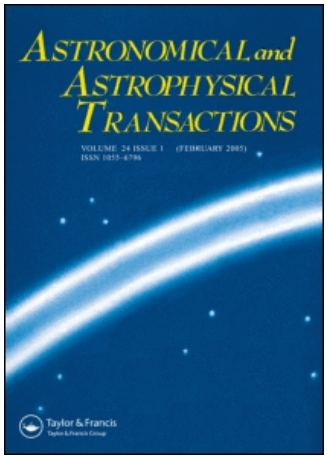

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SKY LUMINARIES IN THE SPACE ORIENTING ACTIVITY OF *HOMO SAPIENS* IN THE MIDDLE PALAEOLITHIC

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Data describing the beginnings of the space orienting activity of *Homo sapiens* is analysed and systematized: observation of the Pole and the recognition of Ursa Major were used as the basis of the determination of the points of the compass. Data and results from astronomy, history of astronomy, archaeology and palaeoanthropology were used for the reconstruction of the evolution of the space orienting activity of *Homo sapiens*.

KEY WORDS Space-orienting of *Homo sapiens*, determination of the points of the compass, observation and fixing of the Pole, Moustierian (Neanderthal) burials, "bear caves" of Neanderthal man, symbolic Moustierian art

Use of the sky luminaries for space orienting is a particular case of the orienting activity of men, both in space and in time. In ancient times some meteorological events were not recognized as being different from sky events. So in the "Celestial officials" chapter of the first centure BC Shih Chi (Historical Records) Ssuma Chhien paid attention in equal degree to both sky luminaries and clouds, fogs, and mists.

Orienting is the determination of the observer's location:

(1) in space relative to the points of the compass and to the orienting object, which is seen from the observer's site;

(2) in time, i.e. a skill to determine time (Menchukov, 1966).

The term "orienting" has a source from Latin, "oriens" and French "orient", which means "east". It probably appeared in the Middle Ages by the cloisters, where they made geographical maps, in which "east" was at the top. "East" was selected as a peculiar direction, because the "Holy Places" of the Christians in Jerusalem were situated to the "east" of Europe. In more ancient times "east" could be selected as the direction of sunrise (Menchukov, 1966).

A man ought to be skilled to choose natural orientations and to use them for orienting in steppes, deserts, and mountains.

The Polar Star and Ursa Major (Great Bear) are the simplest and most important sky orienters among sky objects. The Polar Star is situated near the Pole, being a peculiar point of the heavens, because the celestial sphere is revolving around it. Practically, the Polar Star is the only stationary luminary of the celestial sphere. Ursa Major is situated near the Pole, too, and this constellation is selected by the still-remembered contour of the seven bright stars of the Dipper.

The change of the position of the Dipper about the Polar Star during the night time may be recognized as the "relative watch" (Menchukov, 1966).

The determination of the points of the compass are produced more conveniently also by means of the Polar Star and Ursa Major. The Polar Star indicating North is situated in the northern part of the celestial sphere. In this connection it should be noted that one of the language forms of the conception of the determination of direction in English is the usage of the term "to take one's bearings", where the basic word "bearing" has the root "bear", which is part of word-combination "Great Bear" that is the English equivalent of the name of Ursa Major.

In nature the skill of orienting by sky luminaries is used very often in large-scale space. Ants and bees (Frish, 1966) find their bearings on the ground by means of the Sun. Some birds are probably guided by stars in their migration over great distances.

But instinctive orientation is hard, as proved by experiments using artifical imitations of the Sun and stars, which experimental animals perceived as natural luminaries (Menchukov, 1966).

Man also uses different natural objects in the natural enviroment, but he does it quite consciously. To do this is very important on both local and global scales of space, using purely natural orienter sites, such as steppes and deserts. The steppe plain, having a bright contrast of colour of plants and at the same time having an overall monotonous view produce great difficulties in orienting.

The main and most reliable orienters are the stars, Sun and Moon. Of particular significance is orienting by the Sun, Moon and stars in a desert where dull days are very rare. The Tuaregs, who are named "the kings of the desert", lived in the desert of Sahara, where they roved with caravans of camels. In the daytime they found the way both by means of the Sun and local orienters, which were well known only to them; in the nighttime they were guided by stars (Menchukov, 1966).

The mountains are very complex natural structures and orienting in highland conditions is very difficult. In winter the conditions of orienting in the mountains becomes more difficult because of the winter snow cover and few concrete details of relief stay as orienters on the white background.

The famous Russian traveller N. M. Prjevalsky wrote (1948) that in the nighttime moving in the mountains he had to choose his way only be means of approximately following by stars. Orienting by stars during great journey has an ancient origin.

