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Guardian of Time Flow: Baboon on the Water Clock During the Greco-Roman Period

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ARTICLE INFO Abstract

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As the development of the water clock, Egypt had both the idea and the circumstances in place before anyone thought to use a clock to tell time. Additionally, a basic necessity was met by the invention and development of the water clock. This timekeeping device offers a useful "window" onto the baboon, which served as the ancient Egyptians' representation of the god Thoth, the defender and patron of time. Baboons were extensively researched, probably because they represented a special blend of characteristics that were both comparable to and different from those of humans. The baboon exhibited traits that upheld the Egyptian religion's values of decency, respect for the dead, and worship of the gods.

The fact that, since then, our understanding of the baboon animal has substantially increased justifies reopening the discussion of the Egyptian water clocks. The baboon, which stands in the center of many astronomical scenes and is the spectral point on every water clock from the Greco-Roman period, represents accuracy, stability, and calm of the astronomical system. This article serves as a direct analogue for the water clock's baboon. The baboon's appearance on outflow water clocks, which date from the New Kingdom to the Greco-Roman Period, inflow water clocks, and similarly the models of inflow clocks, as well as in astronomical scenes, explains his significance and function as a time reckoner.

1. Introduction

Ra is announced by baboons¹ (fig.1) as the time when this great god will be reborn in the underworld. They were positioned in the center of the water clocks. This is even more amazing when considers that the famous Greek astro-engineers built their far more complex clocks at Alexandria around the same time, using much more sophisticated theoretical knowledge. There are several of these instruments, with various types copied in the Greco-Roman period. Already, more than thirty fragments of this kind of clock have been discovered.

It is obvious that the Greeks and Romans utilized the Egyptian classical water clocks to measure time and keep track of the nighttime hours. Some of these clocks from this period

¹ Baboons are among the various types of monkey animals that settled in Egypt.

were discovered outside of Egypt, in Greek and Roman cities, which is evidence of the influence of Egyptian science on both of these European civilizations.

Horapollo, a Greek author who wrote a description of Egyptian hieroglyphs in the 4th century AD., reveals that the Egyptian water clock was still in use during the Roman period (Ritner, 2016:385) and specifically links the baboon figure with the sun-moon conjunction near the eastern horizon:

“When they want to represent the two equinoxes, they depict the baboon sitting down. Because it excretes urine twelve times per day, once every hour, during the two equinoxes of the year. The two nights are spent doing the same thing. Therefore, it makes sense that the Egyptians carved a sitting baboon into their water clocks. They also cause its penis to drop water because, as was already mentioned, it represents the twelve hours of the equinox.” (Boas, 1950:69)

2. *Hamadryas* Baboon

Only the Sacred Baboon (*Papio hamadryas*)² and the Olive Baboon or *Anubis* baboon (*Papio cynocephalus Anubis*)³ are likely to have been native to Egypt. The sub-family Cercopithecinae, which includes the sub-family Colobinae and makes up the family Cercopithecidae, includes these semi-family baboons. This is a result of the dietary differences between the two subfamilies.⁴ Up to the Middle Kingdom at the earliest, only the *Hamadryas* had ever been native to Egypt; therefore, they were compatible with the Egyptian environment. Baboons were therefore brought in order to reflect New Kingdom culture (Arnold, 1995:60).⁵ From this period to the Greco-Roman era, the *Hamadryas*, who dwelt in the water clock, was identified with Thoth (fig.2) and was the timekeeper.



Fig.1: Two *Hamadryas* baboons offering the wedjat eye to the sun god, Ptolemaic period- Metropolitan Museum, AN 66.99.73
cf., Metropolitan Museum Online



Fig.2: Statue of a *Hamadryas Baboon* sign of the god Thoth, Ptolemaic period, Louvre Museum, E17946
cf., Louvre Museum Online

² The Dog-Headed Baboon, as it is sometimes known by archaeologists, initially made an appearance during the 3rd Dynasty. (Boylan, 1922:77).

³ Although the *Anubis* baboons have a cape, it is noticeably less stunning than the *Hamadryas*!. They have thick olive pelts, dense coats, and black faces and behinds (Pio, 2018:28-29).

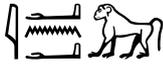
⁴ As generalists, the Cercopithecinae are well suited to surviving on a wide variety of foods (Kavanagh, 1983:141; Goudsmit & Brandon-Jones, 2000:112; Turner, 2009:9).

⁵ According to Glenister, baboons were brought into Egypt from Kush or Punt beginning with the Old Kingdom and ending with the New Kingdom, they were prized as important commodities. According to historical accounts of trading expeditions from Egypt to Punt, strange products like baboons were imported (Glenister, 2008:103).

All baboon species are extremely social, but *Hamadryas* baboons⁶ are not matrilineal like other baboon species. They have a four-layered, extremely complex, and unique fusion-fission social structure that has allowed the species to take advantage of the scarce resources of desert living (Willey, 2020:6). Even though baboons are known to be agitated and violent, they are also intelligent, suggesting that it may have been possible to train them to chase and bite in order. The Egyptians obviously kept the baboons (Evans, 2010:146).

The large numbers of mummified baboons discovered at four sites,⁷ which originated in the New Kingdom and peaked in the Greco-Roman period,⁸ offer significant information for studying the baboon in ancient Egyptian faunal life. They were cared for, trained, and kept as pets for the owner's amusement (Ikram, 2010). Additionally, Brewer (2002:454) rejects theories that baboons were taught to assist in fruit harvesting, arguing that their participation in this activity was just instinctual food collection (Gérard, 1984:211-218). It was a well-known animal, so it appeared as tattoos on the necks of a few female mummies from Deir el-Medina.⁹ These baboons' tattoos served as guardians against demons during the Middle Kingdom, and it was customary to show them on magical wands.

The baboon animal was called *HD-wr* "great white" or "great light," (*Wb* 3:209,6-8; Derchain, 1963:22-25; Larcher, 2016:60) in the Coffin and Pyramid Texts, a name that lasted

until the Ptolemaic period (*PL* 694); and was also known as  *ian* (*ME* 43). It had

the phonetic value  *nfr*¹⁰ (*Wb* 2:253; De Meulenaere, 1954:73-82), during the

Greco-Roman period, and it was a particularly commonly written as  *nfr* 'good', 'beautiful' (Dümichen, 1865:2; *PL* 514; Rochholz, 2002:56; Klotz, 2014:33), and the plural as

 *nfrw* 'good things' (*PL* 514). The word *nfr* is the conventional rendering, but the

word also implies something dynamic, creative, and potent. During this period, the sign 

ra was represented by *hrw* 'day' in  *hrw pn nfr* 'this good day' (Fairman, 1945:100). These new ideographic values occur in all areas of the Ptolemaic temples. In most of the examples discussed above, the baboon determinative appears specifically and plays an influential role in the language of this era.

3. Thoth as a Baboon

In ancient Egyptian art, baboons and other monkey species are frequently shown. They regularly had a significant and mysterious place in daily life, also played a consistent and significant character in ancient Egyptian religion in a variety of roles, from demon to guardian. They have, however, unquestionably retained a permanent place in the religion as one of the more significant animal forms into which the gods may be turned, and it is

⁶ The *Hamadryas* is a terrestrial species that is distinguished by its pink face and scarlet back. The larger, silver-colored males can be identified by their cape, which they lack in comparison to the brown females, who are browner in colour and have hairless facial skin. (Willey, 2020:6). Male baboons are frequently seen in Egyptian imagery, despite references to unique traits of female baboons, according to (Greenlaw, 2011:2-3).

⁷ For more information, read: (Goudsmit & Brandon-Jones, 1999:45-53; Goudsmit & Brandon-Jones, 2000:111-119; Pio, 2018:31-43).

⁸ Egypt entered the Third Intermediate Period as systems changed; baboons were more frequently mummified as votive animals (Goudsmit & Brandon-Jones, 2000:111).

⁹ For more information, read: (Austin & Gobeil, 2017:23-46).

¹⁰ As a seated baboon most of the times.

apparent that prehistoric Egyptians were familiar with them. They developed into sacred creatures connected to some of the most significant Egyptian deities, as well as the kings.

Baboons were very important in Egyptian religion, so many different gods were depicted as these animals, and some of the early deities occasionally had baboon heads. The King was referred to as the "Great White One" and associated with several sacred baboons in the Pyramid Text. According to some scholars, the name of this god was inspired by a dominant

Hamadryas' silver-gray mane (Balaji, 2018). It first appears as the determinative  *ip-wDAt = nsw* "King" during the Greco-Roman period (Von Lieven, 2000:90).¹¹ The animal served in a number of different funerary guardian positions in the Underworld Books, such as four of them serving as the corners of the Lake of Fire in the Afterlife (Van Dijk, 2002:163) and some acting as gatekeepers (Lesko, 2002:145).

Astronomy was thought to have been invented by Thoth (Antoniadi, 1934:51), who was frequently connected to the moon (Fleming and Lothian, 1997:52). To balance Ra's own sun, Ra gave him the moon. He also measured the seasons and controlled time using his expertise in mathematics and astronomy. He planned the shape of the globe and observed the skies, and it was he who maintained the balance of the earth and everything on it. The stability of the cosmos depended on his knowledge. Due to these attributes, he was revered as the god of science (Armour, 1986:155).

Some baboons were preserved as sacred animals for the cult of Thoth (Ray, 2002:87-90). According to Teeter (2002:355-357), these animals may have been utilized in cultic rituals in which creatures were bred in captivity for votive offerings. Even though this animal is a well-known hypostasis of Thoth,¹² it isn't until Amenhotep III that the iconography specifically links it to the god. This new characteristic form of Thoth appears to be emphasized to celebrate the King's Sed-festival, especially in light of the revelations about the essence of kingship and its connection to the god Ra and the moon (Kessler, 2001:321; Larcher, 2016:60 & 68). In Roman times, under the influence of Hellenism, Thoth changed into Hermes Trismegistos and stayed that way until the European Renaissance (Fowden, 1993; Stadler, 2012:1).

Thoth's central position on the water clock is undoubtedly connected to his function as the 'water clock's inventor.' He also created the 'Merkhet,' a device used to measure time and estimates the positions of the stars. He held numerous titles related to time during the Greco-

Roman period, like:  *sky aHaw*¹³ 'the indicator of time' (Zaba, 1953:56; PL 947), or

 *nb wrS* 'Lord of spending time' (PL 245),  *nb aHa* 'lord of time'

(Brugsch, 1883:759)  *Hsb cHaw* 'reckoner of time' (PL 175). Among are of Thoth's

more well-known lunar epithets is  *nb pt* 'lord of heaven,'  *itm HD* 'the silver

sun' (Mariette, A. 1880:82),  *HqA mpwt* "ruler of years" (Brugsch, 1883:759), and

 *Hr-tp pt* 'chief of heaven' (Boylan, 1922:65-66).

¹¹ While this value  *nsw* was first used in an inscription in the Luxor Temple during the reign of King Ramses II (Fairman, 1945:122).

