

Research on hunter–gatherer societies and their astronomical knowledge
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Dedicated to Hertha von Dechend, who inspired me to write this article

In order to truly understand hunter–gatherer societies, they must be comprehensively appreciated in their entire intellectual achievements. This also includes looking at their nature study activities. And in order to be able to put also the rock paintings into a more complex context, and also following the most diverse considerations on the interpretation of rock art, I would therefore like to present an additional aspect of investigation for this, which has received only little attention so far. Although astronomical references in rock art are often mentioned, a more intensive investigation of the astronomical knowledge of hunter–gatherer societies has, to my knowledge, not yet been sufficiently undertaken. My concern here is to make a comprehensive inventory regarding the astronomical knowledge of the hunter–gatherers in order to then use these results to interpret the rock art, too.

A first important investigation shall include the naming of stars and constellations, as they are reported to us so far by foragers since ancient times. In the further the relation in their everyday life to the star names shall be discussed. The importance of the starry sky as a determining factor with regard to the annual cycles will then be discussed in connection with the naming of the Master of animals, who plays a prominent role in the cosmogony¹ of these cultures. This will be substantiated in a detailed consideration of astronomical applications among hunters and gatherer societies. The following question about the knowledge of planets then already points to a complex knowledge of these cultures on astronomical processes, which furthermore refers to the mythological level of implicit astronomical applications. This investigation I would like to accomplish

¹ By cosmogony I mean here explanatory models for the origin and development of the world. These can interpret the creation of the world mythically or explain it rationally.

world-wide on regions related, in order to be able to represent the extensive material structured. Based on this, an additional a new inside into hunter-gatherer societies and a more profound interpretation of rock art including astronomy to the sociological, psychological and structuralist approach would then be conceivable and useful as an extension.

Introduction

In this article I would like to pay tribute to the research of Mrs. Hertha von Dechend (*1915 - †2001) on the astronomical knowledge of hunter-gatherer societies, in particular under the aspect of the complex of the Master of animals and to enrich it with statements of Leo Frobenius (*1873 - †1938) on cave and rock paintings. Their ideas I consider very enlightening until today in the interpretation of rock paintings. Much of the material I use comes from various lectures given by Mrs. von Dechend at the Institute for the History of Natural Sciences at the Johann Wolfgang Goethe University in Frankfurt on the Main in the years 1965 – 1980 and at the MIT in Boston at the same time. Her main focus was the study of astronomical knowledge of ancient cultures and the outstanding cultures of antiquity, such as Mesopotamian, Egyptian, Greek and Roman societies. As further important researchers in this field of the culture of hunter-gatherer societies I would like to mention Leo Frobenius first himself, Otto Zerries and Joseph Wischniewski in the further, who collected much valuable material. As being very close to the Institute, I would also like to include the remarks of Hermann Baumann. Based on their notes and ideas, I try to evaluate their statements with the present newly gained knowledge on the astronomical knowledge of the savage cultures also for the interpretation of the rock and cave paintings, emphasizing the necessary rational component of astronomy, as it has been too little considered so far, but can contribute to a highly plausible interpretation to many of the rock paintings.

Since we still know so little about our prehistoric ancestors, it is very difficult to work out information from the available research material that provides more provable clues to understand hunter-gatherer societies in their nature appropriaton and their motives making rock art. Moreover, it is

of course of fundamental importance to postulate a cultural form of hunter-gatherer societies that remained constant in certain areas during a period of 15 to 20 thousand years of human history without major cultural changes. Nevertheless, with the material meticulously assembled by Mrs. von Dechend and with other current greatly improved dating techniques with regarding rock art and new data in the colonization of Australia and Tasmania, this seems possible in principle (Thackeray, Anne, I. 1983:21-26 and Bonneau, A., F. Brock, T. Higham, D.G. Pearce, and A.M. Pollard, 2016:59, 659-677; Hamacher, Duane et al. 2023).

Based on their enlightening ideas and with the additional new research results of Australian researchers - especially concerning the Aborigines (Hamacher 2014) - the astronomical knowledge of Upper Paleolithic cultures (-40 000 to -11 000) can be traced back and put into a close relation with rock paintings.

The especially young-paleolithic world of imagination was still present especially in recent times among the wild prey cultures that were little influenced by the great ancient cultures, such as the Bushmen, Aborigines, Siberian ethnic groups and North and South American Indian tribes, which could still preserve their tradition, despite damage in parts. Other of these still strongly upper paleolithic oriented cultures, like the Selknam from Patagonia, or the Tasmanian culture do not exist anymore. Nevertheless, it was possible to prove the astronomical knowledge of these people groups from the available ethnological research reports. Regarding the Australian Aborigines, who can show a cultural history of 40,000 years, it has been possible thanks to recent research, as mentioned above (Hamacher 2014), to continuously document their great treasure of astronomical knowledge, which still exists, with great intensity and by means of their helpful cooperativeness (Hamacher 2011:70-86).

The more recent reports, from about 2011, concerning the Australian Aborigines corroborate the statements of Mrs. von Dechend concerning their astronomical knowledge and their rock art interpretations.

I would not like to classify the knowledge of these old hunter/gatherer societies to astronomical processes as "scientific work" in the modern sense, although it contains of course knowledge about nature, but I would like to refer to their images and the language through which they named

these findings as expressed in their myths and legends. That our worlds of gods and religions then developed from these conceptions is quite conceivable, even entirely deducible.

The approach to heaven

At least during the last four centuries, the first world travellers² and in the following ethnologists obtained information from all parts of the world about the astronomical knowledge of the natives. Of course these peoples knew not only the sun and the moon, but report about planets and all kinds of special stars and constellations as well as about the giant Milky Way.

What motivated them to focus so intensively on celestial events? Did this happen only from pure curiosity or were quite survival-necessary strategies the background for the knowledge about processes in the sky? Therefore the question arises about the sense and purpose of these observations and the knowledge acquired from them.

And for this we now have a wealth of information from the ancient hunter/gatherer societies, in which way they used their knowledge about the cyclic changes in the sky. Through Wilhelm Bleek's (Bleek:1874) accounts of how the Kham Bushmen used stars and constellations in their daily lives, we can find out important things. Mrs. von Dechend writes in her lecture on archaic cosmology³ (von Dechend 1976/77:23):

The German linguist Wilhelm Heinrich Immanuel Bleek, a reliable and knowledgeable authority on the now completely extinct Kham Bushmen⁴ of Cape Province, in his report 'On resemblances in Bushman and Australian mythology', (Bleek 1874:102) reports of this hunter/gatherer society and their way of naming stars and asterisms:

“Many of the stars were given animal names. With regard to the

² William Dampier. *A New Voyage Round the World*. London, 1699. Alexander von Humboldt, *Vues des Cordilleres et Monumens des Peuples indigenes de l'Amerique*. Paris, 1810.

³ Cosmology (the study of the world) is the science that deals with the universe as a whole, i.e. primarily the origin, development and fundamental structure of the cosmos.

⁴ See also: *Structure Meaning and Ritual in the narratives of the southern San* (Hewitt, 1986:44).



Figure 1: Hertha von Dechend

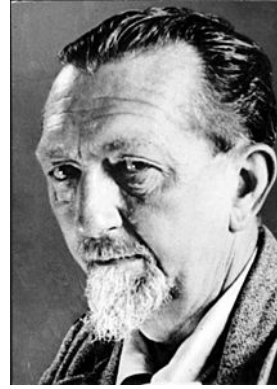


Figure 2: Leo Frobenius

constellations, - it is especially worthy of remark that their names in Bushman seem, generally speaking, to be unconnected with their shapes in the sky, – and that many of them seem only to be named from the fact of their being seen at certain times when the animals, or other objects, whose names they bear, come into season (e.g., bush fowl), or are more abundant(e.g., larvae).”

“Many stars, it was said then regarding the Bushmen, many stars and constellations owe their names only to the fact that they are seen at certain times in the sky. The fact that the life rhythm of the animals was connected with the special position of stars (morning rise or similarly prominent position in the starry sky) is of particularly meaning (Dechend: 1976/77).”

In Joseph Wischnewski's thesis "Afrikaner und Himmelserscheinungen" (Wischnewski 1915:51) we read further to the same question:

The names for stars and constellations refer among the Bushmen as well as partly among the Hottentots in many cases not to the form and shape they show in the sky, but to the time of appearance. Then also the constellations seem to have been named by these natives with regard to the creatures surrounding them, which are particularly frequent at the time of their becoming visible⁵.

⁵ Here shortly before sunrise - this is called heliacal rising.



Figure 3: Heliacal rise: The sun marked as red circle is still about 10° below the horizon. The stars and planets seen here have risen shortly before sun rise (Stellarum Software).

Concerning the astronomical knowledge of South American Guyanese tribes, O. Zerries (1952:222) writes: „When in the course of the year a constellation appears in the sky, the animal species concerned multiplies.” Other reports by ethnologists from Central and South America indicate similar ideas among the natives. Thus Victor Alencar writes: “... to some Brazilian indigenous ethnic groups, this constellation symbolizes the Mutum (a typical Brazilian bird with black feathers). When the Southern Cross appears in the night sky, this represents the migration period of this species” (Alencar 2009:211).”

Walter E. Roth (1915:261), citing Ch. Dance⁶ in connection with records of Schomburgk⁷, comments on Carib population statements as follows: “In South America the Island Caribs regarded all the heavenly bodies as Carib... With regard to the Southern Cross, Dance talks of it as being the great White Crane. This constellation serves also as an indication for the hunting of the bird, Schomburgk recording show, when the Cross stands erect, the powis (*Crax nigra*) commences its low moan.”

Concerning the astronomical knowledge of the Australian Aborigines further references from the literature are added: “... the star Vega (Lyrae), called Neilloan in the Wergaia language, was linked to the Mallee fowl (*Leipoa ocellata*), a chicken-sized ground-

⁶ Chapters From A Guianese Logbook by Charles Daniel Dance (Dance 1881:345).

⁷ Schomburgk, Robert Hermann. Visit to the sources of the Takutu, xiii, 23. London, 1843.

dwelling megapode that builds its nest-mounds when Vega rises at dusk..., and in Aboriginal cultures of the Central Desert, the heliacal rising of the Pleiades signaled the start of winter and the time to start harvesting Dingo puppies” (Leaman, Hamacher, Carter 2016:62,72).

Ray P. Norris et al. (2012:1) write, “As well as being associated with traditional songs and ceremonies, the sky is used to regulate calendars, and mark the time of year when a particular food source appears.”

Regarding this fact, Mrs. von Dechend points out the importance of this knowledge (Introduction to Archaic Cosmology, p23):

“If you name asterisms after animal species which have their breeding or reproduction time at the time of the rising of these asterisms, then you must have known before not only about the life cycle of the animal species, you must also have already determined which asterism rises heliacally (shortly before sunrise) in the course of the year, and this means: You must be familiar in any case with the length of the solar year as well as with the fact that approximately every month other stars become visible before sunrise! Exactly this discovered fact must have caused necessarily those who first noticed it to extensive thinking and to the decisive conclusion that the earthly life is regulated by the stars, unchanged over centuries.

