Ancient Egyptian constellation of  *Wj3* (Boat) and its link to Sagittarius in the Ptolemaic and Roman era

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[The Boat was one of the few Egyptian constellations represented in the astronomical ceilings, which indicates the importance that it could have on the Egyptian thought. With the information we have we can identify with certainty not only some of the stars of the constellation but also the extension that it had in the sky. Throughout the centuries, the Boat continued to be showed in astronomical ceilings and other documents but from the Ptolemaic era, with the introduction of the zodiacal constellations of Mesopotamian origin, the Boat lost prominence and finally disappeared. However, if we look closely at the iconography of Graeco-Roman era, we see that the Egyptian constellation of the Boat, understated and almost unnoticed, was associated with Sagittarius, constellation that occupied its most important part.]

Keywords: Wia, Sagittarius, Boat, zodiacal constellations, decans, Egypt, astronomical ceiling.

1. *Introduction*

During the Pharaonic history only a small group of constellations[1] were represented by the ancient Egyptians. In the oldest representations we know from some coffins of the late First Intermediate Period (ca. 4000 years ago), along with a long list of decans[2] generally we only find representations of Egyptian constellations as *Sah*  , *Sepedet*  , and *Meskhetyu*  , perfectly located in Orion-Lepus[3], Canis Maior (with Sirius as reference), and Ursa Maior, respectively. The only exception is the missing coffin of Heny[4], XI Dynasty, which probably had an iconography similar to that of the astronomical ceilings.

During the New Kingdom, however, astronomical ceilings offer a wider space for figures and inscriptions, so a good set of constellations and other figures were depicted along with decans lists.

1. J. Lull and J. A. Belmonte, "Egyptian constellations", in Clive L. N. Ruggles (ed.) *Handbook of Archaeoastronomy and Ethnoastronomy* (Heidelberg: Springer, 2015), 1477-487.

2. Set of stars or asterisms that served as time markers. See, J. A. Belmonte, "The Decans and the Ancient Egyptian Skylore: An Astronomer's Approach", *Memorie della Societa Astronomica Italiana* 73, vol. spec. 1 (2002), 43-57.

3. K. Locher, "New Arguments for the Celestial Location of the Decanal Belt and for the Origins of the S3h-Hieroglyph", in G. M. Zaccone and T. R. Netro (eds.), *VI Congresso Internazionale di Egittologia* vol. II (Torino: Società Italiana, 1993), 279-84. J. Lull, "Meschetiu in der Mythologie und der Orientierung der ägyptischen Tempel", *Acta Praehistorica et Archaeologica* 40 (2008a), 85-92.

4. O. Neugebauer and R. A. Parker, *Egyptian Astronomical Texts* (hereafter *EAT*)*, III. Decans, Planets, Constellations and Zodiacs* (Providence: Brown University Press, 1969), 9, fig. 1.

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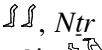
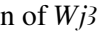
For the northern sky the number of constellations represented in an astronomical ceiling is relatively high: *Meskhetyu*  , *Anu*  , *Serqet* , *Isis-Djamet*  (identifiable with the *Reret*  of the Ramesside star clocks[5]), perhaps *Menit*[6]  , *Saq*  , *Htp rdwy* "restful of feet"  , *Nṯr rwty jmj.snwy* "divine lion who is between them"  (identifiable with the "lion" *mȝj*  of the Ramesside star clocks, and equivalent with the zodiacal Leo)[7], and the anonimous harpooner  (corresponding to our Gemini, if it is not a figuration of the vast constellation of *Nekhet* )[8] (Figure 1).

However, for the southern *sky* there are very few constellations represented in astronomical ceilings or related documents: *Sah*  and *Sepedet*  (also present in the coffins of the First Intermediate Period), *štwy* the "Two turtles"  (constellation formed possibly by the stars of Canis minor Procyon and Gomeisa)[9], the asterism known as  (perhaps the Hyades[10] open star cluster around Aldebaran, or even a figuration of the Pleiades[11]), *sjt* "Sheep"  and, finally, the constellation of *Wjȝ* the "Boat"  , which is what concerns us in this paper (Figure 2).

The fact that very few southern constellations were represented can be an indicator of the importance they may have had for their symbolism or easy visualization by the ancient Egyptians in the sky. Such must be the case of *Wjȝ*, the constellation of the "Boat".

2. *The Decans of the Boat in the Tomb of Senenmut*

The astronomical ceiling of the tomb TT 353 belonging to the noble Senenmut[12] (ca. 1460 B.C.), is the oldest that has come to us, predating even the examples we know from the Valley of the Kings. In this example, the constellation of the Boat is the first that is represented in the southern sky. The Boat is showed unmanned, with a symmetrical prow and stern (relatively similar to sign P28), with five stars arranged in a row immediately above the boat, and two in its deck. The Boat is placed under six columns (columns 7-12) in which some decans are listed, so they can serve to identify the approximate position of the constellation (Figure 3).

5. J. Lull, *La astronomía en el antiguo Egipto* (Valencia: Publicacions de la Universitat de València, 2006), 228-29, 273; J. Lull and J. A. Belmonte, "A Firmament above Thebes: Uncovering the Constellations of Ancient Egyptians", *Journal for the History of Astronomy*, 37 (2006), 373-92, p. 379-80.

6. J. Lull and J. A. Belmonte, "The Constellations of Ancient Egypt", in J. A. Belmonte and M. Shaltout (eds.), *In Search of Cosmic Order. Selected Essays on Egyptian Archaeoastronomy* (Cairo: Supreme Council of Antiquities Press, 2009), 157-94, p. 165-66. However, it is also possible that the triangular figure in the astronomical ceilings that is never identified with the name of a constellation represents, in fact, an astronomical instrument. See, J. Lull, "A Possible Ancient Egyptian Astronomical Instrument for Positioning the Central Meridian", *Discussions in Egyptology*, 64 (2006-2009), 47-56.

7. J. Lull, *La astronomía en el antiguo Egipto*, 232; J. Lull and J. A. Belmonte, "A Firmament above Thebes", 386.

8. J. Lull, "Propuesta de identificación de estrellas y constelaciones egipcias de la lista decanal del techo astronómico de Senenmut en Deir el-Bahari", *Boletín de la Asociación Española de Egiptología*, 15 (2005), 99-120, p. 114-15; J. Lull and J. A. Belmonte, "A Firmament above Thebes", 388-89.

9. Lull, *La astronomía en el antiguo Egipto*, 258.

10. J. Lull "Los cúmulos estelares en las listas decanales y relojes ramésidas del antiguo Egipto", in J. Lull (ed.) *Trabajos de Arqueoastronomía. Ejemplos de África, América, Europa y Oceanía* (Oliva: Agrupación Astronómica de La Safor, 2006), 193-208, p. 205.

11. J. Lull and J. A. Belmonte, "The Constellations of Ancient Egypt", 175-76.

12. P. F. Dorman, *The Tombs of Senenmut. The Architecture and Decoration of Tombs 71 and 353* (New York: The Metropolitan Museum of Art Egyptian Expedition, 1991), pl. 85.

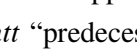
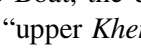
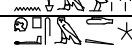
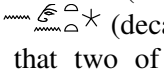
In the sixth column of the ceiling of Senenmut, column apparently precedent to the linked to the representation of the Boat, the decans are *Tpj-ˁ ḫntt* "predecesor of *Khentet*"  (decan number 10) and *ḫntt ḥrt* "upper *Khentet*"  (decan number 11). The tenth decan announces a star located west of *Khentet*, but the eleventh marks the beginning of *Khentet*, which continues in the following columns. As we shall see, if "lower *Khentet*" (decan 12) and the "red of *Khentet*" (decan 13) belong to the Boat, it is also fair to assume that "upper *Khentet*" is part of the same constellation.

