜLLER 1976: 17.
[14] BALCZ 1934: 79; KAPLONY 1963: vol.1, 304.
[15] *WB* 1971: vol.3, 28, 10.
[16] ALTENMÜLLER 1976: 19.
[17] DEINES & GRAPOW 1959: vol.6, 23f.
[18] DEINES & GRAPOW 1959: vol.6, 120.
[19] HANNIG 1995: 1406.
[20] ALTENMÜLLER 1976: 21.
[21] DEINES & GRAPOW 1959: vol.6, 113ff.
[22] KAPLONY 1963: 314; ALTENMÜLLER 1976: FIG.6, Nº.3.
[23] HANNIG 1995: 821.
[24] HANNIG 1995: 778.
[25] ALTENMÜLLER 1976: 23, Nº.61a.

(small trees)[26]. Possibly the oil comes from the *jb-sɜ* plant, which has been used since the Middle Kingdom in the drugs that were officially used in the ointments[27]. *jb-sɜ* is generally used in ointments, ointment (*gs*) and (*wrḥ*), in a powder (*tmt*), in jar (*mt.w*) treatment[28].

10- *ṯpj ḥɜt ḏs šmʿj*: It is a kind of oil produced from an unknown Upper Egyptian *ḏɜs*–plant, which is perhaps identical to the *ḏɜs*–plant attested since the Old Kingdom[29]: Pyr. 2083a: N. has not eaten the *ḏɜs* –plant, …[30]. Apparently, the old name was *ḏɜs* and then developed to *ḏɜjs* –plant. It has a bitter or offensive taste[31]. *Ḏɜs* is an unknown plant, likely with a repulsive taste: it is used as a substance in smoking-incense and ointments[32]. Papyrus Salt mentioned the divinity of (*ḏɜs*) plant: 'The sweat of *Isis* and *Nephtys* when they are weary becomes (*ḏɜs*) plants; while the blood that falls from Seth rises up in the form of the (*nʿr.t*)[33]-«tree of the East»[34].

11-*ṯpj ḥɜt jdt* «Fragrance-Oil»[35]. *jd.t* = Fragrance; *jd.t nṯr* = «God's Fragrance»[36]; Oil delivered from Libya **[FIGURE 1/B, Nº.32]**.

12-*ṯpj ḥɜt jdt š*(*n*)*ḏt* = The name should be translated as a «scent of acacia», which is otherwise unknown[37] **[FIGURE 1/B, Nº.33].**

13-*ṯpj ḥɜt jdt ḏɜ* = The name is only fully preserved by *Hesire* and is translated as «fragrance oil of the *ḏɜ* –tree»[38] **[FIGURE 1/B, Nº.34].**

14-*ṯpj ḥɜt jdt špt* = The otherwise unknown is translated as «the scented oil of the *špt* –tree»[39] **[FIGURE 1/B, Nº.35].**

15-*ṯpj ḥɜt bnw s* = The name of the oil can probably be broken down into a word *bnw* and a word (*s*); it remains an unknown oil-name **[FIGURE 1/B, Nº.36]**[40].

16- *ṯpj ḥɜt tb* = Probably denotes a «tree-oil»[41] **[FIGURE 1/B, Nº.37].**

17- *ṯpj ḥɜt sw* = The otherwise unknown oil-name can be designated as «tree-oil» like previous oil-names[42] **[FIGURE 1/B, Nº.38]**.

18- *ṯpj ḥɜt stj-ḥb* = The festival scent **[FIGURE 1/B, Nº.39]**.

19- *ḥknw* = It is one of the «Seven-holy-oils»[43]; documented since the Pyramid texts. It appears in rituals, offering lists and occasionally elsewhere as one of the seven holy

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[26] BALCZ 1934: 79; KAPLONY 1963: 304.
[27] DEINES & GRAPOW 1959: vol.6, 26f; ALTENMÜLLER 1976: 23[Nº.14 & Nº.63], Abb.6.
[28] DEINES & GRAPOW 1959: vol.6, 26f.
[29] DEINES & GRAPOW 1959: vol.6, 592 ff; ALTENMÜLLER 1976: 23, Abb.6, Nº.15a.
[30] MERCER 1952: 306 [Utterance 688].
[31] *WB* 1931: vol.5, 520, 12.
[32] DEINES & GRAPOW 1959: vol.6, 592f.
[33] *WB* 1928: vol.2, 14, 208; HANNIG 1995: 395.
[34] BUDGE 1910-1923: vol.2, Papyrus Salt 825, 3. Papyrus Nº.10051: 19-20.
[35] KAPLONY 1963: I: 305; ALTENMÜLLER 1976: 25, Abb. 7 [Nº.32].
[36] *WB* 1926: vol.1, 9, 152.
[37] KAPLONY 1963: vol.1, 305; ALTENMÜLLER 1976: 26, Abb. 7 [Nº.33].
[38] KAPLONY 1963: vol.1, 305f; ALTENMÜLLER 1976: 26, Abb.7 [Nº.34].
[39] KAPLONY 1963: vol.1, 305; ALTENMÜLLER 1976: 26, Abb.7 [Nº.35].
[40] ALTENMÜLLER 1976: 26, Abb.7 [Nº.36].
[41] KAPLONY 1963: vol.1, 316; ALTENMÜLLER 1976: 26, Abb.7 [Nº.37].
[42] KAPLONY 1963: vol.1, 310; ALTENMÜLLER 1976: 26, Abb.7 [Nº.38].
[43] HANNIG 1995: 565.

oils[44]. *Ḥknw* was one of the most popular oils throughout ancient Egypt. It is known since the Pre-dynastic–until Coptic times. It was brought from foreign lands for religious rituals and was also used in medicine. *Ḥknw* is mentioned in the Pyramid Texts, the Coffin Texts, and the Book of the Dead[45].

II. THE SEVEN SACRED OILS

1- Names of the Seven Sacred Oils

Stj-ḥb Ḥknw Sfṯ Nḫnm Twɜt Ḥɜtt-nt-ʿš Ḥɜtt-nt-Ṯḥnw

The «Seven Sacred Oils» is a term used by Egyptologists based upon the archaeological evidence of ancient Egyptian temple inscriptions, tomb paintings, and magical papyri. These seven oils were known collectively as *mrḥt* (*Merhet*). It was a generic expression for vegetable oils used for their consecrated anointing oils. From the archaic period 3200 BC until the final Ptolemaic dynasty, the Egyptians consistently recognized seven primary varieties of *Merhet*, associating each with a jar of a different shape. The oldest of these surviving jars, dated back to pre-dynastic times, were found deep under the Step-Pyramid of Saqqara. Many of them are carved exquisitely with high precision in extremely hard crystalline stone. The jars originally date back to the archaic period but were reused and inscribed with the cartouche of a New Kingdom king. These Seven Sacred Oils were used in funerary rituals, offerings, and embalming the deceased's body.

In addition to the «Seven Sacred Oils» from the Old Kingdom, new names appeared during the New Kingdom under the reign of Hatshepsut: The *ʿntjw* «myrrh», which was a symbol of the Queen's power and was dedicated to the goddess *Hathor*. Later, in the inscriptions of the temple at Abydos, Sethos I added three additional sacred oils: *bɜk*, *jbr* and *mḏt* oil and *Madjet*-ointment. From the New Kingdom until the Ptolemaic times, there were often three to five additional sacred oils added to the *Merhet* lists in the temples and tombs, quoting from the translations of the lists and recipes in the *Edfu*-laboratory chamber. Recipes of ingredients are recorded in *Edfu*, *Denderah,* and *Esna's* Temple laboratories. Some examples of ointment ingredients are: *Storax* resin or oil; Lotus; White Frankincense; ox-fat; Grape wine; Cinnamon; Tiger nut oil and Juniper berry oil.

- *Sfṯ* usually appears in funerary contexts: in the processional scenes with offering bearers, offering lists or as fragrant oils necessary for the «Opening of the Mouth» Ritual. The sacred fragrant oils are depicted on the walls of the burial chamber, beside the false doors or in the so-called friezes of objects (late Old Kingdom and Middle Kingdom). The *Mastaba* of Queen Mersyankh III, wife of king Chephren, in Giza (G. 7530-7540), 4th dynasty represents a list of «Sacred Oils»: *snṯr*, *stj-ḥb*, *ḥknw*, *sfṯ*, *twɜwt*, *ḥɜtt-ʿš*, *ḥɜtt-ṯḥnw* **[FIGURE 7/A]**[46]. There is no depiction of *sfṯ* without a vase showing the product itself. It can be assumed that it could have been delivered in red-brownish clumps as the gum of the pine tree (*ʿš*), which is represented in the Syrian tribute scene represented in the tomb of *Rekhmire* (TT 100) **[FIGURE 3]**[47]**.** There are some travertine vases still containing traces of

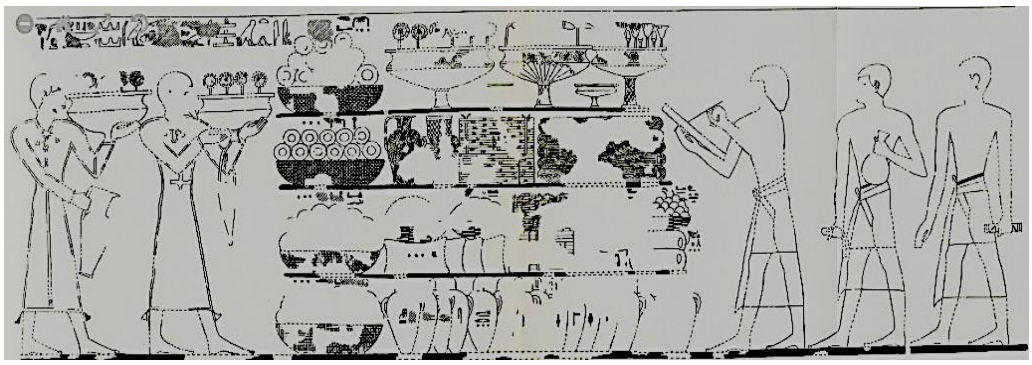
[44] *WB* 1971: vol.3: 5-7, 180.

[45] KAPIEC 2018: 204.

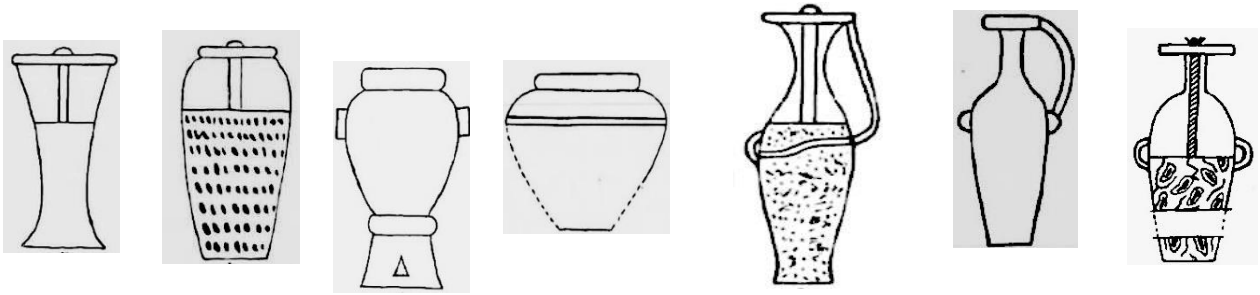
[46] Offering (West) Room, South Wall (17). DOWS & SIMPSON 1974: 17, PL.10, FIG.9)

[47] The Hall: West Wall, South Half. Syrian- and Cretan merchants bringing tributes: basket of gold rings (one of them is a silver-ring); planks of *mrw*-wood; baskets of best «cedar gum»; *mnj*-amphorae: three jars of

oil or resin. *Sfṯ* is usually represented as being inside the *ḫnm-* vase, the jar (bottle) with a long neck and vertical handle[48] **[FIGURE 4][49].** During the early 18th Dynasty, *sfṯ* was mainly represented in the *bɜs-* vases, the cylindrical alabaster jars **[FIGURE 6/A].**



[FIGURE 3]: Tomb of the Vizier *Rekhmire* in West Thebes (*TT 100 – in Sheikh Abd El-Gourna*)



bɜs- Cylindrical jars (*stj* and *sfṯ*)	Pitcher without neck (*ḥɜtt nt ʿš*)	Pitcher without neck *ḥknnw, ʿntjw, sfṯ*	Broad bulbous jars *ḥɜtt nt Ṯḥnw*	Handle jar *nj-ḫnm, sfṯ*	Handle jar (*jbr*-oil)	*ḫnm*-jar Amphora (*twɜt* oil) *sfṯ*
BALCZ 1934: 83, FIG. 106p.	BALCZ 1934: 86, FIG.111k.	BALCZ 1934: 87, FIG.112g	BALCZ 1934: 89, FIG.114b	BALCZ 1934: 91, FIG.118q	BALCZ 1934: 91, FIG. 118a.	BALCZ 1934: 93, FIG. 121h.

[FIGURE 4]: Jars of the «Seven Sacred Oils»

- *Stj-ḥb* is attested for the first time by the end of the 3rd dynasty and was in use until Ptolemaic times[50]. The meaning of its name is «the scent of the festival». According to the sources from the Edfu temple, it was made as a mixture of different seeds, frankincense and flowers.[51] In the Pyramid Texts, *stj-ḥb* together with the *mḏ.t-* oil are mentioned in the context of healing the Eye-of-Horus. In the Coffin Texts, it appears in a similar context, as well as in the Book of the Dead. On the west wall of the Southern Room of Amun, in the

olive oil; six of *snṯr* incense, four of ointment *sfṯ* of Lebanon, four of wine jars; two ivory ointment holders. DAVIES 1943: vol.2, PL.21.

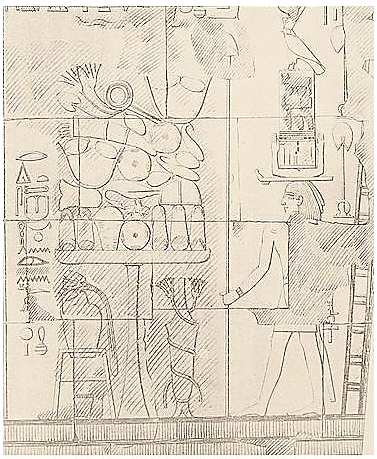
[48] BALCZ 1934: 91, FIG.118q.

[49] BALCZ 1934: 79-82.

[50] KOURA 1999: 157.

[51] KAPIEc 2018: 203.

temple of Hatshepsut in Deir El-Bahari, the king (originally Queen) is making an offering to Amun-Kamutef. In front of the offering table are inscriptions mentioning the sacred oils, *stj-ḥb* and *ḥknw*. Two jars are placed under the offering table, decorated with lotus flowers, denoting that fragrant oils are contained within **[FIGURE 5]**[52]**.**



[FIGURE 5]: Sacred Oils *Sfṯ* and *Ḥknw* are inscribed at the Offering-table: The Upper Court of Hatshepsut's temple at El-Deir El-Bahari. Chamber at South-West Corner, West Wall

[FIGURE 6/A]: Typical cylindrical alabaster ointment jar with lid from a foundation deposit at Hatshepsut's mortuary temple. Traces of oil-content can be recognized inside the jar. Dimension: Height 13.3 cm. New Kingdom, 18th dynasty, ca. 1479-1458 BC. The Metropolitan Museum of Art, Gallery 116, Public Domain. Metropolitan Excavations 1923-24. Nº.25.3.44a,b. http://www.metmuseum.org 01/12/2022.

[FIGURE 6/B]: A limestone palette with seven depositories is inscribed with the names of the '«Seven Sacred Oils»' from Saqqara, ca. 2500 BC. HAWASS 2002: 19.

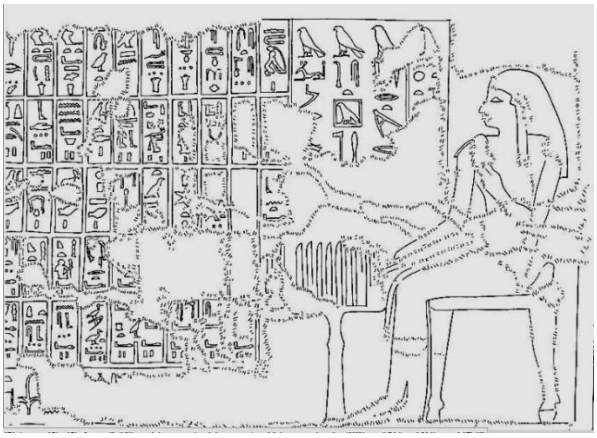
- *Ḥknw* was one of the most popular oils throughout ancient Egypt. It has been known since Pre-dynastic times, and was attested in all the dynasties up to the Coptic times. *Ḥknw* is mentioned in the Pyramid Texts, the Coffin Texts and the Book of the Dead. It was also used in medicine.
- *Nḫnm-* oil is attested for the first time in the Fifth dynasty. The wooden False door of *Ika*, the royal *wʿb*-priest and chief of the Great House, Old Kingdom, 5th dynasty (before the time of Unas), 2475-2355 BC. His wife *Iymeret* was a priestess of Hathor. In the tablet

[52] NAVILLE 1906: vol.5, PL.132.

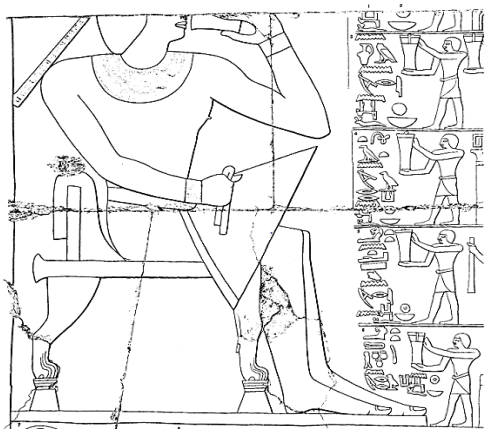
scene above, the square part of the so called «window», Ika and his wife *Iymeret* are seated face to face at an offering table laden with loaves of bread. The inscription above the offering table mentions: *snṯr*, *stj-ḥb*, *ḥknw*, *sft*, *nḫnm*[53]. It is mentioned in the Pyramid Texts and Coffin Texts and is used in the process of embalming the deceased.

- *Twɜ.wt* is attested since the Fourth dynasty. The scene in the *Mastaba* of Queen Mersyankh III in Giza (G. 7530-7540), in the Offering (West) Room, south wall represents the Queen in front of an offering table, loaded with loaves of bread. Above is an inscribed list of offerings including sacred oils: *stj*, *snṯr*, *stj-ḥb*, *ḥknw*, *sft*, *twɜ.wt* **[FIGURE 7/A]**[54].

Ḥɜtt-nt-ꜥš and *Ḥɜtt-ṯḥnw* appeared in the tomb of the Vizier «Mereruka», which is located to the north of the Pyramid Teti, in Saqqara. King Teti was the first king of the 6th dynasty. The Vizier Kagemni was the predecessor of «Mereruka». A scene in Chamber A12 (East Wall) of the *Mastaba* represents Mereruka drinking from a cup; in front of him, offering bearers are depicted. They are bringing big cylindrical *bɜs*- vases with the inscriptions revealing their contents: *nḫnm*, *twɜwt*, *ḥɜtt-ntt-ꜥš*, *ḥɜtt-ṯḥnw* **[FIGURE 7/B]**[55].



[FIGURE 7/A]: Sacred Oils List inscribed in the *Mastaba* of queen Mersyankh III in Giza (G. 7530-7540). The first row contains the names of the sacred oils. Old Kingdom, 4th dynasty. Offering (West) Room, South Wall (17). DOWS 1974: 17, PL.10, FIG. 9.



[FIGURE 7/B]: Mereruka holding a fragrant oil-jar. Before him are presented various oils of the «Seven Sacred Oils». Chamber A12. Old Kingdom, 6th dynasty. East Wall, Scene 1. DUELL 1938, vol.2, PL. 117.

2- Sacred Oils and Incense mentioned in the Pyramid Texts

A. Oils Equated the Horus-Eye

Pyramid texts

(2. Ritual of Bodily Restoration of the Deceased, And Offerings, Utterances 12-203):

Pyr. 50a: 'Pouring a libation of oil' is the heading; the following utterances mention «the Eye of Horus», which explains the tight relationship between Horus-Eye (*Udjat*-eye) and ointments.

Pyramid texts: Utterance 72-78

50a. Pouring a libation of oil

50b. Osiris N, I fill your eye for you with ointment; to say four times *Śtj-ḥb* oil.

50c. Osiris N, take to you that with which a liquid offering is made *ḥknw* oil.

[53] SALEH & SOUROUZIAN 1987: 58.

[54] DOWS 1974: 17, PL.10, FIG.9.

[55] DUELL 1938: vol.2, Chamber A 12.

51a. Osiris N, take to you the eye of Horus, on account of which he (Seth?) was punished *Sf̲t* oil.
51b. Osiris N, take to you the eye of Horus, which is united with him *Nḫnm* oil.
51c. Osiris N, take to you the eye of Horus, with which he brought and carried the gods *twꜣwt* oil.
52a. Oil, Oil, arise, open you; you (the oil) who are on the brow of Horus, arise, open you.
53a. Make him have power over his body (over himself); put his fear in the eyes of all spirits, 53b. who shall look at him, and of everyone who shall hear his name through thee (you) *ḥꜣt.t ʿš*.
54a. Osiris N, I bring to you the eye of Horus, which he took from thy (your) brow *ḥꜣt.t t̲ḥnw*[56].

Pyramid texts: Utterance 200, 55

116a. Homage to thee (you), Incense; greetings to thee, Divine Brother; greetings to thee *mnwr* (incense, cf. *mn-wr*)[57], in the limbs of Horus.
116b. Be great, my father; propagate thyself (yourself) in thy name of *pꜣḏ* (incense pellets). Here we can find evidence revealing the close relationship between Horus and incense. Horus was reproduced by incense pellets.
116c. Thine (yours[58]) odor (scent) is for N; thy (your) perfume is for N.
116d. Eye of Horus, thou (you) art (are) higher, thou art greater than N. –incense.

B. Rejoice and Sparkle of the Deceased as Oil Function

Pyramid texts

12. The Ferryman and the Deceased King's Ascension, Utterances 300-311, p. 101:
453a. Put it on thy brow, in this, its name of «Choice oil»,
453b. that thou mayest rejoice in it, in this its name of «Willow tree»[59],
454a. that though mayest sparkle thereby among the gods, in this its name of «that which sparkles», *t̲ḥnw.t* – oil.
454b. that thou mayest be pleased with it in this its name of «oil of pleasure», *ḫkn.w* – oil[60].

C. Oils Preserve the «Healing Power» of the Deceased

The sacred Pyramid texts clarified the «healing power» of oils.

The dead body has crumbled; its limbs are paralyzed and loose, but the powers of oils are «joining the limbs, connecting the bones, joining the flesh and removing all evil discharges».

D. The Odor of Oils is Sweet Like that of Re

Pyramid texts: 48. Texts of Miscellaneous Contents, Utterances 628-658: Utterance 637, 271

1799a. To say: Horus comes; filled [with ointment], he sought his father, Osiris.
1800b. Oh N, I have come to thee also,
1800c. that I may fill thee with the ointment that came forth from the eye of Horus.
1801a. Fill thyself (yourself) with it.
1801b. It will assemble thy bones; it will unite thy limbs;
1801c. it will collect thy (your) flesh; it will let thy evil sweat flow to the ground.
1802a. Take its odor to thee, that thy odor may be sweet like that of Re,
1802b. when he ascends to the horizon, and the gods of the horizon delight in him.
1803a. Oh N, the odor of the eye of Horus is upon thee;
1803b. the gods who follow Osiris delight in thee[61].

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[56] MERCER 1952: 35.

[57] HANNIG 1995: 339.

[58] 'Yours' means «The scent of Horus».

[59] Willow trees (Salix) are found primarily on moist soils in cold and temperate regions. Willow Bark Extract benefits: -Provides gentle exfoliation for more radiant skin– Helps reduce acne and excess oil– Helps reduce signs of aging and the appearance of wrinkles– Refines pores and smoother look of skin. Google-Willow Plant.

[60] MERCER 1952: 101; https://www.sacred-texts.com-Pyt Accessed on 09/09/ 2022.

E. Illuminating Function of the Horus-Eye (as above Nº.3 «Rejoice and Sparkle» as Oil Function

Pyramid texts, Utterance 639, 272

1807a. To say [Osiris N], take the eye of Horus, being alive, that thou mayest see with it.
1807b. Osiris N, thy face is opened by the light.
1807c. Osiris N, thy [face is illuminated] as the earth is illuminated.
1808a. Osiris N, I have given the eye of Horus to thee, as Re gives it (the light).
1808b. Osiris N, [put the eye] of Horus to thyself, that thou mayest see with it.
1909a. Osiris N, I have opened thine eye that thou mayest see with it.
1809b. Osiris N [I have given to thee] the ointment[62].

3- Oil List of the «Opening-of-the-Mouth» Ritual[63] (*Eberhard Otto*)

A. *mḏ.t* ointment[64]:	Oh, N! Take the Eye of Horus, the *mḏ.t* –ointment!
B. *stj-ḥb* ointment:	Oh, N! Take the Eye of Horus, the *stj ḥb* – ointment!
C. *ḥknw* ointment:	Oh, N! Take the Eye of Horus! Your both eyes will be filled with ointment. It should not flow from your face.
D. *sfṯ* – ointment[65]:	Oh, N! Take the Eye of Horus, under which Seth was punished!
E. *njḫnm* (*nḫnm*)– ointment[66]:	Oh, N! Take the Eye of Horus! Unite yourself with the ointment!
F. *twꜣ.w.t* ointment[67]:	Oh, N! Take the Eye of Horus that is brought to him and in which the gods support him!
G. *ḥꜣt.t-ꜥš* – Best Cedar Oil[68]:	Oh, N! Take the Eye of Horus! Take (it) on your face (face-visage)!
H. *ḥꜣt.t ṯḥnw* – 'Best Libyan Oil'[69]:	Oh, N! Take the Eye of Horus! Take (it) to your forehead!
I. *ʾlbr* – ointment[70]:	Oh, N! Take the Eye of Horus, under which (under its effect) Seth is kept away, (but) does not move away from you! –Ointment functioning against Seth!
J. *ḏt* (*ḏjt*) Olive- tree[71]:	Oh, N! Take the Eye of Horus, which is imputed to you, so that you just illuminate **[FIGURE 1]** !
K. Bag of green Eye-paint:	Oh, N! Take the Eye of Horus by which you are made safe!
L. Bag of black Eye-paint:	Oh, N! Take the Eye of Horus by which you are made safe!

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[61] MERCER 1952: 271.
[62] MERCER 1952: 272.
[63] OTTO 1960: 121f.
[64] BARTA 1963: 129.
[65] Documented since the Pyramid texts; one of the seven holy oils; appeared in rituals and offering lists; Syrian origin. *WB* 1971: vol.4, 11-16, 118; HANNIG 1995: 699. One of the seven sacred oils; from the pine tree. BARTA 1963: 56 [Nº.5].
[66] *WB* 1928: vol.2, 319, 1-3 documented since the Pyramid texts; one of the seven sacred oils; in rituals; in offering lists. BARTA 1963: 55; HANNIG 1995: 429.
[67] *WB* 1931: vol.5: 251, 4-7 (documented since the Pyramid texts; one of the seven sacred oils; ointment in rituals and lists. BARTA 1963: 55; HANNIG 1995: 920.
[68] MERCER 1952: *Pyr*.53b; BARTA 1963: 55; *WB* 1971: vol.3, 28, 10; HANNIG 1995: 159.
[69] MERCER 1952: *Pyr*.54a ; BARTA 1963: 55; *WB* 1971: vol.3, 28, 11.
[70] Kind of precious ointment for body and hair; often used in temple-cults; officially used alone or as part of ointments. *WB* 1926: vol.1, 63, 10-13; HANNIG 1995: 41. A gum resin used in perfumery and for fumigation.
[71] Oil tree documented since the New Kingdom; the fruit of the olive tree. *WB* 1931: vol.5, 618, 4-5; HANNIG 1995: 1016.

M. Ointment! Ointment! It is you who are on the forehead of Horus; you are on the forehead of Horus!

N. You (the ointment) put the terror (fear) of him in the eyes of all the dead who look at him, and likewise of all who hear his name!

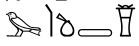
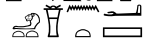
Ritual Offering list from the End of the 4th dynasty[72]

Nº.1: *sꜣṯ*	Pyramid texts; pouring water in purification ritual; offering lists[73].
Nº.2: *sḏt snṯr*	Incense; documented since the Pyramid texts; imported from Punt, Nubia and Incense on the flame (*sḏt snṯr*); fresh and dry incense; in form of balls (pellets); u purification rituals; appeared in offering lists; in medication[75].
Nº.3: *stj ḥꜣb*	«Festival-scent», described as fragrant oil; in offering- and temple rituals, in offering lists; anointing[76].
Nº.4: *ḥknw*	Documented since the Pyramid texts; one of the seven sacred oils; used in rituals, offering lists, and others[77]. Unknown drug, used since Pyramid texts until Coptic medicine[78]. I suggest that *Hekenu* is the «Lotus-Oil».
Nº.5: *sfṯ*	Documented since the Pyramid texts; one of the seven sacred oils; in rituals and offering lists; imported from Syria; used for anointing and embalming[79].
Nº. 6: *nḫnm*	Documented since the Pyramid texts; one of the seven holy oils; used in rituals and offering lists[80].
Nº.7: *twꜣwt*	Documented since the Pyramid texts; name of one of the seven sacred oils; used for anointing; offering lists and rituals[81].
Nº.8: *ḥꜣtt-ʿš*	«Best Cedar-oil»[82] from Lebanon. *ḥꜣtt*[83] was a general expression for «Best Ointment-oil» which could substitute *nḫnm*, *twꜣwt*, *ḥꜣtt-ʿš ʿnd ḥꜣtt-ṯḥnw*[84].
Nº.9: *ḥꜣtt-ṯḥnw*	Best Libyan-oil[85].

[72] BARTA 1963: 56.
[73] *WB* 1971: vol.3, 423, 3-4.
[74] *WB* 1971: vol.4, 180, 18-22.
[75] *WB.* 1971: vol.4, 181, 1-17.
[76] *WB* 1971: vol.4, 350, 7-11.
[77] *WB* 1971: vol.3, 180, 5-7.
[78] DEINES & GRAPOW 1959: vol.6, 384.
[79] *WB* 1971: vol.4, 118, 11-16.
[80] *WB* 1928: vol.2, 319, 1-3.
[81] *WB* 1971: vol.5: 251, 4-7.
[82] *WB* 1971: vol.3, 28, 10.
[83] Best of ointment oil, best kind; documented since Pyramid texts. *WB* 1971: vol.3, 28, 8.
[84] BARTA 1963: 55.
[85] *WB* 1971: vol.3, 28, 11.

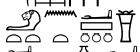
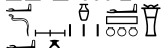
Common Oil-Names

Essential oil names that are mentioned in Pyramid texts (Pyr. 50a until 54a and others), appeared in offering and ritual lists as well[86]. These oil-names are:

	*sfṯ*	Oil (one of the seven holy oils); pine tree oil.
	*stj-wr*	Fragrance of the Greats (oil imported from Libya).
	*stj-ḥb*	Festival Fragrance (one of the seven holy oils); nice scent; in offerings; temple-rituals; offering lists; ointment.
	*ḫknw*	Oil (possibly lotus extraction); one of the seven holy oils; *stj-Ḥr* is earlier expression for (*ḫknw*).
	*stj-nṯr*	Fragrant of the God (since Pyr.); also generally: nice fragrant, incense, ointment.
	*nḫnm*	Oil (one of the seven holy oils).
	*twꜣwt*	Oil (one of the seven holy oils).
	*ḥꜣt.t nt ꜥš*	Best Cedar Oil (*ꜥnḏ ꜥš*) = oil of the pine tree.
	*ḥꜣt.t nt ṯḥnw*	Best Libyan Oil.
	*stj-šmꜥj*	Upper Egyptian-Oil.

[TABLE 1]: Oils Names© Done by researcher

General terms for oils, fats and incense

	*mrḥt*	«Oils, Ointments»; (*Fats of mammals or plants, as ointments, ingredients of medications, perfumed ointment, burning oil*)[87]. Collective word for «Sacred Oils».
	*ḥꜣtt mrḥt*	«Best oil», «kind finest oil»[88]; «ointments of the first quality»[89].
	*ꜥḏ*	«Fats of mammals: beef, goat, ibex and goose»; «burning fat»[90].
	*ḥꜣt.t nt ꜥš*	«Resin and Oil of Cedar»[91].
	*ꜥḏ-ꜥš*	«Cedar Oil» in medical terms[92]; Lumps of fat for putting on fire'[93].
	*ꜥnḏ(w)*	«Ointment» or «Fragrance»[94].
	*ꜥḏ.t*	«Oil» (evident since the Old Kingdom) [95].
	*ꜥḏnt*	«Oil»[96].
	*śtj*	«Fragrance-oil»[97].
	*śtj*	(three linen pouches) = «Fragrance»[98]
	*ꜥḏw stjw*	«Fats of fragrance»[99] **[FIGURE 2, Nº.23].**
	*ḥꜣtt*	«Ointment-oil of best quality»[100].
	*snṯr*	«Making incense-smoke with burner-device», «Purifying»[101].
	*snṯr*	«Incense»[102]. *snṯr* = «putting incense on the flame for getting fragrant smoke»; «smoking a sacred place with incense». In «Purification-ritual»: putting incense on the flame together with pouring water[103]. *snṯr* used in smoking substances, in ointments, and eye-remedies[104].

4- Oil Jars

The oil and ointment jars that appeared in magazine lists and tribute scenes (*Rekhmire* tomb) are of different types, namely the cylindrical ointment jar (*bꜣs*-jars), the low bulbous, the broad- shouldered jugs (*mnj*-jars), and pitchers with handle **[FIGURE 3]**[105].

There were not specific jar types for particular types of oils **[FIGURE 4]**. A part of the tomb funerary equipment is formed by the well elaborated and skillfully decorated «perfume-jars». The tomb of *Tut-Ankh-Amen* contained a number of alabaster perfume-jars for its religious function[106].

A large number of highly elaborate stone vessels had been excavated in the subterranean galleries beneath Djoser step-pyramid at Saqqara. The vessels are dating

[86] OTTO 1960: 121-122; KAPLONY 1963: 301-315; ALTENMÜLLER 1976: 1-29.

[87] *WB* 1928: vol.2, 110, 16; HANNIG 1995: 349.

[88] *WB* 1928: vol.2, 111, 6.

back to grave-goods of earlier archaic period tombs. The traces of oils reveal what they contained. Later, Kings of the New Kingdom inscribed their own cartouches on these extraordinary oil-jars **[FIGURE 6/A]**. Sacred Oils gained significant importance in religious rituals since the 1st dynasty.

The dozens of excavated palettes with seven depositories, which were inscribed with the names of the «Seven Sacred Oils», are evidence for the divinity of these «fragrant-oils» **[FIGURE 6/B]**. These special offering tablets have been discovered in ancient Egyptian tombs especially those of the 5th and 6th dynasties at Saqqara. Its depressions were repositories for small quantities of the seven oils for fingertips to dip into. The name of each kind of oil is inscribed in hieroglyphs. Tablet dimensions: Length 16.5 cm; Width 7.7 cm; Depth 1.5 cm. The tablet is dating to the Old Kingdom, the beginning of the 6th dynasty.

A wide variety of vases were used to store oils. Lists in tombs since the 2nd dynasty have included a multitude of drugs and the containers in which they were kept. The most detailed sources are the depiction of the ointment cupboard in the tomb of *Niankhnum* and *Khnumhotep* and the incomplete list of oil names mentioned in *Hesire's* tomb, which originally contained about thirty compartments of different ointments and oil.

The Sacred Oils Jars [TABLE 2]

stj-ḥb	Dominantly a cylindrical vase.  *ḥɜs* - cylindrical jar[107].
ḥknw	Almost exclusively a cylindrical vase
sfṯ	Almost always the cylindrical vase; the bottle with handle and the amphora.
nj-ḫnm	Mostly handle-vase, rarely amphora.
twɜt	Different forms; multiple wide jars with eyelets.
ḥɜtt ꜥš	Cylindrical vases, bulbous, slender jugs , amphorae, bowels with eyelets
ḥɜtt Ṯḥnw	

[TABLE 2]: Sacred Oils Jars ©Done by researcher

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[89] ALTENMÜLLER 1976: 7.
[90] *WB* 1926: vol.1, 239, 8-13; HANNIG 1995: 165.
[91] *WB* 1926: vol.1, 228, 6.
[92] *WB* 1926: vol.1: 239, 14.
[93] *WB* 1926: vol.1: 239, 17.
[94] *WB* 1926: vol.1: 208, 1; KAPLONY 1963: vol.1, 301.
[95] *WB* 1926: vol.1, 240, 4.
[96] HANNIG 1995: 167.
[97] KAPLONY 1963: vol.1, 311, *WB* 1971: vol.4, 349, 5; HANNIG 1995: 783.
[98] ALTENMÜLLER 1976: 7.
[99] BALCZ 1934: 81; KAPLONY 1963: vol.1, 311; ALTENMÜLLER 1976: 7.
[100] *WB* 1971: vol.3, 28, 8; HANNIG 1995: 508.
[101] HANNIG 1995: 725.
[102] HANNIG 1995: 725.
[103] *WB* 1971: vol.4, 180, 7-18.
[104] DEINES & GRAPOW 1959: vol.6, 450ff.
[105] ALTENMÜLLER 1976: 4f.
[106] SALEH & SOUROUZIAN 1987: Nº.190.
[107] HANNIG 1995: 242.

III. Second Part: Sacred Oils in Religious Rituals

A. Scenes of Anointing and Censing the Cult-image:

Ointment was an integral part of the temple cult. The countless depictions of cult events on temple walls revealed the following inscription: *jrjt rdjt ḥnk mḏt* «Giving the Ointment»[108]. In purification rituals, whether of God or the deceased, the anointing is not skipped. Various types of oils are used for them. It may be that when performing the ritual of anointing, the ritual itself was actually limited to the anointments of the head *ḥɜt.t* and the forehead *ḥɜt*[109]. Only the anointing of the head is shown in the representations of *wrḥ tp* «anoint the head»[110]. The actual anointing is also represented with the little finger stretched out to apply the ointment on the cult-image.

1- Scene: The Temple of Abydos depicts Sethos I anointing the forehead of the cult-image of *Amen-Re* with his small right finger, while the left hand holds the small oil jar **[Figure 10, left]**. This significant ritual invokes the spirit of the deity. The anointing of this specific region awakes all the deceased's senses.