Sea navigation by use of the constellation of Ursa Major was known by sailors of ancient Greece (Germanicus, 1988), and this tradition was probably transmitted from ancient Rome to ancient Britain.

It is worth remembering that the Pole is not stable on the celestial sphere, but from the 4th millennium BC to the 1st millennium BC it shifted between the constellations of Ursa Major and Ursa Minor and Ursa Major was closer to the Pole. In approximately 5000 BC the Pole was situated near α Dra, one of the brightest stars of the Draco constellation.

The age of Ursa Major was established by Gingerich (see also Gurshtein, 1993) as above 15 000 BP. This means that the origin (more correctly the recognition) of Ursa Major may date back as far as the Ice Ages (Gingerich, 1984). Because of the indefinite lower bound of this event it could be proposed that the recognition of Ursa Major probably took place in the process of anthropogenesis and of the evolution of the space orienting activity of *Homo sapiens.*

In such cases the evolution of the space orienting activity is connected with the evolution of the physical type and evolution of the brain, the evolution of intellect and the thought activity of *Homo sapiens.* This activity, in turn, appears to be connected with the evolution of the surrounding enviromental conditions of inhabitance and the process of adaptation, which shaped the way of life of *Homo sapiens* in the changing world.

The space orienting activity in the epoch before written records, taking into account its mediated character, is expressed in the poor and heterogeneous information sometimes having an indirect character.

The most important data connected with the space orienting activity would be obtained by analysing the orientation of so-called Moustierian (Neanderthal) burials.

Moustierian burials are the earliest definite traces of the burial of the dead in human history. It is associated with the different types of Palaeoantropus (including Neanderthal men), who was the creator of the Moustierian cultural complex. Deliberate interments appear in Euroasia in the Early Wurm (about 10 000–80 000 years ago), marking the beginning of mortuary practice in one of its basic forms – inhumation (Smirnov, 1991).

Deliberate burials consist of two related constructions: externally, the burial structure, and internally, the remains of the dead. Simultaneously deliberate burials, as an archaeological complex, combine the elements of an artifical ordered system having fragments, which are transformed under the influence of natural forces over time.

But, as stressed by Smirnov, the facts indicate the absence of a stereotype of mortuary structures in the Palaeolithic and of both complication and vast differences of this process. Different types of interments are often fixed in the region of comparatively simultaneous groups and even in the boundaries of one cemetery.

Smirnov came to the conclusion that three centres of taphological activity for early man existed: the Dordogne, the Crimea and the Levant, where there is 79.5% of 49 burials in 18 sites and 73.8% of 59 remains of individuals.

Taking into account the morphological differentiation of Palaeoantropus, Smirnov classified all of the Moustierian people of Euroasia into three groups:

(1) the West European Neanderthal men of the Chapelle-aux-Saints type;

(2) some more variable Neanderthaloids from the Crimea, Central Asia and the Near East;

(3) the Sapiens forms from the Crimea and the Near East.

Chronologically, none of the burials under study is earlier than the Last Glaciation or Wurm in the first two stages, Wurm I and Wurm II, and the intervening interstadial, Wurm I–II. But it is nevertheless a great interval of time, about 60 000 years, from about 100 000 years to 35 000–33 000 years.

Taking into account this fact, let us analyse the most important problem of this work – the problem of the orientation of Moustierian burials.

Smirnov determined the orientation of the dead as the direction along the axis "pelvis–cranium". This direction is known with the following accuracy: 21 cases from all of 48 have the orientation of this line with an accuracy of 5–10; 6–45 (one sector); 7–135 (three adjacent sectors); 14 cases have no certain orientation.

The statistical analysis of the totality of 35 cases of a value of an angle of orientation of the dead was carried out by grouping accidental events (an angle) by 135 concerning each of 4 main researching directions: N, S, E, W (in this case 4 sectors of grouping of angles are partially covered again). As a result the totality of angles of orientation of the dead can be divided as: east – 17 cases, South – 12, North – 10, West – 9 (Smirnov, 1991). The significance of the east direction is evident in this data.

Some important specific elements of space orienting activity and its evolution may be established by analysis of most characteristic burials into centres of taphological activity. Most representative sites of both European and Middle East centres are evidently the burials of La Ferrassie, Qafseh, Shanidar and Skhul.

The site of Mugharet es-Skhul (briefly – Skhul) is situated 19 km south of Haifa (Israel). This site has yielded the most numerous burials of all those searched until now – there are 10 buried individuals. All of the burials are found in homogeneous soil, therefore burial constructions were not recognized, which makes the relative estimation of orientation of burials more difficult.