¹² The god is also depicted in the form of an ibis bird.

¹³ *ski* could mean "to pass time" (*Wb* 4:314,12; *PL* 947). This is one of the reasons why Thoth, who appeared as a baboon, controlled the water clock's aperture to pass the time.

4. Measuring Time

There is enormous historical curiosity about how time was kept in ancient Egypt. The Egyptians employed a variety of instruments to track the motion and length of the shadow during the day and observe the rising of specific stars during the night. Along with other measurement tools like water clocks, they also observed the stars with the Merkheth, the sun with the sundial, shadow clocks, and gnomons. The lives of people were greatly impacted by all of those machines that operated according to distinct rules. They support law and order as well as everyday human activity.

Because the Kings of the Ptolemaic period were concerned about the Egyptian temples and built new ones or even restored the old ones, the priests continued to use the devices for measuring time to ensure some regularity in the temple services. This shows that the Egyptians' concern about keeping time using traditional methods was still significant throughout the Greco-Roman period. Using the same type and form of water clocks makes sense given that it was still common to divide a day into 24 hours during this time period as a holdover from Egyptian astronomy.

5. Water Clock

One of the earliest methods of time measurement that did not rely on the sight of celestial bodies was the use of water clocks. Because of the changeable environment and the impact that clouds have on both of them when viewing, the sun and stars are both very poor natural timekeepers. As a result, the sun and astral clocks were not always accurate. Because of this, the invention of the water clock must be regarded as one of the most admirable solutions to this problem. Additionally, it was employed to establish the time of day and night, particularly when decan stars¹⁴ were not visible. A Roman period inscription may be found on the rim of a water-clock fragment (fig.3),¹⁵ and it reads:



... r Ssr wnwt grH xft tm m ptr b[Akty]w....¹⁶

‘... is (the time) to specify the night hours if the decans are not visible’

When it becomes difficult to see the decan-stars by Merkheth (Borchardt, 1920:8-9) to establish the hour intervals of the night for the temple ceremonies, the water-clock's purpose, according to those inscriptions, is to split the nighttime into 12 hours for the temple timekeepers. Because of this, it is possible to evenly distribute the hours of duty. The temple attendants probably took turns keeping watches during the night (Sloley, 1931:174; Schomberg, 2018:337). Sloley (1924:44) explains the significance of it by reading the remaining phrase from an earlier piece as follows: “so that, in this way, the proper hour of the sacrifice will be observed.” This is the circumstance that demonstrates the importance of the water-clock as a timekeeping device and the only instrument capable of recording the entire twenty-four hours.

In Amenemhat's autobiography¹⁷ about the contracting of the water clock, the words *mrxt* and *dbHt* are used to designate the instrument. He employs the word *mrxt*, which literally

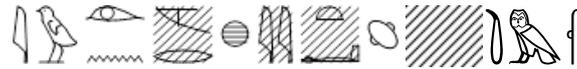
¹⁴ Individual stars were observed as early as the end of the Old Kingdom, and their helical ascending was most likely used for time keeping.

¹⁵ It is now in the Florence Museum at Italy, under no.2613. For more information, read: (Borchardt, 1920:9).

¹⁶ Numerous water clocks bore the same text.

¹⁷ The inscription was found in a tomb carved out of rock near Sheikh-Abd-el-Gurna and belonged to an official by the name of Amenemhat. He lived during the time of three 18th Dynasty kings: Ahmose, Amenhotep I, and

means ‘instrument of knowing’ (West, 1973:64). Despite the fact that each type of clock had its own name, *mrxt* was used to refer to all three of them.¹⁸



iw ir n mrxt Hsb .ti m rnpt

‘I made a Merkheth reckoned among the year’ (Borchardt, 1920:64)

However, it is evident from his comments that "the water pours out only through a single exit" that the paragraph in question relates to the water-clock, while referring to it as *dbH(t)*.¹⁹ This water clock undoubtedly incorporated his findings regarding the hour scales and their divisions. This extraordinary clock was created to display the time in any season.



iw ir n dbH(t) pn

‘I made this remarkable instrument’ (Borchardt, 1920:64)

Although some archaeologists²⁰ suggested that the word *mrxt*, despite the determinative meaning, meant a water clock, the Merkheth is an astronomical instrument; however, it was not a water or shadow-clock. Rather, it was originally a sighting instrument used to align the temple axis by looking at the stars, and it was also used to measure the time at night. Additionally, it was used to count the hours of the day by observing the shadow cast by the sun on its surface.



Fig.3: Fragment of a Water-clock, Florence Museum, Italy
cf., Borchardt, (1920:taf.4.3)



Fig.4: Greek pot-water-clock
cf., Young, (1939:fig.1)

The water clock was the primary timekeeping device used throughout the Greco-Roman period since it was the most basic (fig.4).²¹ The instrument was brought from Egypt to Greece and Rome, where it gained popularity before spreading to other nations in Europe (West, 1973:61-64). The Greeks gave the instrument the Latin name ‘*κλεψύδρη*,’ which means "water-chief." It was placed in the market in every significant town and was used in temples

Thumosis I. It has 16 columns and an inscription detailing the findings Amenemhat made that inspired him to build a water clock. (Borchardt, 1920:60; Clagett, 1995:457).

¹⁸ It is used for all the shadow, astral, and water clocks.

¹⁹ This latter term refers to the little container used to measure grains and liquids, particularly water.

²⁰ Moret, reads the word *mrxt* as ‘a clepsydra’ (Moret, 1902:132). The Merkheth, according to Zaba, could not have been referring to a solar clock or the instrument with the attached plumb line. He came to the conclusion that merkheth must be a water-clock (Zaba, 1953:63f). Isler has a different viewpoint and thinks the device described in the Edfu writings is simply a gnomon (Isler, 1991:57-60).

²¹ The mechanisms of this kind of water clock are a small, plain vessel with a bottom outlet that is either filled with water or inserted empty into a larger, water-filled vessel. For more information, read: (Young, 1939:274; Schomberg, 2018:323-324).

to allow the distribution of the attendants' hours of duty (Sloley, 1931:176). The ancient Egyptian clocks are more complicated than this one.

Additionally, numerous Egyptian water clocks from this era have been found at nearby Egyptian sites in Turkey and Italy, outside of Egypt. In some instances, they even have secondary Latin or Greek inscriptions that show how they were altered during the Roman period. This implies that they had to be taken out of Egypt, and consequently the latitude for which they were originally made (Schomberg, 2018:323). Some clocks have inscriptions stating that they are from a sanctuary (clocks nos. 1 and 3). Without concern for their accuracy, these water clocks were even exported by the Roman Empire to Egyptian temples (Quack, 2003:57–66). This shows that, at some point - likely due to its symbolic significance - the use of this particular form of Egyptian water clock surpassed any precision or increased accuracy.

Along with Egyptian priests, Alexandrian astronomers were instrumental in two different ways in the development of time measurement in Egypt throughout the Greco-Roman period. The first method involved the advancement of measuring theories. While the second method involved creating a new generation of timekeeping devices; most of the work in this area was done by famous Alexandrian inventors like Heron, Ctesibius, and Ptolemy (Allen, 1990:165-166; Schomberg, 2018:325), who created more complex and sophisticated mechanized water clocks. I would venture to guess that these clocks were only used by the astronomers of Alexandria and only in that city, and not anywhere else in Egypt.

Three mechanisms could be used by water clocks. The first technique is the 'outflow',²² which involves letting the water drip out. As a result, the clock was constructed from a bowl with a tiny hole in the bottom through which water could drip steadily. The second method, known as the 'inflow',²³ involved markings on the inside of the bowl to indicate the hours as the water level rose while allowing water to fill a container at a steady rate. The third technique, known as 'sinking',²⁴ also allowed water into the bowl, but the bowl was put in a sizable water container. The bowl steadily filled from a hole in the bottom, and the length of time it took for the bowl to fill and sink served as a measure of time. The inflow clocks were used later, and it appears that the outflow clocks originated in Egypt.

5.1. Outflow Water-clock

Outflow water clocks have been found in abundance all over the world, but the majority date to the Greco-Roman period.²⁵ The courtier Amenemhat's autobiography, which claimed that he created one for King Amenhotep I, contains the oldest mention of this form of water clock (ca. 1526 BC.). In his inscription, he adds that he has noticed how the number of hours varies on a monthly basis. This is the reason that he built this timekeeping device. While the Karnak water-clock (fig.5),²⁶ which was invented during the 18th Dynasty, reign of King Amenhotep III, is the earliest specimen still in existence, one more piece dates to the 26th

²² For example, the water clocks (nos. 1, 2, 3, 4, and 5) from the Greco-Roman period.

²³ The ancient Greek and Roman Edfu inflow water clock (no. 6) is similar.

²⁴ This type was not employed by the Ancient Egyptians. Around 400 A.D., it appears to have been created in India. (Goodenow, Orr and Ross, 2004:57).

²⁵ About thirty two clocks and fragments of this kind have so far been found.

²⁶ Legrain discovered it in parts at the Karnak Temple in Luxor in 1904; he repaired it for the Cairo Museum as JE 37525. Its height is 34.6 cm, and its top and bottom diameters are 48 cm and 26 cm, respectively. This clock's three registers of exterior decoration include several astronomical and other religious images. For more information, read: (Sloley, 1931:174; Pogo, 1936:40; Neugebauer and Parker, 1969:12; Leblance et Nelson, 1976:139; Clagett, 1995:66-68; De Young, 2000:478-189).

Dynasty, the reign of King Necho II (fig.6).²⁷ In general, water clocks were made by the ancient Egyptians out of a variety of materials, including granite, basalt, limestone, and sandstone. Even if not all of them were discovered in Egypt, some of them with authentically ancient Egyptian decoration have been discovered in Rome, where the Romans actually used them. I thus propose that they were taken there by the Romans, which makes the impact of Egyptian science on this European civilization clear.



Fig.5: Karnak Water Clock, Egyptian Museum, Cairo
cf., Egyptian Museum Online



Fig.6: Necho II Water-clock, Egyptian Museum, Cairo
cf., Montet, (1946:pl.ii)

This type of water clock is made simply from a flower pot-shaped vessel that is narrow at the bottom and wide at the top, with horizontal hour-marks within, and equipped with a small aperture or orifice near the bottom to drain the water out in a controlled manner (typically located beneath the seated figure of a cynocephalus baboon). As the water level dropped, the hours were displayed on a scale made up of twelve columns of holes - one column for each of the twelve months - drilled on the interior wall of the basin (University of Chicago eds., 1941:17). The fundamental mechanism was employed in several different ways. Horologists²⁸ have demonstrated significant inventiveness in refining the operation of water clocks throughout the development of this type of timekeeping. The pot was filled with water, which slowly leaked out through the controlled hole, and the water level was compared to a scale of markings on the inner surface to determine the passage of time (Long, 1989:43; De Young, 2000:488; Schomberg, 2018:331).