2- Another scene shows the kneeling king Sethos I handing over two (*mḏt*) ointment-jars to *Re-Harakhty*. According to *Hartwig Altenmüller* the scene of «*handing-over ointment*» to the deity is substituting the ritual of «*anointing god's forehead*». Above the scene is an inscribed list of the «Sacred Oils» **[Figure 8][111].**

3- A third scene depicts king Sethos I handing over two *mḏt* –ointment jars with lids to *Amen-Re*. Behind the figure of the king is a large scale inscription of the «*Litany-of-the-Sacred Oils*» **[Figure 12]**. The inscription reads: Chapter (Utterance) to offer *Madjet* Oil: «Give *Madjet* to his father, whom he has endowed with life». The inscription clarified that the *mḏt*-oil, which king Sethos I offered, endowed the «breath-of-life» to the cult-image of *Amen-Re*.

4- According to *Eberhard Otto,* a ritual scene shows the *Sm*-Priest, followed by *ḫrj ḥbt* (Lector Priest), touching the statue's mouth with the little finger of his right hand. The spells uttered during the «Mouth-Opening»- ritual: «*Sm, open your mouth, open your eyes with your little finger*»[112]. A speech of *ḫrj ḥbt* priest, reads: «*I opened your mouth* (*wpj*), *I opened your eyes* (*wn*) *with my little finger*»[113]. The Tablets containing seven depositories for the «Seven-Sacred-Oils» were used to perform the ritual **[Figure 6/B]**. The names of the sacred oils are inscribed above each depository:

Stj-ḥb, *Sfṯ*, *Ḥknw*, *Nḫnm*, *Twɜt*, *Ḥɜtt-nt-ʿš*, *Ḥɜtt-nt-Ṯḥnw*.

5- Another scene114 depicts the Sm priest115, followed by Xrj Hbt «Chief lector priest»116, *touching the mouth of the statue with his right forefinger*, while holding a jar filled with *sfr*[117] -ointment in his left hand.

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[108] Hannig 1995: 380.

[109] Bonnet 2000: 647.

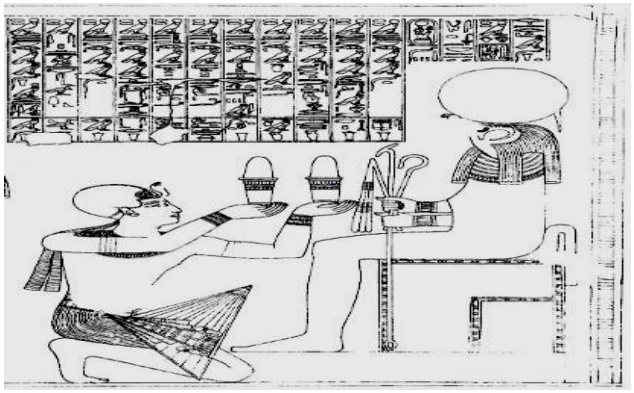
[110] Hannig 1995: 923.

[111] CALVERLEY & GARDINER 1935: vol.2, PL.18.

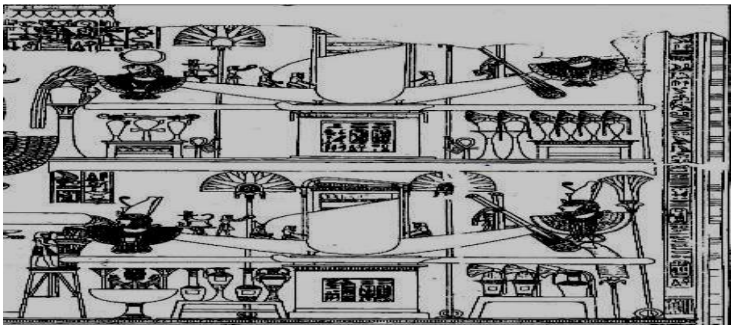
[112] Otto 1960: 93-95, Scene 33 & 65 Scene 14.

[113] Otto 1960: 95.

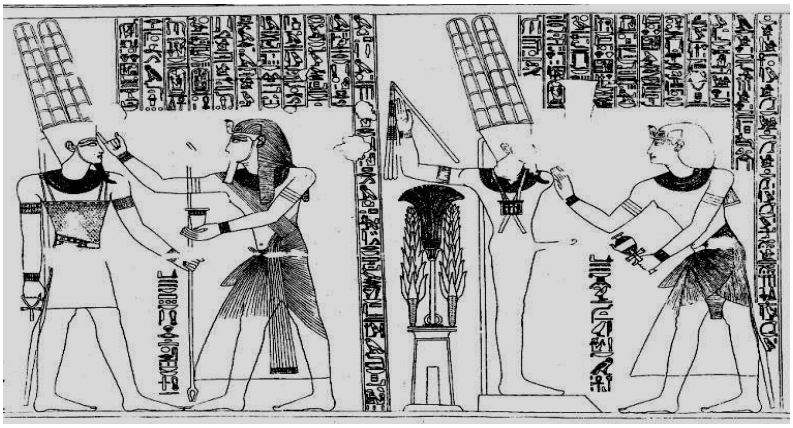
[114] Otto 1960: 120, Scene 55.



[FIGURE 8]: King Sethos I kneeling and handing-over *Madjet* ointment jars to Ra-Harakhti. Above is a list of sacred oils inscribed. Temple of Sethos I at Abydos, Chapel of Re-Harakhti: South Wall, Western Section.



[FIGURE 9]: Sacred Barks of Khonsu and Mut. Beneath the barks are incense burner with *Ankhy* water dispenser, fragrant oil-jars decorated with Lotus-flowers and *Madjet* ointment-jars aligned. Chapel of Amen-Re, south wall, western section. CALVERLEY 1935: vol.2, PL.10.



[FIGURE 10]: Left: King Sethos I anointing Amen-Re image with his pinky right finger and holding ointment-jar with his left. Right: King Sethos I «laying his right hand on the god's image» and holding a water dispenser shaped in the form of *Ankh* life-sign (*Ankhy*-jar) for the performance of «purifying-ritual» by cleansing the cult-image of Amen-Re with fresh water. . A lotus and lettuce are depicted behind the cult-image as well as oil-rich plants. Temple of Sethos I at Abydos: Chapel of Amen-Re, North Wall, Western Section. CALVERLEY 1935: vol. 2, PL.5.

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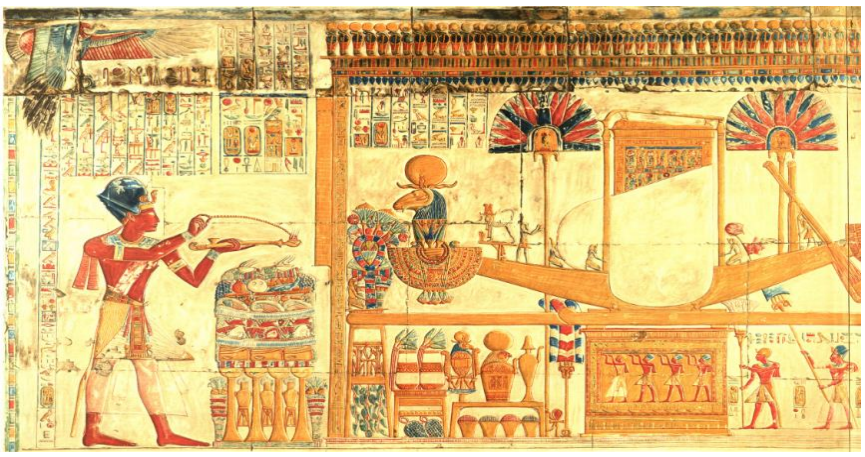
[115] Priestly title; documented since the Pyramid texts; in ceremonial festivals and funerary cult. *WB* 1971: vol.4, 119, 3-9. Priest in «Opening of the Mouth» rituals and «Annual Festival-Processions». HANNIG 1995: 700

[116] HANNIG 1995: 640.

[117] documented since early OK, one of the anointing oils. *WB* 1971: vol.4, 115, 11; anointing oil. HANNIG 1995: 697.



[FIGURE 11]: King Sethos I burning incense on the flame using the burner-arm device. In front of the prow of the sacred bark are Lotus-flower bouquets and *Ankh* (life-sign) placed. The scene is expressing the ritual of invoking god's spirit using incense and fragrant flowers. Temple of Sethos I at Abydos: Chapel of Amen-Re, South Wall, Western Section. CALVERLEY & GARDINER 1935: vol.2, PL.10.

[FIGURE 12]: King Sethos I offering *Madjet*-ointment jars, covered by lids, to Amen-Re. The «Litany-of-*Madjet* Ointment» is inscribed behind the king. Above the whole scene the hieroglyphic sign for sky *(pt)* is depicted. Chapel of Amen-Re, South Wall, Western Section. CALVERLEY & GARDINER 1938, PL.10.

Scene Inscription

- *Sm*, ointment offering,the utterance of the chief lector priest *ḫrj ḥbt* .
- *Sm*, giving the ointment, the green and black eye cosmetics; anointing with light *ỉbr* – oil[118].
- Prepare ointment for N, the utterance of the chief lector priest *ḫrj ḥbt*
- *Sm*, giving (*wdj*) the ointment for N.
- Oh, N! I have filled your face with ointment!
- I have fixed the eye of Horus (*dmj* = put on ointment[119]), so that your face is whole (safe) within it.
- Sweet is his fragrance to you in his name «the sweet smelling».

6- The Enclosure-wall of King Ramses II in Karnak represented the ritual of «anointing the cult-image with the small right finger»: King Ramses II anoints the image of the lion-

[118] Kind of precious ointment for body and hair, often used in temple cult, officially alone or as part of ointments. *WB* 1926: vol.1, 63, 10-13; oil for hair and skin. HANNIG 1995: 41.

[119] HANNIG 1995: 979.

headed goddess «*Sakhmet*» with *stj-ḥb* (festival-scent)[120]. Ramses II is holding the anointment jar with his left hand and anointing with his right; between both figures a group of oil jars is represented. The alignment of jars is shown on the upper shelf of the oil jars stand, and is identified by Lotus flower bouquets. Meanwhile, the lower shelf shows (*nmst*-jars), a pouring device used for the purification ritual. The scene is represented on the south-wall of the enclosure[121].

7- Censing with burner-arm *sḥtp*[122]

A. Utterance of the Chief-lector-priest (*ḫrj-ḥbt*); *Sm*-priest, taking the incense-burner-arm (*sḥtp*); Purifying N, four times; Incense on the flame.

B. Pure is Horus! He deifies him (the deceased) with the Eye-of-Horus. Purify yourself, N! Cense yourself with the Eye-of-Horus.

8- Prophet *ḥm-nṯr* with incense-burner in front of the cult-image[123]:

A. Utterance of the Chief-lector-priest; *Sm*-priest circulate N four times with incense on the flame.

B. Oh, N! Take yourself the Eye-of-Horus! Its scent comes to you!

B. Purification Scenes

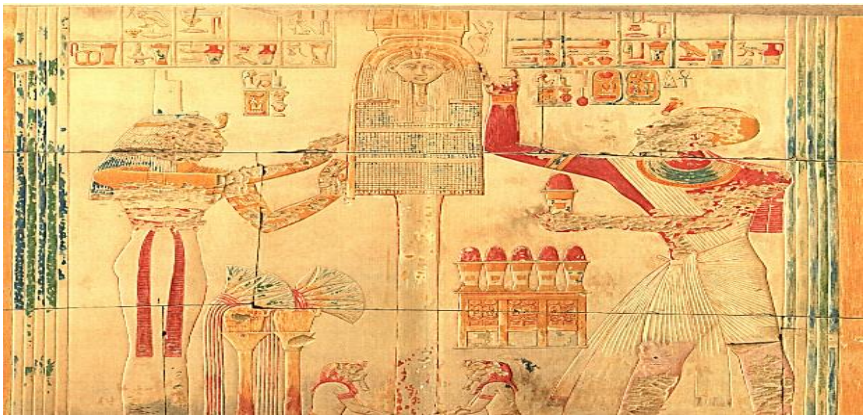
The purification ritual forms a group of rituals that includes the «anointment of the cult-image», «censing», «Natron-balls», and «purifying with water dispenser». The anointment and censing are rituals involved in «purification-rituals». These rituals are building the main cult performance in the temple sanctuary.

1. Scene: A representation in the temple of Sethos I in Abydos, shows the king purifying the cult-image of Amen-Re: he is holding an *Ankh*-shaped liquid-jar (decorated by Lotus-bloom motif) with his left hand while touching the cult image with his right **[FIGURE 10, right].** This scene is representing one of the purification-rituals called «Purifying with water dispenser»[124]. The *Ankh*-shaped jar probably contains (*ḥknw*) «fragrant-oil», which I suggested to be a Lotus-Extraction.

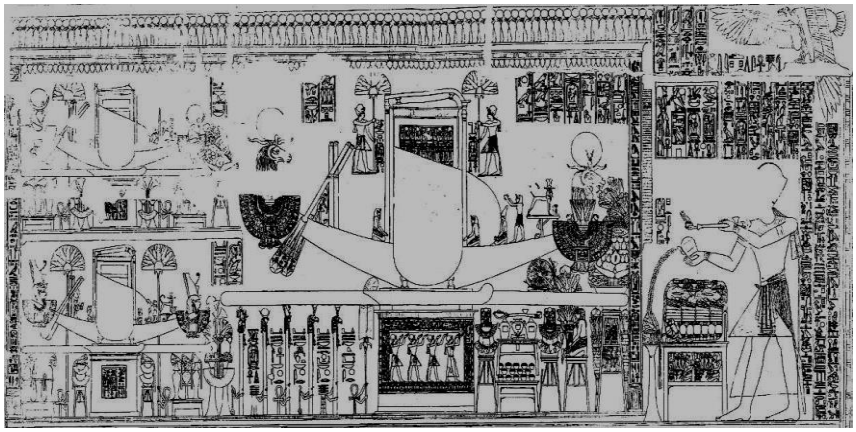
2. Typical Purification Ritual Scene: King Sethos I is holding a water dispenser with his right and an incense burner-arm *sḥtp*[125] with his left in front of the sacred barks of *Amen-Re*, *Mut* and *Khons* **[FIGURE 14]**[126]. The ritual of «burning incense on the flame» with the *sḥtp* burner arm is depicted several times in the temple cult. *Eberhard Otto* explained that the name of the burner device (*s-ḥtp*) means (causative) to «Satisfy», to «Gratify»[127]. I suggest it means that the ritual of burning incense, four times around the cult image, frees the image-owner from any evil spirit, which pleases and satisfies the deceased. The inscriptions accompanying the burning incense scene with the *sḥtp* device, reads: «the utterance of *ḫrj ḥbt* priest; *Sm*-priest, taking the *sḥtp*-burner arm; cleaning the N,

[120] KAPLONY 1963: vol.1, 312.
[121] HELCK 1968: 21, PL.25 &18 [PL.19].
[122] OTTO 1960: 130 , Scene 58.
[123] OTTO 1960: 131, Scene 59A.
[124] ALTENMÜLLER 1969: 23 , Nº.23.
[125] HANNIG 1995: 738.
[126] CALVERLEY & GARDINER 1938: vol.3, PL.6.
[127] OTTO 1960: 131.

four times; incense on the flame. Pure is Horus! He deifies him with the Eye-of-Horus. Purify yourself, N. Cense yourself with the Eye of Horus»[128].



[FIGURE 13]: King Sethos I anointing the serpent (*Uraeus*) attached to the Crown of the Osiris-Fetish of Abydos with his pinky right finger and holding the *Madjet* ointment jar with his left. Above the head of Sethos I are names of sacred oils inscribed. Temple of Sethos I at Abydos, Inner Osiris Hall: West Wall, First Section from North.



[FIGURE 14]: King Sethos I performing a «purification-ritual» in front of the barks-chapel Amen-Re, Mut and Khonsu. Chapel of Amen-Re, North Wall, Western Section. Temple of Sethos I in Abydos. CALVERLEY 1935: vol.2, PL.5.

3. Further scene depicts censing in front of the cult-image: The priest *ḥm nṯr* holds a burner arm in front of the cult image: «utterance of the lector priest; *Sm*-priest, circulate around N four times with incense on the flame. Oh, N! Take the Eye of Horus! His scent comes to you»[129].
4. A scene identical to scene Nº.2 (above), is in the temple of Sethos I in Abydos. In the Chapel of Amen-Re, Sethos I is performing a «purification-ritual». The king holds the incense burner-arm with his left while pouring water with *nmst*-jar with his right **[FIGURE 14]**[130]. It is interesting to see that the flowing water is refreshing the Lotus flowers placed on the offering stand (possibly *ʿḫ.t*: a pool for accumulating the flowing water[131]). A servant is depicted on the offering table and approaching with a jar bearing conical-shaped incense 𓏏 *t-ḥḏ* «incense in conical shape»[132]. The accompanied inscription

[128] OTTO 1960: 130 , scene 58.
[129] OTTO 1960: 131, scene 59A.
[130] CALVERLEY & GARDINER: vol.2, PL.5.
[131] Accumulator of the flowing water. HANNIG 1995: 157.
[132] HANNIG 1995: 912.

clarifies the ritual as  *ḥsj* «pouring-water»; the *Heset*-jar (*ḥst*) represents a specific jar-shape for pouring water[133]during purification rituals. The *ḥs.t* jar is made from metal and has been documented since the Old Kingdom[134]. The Lotus-flowers accumulated beneath the prow of *Amen-Re* bark invoke its spiritual life-breath, moreover freeing its way from any evil power **[FIGURE 8].** Another significant religious feature in this specific image will be clarified below. Beneath the carrying bars of the bark of Amen-Re are *nmst*- and *ꜥnḫy* jars aligned, topped by an incense burner-arm **[FIGURE 14]**. The burner-arm above the jars indicates that they contain water needed for «purification-ritual», because purification ritual scenes include pouring water and burning incense. Beneath the prow of *Khons*-bark, *ḥst* - and *ꜥnḫy* jars are aligned; the incense burner-arm is placed above the jars to indicate that they contain the water required for the «purification-ritual» **[FIGURE 9]**. Beneath the bow of *Mut*-bark are *Ankhy*- and *Ḥsj*- Jars with Lotus-bouquets **[FIGURE 9]**. In front of the prow of Khons-bark a Lotus-flower bouquet and a *Nemset*-water-jar are placed on a stand for the performance of the «purification ritual» aiming to defend the bark against evil powers. **[FIGURE 9]**. Beneath the bark of Khonsu are incense burner-arm and *Ankhy* water-disenser placed; oil jars decorated with Lotus flowers. Beneath the bark of Mut are many *Madjet* ointment jars and precious perfumes aligned.

Anointing the cult-image, handing-over oils, libation, censing, *Natron*-balls and pouring water form a group of rituals under the title of 'Purification-ritual'. A similar scene is represented in the cult-chapel of *Re-Harakhty*[135].

Hartwig Altenmüller clarified these scenes as «Purification-rituals», which were performed with a water dispenser and incense on the flame. Scenes depicting oil-offerings are mostly represented on the south wall of cult-chapels in the temple of Sethos I at Abydos[136]. The images of the gods are not only anointed, but they also receive ointments as gifts.

C. Religious Spells of Thoth for Ointments Preparation

According to instructions that Thoth himself gave, the ointments are prepared under the utterance of holy spells, which explains why they are full of secret powers. The oil heals and soothes wounds and damages. Oil and ointments bear divine power, and are equated with the *Udjat*-Eye of Horus. Thoth bears the epithet «Lord of the Divine Words» which signifies him as the «Lordship over the formulae of ritual and cult». Therefore, Thoth superintended the ritual ceremony. Thoth was the source of all such mysterious power contained in charms (fascinating formulae) and spells, and all invocations of the gods.

Thoth is «who has given words and script»[137]. The various oils used in divine worship were prepared according to the directions of Thoth. Even the incense was carefully prepared according to what we are told in the Temple of Sethos I in Abydos: «oil prepared according to the writings of Thoth which are in the library»[138]. I suggest that the

[133] HANNIG 1995: 557.
[134] *WB* 1971: vol.3, 154, 1.
[135] CALVERLEY & GARDINER 1935: vol.2, PL. 15.
[136] ALTENMÜLLER 1969: 22 [FIG.2], 23 [Nos.20, 23, 33].
[137] BOYLAN 1922: 95.
[138] BOYLAN 1922: 96.

secret spells were kept in the library attached to the temples, notably Horus-temple in *Edfu* and Hathor temple in *Denderah*; this kind of library is mentioned as «*Scriptorium*» located in the «House-of-Life», a building attached to the temple for «Life-regeneration» rituals. The laboratories, the beautiful place of «Kyphi» and «Wine» existed in the following temples: *Esna*, *Edfu*, *Denderah*, *Kom Ombo*, Isis temple in *Philae,* and the temple of *Athribis*.

D.Sacred Oils equated the Horus-Eye

«Amen-Re is the oil-fragrance of the Eye-of-Horus»[139]. Amen-Re was an overriding sovereignty, which let us understand that the «Eye-of-Horus» is divine and «Fragrant-Oils» are divine as well. «The oil of Horus unites its perfume with you». It means that the anointment-ritual endows a divine charm to the anointed image (through anointing the forehead) or person (anointment of the serpent at the king's crown). The anointed one shines; those who meet him are dazzled by the radiance emanating from his face. «The oil puts terror before him in the eyes of all spirits who see him or hear his name»[140] (Pyramid texts: 5). It opens the way to domination and power. This idea of triumph, power and domination let us equate the «ointments» with the «Eye-of-Horus». Hermann Junker explained the *Uraeus* at the forehead of Horus and Kings as «Power», which is equivalent to the power and function of «ointment»[141]. *Alexander Moret* suggests that the idea of «Triumph» and «Rise-to-Reign» of Horus also reflects the function of «ointment». «God *Geb* gives you his inheritance; you triumph over your enemies, you seize the crown before the gods on earth, *Upuaut* opens the way for your adversaries (enemies) ». «The brilliant oil of Horus burns for you, those who follow Seth».[142] This event is repeated to the anointed: «Come, take with it (the ointment) the crown according to the command of Horus himself»[143]. The oil gives power, so it creates pleasure. The oil-scent pleases not only people, but gods too; he bears the fragrance of the sun god[144]. Ointment and incense are considered as the «discharge-of-Ra». Horus-Eye means God's Eye, while ointments and incense are considered the discharge of Re.

E. The Scale of Anointing and Censing in Cult-image Rituals performed in the Cult-Chamber

It is necessary to know the scale of anointing- and censing rituals among the whole ritual order inside the sanctuary to demonstrate its importance. The ritual order of the gods' chapels in Abydos can be considered as a model for most rituals performed generally in the sanctuary. The course of the rituals, which are depicted in the internal images of the chapels of the gods in Abydos, are similar to the course of the rituals performed to the cult-image mentioned in Berlin-Papyri. The images could be considered as a template for rituals performed to the cult-image in the sanctuary:

[139] MORET 1902: 76f; BONNET 2000: 648.
[140] MORET 1902: 198.
[141] JUNKER 1917: 141; BONNET 2000: 648.
[142] BONNET 2000: 648; MORET 1902: 193 (note 4).
[143] CALVERLEY & GARDINER 1935: vol.2 , PLS.5, 15.
[144] MORET 1902: 76; CALVERLEY & GARDINER 1935: vol.2, PL.10; MERCER 1952: *Pyr.* 1802.

A) North Wall of the Cult-Chamber in the temple of Sethos I in Abydos: North Wall Scenes depict rituals preparing for the major ritual-moments on the South Wall.

1-Entering the region of the sanctuary.

2- Breaking the clay door-seal.

3-Pulling out the door-latch.

4- Opening of the two door-wings.

5- Look at the god.

6-Kissing the ground and prostrating.

7-Praising the God (four times) and «**censing**» while entering the chamber

8-Censing with «Censing-device».

9-Praising the forehead serpent (four times).

10- Censing the forehead serpent.

11-Entering the *«Naos»* (*ḫm*)[145]; Entering the Sanctuary (*st-wrt*).

12-Sweeping out the *«Naos»* (*pr-wr*).

13-Dissolving the ointment (referring to the previous performed rituals).

14- Loosening the robe

15-Laying the hands on the god's image.

16-*Purifying with incense on the flame and walk around four times.*

17-Purifying with four balls (pellets) of *bd*-Natron.

18- Purifying with incense on the flame.

19-Purifying with four balls of Upper-Egyptian Natron from *El-Kab*.

B) South Wall of the Cult-Chamber in the temple of Sethos I in Abydos

20-Purifying with four balls of Lower Egyptian Natron from *Wadi Natrun*.

21-Purifying with a water dispenser and with Incense.

22- Pouring Sand

23- Purifying with incense on the flame and walk around four times.

24-Covering the body of the cult image with *nms* –fabric[146].

25- Putting on the white robe.

26- Putting on the green robe.

27- Putting on the red robe.

28- Handing over the (*wsḫ*)-collar and the (*hɜdrt*)-pectoral.

29-Handing over the «Strip of Fabric» (*sšpt*)[147] and the «tassel» (*mᶜnḫt*)[148].

30-Presenting «Ruling-Staff» (*wɜs*), «Scepter» (*ḥḳɜ*), and «Shepherd Scourge» (*nḫɜḫɜ*).

31- Handing over «Oils».

33-Covering the cult image with the large robe.

34- Wiping the track-prints with (*hdn*) – fragrance brushwood and closing the door[149].

Summary of Cult-Image Rituals

It is noteworthy that before the actual coronation, which is the climax of the ritual, the offering of the holy oils and the anointing takeplace **[Scene 31]**. After all these ceremonies, the cult image is crowned and covered with a large cloak (32-33). *Finally, the king performing the rituals runs a perfumed fan through the chamber* [**Scene 34**]. *The fragrance emanating from the*

[145] HANNIG 1995: 599.

[146] *šmᶜr ḥᶜw m nms* «Clothing the body with *nms* –fabric» (a scene in the cult-image rituals). HANNIG 1995: 414.

[147] Cloth or dress of light color. HANNIG 1995: 763.

[148] As a counterweight on the back for a neck collar worn on the chest); (*rḏt sšpt mᶜnḫt*) = «Presenting the strip of cloth and tassel is a scene in the cult-image ritual». HANNIG 1995: 328.

[149] *Jnt rd m hdn jnt ᶜɜ* = «Wiping the track with brushwood and close the door» (a scene in cult-image ritual). ALTENMÜLLER 1969: 23, Nº.36; HANNIG 1995: 500, (*hdn*) is a plant from Nubia.

fan forces the god's enemies (evil spirits) to be driven out of the room, but it does not hinder the freedom of movement of the god incarnated in the cult-image. Then the chamber is closed.[150]

F. The Role of the Sacred Oils to invoke the Spirit «*Ba*»'

The rituals of the «Opening of the Mouth» magically bestows the spiritual «Life-Breath» and the ability to «speak» and «eat» upon either the statue of the deity or the mummified body (spirit) of the deceased. The order of rituals for the transfiguration of the spirit:

1-During the «Opening-of-the-Mouth» ritual the *Sm*-priest was accompanied by the »chief-lector-priest» who uttered the sacred texts during the performance of the rituals. The scenes representing the performance of '«Opening-of-the-Mouth» rituals using the *pssˇ-kf*[151] device document the role of the «Fragrant-Oils» and fresh «Lotus flowers» during the rituals. The ritual was intended to enable either the deceased or the temple statue to breathe through the fragrances of fresh lotus flowers, incense, and anointing oils, as well as to nourish him with food and drinks from the consecrated offerings on the temple altar or in the tomb. A common scene represents the mummified deceased wearing an «*mḏt* -ointment cone» with afresh lotus bloom attached to his head-band. The *Sm*-priest wearing the leopard skin is in attendance while the chief-lector priest utters the spells. Their fragrances were believed to invoke the deity's- or deceased's spirit.

2-Presentation of the offering altar accumulated with food.

3-*Ankh-ifying* Ritual: After invoking the spiritual life-breath with fragrant ointment and the *pssˇ-kf* the ritual of *ankhi-fying* follows: *The priest holds the «Life-sign» symbol ꜥnḫ (Ankh) at the nose or mouth of the deity, or deceased.* This action signifies the spiritual breath of life in his earthly sanctuary, or of the deceased in his tomb. In this way, they are «*ankh-ified*» (according to Pyramid texts) and transfigured into an effective being, the «Light», the *ꜣḫ (Akh)*. The (*Akh*) represented the deceased, who was transfigured to «Light». This «*Ankh-ified*» ritual is clearly expressed in the scene of the sacred bark of Amen-Re **[FIGURE 11]**: King Sethos I is shown burning incense on the flame of the burner-arm in front of the chapel of the sacred bark of Amen-Re. A lotus-flower bouquet is placed at the nose of the ram-headed prow, which is determined by «*Ankh*» life-sign.

G. Ointment Function Against the Evil Power of Seth

The «Sacred-Oils» endow the deceased's safety against any of Seth's evil effects. The inscription of the «Opening of the Mouth» ritual, reads: *Sm* priest and Chief lector priest utterance: «*I fill your eyes with ointment; I fill your head with ointment, which comes from the eye of Horus, in that his name, ointment. I put them on your forehead»!* I suggest that the ointment that comes from the «Eye of Horus», the God's Eye, let us understand that the «Sacred-Oils» are God's gifts. The *Udjat*-eye and the ointment both function against Seth and his followers. The scene's inscription continues:

«The bright eye of Horus, it cooks the entourage (followers) of Seth for you. (But) God Geb gives you his inheritance! You are safe from your enemies. You have seized the wrr.t (the Uraeus –serpent at the forehead

[150] ALTENMÜLLER 1969: 23-24.

[151] HANNIG 1995: 294.

of the king's crown) before the heavenly gods and the earthly humans. Upuaut, he opens the way for you against all your enemies. The Eye of Horus is kind to you! I put it in front of you and behind you (probably incense)! The eye of Horus on the forehead ofN (probably ointment)! Four- times»[152].

The lotus flower incarnated in god Nefertem is considered as «Giver-of-Fragrance». God Nefertem, the lord of the sacred oils, is merging itself with *Ḥr-Ḥknw*, the warrior falcon god, who triumphed against Seth. The Lotus flower that closes its petals at night and withdraws under water to re-appear in the morning from the primeval ocean «Nun» resembles the sun-god, who emerges from the primeval ocean «*Nun*» every morning. The lotus-flower was a symbol of the rising sun. The sun drives out the darkness and thus preserves itself as an enemy of Seth, in whom they are embodied. The combative Horus nature of the victorious god of light, «Re» remains stronger than his role as the «son of Isis». Horus appeared to join other warlike falcon gods such as Month, Sopdu, Harmerti, and Hor Hekenu. Nefertem showed particularly close association with these gods under the formula Nefertem-Hor-Hekenu.

Thus friendly and violent features are united in «Nefertem». He is the light child of the sun and a strong lion who destroys enemies. The bringer of light fights the forces of darkness. Even his role as a dispenser of fragrance conforms the same line, because ointments and oils keep evil away[153].

The last scene in the cult-image rituals is cleaning the cult-chamber against any evil thing: «The king runs a perfumed fan through the chamber» [**Scene 34**]. The fragrance emanating from the fan drives the god's enemies out of the room, but it does not hinder the freedom of movement of the god incarnated in the cult-image. Then the chamber is closed[154].

IV. THIRD PART: THE RELATIONSHIP BETWEEN SACRED OILS, *URAEUS*, HORUS EYE AND *NESHMET*-BARK OF OSIRIS

A. The *Neshmet* Bark-Lotus Bloom-Serpent and Horus as Theological Unit

The oil-magazine list depicted in the tomb of *Niankhkhnum* and *Khnumhotep* in Saqqara represented six ships symbolizing the six groups of listed oils **[FIGURE 2].** Two ships have lotus bloom at the bow and stern, identifying the groups of precious imported oils. A similar representation in the Great Temple of Hathor in *Denderah* (Chamber of *Ḥr-Smɜ-Tɜwy*) depicts a canoe with its bow shaped as a lotus bloom **[FIGURES 2 & 15]**. Inside the bark is a lotus-bloom placed in its center, with a serpent coming out of the flower; behind is the falcon god Horus **[FIGURE 15]**[155]. In front of this group, the king offers a small ship with a group of falcons perched on standards. The parallel scene represents a specific festival date which is recorded at the back of the falcon Horus. This canoe probably represents the Sacred «Bark-of-Osiris» (*nšm.t*) in Abydos[156]. It was the ship in which the

[152] OTTO 1960: 123.

[153] BONNET 2000: 509-510.

[154] ALTENMÜLLER 1969: 24.

[155] MARIETTE 1870: vol.2, PL.49.

[156] *WB* 1928: vol.2, 339, 15, 17.

deceased wished to navigate to Osiris-Paradise (*Peker*), **[FIGURE 17]**[157]. The bark was considered «the mistress of eternity» (*nšmt nbt ḏt*)[158]. This specific ship appeared in many Theban Tombs with inscriptions revealing the deceased's wishes to join Osiris in his Paradise (*Peker*) and to become a member of his entourage in the afterlife[159]. The «*Neshmet*-bark» scene with related garden pictures differs from the «Journey to Abydos» images, which depict «Sailing-Ships» with large crews rather than the theological canoe with the tomb owner and his wife alone[160].

The word  *Pḳr* means «the district of Osiris' Tomb». It is the district where a certain festival has been celebrated concerning the heavenly «ascension of Osiris»[161]. According to *Heinrich Schäfer*'s hypothesis, the word *pḳr* denoted a species of tree. The place name is therefore to be understood as «the one with the *Peker* trees»[162]. On the other hand, there is a word *pḳr*, which means the «fragrant substance in *Kyphi* preparation»,  or  [163].  [164] (*Pḳr n mrḥt*), likely means the «precious fragrant substance» (*Peker*) of the Seven Sacred oils; this was mentioned generally as «*Merhet*». The serpent determinative of the word *Peker* resembles the *Uraeus*  at the forehead of the kings and deities; both were divine features. Otherwise, we have to remember that the word (*Peker*) was mentioned in funerary prayers included in private tombs, when the tomb owner wishes to join Osiris in his Paradise *Peker*. A stele in Cairo Museum CG 20561 is inscribed with offering formulae and then subsequently a «festival-list» including the festival name  *ḏ3.t nṯr r pḳr* «Navigation of the God to *Peker*»[165]. An inscription explaining the festival of Osiris, reads: «*I held a procession of Upuaut when he went to avenge his father. I have rejected the rebels against the Neshmet-bark. I have crushed the enemies of Osiris. I organized the great procession following the god in his steps. I let the ship of God sail while Thoth regulated the voyage*»[166]. This inscription indicates «the ascension of the god Osiris to the heavenly spheres», while Thoth the journey across the sky regulated[167].

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[157] WILKINSON 1983. www.metmuseum.org/art/collection/search/557808. Accessed on 14/10/2022.

[158] HANNIG 1995: 435.

[159] ASSMANN 2011: 108, FIG.128 & 111 , FIG.131.

[160] SHEDID 1994: 69 [PL.114].

[161] *WB* 1926: vol.1, 561, 6.

[162] SCHÄFER 1904: 107-110.

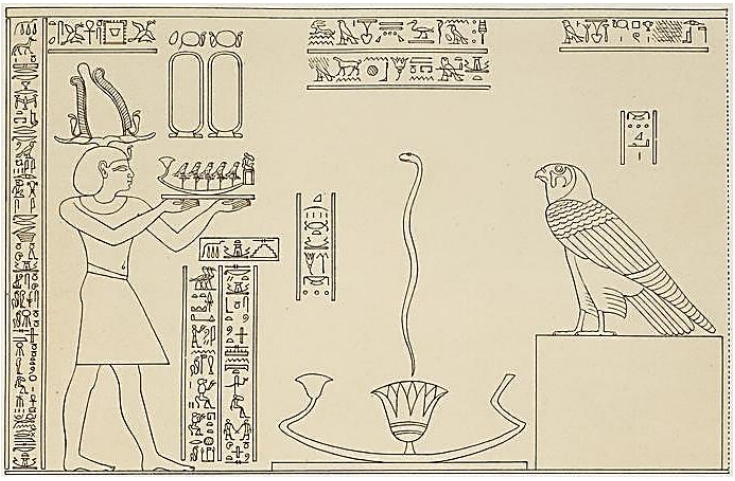
[163] *WB* 1926: vol.1, 561, 10.

[164] *WB* 1926: vol.1, 561, 11 (officially used).

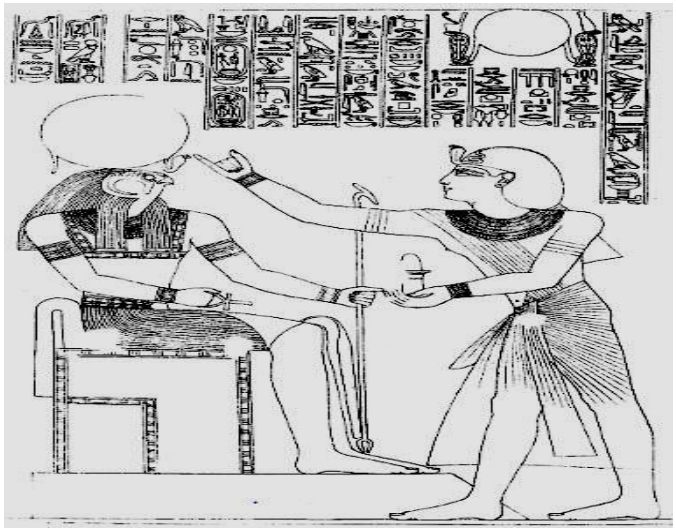
[165] VÉGH 2021: 212.

[166] VÉGH 2021: 232.

[167] SCHÄFER 1905: 26f.



[FIGURE 15]: King performing an offering ritual in front of the falcon god Horus, the *Uraeus* serpent *wrr.t* , *Neshmet*-bark of Osiris and the Lotus bloom. Hathor Temple in Denderah, Sanctuary: Chambre V. [*Ḥr-Sm3-T3wy*].



[FIGURE 16]: King Sethos I anointing the serpent (*Uraeus*) attached to the crown of Re-Harakhti with his right pinky finger, while holding the *Madjet* ointment-jar with his left. Temple of Sethos I at Abydos, Chapel of Re-Harakhti: North Wall, Western Section.

CALVERLEY & GARDINER 1935, vol.2, PL.15.

[FIGURE 17]: Pilgrimage to Abydos: The Neshmet-bark carries Userhat and his wife to Abydos. They are performing adorations to the gods Osiris and Anubis. Userhat was the first Prophet of the royal «Ka» of King Thutmosis I; he lived under the reigns of Horemheb, Ramses I and Seti I. Facsimile Norman de Garis Davies (1909-1910), Metropolitan Museum, Gallery 135, Userhat and his Wife visiting Abydos (*Peker*), Tomb of Userhat, Theban Tomb 51 (West-Thebes).

Otherwise, the *Neshmet* bark festival seems to be related to the «annihilation of the enemies» which is similar to ointment's function. The stele dating to the 1st Intermediate Period equates the god who navigates in the *Neshmet* bark as the «Great God, Lord of the Sky» *nṯr ꜥ nb pt* (Cairo CG 1622)[168]. This inscription confirms the idea that (*Peker*) is the «Paradise in heavenly spheres» where Osiris dwells. The four features: the Neshmet bark of Osiris; the sacred oils headed by Lotus flowers; Uraeus; and Horus' Eye are heavenly features loaded with divine power and functions against evil Seth's evil powers.