Since Mrs. von Dechend was a proven diffusionist, it was clear for her that such fundamental discoveries must have spread everywhere around the globe. Such complex discoveries are not accomplished completely independently of each other just like that. Discoveries are a rare cultural property!

She continues (von Dechend 1976:23 - 24):

“Thus the rising of constellations or stars was declared to the cause, the earthly happening to the effect. In order to express the won insight into the connection between star rises and reproduction times of the animals, one has named now not only stars and star groups after animal species, sometimes also after plants, which represents a relatively noncommittal statement.”

Mrs. von Dechend has therefore developed the hypothesis to relate the stars and constellations with the myths and comes to the following conclusion:

“So we would have to rely on speculation if the wild hunters had not given us clearer information. Fortunately, they have done so by leaving us numerous myths⁸ and rites that revolve around the Master of animals, a central idea of all hunter/gatherer societies that have remained alive until recent times even among people who have come under the strong influence of neighboring arable cultures, but where hunting and fishing still play an important role” (von Dechend 1976:21).

As far as could be ascertained so far, the zodiacal images as we know them today were not given any conspicuous special treatment in this early game Master of animals system; many of the stars and constellations used lie outside the zodiac.

The Master of animals⁹



Figure 4: A Master of Animals (Lascaux Cave)

Concerning the considerations whether constellations could have a decisive meaning for the interpretation of cave paintings, Mrs. von Dechend quotes statements of Leo Frobenius:

⁸ See also: Specimens of Bushman folklore by W. H. I. Bleek 1911 and Customs and Beliefs of the !Xam Bushmen by D. F. Bleek, 1932, The Mantis and his friends by D. F. Bleek, 1924, and especially the Australian myths about the ancestors and the starry sky in W. Lloyd Warner's book: A Black Civilisation, 1937.

⁹ The term "Master" is of course misleading, since many celestial bodies are also listed as female beings in literature (see Arcturus or Jupiter among the Aborigines).

Frobenius would probably not have had the idea that the Franco-Cantabrian animal paintings could represent constellations, if he had not heard outlandish stories from bushmen, according to which, for example, the stars are eland, and according to which one must not break the bones of killed animals. Otherwise', say the bushmen, i.e. if one breaks game bones, 'the light of the starry sky goes away' (Frobenius 1933:130).

Then she tells us why this statement of Frobenius needs a more exact explanation: "So at first glance such a statement does not reveal anything at all: there is an intermediate link missing, which one must know, and that is the so-called "Master of animals", also called wild spirit or bush spirit (master, lord, owner, guardian of the game, maître des animaux, génie des bois)¹⁰.

Hermann Baumann wrote a significant article¹¹ on this subject in 1938 in *Zeitschrift für Ethnologie* 'Afrikanische Wild- und Buschgeister', in which he described in detail the then findings concerning the Master of animals - results which have also been taken into account in this text.

The particularity of this conception lies in the fact that the hunter/gatherers imagined the Guardian of the game as a star or a constellation of stars, who was responsible for a special animal. And the most important function of the Master of animals was to restore the killed animals from their bones¹². But this can only work if the bones remain together unharmed, which is why all early hunter peoples made sure that the game bones were returned to the Master of animals unharmed and carefully bundled; they are hung in trees, buried in certain places, placed in water or the like. Otherwise, in case of non-compliance with the duties, the Master of animals deprives the hunter of the hunting luck, he does not send down 'new' revived specimens to the earth, or he makes the hunter ill, or there is

¹⁰ See also: I. Paulson in "The Supernatural Owners", ed. A. Hultcrantz, p. 90ff., 1961.

¹¹ Afrikanische Wild- und Buschgeister, H. Baumann, 1938:208–239.

¹² ... Okikirmui (the culture hero) carries the skull of the fox home. His attention to the bones of the "dead" fox is typical of the treatment of animal remains in Ainu culture. Although the body and spirit of the animal are generally seen as independent, with the spirit the ongoing entity, they are linked through the bones, most especially the skull. Manipulation of the skull influences the animal spiritual being. In: *Asian Ethnology* Volume 68, Number I. 2009, 27–54. S. M. Strong. The Most Revered of Foxes. Knowledge of Animals and Animal Power in an Ainu Kamui Yukar, 37.

a calamity. It depends on the favour of the Master of animals whether the hunter can kill an animal. He determines which individual animal has to be shot, sometimes it is also said, e.g. by the Abkhazians in the Caucasus, 'a hunter cannot kill an animal that has not been killed and consumed before by the Master of animals and his daughters' (Dirr 1925:140).

That the Master of animals himself eats animals, is the owner of the bones, and that earthly animals arise from 'heavenly' bones, also follows from the statements of the North Australian Murngin about their 'Great Father up there in the sky':

"He looks like an ordinary man but he is much bigger...Everything everywhere, fish, iguana, kangaroo, opossum, when he eats them he puts the bones in a pile and does not let them drop down to earth. If a fish bone dropped down it would make plenty of fish, or if a kangaroo bone dropped down it would make many kangaroos. In fact, any animals bone that fell to earth would multiply its species (Warner 1937:542)."

Mrs. von Dechend then comes to a problem which she describes as follows:

"So far we have spoken of the Master of animals, but still too vague.

Therefore the question: Who are the Masters of animals? A distinction is made by the experts (by the ethnological experts on hunter cultures)

between 'individual' and 'collective' Guardian of animals (Paulson 1961a:91), because often such an Master of animals is not responsible for all animal species, but only for a particular genus, in which case just each genus has its own patron.

This difference is of great importance. In the case of the Master of animals of the individual animal species, it is usually a huge specimen of this genus in the starry sky (a constellation).

But in the case of the 'spirit' responsible for all animals, it is another being, sometimes therio- or even anthropomorphic, sometimes it is an inconspicuous animal. With the Bushmen, it is the Mantis religiosa, the praying mantis, called Kaggen, the so-called bushman god, and according to Mrs. von Dechend it represents the planet Mercury.



Figure 5: *Mantis religiosa* (Kaggen)

Now Otto Zerries (Zerries 1951, 1954) has fortunately compiled all available South American, and also some Central American material on the stars and constellations as Masters of animals¹³. In summary, it can be read from his articles that among the Kalina, Akawoio and other Guyana tribes in Central America, for example, the Southern Cross is the father of the ostriches, the Orion belt is subordinate to the bush chickens, the Pleiades to the bees. The father and Master of the tapirs, on the other hand, is the constellation Taurus.

The Toba behold in two stars of *Canis maior* (Great Dog) or *Lepus* (Hare) the Master of all armadillos, among the Taulipang the wasps have their Master in a Centaurus star, among the Paressi and Bakairi it is generally said that the animals in the sky are the oldest there are (Zerries 1954:107). Of Guiana tribes we hear from him (Zerries 1954:130) concerning these Master of the wild animals and of the plants, who are also called Kuyuha, i.e. father or mother of the genera:

“the Kuyuha travels in due time from his star to the earth, to a breeding place, where he unites with others of his kind, ready to take up his temporary residence in the newborn or fruit-bearing organisms, which he thus endows with life and activity and leaves again only with death, when he returns to his home in heaven.”

Furthermore we learn from him that 'the breeding places of the animals on earth, where the Kuyuha find themselves', receive names 'which are identical with those of the stars', so that then a breeding place of the ostriches on earth would be called also in the sky breeding place of the ostriches (*Crux australis*, cross of the south).

¹³ Zerries, O., Sternbilder als Ausdruck jägerischer Geisteshaltung. *Paideuma* 5, 1951, Wild- und Buschgeister in Südamerika, Wiesbaden 1954.

According to Walter E. Roth, the appearance and position of various constellations in Guiana are associated with animals, plants, and special seasons, and each such star is the permanent home, i.e., the spirit of the same game, tree, or plant into which he changes or passes at said time (Roth 1924:716)¹⁴.

In another text Roth states a connection between fish and the celestial bodies: “And truly, as was predicted, on the annual appearance of those stars, the yarumak (*Pimelodus maculatus*), tibicurie (*Prochilodus rubro-teniatus*), caburessi (*Chalceus taeniatus*) and several other excellent fishes are abundant in the rivers” (Roth 1915:262).

On the association of localities (e.g., breeding places) with stars, a common conception of wild prey cultures worldwide, W. E. Roth writes: “The breeding places on earth where the kuyugas specially assemble, ready to breathe the breath of life over animal or plant, receive names identical with those of their spirit-derived star” (Roth 1924:716).

In the opinion of the Kaliña, therefore, but also of the Arawak Guayanas, the ruling spirits of the animal species have their seat in the constellations (Zerries 1954:130).

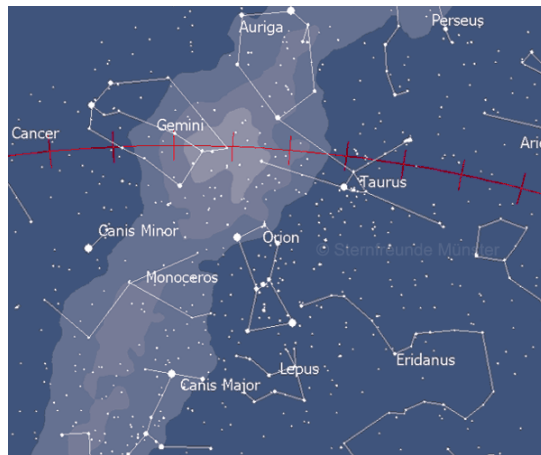


Figure 6: Orion, Canis Maior and Taurus, near the milkyway

The Master of animals conception is also reported from ancient Peru. For example, Lintschotten (Bastian 1878:490) states:

¹⁴ More than this, each such star is the permanent home of, in fact actually is, the spirit of that same flesh, fowl, tree, or plant which is then in season, and into which it changes or passes... (Roth 1924:716).

They (the Peruvians) held that there was no animal or bird on earth that did not have an equal image in the sky and that such should help to carry on the generation and reproduction in the same sex, therefore they had to do with different stars.... The constellation ruling over the Tieger¹⁵ was called Chuguin chinchay (Chinka or Tieger), and so the Peruvians assumed for all animals (bears, lions etc.) a protective image generating and guarding them in the sky (Bastian 1878:603).



Figure 7: Canopus and Southern Cross

The Peruvian constellation chuqui chinchay - meaning 'excellent jaguar' in the Quechua language (Zerries 1954:97) - has been declared by Robert Lehmann-Nitsche (1928b:163-164) to be identical with Scorpius, in addition to some stars in Ophiuchos (Serpent Bearer), Sagittarius (Sagittarius), Ara (Altar) and Triangulum australe (Southern Triangle). In addition, however, Lehmann-Nitsche states (1928b:160) “that apparently in some parts of Peru a real tiger¹⁶ was kept for cult purposes as an earthly representative of the sidereal chuqui chinchay.” Similarly, Siberian peoples as well as the Ainu of northern Japan keep bears in cages, which are then given to ceremonial sacrifice at a young age.