In the dark or at night as well as in the sunlight, the water would trickle as quickly. The clock also had the advantage of being able to be used indoors, whereas the sundial could not. However, the clock required maintenance in that it needed to be regularly refilled, and the orifice had to always be kept completely open because even the smallest obstruction would slow down the rate of dripping and cause the clock to run slowly. The *Oxyrhynchus papyrus*,²⁹ two pages from a papyrus codex, is one of the written sources that aids in our comprehension of the history and construction of the outflow water-clock. Part of it is a description of the outflow water-clock as an astronomical instrument.³⁰ There is also a description of the calculations used to create water clocks.

²⁷ The Cairo Museum is currently home to (JE 67096a, b, and c), an alabaster clock (the three main fragments are labeled individually). Its diameter is 57 cm at the top and 52 cm at the bottom, making it around 37 cm high. This fragment's exterior is painted with numerous astronomical scenes in four registers. The last two registers were formerly covered by a miniature statue of a seated baboon that symbolized the god Thoth. For more information, read: (Montet, 1946:35-36; Neugebauer and Parker, 1969:42-44).

²⁸ They are the creators of water clocks and specialists in the field of timekeeping.

²⁹ The term *Oxyrhynchus* refers to the chief town of an ancient Middle Egyptian province located near present-day Bahnasa on the west bank of Bahr Yousef. The papyri primarily include Greek writing from the reign of Augustus until the eighth century. Some highly significant astronomical manuscripts that provide an overview of the late Greco-Roman period's use of technical astronomy may be found among these papyri. For more information, read: (Grenfell and Hunt, 1903:142; Pogo, 1936:406; Neugebauer, 1962:387; West, 1973:62).

³⁰ Because of the astronomical scenes on its outer surface.

The inside of a water clock is usually marked with a series of graded lines that must have been drawn by hand in order to account for the drop in discharge rate as the water level dropped. There are a number of vertical dots arranged in a circle around the inside of the bowl, one for each month, arranged in a total of 12 scales of varied length to represent the 12 hours of that month's night. Each scale had one of the two marks  *anx*, which stands for 'life', and  *Dd*, which stands for 'stability', at the bottom of the clock (Teeter, 2003:108).

These fragments' exterior decorations are quite conventional, much like those on the Karnak water-clock, which is the most complete outflow clock. The registers and fields are separated by bands, and they are ornamented with scenes that are divided into astronomical and other various religious motifs. The astronomical scenes feature constellations, decans, planets, triangle decans, and gods attending them. The surface contains frames (fields) depicting the King and the twelve gods of the months - two gods per each field - making offerings to the gods represents the typical religious setting.³¹

The intercalary thirteenth month,³² separating between the first and twelfth months, was represented by a miniature statue of the god Thoth as a baboon that was mounted over the aperture or the round hole that passes from the inside of the clock and fell water through. The baboon is surrounded by two monthly scales divided into two frames (fields), one on each side,³³ with Month 1 to the left (Field 1 designating the start of the calendar) and Month 12 to the right (Field 6 designating the conclusion of the calendar). The King is represented by the gods of the twelve months, two per field, throughout the entire year.³⁴ Each pair of month gods (field) is separated by a *wAs* scepter. The fields on both sides of the baboon are as follows:

Field 1: The scene depicts the King offers *nmst* - vase to the god Ptah (who symbolizes the second month, *II Axt*) while holding a *wAs*-scepter. The goddess Tkhy of the (*I Axt* - first month) stands behind the King. She has a feather above her head and is holding a scepter and *anx*-sign.

Field 6: The King is giving the god   *Hr-Axty* Ra-Horakhty who is depicted as a falcon wearing a double crown and holding a scepter and *anx*-sign an offering, (marking *IV Smw*, the twelfth month).

5.2. Inflow Water clock:

After using the outflow water clock for a while, people discovered an intriguing fact: water flowed more quickly from a full vessel than from one that was almost empty. This was due to the higher pressure. They came up with the notion of a twin vessel, with the smaller one on top and the larger one below carrying a float that rose as the vessel filled (Borchardt, 1920:21-22). The cylindrical pot in the lower vessel was either placed in a bigger container

³¹ For more information about the outer surface scenes and inscriptions, read: (Noble and Price, 1968:148-149; Clagett, 1995:66-67).

³² Thoth is depicted on the ceiling of the Ramesseum zodiac (fig.16) within a panel that is similarly enclosed by the regular months, despite the abnormally empty band above the god. The thirteenth intercalary month of the ancient lunar calendar, which is personified by its eponymous deity and his festival *DHwty.t* "Thoth", would be indicated by this, as Parker pointed out (Parker, R.A. 1950:43 §224, and 44, fig.19). But Gardiner responded to this opinion and mentioned that the cynocephalus is represents the five epagomenal days (Gardiner, 1955:23 and 25-27).

³³ They are originally six frames around the whole clock that display the king with the twelve month-specific gods.

³⁴ The typical scene is as follows: the second deity is positioned behind the king, who is portrayed as making an offering to a god (or goddess).

that was kept filled of water so that water slowly leaked into the pot or was allowed to drip into it. The placement of a float with reference to a scale on the clock's inner face, or more simply, a float arrangement displaying the hours on a scale outside, provided an indication of the water's level as it increased (Clagett, 1995:77-78).

These clocks, according to some authors like Borchardt, (1920:22) entered Egyptian use a little after the outflow clocks. According to Schomberg, (2018:338) these types of clocks were first created by Greeks in Alexandria during the Hellenistic period, who also established considerably more effective substitutes for the ancient outflow clock by exposing its apparent weaknesses. However, there haven't been enough monuments from that period uncovered, except for some models with a similar shape. I disagree with this viewpoint because we have kings offering those inflow water clock models to various deities. The only clock of this kind is Roman in origin and was found in Edfu City in 1901 by Maspero.

Since the inflow water clock and Ctesibius's elaborate clock³⁵ (fig.7) have a similar shape, I propose that the later water clock, which was developed in 245 B.C. by the Alexandrian inventor and astronomer Ctesibius and was a more complex water clock for determining the time of day, served as the foundation for the following generation of water clocks. Ptolemy II's Alexandrian hydraulic clock is regarded as the best one ever created.

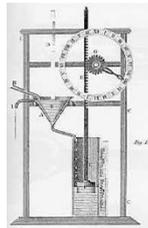


Fig.7: Ctesibius's elaborate clock
cf., <https://gutenberg.org/files/47928/47928-h/47928-h.htm>,
[Retrieved November 20 2022]

5.3. The Models

The water clock models serve as a sort of homage to the original inflow water clocks. The majority of them have a rectangular or square shape and are plain on the outside, except for a little relief image of Thoth - a seated baboon - placed directly over an aperture for draining the water in the clock. There is no graduation inside any of the models (Pogo, 1936:417). I'm suggesting it was used as an alarm clock for a short period of time during a specific rite inside the temple, or as a small clock to measure a short amount of time (perhaps one hour or less). Otherwise, it was intended to be filled with holy fluids when the water clock was ritually presented to various gods. According to some archaeologists (Pogo, 1936:418), they were presented as votive offerings. They are on display in a number of museums. Only four examples have been found thus far, two of which are from the New Kingdom, while the remaining four are from the Greco-Roman period.

6. The Catalogue

As it were, many water clocks have been documented; those that date back to the Greco-Roman period make up the catalogue in this article, which includes eight examples of three distinct types (outflow, inflow, and models), including some exceptional, nearly complete clocks and some excellent fragments. They are as follows:

³⁵ It is the first synthetic, automatically self-regulating clepsydra (Bruton, 1979:21; Fleming, 1986:65).

6.1. Outflow Water-clocks

On the Karnak clock, baboon figures first emerged. Later, they did appear on numerous other clocks of this type. During the Greco-Roman period, it occupied a portion of five outflow water clock and fragments. Only three of those monuments are in great shape and condition; the rest are just fragments, and on most of them, the area where the baboon dwells above the drain hole is partly damaged, which explains why the baboon has only been seen a few times. The following list attempts to arrange those clocks in chronological order:

- Fragment of Water-clock no.1: (fig.8)

Date: Early Ptolemaic Period, reign of Alexander, about 330 B.C. ³⁶

Material: Basalt.

Dimension: It is 33.5 cm. high.

Description: The vignette depicts the god Ra-Horakhty standing above the Horus name of King  *Tmā-a* 'the strong arm'. A little statue of the god Thoth dressed as a baboon that was once beneath the vignette has since been destroyed.

The identical sentence that appeared at the beginning of the inscription on both sides of the god Ra Horakhty figure above the month-fields reads as the following:



DHwty wnw't ir n --- xft ---

"the hour that the God Thoth done, when ..."

Field 1: Except for a goddess Tkhy's upper body, who had a feather over her head but no name, it was entirely destroyed. **Field 6:** in good condition.



Fig.8: Fragment of a water-clock (no.1), Hermitage Museum, St. Petersburg
cf., Roulet, (1972:figs.337-338)

- Fragment of Water-clock no.2: (fig.9)

Date: Early Ptolemaic Period, reign of Ptolemy II, about (285-246 B.C.).³⁷

Material: Basalt.

³⁶ It is found in the Iseum Campense at Rome, and it is now in the Hermitage Museum at St. Petersburg, no.2507a. For more information, read: (Wiedemann, 1901:271; Borchardt, 1920:7; Pogo, Notes, 1936:430-431 and fig.1; Pogo, Egyptian, 1936:403-404; Roulet, 1972:145; Allen, 1990:145; Peter, 2005:548-49; Lodomez, 2007:63-65; Bolshakov, 2011:96-99).

³⁷ It was discovered at the Iseum Campense in Rome, next to the church of St. Maria Sopra Minerva, and is currently housed in the Hermitage Museum in St. Petersburg, Leningrad, with the identification number 2507b. For more information, read: (Roulet, 1972:145-146. Wiedemann, 1901:272; Borchardt, 1920:8; Pogo, Notes, 1936:430-431 and fig.1; Pogo, Egyptian, 1936:403-404; Allen, 1990:145-146).

Dimension: It is 20.5 cm. high.

Description: There are only two partially damaged fields (1 and 2)³⁸ to the left of the entirely destroyed baboon statue that are visible.



Fig.9: Fragment of a Water-clock (no.2), Hermitage Museum, St. Petersburg
cf., Roulet, (1972:figs.340-341)

- Fragment of Water-clock no.3: (fig.10)

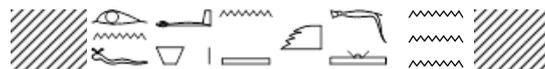
Date: Early Ptolemaic Period, reign of Ptolemy II, about (285-246 B.C.).³⁹

Material: Basalt.

Dimension: It is 38 cm. high.

Description: The vignette that stands directly above the damaged, twice-named Horus names depicts two figures for the god Ra-Horakhty confronting each other on either side of the *anx* 'life' symbol. A completely broken statue of a baboon was lying underneath the vignette. The line that represents the sky decorated with stars is placed over both the vignette and the baboon figure. The fragment shows the King with the gods of the months in three completed scales (two monthly scales in three fields), two unfinished scales in two fields, one on either side of the round hole that passes from the inside, and two badly damaged scales.