A funerary scene depicts Userhat and his wife wearing fragrant ointment cones and smelling fragrant substance filled inside a small jar. The tree-goddess pours them water, while the «*Ba*»-bird spirits stand on a heavenly water-pond, possibly the heavenly afterlife **[FIGURE 18][169].**

[FIGURE 18]: Userhat and his Wife Receiving Offerings: The high priest Userhat, his wife and mother seated in a garden receive fresh water, figs and bread from the tree-goddess of the sycamore fig, the *Ished* tree. The goddess appears in human form with a diminutive tree on her head. Her guests are wearing fragrant cones, lotus-blooms and smelling fragrant substances. Norman de Garis Davies, Original. New Kingdom, 19th dynasty, reign of Seti I, ca. 1320-1279 BC.

[168]VÉGH 2021: 151.

[169]WILKINSON 1983: MET 30.4.33. www.metmuseum.org/art/collection. Accessed on 14/10/2022.

B. Anointing the Forehead and Anointing the *Uraeus*  *jʿr.t*

The ritual of the «*anointment-of-the-forehead*» of the deity and the deceased aims to endow the «breath of life» needed for invoking the spirit **[FIGURE 10, left]**, while the anointment of the serpent, the «poisonous cobra» (*Uraeus*) at the forehead of kings and gods invokes the spirit of the creator god *Atum-Re* as a protective power **[FIGURE 16]**. This protective power of the serpent was equated with the Horus-Eye; both were divine features functioning according to the instructions of Atum-Re. In the Pyramid Texts, the cobra (*Uraeus*) *ḥryt-tp* is described as a solar defensive unit, who sprays fire against enemies[170]. The cobra had been identified with Horus as defeater of enemies[171].

A scene in the Hall of Osiris, in the temple of Sethos I at Abydos, depicts Sethos I anointing the *Uraeus* of the «Abydos-fetish of Osiris» with *mḏt* ointment, using his right pinky finger, while Isis blessing the anointment of the Abydos-fetish **[FIGURE 13]**. The Lotus bloom and *nmst*-jars placed on a stand in front of Isis are indicating the blessing of the performance of «Purification-Ritual» **using water dispenser and sacred oils**. Above the head of Isis sacred oils are listed *Sft*, *Nḫnm*, *Twɜt*. Over the head of Sethos I further sacred oils are inscribed, as *ḥɜtt nt ʿš*, *ḥɜtt nt Ṯḥnw*, *bɜk*, *jbr*, *mḏt*. In front of the king are five *mḏt* ointment jars placed on a stand. Another scene depicts king Sethos I anointing the serpent at the forehead of *Re-Harakhty* **[FIGURE 16]**.

Uraeus is the Latinized form of the Greek *Ouraios*, undoubtedly taken from the ancient Egyptian word with the cobra determinative *jʿr.t*, translated as «the sacred serpent»; «the serpent at the forehead of the king»[172]. A scene in the cult-image ritual has the following inscription: *tɜ*-365 *n nṯr jʿrt ḥr tp.f*, 'the 365 divine *Uraei* are on his head (of Osiris)[173]. An extended translation is «the risen one», because of the poisonous snake that rears up menacingly with a bloated neck. The statements about the function of the serpent are largely the same. She glows and annihilates enemies with the glow of her fiery breath.

The *Uraeus* is considered as «the sun's eye» (the sun god Re as overriding sovereignty), both function according to the instructions of the creator-god Atum-Re. It means that kings and deities are gifted with a part of the overriding sovereignty's might through the poisonous *Uraeus*, which resists any evil power. Her violence is terrible and she resists any abuse. A coffin text belonging to a powerless deceased desires to be «transformed into the fiery Eye-of-Horus», created directly «from the fire of radiance» under the hand of Re, who gave her appearance and beings[174]. I suggest that the *Uraeus* is a part of god's *Re* might; the Horus-Eye is a part of the overriding sovereignty's (*Atum-Re*) might as well.

The cobra's importance is explained by the *Bremner-Rhind-Papyrus*[175]: The creator god Atum, while formless in the primeval waters, delivered an utterance which gave form to the visible world. He created *Shu*, «air» and *Tefnut*, «moisture». *Atum* uttered «… so I promoted it (the cobra) to the front of my face, so that it could rule the whole world»! Thus

[170] WAHBI 2001 :33.
[171] WAHBI 2001 **:**152.
[172] *WB* 1926: vol.1, 42, 1-3.
[173] HANNIG 2000: 31.
[174] BONNET 2000: 845.
[175] FAULKNER 1964 (British Museum 10188): 22ff.

the cobra became «Eye of Atum» loaded with power and might be used to protect gods against the formlessness in the abyss of chaos, and to protect kings against evil enemies in the created world. The creator god *Atum* satisfied the eye, which had become a cobra, by placing it on his forehead as the *Uraeus jʿrt* «the Risen One», which guards the crown[176]. The *Uraeus* at the foreheads of kings and deities are a spiritual power of the overriding sovereignty *Atum-Re*. In the Pyramid Texts the cobra goddess is mentioned as *wrt-ḥkꜣ*, «Great of Magic, who rises on the forehead of Horus»; *sby*, «guide serpent», «watch over»[177]. *Sbj* could also mean «perish the enemies»; «burning incense on the flame» (the wicked who are burned)[178]. The essential names of the *uraeus* are: «*ꜣḫt*», «Eye-of-the-God», «Flame», «Spirit» and «glorious»[179]. The *Uraeus* can also mean «power of a god» and «magic power»[180] or (*tjt ꜣḫt*) «glorious part of the king»[181]. I suggest that the fragrant ointment invokes the glorious god's spirit (*Atum-Re*) dwelling in the *Uraeus* who acts against enemies and evil powers. Another name of the *Uraeus* mentioned in the Pyramid Texts is *nsrt* which means «Royal Serpent», «Flame of the *Uraeus*», «the flame against king's enemies»[182]. *Nsr.tj* is documented in the «Book of the Dead» as a designation of «Horus»[183]. This word equates the *Uraeus* to the «Horus-eye» which has the same magical power as the creator god «Atum-Re». The cobra goddess is also named *tfnt*[184]; it is addressed as the «Eye-of-Re» and the «Eye-of-Horus»[185].

From the Middle Kingdom «Hymns to the Diadem», ca. 1650-1550 BC: «Praise to thee, O Eye of Horus, which did cut off the heads of the followers of Seth. She trod them down. She spat at the foes with that which came forth from her. Her might is greater than that of her foes –in her name of Mistress-of-Might. The fear of her is instilled into them that famed her – in her name of Mistress-of-fear»[186].

A chant to awaken the royal serpent (the following chant was probably sung by Egyptian women or priestesses): «Awake in peace! Great Queen, awake in peace; Awake in peace! Snake that is on the brow of the king N, awake in peace; thine awakening is peaceful». The *Uraeus*, «the risen one» is consistently associated with Horus. Her raised head and expanded hood are threatening and powerful. She is protecting the king[187].

[176] JOHNSON 1990: 6.
[177] JOHNSON 1990: 7.
[178] *WB* 1971: vol.3, 430, 9-10; 18-21.
[179] JOHNSON 1990: 7.
[180] *WB* 1926: vol.1, 15, 4-6.
[181] *WB* 1926: vol.1, 14, 15.
[182] JOHNSON 1990: 8.
[183] *WB* 1928: vol. 2, 320, 6.
[184] FAULKNER 1964: 298.
[185] JOHNSON 1990: 8.
[186] JOHNSON 1990: 10f.
[187] JOHNSON 1990: 11.

Gods associated with Fragrant Oils

Nefertem-Hor-Hekenu

Ḥknw seems to be the extracted oil of the Lotus-flower, and refers to his warrior function against Seth. *Nefertem-Hor-Hekenu* was the god «dispenser of fragrance» that keeps evil away[188]. The Lotus is known as the sacred lotus for its purity and ability to regenerate itself every morning. The lotus rises from the mud without stains, symbolizing purity. The lotus flower was the emblem of the god *Nefertem*; he was worshiped in the form of a lotus flower[189].

Nefertem-Re

The Pyramid texts indicate the relationship between the lotus flower and the sovereignty of *Re*:

Pyr. 266a. «N. appears as *Nefertem*, as the flower of the lotus at the nose of Re»; 266b. «as he comes forth from the horizon every day; the gods purify themselves, when they see him»[190]. The Lotus-flower that incarnated god *Nefertem* is considered a «Giver-of-Fragrance».

Ḥr-ḥknw–The connection between the god *Horus* and *Hekenu*, the warlike falcon god, invokes the struggle between Horus and Seth. *Nefertem*, the lord of fragrant oils, merged himself with the falcon god Horus-*Hekenu*, in his warrior form. This significant function of Horus against evil explains the role of «oils and ointments» that heal and regenerate wounds and damages. Oils are equated to «light», while Seth is equated to «darkness».

Horus-Eye

The Horus-Eye and ointments are symbols acting against the evil function of Seth. The *Udjat*-Eye is described as the «God's Eye», while ointments as «Ointment-of-the God» (*stj-nṯr*). *snṯr* is written with causative (*s*) and (*nṯr*), «god», which means «to make a place divine» with the smoke of the fragrant gum.

[188] BONNET 2000: 510.

[189] BONNET 2000: 509.

[190] MERCER 1952: 266a, b (Utterance 249).

V. Conclusion

Ancient Egyptians expressed the divinity of fragrant oils in their inscriptions and rituals. Papyrus Salt mentioned that the oil *sfṯ* is «from the fallen blood of the god *Geb*». «When Horus weeps, the water that falls from his eyes turns into the «gum (*ʿntjw*) myrrh». *Geb* lets blood fall from his nose, which turns into «cedar trees», and « (*sfṯ*)-oil». When *Shu* and *Tefnut* weep copiously and let their tears fall to the ground, the tears change into plants that produce «incense». The sweat that falls from the members of *Ra* when he is weary turns into the water-flood, and the water that flows from him when he is exhausted turns upon earth into papyrus plants (*ṯwfj*) »[191]. «Every herb or plant or substance that was used in magical ceremonies was believed to be of divine origin». «The sweat of *Isis* and *Nephtys* when they are weary becomes «*ḏꜣs* plants», while the blood that falls from Seth rises up in the form of the « (*nʿr.t*)-tree» of the East».

Pyramid Texts expressed clearly the healing power of the sacred oils. It illuminates the face of the deceased and provides him power to put fear in the eyes of his enemies. It removes all evil discharges which indicate the removing of bad mood. Sacred oils are equated with the Eye-of-Horus which reflects its highly honored position in Ancient Egyptian Religion.

The anointment of the cult-image occupied the most important part among the group of rituals performed in the sanctuary. The scenes represented this essential ritual by showing the king or the high priest anointing the forehead of the deity with his right pinky finger. The offering or the handing over ointment jars could substitute the anointment itself. The Litany of Sacred Oils was uttered during the ritual.

Sacred oils took place in the funerary ritual of the «Opening-of-the-Mouth». The anointment of the forehead of the deceased with fragrant oils aimed to invoke the spiritual life-breath of the deceased to permit the transfiguration of the spirit «*Ba*» into light «*Akh*».

The location of the sacred oils scenes occupied the south wall of the deity chapel and the southern section of the west wall, which was the area of the «false-door». The Lotus-flowers bouquet placed in front of the sacred bark of Amen-Re was determined by *Ankh* (Life-sign) to express the function of the fragrant Lotus bloom as method for invoking the god's spirit.

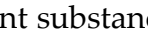
Censing, pouring water, handing-over oil jars and anointments were rituals included in «Purification-scenes».

The sacred ointments were prepared under the utterance of holy spells, according to the instructions of Thoth. This explains the reason that sacred ointments used in rituals were secretly prepared in temple laboratories such as Horus temple of *Edfu*, Hathor temple in *Denderah*, and Isis temple in *Philae*.

The poisonous serpent (*Uraeus*), attached to the crowns of deities and kings, was loaded with holy power derived from the creator god *Atum*. It was mentioned in *Bremner Rhind* Payrus as the «Eye-of-Atum», which could rule the whole world. The anointing ritual of the *Uraeus* aimed to invoke its spiritual power to protect deities and kings against evil powers and Seth. The fire-breath of the serpent should burn the followers of Seth.

[191] This explains the reason for the existence of Papyrus-plant inside the *Neshmet*-bark of Osiris [Pl.15].

A significant religious relationship between the Lotus-bloom, *Neshmet*-bark of Osiris, the serpent (*Uraeus*), and god Horus appeared in two scenes depicted in the chambers called (*Ḥr-Smꜣ-Tꜣwy*) located around the sanctuary of Hathor-Temple at *Denderah*. These scenes are representing a specific festival concerning the «ascension of Osiris» into heavenly spheres. A stele in Cairo Museum CG 20561 is inscribed with offering formulae and a «festival-list» including the festival name  *ḏꜣ.t nṯr r pḳr* «Navigation of the God to *Peker*». This festival inscription is recording «the heavenly ascension of God Osiris». It means that Osiris-bark *Neshmet*, sacred oils titled by its lord «Lotus-bloom», the poisonous serpent (*Uraeus*) and Horus were heavenly features, loaded with magical powers against Seth and his followers.

The word «*Peker*» is expressing two meanings: 1- «Paradise-of-Osiris» in heavenly spheres. 2- «Fragrant substance in *Kyphi* preparation»,  or  .  (*Pḳr n Mrḥt*) that probably means «the precious fragrant substance (*Peker*) inside the Seven Sacred oils», which were generally named as «*Merhet*». I suggest that fragrant oils are divine features sourced from the heavenly paradise where Osiris is dwelling. The fragrant oils are able to invoke the *Neshmet*-bark spirit, which seems to help with the «annihilation of the enemies».

The word (*snṯr*) «censing» is including the terminology of «god» (*nṯr*), and the causative (*s*) which gives the meaning of «making a place divine». The smoke of this divine gum is purifying the spheres.

Egypt could not support its high oil consumption with its own production, but was dependent on foreign imports. Oil imports from Lebanon, Syria, Libya and Nubia have been documented since the 1st dynasty.

The large number of elaborate oil jars found in subterranean corridors beneath the *Djoser* Step-Pyramid, which belonged to earlier graves of the archaic period, are evidence for the religious importance of the «Sacred-Oils» since the 1st dynasty.

The deity *Nefertem-Ḥr-Ḥekenu* is merging friendly with violent features. Nefertem was the lord of sacred oils that bears regenerating and illuminating functions. When merging with the combative *Ḥr-Ḥknw*, it reveals the warrior function against Seth and evil powers.

Ancient Egyptians extracted vegetable oils from the seeds and fruits of various plants. The main oils mentioned in lists and inscriptions include: *sfṯ*, *jbr*, *ʿḏnt*, *ḥꜣtt- ṯḥnw*, *ḥꜣtt-nt-ʿš*, *jb-sꜣ*, *jdt-nṯr*, *ḥknw*, *ḏꜣs-šmʿj*, *stj-nṯr*, *snṯr*, *mḏt*, *stj-ḥb*, *nḫnm*.
The Seven Sacred Oils were: *Stj-ḥb*, *Ḥknw*, *Sfṯ*, *Nḫnm*, *Twꜣt*, *Ḥꜣtt-nt-ʿš*, *Ḥꜣtt-nt-Ṯḥnw*. An Old Kingdom stone palette mentions seven depositories for the seven sacred oils to be used in anointment-ritual of the cult-image. During the New Kingdom emerged additional names for the «Sacred Oil»: *mḏt*, *jbr*, *bꜣk,ʿntjw*. The Sacred Oil (*Ḥknw*) seems to be the extracted oil of the Lotus blossom.

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II. Islamic Studies

THE DATING METHOD OF NAPOLEON BONAPARTE ON A GOLD COIN OF SELIM III AND WHAT IT REFLECTS

BY

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ABSTRACT

[AR] **طريقة التأريخ الخاصة بنابليون بونابرت على نقد ذهب لسليم الثالث**

يعتبر نابليون بونابرت أحد أشهر الشخصيات التاريخية العالمية، والذي غزا مصر بحملتة الفرنسية في فترة حكم السلطان العثماني الثامن والعشرين السلطان سليم بن مصطفى. وعلى الرغم من قصر مدة الحملة الفرنسية التي كانت قرابة ثلاث سنوات فقط، إلا أنها شكّلت نقطة تحول في تاريخ مصر حتى بعد انسحابها ، خاصة وأنها كانت تمثل أول غزو أوروبي على مجتمع اسلامي متمسك بقيمه وعاداته. أما فيما يخص السياسة النقدية التي كانت متبعه في مصر وقت مجيء الحملة الفرنسية، فهي نفسها التي عرفت في مقر السلطنة العثمانية باعتبار مصر ولاية تابعة لها، وبالتالي كان الزر محبوب النقد الذهبي الرئيسي للدولة. وتأتي أهمية النقد الذهبي قيد الدراسة من كونه مصنف على أنه عملة نادرة ضربت في فترة وجود بونابرت في مصر، خاصة وانه قد تم ضربها في العام الأخير من الحملة الفرنسية. ومن خلال دراسة طريقة التأريخ التي سجلت على هذه القطعة من منظور جديد ، فقد عكست ما كان يعرف عن نابليون بونابرت لموهبته في الدهاء السياسي ، وشخصيته الجاذبة ، وعقليته الحكيمة. فقد تبنى نابليون بونابرت سياسة الاقتراب من الشعب لتلبية أغراضة الخاصة، خاصة وانه كان يدرك مدى أهمية الرأي العام. هذه الأغراض في مصر كانت اقتصادية في المقام الأول، وليست السيطرة السياسية. كان هذا واضحًا من خلال الاتجاه الذي اتبعه في سك العملات المعدنية، بينما كانت مصر تحت سلطته. لذلك ساعدت الدراسة التحليلية للعملة في تأكيد نواياه الحقيقية ، وعكس وتأكيد سمات شخصيته الرئيسية.

[EN] One of the world's most famous historical figures was Napoleon Bonaparte, who conquered Egypt with his French expedition in the reign of the twenty-eighth Ottoman Sultan Selim B. Mustafa, known as Selim III. Despite the short presence of the French expedition, approximately three years only, it marked a turning point in Egypt's history even after its withdrawal. It was considered the first modern European conquest into the heartlands of the Islamic World, on an Islamic community that adhered to Islamic customs and values. Regarding the monetary system of Egypt at the time, Egypt abided by the trend of the Ottoman Empire in minting gold coins, as it was notable that there was a unified prototype for all Ottoman coins minted in the different Ottoman countries. Therefore, the main gold coin by this time was the Zeri Mahbub. The specimen investigated in this study is classified as a rare coin minted by Bonaparte, as it was minted in the last year of the French expedition. Studying its dating method from a new perspective reflected what was known about Napoleon Bonaparte regarding his political savvy, charisma, and smart thinking. Napoleon adopted a policy of getting closer to the people to achieve his main goals, which were primarily economic rather than aiming at political control. His manner was evident in the trend he followed in minting coins while ruling Egypt. Therefore, the analytical study of the coin helped demonstrate his real ideological intentions and reflect his primary personality traits.

KEYWORDS: Dating method, personality traits, Napoleon Bonaparte, Selim bin Mustafa, Zeri Mahbub.

I.INTRODUCTION

«There are but two powers in the world, the sword, and the mind. In the long run, the sword is always beaten by the mind»; is a quote from Napoleon Bonaparte that hints at a glimpse of his ideology. During the reign of the twenty-eighth Ottoman Sultan Selim B. Mustafa (1203 AH/1789 AD, until 1222 AH/1807 AD), known as Selim III[1], the French Expedition concurred Egypt on 17 Muharram 1213 AH /2 July 1798 AD, when Napoleon Bonaparte[2] arrived to Alexandria and effortlessly occupied it[3]. The opportunity started to be handed when Sultan Selim attempted to take some actions for the progress of his country and its construction by sending a request to France, calling for engineers, officers, and proficient artificers[4]. At the same time, the French community in Egypt always complained to its home government about the treatment of the Mamluks and their tyranny towards the French, prompting Napoleon to claim that he brought the expedition to Egypt to discipline the Mamluks and protect his nationals[5]. After the battle of Abukir, Bonaparte was trapped in Egypt because of the British blockade. Therefore, he decided to conquer Egypt, establishing a French colony on the Nile which would prosper and serve France[6].

In light of such political events, one would expect that the Ottomans would have done their best in Egypt to abolish the Mamluks and control the country more. Surprisingly, they seemed to have made no real effort to gain power because the Mamluk system survived. They even increased their power. In fact, it is logical to argue that they would break away from Ottoman control and Napoleon would not invade Egypt.

Concerning the primary goal of Napoleon in Egypt, it was to achieve economic purposes, including obtaining a distinguished position in the Middle East due to Egypt's geographical location, where a canal could be built between the Mediterranean and the Red Sea, which would bring France a huge financial profit from imposing taxes on pedestrians[7]. Therefore, the main objective of taking over Egypt was not political control, but the realization of economic benefits.

The duration of French occupation in Egypt lasted approximately three years only when a peace treaty was concluded between Bonaparte and the Ottoman Empire on the first of Jumada al-Akhra 1216 AH/the ninth of October 1801 AD, stipulating that the French soldiers would retreat from Egypt and it shall be returned to the Ottoman Empire[8].

It is worth noting that the short French occupation of Egypt greatly impacted subsequent events in Europe. It also impacted the history of Egypt. It was considered the first modern European raid on an Islamic community that adhered to its customs and

[1] Selim III was one a son of Sultan Mustafa III. His reign was distinguished by the strife that took place in Egypt, which indicated the weakness of the Ottoman Empire. YUNUS (N, D): 135.
[2] Napoleon Bonaparte was born in Corsica Island in France in 1769 AD and died in 1821 AD. He was the emperor of France from 1804 AD to 1815 AD. LAROUSSE 1973.
[3] FARĪD BYK 1896: 180.
[4] AL-ṢERFĪ 1908: 150.
[5] LIHYṬH 1944: 56.
[6] COLE 2007: 20.
[7] LIHYṬH 1944: 56.
[8] FARĪD BYK 1896: 185.

values. In addition, the French expedition had a direct impact on the history of Egypt even after the French withdrawal, as among the Ottoman forces that were sent to confront the French was an officer named Muhammad Ali Pasha, an Albanian military commander of the Ottoman Army- who seized power in Egypt. By working to gain popularity for himself, Muhammad Ali Pasha succeeded in becoming the governor of Egypt in 1220 AH/1805 AD[9]. His reign was a turning point in Egypt as he built an economic and political foundation[10].

II. Descriptive Study

Throughout the Ottoman era, Egypt abided by the trend of the Ottoman Empire in minting gold coins. It was noticed that there was a unified prototype for all Ottoman coins minted in the different Ottoman countries, based on the decree which was sent whenever a new Sultan took the throne[11]. The main gold coin in Egypt at the time of the French arrival was the Zeri Mahbub[12] alloyed with silver[13]. It was estimated at sixteen and three-quarters carats[14].

Before the French expedition, the mint was managed by a person appointed by the Ottoman sultan himself, and the coins were minted by the governor (pasha) of Egypt, and dated by the accession date of the Sultan on the obverse, along with the regional year of the ruler[15] inscribed among the inscriptions of the reverse. After the French invasion, the coins were minted in the Cairo Mint under joint French-Egyptian supervision[16].

During the era of the French expedition in Egypt, the main patterns used in minting gold coins did not change from how they had been since the beginning of the rule of Sultan Selim III, considering that the expedition came to Egypt in the last years of this Sultan's rule. Thus, it was logical not to change the form or pattern used in the coin mint, especially since that change must go through stages to ensure that it did not confuse monetary transactions in the markets[17]. Significantly, Napoleon Bonaparte followed the same method of dating that prevailed before his presence[18].

These facts were reflected in the specimen[19] under study **[Figure 1]**, which Napoleon Bonaparte minted in Egypt during the reign of Sultan Selim III. Its legends are as follows:

[9] Rmdān 2021: 366.
[10] Daly 1998: 70.
[11] Al-Sāwī 2001: 20.
[12] Zeri Mahbub: A gold coin, whose name consisted of two parts; the first is «zeri» which is a Persian word meant gold, while the other part was «mahbub», which means loved. It was also known as «Sequin», among the European traders. Bernard 2002: 66-67.
[13] Mūbārk 1889: 46.
[14] Bernard 2002: 181.
[15] Goussous N.D: 87.
[16] Blanchet 1908: 7.
[17] Arafa 2006: 31.
[18] Lane Pool 1883: 31.
[19] A Zeri Mahbub of Selim III, minted in *Miṣr* in 1203/14 AH, W.: 2.60 g., D.: 24 mm., Cond.: VF, scratches & clipped. This specimen is preserved in the private collection of Mr. George Lotfy.

	Obverse	Reverse
Field	طغراء السلطان سليم	
	فيـــــ	سلطان البرين
	بـــــــ	وخاقان البحرين
	عز نصره ضر	السلطان ابنـ
	مصر سنة	السلطان
	1203	
Margin	**A double circle with annulets in between**	

[FIGURE 1]: Zeri Mahbub minted in *miṣr* in 1203/14AH. Preserved in the private collection of Mr. George Lotfy.

This coin is distinguished in terms of its general form. The inscriptions on the obverse and reverse were in horizontal lines inside a prominent lined double circle with annulets in between. On the observe, the tughra[20] of Sultan Selim bin Mustafa is found, along with the date of ascending the Sultan to the throne in 1203 AH and the location of the mint *miṣr* for Cairo, which was usually preceded by the preposition «in», with the praising phrase «his victory is glorified». While on the reverse, the new Ottoman formula was added, stating: «the sultan of the two lands, and the ruler of the two seas, the sultan son of the sultan». This formula came after the expansion of the Ottoman power over many lands, so it came to show their dominance over the two lands of Asia and Europe and the two seas; the Black Sea and the Mediterranean. Also, the title sultan son of the sultan showed pride in the pedigree of the Ottomans.

The remarkable feature on this coin was the number «14», which comes over the letter «ن» of the word «ابن» in the third line among the inscriptions of the reverse, which represented the actual date of mint. This digit showed that the specimen was minted in the fourteenth year of Sultan Selim's reign, «1203+14-1=1216». As revealed, the coin under study was minted in 1216 AH, the last year of the French expedition; consequently, it is classified as a rare coin minted by Bonaparte.

[20] Tughra: it is the Sultan's signature or name in ornamental design, used on different official papers, documents, and decrees. It includes the sultan's name, title, along with a praising phrase. RMDĀN 2008: 410.

As for the amount of mint in Egypt during the thirty-three months, which was the period of the French seizure of the Cairo mint from the Zeri Mahbub, it was two hundred and sixty-one thousand seven hundred and twenty-one, which was about an average of seven hundred and fifty pieces per month[21].

III. Coin Interdisciplinary Analytical Study

The effective substantial implementation of taking over Egypt achieved by Napoleon came from his military knowledge, cunning, charisma, and distinguished thinking, which were fundamental to his victories. In one-on-one situations, he typically had a hypnotic effect on people[22]. His intellectual vigor was accompanied by a mixture of remarkable charisma and willpower[23].

These main personal traits which formed the character of Napoleon Bonaparte were reflected in the policy followed by Bonaparte in Egypt. This policy became clear through what was mentioned in some of the speeches he gave to the people, as it reflected the policy of getting close to them and aligning with their beliefs as much as possible. For instance, Bonaparte began his first sermon to the people in Egypt with the phrase: «In the name of the Lord the Most Gracious, the Most Merciful, there is no god but *Allah*, He has no son and no partner in His dominion». This decree was also interspersed with the phrase: «I, more than the Mamluks, worship Almighty Allah and respect His Prophet and the Holy *Qur'an*»[24]. These phrases showed how Bonaparte was keen on approaching the people by embracing their religious doctrine. In his propaganda, he claimed to act on behalf of Sultan Selim III, not on his own. Therefore, he tried not to change anything, not even the coins.

«بسم الله الرحمن الرحيم لا اله الا الله لا ولد له ولا شريك له في ملكه«...»وإنني أكثر من المماليك أعبد الله سبحانه وتعالى، وأحترم نبيه والقرآن العظيم»

Likewise, the political cunning and astuteness of Bonaparte were reflected in the events mentioned in contemporary historical sources. His personality was also evident in his approach to minting the coins during the expedition in Egypt. He did not mint foreign coins. Otherwise, Bonaparte continued to mint the same typical Arabic prototype of coins which were minted since the beginning of the reign of Sultan Selim III. Bonaparte adopted even the specific details of the dating method implemented by the former rulers. As revealed through the specimen published in this research, Bonaparte just recorded a number on the reverse that showed the specified year of minting the coin, dating back to his dominance.

Another dating method was also popular and implemented by the former rulers, namely engraving the initials of the ruler's name in the place of the number. Samuel Bernard mentions that there were pieces of gold coins that were minted at the time of the French occupation and were distinguished by the presence of the letter «B»[25]. Whereas,

[21] MŪBĀRK 1889: 49.
[22] JACK 1966: 187.
[23] PRICE 2014: 8.
[24] The events of 25 Muharam 1213 AH/9 July 1798 AD. AL-ĞABIRTY 2003: 4.

[25] BERNARD 2002: 121.

above the word «son», the letter «B» was minted, referring to Bonaparte, instead of the number that referred to the date of minting the piece[26]. This was proved by several pieces published in many studies[27], such as the following specimen **[FIGURE 2]**[28].

Obverse		**Reverse**
Field	طغراء السلطان سليم	
	فيـــــ	سلطان البرين
	بـــــــ	وخاقان البحرين
	عز نصره ضر	السلطان ابنـ ب
	مصر سنة	السلطان
	1203	
Margin	**A double circle with annulets in between**	

[FIGURE 2]: Half Zeri Mahbub minted in *mişr* in 1203AH, with the letter «B».

The phenomenon of engraving some letters on the reverse of Selim's coins appeared on many other specimens with different letters. The problem is to identify these initial letters, as some say that they are probably mint marks, while others argue that they may represent some official's name[29]. Bernard gave a detailed description of the Egyptian Mint in Cairo at the time of the French occupation in 1799 AD. He wrote Shaikh al-balad, or the governor of the country, which used to have their initials engraved on the coins[30]. For instance, some of Selim's coins had the initials «alf, seen»[31], which might refer to Ismail Pasha, who ruled Egypt between 1203 AH/ 1788 AD and 1205 AH/1790 AD [32]. Another letter is the «sad», which refers to Salih Pasha, who ruled between 1208 AH/1793 AD and 1211 AH/1796 AD [33]. During the French expedition, Bonaparte followed this method[34].

[26] BLANCHET 1908: 12.
[27] W.: 1.28 g., D.: 19 mm., Nº.860. KAZAN 1983: 383. For further examples of this prototype, see: LACHMEN 1977: 12; BERNET 1983; ARAFA 2006: 54-57.
[28] Preserved in the private collection of William Kazan.
[29] LACHMEN 1974: 221.
[30] LACHMEN 1974: 222.
[31] BALDWIN 2008: Nº.535.
[32] BERNARD 2002: 121.
[33] AL-SĀWĪ 2001: 76.
[34] LANE POOL 1883: 31.

Consequently, whether the letter B refers to Bonaparte or Bernard, the head of the mint during the French expedition, it represented the time of Bonaparte in Egypt, who was keen to follow the same prototype of Selim's coins even in the minor details; therefore, he did not engrave his full name on coins due to spatial restriction by the size of coins as the space on it would not be sufficient for this. Also, he wanted to emphasize that he ruled under the Ottoman Sultan.

Hence, minting the same prototype of Sultan Selim III by Napoleon Bonaparte reflected and emphasized his real intentions, which were economic in the first place rather than aiming at political control. If it was for political control, coins had to be minted on the French prototype, especially since coins represented the most important emblems of kings and sultans that rulers were keen on immediately obtaining after holding power.

Therefore, the dating method conducted by Napoleon Bonaparte on the coins he minted in Egypt during the French Expedition shows his masterful, brilliant, and cunning traits. He was keen to embrace the people, even by the smallest details, by following the same popular trend of dating on coins, especially since he comprehended that coins were the main means of communication between the ruler and people through which he transmitted the principles of his reign and the foundations upon which it was based. He could reach for them by the mind and not the sword, as he said.

IV. CONCLUSION

In conclusion, the analytical study of this rare piece minted during the last year of the French expedition in Egypt revealed that studying coins from an analytical perspective and connecting them to the historical, contemporary events helped in clarifying the real intentions of Bonaparte which were economic in the first place rather than aiming at political control. If it was for political control, coins had to be minted on the French prototype.

Conducting the analytical study more profoundly helped reflect Napoleon's personality and emphasize some of his main traits and ideologies. Following the same popular former trend of dating on coins, he emphasized his social intelligence. Thus, studying coins can be connected to personality psychology and may help determine the main traits of many prominent historical figures.

This embodies the interdisciplinary side of the study linking numismatics and a branch of psychology, the scientific discipline that studies personality traits and seeks to understand a person's major traits and how they are expressed in an individual's actions.

Accordingly, further analytical interdisciplinary studies between numismatics and other fields of humanities are recommended, taking into account other samples of different coins from various spatial and temporal circumstances.

V. ACKNOWLEDGEMENT

Appreciation are given to Prof./Atef Mansour for providing the coin under study in this research.

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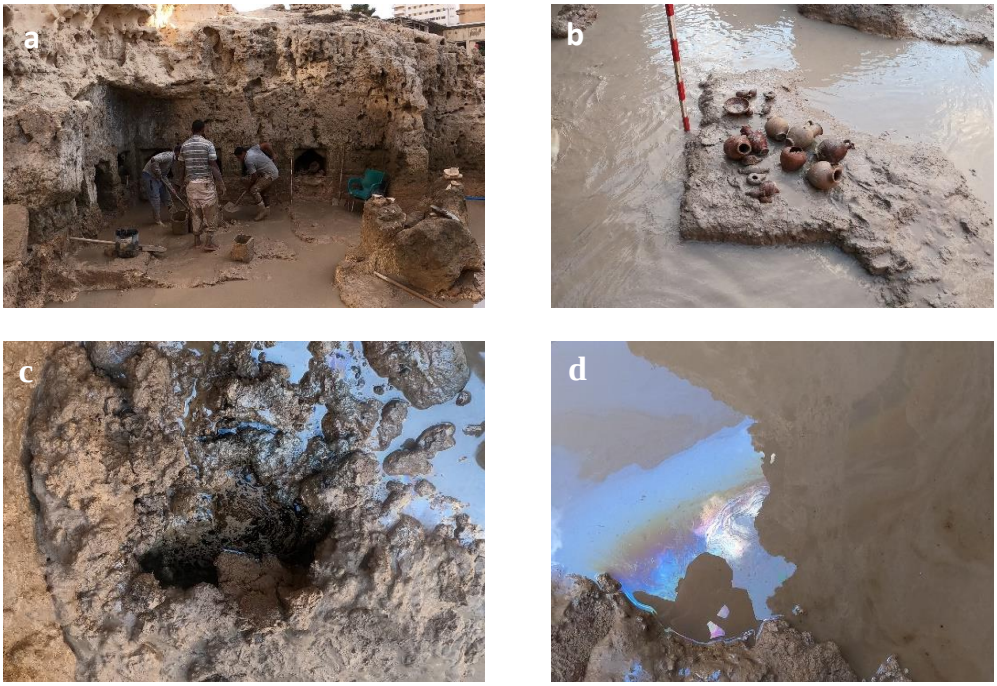

III. Archaeological Conservation

ASSESSING CONSERVATION TREATMENTS OF THE MAIN FAÇADES OF MEDINET HABU TEMPLE, LUXOR–EGYPT

BY

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ABSTRACT

[AR] **تقييم علاج وصيانة الواجهات الرئيسية لمعبد مدينة هابو، الأقصر – مصر**

تُركز هذه الورقة على المخاطر البيئية التي تؤثر على النقوش الجدارية بالواجهات الرئيسية للمعبد الجنائزي لرمسيس الثالث بالضفة الغربية للأقصر، مع اقتراح أفضل المواد لحفظ هذه النقوش. لتحقيق هذا الغرض تمت دراسة مواد البناء المستخدمة في المعبد، ونواتج التلف، والعوامل البيئية المحيطة. تم تحديد خصائص المواد من خلال الفحص البصرى، والميكروسكوب المستقطب، والميكروسكوب الإليكترونى الماسح المزود بوحدة التحليل العنصرى للأشعة السينية، وحيود الأشعة السينية (XRD)، وقياس التغيرات اللونية، وقياس زاوية التلامس مع الماء الثابت، مع تحديد بعض الخصائص الفيزيائية والميكانيكية. أظهرت النتائج أن النقوش الجدارية على الواجهات الرئيسية للمعبد في حالة خطيرة من الحفظ، حيث تأثرت بالعديد من مظاهر وأنماط التلف نتيجة تأثير العديد من عوامل التلف البيئية التي تأتي نتيجة التوسع الحضري والزراعي حول منطقة المعبد، علاوة على الأنشطة البشرية وعوامل التدهور البيولوجي. أظهرت النتائج التي تم الحصول عليها بطرق الفحص والتحليل أن مواد البناء الأساسية هى الحجر الرملى و المونة الجبسية. أظهرت نتائج الدراسة التجريبية للعلاج أن الكمادات المحضرة (A) والتي تتكون من 1000 مل من الماء المقطر، و60 جم من كربونات الأمونيوم، و60 جم من بيكربونات الصوديوم، و25 جم من حمض إيثيلين دياميين رباعي الخليك (إديتا)، و 40 جم أربوسيل (لب السليلوز)، هى الأكثر فعالية في إزالة الإتساخات والبقع وفضلات الطيور من أسطح النقوش الجدارية. بالإضافة إلى ذلك، فإن منتج ميثيل ترای ميسوكسى سيلان له كفاءة كبيرة في تقوية وحماية الحجر الرملي. أيضاً المونة (C) المكونة من (رمال صفراء 100 مل، و جير مطفى100 مل، ومسحوق حجر رملي رمادي 100 مل، ومسحوق حجر رملى بني 100 مل، وماء مقطر + Eucopr M 5ml)، هى أفضل مونة لملء الفجوات والعراميس في الواجهات الرئيسية للمعبد.

[EN] This paper focuses on the environmental hazards affecting the wall reliefs at the main facades of the mortuary temple of Ramesses III at Luxor west bank, abreast with proposing the optimum materials to conserve these inscriptions. To achieve the aforementioned purpose; the building materials used in the structure, the deterioration products, and ambient environmental factors were studied. The materials were characterized by visual observations, polarized light microscope, scanning electron microscopy with energy dispersive X-ray spectroscopy (SEM-EDX), X-ray diffraction (XRD), colorimetric measurements, and static water contact angle, with some physical and mechanical properties. The results revealed that the wall reliefs on the main facades of the temple are in a serious preservation state, where affected by several deterioration phenomena and patterns of damage due to the effectiveness of many environmental deterioration factors, which come as a result to urban and agriculture sprawling around the temple area, moreover human activities and biodeterioration factors. The results obtained by investigation and analytical methods revealed that the main building materials are the sandstone and gypsum mortar. The experimental study results of the treatments demonstrated that the prepared poultice (A), which consists of 1000 ml of distilled water, 60g of ammonium carbonate, 60g of sodium bicarbonate, 25g of ethelyne diamine tetraacetic acid, and 40g of arbocel (cellulose pulp), is the most effective in removing dirt, stains, and bird droppings from the surfaces of wall reliefs. Additionally, the product of Methyltrimethoxysilane (MTMOS) has a significant efficiency in consolidation and protection of sandstone compared to the other evaliuated products in the study. Also, the mortar (C), wich consisting of (yellow sand 100ml, slacked lime 100ml, gray sandstone powder 100ml, brown sandstone powder 100ml, distilled water + Eucopr M 5ml), is the best mortar for filling gaps and joints in the main facades of the temple.

