

THE LANGUAGE OF SKY

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Abstract. Astronomy has passed the long way from the prehistoric man to the modern insight into the night sky and its conspicuous and hidden features. We review the role which night sky has played in everyday life and collective conscious of the prehistorical man and the traditional societies, with emphasis on the ecological unity which the ancients felt concerning Nature in general and heavenly objects in particular. We argue that the prehistorical man was much more familiar with the Universe as visible from Earth than the modern inhabitants of the Globe and examine a number of cases in point, characteristic for various regions and epochs linked with the traditional society.

1. INTRODUCTION

The subject of this paper belongs to archaeoastronomy, which is the study of how past people have understood the phenomena of the sky, how they used them and what role the sky played in their cultures. Here, we would deal with very distant past, i.e. with Prehistory, and with inheritance from this period. The Prehistoric man was unaware of vastness and nature of the heavenly space, but this very space was his immediate environment. He has nightly experience with stars, the Moon, comets, etc. On the other hand, the correlations between the Sun's (apparent) motion and the events on the Earth could not pass unnoticed. For every days life, it was of utmost importance to be able to read the messages from the Sky and infer the influences man could expect to suffer from the heavenly entities. It is this language of sky which is of primary interest here. The correlations between earthly events, in particular periodic changes and astral collective movements have been noted surely very early, possibly before Neolith, and the need for calendar forced humans to observe and record principal changes on the sky. These include short, medium and long period changes, like daily, monthly and seasonal changes, eclipses etc, as well as the unique events like passing of comets, novae, etc. The ability of heavenly events to catch the attention of prehistoric man depended on the frequency as well on the spectacular aspect of the phenomena. Daily changes were too frequent to figure prominently in the human mind, whereas motion with periods much longer than the duration of a generation, like equinoxes precession, were much more difficult to notice. Even if many successive generations were able to perceive those long-period phenomena they could hardly be able to pass the knowledge to other communities. The latter effect kept small communities (which prevailed during the Palaeolith and Neolith) isolated, what considerably slowed down

the exchange of knowledge and the overall evolution of homo sapiens cultures. On the other hand the isolation effect kept many remarkable achievements of the prehistoric man hidden from our modern eyes and we are still discovering astonishing results "primitive societies" achieved. Many unexpected discoveries concerning archeological material make our remote past as unpredictable (better to say unretrodictable) as our future appears nonpredictable.

Once the sky has been lifted to a lofty level, it became profitable in many respects to link a number of earthly objects, and phenomena in general with heavenly entities. We shall consider here a number of instances where particular toponymes are coupled with celestial objects, mainly with the most prominent of them, the Sun.

2. THE WITNESSES OF THE PAST

Most of the Prehistoric culture has been preserved in the form of megalithic structures and cave paintings. In the first case, we will mention the most prominent site, Stonehenge, in comparison to less known ones. The cave painting will be discussed on the example of the famous Lascaux cave.

The megaliths (mainly from the Neolithic period) are found all over the globe. Beside Stonehenge in England (3500-2300 BC), there is a more recent similar structure at Sarmizegetusa in Romania (see e. g. Brown 1976, Hoyle 1977). At Brahmagiri in India there are stone circles dating around 900 BC (Rao 1999, Kak, unpublished), whereas at Wurdu Youang in Australia there is a pre-European stone structure built by aborigine people (Norris & Hamacher 2009). Most of these structures were relevant for astronomy: it was the need to "understand the language of heaven" which propelled the rise of astronomy in the prehistory. For example, at Stonehenge altitude, and only at this one, sighting lines of largest southerly monthly swing of the Moon and midsummer sunrise or sunset appear at right angles (Hoyle 1977, Figure 2.8). The axis of the horseshoe stone structure at Sarmizegetusa points towards mid-winter sunrise, as compared with the same axis in Stonehenge, which points in the midsummer sunrise direction.

However, the earliest connections of the prehistoric man with night sky date from the Upper Palaeolithic. At that time, the painted walls caves flourished in several localities, including the North-West Europe. Caves are linked with night sky for obvious reason - they appear filled with darkness. If heavenly objects are to be reproduced, caves turn out to be the best places to choose. Their role was at least twofold: (i) as the canvas for paintings and (ii) as container which can "catch the sun-beam" at particular yearly instances, like equinoxes or solstices. Usually both instances used to be combined, so that "chosen cave" was decorated with figures, which we may interpret with astronomical or other meaning. Caves are linked with night sky for obvious reason - they appear filled with darkness. If heavenly objects are to be reproduced, caves turn out to be the best places to choose. Their role was at least twofold: (i) as the canvas for paintings and (ii) as container which can "catch the sun-beam" at particular yearly instances, like equinoxes or solstices. Usually both instances used to be combined, so that "chosen cave" was decorated with figures, which we may interpret with astronomical or other meaning.

The principal caves are found at south-east of France, in Vezere and Dordogne Valleys, as well as in the Cantabria, Spain. Some of them seem to be occupied by man from -35 000 years. (- sign means before present - BP.). Some examples are:

Chauvet (29 000 BC), Cosquer (23 000 BC) and Lascaux (16 500 BC) from France, and Altamira (34 000-15 000 BC) and El Castillo (39 000 BC) from Spain. In the following, we shall illustrate an astronomical explanation of the prehistoric painting on the example of Lascaux cave.

3. LASCAUX CAVE: A MAP OF THE SKY

This is actually a complex of caves near the village of Montignac, in Dordogne. The wall paintings, estimated -17 000 years old (belonging to the Magdalenien period), consist mainly of realistic images of large animals, mainly horses, bulls (aurochs) and deers (Fig. 1) It is important to notice that there are no images of reindeers, the principal source of food for contemporary hunters. Hence the images do not represent hunted animals.