Two registers of inscriptions are located just below the upper margin of the fragment and across all fields. Above each register is a line that depicts the sky with stars. The lower register's starting is indicated by the *anx*, which develops to the right and left of this and repeatedly repeats the King's titles, which read as the following:



ir n.f iab n mAT kmt mH mw

"he makes vessel of black granite⁴⁰ which was full of water....".

Moreover, a line of hieroglyphs is framed in the lower portion beneath the fields and on either side of the aperture by two decorated parallel stars, and in the space between them is another inscription that repeats the King titles.

³⁸ Field 2: The goddess Hathor (who represents month 3) is presented with two *nw*-vases by the king as she is holding a *wAs*-scepter and *anx*-sign. The king is shown wearing a Red-crown. The goddess Sekhmet, who stands in for month 4 behind the king, is seen holding a papyrus scepter.

³⁹ It is kept in Rome's Museo Barracco under item number 27 after being discovered on Iseum Campense in 1856. For more information, read: Wiedemann, 1901,:272; Borchardt, 1920:9; Roulet, 1972:146; Careddu, 1985:31-32; Allen, 1990:146; Spalinger, 1996:31-32; Leitz, 2001).

⁴⁰ The king made the water clock out of black granite as an offering to the gods.



Fig.10: Fragment of a Water-clock (no.3), Museo Barracco, Rome.
cf., Museo Barracco Online

- Water-clock no.4: (fig.11)

Date: Early Ptolemaic Period, reign of Ptolemy II, about (285-246 B.C.).⁴¹

Material: Limestone.

Dimension: It is 52.5 cm. high.

Description: Since no orifice has ever been pierced, it appears that this clock was never completed (University of Chicago eds. 1941:17). At the front is a sizable statue of a seated baboon. The best depiction of Thoth as a baboon is in high relief; however, the expected drainage hole was not dug beneath the figure (Ritner, 2016:362).

Unlike the majority of clocks of this sort, this water clock's outer surface is decorated with twelve fields, each of which represents a different month of the year. Three of the four summer months and the first month of inundation are expressly designated, although the other twelve months of the year are solely identified by the deities that correspond to them. The last month of the calendar appeared to the right of the baboon figure, along with


IV Smw, "the final month of the summer season," while *tpy Axt*, "the first month of the inundation season," is completely absent. Each figure of the month's god is accompanied by an empty space that only contains the name of the civil month. The gods and the months start with Tkhy (the first month of the inundation) and end with Re-Horakhty, going clockwise from the baboon (month 4 of summer) (Teeter, 2003:106-107).

The unfinished inscription begins on both sides with the *anx* sign in the middle, just above the barren vignette of the god Ra-Horakhty on the top of the baboon figure. A partially mirrored inscription starts in the middle and moves right and left, with the single *'nh* sign in

the center to be read twice: *'nh Hr*  "Long live Horus.....". If the uppermost inscription had been finished, it would have included the names and epithets of the king in whose name the water clock was dedicated, as is the case with the fragment (clock no. 3), which is unmistakably commissioned on behalf of Ptolemy II (Ritner, 2016:363-364).

Thoth is depicted as a seated baboon in raised relief on an empty band below the *anx*, and a *Dd*-column is engraved below. The Thoth baboon is referred to in two Oriental Institute catalogues as the timekeeper/reckoner who 'sits at the front,' but according to the current museum label, Thoth 'sits in the middle of the twelfth panel, framed by a representation of a temple gateway' (Ritner, 2016:365). The lack of any form of drain hole on this water clock suggests that it was never completed. This could also explain why the upper half of the exterior, which was carefully smoothed, presumably to receive the inscriptions and

⁴¹ It is currently kept in the University of Chicago Museum's Oriental Institute under accession number 16875. For more information, read: (Ritner, 2016:361-385).

decoration seen on other water clocks, is the only part that is decorated (Reblando, 2013:109).



Fig.11: Water-clock (no.4), University of Chicago Museum
cf., University of Chicago Museum Online

- Water-clock no.5: (fig.12)

Date: Roman Period, reign of the emperor Hadrian.⁴²

Material: Black granite.

Description: This water clock is not unfinished. The depiction of the god Ra-Horakhty standing above the damaged King's Horus names. A partially damaged, unfinished statue of the baboon is erected above the aperture underneath the vignette (it is unfinished, the hole is not opened, and a metal gutter was used for the same purpose). The inner surface of the bowl does not have any scales or representations of dots for the clock.



Fig.12: Water-clock (no.5), Ägyptisches Museum, Berlin.
cf., Roulet, (1972:figs.334-336).

6.2. Inflow Water-clock

Only one Egyptian inflow water clock from the Greco-Roman period has so far been uncovered. The baboon figure also occupied a portion of this type of clock, just like on the outflow water clock.

- Water-clock no.6: (fig.13)

Date: Roman Period, 100 A.D.⁴³

Material: Limestone.

Dimension: It is 30 cm. high.

Description: This water-clock is unfinished.

⁴² It was discovered in 1859 at Rome's Fortuna temple, which is located beyond the Porta Portese. Currently, it can be seen in Berlin's Egyptian Museum with the number 19556. For more information read: (Wiedemann, 1901:274; Borchardt, 1920:9; *Wb* 7:415-416; Roulet, 1972:145).

⁴³ It was discovered in Edfu in 1901, and it is currently stored in the Egyptian Museum in Cairo. For more information, read: (Daressy, 1916:6; Borchardt, 1920:22; Sloley, 1924:48).

It is made out of a cylindrical container with a solid, marked column on top, a floating pointer to mark the hours on the column's surface, and a reservoir to drip water into the clock. No such attachments (pointer, column, or reservoir) have been discovered, anyone. When it was time to use it, the opening was closed, allowing water from a reservoir to drip into the vessel. Up until the hour scales' monthly point, water was poured in (Sloley, 1924:48; Sloley, 1931:176). Due to the clock's diminutive size, it might be difficult to read the scale inside; in order to address this issue, a movable float with an expanded pointer that could be changed to the correct month was inserted. This pointer then displays the hour on the column's exterior.

Like the outflow water-clock, the outer surface is not embellished with any religious or astronomical motifs. The sacred animal of Thoth is depicted as a seated image of a baboon in a small niche above the aperture at the base of the clock. It appears that the maker of the clock was attempting to copy a diagram that originated on the inside of a prismatic clock, where the baboon orifice was placed, for reasons of symmetry, below a solstitial scale. The Edfu prismatic diagram on the rim accounts for the unusual features of the cylindrical diagram of the inflow clock, beginning as usual from the autumnal-equinox scale placed over the baboon orifice. (Pogo, 1936:412).



Fig.13: The Inflow Water-clock (no.6), Egyptian Museum, Cairo.
cf., Egyptian Museum Online.

6.3. Models of Water-clock

Only four models of Egyptian water clocks have been found thus far; of the remaining four, two date to the Greco-Roman era and two to the New Kingdom. Baboon figures also appeared on each of them, just like the real outflow and inflow clocks.

- Model no.1: (fig.14)

Date: Ptolemaic Period.⁴⁴

Material: Green Faience.

Dimension: It is 5.5 cm. high.

Description: It is a hollow, rectangular prism that lies on a base with a shallow, rectangular basin in front of the baboon. The monkey is taking a seat on a small rectangular block that is encircled by a double row of steps and has a draining aperture in it. The basin's rim is reached by a double flight of steps, which are reached by ascending a slightly sloping main base's front wall. There is some tapering on the exterior walls.

⁴⁴ It is at Metropolitan Museum under no.17.194.2341. For more information, read: (Pogo, 1936:416).



Fig.14: Model (no.1), Metropolitan Museum of Art.
cf., Metropolitan Museum Online

- Model no.2: (fig.15)

Date: Ptolemaic Period.⁴⁵

Material: Green Faience.

Dimension: It is 8.75 cm. high.

Description: The prism's front portion is broken. It is a hollow square prism that was formerly supported by a base with a basin in front of a baboon, but that basin has since vanished. The baboon with shattered knees is seated on a little rectangular block that has a draining aperture in it.



Fig.15: Model (no.2), Metropolitan Museum of Art.
cf., Metropolitan Museum Online

7. Notes and Discussion

7.1. Scenes:

- While older clocks had multiple registers filled with astronomical scenes, all Greco-Roman outflow water clocks feature a single register of scenes on their outer surfaces. The type of instrument used at this time, however, maintains the custom by simply showing the months. The interesting scenes show Kings making gifts to the gods and goddesses of the 12 months. Unlike older clocks (Karnak clock (fig.5) has three registers, while the Necho II clock (fig.6) has four of them), which were lavishly decorated with additional celestial bodies, including decans, planets, lunar moths, hours, and constellations. Vertical lines of texts, typically containing the names of the Kings, separate each pair of months that are classically displayed in a single field from the next. With the exception of (clock no.4), it is decorated with 12 fields, each for a particular month. Additionally, each of them has a *wAs* scepter to distinguish each field.

Every month's deity has a name, and the majority of them are known as the names of particular civil year months (Telley, 2014:90). As seen on the astronomical ceiling of the Ramesseum temple (fig.16), and the oldest exemplary Karnak water clock, they are typical of the same arrangement. Thoth, who appears as a baboon and occupies the center of both astronomical scenes, represents the accuracy, stability, and tranquilly of the system. In a line, he represents the start of each Sothic cycle, Sothic year, decanal cycle, and lunar year. As

⁴⁵ It is at Metropolitan Museum under no.86.1.93. For more information, read: (Pogo, 1936:417-418).

usual, he also serves as the spectral point on all Greco-Roman period water clocks that are only decorated with the months of the civil calendar.

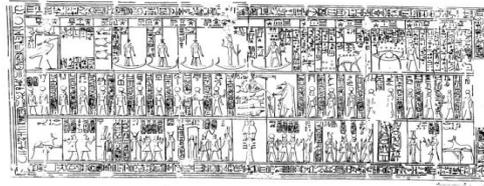


Fig.16: The astronomical ceiling in the Ramesseum as depicted in Gardiner, *The Problem of Month-Names*

c.f., Telley, (2014:fig.6.3)

- On all the Greco-Roman period clocks, to the left of the baboon, and as usual on the New Kingdom astronomical scenes and papyri, instead of *Thoth*, the first civil month of Upper Egypt according to the calendars of this period, *thy* appears first, and then the regular order is carried out. Also, Ra-Horakhty⁴⁶ can be seen on the same clocks to the right of the baboon instead of *Mesore*, which corresponds to the same calendars as Upper Egypt's final civil month. The god of the (month 12) is only depicted as a mummiform falcon-headed god on (clock no.4) and as an exception, but he can be recognized as Re-Horakhty from context. The name *Mesore*, which means 'the birthday of Re' or 'feast of Re', was assigned to this month's first day according to the late Greco-Roman calendar (Parker, 1950:41; Depuydt, 1997:95; Telley, 2014:95-99). This careful arrangement of the months spanning centuries suggests that the Karnak clock, which is the basis for all of these clocks, was used in their construction.