KEYWORDS: Cleaning, consolidation, EDX, Luxor, Medinet Habu, Mortars, sandstone, SEM, Static water contact angle, wall reliefs, XRD.

I.INTRODUCTION

The mortuary temple at Medinet Habu, was built by Ramesses III (c. 1182–1151 BC). It is considered the nucleus of the entire building project of Medinet Habu, and today it is still the centre and its dominant feature. It is also the only structure still relatively fully preserved among the surrounding ruins. The temple is located on Luxor's west bank (25° 42′ N, 32° 36′ E), at the southern extremity of the great necropolis of ancient Thebes, on the desert edge, just above the cultivation **[FIGURE 1]**[1]. From the geological point, this region is a part of the Stable Shelf, which is characterized by alluvium deposits along the Nile's banks which is of Pliocene age and is bordered by Oligocene, Eocene, and Miocene regions. The Pliocene unit is represented in the study area by two formations, namely, Pliocene fault breccia or intraformational conglomerate and Medamud that are covered by the unconsolidated recent alluvial sediments of a Nile flood plain unit. This unit is composed of two sequential layers: silty clay layer of low shear strength and clay layer, with attaining a total thickness of 18.5 m[2]. The temple was built of sandstone, a sedimentary rock, that highly spreads at the surface of the earth and has been classified according to the kind and proportion of cementitious materials (quartz, calcite, iron oxide, clay or other cements), quartz being the main component that gives it strength. It is commonly described as «Nubian sandstone» because it belongs to the stratigraphic sequence known as the Nubian group. In Egypt, a total of thirty-four ancient sandstone quarries, thay occur continuously in the Nile valley and on the adjacent desert plateau from Esan southward into northern Sudan, are identified. In addition, some quarries are located in the western and eastern desertsThe quarries of sandstone at ElSilsilah, ElTaref, Quseir, ElShehab, Kirtas, Duwi, Umm Barmil, Timsah, Abu Aggag and Gabal Ahmar are the most commonly used quarries in ancient Egypt.[3] Sandstone deterioration is a complex process that depends on both internal sandstone characteristics, such as mineral composition, texture, type of cement material, and pore surface formation, as well as external environmental conditions[4].

Unfortunately, the inscriptions on the main facades of the studied temple are suffering from a bad preservation state, as a result to influence of many deterioration factors like the environmental problems, due to the urban and agriculture sprawling around the temple area. In addition, the effects of biodeterioration factors, the human actions and the effects of climate[5], where the climate of study area is classified as arid and semi arid. The range of the monthly average air temperature is 12 to 32 ^{o}C, while maximum relative humidity (RH%) reaches 50% in December and 29% in August. Average rainfall ranges from 0.01 to 0.2 mm, precipitation is restricted to flash floods. The average wind speed varies between 3.7 and 21.1 km/h, and the evaporation rates are

[1] NELSON et Al 1930: 2; HÖLSCHER 1941: 2-4; MURNANE 1980: 1-5; SCOTT 2011: 1-6; JOSÉ DAS 2012: 87.

[2] ELFADALY et Al 2018: 587-610.

[3] NICHOLSON & SHAW 2000: 54-56; HARRELL & STOREMYR 2009: 7-50; LABUS & BOCHEN 2014: 2027-2042; HADI & ALI 2018: 613-619; CAI et Al 2019: 1-18.

[4] MISCEVIC & VLASTELICA 2014: 240-250.

[5] AYMAN et Al 2014: 93-104; ELFADALY et Al 2017: 1-19.

lowest in January (2.5 mm/day) and highest in June (9.4 mm/day)[6]. The effects of those factors can be seen in the aesthetical appearance of the main facades of the temple in many deterioration aspects such as efflorescence, discoloration, scaling, flaking, fragmentation, detachment, powdering, loss of the sandstone's surface layer, microbiological colonization, deposition of guano, and accumulated dust. In addition, can be seen in the effects of internal structural damage in a form of cracking and missing parts. The deterioration of such archaeological buildings as a result of the influence of physical, chemical and biological deterioration factors has been discussed in many works to clarify the mechanism of damag[7]. The treatment that achieves the future preventive effect of such wall reliefs exposed to multiple deterioration agents is always a complex task. Where this requires a broad knowledge of construction materials, previous treatment interventions, conservation materials and techniques as well as an understanding of damage mechanics[8]. The cleaning, consolidation as well as filling gaps and joints are the basic treatment procedures of such wall reliefs in order to restore their appearance before damage, to recover their strength, to increase their durability and to enable regular maintenance especially in an outdoor environment [9]. Many experimental and applied studies have been conducted to demonstrate the effectiveness of multiple techniques and materials in the treatment and conservation of archaeological sandstone buildings[10]. Cleaning treatment is a very delicate process and essential for preservation of archaeological stone buildings. It improves their long term conservation, helps to reveal their aesthetic and artistic values and enhances their historical significance. By removing any undesired material such as dirt, dust, and other harmful materials from their surfaces[11]. The purpose of consolidation treatment is to restore the cohesion between the grains of damaged stones and improve their mechanical properties, which contributes to increasing their durability and helps in the sustainability of the archaeological buildings[12]. Silanes such as methyltrimethoxysilane (MTMOS), tetraethoxysilane (TEOS) and ethyl silicate… etc, are the most well known and successful used in consolidation of sandstone from the late 19th century to the present. Where they are commercially available and have excellent properties such as low viscosity, deeper penetration, better consolidation effect, relatively strong, compatibility with sandstone, resists cleavage by ultraviolet solar radiation as well as chemical, thermal and oxidative stability[13]. The completion or filling of missing parts (joints and gaps) is essential to the conservation of archaeological buildings. This treatment has two aims: the first is to support the building, as it suffers from severe weakness in the region of loss and

[6] WÜST & SCHLÜCHTER 2000: 1161-1172; MAHMOUD et Al 2010: 133-142.

[7] GUPTA et Al 2013: 51- 57; LABUS & BOCHEN 2014: 2027 - 2042; BADER 2014: 201-219; HOSSAM 2015: 5-32; EL-GOHARY 2015: 349-36; EL-DERBY 2016: 273-281; VEREZEN 2017: 20-34; BALA'AWI et Al 2018: 49-66; MANSOUR et Al 2019: 1352-1360, CHIAKI et Al 2021: 8-32; AHMED et Al 2021: 53-63.

[8] MOHAMMAD et Al 2019: 3389-3405.

[9] BADER et Al 2016: 103-118.

[10] BADER et Al 2016: 443-458; HELMI et Al 2016: 29- 40; SALEH et Al 2019: 43- 48; REMZOVA et Al 2019: 1-16; CAI et Al 2019: 1-18; YASER et Al 2020: 16-33; HEFNI 2020: 64-75; ORABI et Al 2020: 238-249; GAJDOS et Al 2021, 1-11.

[11] SIEGESMUND et Al 2011: 444; BAGLIONI et Al 2015: 6.

[12] RODRIGUES 2001: 3-14.

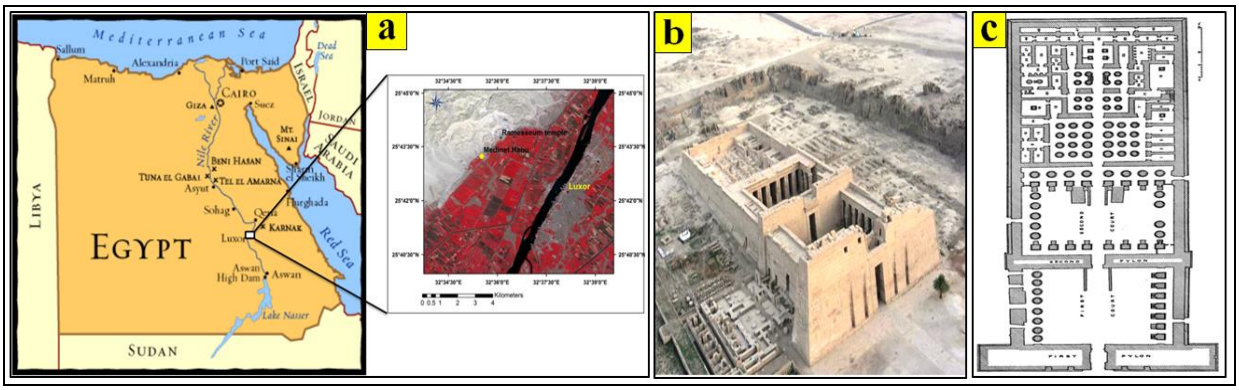
[13] GEORGE 2005: 1-14; FERREIRA et Al 2008: 38-53; GABRIELA et Al 2015: 1-6; MARCO & CARLOS 2018: 235-254; REMZOVA et Al 2019: 1-16.

deep erosion; the second is to present the aesthetics and historical values of the building[14]. The conservation principle states that any fill material should be compatible with the original walls in terms of physical, mechanical and optical properties[15].

This research aims to:

1-Characterize the used building materials and evaluate the current preservation state of the wall reliefs on the main facades of the mortuary temple at Medinet Habu.

2-Propose optimum materials to conserve the inscriptions on the main facades of the temple by conducting experimental studies of treatments, to evaluate the efficiency of two types of prepared poultices, and to determine the best one for removing of dirt, stains and bird droppings from the surfaces of wall reliefs. In addition to evaluate the efficiency of four silicon based consolidation materials, to introduce the most suitable one for consolidation and protection of wall reliefs in the main facade of temple. Such evaluation is carried out on similar sandstone samples collected from the archeological site of Medinet Habu. Also; to evaluate the efficiency of four types of prepared mortars to determine the most suitable one for filling gaps and joints in the main facades of the temple. To achieve such work different examination was carried out to include visual examination, polarizing microscope, scanning electron microscope, X-ray diffraction, and EDX unit (Energy Dispersive X-ray Analysis). The proposed treatment materials were comparatively evaluated by visual examination, colorimetric measurements, static water contact angle, along with determination of some physical and mechanical properties, and morphological characterization by scanning electron microscope.



[FIGURE 1] : A) The study area on the Map of Egypt; B) the mortuary temple of Ramesses III in the center of Medinet Habu complexafter[16]; C) plan of the mortuary temple at Medinet Habu. NELSON et Al 1930: 11.

[14] HASSAN 2022: 38-45.

[15] BALKSTEN 2010: 1-8.

[16] ELFADALY et Al 2018: 587-610.

II. MATERIALS AND METHODS

1. Materials

To characterize the building materials used in the main facades of the studied temple, micro-samples of the stone, mortar joints and salt encrustations were carefully collected from several locations on the walls, especially from the degraded parts as a result of deterioration mechanisms, and they were studied using various investigation and analysis techniques.

For applying the cleaning tests on the main facades of the temple, two types of poultices (A & B) were prepared, their compositions is reported in **[TABLE 1].**

Components of Poultice (A)	Components of Poultice (B)
- 1000 ml distilled water	- 1000 ml distilled water
- 60 gm ammonium carbonate	- 10 gm ammonium carbonate
- 60 gm sodium bicarbonate	- 10 gm sodium bicarbonate
- 25 gm (Ethelyne diamine tetra acetic acid)	- 20 gm Carboxy Methyl Cellulose
- 40 gm Arbocel (cellulose pulp)	

[TABLE 1]: Composition of the prepared A & B cleaning poultices© Done by researcher

Cubic sandstone samples (3. 5 cm^3) were prepared for the experimental study of the consolidation products, according to guidelines for conservation purposes of archaeological surfaces. Four silicon polymers were used for consolidating the prepared sandstone samples. The chemical compositions of the used consolidation materials are reported in **[TABLE 2]**. To simulate the consolidation process as it happens in the archaeological field, the consolidation materials were spread on the surfaces of sandstone samples by brush until the surface was saturated. Then the treated samples were left at the room temperature and controlled RH 50% for about a month, to complete the polymerization process[17].

Product	Composition	Solvent	Company
Wacker OH 100	Ethyl silicate & methyl ethyl ketone	Acetone	Wacker Chemie, Germany
Estel 1000	Ethyl silicate	White spirit	CTS Italian company
Dow Corning	Methyltrimethoxysilane (MTMOS)	Acetone	Sigma-Aldrich, Germany
Nano Estel	Nano silica	Water	CTS Italian company

[TABLE 2]: The chemical compositions of the used consolidation materials© Done by researcher

To prepare the mortars for filling gaps and joints in the main facades of the studied temple, the following materials were used: high quality slaked lime, good quality yellow sand, gray crushed sandstone, brown crushed sandstone, heba powder, Eucopor M product, Addibond product and distilled water. The used sand was free from salts, organic matter, clay, and silt. They were sieved through a medium sieve in order to

[17] LICCIULLI et Al 2011: 437- 444; HELMI et Al 2016: 87-96; MOHAMMAD et Al 2019: 3389-3405.

achieve homogeneous, gradient-grained mixture. The heba powder was obtained by grinding and sifting the clay containing calcitic soil deposits. Eucopor M product is a special plasticiser for mortar, based on neutralized vinsol resin, produced by Swiss Chem. Addibond product is based on styrene-butadiene latex stabilized with polyvinyl alcohol, contains a non-migratory plasticizer and is produced by Chemicals for Modern Building company (CMB). The experimental study was conducted using four types of mortar prepared from the above mentioned materials. Their compositions are reported in **[TABLE 3].** The solid components were mixed in dry states, according to the amounts listed in **[TABLE 3].** This was followed by mixing the slacked lime in a small quantity of water and adding to the mixture through a fine strainer, then adding the improved materials according to their ratio. Finally mixing the ingredients manually, adding water as needed in order to obtain a suitable texture, then casting fresh mortar in cubic metal moulds (5 cm^3), with light compaction to obtain well compacted mortar free of air voids. After one day the samples were demoulded carefully, left to set and harden at room temperature in order to carry out the evaluation tests.

Mortar name	The compositions
(A)	Yellow sand 100ml + Slacked lime 150ml + Gray sandstone powder 100ml + Distilled water.
(B)	Yellow sand 100ml + Slacked lime 100ml + Gray sandstone powder 150ml + Brown sandstone powder 50 ml + Distilled water.
(C)	Yellow sand 100ml + Slacked lime 100ml + Gray sandstone powder 100ml + Brown sandstone powder 100ml + Distilled water + Eucopor M 5ml
(D)	Yellow sand 100ml + Slacked lime 100ml + Gray sandstone powder 100ml + Brown sandstone powder 100ml + Heba powder 50ml + Addibond + Distilled water.

[TABLE 3]: The compositions of the mortars© Done by researcher

2. Methods

Thin section from the collected sandstone and mortar joints samples were prepared for the petrographic study, which was carried out using Nikon eclipse LV100POL polarizing microscope. Quanta 250 scanning electron microscope (SEM) was used to investigate the surface of archaeological samples and the treated sandstone. Philips analytical X-ray diffractometer was used to determine the mineralogical composition for the collected samples. The operating conditions were gained through Cu k α radiation.

The spectra were collected from 2-60 (2θ); the scanning speed was 2θ = 1 degree/min. at constant voltage 40 kv, and 25 mA. The obtained XRD patterns and relative intensities were compared with the «JCPDS» standards of 1967 to identify the compounds of studied samples[18]. The micro chemical analysis was carried out using EDX unit (Energy Dispersive X-ray Analysis).

[18] JCPDS standards 1967.

The physical properties of the samples were determined by calculating the volume of each sample and weighing the dry and wet weight of each sample[19].

Bulk Density (D) in g/cm^3 of the samples was measured before and after treatment using the following equation:-

$$D = \frac{W}{V}$$

Where; (D) is the bulk density in g/cm^3, (W) is original weight in gm and (V) is volume in cm^3.

Water Absorption (W.A) in % of the samples was measured before and after treatment using the following equation:-

$$W.A = \frac{W_2 - W_1}{W_1} \text{ X } 100 = \%$$

Where; (W. A) is the water absorption in %, (W1) dry weight of the sample in g before immersion and (W2) saturation weight of the sample in g after immersion in water for 24 h.

Apparent porosity (A.P) in % of the samples was measured before and after treatment using the following equation:-

$$A.P = \frac{W_2 - W_1}{V} \text{ X } 100 = \%$$

Where; (A.P) is the apparent porosity in %, (W1) dry weight in g, (W2) wet weight in g and (V) is volume in cm^3.

The compressive strength of experimental sandstone samples and the prepared mortar were determined according to ASTM C 170[20].

A colorimetric study of the experimental samples was carried out by means of Optimatch 3100 spectrophotometer, in order to calculate and determine variation of the aesthetical properties induced by the treatments, according to the following equation:-

$$\Delta E^*_{ab} = \sqrt{[(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2]}$$

Where L* is the lightness/darkness coordinate, a* the red/green coordinate (+a* indicating red and -a* green) and b* the yellow/blue coordinate (+b* indicating yellow and -b* blue. While ΔL*, Δa* and Δb* are the differences in the, L*, a* and b* coordinates (according to CIELAB color space) of the treated and untreated samples[21].

The hydrophobicity of the experimental sandstone samples was evaluated using Drop master DM-701, by measuring the static water contact angle with samples, fully automated.

[19] HEMEDA et Al 2018: 835-846.

[20] ASTM C 170 1976.

[21] CIE Standard S014-4/E 2007; DARWISH 2013: 413-422; BADER et Al 2016: 443-458.

III. RESULTS AND DISCUSION

1. State of Preservation

Visual examination confirmed that the wall reliefs at the main facades of the mortuary temple of Ramesses III were highly influenced by many deterioration patterns and forms, as follows: -

A lot of the sandstones have lost their inscriptions due to scaling and flaking **[FIGURE 2/A-B].** This type of decay can be caused as a result of using sandstone blocks after carving; and the stones are laid so that the bedding planes of the rock are vertical rather than horizontal, which allows moisture to flow through the blocks freely[22]. This stimulates salt weathering by crystallization pressures of salts between its sedimentation layers[23]. Moreover, there is powdering on the surfaces of sandstones saturated with moisture, which are located primarily in some lower parts until 3 meters height of the external facades, resulting in the loss of inscriptions **[FIGURE 2/ A, C].** Powdering is one of the most common deterioration forms to sandstone. This is due to the weakness or loss of the cement materials of the mineral granules, as a result to some deterioration factors such as air temperature (AT) and relative humidity (RH), by their alternative cycles and salt weathering[24]. Also discoloration took place at some parts of the stone blocks **[FIGURE 2/ D, F]**, may be due to many factores such as moisture, fire and oxidation of oxidants especially iron oxides as a result of chemical weathering by free oxygen and water. In normal temperatures, free oxygen reactions are slow; while oxidative processes accelerate in the presence of water that is likely to dissolve some minerals, transfer to the surface of the temple walls and then evaporate, which leave disfiguring reddish brownish stains of the inscriptions[25]. Multiple types of cracks are clearly visible by the naked eye, such as individual horizontal, vertical cracks and networks of cracks **[FIGURE 2/ G, H].** They vary in length and depth, and can lead to fragmentation of the stone into small pieces. The most widely discussed reason in studies is that the mechanical stress that occurs by salts due to the growth of hydration pressure of the saline solution inside the stone pores constitutes a great pressure that leads to cracks[26]. Fragmentation, observed in many sandstones **[FIGURE 2I]**, occurs as a result to effects of the mechanical and the physiochemical processes, depending on properties of sandstone, the mineral composition, texture, pore surface formation[27]. There is an extensive amount of dust layer adhered tightly to the inscriptions **[FIGURE 2J].** This layer had turned into a layer of mud in some surfaces, which was saturated of moisture. Also, the presence of many kinds of surface deposits such as bird droppings, especially pigeon excrements, and wasp's nests, adhered tightly causing staining of the stone surfaces, and distortion of the inscriptions **[FIGURE 2/ K, L].** The deposits represent chemical and biological deterioration factors; through creating some

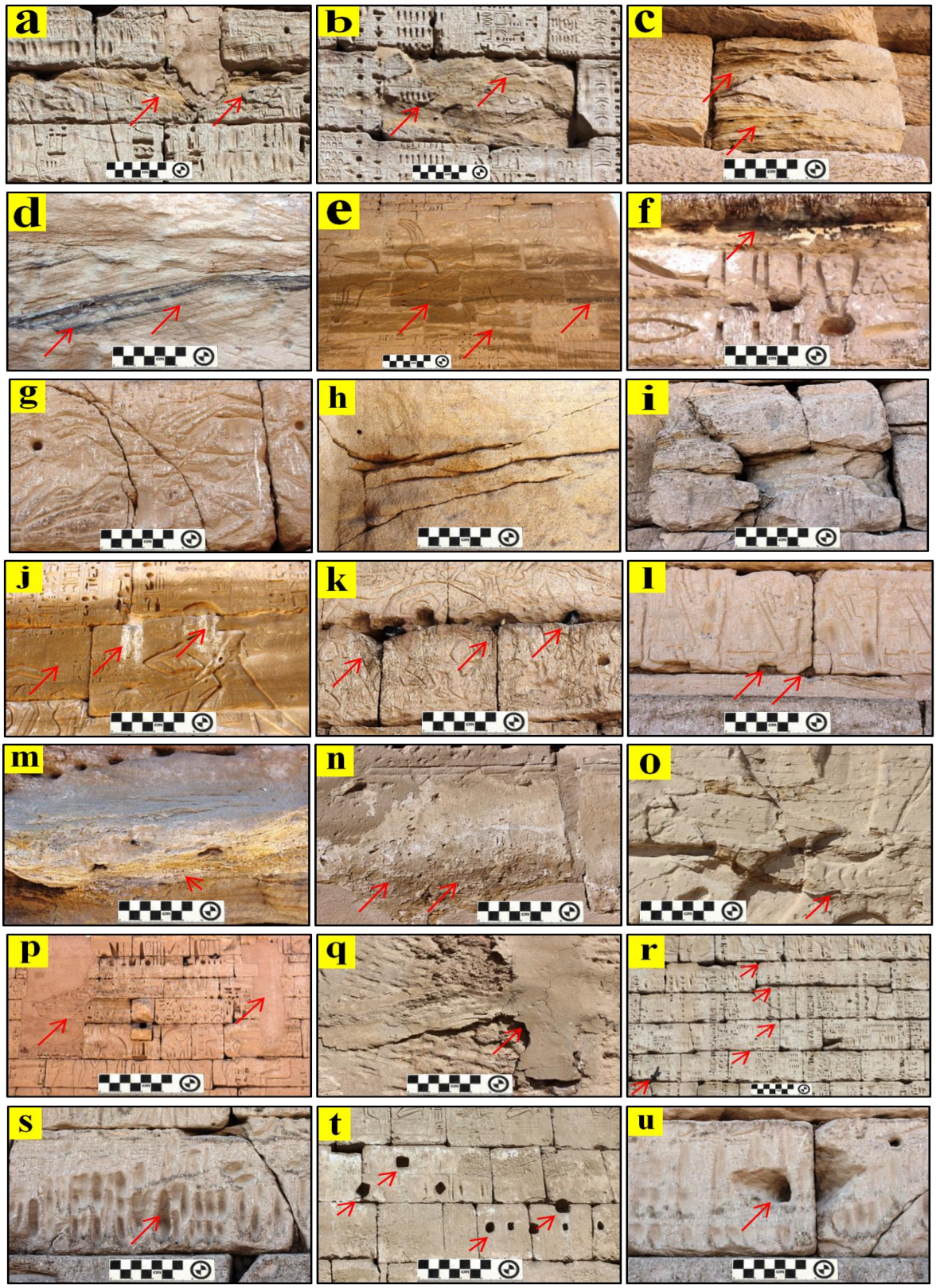
[22] SWANN 24-29.
[23] BADER et Al 2016: 103-118, GERMINARIO & OGUCHI 2021: 85–93.
[24] DESARNAUD et Al 2015: 1- 10; LAMP et Al 2016: 1-24.
[25] NORD 1993: 24- 35; ZHIXUE et Al 2010: 543–551; BADER 2014: 201-219.
[26] EPPES et Al 2017: 470- 508.
[27] MISCEVIC et Al 2014: 240-250; YÜKSEK 2019: 1-13.

acidic central points on sandstone surfaces[28]. Many forms of salts have been observed on the external facades of the studied temple such as (hard crusts and efflorescence) **[FIGURE 2/ M, O].** The salts accumulation may be related to presence of salt in the soil, previous intervention using Portland cement mortar, and the rising salty ground water level in the temple area, as a result to the unplanned urban which is associated with bad sewage networks, and the agricultural encroachment associated of poor irrigation water management[29]. As the groundwater level rises, dissolved salts move with the water into the pores and cracks of sandstones. After the water evaporates salt crystals accumulate on the surface of the stone (efflorescence) and the subsurface of the stone (sub-efflorescence and crypto-efflorescence). The scaling, spalling, powdering and cracking, are some physical degradation forms that affect the archaeological buildings of sandstone, as a result to the effects of salt weathering[30]. The red bricks were used to rebuild areas that lacked the original sandstone and the damaged areas in the external facades had been patched with black cement mortar, which caused darkening, cracking on the surrounding sandstones, and salt crystals accumulation **[FIGURE 2/ P, Q].** Most joints in the external facades are missing the original mortar **[FIGURE 2/R].** Different types of intentional mechanical damage were recorded due to the human activity which includes, blessing marks (knife whetting), and gaps over wide areas. Moreover, on the lower blocks, there are many loops that had been carved from the Middle Ages until the last century, for securing animals **[FIGURE 2/ S &U]**.

[28] EL-GOHARY 2015: 349-368; SPENNEMANN et Al 2017: 2-15; SPENNEMANN et Al 2017: 19-28; SPENNEMANN et Al 2018: 15-28; AHMED et Al 2021: 53-63; MOUSSA et Al 2021: 1-16.

[29] WÜST & SCHLÜCHTER 2000: 1161-1172; MOUSSA 2007: 172; MOUSSA et Al 2007: 1-11; ELFADALY et Al 2017: 1-9.

[30] BENAVENTE et Al 2004: 532-544; SMITH et Al 2008: 275-282; YALDIZ 2010: 1-10; AYMAN et Al 2014: 93–104; ELFADALY et Al 2017: 2-19; ELFADALY et Al 2018: 587- 610; TORRES 2018: 560-570; MANSOUR et Al 2019: 1352-1360; GERMINARIO & OGUCHI 2021: 85–93; MARTINEZ et Al 2021: 123- 132.

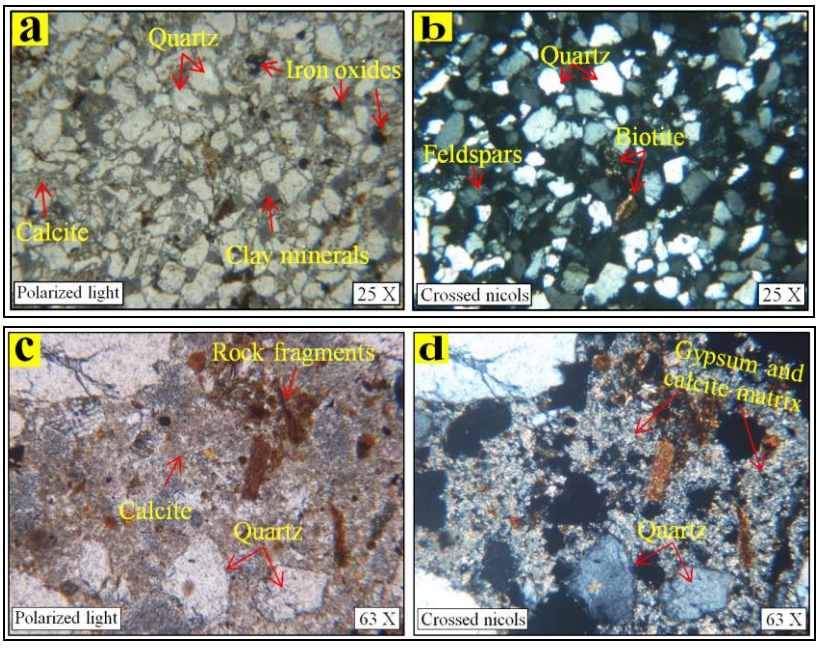


[FIGURE 2]: Preservation state of the external facades of the mortuary temple at Medinet Habu. A) scaling and powdering; B) scaling, flaking, and powdering; C) powdering in wet areas; D) discoloration by oxidation of iron oxides; E) discoloration by moisture; F) discoloration by fire; G) horizontal cracks; H) vertical cracks; I) fragmentation; J& K) dust layer adhered and bird droppings; L) wasps' nest; M) details of efflorescence; N) salt crust; O) micro cracks as a result sub-efflorescence, and crypto-efflorescence; P& Q) previous intervention by red brick and cement mortar; R) loss of joints mortar; S) intentional blessing marks (knife whetting); T) intentional gaps; U) loops for securing animals.

2. Characterization of Building Materials

The petrographic study revealed that the studied archaeological sandstone sample was composed mainly of quartz as an essential constituent, with minor amounts of clay minerals (kaolinite) and calcite, in addition to traces of biotite, feldspars, zircon, iron oxides, and opaques. Quartz occurs as sub rounded to angular, very fine to medium and sorted grains. Most of the quartz grains are monocrystalline while few are polycrystalline. Some grains are cracked and fractured. Feldspars occur as sub angular to angular grains. Clay minerals occur as cement material in most parts, while calcite occurs as cement material in some parts **[FIGURE 3/A & B]**. The components and features of studied sandstone sample are the same components and properties of Nubian sandstone, from Gebel El- Silsila in south -western Egypt (about 160 km south of Luxor, 50 km north of Aswan)[31].

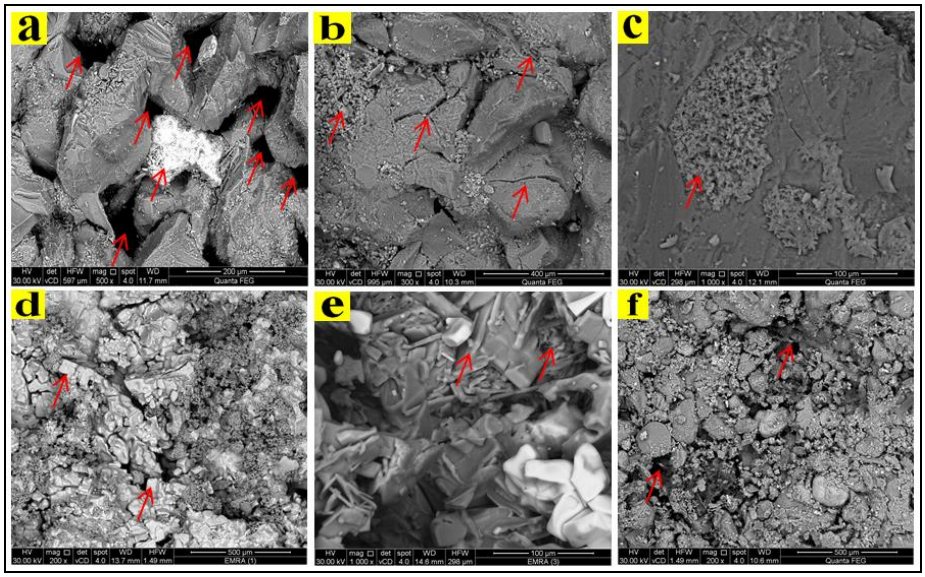
The petrographic study revealed that the mortar's joints sample is formed mainly of gypsum, fragments of carbonate rock in micrite form, quartz (sand grains), in addition to a minute amount of iron oxides and opaques. Quartz presents a single very fine to medium grained, subrounded to sub angular grains scattered in the matrix. Gypsum occurs as micro flakes. Rock fragments are fine to medium grained and have rounded to sub angular outlines. Gypsum and very tiny carbonate crystals make up the sample matrix **[FIGURE 3/ C & D].** This finding confirms that the mortars in ancient Egypt were basically formed of processed gypsum, crushed limestone and sand[32]. Mortar was employed in Egyptian construction techniques to fill in the spaces between blocks, it was not important for bonding the heavy stone components, due to its low parameters of mechanical resistance[33].



[FIGURE 3]: Petrographic microphotographs of sandstone and joint mortar samples; A) sandstone under plane polarized light (PPL); B) sandstone under cross polarized light (CPL); C) mortar's joints under plane polarized light (PPL); D) joint mortar under cross polarized light (CPL).

[31] FITZNER et Al 2003: 1089-1103.
[32] MOUSSA et Al 2009: 292-308.
[33] DZIEDZIC et Al 2015: 93-111.

SEM examination of sandstone samples at the exterior facades of the studied temple revealed variable sizes of angular and subrounded quartz grains **[FIGURE 4/A].** In addition, the growth of salt crystals between the quartz grains led to a collapse of sandstone's internal structure and the dissolution of cement materials. These effects caused loss cohesion among stone particles, an increase in porosity as obviously observed in SEM photomicrograph **[FIGURE 4/A].** It also revealed some mechanical deformations to the quartz grains, such as micro exfoliation, micro pitting and breaking as obviously observed in SEM photomicrograph **[FIGURE 4/B].** SEM photomicrographs **[FIGURE 4/C, D&E]** revealed the dense coats of halite crystals on the stone surface. In SEM photomicrograph halite appears as salt crust **[FIGURE 4/C]**, large euhedral cubic aggregates **[FIGURE 4/D]**, in addition to prism and needles **[FIGURE 4/E].** The SEM examination of the mortar's joints sample from the external facades of the temple revealed variable sizes (very fine to fine to medium grained) of rounded to sub rounded and subangular particles of quartz grains. Diffusion of salt crystals between the grains, disintegration of granules and loss of cohesion, as a result to dissolution and loss of cement materials, led to an increasing porosity as obviously observed in SEM photomicrograph [**FIGURE 4/F**].

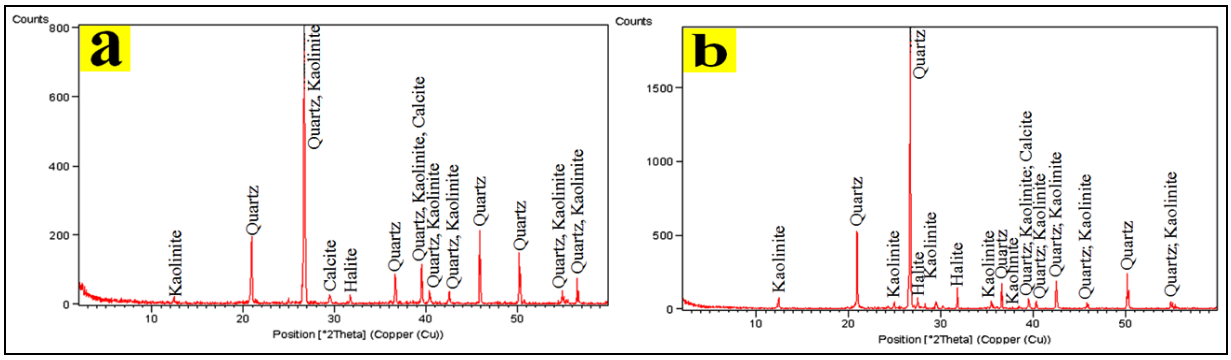


[FIGURE 4]: SEM micrographs of building materials samples; A) show angular and sub rounded grains of quartz, dissolution of cement materials which led to an increasing in porosity of sandstone and presence of sodium chloride crystals between quartz grains; B) mechanical deformations to the quartz grains (micro exfoliation, micro pitting and breaking); C, D & E) dense coats of halite crystals covering the stone surface; F) SEM micrographs of mortar's joints sample.

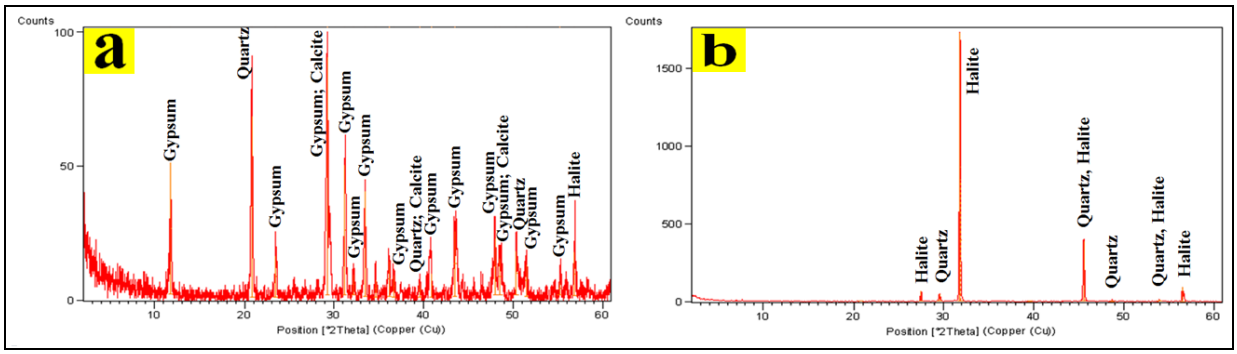
The results of X-ray diffraction revealed the following:-

- The studied sandstone samples **[FIGURE 5/A &** B**]** consist mainly of quartz SiO_2, kaolinite $Al_2(OH)_4Si_2O_5$, calcite $CaCO_3$ and halite NaCl. Although rare amounts of biotite, feldspars, zircon, iron oxides and opaques were detected by polarizing microscope, they were not detected by XRD due to their very low proportions in the sample.
- The mortar's joints sample **[FIGURE 6/A]** consists mainly of gypsum $CaSO_2.2H_2O$, calcite $CaCO_3$, quartz SiO_2 and halite NaCl.

- The salt sample **[FIGURE 6/B]** indicated that it is mainly consists of halite. The presence of halite within sandstone and mortar's joints components indicates a high weathering has occurred, as clearly observed by SEM, which caused by the mechanical stress resulted by the crystallization cycles of halite salt [34]. These results match very well with the petrographic study and SEM.



[FIGURE 5] :A& B) **XRD pattern of the sandstone samples from the external facades of the temple.**



[FIGURE 6]: A) XRD pattern of mortar's joints sample; B) XRD pattern of salt sample.