Table 1: Decans 10-18 in the astronomical ceiling of Senenmut:

Decan	Column	Name		
10	6		*Tpy-ˁ ḫntt*	"predecesor of *Khentet*"
11	6		*ḫntt ḥrt*	"upper *Khentet*"
12	**7**		*ḫntt ḫrt*	"lower *Khentet*"
13	**8**		*ṯms n ḫntt*	"the red (star) of *Khentet*"
14	**9**		*sꜣpty ḫnwy*	"*sapty* of the two khenwy fishes"
15	**10**		*ḥry-jb wjꜣ*	"the (star) which is in the middle of the boat"
16	**11**		*sšmw*	"the guides"
17	**12**		*Knmw*	"(stars of) *Kenmu*"
18	13		*Tpj-ˁ smd*	"predecesor of *Semed*"

In the seventh column of the southern panel of the astronomical ceiling of Senenmut, in the first of the columns apparently linked to the constellation of the Boat, the decan mentioned is *ḫntt ḫrt* "lower *Khentet*"  (decan 12), followed in the eighth column by *ṯms n ḫntt* the "red (star) of *Khentet*"  (decan 13). Is *Khentet* a part of the constellation of the Boat? Most likely so, considering that two of the three decans that are part of *Khentet* are above the representation of the Boat. Moreover, the meaning of *Khentet* can provide a better approach to this problem.

The word *ḫnt*  is translated as "front", "brow"[13]. As preposition *ḫnt* means "out of", "among from", "in front of"[14], etc. Given that the constellation we are dealing with is a boat and the regular movement of the sky is from east to west, it is opportune to find the prow of the boat facing the west, that is, following the movement of the sky. Therefore, we can assume that *ḫntt* (written  or ) can refer to the front of the boat, its prow. Jones[15], in his comprehensive study of Egyptian nautical terminology also proposed that possibility, although in Egyptian texts we do not known with certainty any case in which the prow of a boat is called *ḫntt*.

The fact that a constellation shaped like a boat can be divided into other depending on the parts of the craft has a curious parallel in our sky: Argo Navis (the ship of Jason and the Argonauts in Greek mythology) a constellation described among the 48 cited by Claudius Ptolemy in the

13. R. Hannig, *Die Sprache der Pharaonen. Grosses Handwörterbuch Ägyptisch-Deutsch (2800 – 950 v. Chr.)* (Mainz: Phillip von Zabern, 1997), 607.

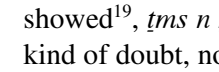
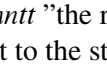
14. R. Hannig, *Die Sprache der Pharaonen*, 607.

15. D. Jones, *A Glossary of Ancient Egyptian Nautical Titles and Terms* (London: Kegan Paul, 1988), 180.

Almagest. This constellation had a great extent, so that in the eighteenth century was divided into three other constellations by French astronomer Lacaille: Carina (the keel), Puppis (the stern) and Velas (the sail). In this case, the stern of Argo Navis is situated west, therefore, contrary to the direction of rotation of the sky. However, regarding Egyptian *Wjȝ* there is a trait that should not be neglected. Argo Navis is located on the Milky Way, which acts as a celestial river. The Egyptian boat, too.

An Egyptian boat in the most prominent part of the Milky Way is a very significant matter from a symbolic point of view, because we must not forget that in the Egyptian conception is quite possible that the celestial goddess Nut could be found in the Milky Way[16]. Consider, as seen in religious compendiums as the *Books of the Hereafter*, that through the body of Nut the solar boat sails with his entourage. Therefore, the Milky Way could also be seen by the ancient Egyptians as a celestial river, so nothing more appropriate to place the constellation of the Boat in one of the places where the Milky Way is more prominent.

As it is known, Neugebauer and Parker[17], despite its enormous effort to approach the Egyptian astronomy through its *Egyptian Astronomical Texts*, they dispensed any attempt to search for equivalence between decans and current stars. However, this is possible, as J. A. Belmonte and I have shown in recent works even originally using different methods.

The fact that three decans are cited as parts of *Khentet* indicates that it should have an important extension. We must remember that the decans served as hour markers and roughly three decans may include three hours of Right Ascension (R.A.). Leitz[18], studying the decans lists coffins of the First Intermediate and Middle Kingdom Period, concluded that these three decans of *Khentet* (*ḫntt ḥrt* "upper *Khentet*", *ḫntt ḫrt* "lower *Khentet*" and *ṯms n ḫntt* "the red (star) of *Khentet*") should be γ Lupi, ζ Scorpii, and ε Scorpii, respectively. However, in my opinion, only one of the decans of *Khentet* is identifiable with its current counterpart with complete certainty. As I showed[19], *ṯms n ḫntt* "the red (star)  of *Khentet*  " should be equivalent, without any kind of doubt, not to the star Wei (ε Sco), as indicated Leitz, but to Antares (α Sco), a red giant star that stands out for its brightest and its reddish color in that region of the sky. In fact, the color index[20] B-V of Wei is 1.14, and its apparent magnitude 2.28, while for Antares color index is 1.86 (redder) and its apparent magnitude 1.03 (brighter)[21]. Stars that we can see red to the naked eye are not many. And, if we take a list of stars under visual magnitude 3.5, only Betelgeuse and 34-μ UMa Tania Australis (B-V: 2.0, spectrum M0, visual magnitude 3.1) have a B-V index higher than Antares. Moreover, in Egyptian texts there are very few cases in which a star is distinguished by its color[22].

16. J. Lull, *La astronomía en el antiguo Egipto*, 192-94; R. A. Wells, "The Mythology of Nut and the Birth of Ra", *Studien zur Altägyptische Kultur,*19 (1992), 305-22, p. 309 fig. 2.

17. *EAT* II, x; O. Neugebauer, *The exact sciences in antiquity* (New York: Dover Publications, 1969), 88.

18. Ch. Leitz, *Altägyptische Sternuhren* (Leuven: Peeters, 1995), 96.

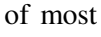
19. J. Lull, "Identification of an Ancient Egyptian Star: *ṯms n ḫntt* "the red (star) of Khentet", *Göttinger Miszellen,*199 (2004), 73-77.

20. The color index (B-V) is the result of the subtraction between the photographic magnitude of a star and its visual magnitude, for photographic plates are more sensitive to blue than red, unlike human eye.

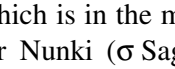
21. Consulted in the database of the *Starry Night Pro* astronomical program.

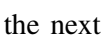
22. Another star that is also known as red is  "the red star" and in the same way appears as a representative of the 34th decade in an inscription from the naos of Saft el-Henna, from the period of Nectanebos I (XXX dynasty). This has been identified with Aldebaran. See Ch. Leitz, *Altägyptische Sternuhren*, 32 (inscription), 33-35; also A.-S. von

The accurate identification of the "red (star) of *Khentet*" with Antares[23] is essential as a starting point for positioning with better guarantees the constellation of the Boat, although the correspondence of most of their decans with current stars can only be approximate. Both upper *Khentet* and lower *Khentet* must be situated, necessarily, west of Antares, so both decans must be located most likely somewhere in the strip occupied by Libra, or even in neighboring constellations that share the same A.R., depending on how the constellation of the Boat will be reflected on the Egyptian imagination.

The ninth column of the astronomical ceiling of Senenmut includes the fourteenth decan, *sꜣpty ḫnwy*  "*Sapty Khenwy*". This should relate to that which in the First Intermediate Period is called *ḫnwj*  "(two) *Khenwy*-fishes" although the latter is preceded by another decan, *ḳdty*  which is not mentioned in the ceiling of Senenmut.

Three main clues can be used for the identification of *sꜣpty ḫnwy* "*Sapty Khenwy*" in the sky: on the one hand, we know that it is east of Antares, in the eastern part of Scorpius or with an equivalent R.A; on the other hand, in the case of the "(two) *khenwy*-fishes" they may be sought within the celestial river of the Milky Way; and finally, the fact that two fish are concerned suggests two stars close together. With this in mind, we can suggest the very possible identification of *Khenwi* with Shaula (λ Sco) and Lesath (υ Sco), two prominent stars very close together (36'), which form the sting of Scorpius.