The orientation is established for six of all of the burials, which have an age of from 50 000 to 40 000 years (this was determined by means of four burials – Skhul 5–7, 9).

Statistics of Skhul burials give a considerable contribution in the angle distribution for burials, belonging to the easterly direction. Five of the six determined directions of Skhul belong the East sector, but only one to the West sector. The entrance in the cave of Skhul has a North–South direction and the northern hemisphere of the celestial sphere may be observed.

In this connection it may be noted that only the burial of the site of Mugharet et-Tabun (briefly – Tabun), which is situated in the cave 170 meters to S–W from the cave of Skhul and having an entrance from N – (N–W) has an orientation of the burial along the direction W–E. The age of this burial is about 50 000 years. In accordance with the plane of the cave of Tabun (Smirnov, 1991) it may be

determined that the orientation of the buried individual does not combine with the conditional direction of the entrance–exit of the cave. The cliffy walls of the exit of the cave of Tabun permit observatation of the northern part of heavens only.

The morphological type of inhabitants of the cave of Skhul ("sapiens" in Smirnov's terminology) are also inhabitants of the grotto of Jebel Qafzeh (briefly – Qafzeh), Israel.

The site of Qafzeh (32°41′ N, 35°18′ E) have five burials and six buried individuals.

The analysis of the burial orientation gives the following result. The natural rocky niche is used for the burial of Qafzeh-8; it is situated by a rocky threshold about 2 m high, which is situated between the covered "vestibule" of the grotto and its inner space. Smirnov supposes that the buried individual was oriented N–E (52°). The orientation coincides with the direction of the axis of the entrance from S–W to N–E. The orientation of the buried individual of Qafzeh-15 is almost opposite (to S–W, 225°). The data of this burial has not been published so far (Smirnov, 1991). It is known that all of the parts of the postcranium are absent. The analyses of three other burials show that the basis of the construction of these burials was the direction from N to S.

The burial of Qafzeh-9, -10 is a double one. Qafzeh-9 is a buried woman about 20 years old; Qafzeh-10 is a buried child about 6 years old. The burial was situated in a pit that was oriented along the line of N–S (the pit had an unknown size and smoothed out bottom). The child was situated a few cm from the feet of the adult; its head was oriented to the East (81°), perpendicular to the line on which the skeleton of Qafzeh-9 (21°) was oriented near to N.

The burial of Qafzeh-11 is a buried child about 13–14 years old, lying along the axis of an oval pit, that was oriented to N. The direction of the head is 351°, i.e. practically to N.

The orientation of Shanidnar is probably the key to understanding Middle East burials.

A study of the site of burials of Shanidar (36°50′ N, 44°13′E, Iraq) shows that it has three or four stages of burial. The age of Shanidar-9 is about 70 000 years; Shanidar-1 is about 46 000 or 50 600 years, Shanidar-5 is 46 000 years, Shanidar-3 is 46 000 years (probably, all of the burials, excluding Shanidar-4, 6–8 and maybe Shanidar-1–5 are divided into great time intervals). This structure of burials makes it possible to analyse the evolution of the orientation of the burials. Having an entrance open from the South, the cave of Shanidar has six burials in which 9 buried individuals were found. Shanidar-1, -3, -5 have nearly the same epoch of burial. The burial of Shanidar-3 is situated in a natural niche among great limestone blocks; the burial of Shanidar-5 has no determined orientation; the burial of Shanidar-1 (rocky and soil mound) is directed along a line from N to S, and the buried individual is oriented along a relatively short line to W (266°).

The most ancient burial here is Shanidar-9, where is a child about 8 month old. Stratigraphic dating shows that the age of the burial is more than 60 000 years. The orientation of the buried (by Smirnov) is N (17°). The burial construction of Shanidar-9 was not determined; the burial is situated in the cultural

deposit. Taking into account the stratigraphic position of the buried individual, Smirnov determined the possible age of the burial of Shanidar-9 as about 70 000 years ago.

Next by the age range of burials is Shanidar-2, where a man of about 20 years old is buried. This is a burial "onto the horizon", probably, under a rocky mound. A great fire was made (as supposed Saletsky who excavated the site of Shanidar) probably above the corpses of the buried which was covered by a rocky mound, but soon after that the fire was filled in with earth. The precise orientation of the buried was not determined, but Smirnov made a qualitative estimation by Saletsky – "orientation of the head to N–E?"