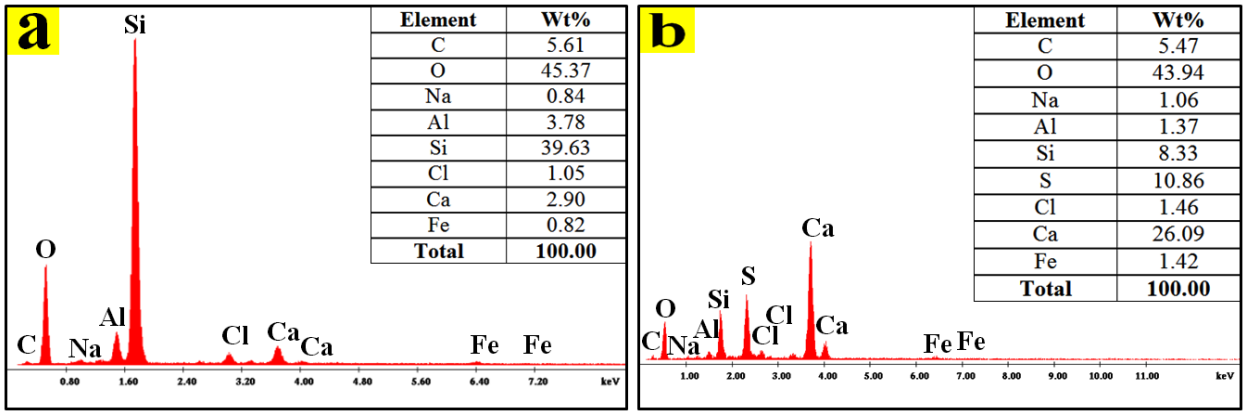
The EDX analysis of the studied sandstone and mortar's joints samples [**FIGURE 7**] were carried out to identify the main elements contained in the samples. EDX spectrum of sandstone sample **[FIGURE 7/A]** revealed the presence of silicon (39.63%), aluminum (3.78%), oxygen (45.37%), calcium (2.90%), carbon (5.61%), chlorine (1.05 %), sodium (0.84%) and iron (0.82%). The high peaks of silicon and oxygen confirmed the existence of silicon dioxide (quartz, Sio_2) as the main component of the sample. An aluminum and silicon peak implies the presence of aluminosilicate materials (e.g., clays «kaolinite, $Al_2(OH)_4Si_2O_5$»). The peaks of carbon and calcium indicate the existence of carbonate mineral (calcite, $CaCO_3$). Small intensity peak of iron refer to the presence iron oxide. The peaks of chlorine and sodium proved the presence of halite (Sodium Chloride, NaCl) in the sample. This result confirm the results of XRD.

EDX spectrum of mortar's joints sample [**FIGURE 7/B**] revealed the presence of silicon (8.33%), aluminum (1.37%), oxygen (43.94%), calcium (26.09%), sulfur (10.86%), carbon (5.47%), chlorine (1.46 %), sodium (1.06%), and iron (1.42%). The high peaks of calcium, sulfur and carbon indicates the existence of calcium carbonates (calcite, $CaCO_3$) and calcium sulphates (gypsum $CaSO_4.2H_2O$). The high peaks of silicon and oxygen confirmed the existence of silicon dioxide (quartz, SiO_2). The peaks of chlorine and sodium proved

[34] RUFFOLO et Al 2013: 753-758.

the presence of halite mineral (Sodium Chloride, NaCl) in the sample. It was suggested that the presence of aluminum, and iron arised from the clay minerals impurities in the fragments of stone or the soiling materials.

The analysis results that were obtained using XRD and EDX confirmed the results obtained by petrographic and morphologic studies.



Element	Wt%
C	5.61
O	45.37
Na	0.84
Al	3.78
Si	39.63
Cl	1.05
Ca	2.90
Fe	0.82
Total	**100.00**

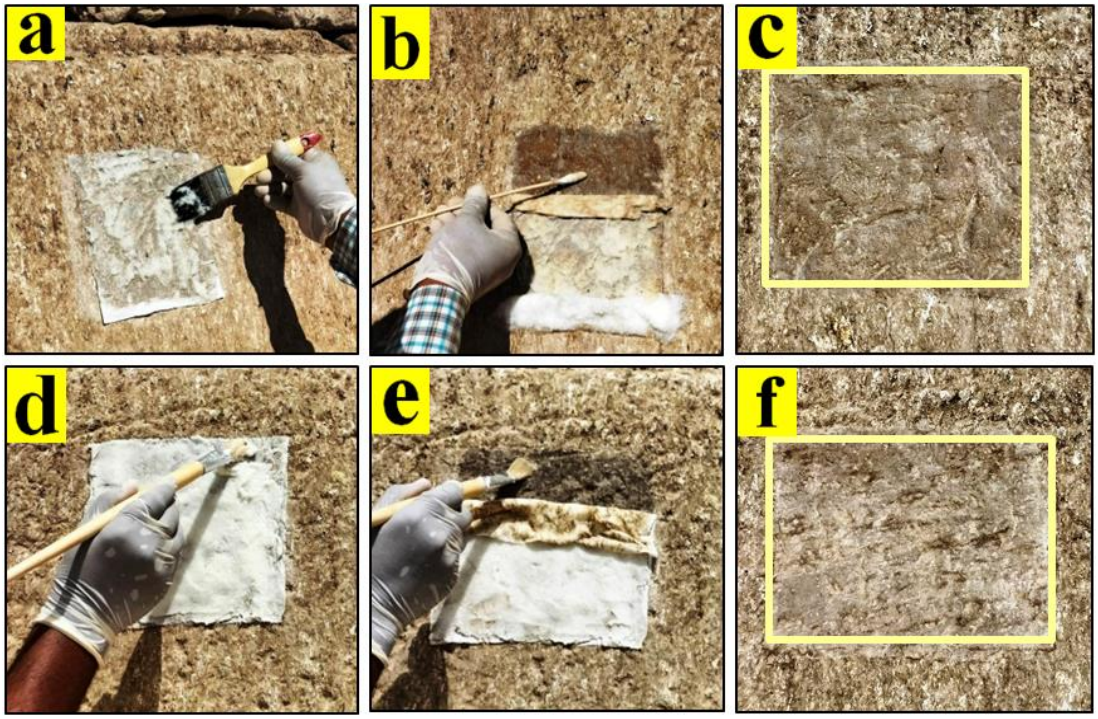
Element	Wt%
C	5.47
O	43.94
Na	1.06
Al	1.37
Si	8.33
S	10.86
Cl	1.46
Ca	26.09
Fe	1.42
Total	**100.00**

[FIGURE 7]: A) EDX spectrum of sandstone sample; B) EDX spectrum of the mortar's joints sample.

3. Evaluation of Conservation Treatments

A. Evaluation of the Cleaning Treatment

The experimental study of cleaning materials and techniques was carried out directly on the southern facade of the temple, where the inscriptions suffer greatly from effects of accumulated dust and bird droppings, especially pigeon droppings. For this purpose, the poultice technique was chosen because it allowed for proper control of all stages, ensuring complete removal of undesired materials while preventing them from penetrating the pores of sandstone. Two types of poultices were prepared. The first poultice (A) compositions were mixed according to the percentages mentioned in **[TABLE 1]** with 40 mg Arbocel (cellulose pulp). The second poultice (B) compositions were mixed according to the percentages mentioned in table (1) with 20 mg of Carboxy Methyl Cellulose. Both composites were applied on a thin sheet of Japanese paper over the surface of the dirt, to avoid the adhesion of the poultice to the stone surface. The poultices were applied in the morning to keep them moist for a longer time. The application time for each poultice was one hour. Finally; the poultices were removed in successive stages, after each stage remaining solubilized materials were removed using a cotton swab embedded with distilled water, until complete removal of poultices. The visual observations reveal that the cleaning proceeded by the poultice (A) gave good results, where the layer of dirt was completely disintegrated, which allowed it to be easily removed. But the dirt was not completely dissolved after removing the poultice (B), which required repeating the poultice three times to obtain the same result that was obtained with one application of poultice (A) **[FIGURE 8]**.



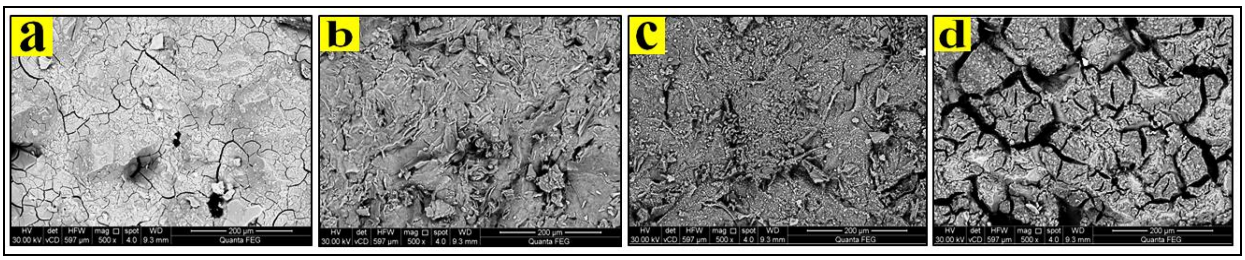
[FIGURE 8]: The cleaning of the accumulated dust and bird droppings on the inscriptions. A& B) application of the poultice (A); C) the cleaning result after removing the poultice (A); D& E) application of the poultice (A); F) the cleaning result after removing the poultice (B).

B. Evaluation of Consolidation Materials

1. Scanning electron microscope (SEM)

SEM micrographs of the treated sandstone samples **[FIGURE 9]** revealed that all the consolidantes utilised in this study succeeded in consolidating the samples with varying degrees, except for the Nano Estel product. Sample treated with Wacker OH 100 **[FIGURE 9/A]** illustrated that the consolidant filled the pores, improving the connection between the grains, and it formed a superficial layer full of micro cracks, obscured many of the individual particles. Sample treated with MTMOS **[FIGURE 9/B]** illustrated that the consolidating material surrounded the particles, filled the big and small pores and coated the surfaces of the sample with a homogenous polymeric layer without blocking the pores.

Also; individual particles are visible. Sample treated by Estel 1000 **[FIGURE 9/C]** illustrated that the consolidant filled most pores, covered the samples with rough homogenous polymeric network, and containing micro cracks in some parts. The sample treated with Nano Estel [**FIGURE 9/D**] illustrated that the consolidation material covered the surfaces of the sample with an inhomogeneous dense coating containing tiny individual nanoaggregates and filled large cracks.



[FIGURE 9]: SEM Micrographs of the treated sandstone samples; A) Wacker OH 100 treatment; B) MTMOS treatment; C) Estel 1000 treatment; D) Nano Estel treatment.

2. Physical and Mechanical Properties

Improving the physical and mechanical properties of treated sandstone samples is an important goal to be achieved with the use of consolidantion products. By measurement, it was found that all the consolidation materials used in the study achieved this goal, where they all resulted in an increase in bulk density, a decrease in both apparent porosity and water absorption to varying degrees. The results were reported in **[TABLE 4 & FIGURE 10]**. By comparison, it was found that the material (MTMOS) achieved the best results in improving the physical and mechanical properties of the treated samples, as follows:

Bulk density: the treated samples with MTMOS, achieved the highest bulk density of 2.11 g/cm^3, which is higher than the untreated sample by about 11.64% that was 1.89 g/cm^3. The treated samples with Estel 1000 ranked second, achieved bulk density of 2.08 g/cm^3, which was higher than the untreated sample by about 10.05%, while the treated samples with Wacker OH 100 ranked third, achieved bulk density of 2.05 g/cm^3 which was higher than the untreated sample by about 8.46%. The treated samples with Nano Estel achieved lowest bulk density of 2.02 g/cm^3, but were still higher than the untreated sample by about 6.87%.

Apparent porosity: the treated samples with MTMOS, achieved the best result in reducing the rates of apparent porosity. It gave the lowest average values of apparent porosity, amount to 0.78% which lowers than the untreated sample by about 96.57% which was 22.78%. But the treated samples with Estel 1000, ranked second in reducing the rates of apparent porosity, where it achieved average values of apparent porosity 14.72%, and its decrease ratio due to consolidation treatment was only 35.38%. The treated samples with Wacker OH 100 ranked third in reducing the rates of apparent porosity, where it achieved average values of apparent porosity 13.09%, and its decrease ratio due to consolidation treatment was only 42.53%. While the treated samples with Nano Estel ranked last in reducing the rates of apparent porosity, where it achieved average values of apparent porosity 21.7%, and its decrease ratio due to consolidation treatment was only 4.74%.

Water absorption: the treated samples with MTMOS, achieved the best result in reducing the amount of water absorption. It gave the lowest average values of water absorption, which measured 0.39% and was lower than the untreated sample that measured 96.75%, and its decrease was by about 96.75%. This low percentage can be attributed to that the MTMOS product is a hydrophobic material. The treated samples with Estel 1000, ranked second in reducing the rates of water absorption, where it achieved average values of water absorption 7.12%, and its decrease ratio due to consolidation treatment was only 40.61%. The treated samples with Wacker OH 100 ranked third in reducing the rates of water absorption, where it achieved average values of water absorption 6.38%, and its decrease ratio due to consolidation treatment was only 46.78%. While the treated samples with Nano Estel ranked last in reducing the rates of water absorption, where it achieved average values of water absorption 10.84%, and its decrease ratio due to consolidation treatment was only 10.34%.

Compressive Strength: the treated samples with MTMOS achieved the best result in increasing the compressive strength, where it gave highest average values of compressive strength of 211.66 kg/cm^2, by an increase of 95.98% with respect to untreated samples, which achieved average values of compressive strength 108 kg/cm^2. The treated samples with Estel 1000 ranked second in increasing the rates of compressive strength, where it achieved average values of compressive strength 193kg/cm^2, and its increase ratio due to consolidation treatment was only 78.70%. The treated samples with Wacker OH 100 ranked third in increasing the rates of compressive strength, where it achieved average values of compressive strength 197kg/cm^2, and its increase ratio due to consolidation treatment was only 82.41%. While the treated samples with Nano Estel ranked last in increasing the rates of compressive strength, where it achieved average values of compressive strength 112.33kg/cm^2, and its increase ratio due to consolidation treatment was only 4.01%.

This result may be attributed to low viscosity rate of the methyltrimethoxysilane polymer, which enables it to high and easy penetration into the porous matrix, in addition to high and fast reactivity in the treated zones, in addition to its high compatibility with sandstone samples, where the methyltrimethoxysilane polymer is hydrolysed with water to form silanols which then polymerize in a condensation reaction to form a polymer that increases the cohesion of the stone material[35].

[35] FERNANDEZ et Al 2017: 1-18.

Tested Property	Samples	Results			
		S1	S2	S3	Average
Bulk density (g/cm³)	Untreated	2.04	2.04	2.15	2.08
	Treated with Wacker OH 100	2.09	2.03	2.03	2.05
	Increase in bulk density %				8.46
	Treated with MTMOS	2.02	2.13	2.18	2.11
	Increase in bulk density %				11.64
	Treated with Estel 1000	2.04	2.04	2.15	2.08
	Increase in bulk density %				10.05
	Treated with Nano Estel	2.02	2.03	2.01	2.02
	Increase in bulk density %				6.87
Apparent porosity (%)	Untreated	22.76	22.78	22.80	22.78
	Treated with Wacker OH 100	13.11	12.52	13.63	13.09
	Decrease in apparent porosity %				42.53
	Treated with MTMOS	0.67	0.74	0.93	0.78
	Decrease in apparent porosity %				96.57
	Treated with Estel 1000	16.78	13.63	13.74	14.72
	Decrease in apparent porosity %				35.38
	Treated with Nano Estel	21.48	21.85	21.77	21.7
	Decrease in apparent porosity %				4.74
Water absorption (%)	Untreated	11.86	11.99	12.11	11.99
	Treated with Wacker OH 100	6.28	6.15	6.70	6.38
	Decrease in water absorption %				46.78
	Treated with MTMOS	0.33	0.38	0.48	0.39
	Decrease in water absorption %				96.75
	Treated with Estel 1000	8.23	6.65	6.49	7.12
	Decrease in water absorption %				40.61
	Treated with Nano Estel	10.62	10.7	10.84	10.75
	Decrease in water absorption %				10.34
Compressive Strength (kg/cm²)	Untreated	108	107	108	108
	Treated with Wacker OH 100	203	199	189	197
	Increase in compressive strength %				72.41
	Treated with MTMOS	215	224	229	211.66
	Increase in compressive strength %				95.98
	Treated with Estel 1000	189	194	198	193
	Increase in compressive strength %				78.70
	Treated with Nano Estel	113	115	109	112.33
	Increase in compressive strength %				4.01

[TABLE 4]: Physical and mechanical properties of experimental sandstone samples.

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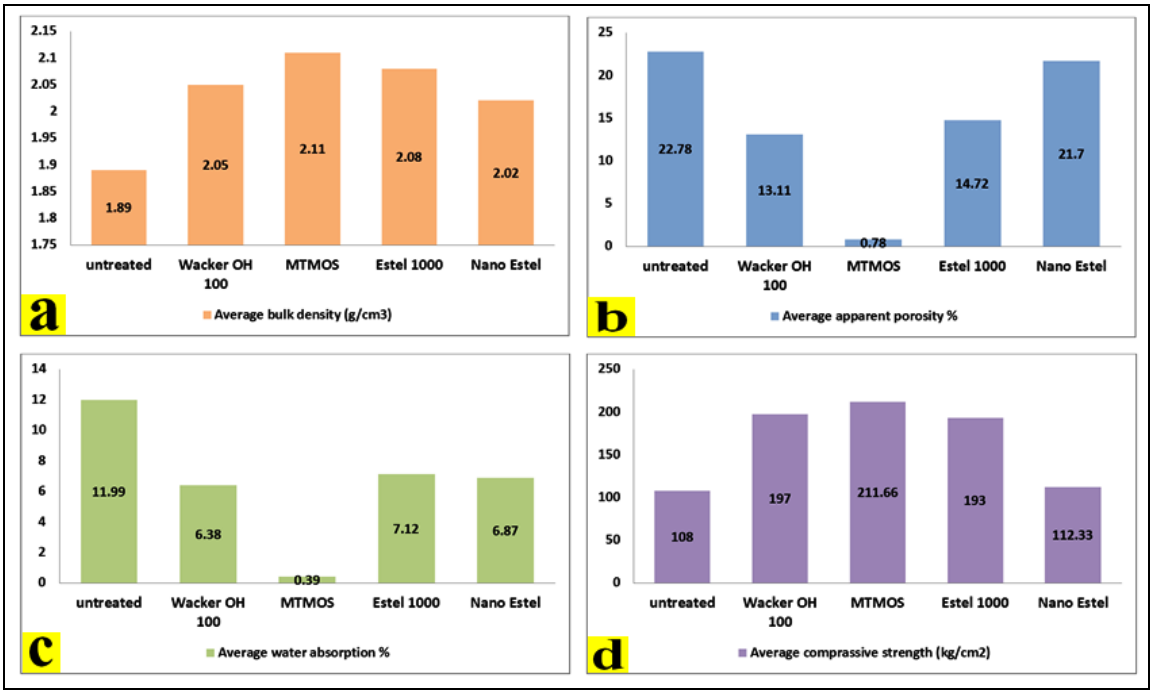


[FIGURE 10]: The physical and mechanical properties of experimental sandstone samples. A)The average bulk density; B) The average apparent porosity; C) The average water absorption; D) The average compressive strength (kg/cm²).

3. Color Alteration

According to guidelines for conservation purposes of historical or monumental surfaces, the ΔE value (total colour variation) of the treated surfaces must be < 5[36]. The values obtained from chromatic changes measurements ΔE*ab of experimental sandstone samples (treated and untreated) are summarized in **[TABLE 5]**.

Samples	L*	a*	b*	ΔE*
Untreated	71.13	6.60	17.86	
Treated with Wacker OH 100	63.63	7.20	20.65	8.02
Treated with MTMOS	70.76	6.20	20.25	2.45
Treated with Estel 1000	69.37	7.37	23.34	5.18
Treated with Nano Estel	72.56	5.81	20.65	2.57

[TABLE 5]: Results of the chromatic measurements of the treated sandstone samples© Done by researcher

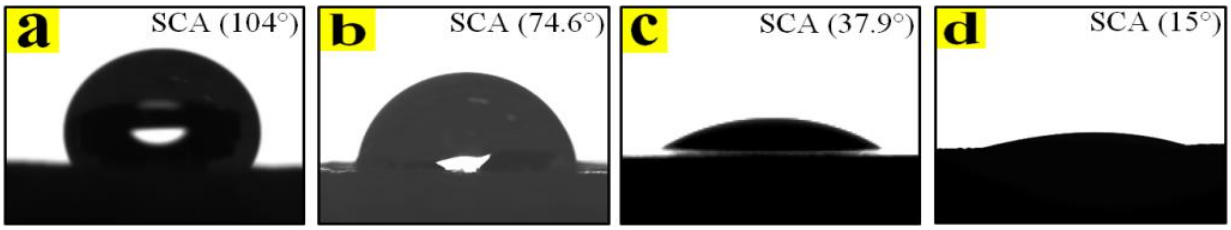
The samples treated by MTMOS achieved lowest value of total color change ΔE*ab (2.45), which is below the threshold values according to guidelines for conservation purposes. Also the samples treated with Nano Estel has ΔE*ab (2.57), which also did not exceed guidelines values of conservation purposes. But the Estel 1000 product caused a minor change in the colour of treated sandstone samples, achieved a value of ΔE*ab (5.18), while Wacker OH 100 product failed to conserve the natural color of treated samples,

[36] GIOVANNI et Al 2015: 222-231; NORMAL 2017; FRANCESCA et Al 2018: 1-23.

causing significant alteration in color of treated sandstone samples. It achieved the highest value of total color change ΔE*ab (8.02), exceeding guidelines values of conservation purposes.

4. Static water contact angle

To evaluate the water repellency of the treated samples, the static contact angle (sessile drop method) of water droplets placed on different positions on the samples were measured, and the average values were taken. The untreated and treated samples were included in this test for comparison. The results showed that all consolidants used in this study enhanced the property of water repellency of the sandstone samples, as shown in **[FIGURE 11]**. **MTMOS** product achieved the highest static water contact angle value (104°), **[FIGURE 11/A]**, so it considered as a hydrophobic material because it has achieved contact angles more than 90 degrees. The hydrophobicity of this consolidant may be as a result of containing a non-polar methyl group connecting to the silicon atoms that form main chain of this polymer[37]. Estel 1000 product had static water contact angle value (74.6°), **[FIGURE 11/B]**. While Wacker OH 100 product had static water contact angle value (37.9°), **[FIGURE 11/C]**. Nano Estel product had achieved the static water contact angle value (15°), which is suggested to be ascribed to the high surface tension of the consolidation material in addition to the cracked and dense microstructural network formed on the treated stone surface. **[FIGURE 11/D]**. Therefore, Estel 1000, Wacker OH 100 and Nano Estel are considered hydrophilic materials, as they achieved water contact angles less than 90 degrees.



[FIGURE 11]: Photographs of water droplets on the treated sandstone samples; A) MTMOS treatment; B) Estel 1000 treatment; C) Wacker OH 100 treatment; D) Nano Estel treatment.

C. Evaluation of the Mortars

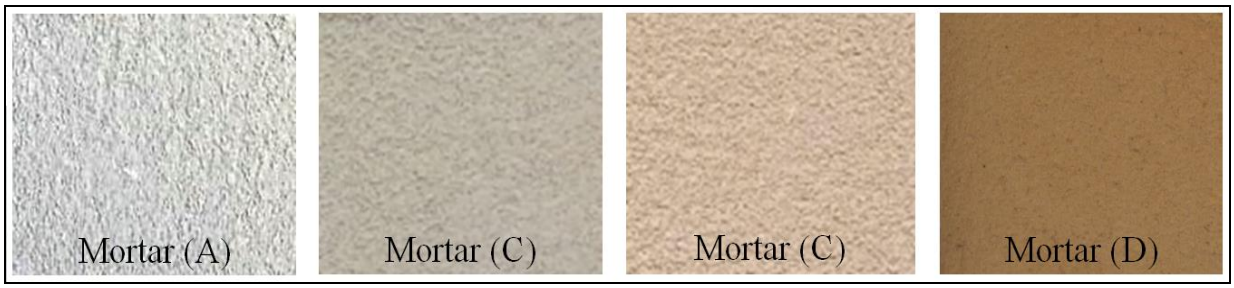
1- Visual Appearance

By Visual examination to the surficial appearance of the prepared mortars to choose the most appropriate one for filling gaps and joints in the main facades of the temple after drying and setting, the following notes have been observed **[FIGURE 12]:**

- Mortar (A) is clear white in color, fine texture and appears to be strong and very cohesive, which is incompatible with the sandstone used for the temple's main facades. The amount of lime used may be the cause of the mortar's white tint.
- Mortar (B) is too weak, too fragile, easy to scratch, has homogeneous texture, dark gray color, which is incompatible with the sandstone used for the temple's main facades.

[37] HELMI et Al 2016: 29-40.

- Mortar (C) is strong, has good cohesion, has homogeneous texture and is compatible in color with the sandstone used for the temple's main facades.
- Mortar (D) matches the color and texture of the main temple facades' sandstone but is too strong, has high cohesiveness, and homogeneous texture.



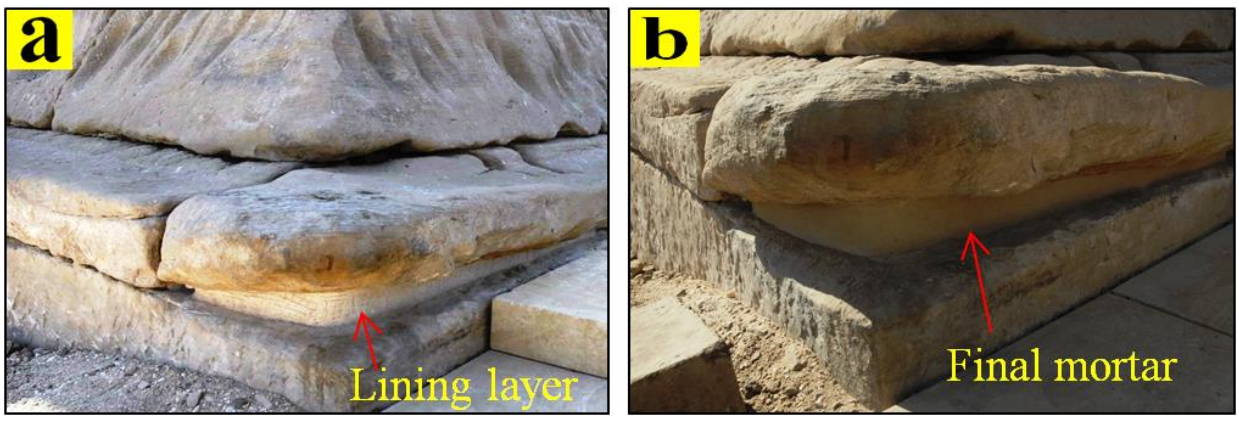
[FIGURE 12]: General appearance of the mortars samples.

2. Physical and Mechanical Properties

The results of physical and mechanical properties of prepared mortars were reported in [**TABLE 6**]. In a comparison, it was found that the mortar (C) achieved the best results in terms of physical and mechanical properties. It has the highest bulk density 1.78 gm/cm^3, the lowest average values of apparent porosity, amount to 4.37%, the lowest average values of water absorption 2.45%, and the highest average values of compressive strength 109.39 kg/cm^2. This is may be attributed to the granular gradation of the components, which led to a good incorporation of the mortar, in addition to the ratio of mortar components, and the role of the (Eucopor M) product. From the above mentioned results it was decided that the mortar (A) would be the suitable mortar for filling gaps and joints in the external facades of the temple at Medinet Habu, as shown in **[FIGURE 13].**

Mortar name	Bulk density (g/cm^3)	Apparent porosity (%)	Water absorption (%)	Compressive Strength (kg/cm^2)
(A)	1.64	32.54	16.22	94. 25
(B)	1.67	38.32	18.87	75. 68
(C)	1.78	4.37	2.45	109.39
(D)	1.73	6.25	3.61	105.21

[TABLE 6] :Physical and mechanical properties of mortars samples© Done by researcher



[FIGURE 13]: Filling joint in the external facades of the mortuary temple at Medinet Habu using mortar; A) after applying the lining layer of mortarp; B) after applying the final mortar above of the lining.

IV. CONCLUSIONS

Observation and visual examination reveal different kinds of deterioration phenomena to the inscriptions on the external facades of the temple, such as scaling, flaking, powdering, discoloration, cracking, gaps, open joints, fragmentations, bird droppings, salt efflorescence, and scratches (blessing marks). The the main factors contributing to the deterioration of these wall reliefs are the rising salty ground water level in the temple area, caused by unplanned urban and agricultural encroachments, human actions, and biodeterioration factors, particularly the wild pigeons. According to the results of investigation and analytical study, the main facades of the mortuary temple at Medinet Habu was built of Nubian sandstone, , most probably from Gebel El- Silsila quarry. It consists mainly of sub rounded to angular very fine to medium and sorted grains of quartz, in addition to minor amounts of kaolinite $Al_2(OH)4Si_2O_5$, calcite $CaCO_3$ and halite NaCl. Moreover, rare amounts of biotite, feldspars, zircon, iron oxides, opaques. Also, the archaeological mortar consists mainly of gypsum $CaSO_2.2H_2O$, fragments of carbonate rock in micrite form (calcite $CaCO_3$), quartz SiO_2 and halite NaCl. It is suggested that the presence of halite in the composition of the studied archaeological sandstone and mortar samples is considered as one of the weathering products. The results of experimental study of the cleaning poultices revealed that the poultice (A) is threefold effective than the poultice (B), as it easily removes dirt, stains and bird droppings from the inscriptions surfaces on the external facades of the studied temple. Also, the results of experimental study demonstrated that the (Dow Corning MTMOS) Methyltrimethoxysilane is the most suitable product for the consolidation and protection of the inscriptions on the main facades of the studied temple, as it achieved the best amelioration values of the mechanical and physical properties of the treated sandstone samples. Moreover, it showed good hydrophobic properties, as it achieved the highest values of static water contact angle. In addition, it achieved an excellent distribution and formed a homogeneous coating on the stone surface without closing the pores, as observed by SEM microscopic investigation. It didn't cause any effect on the color or the general appearance of the treated sandstone samples. In addition; the experimental study of prepared mortars revealed that the mortar (C) is more suitable than other studied mortars for filling gaps, as it is compatible in terms of physical, mechanical and optical properties with archaeological sandstone in the main facades of the temple.

The achieved results in this study will be useful for conservation of the wall reliefs on the main facades of the mortuary temple at Medinet Habu.

V. ACKNOWLEDGEMENTS

The author is very grateful to Prof. Dr. Adel Akarish from Geological Sciences Dept., National Research Centre, Cairo, Egypt, for his scientific assistance in this research and all the members of Medinet Habu site, for their assistance during collecting the archaeological information of the site, and also for permission to study the inscriptions on the external facades of the mortuary temple at Medinet Habu.

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THE TECHNOLOGY OF MANUFACTURING FUEL FOR OIL LAMPS IN THE HELLENISTIC PERIOD: AN APPLIED STUDY THROUGH THE FINDINGS OF THE ALEXANDRIA NECROPOLIS PROJECT OF SHATBY, ALEXANDRIA [2020–2023]

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ABSTRACT

تكنولوجيا صناعة وقود إضاءة المسارج بالعصر الهلينستي «دراسة تطبيقية من خلال مكتشفات مشروع جبانة الشاطبي بالإسكندرية 2020-2023

[AR] يقدم هذا البحث دراسة تطبيقية وتجريبية لما تم الكشف عنه من بقايا مادة وقود الإضاءة التى كانت تستخدم للمسارج فى الفترة الهلّينستية، وكذلك دراسة بقايا لفتيل محترق عثر عليه ضمن مشروع ترميم وتطوير وحماية جبانة الشاطبى الأثرية، والذى نفذته جمعية الآثار بالإسكندرية بتمويل من مؤسسة أ.ج. لفنتيس القبرصية فى الفترة من 2020-2023م. تضمن المشروع إعادة استكشاف الجبانة الأثرية بإزالة الرديم المتراكم بها عبر الزمن. وجادت الجبانة بالعديد من القطع الأثرية تمثلت فى مسارج وأطباق فخارية وأوانى الحضرة وبقايا عظام بشرية. أثبتت التحاليل والفحوص أن الصخر الذى نحتت فيه الجبانة الأثرية أحد أنواع الحجر الجيرى، وأن المياه الجوفية الموجودة بالجبانة هى مياه تتروح نسبة المعادن الذائبة بها بين 1,7جم/لتر ودرجة أس هيدروجينى pH 7.1. تم تحليل مادة الوقود بالتحليل الكروماتوجرافى الغازى المزود بمطياف الكتلة، حيث أثبت أن مادة الوقود ذات أصل بترولى. واستخدم الفحص بالميكروسكوب الإلكترونى الماسح لفحص بقايا عينة الفتيل المتفحم، وتبين أنها جزء من ساق نبات البوط، وتم تأكيد النتيجة بفحص التركيب التشريحى لساق نباتى البردى والبوط كجانب تجريبى.

[EN] This paper is an applied and experimental study on the remains of the fuel material that was used in oil lamps in the Hellenistic period, as well as the remains of a burning fuel and oil lamp wick. These remains are among the finds of the project of restoration, development, and protection of the archaeological cemetery of Shatby, conducted by the archaeological Society of Alexandria (2020-2023), funded by the A.G. Leventis foundation, Cyprus. The entire cemetery of Shatby is hewn in the a type of limestone called Calcarenite, which is a sedimentary rock. The groundwater at the site is slightly alkaline (pH 7.1), with the total dissolved solids (TDS) at 1.7 g/L. Remains of lighting fuel were found during the removal of the accumulated rubble in the ancient cemetery, where they were analyzed using gas chromatography mass spectrometry (GC-MS) analysis which proved that they are composed of crude oil. Using a scanning electron microscope to examine the traces of wick ash, it appeared that the wick was made of the culm of *Cyperus articulate*. Based on experimental work, this was also proven by light microscopy examination of the culms of *Cyperus articulate* and *Cyperus papyrus*.

KEYWORDS: *Cyperus articulate, Cyperus papyrus*, GC-MS, Hellenistic period, oil lamp, lighting fuel, Shatby Cemetery, wick,

I. INTRODUCTION

Shatby Necropolis is located directly beyond the eastern limits of the ancient royal (eastern) quarter of the ancient city of Alexandria, overlooking the shore of the Mediterranean Sea, in the modern district of Shatby. The cemetery is very important as it provides the earliest example of the Alexandrian-style burials carved into rock. This Ptolemaic cemetery dates back to the late 4th century BC and is thought to be the city's earliest cemetery, belonging to the first generation of Alexandrian families[1] **[FIGURE 1]**[2].

Evaristo Breccia, then director of the Graeco-Roman Museum of Alexandria, excavated the site between 1904 and 1910. His findings were published in a remarkably high standard article [1905] and a monograph [1912][3]. Nonetheless, his publication leaves a number of unanswered questions, and various archaeological features undocumented or undiscussed, presenting an opportunity for renewed archaeological research in the area.

Several archaeological field seasons were conducted in the Shatby necropolis area from 2010 to 2014, with the goal of finding explanations for some of the questions left unanswered by Breccia's publication[4].

The Hellenistic cemetery of Shatby has been completely upgraded as part of the Alexandria Necropolis Project [2020–2023], which began in 2020 by the Archaeological Society of Alexandria with funds from the A. G. LEVENTIS foundation of Cyprus and by permission and supervision of the Egyptian Ministry of Tourism and Antiquities. The Archaeological Society's mission was able to consolidate the excavation of the site and reach the original ground level by removing over two meters of layers of debris, dirt, and water. More than 300 artefacts were discovered, including human remains, some *Hadra Hydriai*, an inscribed miniature votive altar, and a huge amount of local and imported pottery in exceptional state of preservation.

Oil lamps were known in ancient Egypt. Castor oil, olive oil, sesame oil, animal fat, and other sources of fuel mentioned in historical sources were used, whose names may be pronounced without referring to the nature of the fuel. Linen or old clothes and some fabrics whose nature was not inferred were used to make wicks for oil lamps[5].

According to archaeological evidence, a lamp in ancient Greece was a small vessel made of stone, clay, metal, oyster shell, or glass. The lamp also included a wick and a liquid or liquefied fuel, such as vegetable oil or rendered animal fat. The wick was mostly made of flax, hemp, or other plant fibers. Lamps were classified into two types based on the position of the wick: spouted lamps and floating-wick lamps[6].

This paper aims to give the first assessment of a multidisciplinary study. It should be noted that the archaeological evidence and any relevant sources are sufficient to reconstruct these diverse aspects of the past if supported by examination, and with the

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[1] AMIN 2017: 73.

[2] A based on Adriani 1966. BOROWIK 2020: 76.

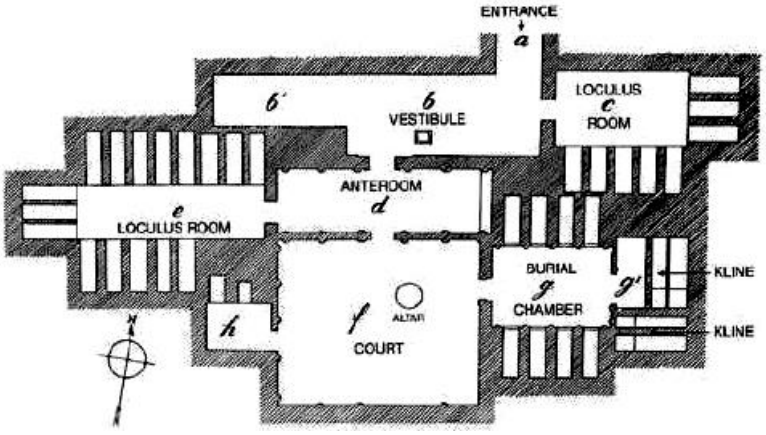
[3] BRECCIA 1912: XXXIV–XL; BRECCIA 1905: 55-106.

[4] RUMMEL & SCHMIDT 2015: 46; RUMMEL & SCHMIDT 2019:1154.

[5] ABD AL-SALAM 1987: 137-145; STRONG 2018 :102-104.

[6] MOULLOU et Al 2012: 238.

help of disciplines that use different methods and approaches, it can significantly improve our understanding to past technologies.



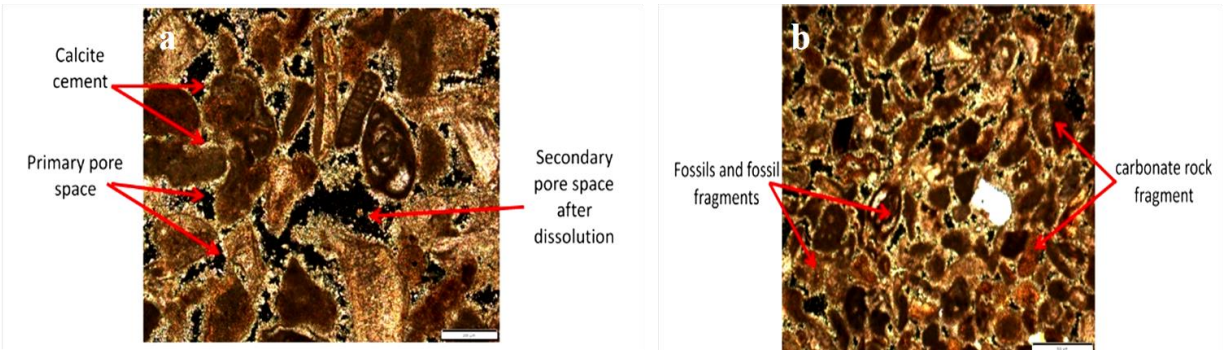
[FIGURE 1]: Shatby Necropolis, plan of Hypogeum.