¹⁵ He surely means the Jaguar.

¹⁶ Surely the Jaguar is meant.

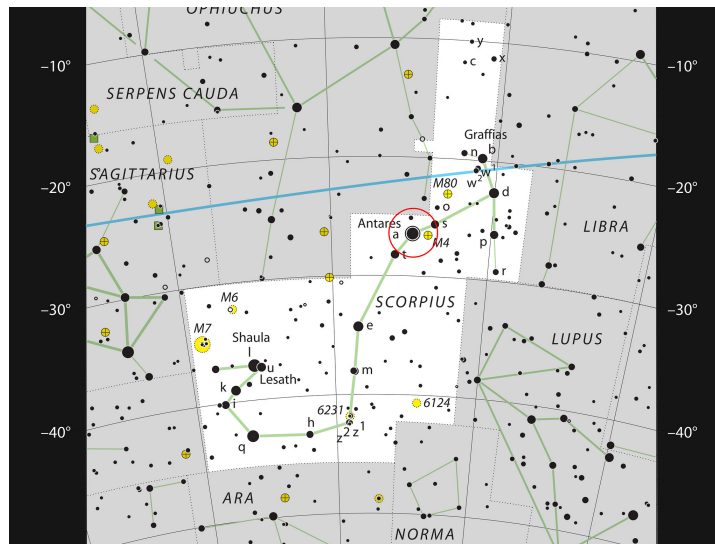


Figure 8: Southern Sky with Scorpius and Ara

From North America come the following reports that prove the connection between the starry sky and earthly life. Regarding the Pawnee of North America, Richard Dangel (Dangel 1929:113-144) states:

“Now the Pawnee conceive the whole world of interest to them as a tremendous magical connection founded on symbolic correspondence. The earthly conditions are regarded as a mirror image of the heavenly ones.... From the heavens all things have been created; each star has made and placed on earth the beings associated with it... The whole political and social structure of the tribe, together with its ceremonies and games, derives from the stars; hence, in the last analysis, all power on earth comes from the beings of the heavens; and thus from their father and master, Tirawa¹⁷.”

Further accounts substantiate this cosmogonic idea of hunter/gatherer societies in northern America. Thus Stansbury Hagar reports of the

¹⁷ Similarly, C. Levi-Strauss locates the rules of behaviour of the Aborigines from Arnhem Land in northern Australia. In his *Les Structures élémentaires de la Parenté*, he explains in detail the dual tribal system of the Murngin (see also Warner, W. Lloyd, *A Black Civilization*), and finds natural reasons for this dual system. He sees in culture the syntax of society: the laws of kinship, economic, and linguistic systems are subject to certain rules of exchange. For the structuralist, once the rules of one system are known, those of all other systems follow logically. His analysis, however, unfortunately does not include the astronomical assignments that are documented in many ways among the Murngin, which would thereby give exchange an even more fundamental dimension. As the Australian Murngin say, the totems are divided into two halves - separated by the Milky Way - and so the exchange takes place predominantly between these two moieties (halves).

The totem members on one side of the Milky Way are obliged to relate to the members of their totems (star or star-constellations) on the other side of the Milky Way. These are then transferred into the kinship relationship through the rules of totem assignments. In this way, the starry sky determines the structure of social relationships, a structure that has lasted for thousands of years and is actually almost eternal for the human imagination.

Cherokee: (Boas 1906:354f.): “According to Cherokee beliefs, every living being on earth is the descendant of an ancestor in the heavens represented by a star or asterism. From this ancestor it has received all its characteristics; in fact, the ancestor is definitely regarded as the only true representative of its kind.

Whoever wants to achieve anything with regard to an animal must first overcome the magical power inherent in each species, which the animal has received from its celestial ancestor as a birthright¹⁸.”

The conception of the Master of animals is known throughout also among the Siberian peoples. Mrs. von Dechend explains this conception against the astronomical background:

With the Siberian Chukchee the polar star is the Master of animals of all game species. And that the containers in which the animals are kept are celestial sections seems unmistakable, especially in view of the Pole Star as the Master of animals, which keeps all wild animals in "trunks"¹⁹.

There we meet with the mentioned examples already a preform of Urano-Geography, which one expects 'actually' only in later cultures, thus after the outbreak of the neolithic revolution, which one would be inclined to attribute actually only to the Mesopotamians and Egyptians, Mrs. von Dechend states in astonishment.

In his report about the Chukchee Waldemar Bogoras (Bogoras 1913:94) writes on page 94:

“The Polar Star spoke to his wife, (and then said,)

'Open (the trunk) a little!'

She opened (it), and it grew somewhat brighter....

'Open the trunk to the eastern side.' (It was full of) seals.

Again she opened another one. (It was full of) walrus.

'These I give to those who bring sacrifices.'

Again she opened another one.

And (it was full of) gray foxes....

She opened another one. This time it (was full of) wild reindeer.

¹⁸ ... every living animal must be represented by some star, and starworship must have been the prevailing aspect of American Indian religion. This can only be accomplished by propitiating (Besänftigung) the invisible ancestor. The bear-hunter, for example, must thus propitiate the Celestial Bear before setting out to pursue the animal; for all bears are invisible to the hunter when they lie on their backs with the soles of their feet up, unless the hunter has learned the magic power of their species” (Stansbury 1906).

¹⁹ Here, "trunk" specifically means an asterism, constellation.

'These here I give without distinction to the poor ones'."

Leo Sternberg says about the pantheon of the Ainu (Hokkaidō, Sakhalin):
“All of these are divine objects, and are called in the Ainu language kamui. The Ainu pantheon is almost exclusively zoological. The principal gods on whom the welfare of the Ainu depends are the ‘masters’... The one is the ‘master’ of the bear.” (Sternberg 1906:426, 427).

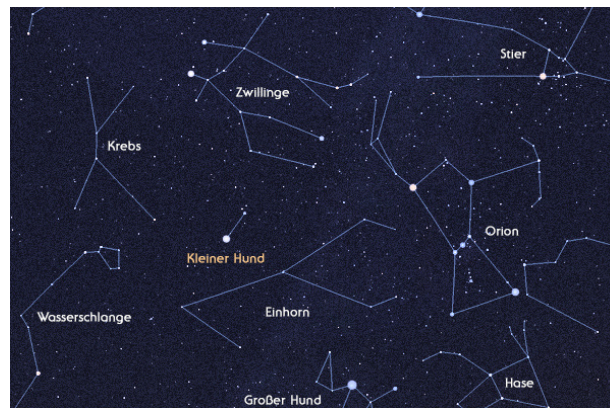


Figure 9: Procyon (Canis Minor)

Further reports from the South African Bushmen and the Australian Aborigines repeat the same facts: the masters of animals are constellations or fixed stars - but they can also be planets.

Among the Bushmen of South Africa, Procyon (see Fig. 9) is a male eland, and the stars α - and β - Geminorum are the associated eland cows. Among the Bushmen, Canopus rising gives the signal to collect termite larvae, called Bushman's rice, that is why Canopus is also called the Bushman's rice star; among the South Australians, however, Arcturus rising prompts the time to collect the eggs of wood ants, called bittur, and hence Arcturus is called 'discoverer of bittur'.

From the Australian Aborigines we hear concerning their animal ancestors: “Most of the totemic ancestral beings are represented in the sky by stars and planets. Although they leave their material bodies on earth metamorphosed into stone, their spirits are the stars (Berndt 1943:62, footnote 129).”

Duane W. Hamacher, an Australian archaeoastronomer, gives a detailed account of the following mythe: “In Wergaia traditions of western Victoria, the people once faced a drought and food was scarce. Facing starvation, a

woman named Marpean-kurric set out in search of tucker for the group. After searching high and low, she found an ant nest and dug up thousands of nutritious ant larvae, called bittur.”

This sustained the people through the winter drought. When she passed away, she ascended to the heavens and became the star Arcturus. When Marpean-kurric rises in the evening, she tells the people when to harvest the ant larvae (Hamacher 2014:4).

Finally, a strange story from Guyana in which the Masters of animals degenerated into wretched creatures and fled to heaven at a time that seems already to date back to biblical times: “Many myths relate of animals that were badly treated by men and in consequence ascended to heaven where they became constellations. This probably occurred when the golden age came to an end and the world became as it is now. Those mythic animals are now the leading spirits of the different species of all animals and the constellations are indicated by the name of that animal with the suffix Kalina–yumu, Arawak–kujuhut or –kuya. When in the course of the year a constellation appears in the sky, the respective animal species procreates (de Goeje 1943:17).

All these quotations seem now also to prove in the most beautiful way the idea of the celestial Masters or Mistresses of animals as the cause and basis of the fertility rites often evoked: The Mistress or Master of animals is asked for and courted with gifts for the mostly annual multiplication of his offsprings, in order to ensure the continued supply of people with his animals, without ever ceasing to do so. Important references are the special ritual dances and songs of the hunter/gatherer societies that take place in the course of the year, which are supposed to contribute, among other things, to the reconciliation with the guardian of the game, who, after all, loses one of his favorites, so to speak.

About the Milky Way and the transmigration of souls

Mrs. von Dechend writes: “Ideas have a tenacious life, the older they are, the more tenacious, and not all stories that circulate among Peruvians,

among high culture descendants in the Western Sudan and elsewhere, are therefore already products of high culture. Realize from time to time that with us still today 'the sky', into which the braves enter, is a lively scheme, even if no one knows any more that with it was meant quite real the fixed starry sky, with its 'totem constellations', the home of the ancestors, whence the first ancestors came, and whither one wishes to return, even if mostly in vain.

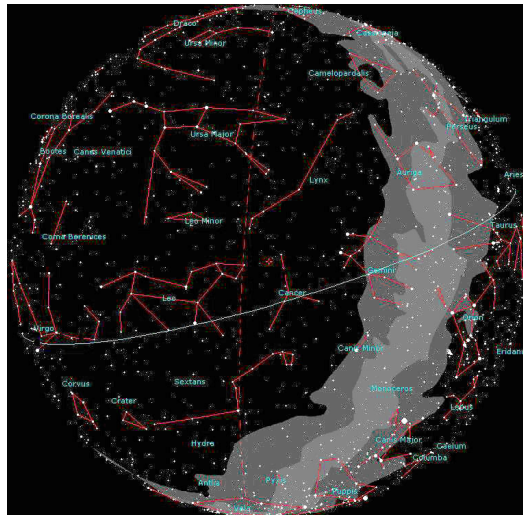


Figure 10: The Milky Way

That the animal souls or shadows of animals reside in heaven is reported by the Siberian Yukaghirs (Holmberg, 1938:395): “Between the living and the dead there is a constant close relationship, on which the life and livelihood of the people on earth depend, for before the real man may kill an elk or a reindeer, the shadow of his dead relative must necessarily kill the shadow of the animal which the latter wants to hunt down, otherwise the hunter cannot get the animal to be caught.”