The group burials of Shanidar-4, -6, -7, -8, which were almost simultaneous with the burial of Shanidar-2, had a sequence of burials from top (-4) to bottom (-6, -7, -8). This group of burials was found among rooks in an oblong niche oriented along a line of (N–W) – (S–E) having an open mouth to N–W. The orientation of these many-layer burials was determined for only the top burial. The buried of Shanidar-4 was oriented "ahead" to S–E. The orientation of Shanidar-6 was probably to S, and that of Shanidar-7, -8 was not determined, particularly in the region of the burial niche.

The burial of Shanidar-6 was probably destroyed by the burial of Shanidar-7, which, in turn, was destroyed by the burial of Shanidar-8. The orientation of Shanidar-5 was not determined. The burials of Shanidar-1, and -2 have some likenesses.

The buried of Shanidar-1 was a man of 30–45 years old. The burial was made "on the horizon" under a mound of rocks and earth, with irregual (undetermined) form, which was drawn out from N to S, having a size of 2.5 m × 1.5 m.

The burial of Shanidar-3: the buried man was 34–50 years old, the skeleton was situated partially in a natural niche (0.7 × 0.55 m size), the long axis was directed from S to N, and the buried was situated across the niche and oriented "ahead" to E.

Based on these facts, it may be concluded that there is a tendency to establish the orientation of burials along the direction of N–S. The burials of Shanidar-1, -3 and probably -4, -6, -7, -8 have nearly the same orientations taking into account the natural relief of burials.

The direction of the burial site near a line N–S was found for old burials -2, -4, -6, -7, -9 and near a line E–W for the younger burials of -1, -3.

Therefore it may be concluded that excluding unfixed oases and cases of burials in natural (rocky) niches, the basis of construction in almost all of the burials of Skhul, Qafzeh and Shanidar is probably the axis line along the direction N–S and in the second instance the perpendicular direction of E–W.

The orientation of the burials of the assemblage of La Ferrassie correspond to this tendency.

Derevjanko *et al.* (1994) noticed that the assemblage of La Ferrassie was one of the most expressive burials of the Middle Palaeolithic.

La Ferrassie, France, the Dordogne: the rocky shed, the so-called "Big Shed" at La Ferrassie, was opened to S (S–W). All of the burials, excluding La Ferrassie-6, were made under the shed. The assemblage has seven burials (one of them is double)

in pits, which were surrounded by little hills (mounds) and little pits without signs of burial. The pose of the buried of the burials of La Ferrassie-3 and -4 was not determined. The orientation of the oval burial pit of La Ferrassie-5, where the pose of the buried was not determined was fixed along the line E–W.

The buried of La Ferrassie-1 (probably a man about 45 years old) was oriented "ahead" to W (266°). The buried of La Ferrassie-2, probably a woman about 25–30 years old, was apparently oriented "ahead" to E (111°). The burials of La Ferrassie-1 and -2 were closely situated and the buried were oriented in a position "head-to-head" in the burial pits, which were drawn out of the line E–W.

The burial of La Ferrassie-7: the burial was badly destroyed. It is proposed by Smirnov that the direction of burial was E.

The burial of La Ferrassie-6 should be studied in more detail because of its uniqueness.

Smirnov supposed that this burial was probably of "classic" Neanderthal man, who was a child of about 3 years old. The age of the burial is about 68 000–75 000 years ago (Wurm II). The pit of the burial is orientied along a line from N to S. The postcramium skeleton was put in the northern narrow part of the pit "ahead" to E, in the narrow trench across the long axis of the pit. The cranium was separated from the skeleton and put in 1.25 m to S and higher along the inclined bottom. It was buried on the opposite side of the pit under the angular part of the limestone plate, which had on its inner side a symbolic drawing, made by means of thin "cup" hollows.

The burial plate did not cover all of the burial. The skeleton was uncovered by the burial plate.

Alekseev (1984) wrote that the famous Russian archaeologist and specialist of the Palaeolithic, P. I. Boriskovsky, saw the grave plate of La Ferrassie-6, but did not recognize any sign or consequnce in the "cup"-like hollow drawing of the burial plate.

Stoljar (1985), it appears, estimated this symbolic drawing in the same way as Boriskovsky. He supposed that the inclusion of this plate into this cemetery was accidental.

But complicated analysis of this burial shows the determined relationship between the positions of entire elements of this burial. There is a very important fact of the similarity of the burial of La Ferrassie-6 and the assemblage of an unequal burial of Regourdou-1 (France, Dordogne) (Figure 1). The construction of these assemblages are based on a certain analogy of the consequence of some important elements of their structures which are evidently oriented along a line from S to N.

