

ASTRONOMY AND MYTHOLOGY

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Abstract. The sky fascinated prehistoric man from the time immemorial. Our ancestors used to read heavenly messages according to their needs and fancy. At the same time they projected many earthly events and objects onto the celestial sphere. We shall discuss a number of general points regarding the link of mythological narratives with the heavenly constellations. We pay particular attention to three interesting mythological narratives, which happen all three to be linked with Egypt, one from the Jewish Bible and two from the Greek tradition. We show that the famous episode with Joseph and pharaoh's dream was inspired by the Egyptian interpretation of the specific significance of Pleiades constellation as the time marker. We briefly present the case of Berenice's hair and finally sketch an astronomical interpretation of Plato's famous myth on Atlantis.

1. INTRODUCTION

Sky appears a very special object of human experience. It is available to human perception for half of a human's life, yet it is literally untouchable. Unlike other earthly objects and events, which are accessible to a number of different sensory experience, like visual and acoustic, we are passive observers of the heavenly objects and events. It leaves much space to our imagination when attempting to compensate the lack of complete inference into the heavenly matters.

Sky offers to our eyes a number of types of celestial objects, like:

- (0) Sun and Moon
- (i) fixed stars (celestial sphere(s))
- (ii) irregular periodic motion (planets)
- (iii) very rare periodic appearances (comets)
- (iv) periodically changing brightness (Algol)
- (v) sudden appearance of bright stars (novae, supernovae)
- (vi) unpredictable atmospheric events (meteorites/falling stars).

Each of these types inspires our imagination, for various reasons, which might be:
 (i) curiosity (ii) explanatory needs (like Berenice's hair) (iii) predictive power (iv)
 religious tool (v) cosmological interest (vi) descriptive presentation (mythology) (vii)
 allegorical inspiration (Atlantis).

These interpretations appear common to all cultures on the globe, prehistoric and historic alike. They may differ from the society to the society, but in many cases one can discern particular pattern common to a number of cultures, as the case of Milky Way illustrates. Many of these patterns belong to the so-called mythemes, specific ready made constructs, which can be found in many mythologies, fairly tales etc. We

shall start with one of these mythemas, as found in the Jewish Bible (Old Testament in the Christian tradition).

2. HEAVENLY BOOK

As pointed out by Galileo, who stated that Nature is a book whose language is mathematics, the sky is an open book which can be read by applying a proper exegesis, i.e. by trying to decode the message which gods or like have written across the celestial sphere. We start with the famous episode from biblical narrative as written in the book of Exodus.

2. 1. PHARAOH'S DREAM

Here is what pharaoh told Joseph he dreamt: (see, e.g. Hertz 1967):

In my dream I stood upon the brink of the river. 18. And behold, there came up out of the river seven kine, fat-flashed and well-favoured; and they fed in the reed-grass. 19. And, behold, seven other kine came up after them, poor and very ill-favoured and lean-flashed, such as I never saw in all the land of Egypt for badness. 20. And the lean and ill-favoured kine did eat up the first seven fat kine. 21. And when they had eaten them up, it could not be known that they have eaten them; but they were still ill-favoured as at the beginning. So I awoke. 22. And I saw in my dream, and behold seven ears came up upon one stalk, full and good. 23. And behold seven ears, withered, thin, and blasted with the east wind, sprung up after them. 24. And the thin ears swallowed up the seven good ears.

How did this narrative arise and what might be the inspiration for this mythema, we meet again in the similar episode in the Book of Daniel? We start with physical geography of the northern African continent, specifically with the region we call today Sahara.

2. 2. ANIMAL VENERATION

Geologists have for a long time estimated that Sahara was not always desert and climate changes have been taking place periodically. Recent investigations have revealed that for about 8.000 years Sahara was not arid, but green area, inhabited by nomadic people, who lived on hunting wild animals and domesticated cattle. Investigations of the area of Nabta Playa region, west from the present day Abu Simbel, show that about 5.500 BC nomadic people from the Eastern Sahara region settled there and subsequently mixed with Nile indigenous populations. Generally, Sahara desiccation ceased around 10.000 BC and there is evidence that the area was populated by people whose social structure was superior to their Nile Valley counterpart.