In the next column, finally, the constellation of the Boat is introduced through *ḥry-jb wjꜣ* "(the star) which is in the middle of the boat"  (decan 15). For Leitz[24], the decan must match the star Nunki (σ Sagittarii). In my opinion, however, a good option could be Kaus Australis (ε Sgr), the brightest star in the constellation of Sagittarius and closer, comparing with Nunki, to the brightest part of the Milky Way in this region. Moreover, this identification would fit better with the fact that, as we shall see later in the zodiac of Esna, *ḥry-jb wjꜣ* is linked to the western third of Sagittarius, and Kaus Australis lies at that end.

The next decan, in the next column, is *sšmw*  which can be translated as "guides". The "guides" can refer to the pilots of the Boat. Recall, for example, that while the fifth hour of the night is called "which is in the middle of his boat" in the *Book of Nut*[25] or in the first division of the *Book of Imiduat*, the fifth hour of the *Book of Imiduat* receives the full name of *sšmyt-ḥrt-jb-wjꜣ.s*, "(she who) guides, in the middle of his boat"[26]. Therefore, and since this decan is over the figure of the Boat, it is clear that is also part of it. Since the "guides" should be formed by a group of three or more stars, the equatorial coordinates lead us, east of Kaus Australis, to the group composed of 27-φ Sagitarii, Nunki (34-σ Sagittarii) and Ascella (38-θ Sagittarii).

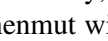
Bomhard, *The Naos of the Decades: Underwater Archaeology in the Canopic region in Egypt* (Oxford: Oxford Centre for Maritime Archaeology, 2008), 177.

23. Against, for example, von Spaeth who surprisingly thinks that it could be Antares. See, O. von Spaeth, "Dating the oldest Egyptian star map", *Centaurus,*13 (2000), 159-79.

24. Ch. Leitz, *Altägyptische Sternuhren*, 90.

25. J. Lull, *Las tumbas reales egipcias del Tercer Período Intermedio (dinastías XXI-XXV) Tradición y cambios* (Oxford: Archaeopress, 2002), 140; G. Roulin, *Le Livre de la Nuit. Une composition égyptienne de l'au-delà*, vol. ii, OBO 147/2 (Fribourg: Editions Universitaires Fribourg, 1996), 53.

26. E. Hornung, *Texte zum Amduat,* vol. ii. *Langfassung 4. bis 8. Stunde* (Genève: Editions de belles-lettres, 1992), 387.

Finally, above the figure of the Boat a last column appears in the astronomical ceiling of Senenmut with the decan *Knmw*  (decan 17). The decan may correspond to the group of stars around Albaldah (41π Sagittarii) as 39-o Sgr, 37-ξ Sgr or 44-ρ Sgr, further east.

Chatley[27] proposed that the stars represented among Knmw and the next decan,  *Tpj-ᶜ smd* "which is before *Semed*", could symbolize the Milky Way although this hypothesis does not seem to correspond with what we would see in the sky, because the showiest part of the Milky Way is precisely that runs through the constellation of the Boat, between Sagittarius and Scorpius.

3. *Extension of the Boat and Identification of its Decans*

The so-called rectangular zodiacs of the Ptolemaic era offers us a clue to confirm the area of the Boat. In Esna[28], the date of manufacture of the rectangular zodiac is situated around 200 B.C. In it the zodiacal constellations are divided into three sectors each. These sectors, totaling 36 in all, are related to the decans. The list of Esna is related to the list of decans of the so called "family of Seti I B" and the "family of Tanis", as was catalogued by Neugebauer and Parker. In the table reproduced below I include only the decans of the Seti I B list, starting from Cancer with *spdt*, Sirius:

Table 2: Decan list of the rectangular zodiac of Esna

Zodiacal const.	Decan	Zodiacal Const.	Decan
CANCER	*Spdt*	CAPRICORNUS	*Tpj-ᶜ Smd*
	Šṯw		*Smd*
	Knmt		*Srt*
LEO	*ḥry ḫpd Knmt*	AQUARIUS	*Sȝ Srt*
	ḥȝt ḏȝt		*ḥrj ḫpd Srt*
	Pḥwy ḏȝt		*Tpj-ᶜ ȝḫwy*
VIRGO	*tmȝt*	PISCES	*ȝḫwy*
	Wšȝtj bkȝtj		*Tpj-ᶜ bȝwy*
	Jpsd		*bȝwy*
LIBRA	*Sbḫs*	ARIES	*ḫntw ḥrw*
	Tpj-ᶜ ḫntt		*ḫntw ḫrw*
	ḫntt ḥrt		*Sȝ Ḳd*
SCORPIUS	*ḫntt ḥrt*	TAURUS	*ḥᶜw*
	tms n ḫntt		*ȝrt*
	Sptj ḫnwy		*Rmn ḥrj*
SAGITTARIUS	*ḥrj-jb wjȝ*	GEMINI	*ṯs ᶜrḳ*
	sšmw		*Wᶜrt*
	Knmw		*Tpj-ᶜ Spdt*

Khentet decans were linked in Esna with the eastern third of Libra and Scorpius western two-thirds, while the eastern part of Scorpius was linked to the decan *Sapty Khenwy*. However, this

27. H. Chatley, "Egyptian Astronomy", *Journal of Egyptian Archaeology,* xxvi (1940), 120-26, p. 124.

28. *Description de l'Égypte, ou, recueil des observations et des recherches qui ont été faites en Égypte pendant l'expédition de l'armée française, I* (Paris, 1809), pl. 87.

does not necessarily mean that these decans are found within the space covered by these zodiacal constellations, but are for sure in the same R.A. that the corresponding thirds of those constellations (observe the case of Sepedet-Sirius, associated with the western third of the constellation of Cancer). That is, those decans may or may not be located in Libra and Scorpius, but they must have equivalent coordinates in R.A.

In the zodiac of Esna, "the red (star) of *Khentet*" appears as the central decan of Scorpius. Obviously, recognizing the equivalence of Antares with the decan, the place where we expect to find this decan is just where it is, the abdomen of the scorpion in the center of the constellation, just as if we identify *Sptj ḫnwy* with Shaula and Lesath, stars that in the eastern third of Scorpius form the sting of the scorpion.

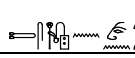
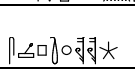
Knmw decan  (decan 17), in accordance with what is indicated in the zodiac of Esna, is the most eastern of Sagittarius. This confirms what we advanced above, ie, that it can match the group of stars that are around Albaldah (41-π Sagittarii), or 44-ρ Sgr, since it is the last prominent group of stars in the eastern third of Sagittarius.

As we have seen, the entire constellation of the Boat, assuming that *Khentet* can be translated as "bow" and therefore is part of it, would be constituted by decans located between Libra, Scorpius and Sagittarius, mainly on one of the most prominent areas of the Milky Way (figure 4). However, the core of the Boat remains in Sagittarius, because as written in previous lines in this constellation would be the decans *ḥry-jb wjȝ* "(the star) which is in the middle of the boat", *sšmw* "guides" and Knmw. Neither the Boat nor any of the decans who were part of it, mentioned in diagonals stellar clocks and lists of decans of the astronomical ceilings, were included in the Ramessides stellar tables[29], where the vast constellation of Nekhet  served as new reference in this R.A.

The decans which were part of the constellation of the Boat are the decans 11-17 (ie, from *ḫntt ḥrt* to *Knmw*) with *Tpy-ʿ ḫntt* as precedent decan to the bow of the boat and *Tpj-ʿ smd* as following decan of its stern.

Table 3: Astronomical ephemeris of decans 10-18 in *The Book of Nut*

29. J. A. Belmonte, "The Ramesside star clocks and the ancient Egyptian constellations", *Uppsala Astronomical Observatory report* no. 59 on *Calendars, Symbols, and Orientations: Legacies of Astronomy in Culture*, SEAC 2001 Proceedings (Uppsala, 2003), 57-65.