The plate of La Ferrassie-6 has the symbolic drawing at the inner side and covered an obvious symbolic burial (endocast). The narrow part of this plate was directed to N and to the deep part of the pit, in which the postcramium was situated along the line E–W "ahead" to E perpendicularly to the direction of the long plate axis and near (in row) to the end of the narrow part of this plate. The main object of the Middle Moustierian horizon IV (it is dated to about 45 000 years ago) of Regourdou is a specially dug pit between blocks falling from the ceiling of the cave. The full skeleton of a brown bear dismembered before burial was found in this pit.

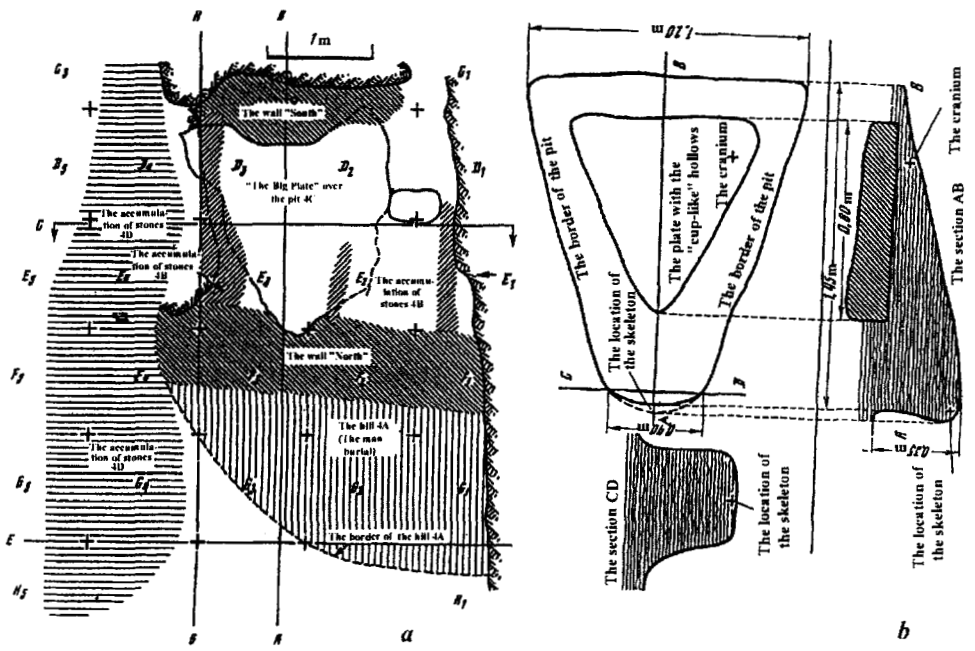

Figure 1 Comparative plan of burials of Reguordou (*a*) and La Ferrassie-6 (*b*).

Isolated groups of fossils were found in the different parts of the pit: two criss-cross scapulas were found near the south wall of the pit; the cranium of a bear was near the northern wall of the pit; a stone, having holes, probably, slightly worked; and some long bones (lying in position on the right and the left side of the corpse?).

The bones of some bears were found here in the bottom of the pit, these bones were dated to the next time period by Stoljar (1985). The pit lay to N by its long axis and has a size of 1.5 m long and 0.6 m wide.

The pit was covered by a plate of near triangular form similar to the plate of the pit of the La Ferrassie-6 burial, and this plate is also oriented to N of the narrow part (see Figure 1). Both the base and the height of the triangular part of this plate are about two metres each, and its mass is about 850 kg. Stoljar (1985) supposed that the plate was specially delivered here. It should be noted that near this burial, adjoining up to the northern part, was situated the burial of Palaeoanthropus, drawn out along a line from E to W. The similar burial of a child in La Ferrassie-6 was situated also to N from the symbolic assemblage covered by a plate bordering with the pit of the burial. Stoljar notes the relationship of "bear-palaeoanthropus" of Regourdou and supposes that it is realized in the sign-creation of Moustierian and in monuments of the beginning of the Upper Palaeolithic (such as "a natural model" or "makaroni"). Stoljar (1985) supposes that the assemblage of Regourdou was probably the basis of a complicated conception "of revivial of a beast", which was revealed in more detail by ethnography.

It should be noted that the similarity of the details of the burials of Regourdou and La Ferrassie-6 was probably based on similarities of the idea of burial. In fact it probably follows from the idea of the consequence of "symbolic burial – the plate oriented with the narrow end to N – burial of Palaeoanthropus along the line of E–W" and was constructed on the basis of the orientation along the direction from S to N and this construction did not depend on any concrete details of site and burial.

This phenomenon of a Mousterian burial in the "lithosphere" (terminology of Smirnov) itself seems to mean both a realizing of certain differentiation of the surrounding space of the habitat, and the establishing of a demarcation of the world, on which one side was determined as the site of beings and the other side as the zone of the buried. The perception of Palaeoanthropus of this dividing line was most probably not adequate to contemporary rational human beings.