As the green areas started withdrawing before the advancing sand, population moved toward the Nile and began mixing with indigenous Egyptians. (Brass 2002). As hunters, Sahara population venerated animals, wild and domesticated alike. Kine played particular prominent role within their Pantheon, for obvious reasons. They provided almost everything they needed, from milk, meat, skin, horns to hoofs. Even dropping as fuel, since Nile valley was lacking woods. By mixing people it was inevitable that the resulting population, which will give rise to one of the most advanced civilization of the time, would meld two pantheons, animal based of the Sahara incomers and anthropomorphic of the Nile agricultural inhabitants. In this way hybrid divinities, with human bodies and animal heads populated Egyptian pantheon, as we

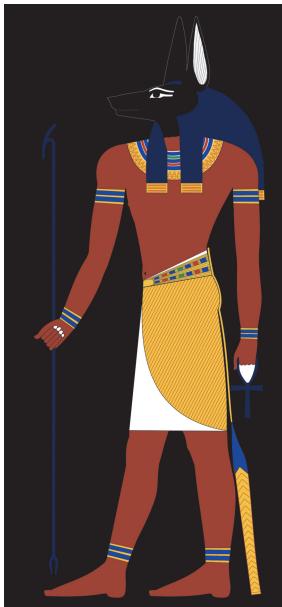


Figure 1: Anubis, god of the afterlife and mummification, with head of jackal.

know today. One of the best known example is that of the god Anubis, see Figure 1, with human body and jackal head.

As a reminiscence of this Egyptian tradition, many gods used to be represented with horns, even in the Greek pantheon, like Alexander's effigy with ram's horns on coins. Even Michelangelo could not resist putting bull's horns on Moses' head in his famous sculpture in Rome, although he was aware of the apocryphal interpretation of this biblical narrative..

2. 3. THE ROLE OF PLEIADES

The Pleiades (Seven sisters) is thought to be about 410 l.y. away from us. The cluster is around 76 million years old. This prominent open cluster, which contains about 300 stars, appears part of many myths around the globe, like Egyptian and Greek

The myth tells us they are daughters of Atlas and Pleione, who were pursued by Orion, but they were rescued by Zeus, who lifted them into Heaven. Merope married mortal Sisyphus and that's why her star is barely visible within the constellation.

Due to a high visibility, these stars gained a special place in many ancient cultures. They are winter stars in the Northern Hemisphere and summer stars in the Southern Hemisphere. These stars were known since the old times, by many cultures all around the world, including the Maori and Australian Aborigines, Chinese, Maya and Aztec and the Native people of North America. The Pleiades are particularly important in Hindu mythology as the six wives of the six sages. The number is not fixed but changing in the myths between six and seven. As Sparavigna emphasizes (Sparavigna 2008), representations of these stars in the local mythologies are different, but a rather common element is their female nature. For instance, in one of the Maori traditions, Matariki, the Maori name for the cluster of stars, is a mother with her six daughters.



Figure 2: Pleiades.

The Sioux of North America had a legend linking the origin of Pleiades to the Devil's Tower. The stars were seven women, pursued by a bear. They prayed the gods, who raised the ground where they were located high into the air, to save them from the bear. The maidens then turned into stars.

The Greek mythology

This narrative strikingly resembles that of Greek mythology. In the Greek myths, several of Olympian gods were engaged with the seven heavenly sisters. Merope, the youngest of the seven Pleiades, married Sisyphus and, becoming thus mortal, faded away: this is how the myth explains why in the Pleiades star cluster only six of the stars shine brightly and the seventh, Merope, appears faint. As Graves (1966) emphasizes it was wrong to consider they virgins, for all of them married with gods, except Merope.

The Pleiades start to shine over the horizon and set in the West, during October/November, the proper time of the year in Mediterranean area, to plough and sow the land.

The Egyptian religion

The ancient Egyptians divided their calendar into three principal seasons. The first of them was the inundation season. This was the time of the Egyptian calendar year when the Nile waters flooded the farmland. The last month of this season is Ahtyr: this name is a variant of Hathor, the goddess guardian of the tombs. At Plutarch's time, Athyr month was coincident with October/November. Known today by the Greek name, Hathor is the Egyptian patroness of lovers, the goddess of the

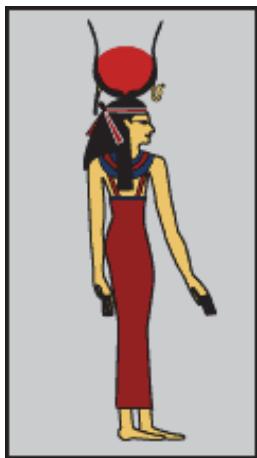


Figure 3: The goddess Hathor with horns and Sun disk.

sky, the protector of women and children, and beloved of both the living and the dead (Fig.3). Earliest references of this goddess date back to the second dynasty. In art, she was often depicted with just the head or the whole body of a cow, the Heavenly Cow. Worshipped at the city of the dead, at Thebes, she became the Goddess of the Dead.