- Above each internal column of drill holes, the names of the months are inscribed on the basin's rim. The rims of (clocks nos.2 and 3) are completely damaged. The names are clearly displayed on (clock no.1), however, there is no identification engraving on (clocks nos.4 and 5). Since there are no names for the months on the clocks' rims, the clock-reader must instead look at the baboon figure on the outer surface, which marks the start and end points of the calendar at the same time, and only preview the scenes of the months in order to recognize the amount of water needed to fill the pot with instead of using the rim for the same purpose.

7.2. The Baboon:

- The baboon figures that guard the apertures of all three types of water clocks are all represented as bas-relief sculptures, which means that the majority of them have been damaged over time because the clock's aperture is both its weakest point and its most visible feature. Baboons on (clocks nos. 1, 2, and 3)⁴⁷ are completely damaged, and partly on (clock no.5). While, the baboons that dwell in (clocks nos. 4, 6, and models nos. 1 and 2) are in excellent condition.

- The statue of the baboon, which is always depicted on the two different types of water clocks and even the models, is related to the roles played by the god Thoth, who is the keeper of time for both gods and humans and is known to be adept at computation and time measurement. He used to be mounted over the aperture, which stood in for the thirteenth intercalary month separating the first and twelfth months.

⁴⁶ It appeared as *wp-rmpt* on various papyri and astronomical scenes from the New Kingdom and Late Period..

⁴⁷ Even Karnak clock itself has a broken baboon.

A damaged inscription occurred above the month fields and under its rim on a fragment of a water-clock⁴⁸ (fig.17) dates to the reign of King Alexander, around 330 B.C., reads:



... [wn]wt nty wb[n] ... wn[t] m .sn iw iw twtw nb Hr wnw t .f ...

".... hour, in whoever rises, that is in them is. Every figure is in its hour"

The text proves that there is a clear connection between the baboon's residence in the center of the celestial bodies that began and ended around his body, as well as that connection between the names of the months written along the rim and both those bodies on the outer surface and the dots of hours written along the inner surface of the water clock.



Fig.17: Fragment of a Water-clock, British Museum cf., British Museum Online

- According to Clagett and Daressy, the Egyptians carved a seated dog-faced baboon onto their water clocks; it was thought that this animal urinated twelve times a day at regular intervals. One would assume that this merely indicates that the baboon is effectively "urinating" during the entire day by ejecting water from the aperture clock beneath the seated baboon. The animal spends the entire day essentially 'urinating' (Daressy, 1916; Clagett, 1995:148-149). Horapollo's link was the one that was the most direct with that fact: '..... it discharges pee twelve times a day, one every hour. In the evenings, too, time is spent doing the same thing. Therefore, it makes sense that the Egyptians carved a sitting baboon into their water clocks. They also cause its penis to leak water....' (Boas, 1950:69).

Baboons behave in a particular way while the sun is rising and setting, and consequently at the two equinoxes (every year, in September and March), making them a symbol of time. Only at the two equinoxes, when the sun shines directly down on the equator and both day and night are almost equal in length, does the baboon typically void its urine 24 times, connecting to the 24 hours in a day, which is why this animal is used as a symbol for measuring the beginning and end of each hour. One of the first civilizations to divide a day

into 24 unequally spaced time periods was the Ancient Egyptians, or  (ME 61)

var.  . wnw t 'hour' (Wb 1:316,1). However, the Egyptians used the inner scales on the inner face of the clock to measure the irregularly shaped hours. Therefore, the baboon is merely a representation of the current sharpening measure.

- The seated baboon was a distinctive element of Ancient Egyptian art that appeared both on the equipment used for measuring time and in the religious scenes. The weighing of the heart

⁴⁸ It was discovered in Tell al-Yahudiyya and is currently housed in the British Museum with accession number 933. For more information, read: (James, 1989:190).

is the major theme of this intricately detailed image of the seated baboon in his place of worship that is painted on the north wall of Nakhtamon's tomb (fig.18).⁴⁹ At the top of the shrine, which is accessed by eight steps, is a representation of the god Thoth as a seated baboon with the moon on his head (it conveys a significant symbolic message about the deity's elevated position). The inscriptions 'the gods greet you' and 'the gods praise you' (Benderitter, 2017) are written on either side of the side door, denoting the baboon's exaltation. Those steps, which lead to the baboon above his shrine, are a typical representation of those on the model (no.1), where the monkey sits on a small rectangular block that is encircled by a double row of steps and has a draining aperture in it.

- The pose of the squatting baboon on the water clock, placing its forepaws on its knees, is frequently seen in astronomical and religious scenes or statues. The embalmers sometimes place baboon mummies (fig.19) in the same position. The majority of the baboon mummies discovered sitting in wooden coffins share the same shape.



Figure 18: Praising baboons - tomb of Nakhtamon –Deir el-Medina
cf., [https:// theygamelyan.blogspot.com /2019/02/nakhtamon-tt-335.htm](https://theygamelyan.blogspot.com/2019/02/nakhtamon-tt-335.htm), [Retrieved October 22 2022]



Fig.19: Two seated mummified baboons, Ancient Egyptian Agriculture Museum
cf., www.museum.agropolis.fr/pages/expos/egypte/eng/museum_cairo/baboons.htm, [Retrieved November 18 2022]

- The fact that a baboon is featured on other measuring time devices is also an outlier and speaks to the primate's significance as a guardian of time and its measurement tools. A Late Period sundial⁵⁰ (fig.20) with a gnomon decorated with a sculpture of a seated baboon kneeling on a pedestal with the moon on his head. As in many astronomical scenes, the relationship between the two heavenly bodies (sun and moon) is depicted here by the instrument, which is typically used to measure time according to the motion of the shadow, and the baboon, a symbol for the moon. This instrument shows that the baboon is not only connected with the water clock but also with other different measuring time instruments as a guardian for the time.



Fig.20: A sundial dates back to the Late Period
cf., Louvre Meuseum Online

7.3. *Dd*-column

- Only on (clocks nos. 1 and 4) is a *Dd*-column incised, under the seated figure of Thoth as a baboon. However, this does not preclude the possibility that the other clocks examined in this

⁴⁹ The tomb dates back to the 19th Dynasty at Deir el-Medina (TT335).

⁵⁰ Currently, it can be found in the Louvre Museum with accession number E 11558.

article, which feature a section devoted to a baboon that is now partially destroyed, were once painted with this symbol below the baboon.

- During the Greco-Roman period, the verb  *Dd*, meaning ‘to say’ (*D* = *DHwtj*) (*PL* 1251), was also written with the baboon determinative. This spelling might be used at Esna more frequently than conventional phonetic writing. It is common to begin etiological

derivations of toponyms or divine names with the phrase   *Dd.tw* ‘one says’ (Klotz, 2014:56). Thus, the significance of ‘Thoth say the time’ seems to be implied by its appearance on the water clock.

- As Parker (1950:43§224) notes, ‘*Dd* pillar, the well-known sign of Thoth,’ and the relationship between the hieroglyph and the baboon is scarcely unique. The lower register of the Ramesseum's astronomical ceiling's depiction of the lunar months' significant feature (fig.16) bears similarities to a depiction of Thoth's figure as a baboon above a *Dd*-column. Thoth's central role is undoubtedly connected to his function as the ‘creator’ of the water clock, ‘by which offerings are made’ (Borchardt, 1920:97).

- The baboon appears as a Thoth symbol on a *Dd* column in the penultimate lower register's central dividing point of the Ramesseum's astronomical ceiling and the outflow water clocks. Currently, the ceiling is divided into thirteen sections, twelve of which are designated for the months, while the remaining section is occupied by a baboon. Additionally, the twelve months are divided by that division. The conclusion is that this last division corresponds to the intercalary month of Thoth, whose name is supported by the Thoth symbol, which represents his function as the patron of time determination and the inventor (Clagett, 1995:136).

7.4. Texts:

- The Greco-Roman water clocks, which are famous for their text bands under the rims (some of them surrounding the baboon figure itself), the fields of months they were encircled with, and even the baboon himself, had another peculiarity. Only the incomplete (clocks nos. 4 and 5) have bands that are empty except for the upper band's text entry (clock no. 4).

- The king's titles are repeated to the right and left of the point on the circumference containing the hieroglyph *anx* ‘life.’ Only on (clocks nos. 3 and 4) the inscriptions are finished, and on (clock no. 4) the single ‘*nh*’ in the center is the first word of the texts on

both sides, and just the beginning of the texts on both directions, surrounded by two  , one on each side, to be read twice: ‘*nh Hr*’ ‘Long live Horus’.

- On the other hand, the inscription on (clock no.1) is entirely different. Instead of the letter ‘*nh*’ in the center, there is a representation of the god Ra Horakhty, and on either side of him are mirror writings that begin with the name of the god Thoth. This mirrored inscription refers to King Alexander the Great and reads, ‘Long live the good god, lord of ritual action, son of Re, Alexander. As his monument (water clock), he made.....’ (Peter, 2005:548–49; Bolshakov, 2011:96–99) on either side of a Thoth high relief figure that has been cut out on a *Dd*-column. He created a water clock in his honor. The identical inscription may be seen on a piece of the water-clock (fig.17), which also dates to King Alexander's reign.⁵¹

- Inscriptions on the clock's underline, which depicted the sky, on (clock no. 3) mention Ptolemy II as having offered a black granite water clock to the gods. The inscription on that water clock, which is made of basalt, not granite, makes it appear as though it was copied

⁵¹ For more information, read: (Andrews, 2001:38; Stanwick, 2005: 547–48).

from an older clock or papyrus or that the King is referring to the granite *wnSb* offering in this text.

- Both (clocks nos. 1 and 4) each month panel has blank cartouches; while in reliefs from the Ptolemaic period, scenes may have empty cartouches even when the surrounding text has finished cartouches (Ritner, 2016:364-365). Since the dedication inscription's unfinished status correlates to the empty cartouches in each month panel, it is required to date the water clock artistically. The names of Alexander the Great⁵² and Ptolemy II are written on several fragments. In other instances, unfilled cartouches indicate manufacturing in the very brief 320–246 BC timeframe, and inscriptions or other evidence at the very least points to their Hellenistic origins (Schomberg, 2018:323-333).

7.5. Ra Horakhty and the Baboon

- The inscriptions that ran through the clock's body began and ended at a single point, which is the squatting baboon above the aperture, which is also topped by a column of conventionally repeated images of the god Re-Horakhty, who represents the Sun on top, and the image of the baboon, a symbol of the god Thoth, represents the Moon on the bottom of the column.

- On the Greco-Roman (clocks nos. 1, 3, and 5),⁵³ god Ra-Horakhty standing on the vignette above the Horus name of the King, which reads ‘the strong arm.’ With the exception of the Karnak clock, there are no other clocks from the New Kingdom that depict anything like this. In order to protect the name of the King, it is traditional to place it in the midst of the sun and moon symbols. Numerous water clocks from the Greco-Roman period also had different King's Horus names; one of them, a fragment (fig.21), dates back to King Ptolemy II's reign.⁵⁴ There was a name:



KA-nxt xa m Sw

‘The strong bull-arising in the sun.’