As mentioned by Smirnov (1991), the Moustierian burial complex survived into our era without changing its basic idea. Just this basic idea – division of space – was realized in the essence of the main structure elements of the burial.

The burials of Skhul, Qafzeh, Tabun, Shanidar and La Ferrassie had one trail in common – they were constructed on the basis of a choice of direction from S to N as a ground idea of the entire complex of the burial (taking into account also some deviance of accuracy of this choice for natural rock niches), in spite of various morphologic types of habitats of these sites, different eras of burials, various geographic conditions and particularly differences in the most convenient direction for observation of the celestial sphere.

The more complex construction for European burials should be noted; this included the direct overhead cover (La Ferrassie-6, Regourdou), sign images (La Ferrassie-6, Regourdou) and the presence of a special layer of bear bones. It is important that most ancient burials of Qafzeh–11 (78 000–98 000 years ago) and Shanidar-9 (age of 70 000 years?) had the orientation of burials to N; and like that La Ferrassie-6 (68 000–75 000 years old) had the top part of brain case placed on a South–North line perpendicular to the East–West line of the direction of the skeleton burial.

The construction of the burial of La Ferrassie-6 is more complicated than that of Shanidar-4, and even more so than Qafzeh-11. Symbols of the worship of the bear were found in the burial of La Ferrassie-6 and they had a more evident form in the burial of Regourdou, where there were symbolics not of a cave bear, but of an ordinary brown bear (Stoljar, 1985). The burial of Qafzeh-11 had no such symbols of worship to a bear; moreover it had the symbols of the worship of a fallow deer. This means that a clear relationship between the orientation to the North and the image and the symbols of a bear existed in La Ferrassie-6.

The great importance of the bear symbolics of Regourdou and probably La Ferrassie-6 is shown more clearly by the comparison with the phenomenon of the so-called Neanderthal Alpine bear caves, which were situated above the snow boundary of Alpine mountains during Wurm Glacication. The most significant cave was that most highly situated in Drachenloch – it is situated near 2445 m high. Even now the forest does not exist in Alpine climates higher than 1900 m.

The construction of the special type of fenced bones of a bear laying-out (about 5.5 m long) was found along the wall in the II and III sections of the cave of Drachenloch. A rocky box having an overhead cover (having the size of walls about 0.9–0.95 m long) filled with bear skulls, put in some order (Stoljar, 1985), was also found.

This is a very notable indicator: the farther a relic was from the valley of the habitation zone and the more difficult the ascent to the relic was (Neanderthal man began opening up the Alpine regions in the Moustierian epoch only), the more striking is the symbolic essence of the relic.

Most Alpine caves of Drachenloch took first place concerning this indication. Next after Drachenloch was a cave of Wildenmannlisloch (1628 m high), where bone compositions were less numerous and rocky constructions of the box-and-wall type were not found at all. The cave of Wildkirchly was the least significant (1477 m high).

The opening up of Drachenloch is dated to about 53 000 years before present (Stoljar, 1985).

Thus there was a complicated complex of correlated elements having a bearing on the space orienting activity of the Palaeoanthropus during the Moustierian epoch. Alpine bear caves containing nothing more than the bear-bones composition stressed a partiqular role, which the symbolics of a bear played in the burial of Regourdou. It may be supposed that the symbolics connected with the brain case and little cape-wise hollows on the plate of La Ferressie-6, by analogy with Regourdou, have also some relation to the worship of a bear. For establishing the importance of the direction from S to N of Moustierian burials we should consider the possibility of Moustierian burial orientation on the grounds of a fixed direction of the "entrance-exit" of the cave burial, as supposed, for instance, by Okladnicov (see Smirnov, 1991).

First of all an argument against this statement is that it was difficult to choose such a direction in particular for large-scale sites. So, for example, the grotto of Qafzeh has a complicated structure and great size of entrance – the size of the terrace is 15×12 m, there is an open lobby of 5×4 m and the grotto itself (21×17 m size) is partitioned off by a big rocky threshold of 2 m high. The main entrance of the grotto is an arch-shape cavity 5 m high.

The grotto of Skhul has an entrance of 14 m wide, a square of about 7 m into a cave, and a rocky threshold of about 1 m high into a grotto. The cave of Shanidar has an entrance of 25 m width, a ceiling of 8 m high, and a cavity of 40 m long, with a changing width, having a maximum size of about 53 m.