That the animal souls come from fixed stars and return there is, as mentioned above, with certainty a young Palaeolithic conception. To this Mrs. von Dechend remarks: “Thus, Meso- or Late Palaeolithic think that human souls come from the sky and return to the stars after death. Not stopping there, they call the Milky Way²⁰ ‘ghost trail or path’ or ‘dead

²⁰ See also the information on the Milky Way by Mrs. von Dechend. In her lecture Einführung in die Archaische Kosmologie (Introduction to Archaic Cosmology), WS 1976/77, she writes on page 65: "The other souls, i.e. practically all of them, struggle after death to climb up/out through the planetary spheres, but when they have happily

persons path'... (Speck:1935:65). A meritorious investigator of the Naskapi, Frank Gouldsmith Speck states of these Algonkin tribes, "Their material culture has remained an Upper Paleolithic one. The Naskapi hold that human souls come from heaven and return to the stars after death, "and rest in the firmament until they become reincarnated (Speck:1935:50).

Mrs. von Dechend now deals with the consequences of these statements about the Milky Way as a 'ghost trail': "With the conception of the Milky Way as a ghost trail and connected with it the idea that the departed souls reside in the starry sky, we encounter the combination of ideas as they have been handed down, among others, in the distant Finno-Ugric mythology.

Throughout Finno-Ugric Eurasia we find this conception, as well as in areas of North Central and South America or in Polynesia; more surprising is the fact that the idea of the Milky Way as the abode of the souls of the dead between incarnations has been an integral part of Orphic and Pythagorean doctrine (von Dechend and de Santillana 1977:242 f.).

Orphics and Pythagoreans have the idea of the ancient Oriental high culture; from it also the Finno-Ugric languages speaking Central and North Asians could have it, and also the Polynesians. But the Naskapi? That is almost unthinkable, and for that reason we may have to totally rethink and get used to the uncomfortable idea that the whole complex 'Fixstar Soul', which we find formulated most fully in Plato's dialogue *Timaeus*, goes straightaway back to the Upper Palaeolithic."

The early 18th century Jesuit missionary Lafitau (1724:360), reports Canadian Algonkin tribes as holding "that chaque espèce a dans le ciel ou dans le pays des âmes le type et le modele de toutes les autres, qui sont contenue dans cette espece: ce que revient aux idées de Platon²¹."

From the Kobéua in northwestern Brazil we hear of souls who enter a special afterlife 'in which... the Master of all Arara parrots resides' (Zerries 1959:148).

arrived in the Milky Way, they are ordered back from there and condemned to further incarnations; Macrobius, among other things writes, they come down again at the Gemini crossroads, in Honduras and Nicaragua between Sagittarius and Scorpius, at the "Mother Scorpion at the end of the Milky Way" who nurses the baby souls.

²¹ "that every species has the type and model of all its kindred in heaven or in the land of the soul, which goes back to the ideas of Plato."

Mrs. von Dechend remarks: „We know where the animal lords reside, and therefore also the lord of the Arara parrots, [namely in the sky, note A.K.] and therefore we know where these souls go, and in case of doubt, the souls of the people whose totem the Arara is.” Also understandable is the statement from Honduras and Nicaragua, according to which the Sumu and Paya “never in their lives... mistreat or kill such animals... that they believe they will encounter after death on the way to the afterlife, otherwise they will take revenge instead of helping the erring soul”. (Zerries 1959:148, citing Eduard Conzemius (Conzemius 1932:161, note 90)).

We know the many threatening animals that we encounter on the journey to heaven or hell²² from the Popol Vuh of the Mayas in Central America and also from the Egyptian and Tibetan Book of the Dead literature.

From the North Australian Murngin we learn (Warner 1937:543): “Our ancient people think that there is another world up in the stars. The world we live in is a second world, and there is another within ours. The land all the way inside is just like ours. Above (in the stars) live the Wongar people, here live ordinary people, and below live those who are almost like Men.”

Wongar time refers to the mythological period when totems inhabited the earth and were often like humans. Wongar people and Wongar animals are totem ancestors and totem animals.

“On which occasion you may learn at once that totem ancestors, whether human or animal, were stars²³ and nothing else”, Mrs. von Dechend wants to express this unmistakably: “The inventors of totemism understood by the ‘animals’ from which they and these descended, stars: the Wongar live ‘up above.... in the stars’; ‘the Murngin say that clearly - it’s just that nobody listens to them’ remarks Mrs. von Dechend somewhat ironically.

These ideas can certainly already be described as a kind of precursor idea of shamanism, which developed from the early hunter/gatherer culture, as the following account shows (Jochelson 1924:210):

²² The Hell is also found in the sky, in southern regions, mostly in the area around Canopus.

²³ The assertion of innumerable travellers, psychologists and ethnologists that tens of tribes in all continents “believed” that they descended from terrestrial parrots, crocodiles, kangaroos, wolves, etc., this assertion is inaccurate. Some little Moritzes, who have never been lacking anywhere, may “believe” such things, just as 90% of our contemporaries believe in the worst nonsense, e.g. in E. v. Däniken with his extraterrestrials (von Dechend 1976/77:40).

“During a hunting ceremony, the shaman²⁴ goes on a so-called soul journey to this ‘Master of the taiga and animals’ to ‘ask him to return various game (i.e., the 'souls' of the animals) that the Tungus need for their food”. And among the Yukaghirs, the shaman's duties included “to travel to the Owners of the Mountains, of the Earth, the Rivers, Lakes, the Ocean, and to the Keepers of the separate species of animals, and, beg them for a plentiful supply of animals during the hunt.”

On the transmigration of the 'human' soul.

Mrs. von Dechend deals with the question concerning the whereabouts of human souls as follows: “Why did early mankind focus on celestial processes with an intensity we can hardly imagine nowadays. A decisive hint has given us the conception of the Master of animals of the Upper Paleolithic: the souls of the animals come 'down' from the constellations and return there. How the human souls would be treated, that was apparently more difficult for the ethnographers and missionaries to find out. From the Kahm bushmen we learn only: Dead sorcerers are to become stars immediately after their death (Bleek D. F. 1935:24). Girls killed by rain by means of lightning also become stars, and the moon in the first quarter is said to be 'hollow, because it is carrying people who are dead' (Schapera 1930:167). Of the Kung Bushmen in Southwest Africa, the missionary Henrich Vedder says (Vedder 1937:431) ‘Animals can be resurrected if a part of their animal body is still preserved. They belong, after all, to the primal gender. But human beings do not resurrect. Only the spirit lives in the magical world. Among all spirits, however, the prime father is most important for the clan [...] The dying bushman knows that his spirit goes to the prime father.’

It was not until the Neolithic Revolution that this view gradually changed and man came to the fore through his active intervention in natural processes. Through the development of agriculture and animal breeding about 11,000 years ago in Mesopotamia, man there began to see himself as an actor intervening in and determining natural events. Gradually, the pure idea of an animal as an animal master changed to a view of a therianthropic

²⁴ Shamans and shamanesses often have very good astronomical knowledge.

up to a purely human-shaped, heavenly, omnipotent ruler, who finally regulates all human, animal and plant life.

References to the knowledge of planets

“If one already cannot avoid to admit that the 'proper' animals, the gigantic generic specimens, to which the souls of the terrestrial animal species return between their incarnations, are constellations,” writes Mrs. von Dechend, “so one would like to know what the Masters of animals are supposed to be, who sit or ride²⁵ on these animal constellations, if not planets.”

And this statement is confirmed by the following explanations from Central America, by the Serente in East Brazil, by the North Asian steppe peoples of the Bookmen in South Africa as well as by the Aborigines in Australia. But at first a short explanation to planet characteristics:

Mercury for example is always to be seen only briefly in the morning or in the evening in the proximity of the sun and moves fastest of all planets.

Venus also an inner planet like Mercury, (located between Sun and Earth) is the most luminous celestial object - except Sun and Moon - and also only visible in the morning or evening.

The outer planets, like Mars, Jupiter or Saturn are well visible the whole night long and have the property of a retrograde motion, as explained in figure 12. All outer planets, if they are behind the sun, cannot be observed. Now I would like to deal with the knowledge of planets and their use in hunter/gatherer cultures. Beginning with Central and South America, since from there a large part of the research material originates, my investigations then lead me to Siberia, Australia and finally to South Africa to the Bushmen.

As we hear from Otto Zerries, among the Cuna in Panama and the Serente in eastern Brazil, Mars and Venus act as hunting spirits (Zerries 1954:124): “Among the Cuna in Panama, the planet Venus, called Pugsu, is considered a great hunter. If the Cuna find a whole whale landed on the cliffs, they believe that Pugsu has killed it ... Pugsu is left-handed, so left-handed people harpoon best.”

²⁵ "riding" was hardly common in early cultures.

It is said of the Ge tribe of the Serente in eastern Brazil that good hunters were trained by Mars and Venus, and generally these Masters of animals confer hunting luck - with or without vigorous coaching from tobacco; the Master of animals of the North Asian Yukaghirs, however, prefers Brandy²⁶ (Paulson: 1961).

It "the planets Mars and Venus appear in human form to those chosen by them, first at night in a dream, then during the day in the forest or in the steppe, always in the same place, calling them to them and teaching them to become a good hunter or medicine man," as we hear from Curt Nimuendaju (Nimuendaju 1942:86). Just during his time of instruction by the planet Venus, however, which lasted 12 days (see also Zerries 1954:21), Nimuendajú's grantee killed a surprising amount of game. The planet Mars, personified in the daemon Hieparo wawe²⁷, usually appears [...] to a lone hunter on the decency. His disciples paint their whole body black except for the face, hands and feet, which are painted red, for such is the appearance of the Daemon (Zerres 1954:21).

As for Mars, its distinctive feature is the great looping motion it describes in the sky (see Figure 12). This is often mentioned figuratively or in



Figure 11: Depiction of a man with inverted feet (H. Schedel:1493)

²⁶ It would of course be very interesting to find out from when the technology of alcohol and tobacco production was demonstrably developed. Traces of fermented grain were discovered as early as 13 000 years ago by Israeli archaeologists near Haifa.

²⁷ Of particular importance is the planet Mars (Wasitopre) as the companion of the moon (Wairie), personified in the demon Hieparo wawe, of whom one source says: "He belongs to the night that torments us, "Hieparo wawe" appears only at night (Wairie' s most important companion is Wasi-topre'-pe (planet Mars), personified in the demon Hieparo-wawe (Unkel 1942: 85ff.)), usually to a lonely hunter on the stand.

narratives as striking: the backward pointing feet (see Figure 11), or walking backwards²⁸.

About the Master of animals most frequently treated in the literature, the Corupira of the Tupi language speaking Indians of Brazil and the Amazon region, only so much shall be said:

'He usually appears as a small man of 3 feet in height ; he is bald, but all the rest of his body is covered with long hair, with only one eye , with blue or green teeth, large ears, with legs without joints, the feet always bent backwards, and of extraordinary physical strength' (Teschauer 1906:26, Zerries 1954:9).