- The same Horus name appears on the Karnak clock, but unlike other clocks of this type, Re-Horakhty does not appear above the baboon and the aperture but rather a few centimeters to the right of them. It takes up space in the first upper register, between the *spDt* Sothis (decan no.36) which is depicted as a standing goddess in a bark, and another bark that has a statue of Amenhotep III, planets Jupiter and Saturn,⁵⁵ and another bark that contains a figure of Amenhotep IV. The King's Horus name reappeared beneath the representation of Re-Horakhty.

⁵² Or even his brother Philip Arrhidaios.

⁵³ t is partially damaged on (clock no. 4).

⁵⁴ It was discovered in Nineveh and is currently shown with the number 7125 in the Oriental Institute at the University of Chicago Museum. For more information, read: (Ritner, 2016:385-389).

⁵⁵ Throughout Horus' name, the same Re Horakhty figure reappeared twice and moved between the planets.



Fig.21: Fragment of a Water-clock, University of Chicago Museum
cf., Ritner, (2016:fig.18).

- Ra-Horakhty is the god of the last month⁵⁶ according to the civil calendar, which matches how the months are arranged on the water clocks. However, he is actually the god of the rising sun in Egyptian mythology, which is one of the reasons why the baboon is depicted right after this god in order to connect using one symbol (Ra-Horakhty) to eternity, or the end and the beginning at the same time.

- The ceremony of the sacred birth is being performed by baboons (monkey souls of the east), who herald Ra's birth, welcome him, and rejoice in him during his sunrise. This ceremony aids in Ra's rebirth in the final hours of the night so that he can rise the next morning.

Throughout the Middle Kingdom, the baboon was known as  *bnt* ‘baboons which greet the morning Sun’ (ME 83).⁵⁷ Amenemhat's inscription concerning the water clock describes the significant relationship between the baboon and the sun as follows:



Smwt ra pt m xrw .sny Awt-a

"[I represented them (months) on the water clock]⁵⁸ and the movements of Ra in the sky, with the utterances of both⁵⁹ and an offering."

This pronoun  *.sny* ‘both’ refers to the existence of two gods, which Borchardt and Sloley (1924:45) identify as Ra and the moon deity.

Actually, Horapollo links the depiction of the baboon to the point at which the sun and moon meet in the east: ‘When they mean the moon... they draw a baboon. The moon, since this animal exhibits some affection for the alignment of this god. Because the male baboon doesn't look or eat when the moon is shadowed by its combination with the sun’ (Boas, 1950:52-53). He gives an explanation to this relation between the two celestial bodies, the moon, as this creature expresses some adoration for the alignment of this sun god. Because of the male baboon's lack of interest in the moon's shadow caused by its conjunction with the sun, the moon is rarely seen.

⁵⁶ It is also the name of the same month in the civil calendar at the same time, *msw.t-Ra-Hr-AXty*, or ‘the Birth of Re- Horakhty,’ emphasizes the celebration of the god. This month of transition might be written as *wp-rmp.t*, ‘The Division/Opening of the Year,’ in both the lunar and civil calendars. (Ritner, 2016:382).

⁵⁷ Among some other names like *bnw*, *bnt*, *ian* etc.

⁵⁸ This addition was suggested by (Borchardt, 1920:61).

⁵⁹ However, there is no proof that the moon had anything to do with the water clock. The phrase  *rx wHmn HAty* "knowing the repetition of the two lights (moon and sun)" can be found numerous times on astronomical monuments, including Merkhety (no.1) and a wall of the Edfu Temple. (Chassinat, 1928: 3,351). It seems that understanding how the sun and moon move can be regarded as a feat and merits being recorded in writing.

- Baboons' early morning antics, which included shouting and gesturing toward the rising sun to increase their metabolism, were thought to be a special means for them to communicate with one another and, in particular, with the gods. Baboon chatter served as the Egyptians' sacred language, which was only spoken and understood by the gods. In the First Hour, the transitional period between twilight and night, the baboon motif is clearly displayed (Pinch, 2002:114). The 'gods who open the gateways to the Great Soul' are the baboons of the First Hour (Taylor, 2016:13), according to the Amduat. Baboons, also known as the 'Sons of Ra...they sing for him, dance for him, bounce around for him, sing praises for him, and shout for him,'⁶⁰ words appeared on a hymn from the Late period.

- One of the visual registers on numerous hypocephali⁶¹ depicts the collision of the solar and lunar boats as they travel across the sky during the day. The encounter between the sun and moon represents the circumstance when they are both residing in the liminal zones of the netherworld, close to the western and eastern horizons, respectively, according to an analysis of the cosmographic scheme of these funerary objects and a comparison of the scene with other astronomical representations. In more traditional depictions, the two solar boats are shown prow to prow, with the moon boat serving as a stand-in for the morning barque (Priskin, hypocephali, 2015:24). In a 26th Dynasty⁶² example (fig.22), a barque transports the lunar deity while carrying a naos with a squatting baboon visible inside it, to whom another baboon extends the wedjat-eye.



Fig.22: A hypocephalus dates back to the 26th Dynasty cf., Ashmolean Museum online

7.6 Aperture:

- Amenemhat's inscription about the water clock had the following sentence:



wnwt nbt r trw .s pr mw Hr wDi ntH wat.

"Every hour at its time. The water runs out only

through a single exit" (Borchardt, 1920:64)

In this inscription, Amenemhat outlines the technique and the sole means of dripping water from the water clock through the aperture that was in close proximity to the baboon. Thoth is shown as a mounted baboon above the aperture. Only the clocks (nos. 1 and 3) and models (nos. 1 and 2) have apertures that can be opened and used to measure time, while (clocks nos. 4, 5, and 6) have clear marks for the holes but incompletely constructed apertures, and (clock no.2)'s is completely damaged.

⁶⁰ An 18th Dynasty hymn describing the relationship between baboons and the sun god Ra (Te Velde, 1988:133; Houlihan, P.F. 1996:96).

⁶¹ The funerary apparatus known as the hypocephalus first appeared in Late period Egypt as a round item put beneath the deceased's head. (Priskin, hypocephali, 2015:24).

⁶²The hypocephalus of Tasheritenkhonsu, made of linen and plaster, is now on display at the Ashmolean Museum. AN1982.1095.

- On the completed clocks, a similar aperture would have been created between the god's feet, with the drainage locus corresponding to the baboon's phallus (Ritner, 2016:366). Schott (1950:922) made the same suggestion, claiming that the Necho II clock (fig.5) had been equipped with a drainage tube, emphasizing the relationship to the phallus. According to an ancient belief, the baboon urinates twelve times daily at regular intervals (Daressy, 1915: 5–16).

- The metal gutter in (clock no. 5) shows that the Romans used it inside the Fortuna temple, where it was discovered. How did they utilize it to measure time without all the standard scales and dots that should be shown on its inner surface? That is the question at hand. While these scales were discovered on the inner surfaces of seven additional clocks and clock fragments⁶³ dating from the Roman period, they were also used for the same purpose. The large number of clocks that were found in Rome indicates that they used Egyptian technology to measure the passing of time and did not even attempt to remove or change their decorative elements.

7.7. Inner Surface:

- On our five outflow clocks, only (clocks nos. 1, 2, 3, and 4) had inner marks (just the dots on the upper inner surface are visible); all of the regular marks had vanished from the incomplete clock (clock no.5). Sloley (1924:45) sums up the function of the outflow clock by stating that while it was in operation, the vessel was fully stocked. The clock from Karnak, where this line had likely been painted on, is not visible. The other fragments contain remnants of the line, most of which is dates back to the Greco-Roman period. There were any inner marks on the inflow clock (no. 6) and the models (no. 1 and 2).

- I suggest that common people in ancient Egypt used unmarked outflow clocks to tell time at night inside, followed by Greeks and Romans. Most of those people were farmers and workers, they were unable to operate the complicated regular type of outflow water clock (which usually has a marking scales on the inner surface) because it requires a professional astronomer or hour-watcher.

- Therefore, I provide two answers to this conundrum. The first involves using capacity measurements to determine how much water should be put in the bowl to make it adequate for a given period of time. The second method, however, involves using a cubit to gauge how much water should be added to the bowl until it reaches a specified depth. According to Soliman (2009), the unmarked clocks evolved into simple tools that were easy to make and operate and did not require a man to have a high level of education to deal with.

7.8. Votive Offering Models

- The models' size suggests that they are special in some sense. According to Pogo (Egyptian, 1936:417), they are water clock replicas or votive items rather than the actual working clepsydra. It also illustrates how different it is from the conventional cylindrical clepsydra, it has a peculiar rectangular shape. The older models date back to the New Kingdom, and those from the Greco-Roman period don't differ significantly in style.

⁶³ For more information, read: (Symons, 2013).

- The inflow water clock (Pogo, Egyptian, 1936:414-416) or its analogues are frequently shown as votive offerings in the forms of determinatives  or  on the walls of the ancient Egyptian temples. From the Middle Kingdom to the Greco-Roman period, it was a customary type of offering.

Those combined votive offering signs appear for the word  *Sbt*.⁶⁴ in the New Kingdom,⁶⁵ there are two other group-signs that have the same meaning, the first is   var.    *wnSb* (*Wb* 1:325,9), and the other is     *wtT*.⁶⁶ According to those names of the water clocks, which all appeared in both the inflow clocks and the models, it appears that the outflow-clocks were not written in hieroglyphic form in ancient Egyptian writing. According to Wilson (*PL* 238), *wnSb* is only a Greco-Roman rendering of *Sbt*, which in the New Kingdom is translated as a 'water-clock' or 'symbol of the cycle of time.'

The group sign  *Sbt* is composed of the word  *Hn* 'the prism,' which in the Middle Kingdom meant 'space of time' (*ME* 171), as a square pillar (similar to the models nos.1 and 2) with a V-shaped chevron at the top. Since the New Kingdom, the sign has come to symbolize a prolonged or infinite time period (*Wb* 3:106,4-7). The prism and baboon are both positioned on the sign *nb*, which means 'lord,' and the baboon  alludes to the god Thoth,⁶⁷ the "Master of time." The entire symbol *Sbt* thus denotes 'Thoth, Lord of Extended Time.' The sign , which is the platform the baboon rests on, occasionally takes the form , decorated with a core diamond pattern filled with a flowery pattern, which refers to the hieroglyph *Hb* for 'festival' (Sambin, 1988:250). Two baboons flank the door in a scene from the tomb of Nakhtamon (fig.18), which is where the god Thoth is depicted as a baboon sitting on the top of the pedestal. While standing on a *nbt* (basket), which symbolizes authority ('lord of') atop plants, both are viewed as perfect adorers with a star in front of each.⁶⁸

- A classic image from one of the many Greco-Roman temples depicts the King offering a water clock to divine entities, indicating that the water clock was also thought of as a more abstract representation of organized, cyclical time (*PL* 238-239). In this instance, the water clock elevated the original item above its ordinary usage and put it in a greater symbolic realm. One of those senses was depicted as an offering table with a water clock  in the first register on the walls of the temple to the god Khnum in Esna (Sauneron, 1959:162 and fig.6) (fig.23). Another image depicts the King Ptolemy V⁶⁹ holding a water clock and making an offering to the goddess Hathor in Karnak, on the walls of the Opet temple (fig.24); the inscription in front of the King reads:

⁶⁴ For more forms of this term, see: (*Wb* 4:438,5; Sambin, 1988:234)

⁶⁵ In the Middle Kingdom, it shows only Thoth as a cynocephalic baboon in a naos. (*Wb* 4:438,8).