It is clear that an estimation of the seeing direction of the entrance of a cave is very dependent on the site relief. In this situation it is difficult to grasp all of the space-oriented details of the grotto structure and the shape of the entire cavity of an entrance.

It should be noted that some burials were deposited outside of the caves and may be not connected with the conventional direction of "entrance-exit".

Thus a more preferred hypothesis is a statement about the choice of the direction from N to S as a basis for most of the construction of the burials. The statement

of what choice of direction had a certain sign for Palaeoanhtropus ought to be confirmed by the analysis of the direction of the line entrance of the caves showing the absense of a cave dwelling entrance oriented along the line of W–E. On the contrary, the Alpine bear cave of Drachenloch has the direction of the entrance from E and an orientation from E to W (two of the other Alpine bear caves have an entrance from N–E).

But for the singling out of two space, particular cross-perpendiculiar, directions both into and out of a grotto taking into account the complicated site relief, there should first of all be a skill fixing these special directions in any location by means of some symbolics. Such symbolics were worked out by Palaeoanthropus.

The separation of two cross-perpendicular directions, which very clearly appeared in the composition of burials such as La Ferrassie-6, was perhaps reflected in simple symbolics by means of the elementary drawing of two short cross-lines. The history of such lines began from a simple repeating of a scratch of a bear claw on a rocky wall made in the Lower Palaeolithic (Stoljar, 1985), then was continued by crossing out such lines and finally ended by recognizing the connection between the cross-wise structures of burials and the symbolics of a bear, which was a primary inhabitant of the Palaloanthropus cave. Therefore, this may be a consequence of connected elements: realization of the direction from S to N – an embodiment of it as a base in burial construction – reproduction of this construction idea in the simplest drawing of two cross-lines, i.e. differentiation of two cross-perependicular directions of space.

The S–N direction recurring during different epochs independently on both cave sites and cave entrance directions indicates evidently the existence of the only universal global orienting point. This orienting point is most probably the reference point of the North – the celestial Pole or North Pole (more exactly it is the mark of the Pole, i.e. the bright star or the recognition of a contour of a group of enough bright stars near the Pole).

The burial of La Ferrassie-6 probably shows the development of differentation of two cross-perpendicular directions. The main directions of this burial are S–N and E–W. The directions of the pit, the plate, and the position of the cranium were connected with the direction from S to N, but the postcranium skeleton was laid out along a line from E to W, although this last direction does not distinguish anything else in the burial.

The drawings of a cross which means a differentiation of two cross-perpendicular directions was found among Moustierian relics.

These are cross-wise figures on a fragment of the lower jaw of a beast from Wilen by Lorrah (Germany), on the plate of limestone from the Moustierian layer of the Tson cave in Geogia, and on "an amulet" from the Moustierian complex of Tata (Hungary; the age of this site determined by means of the radiocarbon method is about 50 000 years) (Figure 2). The relic from Wilen is most interesting among: these relics, because there is a combination of a short line and cross on it. Probably there is here the fixing of a more complicated structure of space, i.e. the fixing of two of cross-perpendicular directions relative to a fixed mark point.