Decan	Name		First Hour	Conjuction	Heliacal rising
0		*Tpy-ᶜ ḫntt*	II *peret* 16	I *shemu* 16	III *shemu* 26
1		*ḫntt ḥrt*	II *peret* 26	I *shemu* 26	IV *shemu* 6
2		*ḫntt ḫrt*	III *peret* 6	II *shemu* 6	IV *shemu* 16
3		*ṯms n ḫntt*	III *peret* 16	II *shemu* 16	IV *shemu* 26
4		*sꜣpty ḫnwy*	III *peret* 26	II *shemu* 26	I *akhet* 6
5		*ḥry-jb wjꜣ*	IV *peret* 6	III *shemu* 6	I *akhet* 16
6		*sšmw*	IV *peret* 16	III *shemu* 16	I *akhet* 26
7		*Knmw*	IV *peret* 26	III *shemu* 26	II *akhet* 6
8		*Tpj-ᶜ smd*	I *shemu* 6	IV *shemu* 6	II *akhet* 16

The astronomical ephemeris provided by the *Book of Nut*[30] (whose original title was precisely "Fundamentals of the course of the stars"[31]), are equally interesting to point out or confirm a little more the identification of some of the decans that make up the constellation of the Boat, because they offer the possibility of deducing the approximate distance between them (in R.A.) and the time the decans were useful as time markers (figure 5).

As chronological reference we must take into account the data presented for the star Sirius:

"[Decan Sepedet]: First hour, III *akhet* 6. Encased by *duat*, II *peret* 6. Birth, IV *peret* 16".

This data is crucial to understand that the decanal ephemeris provided by the *Book of Nut* are copies of some older we should date in the XII Dynasty[32].

Antares could serve as a marker of the first hour of the night in late June or early July 1830 B.C., when it was crossing the central meridian at a height of almost 54º from the latitude of

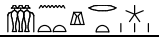
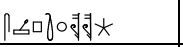
30. H. Frankfort, *The Cenotaph of Seti I at Abydos* (London: Egypt Exploration Society, 1933), p. 81.

31. A. von Lieven, "Translating the Fundamentals of the Course of the Stars", in A. Imhausen, T. Pommerening, (eds.), *Writings of Early Scholars in the Ancient Near East, Egypt, Rome, and Greece: Translating Ancient Scientific Texts* (Berlin: De Gruyter, 2010), 139.

32. J. Lull, *La astronomía en el antiguo Egipto*, 125. The heliacal rising of Sirius is said to have happened in IV *peret* 16 (which coincides with the date provided by p. Berlin 10012 for year 7 of Senusert III). This means that the decanal transit clock of Seti I do not have the slightest functional sense for its time, because it obviously is a copy of another that was useful during the reign of Senusret III, c. 1830 B.C.; In this sense, it is interesting to note that Von Lieven concludes that the *Book of Nut* traces its origin to the Old Kingdom. See, A. von Lieven, *Grundriss des Laufes der Sterne: Das sogennante Nutbuch* (Copenhaguen: Museum Tusculanum Press, 2007), 253 and 278.

Thebes. Taking as a starting point Antares, taking it as the equivalent of *ṯms n ḫntt*, we can propose the following equivalents of the decans of the constellation of the Boat:

Table 4: Proposed equivalents of the decans of the constellation of the Boat

Decan	Name		Likely equivalence	Magnitude	Distance in R.A.
11		*ḫntt ḥrt*	α Lib Zuben Elgenubi	2,6	
12		*ḫntt ḫrt*	γ Lib Zuben Elakrab	3,9	40’
13		*ṯms n ḫntt*	α Sco Antares	1	41’
14		*sꜣpty ḫnwy*	α Sco Shaula / υ Sco Lesath	1,6 / 2,7	40’
15		*ḥry-jb wjꜣ*	ε Sgr Kaus Australis	1,8	48’
16		*sšmw*	σ Sgr Nunki	2	40
17		*Knmw*	ρ Sgr - 44 Sgr	3,9	37’

We can conclude, therefore, that the ancient Egyptian constellation of the Boat extended, with very high probability, from the constellation of Libra to Sagittarius.

4. *The Boat in other Astronomical Ceilings*

The order of decans between *Tpy-ᶜ ḫntt* and *knmw*, as we have seen in the astronomical ceiling of Senenmut, is repeated[33] not only in other cases of the so called “family of Senenmut” but also in other families of decans[34], adding tens of known examples. Therefore, we can deduce that this is a well-defined error-free list.

The clepsydra of Amenhetep III[35], found in Karnak in 1904 (Cairo JE 37525) shows in its external decoration a list of decans that, for the linkable to the Boat, repeats the same list (in fact, this example belongs also to the “Senenmut family”). Even being one of the oldest examples of lists that we know in the New Kingdom is about a subsequent century to the Senenmut one.

The oldest preserved astronomical ceiling, after the one of Senenmut, is found in the burial chamber of Seti I (KV 17) in the Valley of the Kings. In this example the Boat was represented in a different way to that of Senenmut. Bow and Stern are no longer symmetrical but similar in style to the sign P30; and the Boat does not appear unmanned but with Isis, Nephthys, Seth and Horus on board. Above these deities 6 stars are shown in a row, while in the hull of the ship were located

33. Regardless writing variants.

34. *EAT* III.

35. *EAT* III, pl. 2; M. Clagett, *Ancient Egyptian Science, II. Calendars, Clocks, and Astronomy* [Memoirs of the American Philosophical Society 214] (Philadelphia: American Philosophical Society, 1995), fig. III.22.

other three. The decans of the Boat are in Seti I[36] the same as those described in the case of the tomb of Senenmut. Similarly, the preceding and following decan coincide.

In the astronomical ceiling of the Ramesseum[37], the Boat is similar to that of Seti I, while changing the surrounding decorative elements. No crew but a disc inside with two streams of circular elements, which is like on that roof the stars are shown instead of the usual five-pointed. On the other hand, a row of larger dots, but smaller than the rest of the surrounding stars, joins the bow and stern of the boat. The astronomical ceiling of the Ramesseum repeats the same decans of Senenmut and Seti I, with the exception of the one which is before the Boat, because here is *sȝtj bkȝtj* instead of *Tpj-ˁ ḫntt*. It should be noted that the decan *Kenmu* appears here within the box in which the representation of the Boat is included.

Taking a leap in time, from the XXV Dynasty we can cite the example of the newly discovered astronomical ceiling of the tomb of Karakhamun (TT223), which must be included in the "family of Senenmut"[38]. As for the iconography of the Boat (Figure 6) it has a row of dots reduced in size starting from the middle of the bow and interrupted halfway to the stern. This row has its first example in the Ramesseum, although in that case is more complete. With dotted lines it was also set up a kind of basis on which the boat rests. This base is perfectly represented in the decoration of the coffin of Harendotes (BM 6678), a priest of the god Amun who lived in the time of Ptolemy III. In the case of Karakhamun, the decans remaining within the limits occupied by the representation of the Boat are from number 10 (*Tpy-ˁ ḫntt*) to 17 (*Knmw*).

Two other comparable examples are those of the tomb of Montuemhat[39] (TT34) and the tomb of Pedamenope[40] (TT33), from the XXVI Dynasty (Figure 7). In both, the decan *ḫntt ḥrt* is unrelated to the box in which the Boat is showed. Instead, *Tpj-ˁ smd* is included among the related decans. In both examples, the design of the boat is the same. In the case of Montuemhat we can see a row of dots from the bow to the stern, in the same style mentioned in the example of Karakhamun and the Ramesseum. In addition, in the middle of the boat, on the deck, a bigger star is just in the vertical of the decan *ḥry-jb wjȝ*, so we can suggest that it represents this decan. Instead, in the tomb of Pedamenope the row of dots and the central star does not appear.

An even later example is the burial chamber of the tomb of Queen Khenuwa[41] (South Begrawiyah 503) from the initial Meroitic period (third century B.C.). It offers the same set of decans related to the Boat.

5. *The Boat associated with Sagittarius during the Ptolemaic and Roman Era*

As we have seen, the constellation of the Boat should cover the eastern third of Libra and the constellations of Scorpius and Sagittarius. However, the part belonging to Sagittarius should be the most important of the Boat, for "the (star) which is in the middle of Boat" and "guides" stood in it, in the brightest part of the Milky Way. His representation throughout the centuries, one of the few

36. *EAT* III, pl. 3.