⁶⁶ For more forms of this term, see: (Sambin, 1988:238). However, (*Wb* 1:382,15) reads it as *wtT*.

⁶⁷ For this connection with the god Thoth see: (Bruyère, 1952:100f).

⁶⁸ Lower Egypt is symbolized by papyrus, and Upper Egypt by lotuses.

⁶⁹ These kinds of scenes show the king acting as the son of Thoth. (*PL* 238-239).



(De Wit, 1958:53)

rdi wnSb n mwt .fir (n).f rdi anx

'giving a water-clock to his mother, who is given life'



Fig.23: The water-clock as a votive offering, temple of Khnum at Esna cf., Sauneron, (1959:fig.6)



Fig.24: The King Ptolemy V presents a votive offering (water-clock) to the goddess Hathor cf., De Wit, (1958:pl.1.b and pl.8.c.)



Fig.25: The King making a votive offering (water-clock) to the goddess Sekhmet, Isis temple, Philae cf., on the Site

While the King is making an offering in front of the goddess Hathor's emblem (De Wit, 1958:168 and pl.8.c), the same text reappears. In the Egyptian temples, the scene of making this kind of votive offering to the gods was popular and repeated a number of times, one of them decorated one of the inner sanctuaries of the Philae temple (fig.25). Although these clocks are also shown in the temple inscriptions, a text can be found in the Hathor temple in Dendera that says:



(Daumas, 1970:71)

nb(t) wnSb xnt wnSb n Hmt st

"Lady of the time-cycle, (making a water-clock) in the Hypostyle Hall of her majesty."

And as usual, in both of the last texts, the Egyptians used the word *wnSb* to identify the votive water clocks, more than they used for both *Sbt* and *wtT*. The *wnSb*, which represents the sun's and moon's coordinated motion, is thus a particularly fitting symbol to use when referring to an eclipse (Priskin, Dendera, 2015:162). There are numerous such scenes and inscriptions to be seen on the temples' damaged bricks, walls, and columns.⁷⁰

- Some objects that have been found dates to the Late period⁷¹ symbolize those votive offerings that are depicted in temple offering scenes. They also represent the Thoth baboon emblem that is seated in front of a pillar (typical like the models and the scenes). One of these, a *Sbt* sacrifice statue, dates from the early Ptolemaic period (fig.26).⁷² Actually, several of these recently found statues date to the New Kingdom.⁷³

⁷⁰ For more scenes see: (Sambin, 1988:pls.i-v).

⁷¹ They first arose during the 18th Dynasty and continued into the Roman period.

⁷² It is a faience statue that can be found online at the Metropolitan Museum of Art with the number 021.41.129.

⁷³ For more information, read: (Sambin, 1988).



Fig.26: Figure of baboon on a basket and with a pillar
cf., Metropolitan Museum of Art Online

8. Influence on the astronomical scenes

- The main artwork, which is *Astronomy*, includes water clocks. Baboons were among the many mythological and astrological creatures that lived in the astronomical scenes alongside this sort of Greco-Roman period clock. Between the numerous celestial bodies, the sacred animal baboon is stranded (zodiacal signs, constellations, decans, planets, etc.).

- The beginning of the events leading up to Horus's birth is depicted as being occupied by a baboon in both the round zodiac of Dendera B⁷⁴ (fig.27)⁷⁵ and the rectangular zodiac⁷⁶ of Dendera E⁷⁷ in the same temple. This is indicated by the combined symbol of the squatting baboon carrying an oryx and wedjat-eye into a disc in Pisces which records the day of the autumnal equinox (Priskin, Dendera, 2015:170). It would be more accurate to say that the entire image represents a solar eclipse if the baboon represented the moon at its time of hiddenness (conjunction), which is the time when a solar eclipse can happen (an annular eclipse) (Aubourg, 1995:10; Cauville, 2011:540-541). The same constellation is depicted with the same image in the rectangular zodiac Dendera E (fig.28); it is a disc that is encircling the image of Osiris holding a baboon and a pig by the tail (Priskin, 2016:8).



Fig.27: Round Zodiac B, Dendera Temple
cf., In Site



Fig.28: The Baboon carrying an oryx,
Dendera E Zodiac
cf., <https://imgur.com/gallery/G6VbvFm>,
[Retrieved November 12 2022]

⁷⁴ Some monuments, such as Dendera B and Dendera E, are categorized using capital letters at the end of their names. Because a single monument could contain different astronomical scenes, Neugebauer and Parker classified these monuments for the first time in their catalogue of astronomical monuments, *Egyptian Astronomical Texts*, vol. 3, published in London in 1969, and any book published after this date that was classified similarly.

⁷⁵ The Louvre Museum in Paris now houses this circular zodiac, which originates from the end of the Ptolemaic Period. On the roof of the Dendera temple, it was discovered on the western half of the ceiling of the Central Room of the East Osiris Chapel. For more information, read: (Lagier, 1927:20-45; Goyon, 1976:289-300; Slosman, 1979:161-179; Aubourg, 1995:1-10; Moore, 2002:531-549).

⁷⁶ The Outer Hypostyle Hall ceiling, which Tiberius built, is decorated with the rectangular zodiac in six of its seven bands (14-37A.D.). (Brugsch, 1883:5-23, 67-68, and 147-152; Neugebauer and Parker, 1969:67; *PM* 6:134).

⁷⁷ The rectangular zodiac on the first hypostyle hall's ceiling includes a section called Dendera E. It is situated to the east and west of the center in the third (outer) strip. For more information, read: (Neugebauer and Parker, 1969:79; *PM* 6:49).

- The sun and moon, which appeared together on the water clock, also took up some space in the zodiacs of the Greco-Roman period. The sitting baboon travelling in a boat (carved into the lunar disc in the linear zodiac) on the Deir el-Haggar zodiac⁷⁸ (fig.29) alludes to the moon. It meets the boat of the sun, which is symbolized with a child in the solar disc in front of the moon, which may refer more specifically to the time of conjunction. The same baboon figure appeared inside his disc on the Esna and Nag Hamad zodiacs⁷⁹ (fig.30).

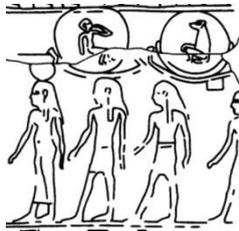


Fig.29: A sitting baboon travelling in a boat, Deir el-Haggar zodiac cf., Kaper, (1995:fig.1)

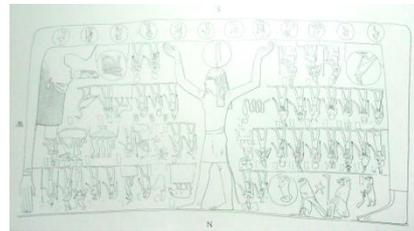
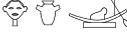


Fig.30: Nag Hamad zodiac cf., Neugebauer & Parker, (1969:pl.39)

- Numerous scenes from the Greco-Roman zodiacs have depictions of a baboon sitting inside a boat. He appeared to be seated in a boat in the Edfu zodiac⁸⁰ (Fig.31). According to lists discovered in Ptolemaic temples, the moon boat appears with the welcoming Thoth and Harendotes, the squatting baboon, and the eponymous gods of the month, Thoth and Harendotes, who are revered by the baboon, relate to the first two days of the lunar cycle (Symons, 1999:36). Here the moon boat appears with the welcoming Thoth and Harendotes, the squatting baboon, and the eponymous gods of the month Thoth and Harendotes, who are revered by the baboon, relate to the first two days of the lunar cycle, according to lists discovered in Ptolemaic temples (Symons, 1999:36). Moreover,  *Hry- ib wiA* (Decan.12), one of the 36 decans around the perimeter, is depicted in Nag Hamad (fig.30) and Dendera B (fig. 27) as a baboon squatting in a bark with three stars in front of him.

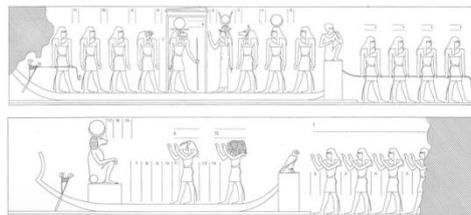


Fig. 31: The moon and sun are visible on the colonnade's opposite northern lintels in the Edfu temple's court

cf., Rochemonteix and Chassinat, (1934:pl.cxxxv)

⁷⁸ The Dekhleh Oasis' westernmost point is where the temple is situated. It was created in the first century A.D. The ceiling of the sanctuary is decorated with an ancient astronomical scene from the second century A.D. (Kaper, 1995:175f).

⁷⁹ It is a two-room rock-cut tomb located in Nag Hamad, which is southwest of Sohag. The dates of the tomb, whether they belonged to the Ptolemaic or Roman periods, were disputed by Neugebauer and Parker, who published it. The zodiac is decorating the ceiling of the inner room. (Neugebauer and Parker, 1969:76-77).

⁸⁰ It is decorated the lintels of the colonnade that encircles the court of the Edfu temple's northern wing. The outstanding example of Ptolemaic temple construction in Egypt is the temple of Horus at Edfu, which Ptolemy III constructed in 237 B.C. (Arnold, 1999:169-171). The frieze below the architraves on the north wall of the outer Hypostyle is decorated with a rectangular zodiac. (Neugebauer and Parker, 1969:67-8; *PM* 6:134. Chassinat, 1928).

- The seated baboon appeared in other zodiacs as well, but this time it was worshipping the sun. Two sitting baboons making adoration in honor of Kheper between the goddess Nut's feet and the constellations on either side of her body can be seen in the zodiac that Soter's coffin was painted with (fig.32).⁸¹ The seated baboon is depicted once more on the top of a scale on the exterior of the same coffin (fig.33). In the customary scene depicted in Going Forth by Day's Chapter 125, baboons are typically seen observing justice while squatting on the crossbar of the scale used to weigh the deceased's heart or pointing at the moon (Taylor, 2011:237).