Sometimes he 'rides' on a deer, also on a rabbit, but mostly on a wild boar. He is always receptive to tobacco: if the hunter gives him some, Corupira gives him hunting luck; the Master of animals of the Jukagirs (small northern Siberian ethnic group), however, prefers brandy (Paulson 1961b:58).

This property thus characterizes not only the Corupira (South America), but numerous bush and water spirits of South America (cf. Alexander, Hartley, Burr 1920:300, 327, Teschauer 1906:26) as well as some hunting spirits of the African Ivory Coast (Baumann 1938:226-228). With these characteristic descriptions, knowledge of the planet Mars can be inferred.

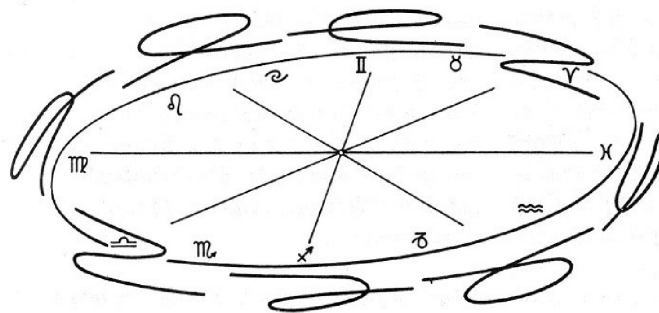


Figure 12: Apparent Mars loops, semi schematic (Schultz 1936:129)²⁹.

For the identification of planets - in this case of Mercury - as the Master of animals, the statements of the Tepehuana from Honduras can likewise be

²⁸ Moving backwards, in the 'wrong' direction, is not a phenomenon copied from terrestrial fauna. The planets move, or appear to move, backwards in relation to the fixed starry sky, which is why images were invented in antiquity and in China to illustrate and explain this apparent backward movement. Vitruvius (De Architectura, 9.1.15, 423) uses the image of a potter's wheel on which ants run in the opposite direction.

²⁹ The Planetary retrograde constants for Mars are 72 days, for Jupiter 121 days and for Saturn 138 days.

consulted, who say of the master of the deer ... that he is a dwarf, who rides on a deer; among the Cáhita the chief of the animals is a black dwarf, among the North American Shoshoni "a dwarf, who screams like a toddler and carries bow and arrows" (Haekel 1959:68). Among the Bushmen of South Africa, Kaggen³⁰ is also imagined to be of small stature.

Among Mayan descendants in southern and central Honduras, the actual patron of hunting and fishing, but at the same time of agriculture [...] is considered Xulab, the morning star.

He is thought of as a bearded³¹, ugly man... . He was the elder brother of Kin, the Sun, and later became Venus. According to one tradition, Xulab /Venus is the owner of all the animals in the world. He keeps deer, peccary, antelope, turkey, in short all quadrupeds and birds in enclosures³², so that people can come to him for meat. For his protégés he has grown a large cornfield (Haekel 1959:62).

Also until the present time Mars is considered as the red planet, a characteristic which is proved worldwide, because it shines in reddish color in the sky.

Otto Zerries reports of the Serente (Zerries 1954:21):

"If they wish to meet him in the forest during the six days' instruction, they swing a buzzwood called 'Roarer of the Hieparowawa' at the place in question, and immediately the demon appears."

These Bullroarers³³ are very popular among the Bushmen in South Africa as well as among the Australian Aborigines. Among them they are mostly used as musical instruments. Their further meaning is described in detail by Otto Zerries (Zerries 1942).

The sun³⁴, or the sun god, we find as Masters of animals among others at the Guarani tribe of the Mbwiha in Paraguay (Zerries 1954:18):

³⁰ Mrs. von Dechend identifies Kaggen with Mercury.

³¹ In ancient Babylonian texts Venus is described as being bearded when she is in the Pleiades (Planetarium Babylonicum oder Die Sumerisch-Babylonischen Stern-Namen. Edited by Felix Gössmann O. E. S. A. Rome 1950. See on the star name No. 109 mulDIL BAD, 12th Venus-Bart).

³² See the above-mentioned report on the Chukchee by W. Bogoras.

³³ Using the Bullroarer also as a musical instrument could be an indication that this use was taken up in the ancient Pythagorean tradition and that all planets were assigned certain tones.

³⁴ Care must be taken when naming the word sun, as it can also have another meaning. This other meaning comes from the myths of the shooting down of several superfluous suns, the number of which changes. The motif is found in Central and Northern Asia among the Buryats, Torgutes, Golden, Tungus, Gilyaks, in the whole of China, on Formosa and in Japan, among the Tail, in Indonesia among the Dajak and Battak, in California among the Chasta, and in Peru.

Namandu, the god of the sun, strictly speaking, the spirit of the rising sun, not the heavenly body himself is invoked by the hunters in a prayer before the start of the hunt: O Namandu, allow us to kill an animal in your path. Bring the animals to us.

Among the Selknam of Tierra del Fuego, the sun is apparently considered Master of the fish (Gusinde 1931:711); for other animals, the fox seems to be in charge. Not directly among the Selknam, but among the Haush living nearby in southernmost Patagonia, it is the fox 'who usually appears in the guise of a trickster' (Zerries 1954:21; Unkel:1942, 85f.).

Among the Chukchee (Paleo-Siberian people of the extreme northeast of Siberia) we also hear of a certain Pic vu'cin, a "special owner" of wild reindeer and of land game in general. He is no longer than a finger, and his footprints are those of a mouse. He insists on the strict observance of all ancient hunting rites and sacrificial acts (Paulson 1961b:61).

Among the Tungus in the Baikal region a white-haired spirit is in charge of the game, and he is said by some to use a white stallion for locomotion, by others to use a tiger for this purpose (Paulson 1960:95), while the Yenisei Tungus only know, 'the Master of animals lives on the third cloud of the upper world' (Paulson 1960:97).

Among the Buryats (Mongolian ethnic group in Siberia) the horses have their special Master and protector, called Solbon, and that is the planet Venus (Holmberg 1938:197). As we hear from Holmberg, "the star is said to be a great equine friend who rides over the celestial realm with a lasso in his hand. He possesses a great band of horses, which a servant tends."

As described, the planets Venus, Mars, and Jupiter are named in detail because they are clearly visible in the sky. Venus in particular, as the 'morning star', has a strong luminosity and can sometimes even be seen throughout the day. Mars stands out because of its red coloration and pronounced retrograde motion, and Jupiter as the outer planet is easily visible throughout the night as it moves in opposition to the Sun.

Perhaps they are zodiacal images that were called "suns".

Thus, among the Aztecs, the term "sun" means a whole age, which implies a knowledge of the ancient world age theory. In Central Asia, among Buryats, a legend has been recorded according to which there were originally several, namely three or four suns. By way of comparison, it should be mentioned that there are also corresponding legends elsewhere, such as in China with 10 suns, in India with 7 and in Sumatra with 8 suns. How old this terminus technicus is, however, is written in the stars.

Among the Australian Bushmen, there existed only the 'Early Race', the so-called Original Bushman Race, which were stars, animals, rain, wind, sun (Smyth 1878:431): The stars were formerly men. The progenitors of the existing tribes - whether birds or beasts or men were set in the sky, and made to shine as stars if the deeds they had done were mighty, and such as to deserve commemoration. The Eagle (Quarnamero) is now the planet Mars, and justly so, because he was warlike, and much given to fighting.

It is said of the Ooldean Aborigines in Australia (Leaman, Trevor, Hamacher, Duane and Carter, Mark 2016:62) that [...] "the Black Cockatoo is related to both Antares³⁵ and Mars...."

Regarding the planet Saturn, there are very few statements or reports known to me concerning hunter/gatherer cultures.

Nevertheless, we hear the following reports from Aborigines in Australia (Norris 2016:19): Mountford (Mountford 1976:450) reports that the Central Desert people regarded Venus and Saturn as two brothers, and Jupiter was their dog, and Saturn and Jupiter spend much of their time finding food for Venus. Ridley (1873:273) reports that the Kamilaroi regard Saturn as a small bird called Wuzgul.

Mercury is never explicitly mentioned as a planet, because presumably the field researchers did not ask for him, and behind the trickster figure nobody except Mrs. von Dechend suspected the planet Mercury.

The Australian Aborigines have known the planets since ancient times. Daisy Bates, an English anthropologist (1859³⁶-1951) recorded some accounts from the area around Ooldea Station in the Spencer region of South-West Australia about the planets Jupiter and Venus. She writes (Bates 1924:226): "Curiously enough, Jupiter and Venus, both males, are associated in a myth covering a large area of South and Western Australia. Near or far apart though these planets may be as they travel over their

³⁵ Since in many ancient cultures Antares is associated with the planets Mars, it is remarkable to find this association also in Australia. An investigation into this cross-cultural association of Mars and Antares would therefore be of great importance for the diffusion debate.

³⁶ Sometimes her date of birth is given as 1861.

appointed track they are Katta-ku-dharra (heads two³⁷), having no body, but always following one another along the "dream road" (possibly the ecliptic) which they themselves had made after their translation."

One version of this myth says that the two men were transformed into grey and red kangaroos (Fredrick 2008:101).

In his book 'Structure Meaning and Ritual of the San', Hewitt writes about the San Bushmen of South Africa (Hewitt 1986:44):

"The moon was also said to have once been a man, as was the 'Dawn's Heart Star' Jupiter, while several stories describe two lions, !Haue ta ≠hou and !Gu, who, according to one narrative, are now the two pointers on the Southern Cross. Some narratives speak of whole families becoming groups of stars."

On page 76 he continues with a Bleek quote (Hewitt 1986:76):

"[...] Both narrators conclude with references to the brightness and fearful aspect of the Dawn's Heart star (Jupiter), and !Kabbo (Bleek's informant) also adds that because the Lynx had been given polluted ants' chrysalids, she no longer ate that food but became a real lynx, while the Dawn's Heart and his daughter went to live in the sky."

These statements impressively confirm that the Bushmen already had very good astronomical knowledge.

The Kaggen of the Kham Bushmen, who is the subject of many stories and myths, is a typical trickster figure³⁸ with all his characteristics, who could also originate from North America - in the shape of the coyote, as an avatar of the planet Mercury. However, there are only indirect statements on this and therefore it is difficult to prove. In large parts of Africa, the hare plays a comparable role (e.g. in fairy tales from Guinea, Namibia, East Africa and the Congo).

Mrs. von Dechend (von Dechend 1975:39) sums up: "Now what does the little material dealt with here let us know unequivocally? First and most importantly: that 'the sky' is made the setting for countless poetically

³⁷ In Mayan Mythology, in the Popol Vuh there is told about a one-headed hero without body, too.

³⁸ A very famous trickster figure in Greek mythology is Odysseus, who is a true Mercury figure. He enters into the greatest dangers, whether intentionally or not, which he then survives more or less unscathed, just like the South African Kaggen of the Kham Bushmen.

conceived stories'³⁹, as the South African ethnologist Schapera (Schapera 1930:175) stated with reference to Bleek. In other words, the Bushmen, or rather their savage ancestors, at least have laid the foundation for the 'technical language', they 'told' celestial movements."