37. *EAT* III, pl. 5.

38. M. Á. Molinero Polo, "A Bright Night Sky over Karakhamun: The Astronomical Ceiling of the Main Burial Chamber in TT 223", in E. Pischikova (ed.): *Tombs of the South Asasif Necropolis. Thebes, Karakhamun (TT 223) and Karabasken (TT 391) in the Twenty-Fifth Dynasty*, (Cairo: American University in Cairo Press, 2014), 201-38, p. 207.

39. *EAT* III, pl. 20.

40. *EAT* III, pl. 18

41. J. W. Yellin, "An Astronomical Text from Be. South 503", *Meroitica*, 7 (1980), 577-82.

southern constellations which enjoyed such honor, somehow can also indicate the importance of this constellation for the Egyptians.

However, during the Ptolemaic era a notable change occurs in the Egyptian heaven: the zodiacal constellations of Mesopotamian origin are introduced. With this change the ancient Egyptian constellations occupying the zodiacal band were eliminated in favor of the new constellations or, at best, minimized. This last option is what must have happened in the case of the constellation of the Boat.

At the begining of the Ptolemaic era the coffin of Harendotes (BM 6678) is one of the latest examples to show the list of decans with the old representation of the Boat. In fact, it was cataloged by Parker and Neugebauer as the last exponent of the "family of Senenmut"[42].

With the new zodiacal constellations the sky of the Egyptians had significant changes. In the case of the former Boat constellation, it was associated, minimized, to the constellation of Sagittarius. This can be checked even in the zodiac of Dendera, from the mid-first century B.C. In it we see that at the foot of Sagittarius it was represented a small boat (Figure 8), just as in the rectangular zodiac of the western part of the roof of the pronaos of the same temple, or in the rectangular zodiac Esna (where the boat appears not under the Sagittarius forelegs but under the hind legs).

It could be argued, following the Mul-Apin (Mesopotamian astronomical tables from the seventh century B.C.) that the boat associated with Sagittarius corresponds to Mul-Ma-gur or Makurru[43], the "load boat" which could correspond to the star ε Sagittarii or to the constellation of Corona Australis. In fact, in the zodiac of Dendera we find other parazodiacal constellations of likely Mesopotamian origin[44].

Aubourg[45] and Cauville[46], however, identify this boat with the constellation of Corona Australis (CrA), appointed by Claudius Ptolemy as Στεφάνοςνοτιος ("Southern wreath"). However, keep in mind that the stars of this constellation are not at all bright and prominent. Both β CrA (Alphecca meridiana) as β CrA are stars of apparent magnitude 4.1.

Although in ancient times the stars of CrA could be associated with Sagittarius (the Mesopotamian Mul Pa-bil-sag), as well as a boat, as well as a crown or garland according to Mesopotamian or Greco-Roman tradition, in my opinion, the small boat that is associated with Saggitarius in ancient Egyptian documents is *wj3* (the Boat), constellation that far from being eliminated by the introduction of Sagittarius was associated with it in the iconography[47]. The introduction of the Mesopotamian "load boat" in the zodiac of Dendera could be perfectly assumed in the Egyptian conception being transmitted iconographically as *wj3* associated with Sagittarius.

In Roman times, finally, the constellation of Sagittarius will prevail, making the Boat disappear. This can be seen in the coffin of Soter (BM 6705) and in the coffin of Petemenophis (Louvre E 13048), both from the early second century A.D. (time of emperor Trajan)[48]. Around the

42. *EAT* III, 61

43. H. Hunger and D. Pingree, *MUL.APIN An Astronomical Compendium in Cuneiform*, *Archiv für Orientforschung* 24 suplement (Horn: Ferdinand Berger & Söhne, 1989).

44. J. Lull and J. A. Belmonte, "The Constellations of Ancient Egypt", 182.

45. E. Aubourg, "La date de conception du zodiaque du temple d'Hathor à Dendera", *Bulletin de l'Institut Français de Archéologie Orientale,* 95 (1995), 1-10, p. 4 fig. 2.

46. S. Cauville, *Le zodiaque d'Osiris* (Leuven : Peeters, 1997), 35.

47. J. Lull, "El planisferio egipcio del templo de Dendera", *Astronomía,* 113 (2008), 76-83, p. 79 and 80 fig. 5.

48. *EAT* III, pl. 47A.

figure of Nut there were represented the zodiacal constellations, with no trace of the original Egyptian constellations. The same is observed in the zodiacs of several tombs of el-Salamuni, all from Roman times.

However, we still find some examples in which the ancient Egyptian constellation of the Boat remains associated with Sagittarius. Such is the case of the coffin of Heter[49] from the end of the first century A.D. now disappeared. The coffin of Kleopatra (BM 6706)[50], even with a similar dating (in fact, she was daughter of Soter and sister Petemenophis), also shows a stylized boat below Sagittarius. Also, for example, it can be seen this association in the tomb of the brothers Ibpameny and Pamehit in Athribis[51], from the late second century A.D. (Figure 9). From the third century A.D. onward the Egyptian constellation of the Boat disappeared.

6. *Bibliography*

Aubourg, E., "La date de conception du zodiaque du temple d'Hathor à Dendera", *BIFAO*, 95 (1995), pp. 1-10.

Belmonte, J. A., "The Decans and the Ancient Egyptian Skylore: An Astronomer's Approach", *Memorie della Societa Astronomica Italiana* 73, vol. spec. 1 (2002), pp. 43-57.

Belmonte, J. A., "The Ramesside star clocks and the ancient Egyptian constellations", *Uppsala Astronomical Observatory report no. 59 on Calendars, Symbols, and Orientations: Legacies of Astronomy in Culture*, SEAC 2001 Proceedings (Uppsala, 2003), pp. 57-65.

Bomhard, A.-S. von, *The Naos of the Decades* (Oxford: Oxford Centre for Maritime Archaeology, 2008).

Cauville, S., *Le zodiaque d'Osiris* (Leuven: Peeters, 1997).

Chatley, H., "Egyptian Astronomy", *JEA* 26 (1940), pp. 120-26.

Clagett, M., *Ancient Egyptian Science, II. Calendars, Clocks, and Astronomy* [Memoirs of the American Philosophical Society 214], (Philadelphia: American Philosophical Society, 1995).

Dorman, P. F., *The Tombs of Senenmut. The Architecture and Decoration of Tombs 71 and 353*, (New York: The Metropolitan Museum of Art Egyptian Expedition, 1991).

Frankfort, H., *The Cenotaph of Seti I at Abydos,* (London: Egypt Exploration Society, 1933).

Hannig, R., *Die Sprache der Pharaonen. Grosses Handwörterbuch Ägyptisch-Deutsch (2800 – 950 v. Chr.),* (Mainz: Phillip von Zabern, 1997).

Hornung, E., *Texte zum Amduat, II. Langfassung 4. Bis 8. Stunde*, (Geneve: Editions de belles-lettres, 1992).

Hunger, H., Pingree, D., *MUL.APIN An Astronomical Compendium in Cuneiform*, Archiv für Orientforschung 24 suplement (Horn: Ferdinand Berger & Söhne, 1989).

Jones, D., *A Glossary of Ancient Egyptian Nautical Titles and Terms*, (London: Kegan Paul, 1988).

Leitz, Ch., *Altägyptische Sternuhren* (Leuven: Peeters, 1995).

Lieven, A. von, *Grundriss des Laufes der Sterne: Das sogennante Nutbuch*, (Copenhaguen: Museum Tusculanum Press, 2007).

49. *EAT* III, pl. 50.
50. *EAT* III, pl. 48.
51. *EAT* III, pl. 51.

Lieven, A. von, "Translating the Fundamentals of the Course of the Stars", in A. Imhausen, T. Pommerening, (eds,), Writings of Early Scholars in the Ancient Near East, Egypt, Rome, and Greece: Translating Ancient Scientific Texts, (Berlin: De Gruyter, 2010).