III. MATERIALS AND METHODS

Mother Rock Investigation

The project examined a sample of the mother rock from which the cemetery chambers were carved, at the Department of Geology, Faculty of Science, Alexandria University. The rock was identified as a type of limestone called calcarenite, which is a sedimentary rock that has a white, creamy color, and is mainly composed of calcite and aragonite minerals ($CaCO_3$). It is composed of well-sorted, well-rounded, fine- to medium-sized carbonate grains, including different fossil fragments. All the grains are cemented together by a low to moderate amount of calcite cement. The rock has high porosity, up to 30% **[FIGURE 2].**

The limestone rocks are mainly composed of calcite and aragonite minerals. These minerals have high susceptibility to dissolution by certain types of groundwater (acidified water). Due to the fact that the groundwater at the site was slightly alkaline (pH 7.1), with the total dissolved solids (TDS) level of 1.7 g/L, it helped to protect the mother rock from erosion while also preserving the finds that were discovered in a good condition, such as oil lamps, wick residues, and pottery vessels.



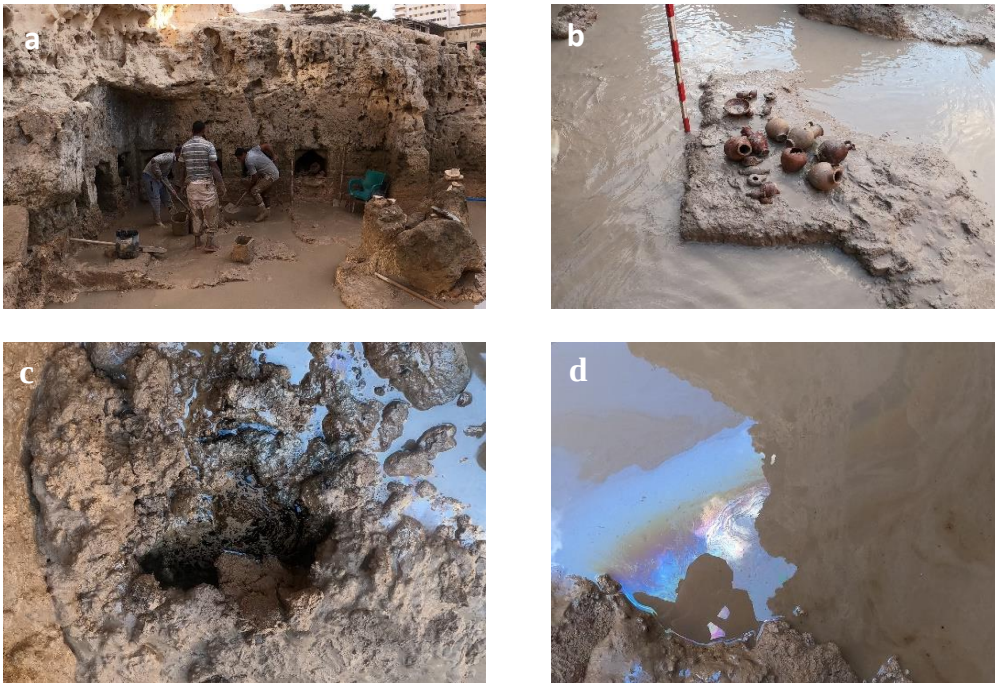
[FIGURE 2]: Photomicrographs of the rock thin section under microscope. A) calcite cement, primary pore space and secondary pore space after dissolution; B) Carbonate rock fragment, fossils and fossil fragments

IV. FUEL SAMPLE GAS CHROMATOGRAPHY–MASS SPECTROMETRY (GC-MS) ANALYSIS

The chemical composition of the samples was determined using a Thermo Scientific GC-TSQ mass spectrometer with a direct capillary column TG-5MS (30 m x 0.25 mm x 0.25 m film thickness) (Thermo Scientific, Austin, TX, USA). The temperature of the column oven was initially held at 60°C, then increased by 5°C/min to 250°C withhold 2 minutes, then increased to 300 with 30°C/min. The temperature of the injector was kept constant at 270°C. Helium was used as a carrier gas at a constant flow rate of one milliliter per minute. The solvent delay was 4 min and diluted samples of 1 µl were injected automatically using Autosampler AS3000 coupled with GC in the split mode. EI mass spectra were collected at 70 eV ionization voltages over the range of m/z 50–650 in full scan mode. The temperatures of the ion source and transfer line were set to 200 °C and 280 °C, respectively. The components were identified by comparing their mass spectra to the mass spectral databases WILEY 09 and NIST14[7].

Fuel Sample Preparation

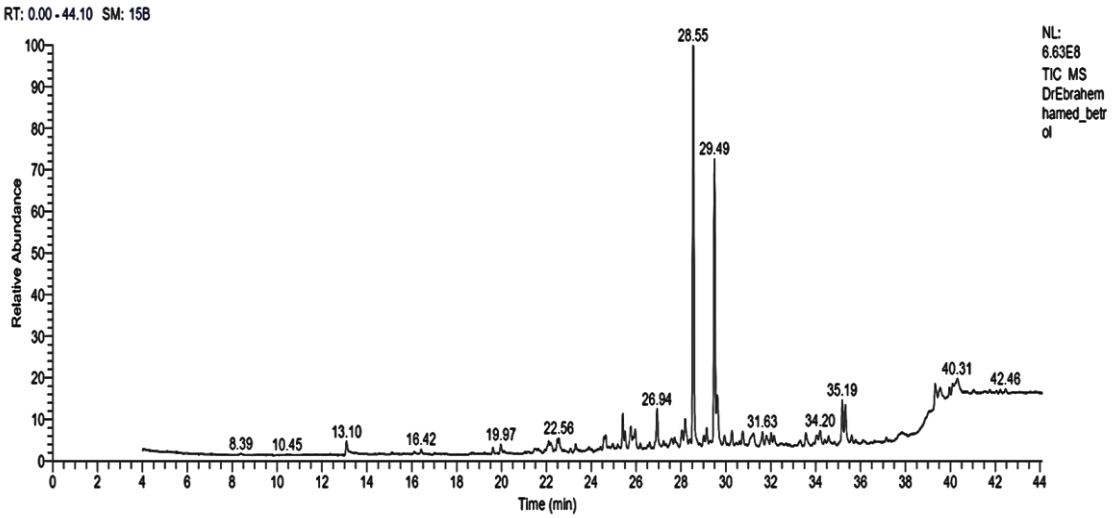
Residues of ignition fuel were found in the southwestern corner of room C, at the right side of the entrance, where they were picked up with absorbent cotton. The raw fuel seemed to be sticky like grease, as soon as it floated on the surface of the water around the room during excavations, until it disintegrated and spread on the surface of the water, giving the colors of the spectrum **[FIGURES 3/ A & D]**



[FIGURE 3]: A)The removal of rubble to reach the level of the rocky floor in room C of hypogeum A; B) Some pottery vessels and oil lamps of various shapes and sizes found in room C; C) The black adipose material floats to the surface in the southwest corner of room C after reaching close to the original bedrock; D) The agglomerations of the black fatty substance, as soon as they float to the surface, disintegrate, giving the colors of the visible spectrum© Taken by the researchers

[7]ABD EL-KAREEM et Al 2016: 14.

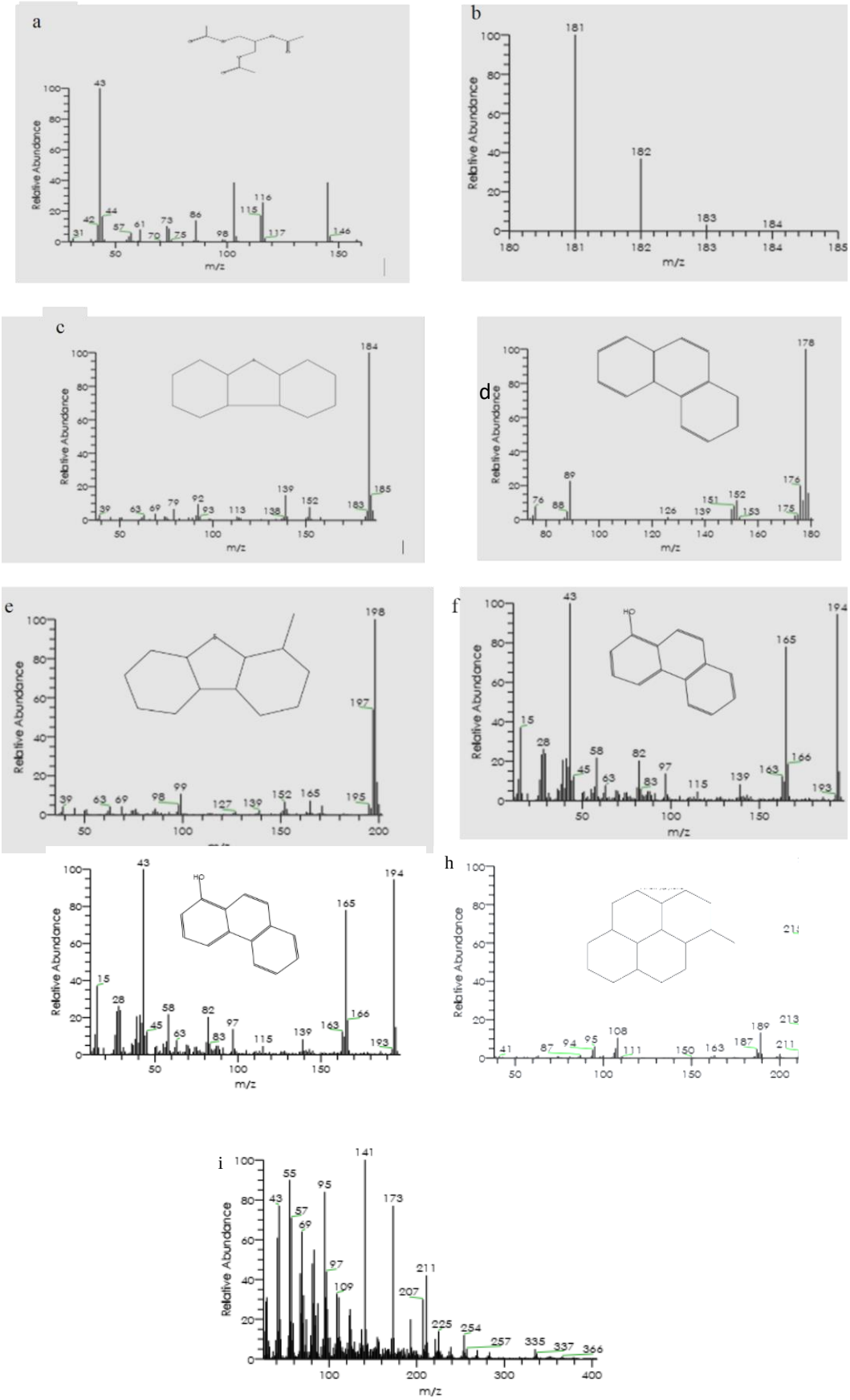
It is noteworthy that samples similar to the collected fuel sample appeared in Philoteknos room in the northeast corner of hypogeum A, to the right of the entrance, also. The sample was dissolved in 50 mL hexane, filtered on filter paper, and transferred to GC-MS **[FIGURE 4].**



[FIGURE 4]: The GCMS chromatogram of the fuel sample © Analyzed by the researchers

Peak Report			
ID	RT	Name of compound	Molecular weight
1	13.09	Triacetin	218
2	19.97	Pyridine	210
3	23.30	Dibenzothiophene	184
4	23.30	Phenanthrene	178
5	24.96	Dibenzothiophene, 4-methyl-	198
6	25.17	1-Phenanthrenol	194
7	28.55	Fluoranthene	202
8	31.63	Pyrene, 1-methyl-	216
9	40.31	Docosanoic acid,8,9,13-trihydroxy-, methyl ester	402

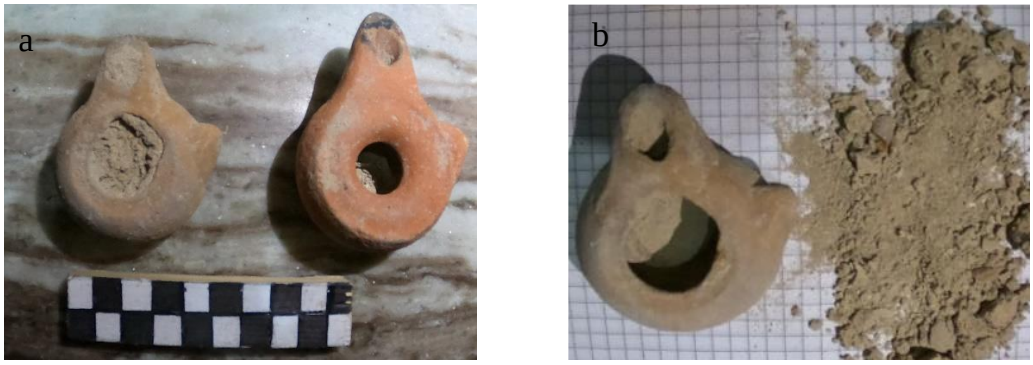
[TABLE 1]: The most important compounds of GCMS chromatogram of the fuel sample ©Done By the researchers



[FIGURE 4]: A)The mass spectrum of Triacetin; B) The mass spectrum of Pyridine; C) The mass spectrum of Dibenzothiophene; D) The mass spectrum of Phenanthrene; E) The mass spectrum of Dibenzothiophene, 4-methyl-; F) The mass spectrum of 1-Phenanthrenol; G)The mass spectrum of Fluoranthene; H) The mass spectrum of Pyrene, 1-methyl-; I) The mass spectrum of Docosanoic acid,8,9,13-trihydroxy-, methyl ester

V. Scanning electron microscope examination

The traces of wick ash that were found in an oil lamp in the same location in room C **[Figures 5/ A & B]** were examined with a scanning electron microscope / FEI QUANTA 3D 200 I at the Grand Egyptian museum's laboratory-at 750x magnification. The samples were glued to a sample holder with conductive adhesive and then sputtered with a thin layer of gold for 180 seconds using an Edwards Scan Coat Six device.

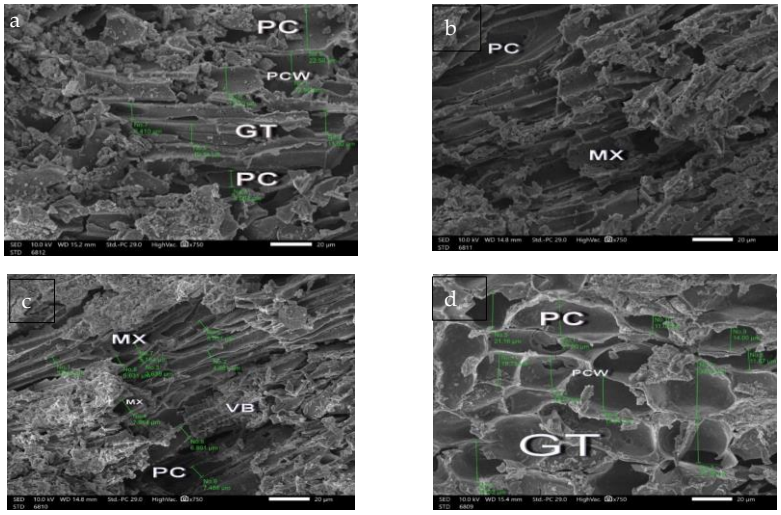


[Figure 5]: A) Two oil lamps filled with rubble, one of which was found with the remains of the ashes of the burning wick, as they were discovered among another group in the southwestern corner of room C; B) After drying, the ashes were emptied to find the remains of the burning wick. © Taken by researchers

VI. Experimental Method

1. Evidenced Research

Upon the preliminary results of the examination of SEM images obtained, samples of suspected plants with the similar anatomical characters of two *Cyperus* spp., namely, jointed flat sedge *C. articulate* and papyrus *C. papyrus,* were collected for the determination of their specific gravity as well as their anatomical characteristics **[Figures 6/ A & D]**.



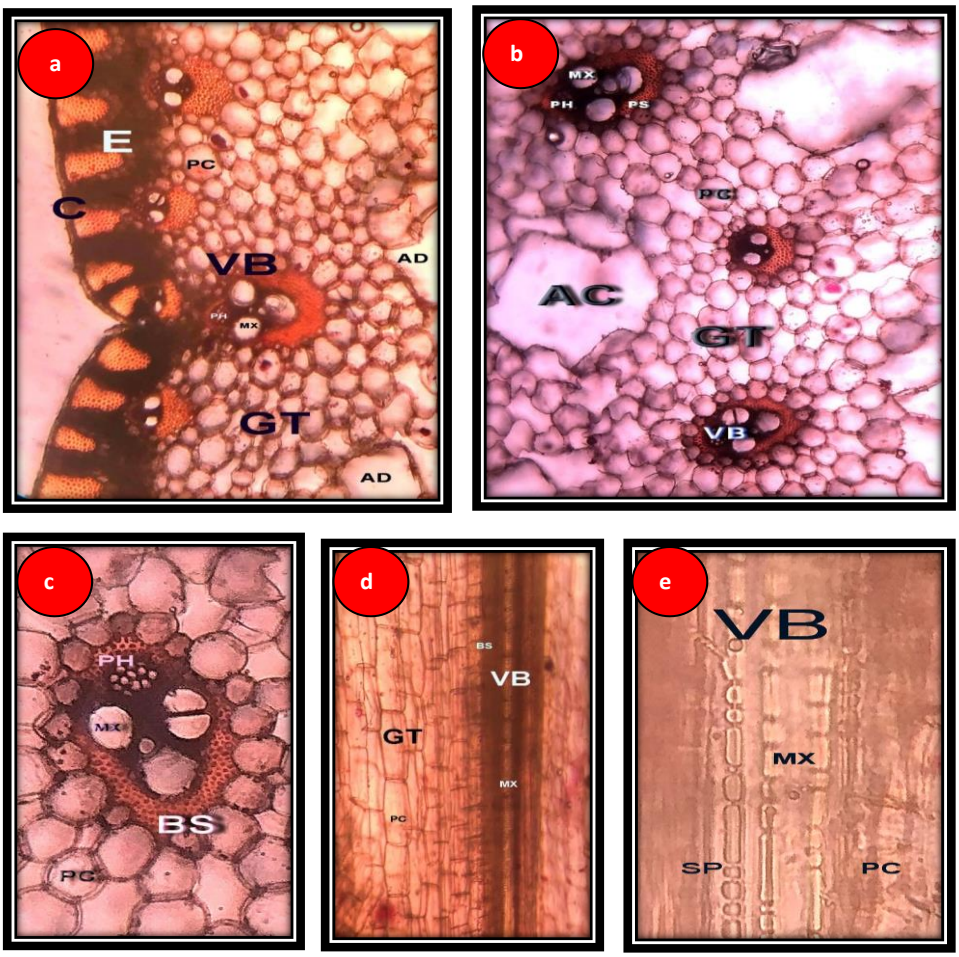
[Figure 6]: Scanning electron micrograph of burnt wick obtained from the oil lamp. A) Side (longitudinal) view of an intact plant tissue covered with ash and impurities. MX is the metaxylem of vascular bundle (VB) and PC is the parenchymatous cell of the primary cell wall (PCW) of the ground tissue (GT); B) Intact plant tissue covered with ash and impurities. MX is the metaxylem of vascular bundle (VB) and PC is the parenchymatous cell; C) Intact plant tissue covered with ash and impurities. MX is the metaxylem of vascular bundle (VB) and PC is the parenchymatous cell; D) Transverse view of an intact plant tissue. PC is the parenchymatous cell of the primary cell wall (PCW) of the ground tissue (GT).

2. Determination of Specific Gravity

Samples of culms of *C. articulate* and *C. papyrus* were cut into 3-cm-long segments to determine the specific gravity according to the method described by Smith [1954]. Five replicates were used in a complete randomized design, and the data obtained were statistically analyzed[8].

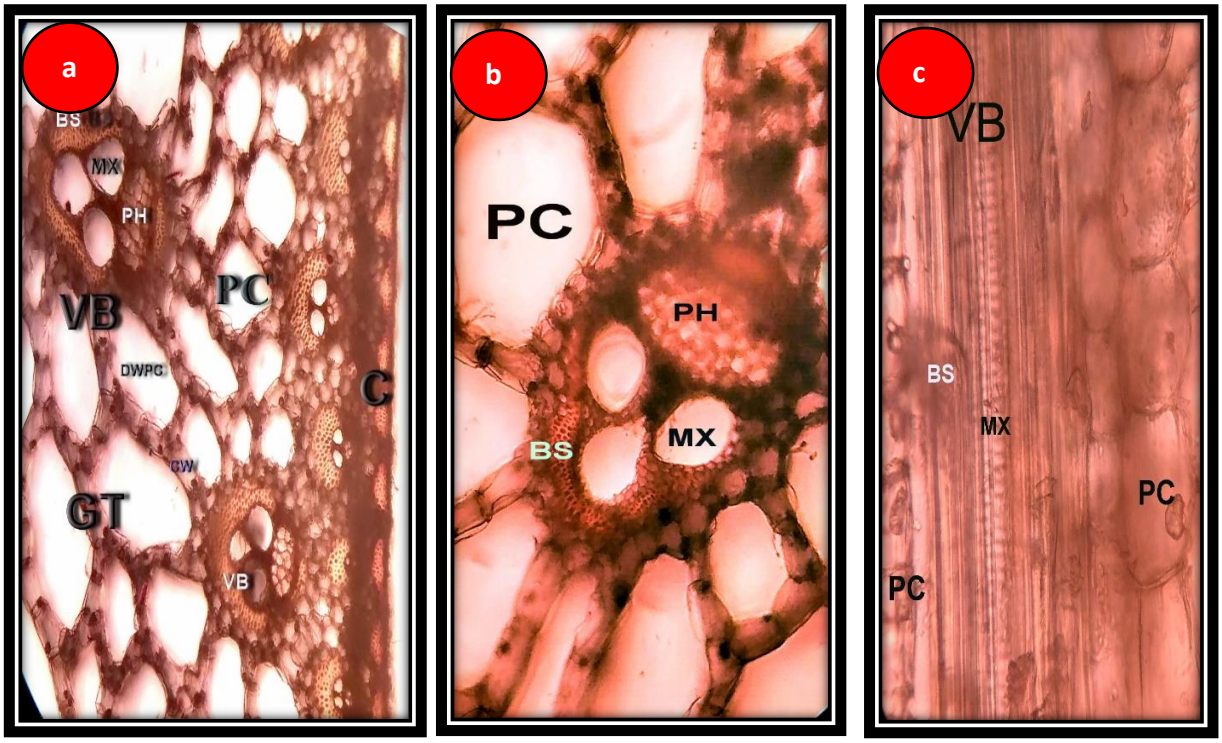
3. Anatomical Studies

Green samples of culms of *C. articulate* and *C. papyrus* were cut into 2-cm-long segments, softened in hot water, then transverse and longitudinal hand sections were taken, stained with safranin stain, rinsed in distilled water, and eventually fixed in slides with glycerin for microscopy examination **[FIGURES 7/ A & D] & [FIGURES 8/ A & C].**



[FIGURE 7]: *Cyperus articulatus*: A) Transverse section (TS) of *Cyperus* sp culm shows the scattered vasular bundles with ground tissue of thin (single) walled parenchymatous cells and noticeable longitudinal air duct (AD); B) TS of *Cyperus* sp culm indicats the thin-walled paranchymatous cells of the ground tissue, vascular bundles and longitudinal air channel (AC); C) vascular bundle composed of metaxylem, phloem and bundle sheath; D) longitudinal section (LS) of *Cyperus* sp culm shows vascular bundle and groud tissue ; E) LS of *Cyperus* sp culm shows metaxylem member and simple pits (SP) of its wall. C is the cuticle, E is the epiderms, GT is the ground tissue, PC is parenchymatous cells, BS is the bundle sheath, VB is vascular bundle, MX is the metaxylem, PH is the phloem tissue, AD is the longitudinal air duct or air channel (AC).

[8] SMITH 1954: 2.



[FIGURE 8]: *Cyperus papyrus*: A) Transverse section (TS) of *Cyperus* sp culm showing the scattered vasular bundles with ground tissue of thick- (double) walled parenchymatous cells; B) TS of *Cyperus* sp culm indicats double-walled paranchymatous cells of the ground tissue, vascular bundle composed of metaxylem, phloem and bundle sheath; C)longitudinal section (LS) of *Cyperus* sp culm shows vascular bundle and metaxylem of scalariform pitting and ground tissue of parenchymatous cells.

C is the cuticle, CW is the cell wall, GT is the ground tissue, PC is parenchymatous cells, VB is vascular bundle, BS is the bundle sheath, MX is the metaxylem, PH is the phloem tissue and DWPC is the double-walled parenchymatous cell.

4. Anatomical Studies

The preliminary scanning electron microscopy examination indicated that the wick is just an intact tissue of a plant that belongs to the monocot plants, since the ground tissue of single-walled parenchymatous cells was detected in addition to vascular bundles **[FIGURE 6].**

5. Specific Gravity (SG)

On the basis of the data obtained regarding the specific gravity (SG) of culms, it was found that the SG was 0.128 and 0.197 for the culms of *Cyperus articulate* and *C. papyrus*, respectively.

VII. CONCLUSION

By analyzing the fuel sample, it was found that it was composed of crude oil compounds (TABLE (1) AND **[FIGURE 4/A & I]**. It is of no surprise that crude oil and bitumen derivatives were used in this era; since an increase in bitumen use was apparent during the Third Intermediate Period, where it reached the peak of use in Ptolemaic and Roman times on mummy balms[9]. Bitumen and crude oil were both utilized for lighting in ancient times. For instance, bitumen-soaked rushes were used to make torches in ancient Babylon, and during the Roman era in Sicily, liquid asphalt was used in lamps in place of olive oil[10]. Triacetin [$C_9H_{14}O_6$], a triester of glycerol acetic acid, could be used as an additive to biofuel. A byproduct of the manufacture of biodiesel is glycerol. Triacetin boosts the density and viscosity of the blend, according to a recent study on the substance's effects. However, the blend's octane number, heating value, and flash point decreased[11].

Pyridine has the chemical formula C_5H_5N and a benzene-like structure. It is a weakly basic, transparent «yellowish», water-soluble heterocyclic aromatic compound with a distinct and unpleasant odor. Many of the different substituted pyridines exhibit similar properties[12].

Naphthalene, fluorene, phenanthrene, dibenzothiophene, and their alkylated isomers, as well as anthracene, fluoranthene, benzopyrenes, and aromatic steranes, are examples of aromatic hydrocarbons found in crude oil[13].

The oil lamp was the most effective type of lighting in the ancient societies. Oils used as fuel included olive, bituminous oils like petroleum, and vegetable oils[14]. The crude oil stains during the removal of the debris from the southwestern corner of Room C floated on the water in the form of small black lumps, and as soon as they stopped flowing, they spread on the surface of the water, giving the colors of the rainbow **[FIGURE 2/ B & D]**. A type of slick appearance illustrated in rainbow sheens have different physical origins than other thickness-appearance relationships, according to research. Hornstein investigated various slick phenomena and came to the conclusion that the rainbow sheen was caused by constructive and destructive interference between light reflected from the oil surface and that reflected from the water surface. This is a one-of-a-kind indicator of oil thickness[15].

The wick's remnants lack the smooth surface with dislocations, polygonal cross section, and other traits of bast fibers like flax or jute. Instead, the wick is still visible by SEM with a surface that resembles parenchymal tissue and sporadic vascular tissue. The fibers might be remnants of unprocessed plant stems because they do not seem to have been altered. The fiber of plants in the rush family (Juncaceae) appears to be the closest comparison yet discovered, because they exhibit highly comparable features **[FIGURE 6]**.

[9] CLARK et Al 2016: 2.

[10] FORBES 1936: 79.

[11] ZARE et Al 2015: 1.

[12] SILVAA et Al 2021: 1.

[13] ONYEMA & OSUJI 2015: 526.

[14] PETERSON 2013: 98.

[15] FINGAS 2021: 6.

Lamp wicks, however, might be reportedly and frequently manufactured in antiquity from plant crude fibers including flax, hemp, common rush (*Juncus effusus* L.), papyrus, or mineral asbestos, according to ancient authors. Pliny the Elder makes a point of stating that the rush pith is used for this purpose[16].

Cyperus is a large genus with about 600 species that is found all over the world. Cyprus spp. has three taxa (*Cyperus alopecuroides*, *C. articulates and C. papyrus*) are naturally growing on the Nile delta canal banks in Egypt[17].

Light microscopy examination of the culms of *Cyperus articulate* and *C. papyrus* **[FIGURES 6-7]**, which belong to monocot plants, revealed that the former species (*C. articulate)* is closer to that recognized in the wick examined by SEM, notably its single-walled parenchymatous cells of the ground tissue that distinguish it, compared with that manifested in *C. papyrus*, are characterized with double-walled parenchymatous cells.

It is concluded, however, to a great extent, that the wick used for the lamp was taken from the culm of *Cyperus articulate,* which has a lower specific gravity (0.128), which enables the diffusion and flow of the fuel through its vascular bundles and air channels easily; also, SEM micrographs of C. articulate show its cell shape, concave periclinal walls, and indistinct silica bodies[18]. Additionally, *C. papyrus* has significantly reduced vascular tissue[19].

VIII. ACKNOWLEDGEMENT

The researchers would like to thank **Prof./ Mona Haggag**, President of the Alexandria Antiquities Society and Director of the restoration project, development, and protection of the archaeological cemetery of Shatby. The primary researcher is also a member and is in charge of the restoration project.

[16] BASSO & GLEBA 2016: 354.

[17] EL-AMIER & ABD EL-GAWAD 2017: 294-299.

[18] SHALABI & GAZER 2015: 2339-2346.

[19] AMINI RAD & SONBOLI 2008: 8.

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REHABILITATING EL-SAKAKINI PASHA'S PALACE AS A MUSEUM OF ARCHITECTURE

BY

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ABSTRACT

[AR] إعادة تأهيل قصر السكاكيني باشا كمتحف يروي تاريخ العمارة

يُعاني قصر حبيب السكاكيني من الإهمال السيئ الذى كان حافزًا كبيرًا للباحث لإيجاد حلول قابلة التنفيذ لإعادة تأهيله وإعادته للحياة مرة أخري. يهدف هذا البحث إلى تحويل القصر إلى متحف. يُعتبر قصر حبيب السكاكيني من أهم القصور المصرية لإتباعه لأسلوب فني يُعرف باسم «*الروكوكو*». يتسم هذا القصر بموقعه الفريد بحي الظاهر والذى كان مليئًا بالحياة حتى وفاة السكاكيني باشا الذى فُقِدَ ميراثه. يُعد استخدام الأدبيات السابقة لجمع وتحليل البيانات حول القصر نقطة الإنطلاق لهذا البحث. علاوة على ذلك، تهدف الدراسة الميدانية للقصر إلى زيادة فهم واقعه الفعلي لتطوير نهج مناسب يُنظم إعادة تأهيله كمتحف. كما قدمت بعض الصور الوثائقية للقصر معلومات قيمة حول القطع القليلة من أثاثه المتبقي . وفي النهاية ساعد البحث التجريبي للباحث علي تطوير مناهج جديدة ومبتكرة لتحويل القصر إلى متحف. سوف يُساعد تحويل القصر إلى متحف في الحفاظ علي معماره التاريخي الرائع. تُقدم هذه المقالة أفكارًا، وموضوعات، وتقنيات عرض متحفي لتسليط الضوء على أهمية القصر والحفاظ عليه للأجيال القادمة. كما شجعت قيمة القصر الفنية، و تصميمه المتميز، و زخارفه المميزة الباحث على تطوير مقترح لتحويله إلى متحف للهندسة المعمارية بدلاً من استخدامه كبنك، أو فندق، أو مدرسة والذي قد يجرده من سياقه التاريخي وهويته. ويُقدم البحث هذا المُقترح إثراءًا لخريطة المتاحف بمصر.

[EN] The palace of Ḥabīb El-Sakakini is suffering badly from neglect; a condition which was a big motivator for the researcher to investigate possible solutions to rehabilitate the building. This research aims to convert the palace into a museum. Because it follows the *Rococo* style, the palace is considered one of the most important Egyptian palaces. It is uniquely located in the *al-Ẓāhir* district. The palace was full of life until the death of Sakakini Pasha and his inheritances were lost. The starting point of this article is considered to be the previous literature's usage for collecting and analyzing data about the palace. Moreover, the study of the palace aims to increase the understanding of its actual situation to develop an appropriate approach for organizing its rehabilitation as a museum. Furthermore, documentary photos provided valuable information about its few remaining furniture collections. Finally, empirical research helped the researcher develop new and innovative strategies for transforming the palace into a museum. Transforming the palace into a museum will help the palace preserve its historical and outstanding architectural design. This article presents ideas, themes, and exhibition techniques to highlight the palace's importance and preserve it for the next generations. Additionally, the palace's artistic value, unique design, and distinctive decorations encouraged the researcher to develop a proposal for converting it into a museum of architecture rather than using it as a bank, hotel, or school, which might strip it out of its historical context and identity. The article presents this proposal in an attempt to enrich the Egyptian museums' landscape.

KEYWORDS: Architecture, El-Sakakini Palace, El-Sakakini Pasha, museum, museum exhibition, Museum of architecture, style of art.

I. INTRODUCTION

The Palace of Ḥabīb El-Sakakini has a unique architectural style and colorful decorations that make it distinct and fantastic in Cairo's skyline **[FIGURE 1]**. It is characterized by many architectural details; garlands, statues, and other sculptures everywhere[1]. Unfortunately, the abandonment of the palace started after its owner's death and his grandchildren; its walls and paintings were cracked, most of its fountains deteriorated and its statues were broken or lost. This inadequate status urged the Antiquities Authority (nowadays, Ministry of Tourism and Antiquities), in cooperation with the Ministry of Health temporarily occupying the palace as a health museum, to start its joint restoration project[2].

[FIGURE 1]: Skyline View of Sakakini Palace
https://www.facebook.com/groups/best.places.egypt/permalink/5775404869148577/
Accessed on 05/07/2022.

The Palace of Ḥabīb Sakakini also suffered from the implications of a poor restoration project during the 20th century that affected its historical features[3]. Nowadays, the palace is still suffering from negligence, which encouraged the researcher to think about proposing a project to transform it into a museum of architecture.

[1]RABBAT 2020: 141-168.
[2]*ARCHIVE, THE EGYPTIAN PRESS* 1990: 21.
[3]*ARCHIVE, THE EGYPTIAN PRESS* 1991: 3.

Furthermore, the richness of the employed architectural styles and the architectural significance of the palace strongly supported this proposal. This museum would highlight the history and development of architecture using evident and comprehensible museological methods.

II. Overview of Palace's History and Value

The distinguished Palace of Ḥabīb Sakakini was built following various styles of architecture including the Rococo style in 1897[4]. It is said that the palace is a copy of an Italian palace that Sakakini Pasha admired, so he ordered an Italian Company to build its replica in Egypt. The features of the Rococo style, which originally emerged in the late Baroque and was rare in Egypt, unlike in Europe at that time, were apparent on the palace's façade, using the floral decorations and the initials of Sakakini's name «HS»[5]. The architectural style and location of the palace showed the strong determination and detailed insight of Sakakini Pasha, who built his palace on a square named after him; an intersection of eight streets in the *al-Ẓāhir* district, a developing neighborhood northeast of a Fatimid City at that time[6].

The land of the palace was originally a lake known as «*Turkmen Karaja*» located to the east of *Sultan Bebars Al-Bondoqdary's* mosque[7]. It is claimed that Sakakini Pasha got the land of this lake with the help of Khedive Ismail through a public auction. His land ownership was documented in a decree issued by the Mixed Courts in June 1880. Sakakini Pasha started to dry out the lake in 1892 and prepare it and its surroundings to build his palace. The Pasha lived in the palace till his death in 1923 and hence his heirs till 1952. After his death, one of the heirs dedicated his inheritances to the Ministry of Health, which transformed the palace into a museum; the other heirs gifted the rest of their inheritances to the government. In 1961, the palace was transformed into the headquarters of the Socialist Union and then into an educational museum for health, besides the basement's use as a clinic[8]. Even after the palace was registered as a monument by the Ministry of Culture with decree number 143 in 1986 **[Figure 2]**[9], it has remained in a state of neglect since the death of its owners[10].

[4]Helmy 2016 : 167.
[5]Hemeda 2013: 344-357.
[6]Rabbat 2020:141: 168.
[7]Hemeda 2013: 344-357.
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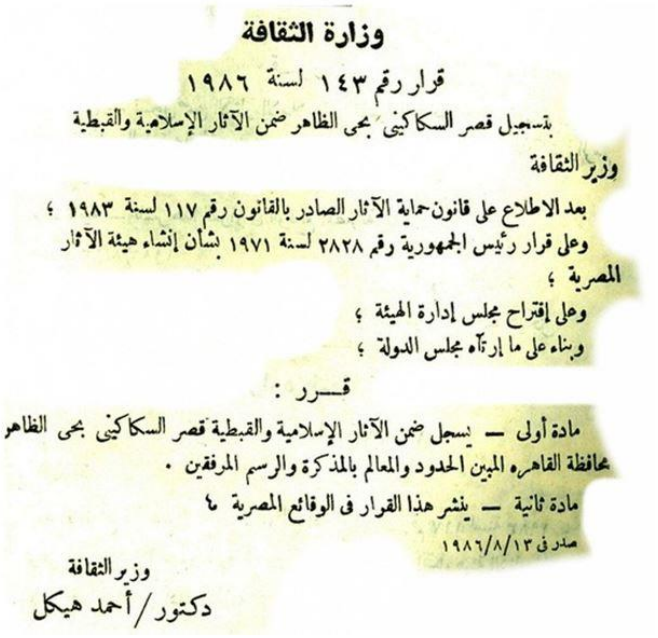
[9]*The Ministry of Tourism and Antiquities*.
[10]*Ministry of Culture, Cabinet Decision* 1986.



وزارة الثقافة

قرار رقم ١٤٣ لسنة ١٩٨٦

بتسجيل قصر السكاكيني بحي الظاهر ضمن الآثار الإسلامية والقبطية

وزير الثقافة

بعد الاطلاع على قانون حماية الآثار الصادر بالقانون رقم ١١٧ لسنة ١٩٨٣ ؛

وعلى قرار رئيس الجمهورية رقم ٢٨٢٨ لسنة ١٩٧١ بشأن إنشاء هيئة الآثار المصرية ؛

وعلى إقتراح مجلس إدارة الهيئة ؛

وبناء على ما إرتآه مجلس الدولة ؛

قـــرر :

مادة أولى — يسجل ضمن الآثار الإسلامية والقبطية قصر السكاكيني بحي الظاهر محافظة القاهرة المبين الحدود والمعالم بالمذكرة والرسم المرفقين .