In the myth, the planets are the driving force, the actors, so to speak, and the stars and constellations are the stage, the background, the staffage, the props, the ambience. This is a very remarkable reinterpretation of the myth, towards an astronomically guided interpretation, if we take the aboriginal accounts seriously and trust them with scientific knowledge - a driving force in Mrs. von Dechend's work, which encourages a modern view of very old cultures and takes the 'so-called primitives'⁴⁰ to absurdity.

The heavenly Masters of animals were then presumably transformed over a long time into the gods of the ancient cultures (Narr 1966:318, Bandi and Maringer 1955:166). Beginning with the Sumerians in Mesopotamia and extending to the Mayas in Central America, the gods in their representations are very often of mixed form, depicted in animal and human form, usually with animal heads and human torsos. In the Egyptian world of gods, mention should be made of Bastet with a lion's head, Anubis with a dog's head or the falcon-headed Horus. In India Ganesha, the elephant-headed god, in the Aztec or Mayan codices, the gods are depicted with human bodies and dog or bird heads. From this point of view, the Cretan Minotaur becomes a very old mythological figure, if it could be put in direct connection with the ideas of the hunter/gatherer about the Master of animals. This then raises the question of the claims to power - who is the master from now on!

³⁹ Schapera (Schapera 1930:175) states: "at the same time, mythological personification would begin its work, and make the heavens the theatre of numberless poetically-conceived histories."

⁴⁰ Ludwig Gumplowicz, *Soziale Sinnestäuschungen*, *Neue Deutsche Rundschau* 1895, 6 (pp. 1-11): The most ominous of all these spectres, however, which hinders the course of humanity, which clings to its soles like a lead weight, is acrochronism. Like a lead weight on the soles of its feet, is acrochronism (may I be forgiven for using the word), that is the unfortunate delusion of every age that it is the of every age that it is the "highest". We firmly believe that our time is the time of the "greatest progress, the greatest civilisation, the greatest humanity" and that far behind us lie the times of "savagery" and "barbarism". We call our time the "age of reason" and behind us we believe the times of "faith and superstition."

On cave painting



Figure 13: Altamira, Bison

It would now be of decisive importance for the clarification of the rock painting motifs if the Upper Palaeolithic paintings could be related to the myths that were told to us by the Bushmen or are still handed down by the Aborigines and are very closely connected with the starry sky and the observations of celestial phenomena. This also means that the origin of myths can be attributed a very old age, as is also attested by the statements of the Aborigines and Bushmen. For the interpretation of the rock and cave paintings this can, as I said, be very helpful.

But first I would like to turn to the reflections on cave painting by Mrs. von Dechend and Leo Frobenius. Mrs. von Dechend writes (von Dechend:1975:6): “Only the legacy of the Upper Palaeolithic cultures of the Aurignacian (from about -35,000) and especially of the Magdalenian (from about -17,000) give us information about the world of thought of people of that time; there we find, besides a large number of refined stone tools and besides the spear sling, bone carvings also those enormous polychrome rock paintings in caves in southern France and northern Spain, which have attained a high reputation far beyond the circle of experts. Of course, [...] we also have to deal with the question of why the pictures of the polychrome so-called Franco-Cantabrian large animal style are often found in the most inaccessible, darkest parts of the French and Spanish caves.

So why, Leakey asks (Leakey 1953:151) 'why were these dark and often inaccessible places chosen for the manifestation of art?'

But not only were the caves as such already dark, the paintings are often [...] in incredibly hard-to-reach places within the caves; in crevices, on narrow ledges and on the ceiling; places where it must have been very difficult, purely physically, to paint successfully. (Imagine 19th century 'forgers' voluntarily going to such lengths just to mislead colleagues!)⁴¹

The question of why the most uncomfortably dark places were singled out to put animal paintings there has remained unanswered. The assurance that it was 'a manifestation of the magico-religious' (Leakey 1953:154) cannot be taken as an answer, and was probably not meant as such by Leakey.

Mrs. von Dechend continues (von Dechend 1973/74: 19): "What has thus been depicted on pitch-dark ceilings in the most inaccessible niches and crevices of Franco-Cantabrian caves were thus possibly, if not probably, constellation of the Master of animals. From the Magdalenian period onwards, this can be assumed with certainty. This by no means excludes the interpretation of hunting magic, but magical actions, whenever and wherever they occur, are 'applied' knowledge, and the knowledge that must have existed before whatever application is of interest in each case. In the special case of the Upper Palaeolithic, the fact that constellations were installed and possibly planets were known is of importance.

In the 2016 article by Sam Challis and Mark McGranaghan 'Reconfiguring Hunting Magic' (Challis and Mark McGranaghan: 579, 594, 596) we read the following about hunting magic: "Contemporary arguments for 'hunting magic' components of the art, too, are relatively muted, though Francis Thackeray (Thackeray 1983:38-46; 1986:6,7; 1993:74,75; 2005a:27-34;2005b:5) has repeatedly argued that some panels deal with beliefs relating to sympathetic control in hunting contexts, either within or in contrast to a broader shamanistic framework.... ... much 'shamanic' activity amongst the Xam should be seen as a type of hunting magic... and lead them into scenarios where they could be shot. ... that might support the contention that Bushman communities practise 'hunting magic'.

⁴¹ A common opinion among archaeologists in the late 19th century, who dismissed the paintings as a hoax. The French prehistorian Émile Cartailhac described the paintings as the "vulgar prank of a daubers", which he and his contemporaries did not even want to look at.

We agree that issues of animal behaviour and resource control held wide resonances within Southern Bushman cosmologies, and that they are therefore likely relevant to thinking about rock-art practices. We will argue that 'control of animals' is best deployed not as an alternative explanation to shamanistic arguments, but rather as an element within this larger whole (McGranaghan and Sam Challis 2016:580).”

Regarding hunting magic, Joseph Campbell explains in his 1960 book *Primitive Mythology* (Campbell 1960:305): “for it is certain that the paintings were associated with the magic of the hunt.” For him, this sympathetic magic resembled a participatory mysticism in which “the pictures were painted in a sanctuary [...] in a ritual manner” (Campbell 1960:308).

Mrs. von Dechend refers in her further remarks to ideas of Leo Frobenius (von Dechend 1976/77:6):

“It was Frobenius again who spoke so casually in two passages of his *Kulturgeschichte Afrikas* (Frobenius 1933:146, 187ff.) of the ‘Gestaltwelt der astralen Tiermalerei und Tierbildnerie...in der Mittelsteinzeit’ (transl.: Gestalt world of astral animal painting and animal sculpture...in the Mesolithic period).

He did indeed assumed such things, but he merely threw the idea out there and did not pursue it further. In his *Kulturgeschichte Afrika* (Frobenius 1933:146) he asked with regard to the Magdalenian rock paintings: ‘Was it the case that these Mesolithic people, when they carved their pictures into the walls of their underworld, which surely served pious consecration, painted pictures of animals, but carried the essence of the stars, the moon and the sun in their hearts?’

Shortly afterwards he speaks of the ‘first artistic period’ of mankind, in which the artists... let the animals play the role of the stars’. The environment of the cult of that time, however, was the underworld, the cave the natural home of the nightroll of the starry sky.

‘Frobenius was not on intimate friendly terms with the German language’, Mrs. von Dechend writes further (von Dechend 1976/77:19), “but he did sense that one must not take the painted animals ‘by their word’, not by

their zoological form. That no one except Frobenius seems to have come up with this idea remains puzzling to me..."

It is worth mentioning another important consideration of Mrs. von Dechend's concerning the wall paintings (von Dechend 1973/74:16): "Since the 'achievements' of the Upper Palaeolithic have spread around the globe on many different paths, it is not entirely hopeless to find out what the cave painters were thinking of when they practised their art, and we will now attempt to approach a conceivable interpretation of the rock paintings in a roundabout way: The starting point is the bear (cf. on the following especially Friedrich 1941:20ff.). You will find said Master Petz (a German synonym for bears) several times in southern French caves, along with bison, boar, wild horse and mammoth".

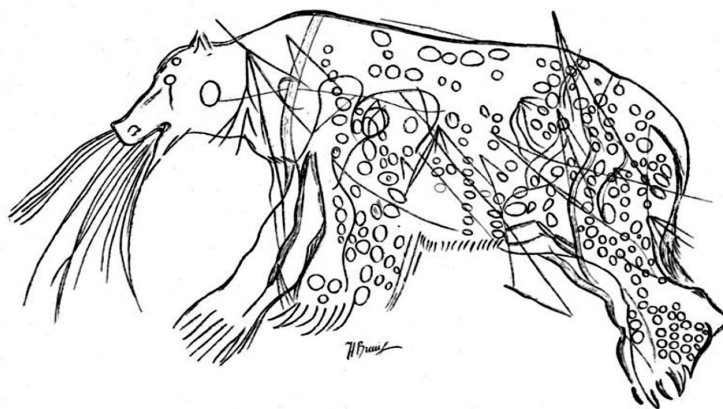


Figure 14: Bear from the Grotte de Montespan

In the cave of Montespan (Haute-Garonne) you can see such a representation: the bear is pierced by arrows and spits blood (see Figure 14). In addition, a clumsily crafted, headless animal figure in a crouching position has been discovered in this cave. "Instead of the clay head that had been searched for in vain, a bear's skull⁴² was found between the front legs of the figure. The discoverers concluded that the figure must be an

⁴² Behind this, a rite is to be assumed. The significance of the rite lies in the perpetual transmission of complex knowledge, which must be carried out in the most precise form in order to ensure the exact reproduction of the knowledge gained with great effort. In the book "Mit dem Rücken zur Kunst. The Context of Ice Age Cave Paintings" by Andreas Pastors (Pastors 2016), a remarkable method for finding additional information on cave paintings. The environment in the painted caves is examined in great detail for artefacts and traces of the people working or even living in them at the time. In the special case of the bear cave in Montespan, this could lead to revealing information on the practical performance of the rites.

underlayer scalp, made to carry the bear skin together with the head⁴³. This is a valid conclusion, because such calottes, over which the head and fur of large hunting animals, especially predators, are placed, have also been found in Western Sudan: in the absence of bears, the Africans used the head and fur of leopards⁴⁴ (see Figure 15).



Figur 7 a. Opferplatz der Bamana in Tula

Figure 15: Leopard calotte (Frobenius 1933:83)

The Abkhazians say that a hunter cannot kill a game whose 'shadow' has not first been killed in the upper world by the man-shaped Master of animals and eaten by his family; the 'Great father up in the sky' of the North Australian Murngin is said to eat the animals and pile up their bones - however, the Murngin say that he does not drop bones on the earth, just for diligence, but if he really never did, there would be no kangaroos, iguanas or fish (Warner: 1937).