Locher, K. "New Arguments for the Celestial Location of the Decanal Belt and for the Origins of the *ś3h*-Hieroglyph", in G.M. Zaccone and T. R. Netro (eds.), *VI Congresso Internazionale di Egittologia* vol. II, (Torino: Società Italiana, 1993), pp. 279-84.

Lull, J., *Las tumbas reales egipcias del Tercer Período Intermedio (dinastías XXI-XXV) Tradición y cambios* (Oxford: Archaeopress, 2002).

Lull, J., "Identification of an Ancient Egyptian Star: *ṯms n ḫntt* "the red (star) of Khentet". *Göttinger Miszellen* 199 (2004), pp. 73-7.

Lull, J., "Propuesta de identificación de estrellas y constelaciones egipcias de la lista decanal del techo astronómico de Senenmut en Deir el-Bahari", *BAEDE* 15 (2005), pp. 99-120.

Lull, J., "Los cúmulos estelares en las listas decanales y relojes ramésidas del antiguo Egipto", en J. Lull (ed.) *Trabajos de Arqueoastronomía: ejemplos de África, América, Europa y Oceanía* (Oliva: Agrupación Astronómica de La Safor, 2006), pp. 193-208.

Lull, J., *La astronomía en el antiguo Egipto*. (Valencia: Publicacions de la Universitat de València, 2006).

Lull, J., "Meschetiu in der Mythologie und der Orientierung der ägyptischen Tempel". *Acta Praehistorica et Archaeologica* 40 (2008a), pp. 85-92.

Lull, J., "El planisferio egipcio del templo de Dendera", *Astronomía*, 113 (2008b), pp. 76-83.

Lull, J., "A Possible Ancient Egyptian Astronomical Instrument for Positioning the Central Meridian", *Discussions in Egyptology* 64 (2006-2009), pp. 47-56.

Lull, J., Belmonte, J. A., "A Firmament above Thebes: Uncovering the Constellations of Ancient Egyptians", *Journal for the History of Astronomy* 37 (2006), pp. 373-92.

Lull, J., Belmonte, J. A., "The Constellations of Ancient Egypt", in J. A. Belmonte y M. Shaltout (eds.), *In Search of Cosmic Order. Selected Essays on Egyptian Archaeoastronomy* (Cairo: American University in Cairo Press, 2009), pp. 157-94.

Lull, J., Belmonte, J. A., "Egyptian constellations", in Clive L. N. Ruggles (ed.) *Handbook of Archaeoastronomy and Ethnoastronomy* (Heidelberg: Springer, 2015), 1477-487.

Molinero Polo, M. Á., "A Bright Night Sky over Karakhamun: The Astronomical Ceiling of the Main Burial Chamber in TT 223", in E. Pischikova (ed.): *Tombs of the South Asasif Necropolis. Thebes, Karakhamun (TT 223) and Karabasken (TT 391) in the Twenty-Fifth Dynasty*, (Cairo: American University in Cairo Press, 2014), pp. 201-38.

Neugebauer, O., *The exact sciences in antiquity* (New York: Dover Publications, 1969).

Neugebauer, O., Parker, R. A., *Egyptian Astronomical Texts*, II (Providence: Brown University Press, 1964).

Neugebauer, O. y Parker, R. A., *Egyptian Astronomical Texts*, III. *Decans, Planets, Constellations and Zodiacs* (Providence: Brown University Press, 1969).

Spaeth, O. von, "Dating the oldest Egyptian star map", *Centaurus*, 13 (2000), pp. 159-79.

Roulin, G., *Le Livre de la Nuit. Une composition égyptienne de l'au-delà*, vol. 2, OBO 147/2 (Fribourg: Editions Universitaires Fribourg, 1996).

Wells, R. A., "The Mythology of Nut and the Birth of Ra", *SAK* 19 (1992), pp. 305-22.

Yellin, J. W., "An Astronomical Text from Be. South 503", *Meroitica*, 7 (1980), pp. 577-82.

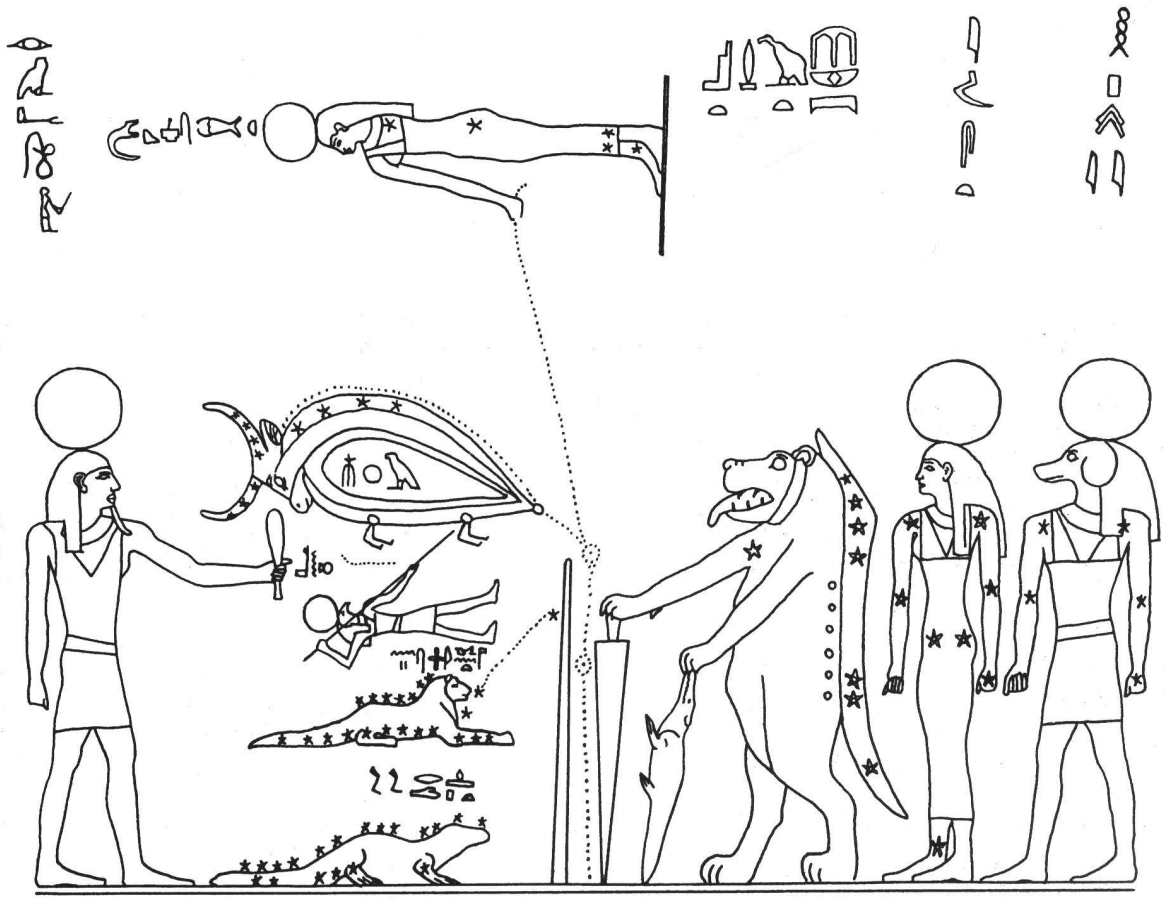


Figure 01: Northern constellations. Astronomical ceiling of Pedamenope, XXVI dynasty (from R. H. Wilkinson, "New Kingdom Astronomical Paintings and Methods of Finding and Extenting Direction", *JARCE* 28, 1991, 154 fig. 4).

Figure 02: Egyptian constellations of the Sheep and the Boat. Astronomical ceiling of Senenmut, XVIII dynasty (photo taken by J. Lull).