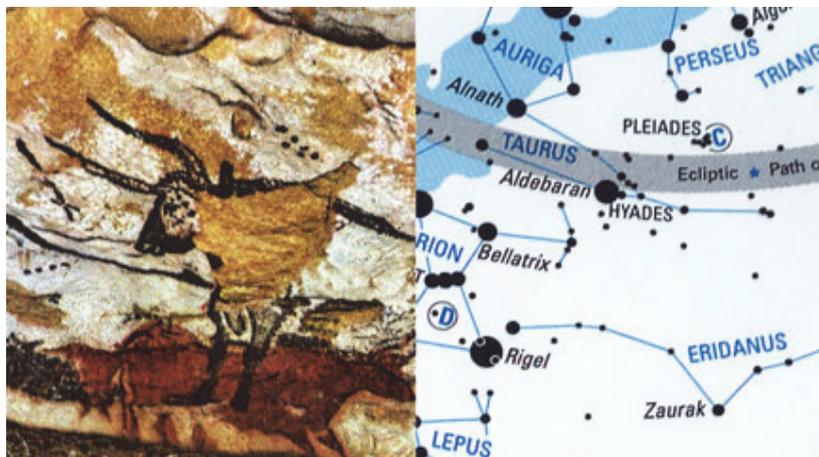


Figure 1: The prehistoric sky-map from Lascaux cave (detail, see text).

Several wall paintings were related to the night sky by some prehistory researchers. In the Hall of Bulls (Fig. 2) there are four black bulls or aurochs (a large species of wild cattle). The largest one is over 5 m long. According to the Spanish researcher Luz Antequera Congregado (doctoral thesis, 1992) the set of painted dots above the shoulder of the bull depicts the Pleiades cluster and the set of dots on the bull face (see Fig. 1) represents the Hyades constellation. Similar interpretations, including the correlations with the constellation of Taurus, are due to Rappenglueck and the American astronomer Frank Edge, as well as to some other researchers. Rappenglueck (1997) has also identified a star map from another painting, in the Shaft of the Dead Man (Fig. 3). The eyes of the lying birdman, the bull and the bird represented on this image would correspond to the three stars which were prominent in the spring 17 000 years ago. These are Vega, Deneb and Altair, known as the Summer Triangle, nowadays seen in the middle of the northern summer. Another idea of Rappenglueck is that some of the animal's paintings are symbolic representations of the phases of the Moon. The old lunar calendar would consist of groups of dots and squares painted

alongside images of bulls, horses and antelopes, depicting the 29-day cycle of the Moon.



Figure 2: Hall of the Bulls (detail, see text).

Lascaux paintings can be considered as a proof that the beginning of the astronomical science dates before Babylonians (about 5000 BP). French ethno-astronomer, Chantal Jegues-Wolkiewiez noticed that the architectural structure of the Hall of Bulls makes an observer feels encapsulated, as if one watches the night sky motion from a hill. Looking at the various animals painted on the walls, she was able to recognize the zodiacal constellations of the Palaeolithic sky. To prove it, she had to use high-tech astronomical computer programs to reconstitute the map of the Magdalenian sky. She carried out numerous orientation measurements of the sets of dots and lines represented the painted animals, comparing the archeological and the astronomical data (Jègues-Wolkiewiez 2005). According to her one can recognize on the cave walls the stars forming the Capricorn, the Scorpio and the Taurus constellations. In the last case, the image of a bull was completed with the stars clusters Pleiades and Hyades. "The paintings provide clear evidence that the artists were expert watchers of the sky, able to gather up these observations and inscribe them in the cave", maintains Jègues-Wolkiewiez. She found that the orientation of the cave was of primary importance. The plan and the section of the Lascaux cave entrance show that before the landslide blocked the access to the rotunda, at the time of summer solstice the rays of the setting sun would enter the cave and shine on the walls of the Great Hall of Bulls and on the axial diverticulum.

During the summer solstice 1999 Chantal Jegues-Wolkiewiez, and the Lascaux curator Jean-Michel Geneste, confirmed the above hypothesis: the setting sun illuminated completely the interior of the rotunda at the time of the creation of the images. This permitted painting under light during about one hour for several days in the beginning of the summer. Further, Jegues-Wolkiewiez verified that the similar phenomena occurred in other caves beside Lascaux. Actually, she found that the sunlight played the same role as in Lascaux in 137 other painted caves (Jegues-Wolkiewiez 2007). These caves were aligned with the sunrise or sunset on key days of

the year - solstices or equinoxes. The Palaeolithic man could keep track of changing seasons by observing the sun sliding along the horizon as the months went by. This was important in connection with the migrations of the large mammal herds that they hunted. The accumulated astronomical knowledge passed from generation to generation without writing, in the "mythological" language of the Palaeolithic art. Not only astronomy, but also the mythology and legends of later periods, in Sumer, Babylonia, Mycenaean and Minoan civilizations and Egypt were most likely derived from the Palaeolithic proto-types represented in cave paintings (Brown 1976).



Figure 3: The prehistoric scene from Lascaux cave (detail, see text).

4. CONCLUSION

Passing from rural way of life into urbanization marked the transition from the pre-history to history, from the traditional society to the civilization. In this short essay we have argued that the same transition resulted in separation of man from the sky, a gradual moving of stars beyond the horizon of homo sapiense. This transition has been illustrated by a number of examples, some well known, like Stonehenge and Lascaux, whereas some recent research results are presented to illustrate that the archeology is still moving ahead by penetrating into our remote past. Archaeoastronomy appears as observational as anthropological research, examining the roots of our awareness of being an organic part of the Nature at large, of the Universe. Urban man has lost the night and thus the sky, except on the PC screen. To the "primitive man" sky was a paper to write and book to read, the language we have almost lost.

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