In her further elaboration, Mrs. von Dechend then remarks: "It might be conceivable that the Franco-Cantabrian human and mixed-being figures - e.g. the so-called 'sorcerer' of Trois-Frères and the so-called 'bird-man' of Lascaux or the lion-man from the Vogelherd cave - do not represent 'sorcerers and priests', as the common interpretation goes, but special stars or planets. This could then mean that the real Young Palaeolithic people who shot at the bear calotte, or painted arrows on animal pictures, especially on bear pictures, wanted to suggest in this way to the Master of animals possessing animal souls to now kill or release a few specimens of the respective desired animal species in the upper world, and to send them

⁴³ An important ceremony at the end of the celebration is the 'sending home of the bear' (to its master). The skull - as the original seat of the bear's soul - plays a central role (see also *Die Vorstellungen von den Seelen der Tiere bei den nordeurasischen Völkern* p145, I. Paulson, 1958).

⁴⁴ Friedrich, Adolf in *Paideuma* 2, p24, 1941; the Konso used cattle calotts, Dauruahellu; s. Jensen (1936:373).

without delay before the spear of the hunter on earth⁴⁵. This is a non-binding suggestion; it is far too early to come up with veritable theories. But the Congo pygmies observed by Frobenius did not go hunting until the first ray of sunlight and at the same time an arrow hit the image of the antelope. There is no question of 'primitive hunting magic'."

Cave painting in the most inaccessible places could also be a strong indication of sacred significance, since the most sacred things (e.g. hard-to-obtain knowledge of nature of any kind) must be kept in specially secured places in order to protect them from oblivion and destruction. From what has been said so far, it can therefore very probably be concluded that rock paintings and cave paintings can only be understood through myth or an associated story. A good example is provided by today's Australian Aborigines, who have explained their paintings. An example in Ch. P. Mountford (Mountford 1956:83) on figure 16 makes it clear that these paintings cannot be explained without the context of the myth and, moreover, without the inclusion of the landscape.

Ch. P. Mountford (Mountford 1956) explains the bark drawing on page 82 in his book 'Art, Myth and Symbolism': "Plate 27B represents the low sandy island, Moraraka, in Little Lagoon, near Umbakumba, which was created by bangudja. The central disc is the island; the horizontal arms are the two casuarina trees, the metamorphosed bodies of the shark-man and his wife; and the vertical limbs of the cross, the long sand-bars which reach out into the sea."

⁴⁵ See Thackeray 2005a:31 (author's note)

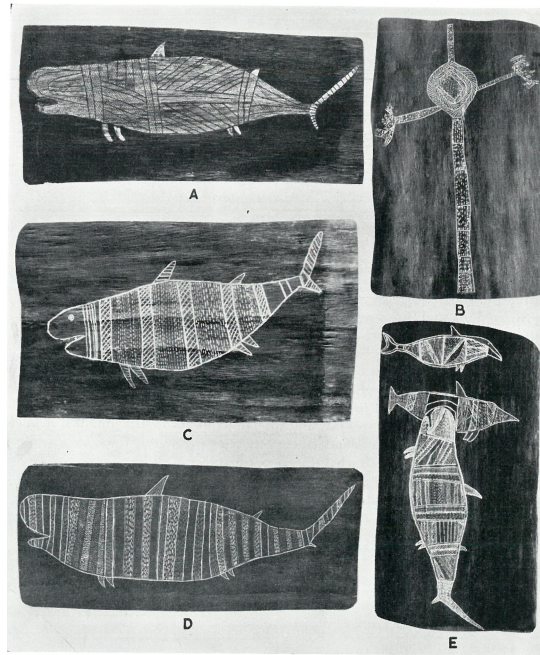


Figure 16: Bark paintings, Groote Eylandt (Plate 27)

A: Shark, unidentified B: Totem place of the Tiger-shark⁴⁶, Bangudja, Groote Eylandt. C, D, E: The tiger shark

This pictorial information could therefore only be known to the painter himself or to other members of the group. And this points to the difficulty of deducing the content and meaning of the old paintings without this information about the myth. The paintings and myths must now, as mentioned above, be seen in a close connection in order to be able to make statements about 'the art' of the savage cultures⁴⁷. This means, in plain

⁴⁶ Mountford (Mountford 1956: 82-83) gives the myth of the shark "bangudja" as follows: The shark, bangudja (*Galeocerdo cuvier*), then an unmarried man, left Woodah Island and travelled to Bada-bada (Chasm Island), where he made his camp. One day he saw two dolphins swimming in the sea and, after a long chase, succeeded in capturing and killing the male. The female, who escaped by entering the ground, later met and joined a group of her own kind living in those waters.

On a high cliff on the south-western corner of Chasm Island is a large red stain which bears a remarkable resemblance to the outlines of a shark. This is the totemic body of bangudja. There is a hole in the upper face of a nearby cliff, with natural curving lines leading to it where, according to the myth, the female dolphin entered the ground to escape from her enemy, the shark.

Her totemic body is now a low rock awash at low tide, just off the eastern end of Chasm Island. The shark, bangudja, and his wife (my informant did not know where he was married) left Chasm Island and made a camp about two miles south of Umbakumba, which camp, when they left, became a small lake. From there they travelled to the sea, their track becoming the Arua Creek. Not far from the mouth of the Arua Creek are two casuarinas trees, marking the camp of the shark and his wife. The pair then travelled across Little Lagoon and, on the northern side, created a small sandy island, Moraraka (Pl. 27B), where again casuarina trees indicate their camping place. The shark ancestors continued on their way northward, but the Groote Eylandt aborigines had no further knowledge of their journeyings.

⁴⁷ I would not call the art of the gamekeepers art, but a special form of cultural appropriation. A special knowledge of natural processes is recorded - not formulaically - but in the form of a pictorial representation of celestial processes that is accessible to all, but which is very difficult to recognise and can only be understood through technical language, but can thereby be preserved for a long time, with the myth providing the formula for understanding.

language, that we need the statements of the painters about what they depicted in the paintings. For, as can be seen in the reports of the painters, it is extremely difficult to recognise the contents depicted if one is not familiar with the iconography of the artists and their society.

In his report *Archeology of Tandandjal Cave, South-West Arnhem Land*, Neil Macintosh (Macintosh 1951:189) says on page 189: “Without an informant, no interpretation of the figure is possible; it can only be commented that geometrical designs are characteristic of the central and more southern regions of the continent.”

Another important area of investigation concerns interpretations of Bushman rock paintings. The article by Mark McGranaghan, Sam Challis and David Lewis-Williams (Challis and David Lewis-Williams 2013) on Orpen's 1874 article, which quotes a Bushman named Qing explaining a rock image to him, highlights how much the personal beliefs of the European influence the Bushman's interpretation⁴⁸. The history of the Bushmen must also be taken into account, as their ancestors show Nilotic influences that could also have an impact on their myths. Another major difficulty for the researcher is the limited information provided by the informants about the images, as they are bound to secrecy by confidentiality rules. Thus, the content of the images can only be explored indirectly or with great patience in order to gain more insight into the content of the rock paintings. As an example, G. Dieterlen and M. Griaule should be mentioned, who waited for 15 years until the Dogon in Mali provided them with their extensive myth explanations, which found expression in their book *Le Renard Pâle*, published in 1965.

Reference should also be made to a method of exclusion (called Ockham's knife), which transports many a strange interpretation of rock art into the realm of fantasy⁴⁹. Ockham, philosopher and theologian of late

⁴⁸ Orpen accompanied this expedition, and he recorded Qing's words, along with copies of the petroglyphs about which he obtained information (Lewis-Williams 2003). The brevity of the article - and the fact that it has not yet been possible to find any 'field notes' that Orpen may have made (Mitchell and Challis 2008:399-400) - poses a major challenge to trying to extract meaningful ethnographic information from it: The resulting need to be careful with interpretations has long been recognised by researchers (e.g. Lewis-Williams 1980:468 and 480; Vinnicombe 1976, 314). Bleek (1874:11-13) noted that Qing's narratives were broadly similar to those he and L. Lloyd collected, but also commented on their specificity.

⁴⁹ So reports R. G. Bednarik in his article "Myths About Rock Art" (Bednarik 2013:483): “Neil Macintosh was a distinguished professor of anatomy who “identified” the hundreds of painted biomorphs of Beswick Cave in the Northern Territory of Australia (Macintosh, 1952). Twenty years later, he discovered that the painters were still alive, so he took them to the site and asked them to explain the rock art imagery in detail, in order to test his own expert

scholasticism (~1288 - 1347) postulated that the most obvious and simplest theory should be preferred at first.

A preliminary conclusion

What could be elicited from the ethnological and other diverse linguistic research reports ultimately boils down to the following 'results':

Constellations were coined in the Upper Palaeolithic. This could be inferred from the star lore of hunter/gatherer populations in Australia, in northern Asia, in the eastern woodlands of North America, in the South American jungle and on Tierra del Fuego, in the South African steppes and deserts; i.e. from the tradition of cultures that were not at all or only minimally affected by the so-called Neolithic Revolution and by the ancient culture of the Near East, and that were closest to the culture to which we owe the unique rock paintings in southern French and northern Spanish caves. From the history of the settlement of North America it can be further deduced that this concept of the celestial Master of animals can certainly be dated to a time before -14,000, since this cosmology was also found in North and South America - the first settlement of North America is currently estimated to have taken place around this time. And this is an excellent indicator to determine the minimum age of the idea of the Masters of animals and that of mythical tales. The much older culture of the Aborigines - the settlement of Australia began ~ -45 000 - is another indication for the global idea of the Master of animals.

Mrs. von Dechend explains in the further course of her remarks: "From the traditions of these - at least until recently still 'functioning' -

interpretations. He conceded that he had failed to diagnose correctly the individual painted items in 90% of the site's inventory, and he stated that "the mental code of the artists' schematization cannot be cracked without keys provided by highly initiated informants" (Macintosh, 1952, p. 197). This has also been my experience in working with indigenous rock artists. Since Macintosh's (1977) work was published, Australian rock art researchers have adopted the convention of always placing their "determinations" of motif meanings in quotation marks, a practice which their colleagues in the rest of the world have not yet espoused. This is of particular significance when it is remembered that Australia is the only country where *comprehensive* knowledge about the meaning of rock art has remained available to the present time."

In the entire ethnographic world literature there is not a single account of a shaman who produced rock art. There are, however, numerous cases in which the production of rock art has been observed and recorded was observed and recorded, or where we may know the creators of the "art". In all these cases, no shamans were involved, and the utilitarian or ceremonial purpose of the rock art, if known, has nothing to do with shamanism.

Although none of this proves that no rock art was ever produced by shamans, the claim, that significant amounts of rock art are the work of shamans (Lewis-Williams and Dowson 1988), is not justified by the empirical data, and it is of course not verifiable.

hunter/gatherers societies one could conclude that stars or asterisms were mainly named after the animal species that have their breeding or reproduction time at the time of the heliacal rising of these asterisms or another exposed position of the stars – we received news about this from Bushmen, North and South Australians and also South American Guayana tribes. And the special thing about it is that the similarity of the constellation with the constellation name was never intended – there can be no question of playful naivety or arbitrariness.