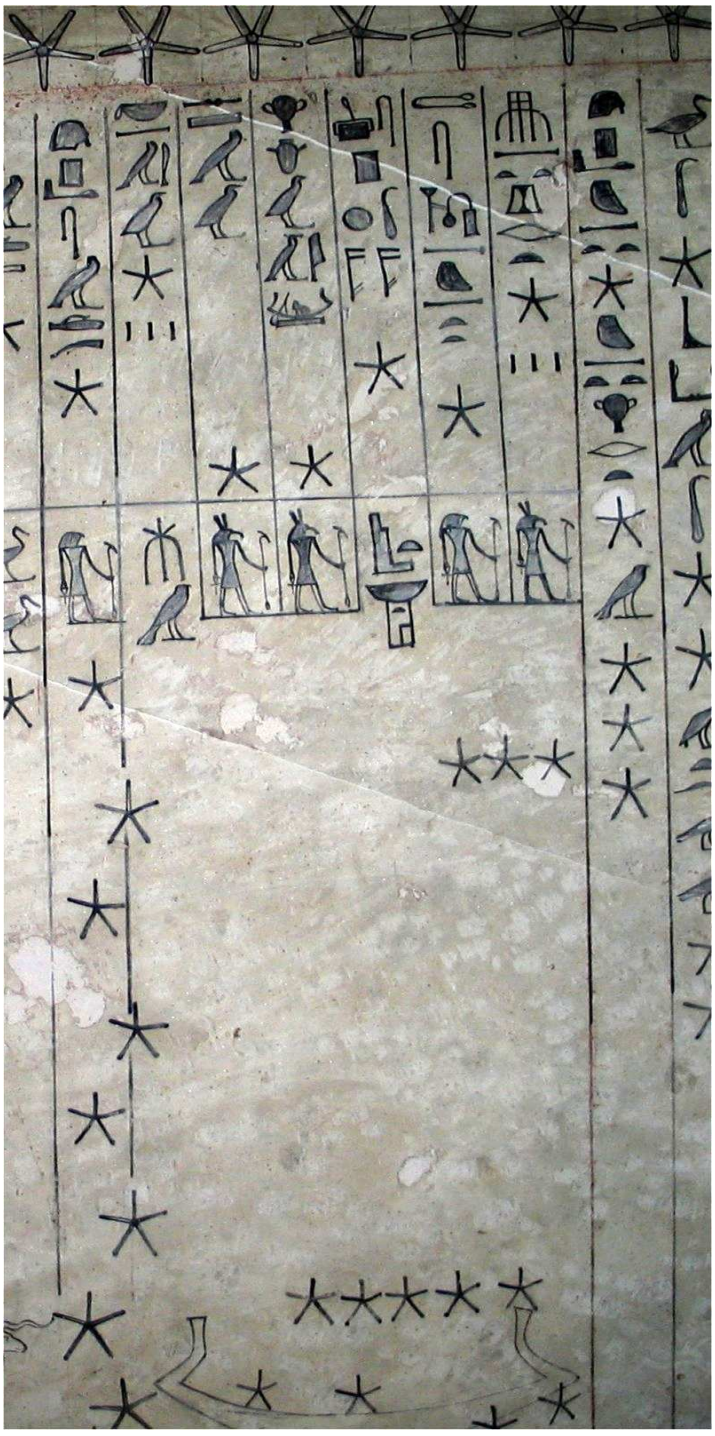


Figure 03: Decans associated with the Boat. Astronomical ceiling of Senenmut (photo taken by J. Lull).

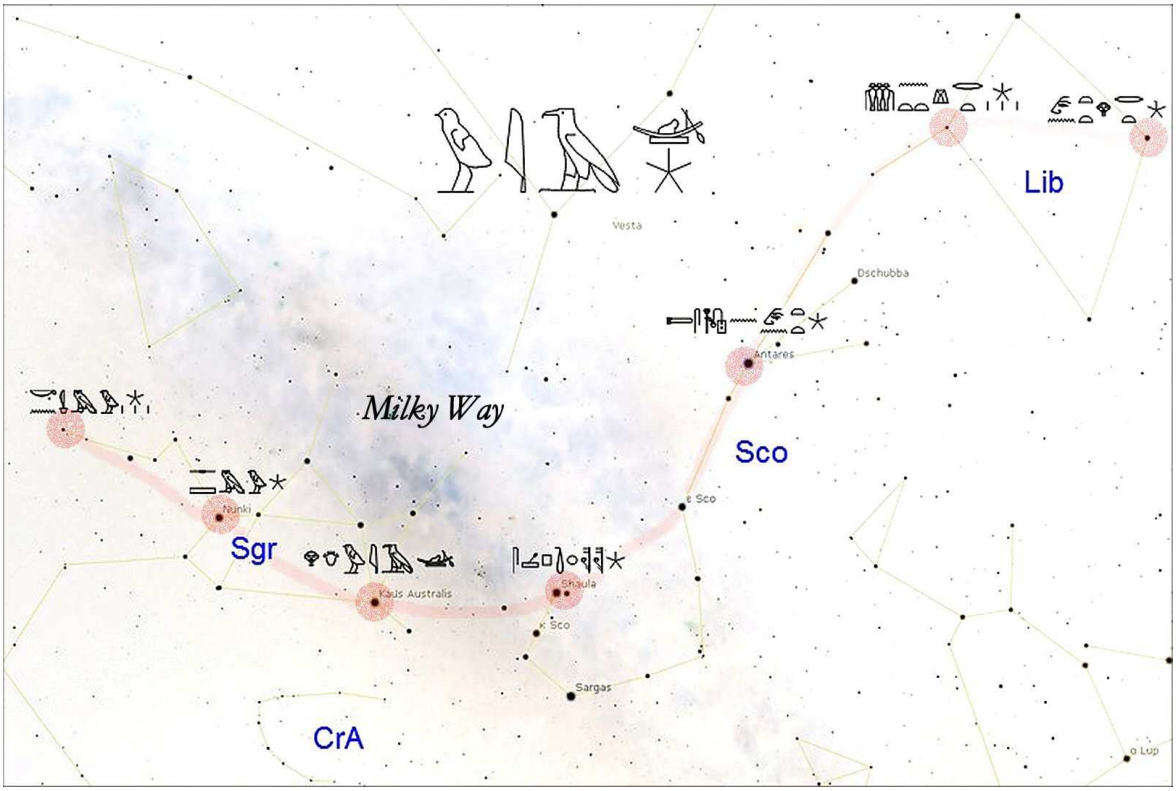


Figure 04: The decans belonging to the Boat (modified from *Stellarium*).

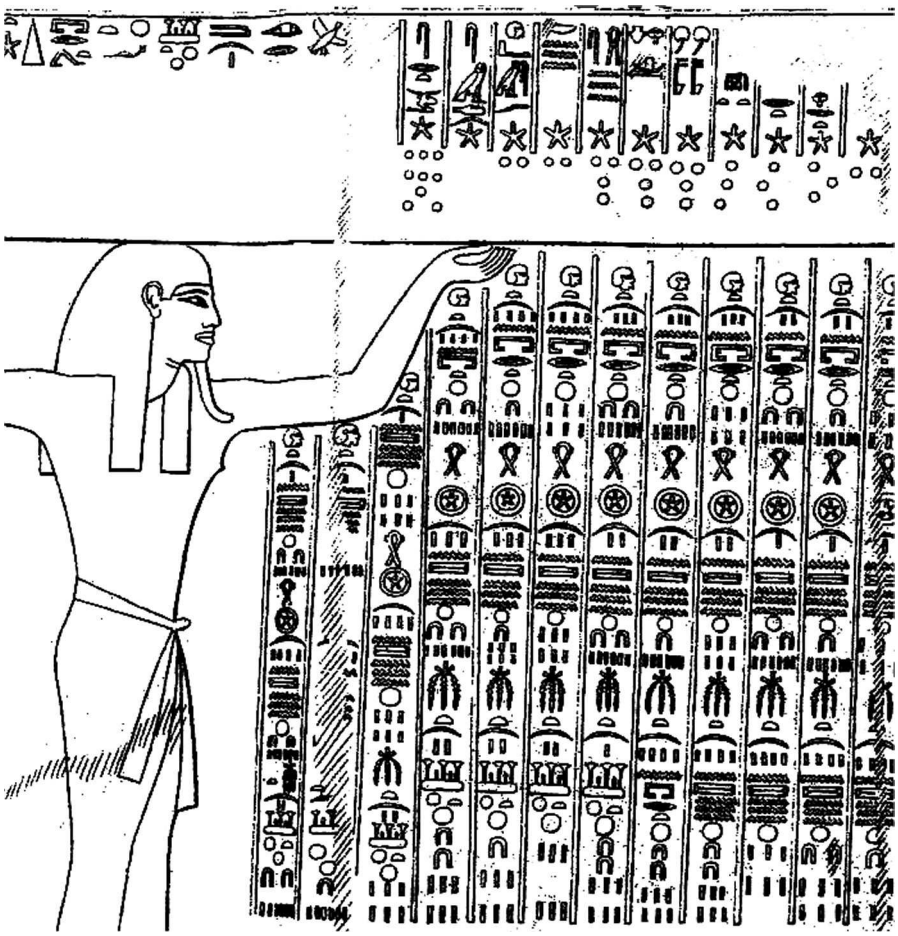


Figure 05: Astronomical information about the decans of the Boat in the Book of Nut of Seti I (*EAT* III).