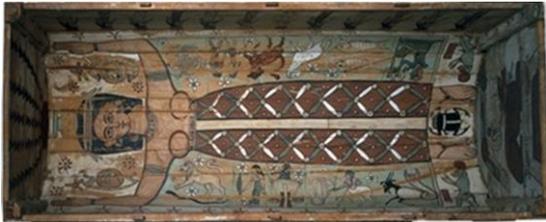


Fig.32: Base-board and cover of the wooden coffin of Soter
cf., Neugebauer and Parker, (1969:pl.47A)



Fig.33: Exterior of the coffin of the wooden coffin of Soter
cf., <https://donsmaps.com/egypt4.html>,
[Retrieved November 24 2022]

- The baboon also showed up on several of the Dendera Temple's rectangular zodiac strips. A scene depicting a baboon sitting on the brow of the Solar Bark of Ra-Horakhty can be seen on the Dendera C⁸² (fig.34) and Dendera D⁸³ (fig.35) zodiacs, which are rectangular in shape. Additionally, the baboon guards Ra at the ninth hour of the day, as evidenced by the images of the animal embracing truth and wisdom. Moreover, during the eighth hour of the day, a scene depicting Ra in his sacred boat as a baboon-headed god was depicted also on the rectangular zodiac of Dendera C, and both Thoth (an ibis-headed god) and Bastet offered adoration to him. The seated baboon occasionally associates with Ra or other different deities. Figures of Thoth as a seated baboon joined Horus as a falcon to form the Northern constellation on the Heter zodiac (fig.36),⁸⁴ which was then followed by the four sons of Horus. The same image also appeared on the Nag Hamad zodiac (fig.30) in front of the feet of the goddess Nut.

⁸¹ The local official Soter's wooden coffin, which was discovered in Sheikh Abd el-Qurna on the west bank of Luxor and is now housed in the British Museum under the number 6705, dates to the early second century AD. The upper portion of the coffin's inner face of the zodiac is occupied. For more information, read: (Neugebauer and Parker, 1969:91; *PM* 1:675,4. Bagnall and Rathbone, 2004:204; Riggs, 2006:316-317).

⁸² The Dendera C zodiac is a section of the Dendera temple's rectangular zodiac and can be found on the first (inner) strip to the west and east of the center. (Brugsch, 1883:5-23, 67-68, and 147-152; Neugebauer and Parker, 1969:67; *PM* 6:134).

⁸³ The rectangular zodiac includes this zodiac as well. To the east and west of the center, it can be found in the second (middle) strip. For more information, read: (Brugsch, 1883:15-23; Neugebauer and Parker, 1969:78; *PM* 6:49).

⁸⁴ It is the missing wooden coffin of Heter, which was most likely made at Thebes. It was from around 125 A.D. The interior face of the upper half of the coffin features a zodiac scene. It depicts the goddess Nut surrounded by the stars, planets, hours of the day and night, winds, and zodiacal signs. For more information, read: (Neugebauer and Parker, 1969:93-94; *PM* 1:647. Brugsch, 1880:21).



Fig.34: Dendera C Zodiac
cf., <https://imgur.com/gallery/G6VbvFm>, [Retrieved October 20 2022]



Fig.35: Dendera D Zodiac
cf., <https://imgur.com/gallery/G6VbvFm>, [Retrieved November 02 2022]

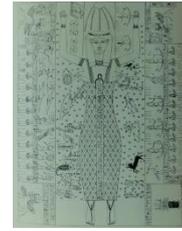


Fig.36: Coffin lid of Heter.
cf. Neugebauer and Parker, (1969:pl.50).

- It is clear that during the Greco-Roman period, Egyptian iconography was used in unusual ways and frequently combined with non-Egyptian iconographical elements. Egypt's extensive Greek and Roman presence at the time seems to have had an impact on the increased dominance of ancient Egyptian imagery. The use of the baboon figure, particularly the seated ones, in both the Greek and Roman zodiacs is the most overt manifestation of Egyptian influence. The Daressy Zodiac⁸⁵ (fig.37), which originates from the Roman period, is made up of three circular bands (the central one features busts of the moon and sun; the next inner band has twelve animals related to the zodiac signs; the outer band is blank). In this calendar, the baboon, which is depicted sitting, is associated with the Capricorn zodiac sign.

- Researchers are becoming interested in this type of water clock that is painted with a seated baboon. The first person to correctly identify two fragments of a water clock and publish them was Athanasius Kircher in 1654.⁸⁶ The top of this outflow water clock features a seated baboon, brightly illustrating one of them (fig.38). That demonstrates the significant impact the ancient Egyptian water clock had on the clepsydras for a very long time.



Fig.37: Cairo or Daressy zodiac
cf., Boll, (1903:pl.vi)

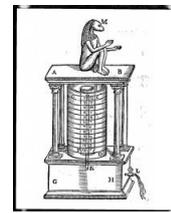


Fig.38: Dog-headed baboon on the Egyptian water clock
cf., Kircher, (1654:340)

- Baboons also played a significant role in a number of religious scenes shown on Greco-Roman horoscopes, some of which included representations of the Book of the Underworld. On Petosiris zodiac, which is in the inner chamber of his tomb in Qret el-Muzawwaqa in the Dakhleh oasis⁸⁷ (fig.39), the sun is depicted as a winged scarab that is sailing in a boat while being greeted by eight baboons, four on either side. The scarab and baboons all appear in the

⁸⁵ Before 1901, Georges Daressy noticed the grey marble plaque known as the "Daressy Zodiac" in an antiquities dealer's shop in Cairo. Although its current whereabouts are unknown, a photograph that Daressy took is still on display in Cairo at the Institut Français d'Archéologie Orientale. For more information, read: (Neugebauer and Parker, 1969:103-104; Evans, 2004:9).

⁸⁶ For more information, read: (Kircher, 1654:340).

⁸⁷ One of the most beautifully decorated tombs from Roman Egypt is the cut rock tomb of the priest Petosiris in the Dakhla Oasis. It is located on a rise known as Qaret el-Muzawaqqa and most likely dates to the late first and early second century A.D. Petosiris zodiac is one of two astronomical scenes decorating the chamber of Petosiris tomb. For more information, read: (Osing, 1982: Riggs, 2005:161).

illustrations and inscriptions of the first hour of the Book of that which is in the Underworld (Whitehouse, 1998:263).



Fig.39: Petosiris zodiac

cf., <https://famouspharaohs.blogspot.com/2018/02/>

[paintings-from-tomb-of-petosiris-at_20.html](#), [Retrieved November 15 2022]

According to Chapter 126 of the Book of Going Forth by Day (Allen, 1974:102), this representation of the baboons traditionally aids the rising sun in the east as it enters the Duat. A scene depicting four standing baboons (referred to as ‘the souls of the east’) making offerings to the boat of Kheper-Ra as three black jackals and a uraeus pull the early morning sun to the east, can also be found on many astronomical scenes, such as the rectangular zodiac of Esna and Dendera D⁸⁸ (fig.34). Along with other characters (all of them inside discs) roughly equaling the 12 hours of the night, he is seen standing and wielding a scepter on the Nag Hamad zodiac (fig.30). He is here referring to the third hour.

9. Conclusion

Clocks and time measurements in general were invented, used, and transmitted in a special way by Egypt to the world. Water clocks are part of the main big picture which is ‘Astronomy’. The baboon serves a variety of purposes in the astronomical scenes, where he is shown standing or sitting like his depiction on the water crooks; as a decan, constellation, moon, or hour; worshipping Ra; or as his protector.

This article concentrated on the origin, evolution, and symbolism of the baboon on certain unique timekeeping devices, especially the water clocks. There are three different types (outflow, inflow, and models) of those clocks, and the baboon dwells on them all and occupies a central point on them. The holy animal of Thoth, the god of time and science, was depicted seated with a hole between his legs through which water flowed. The baboon also signified the intercalary thirteenth month, situated precisely under the field of Northern stars and separating the first and twelfth months.

This study came to the conclusion that the baboon motif in Greco-Roman period water clocks is significant since one animal represents both divine qualities and human desires. By comparing the baboon motif to other animal motifs, it may be possible to determine whether the representation of dual qualities (human and gods) is unique to ancient Egyptian civilization. Not all of these Egyptian clocks from this period were discovered in Egypt. The issue of the impact of Egyptian science on other civilizations becomes clear. Furthermore, the baboon's demonstration on some mechanized elaborate clocks is a pure and significant influence of the ancient Egyptian water clock on the clepsydras all over the world for a long time.

List of Abbreviations

ME Faulkner, R.O. (1981). *A concise dictionary of Middle Egyptian*, Griffith Institute-

⁸⁸ Two circular zodiacs, one on each ceiling, adorn the double-chambered tomb. For more information, read: (Brugsch, 1883:15-23; Neugebauer and Parker, 1969:78; *PM* 6:49).

- Ashmolean Museum, Oxford.
- PM* Porter, B. and Moss, R.L.B. (1927-1995). *Topographical Bibliography of Ancient Egyptian Hieroglyphic Texts, Reliefs and Paintings*, 7 vol., Oxford.
- PL* Wilson, P. (1997). *A Ptolemaic Lexicon, A Lexicographical Study of the Texts in the Temple of Edfu*, Leuven.
- Wb* Erman, A. and Grapow, H. (1962). *Wörterbuch der Aegyptischen Sprache*, 5 vols, Hinrichs' sche Buchhandlung, Leipzig.

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حارس تدفق الوقت: قرد البابون على الساعة المائية خلال الفترة اليونانية الرومانية

وائل سيد سليمان

قسم الإرشاد السياحي - معهد سيناء العالي للسياحة والفنادق

المخلص	معلومات المقالة
مع تطور الساعة المائية، كان لدى مصر الفكرة والظروف في مكانها الملائم قبل أن تفكر أي حضارة أخرى في استخدام هذا النوع من الساعات، فهي التي قامت باختراعها وتطويرها لتلبية ضرورة أساسية في حياة	الكلمات المفتاحية الساعات المائية؛ تحوت؛ قرد البابون؛

المصريين القدماء وهى قياس الوقت. يفتح هذا النوع من ساعات ضبط الوقت نافذة مفيدة على قرد البابون، والذي كان بمثابة تمثيل المصريين القدماء للإله تحوت، المدافع وراعي الزمن. قروود البابون هي هذا النوع من الحيوانات، والذي تمثل مزيجاً خاصاً من الخصائص التي كانت قابلة للمقارنة ومختلفة عن تلك الخاصة بالبشر في نفس الوقت. وقد لعب البابون دوراً كبيراً في الديانة المصرية القديمة.

مع الوقت وبفضل الكثير من الدراسات، أزداد فهمنا لحيوان البابون بشكل كبير، وهو الأمر الذي يبرر إعادة دراسة الساعات المائية المصرية ودور البابون فيها في هذا البحث. هذا النوع من القروود الذي يقف في وسط العديد من المناظر الفلكية وبالأخص في النقطة المركزية في كل الساعات المائية من العصر اليوناني الروماني، يمثل الدقة والاستقرار والهدوء للنظام الفلكي، ويبرز أهميته ووظيفته في حساب الوقت وحمايته. كما أن هذه الدراسة توضح تأثير العلم المصري على الحضارات الأخرى، وبالأخص التأثير الكبير للساعات المائية المصرية في جميع أنحاء العالم لفترة طويلة.