To Egyptians Hathor, in her form as the celestial cow, provided the sustenance and in earlier myths she was responsible for the raising of the Sun to the sky with her horns (see Figure 3). The name Hathor means the "house of Horus" in the zodiac (the Heavenly Cow). During the Old Kingdom she assumed the properties of an earlier bovine goddess, Bat. She is also worshipped in the form of "Seven Hathors": these seven goddesses are the Pleiades shining in the sky, usually represented by seven cows, often associated with a bull, as a heaven herd providing the nourishment, bread and beer in the Underworld. We find again the Taurus, with Aldebaran its main red star, as one of the most ancient group of stars viewed as a constellation, also in Egyptian area. As the Seven Hathors, she was the goddess often present at birth.

What is the most significant to our subject Hathor was able to foretell the future, and that she was connected with the Nile inundation and the abundance of the grain harvest. The Seven Hathors of the Celestial Herd were named in a spell of the Book of the Dead and these names are: the "Lady of the Universe", the "Skystorm", "The hidden one, presiding over her place", "You, from Khemmis", the "Redhair", the "Bright Red" and "Your Name prevails over the West" (Sparavigna 2008). Often accompanied by Osiris/Apis, Bull of the West, and the oars representing the four cardinal points, in the vignettes enclosed to the text in the "Book of the Dead", the seven cows and the bull are depicted in front of the offering tables of worshippers.

2. 4. THE JOSEPH'S EXPLOIT

Among other features, Jewish Bible appears a collection of various narratives from other mythologies, fairy tales etc. Many of these borrowing are more or less well disguised and it takes a scrutinized effort to trace the origin of particular themes.

The case with Joseph and pharaoh's dream appears particularly interesting

It does not require particularly profound insight to see that the whole story is a paradigm of a fairy tale. But it nevertheless still begs for an explanation of the specific setup we meet in this biblical episode. The principal question arises, as to how it happened that the link with the Egyptian religious beliefs was passed unnoticed. For once we read about the role of Hathor and Seven Cows, it becomes immediately clear that the ancient Egyptian representation of the Pleiades was instrumental in coining the biblical story.

We have to answer a number of questions. First: how it happened, if we believe in the veracity of the biblical story, that the very pharaoh, who must surely have been well acquainted with the role of Hathor, did not decode his own dream? In particular, in view that the allegory, well exposed by the second dream with her, was more than telling?

The puzzle points towards a convincing explanation. But before we attempt to provide it, a few words about Egypt and its influence on the neighboring nations seems in order.

Egyptian civilization was by far the most ancient in the region preceding by two millennia all its surrounding civilizations, including Greek one. It had very strong connections with neighboring people, first of all as a rich country, providing, among other things, the most important good - wheat, which has always been in the foundation of civilization as such. Its scientific and religious wisdom was notorious, acknowledged by very Greeks, who borrowed much of the Egyptian knowledge and skills. The attraction Egypt exercised on the surrounding population is testified by the very Bible, Jewish and Christian alike. Jacob's son Joseph, Jesus' father Joseph etc, to mention but a few examples. Alexander, Caesar and Napoleon, three greatest military leaders and statesmen, all visited Egypt, in a sort of pilgrimage.

There is no doubt that Israelis were frequent visitors to Egypt, for short or long stays. They must be well acquainted by their customs, mythology, religion etc. The author of Joseph's narrative, written probably in VII c. BC, had some knowledge of the Egyptian culture, but obviously counted on the poor acquaintance of his compatriots about the same. Otherwise he would not dare to transcribe so directly something that every Egyptian of the time knew, into a religious fable, with the pretence of both originality and veracity. The Book of Exodus was written outside Egypt, long time after the alleged Jewish sojourn in the Nile valley.

The seven cow-Goddesses used to nourish generations of the Nile people, but generations of Hebraic and Christian believers as well. Not with wheat, but mythological nourishment.

3. BERENICE'S HAIR

This narrative, well known, but in various presentation is interesting to us here for a number of reasons. First of all, it is not clear whether it refers to a historical event, or it is just another mythological fable. If it is the latter case it demonstrates the power of human attraction by supernatural explanations, even within an advanced civilization, as the Ptolemaic Egypt was. It contains the same mythema we encountered with Pleiades, or Seven cows - rescue by lifting the earthly creatures to Sky, as a common heavenly abode. Another point to make is the presence of various variants, pointing the distortions which even presumably historical events are subject to.