Figure 06: The Boat and related decans in the astronomical ceiling of Karakhamun (photo courtesy of Elena Pischikova and Miguel A. Molinero).

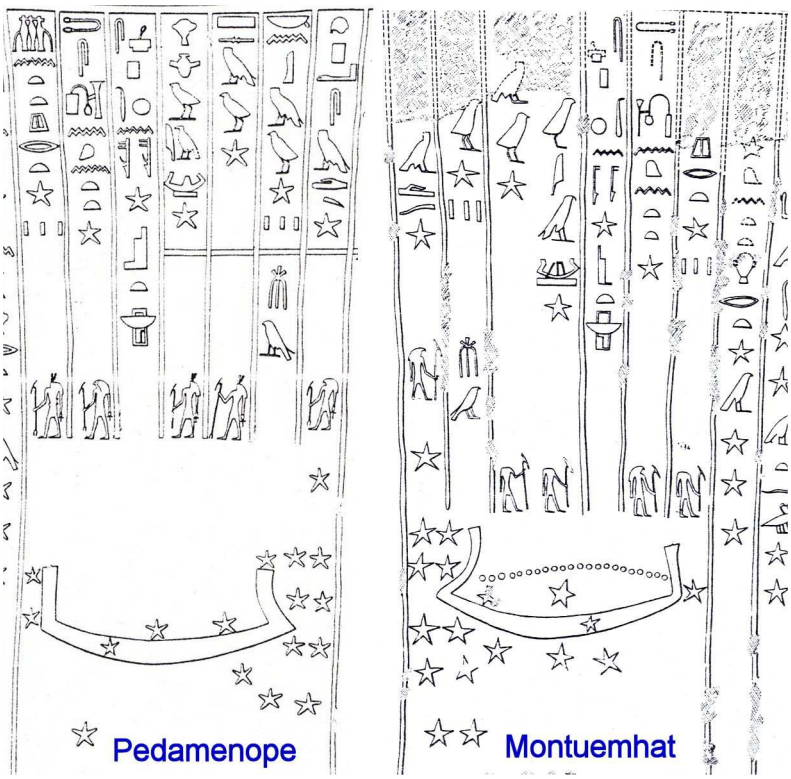


Figure 07: The Boat and related decans in two tombs of the early XXVI dynasty (*EAT* III).

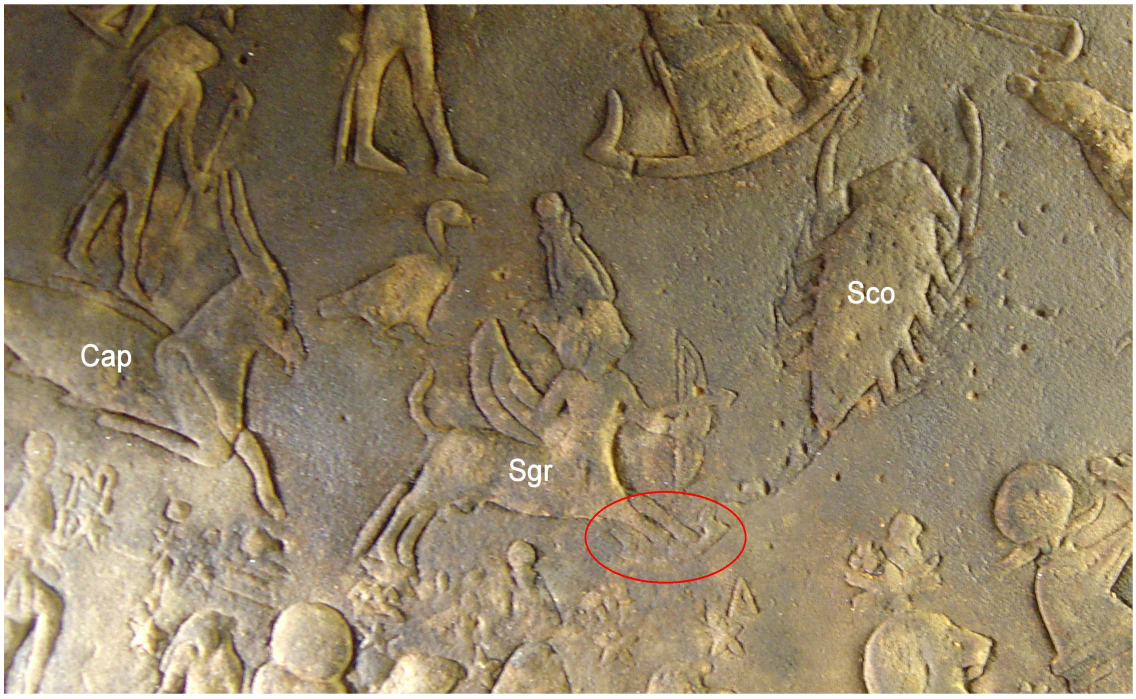


Figure 08: Sagittarius (with the Boat encircled), Capricornus and Scorpius in the Zodiac of Dendera (photo taken by J. Lull).

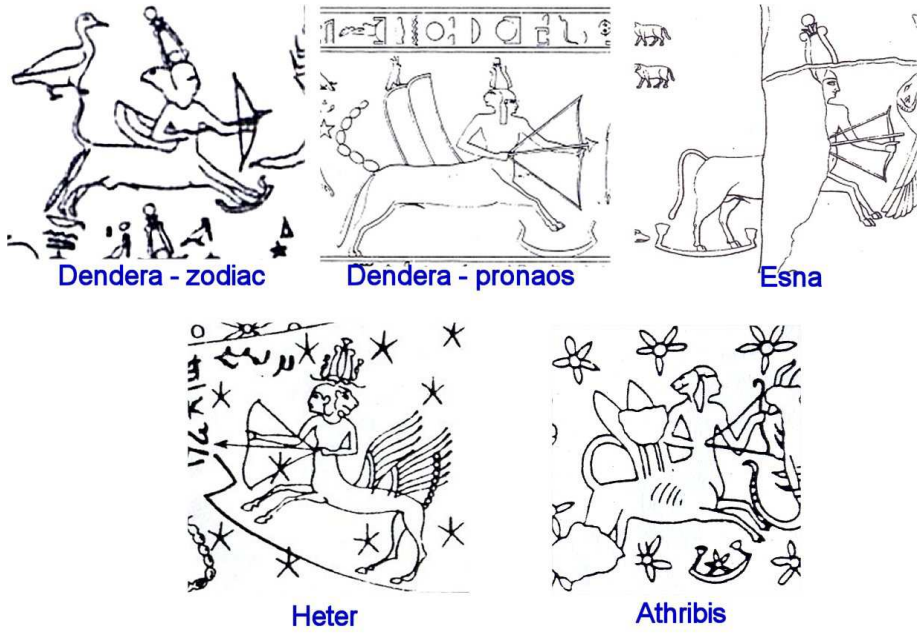


Figure 09: Some graeco-roman examples of the Boat associated to Sagittarius (modified from *EAT* III).