مادة ثانية — ينشر هذا القرار في الوقائع المصرية ؛

صدر في ١٣/٨/١٩٨٦

وزير الثقافة

دكتور/ أحمد هيكل

[FIGURE 2]: Registration Decree

In an attempt to rescue the palace, former President Mohamed Hosny Mubarak dedicated one million dollars to a restoration project, but, unfortunately, it was poorly restored; the palace and its doors were painted green and yellow, respectively, distorting its historical features. This painting process ignored the original colors of the palace and the fragile nature of its structural assemblies, like its wooden doors[11]. There were some other attempts to revive the palace such as the initiative of Dr. Zahi Hawas in 2003, which called for restoring the palace to transform it into a museum for medical sciences. Unfortunately, this idea was never put into action.

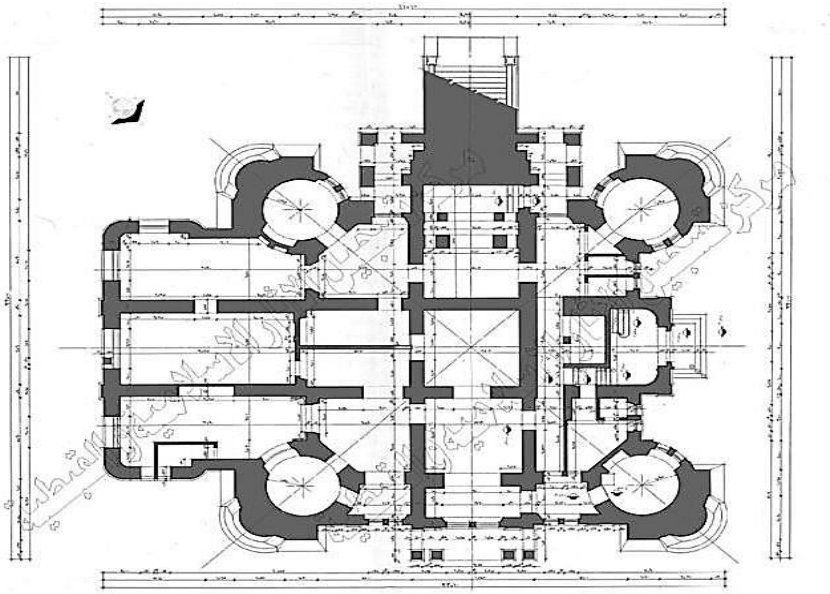
Palace's Description

Sakakin Pasha built his palace, consisting of the basement and about fifty rooms spread among its floors, on about 2698 square meters **[FIGURE 3]**[12]. The palace is surrounded by iron railings and a small garden decorated with some statues. There were around 300 statues distributed in many places in the external façade of the palace as well as inside it. Two lion alabaster statues decorate the palace entrance before its main wooden door. This door leads to a decorated rectangular hall that opens to other rooms decorated on their ceilings and walls **[FIGURE 4]**[13].

[11]*ARCHIVE, THE EGYPTIAN PRESS* 1991: 3.

[12]*THE ISLAMIC & COPTIC REGISTRATION CENTER OF ANTIQUITIES AT THE CITADEL, MINISTRY OF TOURISM AND ANTIQUITIES.*

[13]SULEIMAN 2013: 54-55.



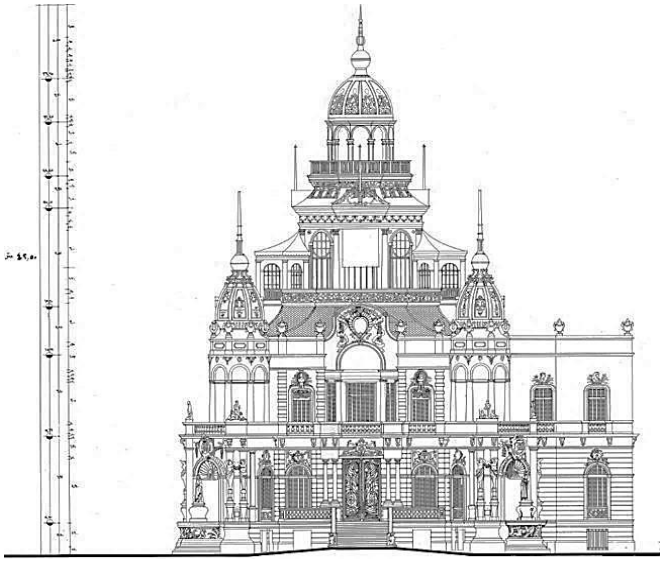
[FIGURE 3]: Plan of Sakakini Palace

[FIGURE 4]: Decorated Hall© Taken by the researcher 01/ 04/ 2022

The external façade of the palace is very richly decorated and takes the shape of squares occupied by four circular towers. These towers are cupped with ribbed round domes at the four corners. In addition, there is a central dome located above a tiered octagonal pavilion.

Busts of Ḥabīb Sakakini and his wife, in addition to four pairs of different-age children's statues, are scattered on the handrails of the first-floor bedrooms' balconies. One of the most noticeable and elaborate elements of the façade's decorations is the four maidens' statues representing the four seasons **[FIGURE 5]**[14].

[14]The Islamic & Coptic Registration Center of Antiquities at the Citadel, Ministry of Tourism and Antiquities.



[FIGURE 5]: Front Façade of the Palace

Each statue is standing alone on a large urn inside a niche taking the shape of a seashell flanked on each side by a pair of caryatides **[FIGURE 6]**. The arrangement of these four statues softens the sharp square edges of the palace to give it the effect of an octagon. Moreover, the top of each niche is decorated with the two Latin letters «**H**» and «**S**» in four different styles indicating the initials of Ḥabīb Sakakini's name. In contrast, his full name is inscribed above the western entrance of the palace in Arabic, along with the date, 1897, of building the palace. **[FIGURE 7]**.

[FIGURE 6]: Overview and Corner Niche of Sakakini Palace© Taken by the researcher 01/ 04/ 2022

[FIGURE 7]: The inscribed name of Sakakini and the date of building above the entrance© Taken by the researcher 01/ 04/ 2022

III. SUGGESTED VISION

This part of the article proposes some affordable ideas, objects, themes, and exhibition techniques that could be applied in the palace after adopting the proposal of transforming it into a museum of architecture. All the proposed ideas and suggestions have considered the ancient history of the palace and its unique architectural significance. Accordingly, the idea of its transformation into a museum of architecture was very well studied and was deliberately chosen based on the strong consistency between being a museum of architecture and its unique architectural style and decorations. This would leave the needed space for its visitors to contemplate the palace's beauty, its distinctive decorations, and its architecture. The following themes and exhibition ideas would help in achieving this goal.

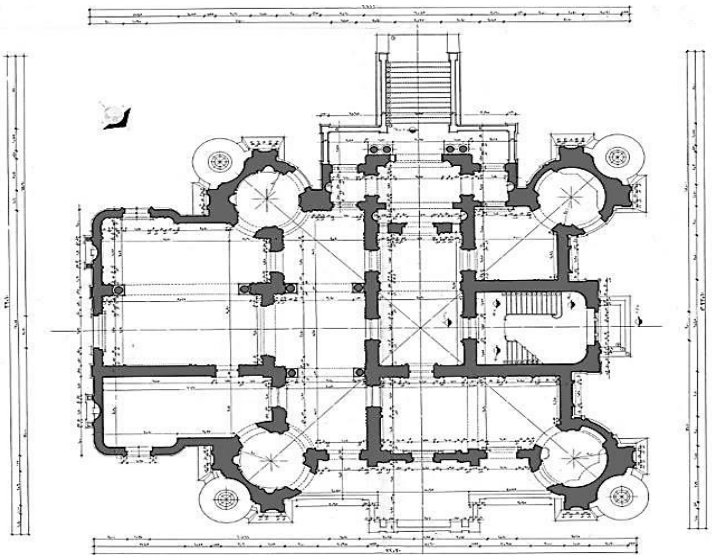
1. Exhibitions of the 19th Century's Various Styles of Architecture

Before the French expedition to Egypt, the architecture in Egypt was affected by the local style which emerged from the previous Islamic eras' styles and the Ottoman styles. After evacuating the French expedition from Egypt in 1802 and mandating Muhammed Ali to rule Egypt in 1805, a new generation of openness to European and Western architectural styles was started. Implementing these new architectural styles required skilled artists who came to Egypt to generate different styles[15]. Egypt witnessed many architectural styles transferred to

[15]MAHFOUZ 2017: 732-753.

it, especially from Europe during the 19th century. These styles became part of our cultural identity, representing living landmarks on Egyptian land.

It is therefore recommended to set up several museum exhibitions for each architectural style at the «Museum of Architecture»**.** These exhibitions would display the artistic features and adopted techniques of these styles by exhibiting and elaborating on some established historical structures in Egypt and maybe comparing them with examples from abroad at some points. Locating this exhibition at the palace's ground level is recommended here to be the starting point for elaborating the purpose of the museum of architectural development **[FIGURE 8]**[16]**.** Among the most important architectural styles that were transferred to Egypt are **1)** the Gothic Architectural Style, **2)** the Renaissance Architectural Style, **3)** the Neo-Classical Architectural Style, **4)** the Baroque Architectural Style, and **5)** the Rococo Architectural Style[17]. These styles were used in the palaces following the European style of art and architecture, like the Baroque Style that has found its way and spread in Egypt[18].



[FIGURE 8]: Palace's Ground Level Plan

The palaces' architecture and styles that would be exhibited at the «Museum of Architecture» are diverse and of great value. The Palace of Muhammed Ali in Shubra as well as his Gawhara Palace in Salah El Din Citadel are examples that adopted the *Romy* style, which followed the Islamic rules, in their architecture, imitating the vast palaces of Turkey[19]**.**

Most of the 19th century's Egyptian palaces combined more than one architectural style along with reviving some of the old styles. This diversity came to Egypt due to many historical reasons like wars, expeditions, and foreign artists coming from different countries to work in architecture. These important reasons affected the architectural styles, enriching this part of the exhibition with diversity and variety that can attract all architecture lovers.

[16]The Islamic and Coptic Registration Center of Antiquities at the Citadel, Ministry of Tourism and Antiquities.
[17]ABD ELRAHMAN & ELNABARAWI 2021: 100-120.
[18]MOUSA 2019: 718-733.
[19]IBRAHIM 2022: 46-64.

The Sakakini Palace, as a case study of this paper, reflects this diversity in using European, Ottoman, and Islamic styles of architecture[20], making it an excellent venue for setting up the «Museum of Architecture». The rich details of architecture and the mix of styles in the Palace of Sakakini Pasha should be highlighted through a standalone museum exhibition to interpret it to its visitors and the local community.

The researcher suggests presenting several models that would display international representations of historical palaces built in diverse architectural styles, including the Gothic, Renaissance, Neo-classical, Baroque, and Rococo Styles. One example that applied the same method is the Linköping Castle and Cathedral Museum in Sweden, where visitors can imagine the whole process of building the castle through a 3D model, **[FIGURE 9]**, which reflects the building methodology that dates back to 900 years, including its transformation from a bishop's castle to a royal castle following the Renaissance style[21].

[FIGURE 9]: Linköping Castle & Cathedral Museum model, https://lsdm.se/?page_id=484 Accessed on 10/06/2022.

Another example is the City Museum of Stuttgart in Germany, which presents interactive models to enrich visitors' knowledge with diverse information about the city and its buildings. The museum exhibits interactive multimedia models for the city of Stuttgart to reflect the life inside the city, including its streets and buildings. Among the models of the buildings are some white models **[FIGURE 10],** which included the representation of the Solitude Palace using an exciting way with the visitors that let them discover the meanings of the objects themselves. These multimedia stations provide visitors with in-depth information according to their interests and from diverse perspectives on interactive and touchable surfaces[22].

[20] HELMY 2016: 185-202.

[21] LINKÖPING CASTLE & CATHEDRAL MUSEUM WEBSITE: «EXHIBITIONS AT LINKÖPING'S CASTLE AND CATHEDRAL MUSEUM», in: https://lsdm.se/kontakt/, accessed on 10/06/ 2022.

[22] STADTPALAIS- CITY MUSEUM OF STUTTGART WEBSITE: «JANGLED NERVES, WORLD-ARCHITECTS.COM- PROFILES OF SELECTED ARCHITECTS», in: https://www.world-architects.com/en/jangled-nerves-stuttgart/project/stadtpalais-city-museum-of-stuttgart, accessed on 10/07/ 2022.

[FIGURE 10]: Tactile Interactive Models, https://www.world-architects.com/en/jangled-nerves-stuttgart/project/stadtpalais-city-museum-of-stuttgart, accessed on 10/07/2022

2. El- Sakakini's Life and Biography Exhibition

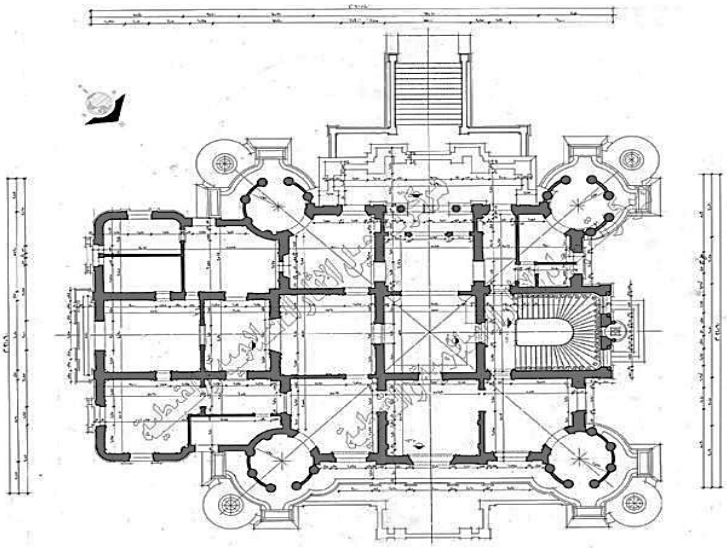
At the age of sixteen, Ḥabīb Sakakini, who is of Syrian origin, came to Egypt from Damascus to work as a day laborer in Port Said and later worked as an officer in the Suez Canal Company, and hence, the rich story of a businessman from Levantine began. It was said that Ḥabīb Sakakini gained most of his wealth due to his work as a contractor for Khedive Ismail. Regardless of the reality of the primary source of his wealth, Ḥabīb Sakakini succeeded in owning a very exceptional palace as a center point of a square named after his name in *al-Zāhir*, located northeast of the Fatimid city in Cairo[23]. Ḥabīb Sakakini Pasha (1841-1923) became among the close people to De Lesseps who entrusted him with the responsibility of drying swamps and ponds in Cairo. He did not stop at these positions; he took another direction to the construction field until he became very popular and skilled in it.

His talent reached Khedive Ismail, who decided to use his experience by handing him the duty of finishing the construction of the Opera House under the supervision of the Italian architect Pietro Avoscani before the opening ceremony of the Suez Canal. Sakakini developed the work-with-shift system that reached eight hours for each worker per day with twenty-four working hours a day. His innovative suggestion at that time proved its credibility and success, and the Opera House was opened at its planned time on November 19th, 1869. Sakakini had many other achievements during his lifetime, which led the Ottoman Sultan Abdelhamid to grant him the title *Bey* and then *Pasha*.

His success and accomplishments continued until he died in 1923. His intelligence and skills are advantages that made him distinguished in Egyptian history[24]. All this history could be highlighted in an exhibition in the «Museum of Architecture» that tells the history of the palace's owner and his contributions to Egyptian Architecture through his palace in the *al-Ẓāhir* neighborhood. It is suggested here to set up this exhibition on the palace's first floor

[23]RABBAT 2020: 141: 168.
[24]SULEIMAN 2013: 54-55.

[FIGURE 11][25] after handling the 19th century architectural styles at its ground level to be a transforming point for visitors to get in touch with the history of the palace's founder.



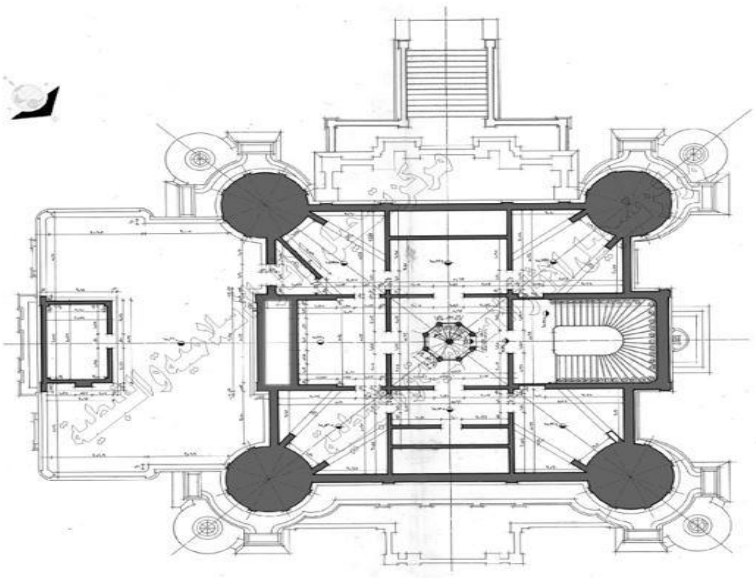
[FIGURE 11]: Palace's First Floor Plan

ARCHIVAL PHOTOS

Setting up an exhibition for some of the archival photos is among the suggested ideas of the researcher. It is recommended to set up a museum exhibition that aims to document the original architecture of Sakakini's Palace through some old photos taken, whether inside or outside the palace. These photos can also greatly assist the restoration process, in addition to their value in creating a nostalgic atmosphere among visitors. Moreover, using such archival images, the exhibition can reflect some of Sakakini's memories and special occasions with his family. Some pictures of Sakakini and his family would also be exhibited to keep their images alive in the visitors' eyes as the core theme of the palace.

It is preferable that the second floor **[FIGURE 12]**[26] would host this exhibition to let visitors get in touch with the real life inside the palace. After obtaining information about architectural styles and the palace's founder, this floor was chosen as an intermediate station. Furthermore, the *al-Ẓāhir* district is famous for the prominent public figures who lived there and enriched Egyptian culture[27]. It is suggested here also to dedicate an archival photos exhibition room that displays those public figures and their significant accomplishments. Moreover, this palace was documented in some TV shows, and it would be of great value to show short movies combining shots filmed inside or outside this palace.

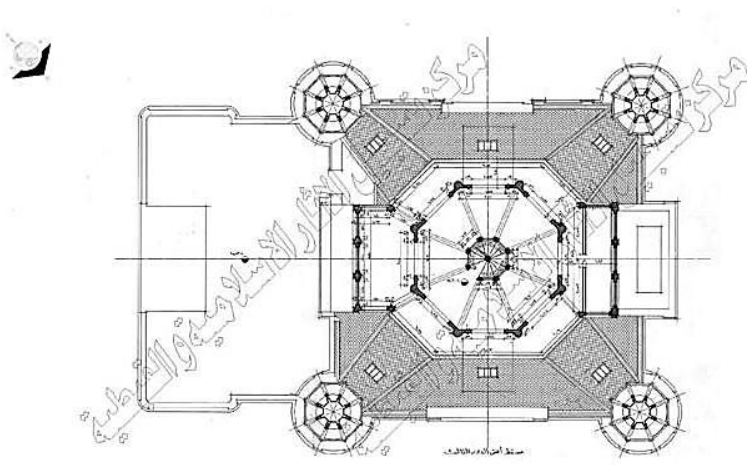
[25]The Islamic and Coptic Registration Center of Antiquities at the Citadel, Ministry of Tourism and Antiquities.
[26]The Islamic and Coptic Registration Center of Antiquities at the Citadel, Ministry of Tourism and Antiquities.
[27]SULEIMAN 2013: 54-55.



[FIGURE 12]: Palace's Second Floor Plan

Imitating Real Furniture through Augmented Reality Technique

After introducing some archival photos to the visitors on the second floor, it is recommended here on the third floor **[FIGURE 13]**[28]. To present an actual image of the palace's original furniture through the augmented reality technique. One of the relatively new methods that the heritage industry seeks to use for exhibitions and attracting new visitors is augmented reality[29]**.** Augmented reality is a visualization technology used to reconstruct the ruined heritage to afford good imagination of the past and to preserve it from being lost. Visitors can apply and use it during their tours through a rich database and a strong internet connection[30]. This method aims to provide computer-generated and real-time images in a live view, creating an almost lifetime experience of reality.



[FIGURE 13]: Palace's Third Floor Plan

[28]The Islamic and Coptic Registration Center of Antiquities at the Citadel, Ministry of Tourism and Antiquities.
[29]TSCHEU 2016: 607-619.
[30]VLAHAKIS 2001: 584993-585015.

The value of using augmented reality in the heritage field is excellent. It can afford a real-time experience and an enjoyable atmosphere through visitor's interaction with augmented reality shows[31]. The Palace of Sakakini Pasha was once inhabited and full of life. Every part of the palace, including furniture, was a witness to a lot of memories. The palace still houses a few objects from its original furnishings, such as a wooden partition **[FIGURE 14]**, a heater **[FIGURE 15]**, a wooden bookshelf affixed to the wall **[FIGURE 16]**, and a large wooden cupboard **[FIGURE 17]**. To bring the imitation of the original palace back to life, these few objects would be used to build the palace's original stenography beside the use of augmented reality[32]**.** Imitating the lost real furniture of the palace through augmented reality would keep a vivid picture of the palace for us and the next generations. It is also an affordable idea that will not cost a lot of money and would preserve the authentic picture of this palace.

[FIGURE 14]: Wooden Paravan

[FIGURE 15]: Heater

©Ministry of Tourism and Antiquities, Unpublished Documentary Report.

[FIGURE 16]: Wooden Library Affixed to the Wall

[FIGURE 17]: A large Wooden Cupboard

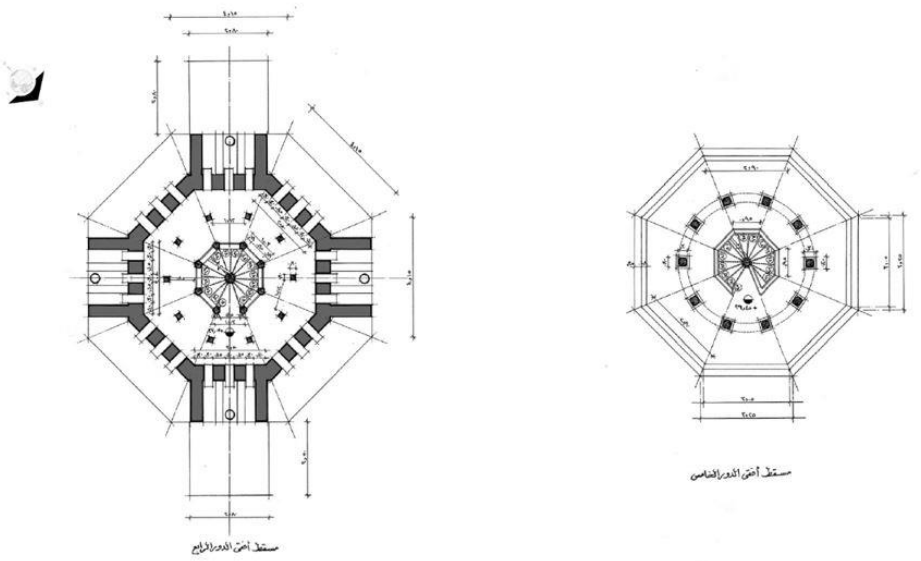
©Ministry of Tourism and Antiquities, Unpublished Documentary Report.

[31]TSCHEU 2016: 607-619.

[32]MINISTRY OF TOURISM AND ANTIQUITIES, UNPUBLISHED DOCUMENTARY REPORT ON SAKAKINI PALACE: 37-38/ 49-50

3. Exhibition about *al-Ẓāhir* Architecture

In this museum section, the researcher would like to highlight the historical importance of the *al-Ẓāhir* neighborhood through its architecture on the fourth and fifth floors (towers) **[FIGURE 18]**[33] of the palace, which would be the last stop while looking at the panoramic view of the district from the palace's highest point. The *al-Ẓāhir* neighborhood is a vibrant historic district from the 19th- century. Besides the Sakakini Palace, it houses other monuments from Egypt's ancient history uptil its modern one. It is also a dwelling for diverse religions as it has a synagogue, churches, and mosques that reflect various styles of architecture[34]. Among these buildings is *al-Ẓāhir* mosque, the oldest mosque in the district. It is registered as an Islamic monument and was named after *al-Ẓāhir Baybars*. It was misused a lot throughout history. For example, it was used as a soap factory[35] until it was renewed and repaired by the Committee for the Conservation of the Monuments of Arab Art in 1893. The mosque's architecture and many other historical buildings are suggested to be highlighted in the «Museum of Architecture» inside Sakakini Palace. The aim of this exhibition is to focus on *al-Zāhir's* masterpieces of architecture while connecting the local community with their neighborhood and raising their sense of awareness and pride of the area.



[FIGURE 18]: Palace's Fourth and Fifth Floors (Towers) Plan

[33]The Islamic and Coptic Registration Center of Antiquities at the Citadel, Ministry of Tourism and Antiquities.
[34]MOHAMED 2018: 1-53; AL-TAYEB 2018: 304-326.
[35]AL-JABARTI 1880: 1776; MARZOUK 1950: 91-102.

IV. Transformation Challenges

Being in a local area might create a barrier to transforming the Palace of Sakakini Pasha into a «Museum of Architecture». The government should consider this because accessibility is a vital barrier, especially for the tourism sector as a primary source of National Income. Moreover, most stakeholders care more about the most vivid and readily accessible areas for economic purposes.

This issue of accessibility could be addressed by setting up a rehabilitation plan on the city level, not only for the palace itself. Thus, the museum's Egyptian and foreign visitation rates would be increased. Furthermore, the renovation and conservation work cost would be a barrier for the Ministry of Tourism and Antiquities if it did not get suitable funds from other governmental or non-governmental grants.

V. Conclusions

The transformation of Sakakini Palace into a «Museum of Architecture» would raise the awareness of the local community not only about its historical significance but also about the significance of the whole district. This positive environment can help support international and local tourism to the palace, which would, in turn, raise its revenue. This revenue would benefit the country and keep the regular maintenance of the palace. Not to mention that this suggested proposal of transforming Sakakini's Palace into a «Museum of Architecture» would conserve it from further destruction and preserve its original features, architecture, and vivid memory for the next generations. The preservation of this memory would, in turn, save the cultural identity of the *al-Ẓāhir* district and hence the whole city. Furthermore, the success of this proposal would encourage a wide range of scholars and stakeholders to think about saving other Egyptian historical structures shortly.

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EVALUATION OF SOME SELECTED GAP-FILLING MATERIALS USED IN RESTORATION OF ARCHAEOLOGICAL POTTERY EXCAVATED FROM TELL BASTA IN SHARKIA: AN EXPERIMENTAL AND APPLIED STUDY

BY

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ABSTRACT

[AR] تقييم بعض مواد الاستكمال المستخدمة في ترميم الفخار الأثري المستخرج من تل بسطة بالشرقية: دراسة تجريبية وتطبيقية

الفخار الأثري الذي تم الكشف عنه بتل بسطة بالشرقية هش ومكسور، ومعظم القطع الفخارية المستخرجة من الحفائر تعاني من فقد لأحد الاجزاء مثل البدن أو الفوهة أو المقبض أو الحافة أو القاعدة، ومثل هذه النوعية تحتاج إلى عمليات استكمال حيث تعد من أهم عمليات الترميم والصيانة لتلك النوعية من الآثار الفخارية. وتعتبر عملية الاستكمال بمثابة إعادة احياء تاريخي للفخار بالتعرف على معالمه الاجتماعية والاقتصادية والدينية. وتم إجراء تقييم لبعض مواد الاستكمال المختارة بإجراء العديد من التجارب والاختبارات كتعيين وقت التشغيل ودرجة الانكماش ومقاومة الضغط قبل وبعد التقادم الصناعي المعجل بالحرارة والتقادم الضوئي بالأشعة فوق البنفسجية وتعيين قوة الضغط والخواص الفيزيائية قبل وبعد التقادم الملحي بغرض تقييم مواد الاستكمال المختارة حتى يتثنى اختيار أفضلها وأنسبها في استكمال القطع الفخارية بتل بسطة بالشرقية. وقد اثبتت الدراسة التجريبية نجاح وكفاءة بعض مواد الاستكمال حيث يوصي البحث بضرورة استخدام أحد مواد الاستكمال التي ثبت نجاحها بكفاءة في عملية استكمال الفخار الأثري بتل بسطة وهما: أولا: خليط الميكروبالون ومسحوق الفخار بنسبة 1:2 على التوالي. ثانيا: خليط البولي فيلا ومسحوق الفخار بنسبة 1:2 على التوالي. وتم التطبيق علي طبق فخاري مستخرج من تل بسطة بالشرقية بترميمه وعلاجه واستكماله باستخدام خليط الميكروبالون ومسحوق الفخار بنسبة 1:2 على التوالي، وبعد ترميمه وصيانته أصبح جاهزا للعرض المتحفي بمتحف تل بسطة بالشرقية.

[EN] The archaeological pottery discovered in tell Basta in Sharkia is fragile and broken and most of the pottery objects excavated from Sharkia suffer from loss of one of their parts such as body, rims handle and base. As a result, the pottery needs gap filling, which is one of the most important restoration and maintenance processes. This process is considered a historical revival identifying social, religious and commercial aspects. An assessment of some selected filling materials was done by conducting many experiments and tests such as determining work time, shrinkage degree, compressive strength, accelerated artificial thermal and light (U.V) ageing, salt weathering, compressive strength and physical properties after accelerated artificial ageing for selecting the most appropriate materials in replacement process. This experimental study on filling materials proved successful and efficient loss compensation materials, and it is recommended to use one of the following filling materials: (First: a mixture of microballoon and pottery powder (grog) in a ratio of 2: 1 respectively, Second: a mixture of Poly filla and pottery powder (grog) in a ratio of 2: 1 respectively). In the applied part of the study, restoration, treatment and replacement were conducted on an excavated pottery plate from tell Basta in Sharkia using a mixture of microballon and pottery powder (grog) in a ratio of 2: 1, prior to its museum display at tell Basta Museum, Sharkia governorate.

KEYWORDS: Ageing, grog, microballoon, poly filla, pottery, replacement, shrinkage.

I. INTRODUCTION

Bubastis is one of the most important capitals of ancient Egypt; excavations area had proved that it was inhabited since dawn of ancient Egyptian history. Egyptian historical sources mentioned that Bubastis was the thirteenth province of Delta provinces. Then it became an independent province, and was the eighteenth province, and its capital was Bubastis. Today, the archaeological site is known as tell Basta (Sharkia), it was known in Hellenistic era as Bubastis. Both names (Bubastis - Basta) are derived from ancient Pharaonic name «Br-Bastet», which means «house of goddess Bastet»[1] **[FIGURE 1]**.

[FIGURE 1]: Represents Tell Basta, Sharkia© Taken by the researcher

Damage manifestations of archaeological pottery varied at excavation sites as a result of exposure to various damage factors that may cause cracking or fracture of the pottery body[2], as pottery is breakable by pressures and external soil loads, or as a result of exposure to impact damage, which is irreversible mechanical damage. The fracture may be accompanied by a small or large loss depending on the pressure force. This damage may lead to complete fragmentation[3]. The same mechanical damage can occur because of fault lifting, floods, earthquakes[4], tunneling and reclamation of agricultural land by plows. Damage degree and loss of the pottery body depends on nature of burial environment, whether direct or indirect. The fracture and loss degree increase when the pottery is close to surface soil[5].

After assembling process, some pottery pieces may lose one of their parts. These missing parts differ in their shape and place in the pottery body, so replacement process varies according to missing part shape. This process may be simple or complex because each lost part needs certain filling method[6]. Replacement process is one of the most

[1]NOUREDDINE 2018: 356.
[2]PRICE 2011: 1-4.
[3]RYDZEWSKI 2021:781-790.
[4]SALEH et Al 2020: 97-108.
[5]ZAREMBA et Al 2021:67-81.
[6]WILLIAM 2002: 49-50.

important treatment interventions[7]. A complex replacement process depends on skill of restorer[8]. Filling materials should have various features such as retrieval properties, chemically inactive[9], adequate tensile strength, stability and non-shrinkage[10]. A shrinkage and expansion coefficient should be close to those of the pottery materials. In addition, they should have resistance against microorganisms. It should be easy to shape and have an appropriate work time for modelling. It should not distort the archaeological pottery surface[11], match the pottery body color[12] and be compatible with the charters approved by organizations in this field[13] .

The replacement process always needs a conscious restorer because it is an artwork; its goal is to preserve authenticity of pottery objects. By restoration of pottery that lost shape by filling materials, one can identify social, cultural, religious and commercial aspects for that era[14], therefore, the restorer must focus on historical, artistic and archaeological value during replacement process[15]. Replacement process varies from one country to another according to prevailing philosophy school, technical skill of conservator, nature of the loss part, and filling materials[16]. Many filling materials had varied with progress of chemistry[17] such as dental wax, reinforced aluminum sheets, synthetic rubber, polyfilla, Durofix, some acrylic and vinyl pastes such as **A.J.K** dough[18]. Therefore, conservators should be more specialized in this field[19], with the continuous development of the filling materials[20]. In this study, some filling materials will be evaluated to select the best and most appropriate ones in replacement of some of the archaeological pottery excavated from Tell Basta in Sharkia as an experimental and applied study.

[7]HASSAN 2021: 879-892.
[8]MONACO et Al 2021:41-50.
[9]FIORENTNO & BORRELLI 1975:202.
[10]DOWMAN 1970:62-63.
[11]CAUPER et Al 2021:311-322.
[12]SANDU et Al 2021:361-390.
[13]ABD AL KAREEM et Al 2021:417-428.
[14]BDRABOU et Al 2021:403-416.
[15]AL SAAD & BATAINEHM 2021:493-506.
[16]HEFNI et Al 2021: 325-334.
[17]IVASHKO et Al 2021:935-960.
[18]LARNEY 1971: 74-75.
[19]HAMAD et Al 2021:105-112.
[20]CAYME 2021:977-986.

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II. MATERIALS AND METHODS

1. Study Materials

A. Archaeological Pottery

A pottery plate from was selected for the applied study as shown in **[FIGURE 2]**.

[FIGURE 2]: Represents the pottery plate, Tell Basta, Sharkia

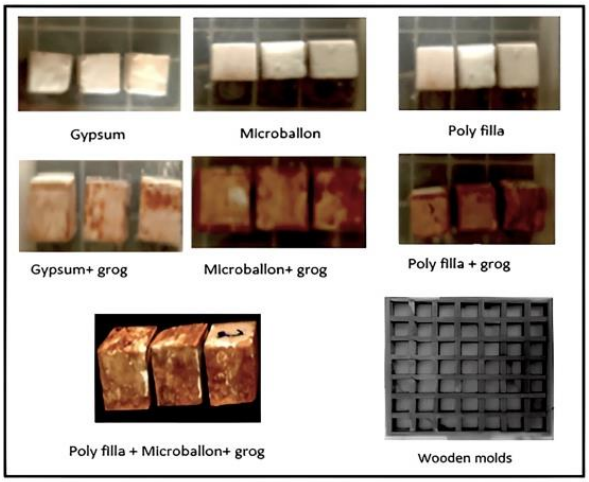
B. Selected Filling Materials

Filling materials selected for the experimental study included poly filla, microballoon, - Italian Gypsum and pottery powder **[FIGURE 3]**.

[FIGURE 3]: Represents some of the selected filling materials

C. Preparation of the Samples

The samples were prepared to suit tests and experiments that were conducted in the experimental study according to Salah[21], as shown in **[FIGURE 4]**.



[FIGURE 4] : **Represents filling materials cubes used in experimental study**

[21]SALAH 2019:184.

2. Study Methods

After preparing several samples of the selected filling materials, many experiments and tests were conducted to evaluate filling materials that can be used in restoration and maintenance process. The most important experiments and tests were conducted as follows:

1. Determination of Working Time.
2. Determination of Degree of Shrinkage.
3. Determination of Compressive Strength.
4. Thermal [Heat] Ageing.
5. Light Ageing by U.V.
6. Determination of Compressive Strength after Thermal and Ultra-violet Ageing.
7. Determination of physical properties after thermal ageing.
8. Salt ageing.
9. Determination of Compressive Strength after salt weathering.

3. Results

1. Determination of Working Time of Material

Working time of selected filling materials was observed during the preparation of samples for experiments and tests according to (Rasheed, 2019)[22], and the results recorded are as follows:

A. Poly Filla.

Is mixed with water, is difficult to shape immediately after pouring, and dries within 25 minutes. The material is shaped easily giving a smooth and polished white surface after drying. It can be easily retrieved mechanically.

B. Microballon

It is added to Paraloid B 82 at a concentration of 5%. After casting, it remains in a soft state, it is difficult to shape before 40 minutes, and it dries within 60 minutes. After an hour, the material can be formed and polished.

C. Italian Gypsum

A white substance prepared easily by mixing it with water, it is difficult to form immediately after pouring; and it dries within 6 to 7 minutes.

D. Poly Filla and Pottery Powder (Grog).

Grog was added to polyfilla in a ratio of 1:2 and mixed well, before being added to some water; the working time of this material is 30 minutes.

[22]RASHEED 2019: 195-199.

E. Microballon and Pottery Powder (Grog).

Pottery powder was added to microballon in a ratio of 1:2 respectively, and mixed well. The mixture was added to a solution of Paraloid B 82 with a concentration of 5%. Working time was 60 minutes. It gave a reddish white surface after drying, and can be retrieved.

F. Gypsum and Pottery Powder (Grog).

Pottery powder was mixed with Italian gypsum in a ratio of 1:2 respectively, after that, they were mixed well in water; it dries within 6 to 7 minutes. This material is characterized by its ease for modelling; it gives a reddish-white surface after drying. It can be easily retrieved mechanically.

G. Poly Filla+Microballon+ Pottery Powder (Grog).

Grog was prepared, and then pottery powder was added to polyfilla and microballoon in a ratio of 1:1:1 respectively. They were mixed well in a solution of Paraloid B 82 with a concentration of 5%. Working time is 40 minutes. It gave a reddish white surface after drying and it can be retrieved.