Figure 4: Berenice's hair.

Ptolemy III (246 - 222 BC) was one of the most prominent member of the arguably the most prolific dynasty in the history (Pollard and Reid 2007). He married his daughter Berenice to Seleucid king Antiochus II Theos. After some struggle over throne of the dead king Berenice invited her father to intervene and the war was inevitable. The most important result of Ptolemy's victorious campaign were about two thousand items of spoils, which Cambis looted in Egypt, the pharaoh recovered. It was for this exploit the people gave him the title "Uergetes" - the Benefactor.

But the story does not end here. According to legend, Pharaoh's Cyrenian wife, Berenice, had promised to gods her beautiful hair, if the pharaoh returned victorious. She fulfilled the promise and after Ptolemy's arrival, deposited her hair in Aphrodite's temple. However, when the royal couple appeared next morning at the shrine, the hair was missing. They were furious about the lost, but astronomer Conon save the situation, declaring that the hair was not looted, but taken by gods as an offering. Next evening he took the pharaoh and Berenice at the open air and showed to them the constellation we call today Coma Berenice (see Figure 4).

It sounds nice, but is there any truth in this story? And even if there is, should we believe the royal couple trusted the astronomer (and gods, for that matter)? This, otherwise legitimate question, lies outside our subject, however (see e.g. Veyne 1983).

4. THE ATLANTIS MYTH

This myth (quasimyth would be, perhaps, better term) appears one of the most curious narrative in the literature of ancients. Unlike majority of other stories which have reached us, it appears in a single source, Plato in this case (*Timaeus*, *Critias*, 421. BC). This story puzzles the Plato scholars, who hesitate to take it seriously. Is it a mere Plato invention, as an allegorical narrative, or it contains a grain of historical authenticity? Did Plato really heard this story from somebody, presumably Egyptian priests and just transmitted it to us? Are we to take seriously the numbers Plato quotes as of the years the narrative refers to. What was inspiration of the story, if it wasn't a mere invention (allegorical or otherwise)?

In his Dialogs *Timaeus* and *Critias* Plato talks about a story which, allegedly, Solon heard from a priest at Sais, c. 670 BC. Plato will himself learn the same story from priests Conuphice and Secnuphice at Heliopolis, when visiting Egypt, c. 370 BC.

In his inspirative interpretation Reiche (1981) turned to Sky to decode Plato message about the island which disappeared some millennia before in a cataclysmic event. He first noticed that in the period (6.000 - 4.000) BC vernal points coincided with crossing of Milky Way with Ecliptic. Thus the Milky Way linked Gemini with Sagittarius, which crossed Ecliptic in the autumn equinox. It was the time when gods communicated with mortals (Golden Age). It ended in a fatal diversion of Sun from its usual path (myth about Faethon). Further corruption ensued and king Lykaon offered to Zeus flesh of his son - Silver Age arose (2.500. BC). Then Taurus and Scorpion came instead of Gemini and Sagittarius. When Zodiac constellations, following the eastward precession, successively dive behind the vernal point we have allegorical, Drang nach Osten of Antiquity. The role of conquerors is played by the Atlantic people, and the role of defenders of the civilization is played by whom else but Athenians. Gods are satisfied, but not completely. Athenians commit sin too (forest devastation of Attics?) and they dive themselves. Athenians are thus sacrificed for the wellbeing of mankind, after ensuring order and moderation.

It is not easy to decide about the veracity of the content of the story, as well as for the reality of the way the story saw light. Was this moral warning of Plato to his country fellows as for the ethics of his time? In his dialogue The Republic, Plato tells us another myth, that of Er who visited Underworld and witnessed the work of Mires, who decide human destinies. Both myths appear not only outside Plato's rational discourse, but lie opposite to his own critics of Greeks for paying to much attention, in his opinion, to the Homeric poetry as the standard of human ethics.

5. EPILOGUE

All three narratives have a number of features in common. First, they are linked in one or other way to Egypt, which to the Ancients was what now Hellada is for us. And all involve the Sky as Heaven, in the modern interpretation of the term. To the Ancients the Sky was a sheet of paper, on which divinities wrote messages to mortals. Starry constellations were seen as letters in the broad book of Nature, which were to be fathomed by mortals.

Our exegesis of the Book of Exodus attempts to show that this part of the Jewish Bible should be taken as an example of fairy tale, in which the Bible abounds. The story of pharaoh's dream seems to be, as far as the interpretation is concerned, too conspicuous to be noticed by scholars.

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