If we take into account the fact, that we are all slaves to our language, we should not be surprised if the heliacal rising of the constellations named after animal species had been understood as the cause of animal (and also plant) behaviour.

And exactly this has been unmistakably the case: the constellations were regarded as 'Masters and mistresses of animals' of the animal species, whose special behavior (e.g. their reproductive period) they indicate by their heliacal rising or a special position in the starry sky.

The conception of the determinacy of terrestrial processes by celestial phenomena is therefore certainly already Late Palaeolithic. The stars do not simply indicate events, they cause and govern them, and nothing happens here that has not been ordered and determined 'in a higher place' by the 'visibly circling gods'. To know the planetary orbits and to ensure the ever-changing shape of the starry sky into a form of recording knowledge could be excellently accomplished by rock painting, and myth is the vehicle and the uniquely devised memorising form for the correct transmission of the very difficult-to-obtain knowledge of nature.

On the precession movement of the earth's axis

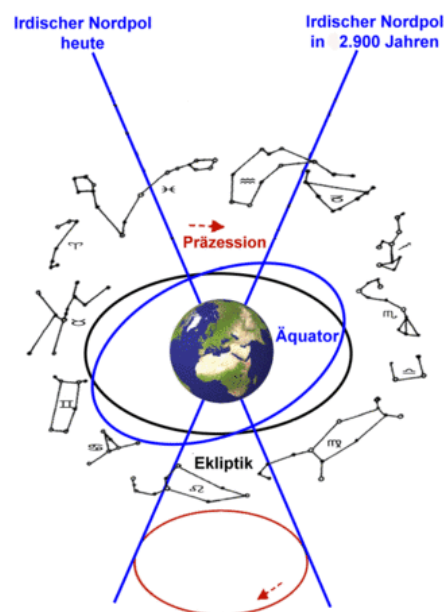
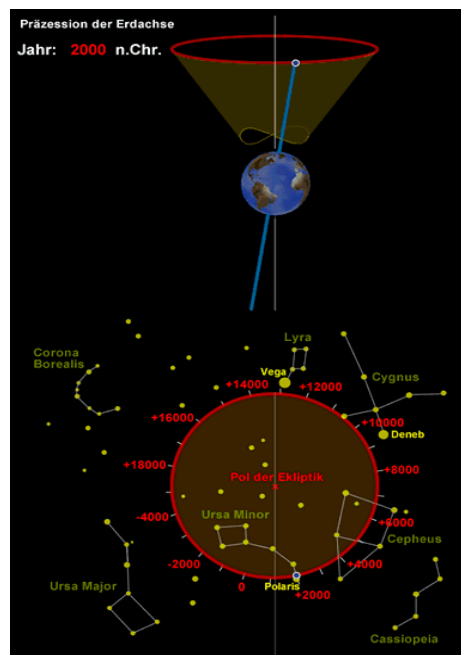


Figure 17 a and b: Precession movement of the earth's axis⁵⁰

One celestial phenomenon should be mentioned which could be of special relevance for the dating of the astronomy-related activities of the hunter/gatherer societies: the precession movement of the earth's axis!

⁵⁰ See an animation of the Earth's axis movement at: https://sag-sas.ch/wp-content/uploads/praezession_ani.gif

This movement of the Earth's axis causes the sky to shift over the millennia with regard to the heliacal star risings and thus also the assignment of constellations to the natural phenomena mentioned above over the course of the year (see Figure 17a and 17b). The zodiacal constellation that rises heliacally today in December (e.g. on 12 Dec. 2020 it will be the constellation of Sagittarius) was 2000 years ago, due to the retrograde nature of this movement, the constellation of Scorpio. Today we have Pisces as the spring constellation. 2000 years ago it was the zodiacal sign of Aries, before that the Pleiades constellation. This means that around every 2000 years one had to be readjusted, because e.g. the Pleiades no longer rose heliacally at the vernal equinox around -1500, but the stars of Aries rose heliacally and today the constellation of the Pisces^{51 52}. A first example selected for the dating problem is to refer to the 'Seven Sisters' mentioned by the Aborigines, called the Pleiades by us (see Leaman, Duane Hamacher, 2014 and Leaman, Duane Hamacher and Mark Carter 2016).

To clarify this shifting process, let us refer to the assignment of the Pleiades with respect to the Dingoes, as mentioned in the text above. The Pleiades currently rise heliacally in early June (~9 June). This is the time when the dingoes throw their young. However, due to the precessional motion of the Earth's axis, the heliacal rising of the Pleiades is limited in time. After about 500 years, the Pleiades gradually disappear behind the horizon and are no longer visible in the morning. Therefore, a subsequent constellation or star must be used! This means that the star or constellation must be re-determined and the new stars must also be renamed according to the old assignments to animals or plants⁵³. This is an enormous amount of work that takes a lot of time - sometimes up to 100 years or even more - and requires patience.

Another example should refer to the myth about the 'bittur' star of the Aborigines mentioned earlier in the text, scientifically called Arcturus (Leaman and Hamacher 2014:191).

⁵¹ Jesus as ruler of this age - was also a fisherman like some of his disciples.

⁵² See the article on Christian iconography and the Master of animals (Lang 2012:135-136).

⁵³ Due to the precession of the earth's axis, the seasons also change. How this affects the life cycle of animals still needs to be analysed in more detail!

In order to understand the drama of this process, we should refer back to the story of the 'bittur' star in the text. This is because the gradual change in the star's position causes this story to lose its consistency. Arcturus is currently rising in the evening sky, indicating the time for gathering ant larvae. About 2000 years ago, Arcturus rose 30° later, so it was visible in the night sky. Then it wandered backwards as seen from Earth and rises after a certain time, which is today, in the evening twilight, and then disappears after a certain time (in about 500 years) in the sunlit brightness of the afternoon - so it is no longer visible. Therefore, a subsequent star must then be used! This means that the star or the constellation must be re-determined and the new stars must also be renamed according to the old assignments to animals or plants. A so-called remeasurement and renaming of the world must be carried out, a re-cadastralization⁵⁴. Thus the 'bittur' myth has lost its validity; the story is no longer true! If a picture was painted of this myth of the food-seeking woman in connection with Arcturus, it must then either have been painted over or be painted anew. The image that is no longer valid loses its content and becomes 'blank art'. Another story mentioned in this text is about Polaris (the foremost drawbar star in the Little Dipper, α -Ursae Minoris) and it too is affected by the precessional motion, for the Earth's axis in its $\sim 26\,000$ year circular motion around the ecliptic pole points to other stars in each case, which we call polar stars (see Figure 17a). In the text by W. Bogoras we heard about Polaris and his tasks as Master of animals (Bogoras 1913:94): "These here (wild reindeer) I give without distinction to the poor ones". Now, if Polaris no longer occupies this position, then a succeeding star must be sought. At some times, in contrast to today, no stars are visible near the celestial pole (see lower diagram in Figure 17a). This then means that this assignment can only be realized at certain times.

The most significant aspect of the precession of the Earth's axis for the star identification of the hunter/gatherer societies is therefore the temporal component. This makes it possible to determine at what time an assignment of stars to animal behaviour took place. Thus, if in recent times the

⁵⁴ In Greek mythology, this is the constant work of Zeus (the planet Jupiter). With us, the sun is responsible for the calendar and determines the months. In the Chinese calendar system, this is the job of Jupiter, as it passes through a zodiac every year and after 12 years this process repeats itself. This points to the outstanding role of this planet. And so he was assigned the task of cadastralization.

Pleiades star is regarded as an indicator for a certain animal species⁵⁵, then 2000 years ago, from today's point of view, it was the preceding stars, i.e. the stars of the Taurus constellation – if a star-animal connection already existed at that time – etc.....⁵⁶

On the basis of this knowledge, a great deal can be said about the star names ante quem. A conditional chronology can be worked out, which can be used to infer the age and the time of origin of the story and rock art production, be it through archaeological finds or mythical tales.

This means that the myth, as mentioned above, has another fundamental function. Without the myth, we probably cannot understand the rock art and cave paintings, nor can we determine the time in which they are to be related to the myth or, in other words, for what time the myth was designed⁵⁷.

Recognizing the precession-related changes in the starry sky could open up new insights into the astronomical activities of hunter/gatherer societies. However, such further research should only be carried out with the consent of the indigenous communities if they themselves demonstrate an interest in it, but not against their will.

⁵⁵ ... when the Pleiades star cluster rises just before the morning sun, it signifies the start of winter to the Pitjantjatjara people of the Central Desert and tells them that dingoes are breeding and will soon be giving birth to pups. (Hamacher 2014:3)

⁵⁶ Another, but very hypothetical, insight could be gained from the overpainting of petroglyphs. because, if the overpainting time points were determined, they could provide information about the knowledge of celestial long-term processes of these hunter–gatherer societies, since they realised these changes precisely by overpainting.

⁵⁷ A collection of faithful copies of Bushman paintings is, therefore, only second in importance to a collection of their folklore in their own language. Both such collections will serve to illustrate each other, and to contribute jointly towards showing us in its true light the curious mental development of a most remarkable race. A Bushman painting will frequently help us to unearth a myth, legend, or fable, which otherwise would have been forgotten, and might have remained unrecorded, although of importance perhaps for the explanation of the nature and origin of Bushman mythology (Bleek 1874: 13 und McGranaghan 2013: 164).

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Appendix 1:

List of stars and constellations named in the text

Names in the text	Scientific Name
the Pleiades	M 45
Vega in Lyra	α -Lyrae
Southern Cross	Crux australis
Taurus	Taurus
Canis Maior	Canis Maior
Hare	Lepus
Hyaden	Melotte 25
Centaurus	Centaurus
Canopus	α -Carinae
Scorpius	Scorpius
Antares	α -Scorpii
Ophiuchus	Ophiuchus
Sagittarius	Sagittarius
Ara	Ara
Triangulum australis	Triangulum australis
Celestial Bear	Ursa Maior
Polar Star	Polaris (α -UMi)
Procyon	α -Canis Minoris
Castor and Pollux	α -, β -Geminorum
Arcturus	α -Bootis

Appendix 2:

List of plant and animal names that appear in the text

Names in the text	Scientific Name
Dingo	<i>Canis lupus familiaris dingo</i>
Mallee fowl	<i>Leipoa ocellata</i>
Mutum	<i>Crax blumenbachii</i>
Great White Crane	<i>Grus americana</i>
Powis	<i>Crax nigra</i>
Kaggen	<i>Mantis religiosa</i>
Eland	<i>Taurotragus oryx</i>
Yarumak	<i>Pimelodus maculatus</i>
Tibicurie	<i>Prochilodus rubro-teniatus</i>
Caburessi	<i>Chalceus taeniatus</i>
Casuarina tree	<i>Casuarina</i>
Bangudja	<i>Galeocerdo cuvier</i>