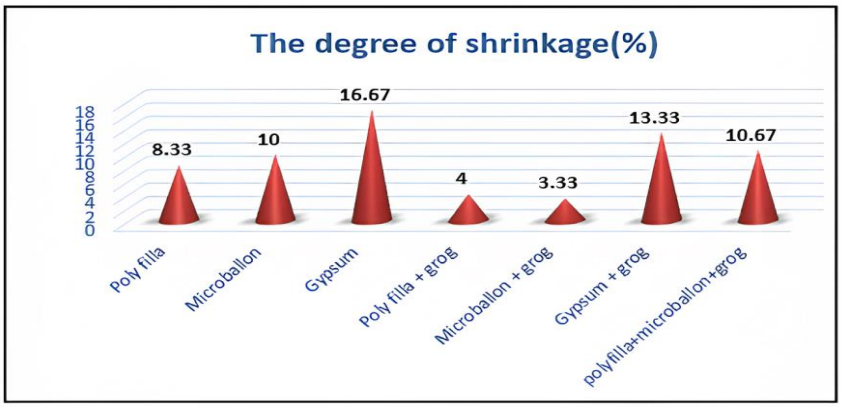
2. Determination of Shrinkage Degree for Selected Filling Materials

Filling materials were poured into molds with known dimensions, and the length of the samples was measured after drying. Thus, degree of shrinkage could be determined, which is a scientific basis for evaluating some selected filling materials. Cylinder-shaped fills were made of certain lengths and a fixed uniform diameter, and then they were left to dry gradually away from the sun's rays. Then, they were placed in a drying furnace at a temperature of 105 °C for 24 hours; the length of samples was measured after drying to obtain the dry length, where drying shrinkage was measured according to (Rice - 1996)[23]. The results are shown in **[TABLE 1] & [FIGURE 5]**.

Material Filling	Wet length	Dry length	The degree of shrinkage (%)
Poly filla	**3**	**2.75**	**8.33**
Microballon	**3**	**2.70**	**10**
Gypsum	**3**	**2.5**	**16.67**
Poly filla + grog	**3**	**2.88**	**4**
Microballon + grog	**3**	**2.9**	**3.33**
Gypsum + grog	**3**	**2.6**	**13.33**
Poly filla + Microballon +grog	**3**	**2.68**	**10.67**

[TABLE 1] : Shows results of shrinkage degree of selected filling materials© Done by the researcher

[23]RICE2015: 70-71.



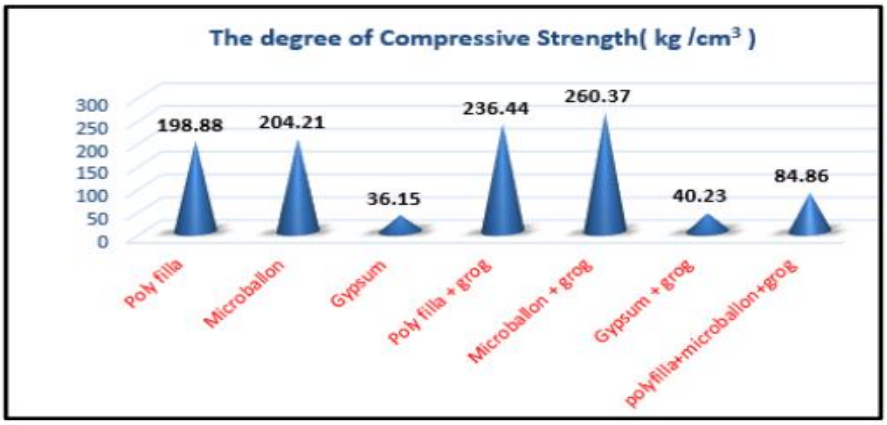
[FIGURE 5]: Represents determination of shrinkage degree of some selected filling materials

3. Determination of Compressive Strength for Selected Filling Materials

Some cubes of selected filling materials were prepared to determine compressive strength for assessing their ability to resistance stresses and loads, which is a guide for assessing the mechanical properties of the selected filling materials. This test was done by German-made device according to ASTM[24]. The results shown in **[TABLE 2] & [FIGURE 6]**.

Material Filling	Compressive Strength (kg /cm³)
Poly filla	198.88
Microballon	204.21
Gypsum	36.15
Poly filla +grog	236.44
Microballon +grog	260.37
Gypsum +grog	40.23
Poly filla + Microballon + grog	84.86

[TABLE 2]: Shows results of compressive strength degree of the selected filling materials© Done by the researcher© Done by the researcher



[FIGURE 6]: Represents determination of compressive strength degree of some selected filling materials

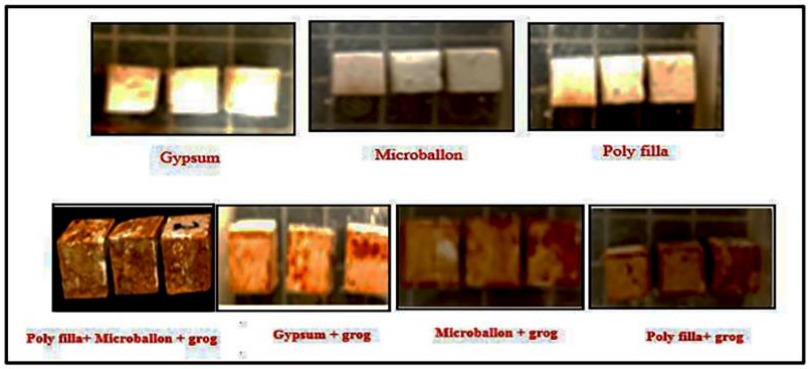
[24]ASTM 2001:118-119.

4. Accelerated Artificial Ageing by Heat for Selected Filling Materials

Filling materials may be damaged and subject to deterioration by accelerated artificial ageing by heat. This deterioration (change in weight or color) is considered a basis for evaluating any material. The more the material is stable and has good resistance, the more material is appropriate for restoration purposes. Thermal ageing was done according to (Brania, 2011)[25]. Samples of cubes were prepared and then left to dry at room temperature for 21 days. They were placed inside a furnace at a temperature ranging from 65-100 °C. Heat temperature was gradually raised, and the cycle period was (30) days for 720 continuous hours. The weight of the samples was measured before placing in the furnace (dry weight), then the samples were weighed several times until the end of heat cycles, the change in color and weight were noticed and recorded. These results are presented in **[TABLE 3]** and **[FIGURE 7]**.

Filling Materials	Heat	Exposure Time	Color before	Color after
Poly filla	100 °C	**720**	**white**	**darkness**
Microballon	100 °C	**720**	**white**	**No change**
Gypsum	100 °C	**720**	**white**	**darkness**
Poly filla + grog	100 °C	**720**	**light brown**	**No change**
Microballon + grog	100 °C	**720**	**light brown**	**No change**
Gypsum +grog	100 °C	**720**	**dark brown**	**darkness**
Poly filla + Microballon + grog	100 °C	**720**	**light brown**	**No change**

[TABLE 3]: Shows results of accelerated artificial thermal ageing for the selected filling materials ©Done by the researcher



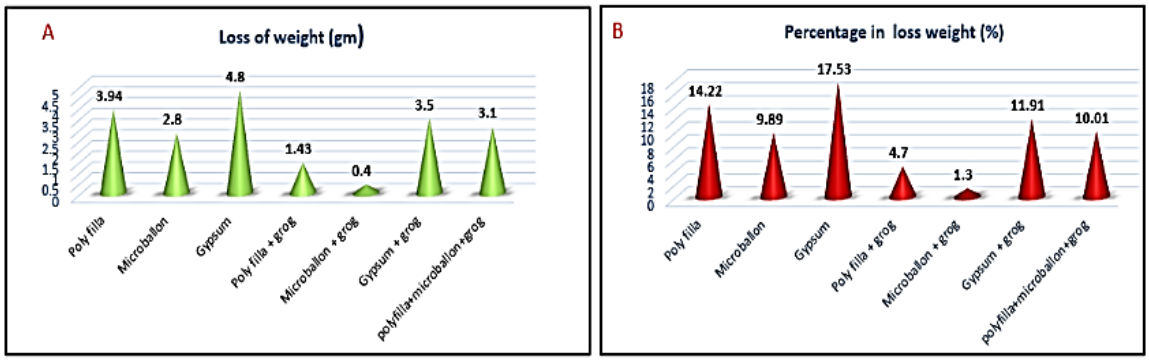
[FIGURE 7]: Represents color change of some selected filling materials by artificial thermal ageing

It has been noticed that most of filling materials samples were subjected to a change in weight in different proportions due to heat temperature; the loss in weight and its percentage are shown in **[TABLE 4] & [FIGURE 8]**.

[25]BRANIA et Al 2011:4.

Filling Materials	Heat Temperature	Exposure Time «hour»	Loss of weight (gm)	Percentage in loss weight (%)
Poly filla	100 °C	720	3.94	14.22
Microballon	100 °C	720	2.80	9.89
Gypsum	100 °C	720	4.80	17.53
Poly filla +grog	100 °C	720	1.43	4.70
Microballon +grog	100 °C	720	0.4	1.30
Gypsum +grog	100 °C	720	3.5	11.91
Poly filla + Microballon + grog	100 °C	720	3.1	10.01

[TABLE 4]: Shows the weight loss and its percentage for selected filling materials by artificial thermal ageing© Done by the researcher



[FIGURE 8]: Represents thermal ageing of selected filling materials A: loss of weight B: percentage in weight loss

5. Light Artificial Ageing of Selected Filling Materials

Light artificial ageing can physically damage the selected filling materials by ultraviolet rays. The samples were exposed to ultraviolet radiation for 30 days at a rate of 720 hours. Light ageing was done according to Elghareb[26]. The results were shown in **[TABLE 5]**.

Filling Materials	Exposure Time «hour»	Color before Exposure	Color after Exposure
Poly filla	720	white	No change
Microballon	720	white	No change
Gypsum	720	white	No change
Poly filla +grog	720	light brown	No change
Microballon +grog	720	light brown	No change
Gypsum +grog	720	dark brown	No change
Poly filla + Microballon + grog	720	light brown	No change

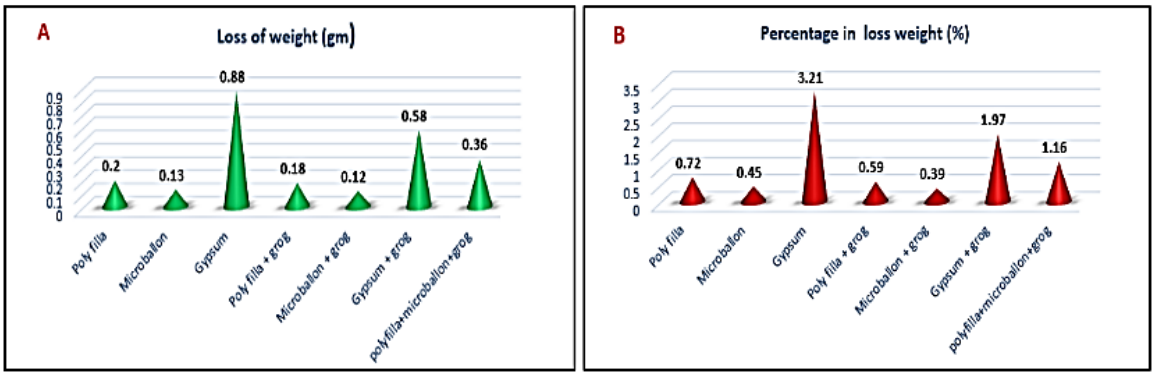
[TABLE 5]: Shows the results of light artificial ageing of the selected filling materials© Done by the researcher

[26]IBRAHIM et Al 2018: 39-48.

It is clear from results of previous table that the samples showed a degree of stability and resistance to light ageing but they were subjected to loss in weight as recorded in **[TABLE 6] & [FIGURE 9]**.

Filling Materials	Exposure Time «hour»	Loss of weight(gm)	Percentage in Loss weight (%)
Poly filla	720	0.20	0.72
Microballon	720	0.13	0.45
Gypsum	720	0.88	3.21
Poly filla +grog	720	0.18	0.59
Microballon +grog	720	0.12	0.39
Gypsum +grog	720	0.58	1.97
Poly filla + Microballon + grog	720	0.36	1.16

[TABLE 6] : Shows the weight loss and its percentage of the selected filling materials by U.V. © Done by the researcher



[FIGURE 9]: Represents light ageing of the selected filling materials, A) the loss of weight; B) the percentage in weight loss

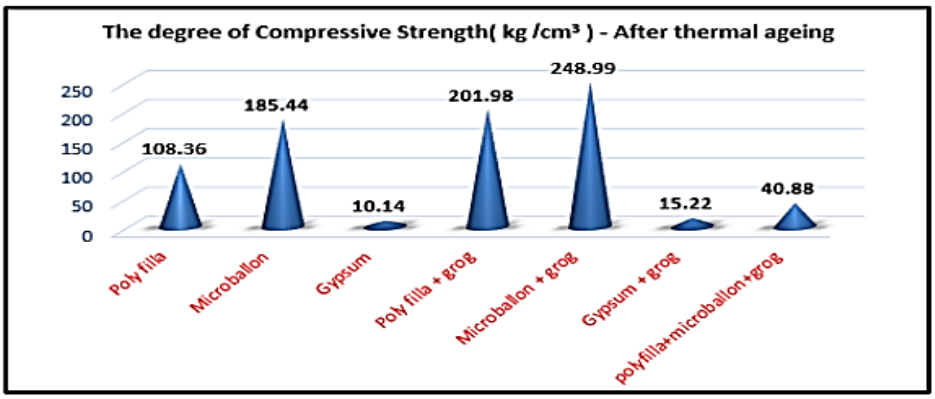
6. Determination of Compressive Strength after Artificial (Thermal-Light) Ageing

A. After Thermal Ageing

Measurements were taken after accelerated artificial heat ageing to determine stability of these materials after exposure to high temperatures. This test was carried out on previously described device. The results are shown in **[TABLE 7]** and **[FIGURE 10]**.

Material Filling	Compressive Strength kg /cm³
Poly filla	108.36
Micropallon	185.44
Gypsum	10.14
Poly filla + grog	201.98
Microballon + grog	248.99
Gypsum + grog	15.22
Poly filla+ Microballon +grog	40.88

[TABLE 7]: Shows the results of the compressive strength degree of the selected filling materials after artificial thermal ageing© Done by the researcher



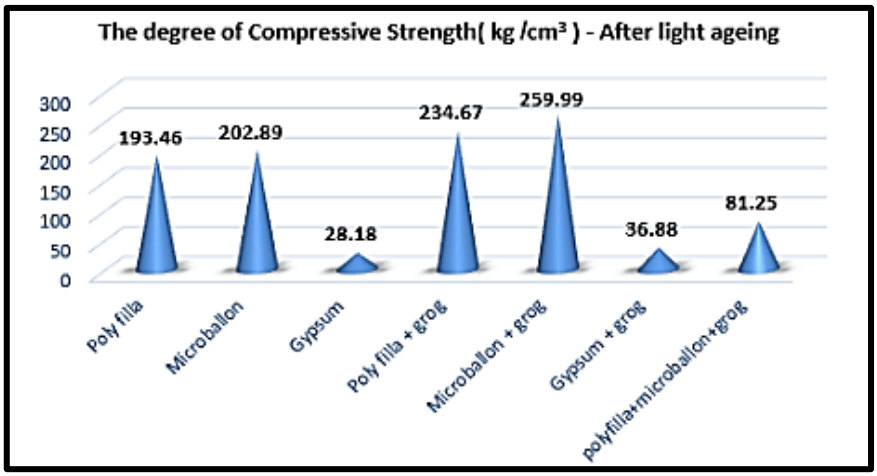
[FIGURE 10]: Represents compressive strength degree after thermal ageing of the selected filling materials

B. After Light Ageing

Test of compressive strength was done after accelerated artificial light ageing to determine the stability of these filling materials .The results are shown in **[TABLE 8] & [FIGURE 11]**.

Material Filling	Compressive Strength kg /cm³
Poly filla	193.46
Micropallon	202.89
Gypsum	28.18
Poly filla + grog	234.67
Microballon + grog	259.99
Gypsum + grog	36.88
Poly filla+ Microballon +grog	81.25

[TABLE 8]: Shows the results of the compressive strength degree of the selected filling materials after artificial light ageing by U.V© Done by the researcher



[FIGURE 11]: Represents compressive strength after light ageing of the selected filling materials

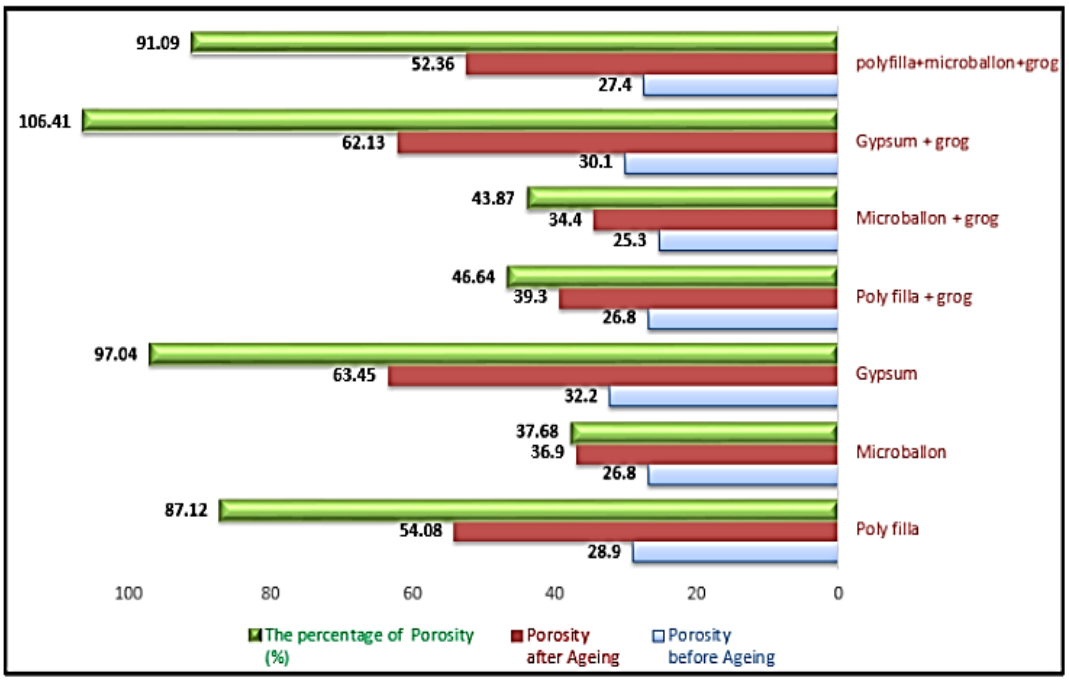
7. Determination of the Physical Properties of the Selected Filling Materials before and after Accelerated Thermal Ageing.

A. Porosity

The porosity values changed after artificial thermal ageing of the selected filling materials according to ASTM [27], the results are shown in **[Table 9] & [Figure 12]**.

Filling Materials	Porosity before Ageing	Porosity after Ageing	The percentage of Porosity (%)
polyfilla	28.90	54.08	87.12
Microballon	26.80	36.90	37.68
Gypsum	32.20	63.45	97.04
Polyfilla + grog	26.80	39.30	46.64
Microballon + grog	25.30	34.40	43.87
Gypsum + grog	30.10	62.13	106.41
Polyfilla + Microballon + grog	27.40	52.36	91.09

[Table 9]: Shows the porosity of the selected filling materials after artificial thermal ageing
© Done by the researcher



[Figure 12]: Represents porosity and its percentage of the selected filling materials after thermal ageing

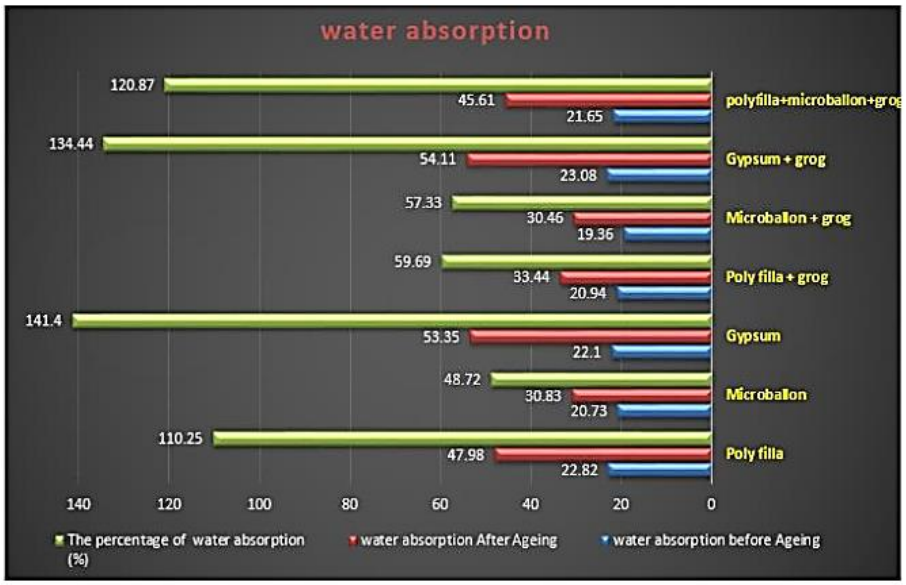
[27] ASTM 2001: 118-119.

B. Water Absorption

Water absorption values changed after thermal ageing of the selected filling materials according to (Kamel, 2012)[28]. The results are shown in **[TABLE 10] & [FIGURE 13]**.

Filling Materials	water absorption before Ageing	water absorption after Ageing	The percentage of water absorption (%)
polyfilla	22.82	47.98	110.25
Microballon	20.73	30.83	48.72
Gypsum	22.10	53.35	141.40
Polyfilla + grog	20.94	33.44	59.69
Microballon + grog	19.36	30.46	57.33
Gypsum + grog	23.08	54.11	134.44
Polyfilla + Microballon + grog	21.65	45.61	120.87

[TABLE 10]: Shows water absorption of the selected filling materials after artificial thermal ageing
© Done by the researcher



.[FIGURE 13]: **Represents water absorption and percentage of selected filling materials after thermal ageing**

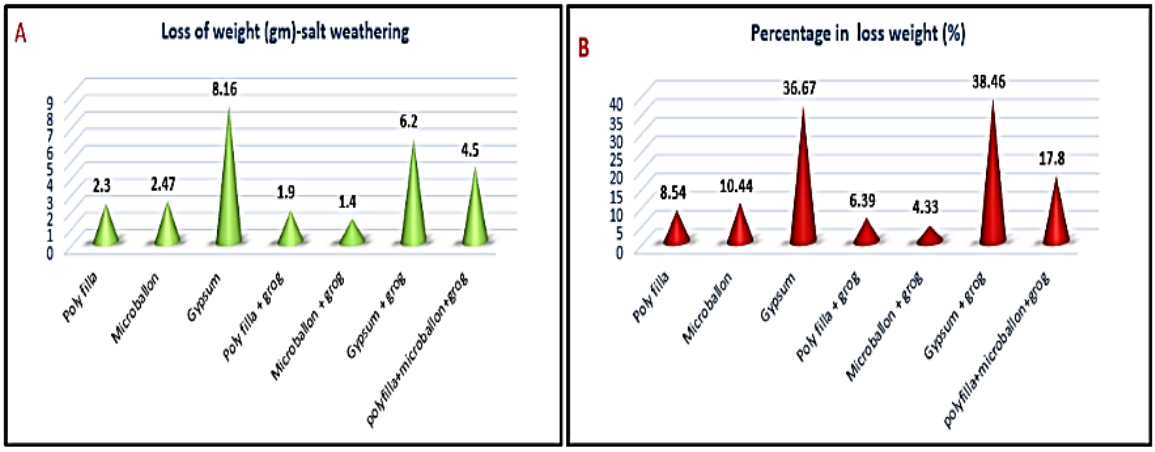
8. Test of Salt Ageing.

Salt ageing was carried out on samples that were prepared in the form of "cubes 3 x 3 x 3 cm" that were left to dry at room temperature for 21 days. After drying, they were placed in a furnace at 105 °C. The dry weight was determined. Then the samples were immersed in a solution of sodium chloride NaCl with a concentration 10% for 8 hours, and then the samples placed for 16 hours in room atmosphere. After that, they were placed in a furnace at about 65°C to 100°C. This cycle was repeated for 30 days according to (Ismail, 2012)[29]. The results are shown in **[TABLE 11] & [FIGURE 14]**.

[28]KAMEL2012: 29-30.
[29]ISMAIL 2000: 70.

Filling Materials	Loss of weight(gm)	Percentage of Loss weight (%)
Poly filla	2.30	8.54
Microballon	2.47	10.44
Gypsum	8.16	36.67
Poly filla +grog	1.90	6.39
Microballon +grog	1.40	4.33
Gypsum +grog	6.20	38.46
Poly filla + Microballon + grog	4.50	17.80

[TABLE 11]: shows the results of artificial ageing by salt weathering with sodium chloride (10%) for the selected filling materials



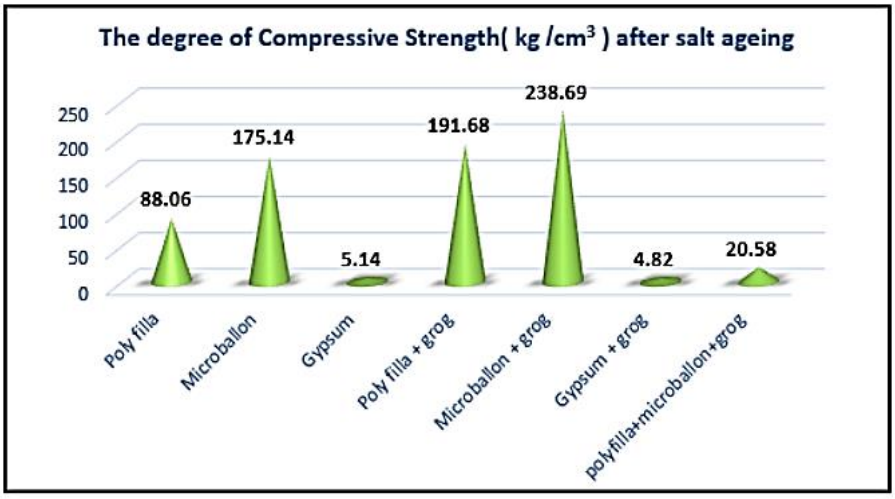
[FIGURE 14]: represents weight loss and its percentage after salt weathering for the selected filling materials, A: loss of weight, B: percentage of weight loss

9. Determination of Compressive Strength of Selected Filling Materials after Accelerated Artificial Ageing by Salt Weathering with Sodium Chloride Salt NaCl (10%).

These measurements were done after salt weathering with sodium chloride salt 10% to recognize the stability of these materials for salt weathering. This test was done on the aforementioned device, and the results are shown in **[TABLE 12] & [FIGURE 15]**.

Filling Materials	Compressive Strength (kg /cm³) after
Poly filla	88.06
Microballon	175.14
Gypsum	5.14
Poly filla +grog	191.68
Microballon +grog	238.69
Gypsum +grog	4.82
Poly filla + Microballon + grog	20.58

[TABLE 12]: Shows compressive strength degree of selected filling materials after salt weathering (NaCl 10%)© Done by the researcher



[FIGURE 15]: **Shows compressive strength after salt weathering with NaCl (10 %)**

III. DISCUSSION OF RESULTS

The experiments and laboratory tests in this study gave different results depending on nature of each material. Polyfilla is a white material[30], which is easy to prepare by mixing with water[31], is difficult to form immediately after pouring, dries within 30 minutes, and is formed easily and gives a white surface[32]. Microballon, is a white substance that is easy to prepare by mixing with Paraloid B 82 at a concentration of 5%[33]. It is difficult to shape before 60 minutes, and after complete drying, it is difficult to polish and shape.

Italian gypsum consists of semi-aqueous calcium sulfate $CaSO_4.2H_2O$, and has a specific gravity of 2.32. There are two types of gypsum, the first is alpha plaster, and the second is beta plaster. They differ in their physical properties, alpha one needs less water than beta gypsum[34]. Some of the main gypsum defects are its low working time, its expansion and water absorption[35]. It is easy to prepare by mixing with water. It is difficult to form immediately after pouring, it dries within 6 to 7 minutes, and is reversible.

The mixtures of Poly filla and pottery powder (grog), Microballon and pottery powder, and gypsum and pottery powder gave different results in determining working time. It was noticed that during preparation of these mixtures that pottery powder should be finely ground, several pottery powders must be made to select the powder that suits pottery body color[36]. In some cases, color oxide can be added to modify the paste color for matching pottery body. Work time for a mixture of Microballon and pottery powder was 60 minutes, while working time for a mixture of

[30]Al-SEYOUF,2012162.
[31]AllAM,2005: 202.
[32]HENKEL DÜSSELDORF–CHEMIE 2021: 118-122.
[33]CTS CATALOGUE 2020:153.
[34]SADIQ2005:132.
[35]ATTIA 2003:111.
[36]AL-FATEH 2007:156.

gypsum and pottery powder was from 6 to 7 minutes; working time of a mixture of Polyfilla, microballoon and pottery powder was about 40 minutes.

It has been shown through determining working time for microballon or a mixture of microballon and pottery powder that working time can be controlled by type of solvent where evaporation speed of solvent leads to speed drying, and thus the time of working is reduced and vice versa.

Results of experiments and tests of shrinkage degree gave different results according to properties of each material; it is known that determining shrinkage degree is a scientific basis for evaluating selected filling materials. The lower shrinkage degree, the better in replacement process. A mixture of microballon and pottery powder achieved the lowest shrinkage degree at 3.33%, but Italian Gypsum recorded the highest shrinkage degree at 16.67%. Among them, there were the rest of results of determining shrinkage degree as in **[FIGURE 5].**

The results of determining compressive strength of selected filling materials before ageing showed a difference in degree of resistance sample to compressive strength according to properties of each material. Microballon and pottery powder had the best results recording compressive strength degree about 260.37 kg/cm³, but Gypsum recorded 36.15 kg/cm³, among them, there were the rest of the results of compressive strength as in **[FIGURE 6].**

It was clear from artificial thermal ageing results of selected replacement materials that selected filling materials showed a difference in their resistance to discoloration and weight loss. All replacement materials showed stability to color change except for polyfilla, Italian gypsum, and a mixture of gypsum and pottery powder that had changed to dark color. It is shown from the results of thermal ageing that a mixture of microballon and pottery powder had the best thermal resistance. It recorded weight loss of about 0.4 g and its percentage was 1.30%, while Italian gypsum recorded weight loss of about 4.80 g with a percentage 17.53%, the rest of the results were between the two numbers **[FIGURE 8].**

It is shown from results of light ageing that a mixture of microballon and pottery powder had the best light resistance. It recorded weight loss about 0.12 g and its percentage was 0.39%, while Italian gypsum recorded weight loss about 0.88 g with a percentage of 3.21%, among them there were the rest of the results as **[FIGURE 9].**

Selected replacement materials after artificial thermal ageing showed a difference in resistance to compressive strength. A mixture of microballon and pottery powder had the best pressure resistance results, where it recorded a resistance degree about 248.99 kg/cm³ while gypsum recorded 10.14 kg/cm³. Between them, there were the rest of results as in **[FIGURE 10].**

Regarding compressive strength degree after artificial light ageing by U.V. the mixture of microballon and pottery powder had the best pressure resistance results, where it recorded a resistance degree about 259.99 kg/cm³ while gypsum recorded 28.18 kg/cm³. Between them, there were the rest of results as in **[FIGURE 11].**

The replacement materials showed a difference in porosity degree after thermal ageing compared to the samples before ageing. A mixture of microballon and pottery powder recorded the best results. It recorded the lowest porosity degree before ageing about 25.30, while it recorded porosity degree after ageing 34.40 with percentage 43.87%. Gypsum, as well as a mixture of gypsum and pottery powder had recorded the highest apparent porosity degree 32.20 and 30.10, respectively before ageing, while a mixture of gypsum and pottery powder recorded an apparent porosity degree 62.13 with percentage 106.41, as in **[FIGURE 12].** An increase of porosity in all samples was due to poor inter-granular bonding because of thermal ageing.

Filling materials showed a difference in water absorption degree. Microballon and pottery powder recorded the best results. A mixture of microballon and grog recorded the lowest water absorption degree about 19.36 before ageing, while it recorded water absorption degree after ageing 30.46 with percentage 57.33%. Then, gypsum, followed by a mixture of gypsum and pottery powder had recorded the highest water absorption degree at 22.10 and 23.08, respectively before ageing, while a mixture of gypsum and pottery powder recorded water absorption degree 54.11 with percentage of 134.44 % but water absorption percentage of gypsum was 141.40 % as in **[FIGURE 13].**

Water absorption degree after ageing was increased compared to the samples before ageing due to poor cohesion of grains by thermal ageing.It is clear from the results of saline ageing that the samples were affected by salt weathering (sodium chloride salt 10%) in different proportions. A mixture of microballon and pottery powder gave the best results of weight loss resistance by saline weathering. Mixture of microballon and grog recorded a weight loss of 1.40 g with a percentage of 4.33%, while gypsum recorded a weight loss of 8.16 g with a percentage of about 36.67%. Among them, there were the rest of the results, as in in **[FIGURE 14].**

From the determination of compressive strength of selected filling materials after salt ageing (sodium chloride salt 10%), a difference in their degree of resistance is clear. A mixture of microballon and pottery powder had the best pressure resistance results, where it recorded compressive strength degree of about 238.69 kg/cm³, while a mixture of gypsum and pottery powder recorded compressive strength 3.82 kg/cm³. Among them, there were the rest of the results, as in **[FIGURE 15].**

IV. APPIED STUDY

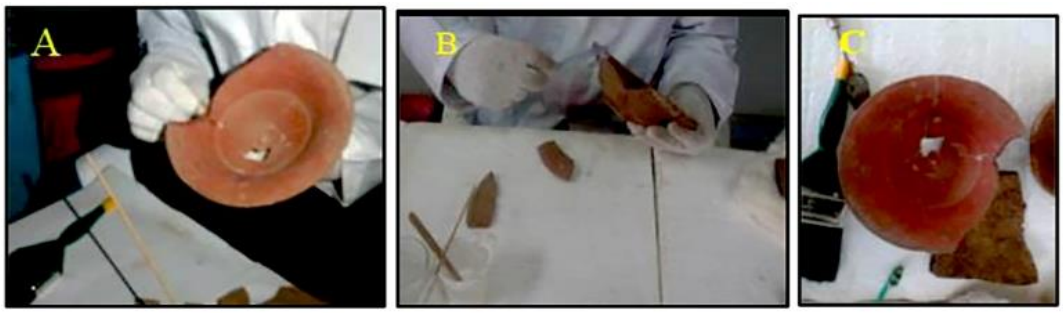
A. Description and Diagnosis of Damage

A pottery piece, which was a medium-sized pottery plate that was broken into three different fragments, was chosen for the applied study. The pottery piece suffers from presence of many different clay and lime soil sediments, as well as crystallization of salts, as shown in **[FIGURE 16].**

[FIGURE 16]: Represents a pottery plate before restoration and maintenance, tell Basta, Sharkia,

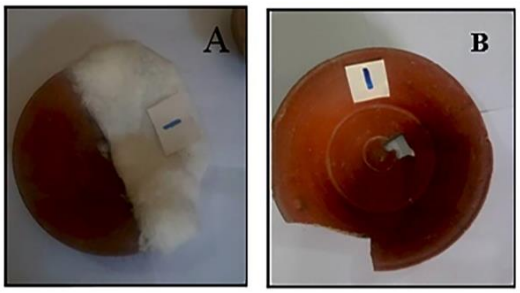
B. Cleaning Process

Soft brushes were used to remove dirt deposits mechanically. In some cases, scalpels may be used to clean hard calcifications carefully, gave excellent results[37], but the pottery plate still suffered from some lime deposits, as in **[FIGURE 17].**



[FIGURE 17]: Represents mechanical cleaning of pottery plate, A) needle cleaning; B) brushing cleaning; C) after mechanical cleaning

The lime sediments were cleaned by EDTA, known as tetra sodium ethylene diamine tetra acetic acid according to Nabil& Ala[38], which gave excellent results as in **[FIGURE 18].**



[FIGURE 18]: Represents chemical cleaning of pottery plate, A) during chemical cleaning; B) after chemical cleaning

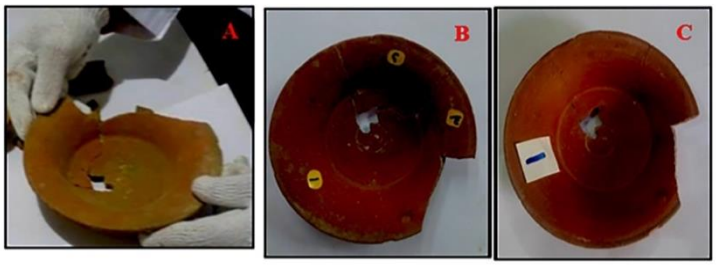
C. Bonding Process

After mechanical and chemical cleaning of the pottery plate a preliminary assembly of the plate fragments with each other was carried out in order to locate the lost parts. Then a process of assembling for these pottery sherds was carried out using Paraloid B72 dissolved in toluene at a concentration of 50% according to (Nagwa, 2016) [39], and thus the artifact was restored to its original shape before burial in the soil, as shown in **[FIGURE 19].**

[37]SEASE 1994:111-124.

[38]BADER & MOHAMED 2016: 443-458.

[39]SAYED 2016: 25.



[FIGURE 19]: Represents assembling process of pottery plate, A) preliminary assembly; B) during assembling; C) after cleaning and assembling process

After assembling process, the artifact was strengthened by a mixture of Nano silica dispersed in ethyl alcohol at a concentration of 1% with Wacker H at a ratio of 1: 1 using poultice method according to Elghareb[40], as shown in [**FIGURE** 20].

[FIGURE 20]: Represents strengthening process by poultice method

D. Replacement of Lost Parts

It was noticed after assembly process, that the pottery plate suffered from missing parts. Aluminium paper was applied under the missing part as a support material. Then replacement material was prepared, which was a mixture of microballon and pottery powder in a ratio of 2: 1. The paste was applied. After an hour, it was shaped and polished. Thus, the pottery object was restored to its original shape before burial in the soil. The pottery object was protected and isolated using Paraloid B 82 with a concentration of 3 % by brush, as shown in **[FIGURE 21].**

[FIGURE 21]: Represents replacement process of pottery plate, A) before replacement; B) after replacement

[40] EL GHAREB 2019:415-428.

V. CONCLUSION

The research proved that most of the excavated pottery pieces from tell Basta in Sharkia suffered from loss of one of their parts. These pottery objects need a replacement process to restore its artistic and archaeological form before breaking. It is considered a historical revival identifying social, religious, commercial aspects. The experimental study proved successful and efficiency of some gap-filling materials in completing of the pottery was achieved. It is recommend to use one of the tested filling materials: (First: a mixture of microballoon and pottery powder (grog) in a ratio of 2: 1 respectively, Second: a mixture of Poly filla and pottery powder (grog) in a ratio of 2: 1, respectively). In the applied study, restoration interventions and treatment were done for a pottery plate. In addition to the completing process using a mixture of microballon and pottery powder (grog) in a ratio of 2: 1 for the pottery object. After restoration, the treated archaeological pottery plate was ready for museum display at tell Basta Museum, Sharkia governorate.

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