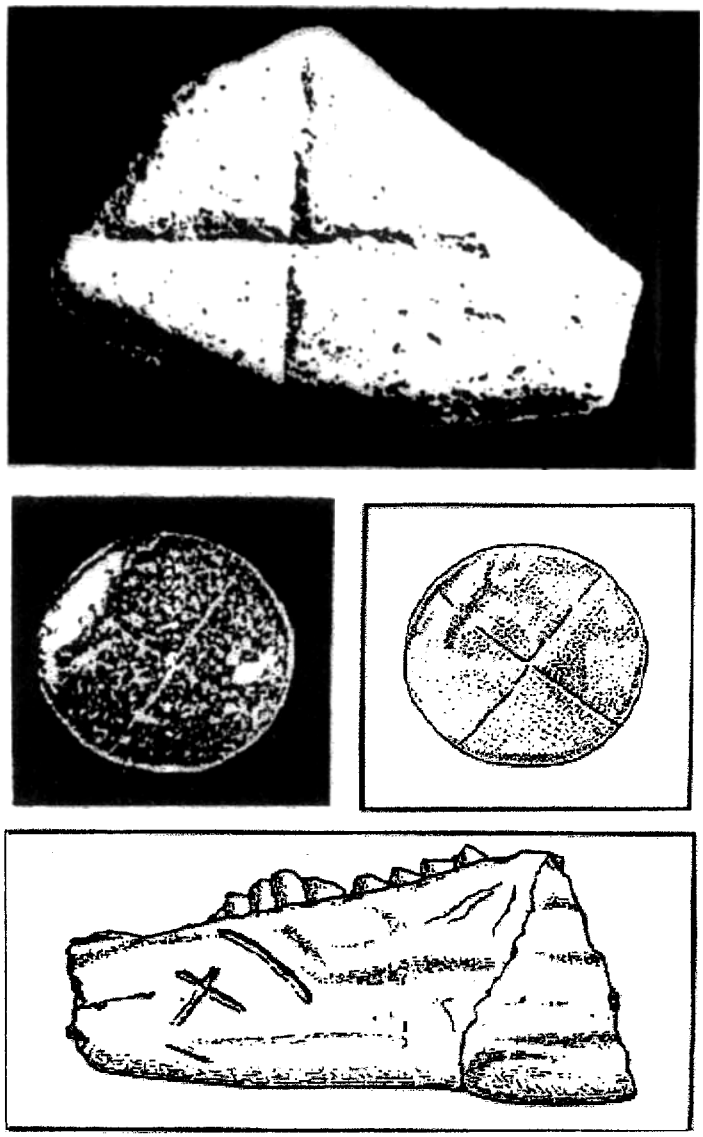

Figure 2 Palaeolitic cross-wise figures.

The connection of the bear theme (primarily – a cave bear) with the primary fixed direction of S–N was probably realized by a symbol drawing with capwise hollows on the plate of La Ferrassie-6. This fact may be determined from the conformity of the position of the plate of La Ferassie-6 to the position of the analogous plate of Regourdou. The last of these is connected with the bear symbolics by means of the bones of a bear that is buried under this plate.

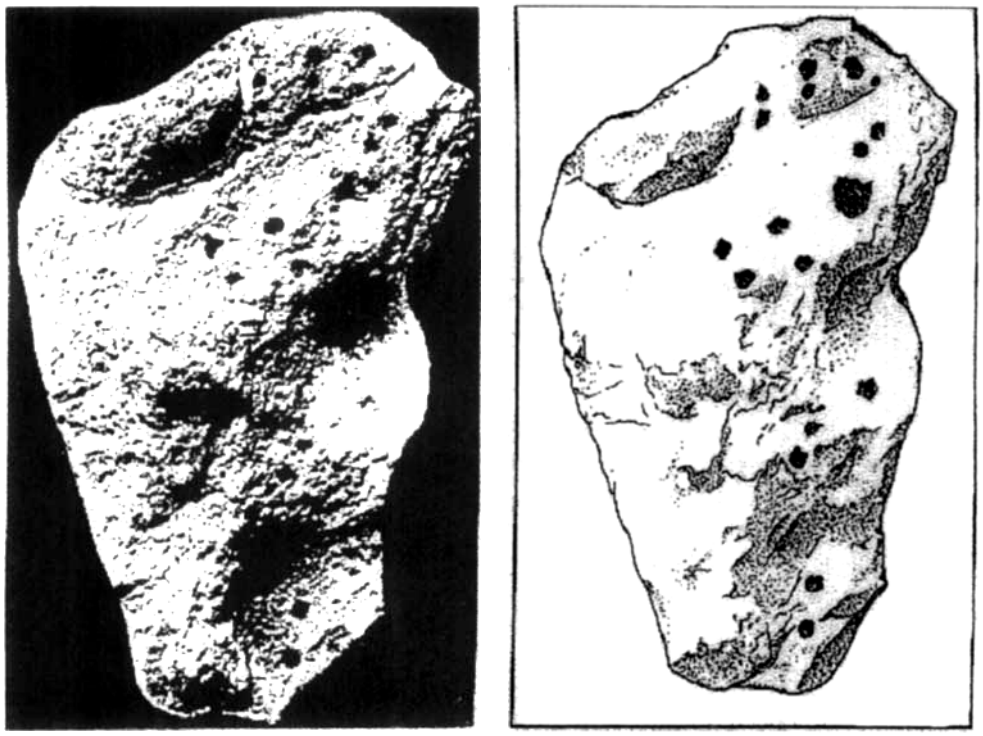

Figure 3 Symbolic drawing on the La Ferrassie-6 plate.

The drawing of the plate of La Ferrassie-6 (Figure 3) may be interpreted by analogy with this bear-bones composition, as at Regourdou, as a picture of the opposition of the two cross-overturned "Dippers", each of which is a composition of stars of the circumpolar constellation of Ursa Major, primarily chosen as a marker of the Pole by Palaeoanthropus. Such "binary opposition" was realized also in the burial of La Ferrassie-6 itself by means of the composition of a "skill-skeleton", but this composition was not a sign but a natural object.

It may be determined that in that time there were all the necessary details for the appearance of this conditional drawing of the constellation which would be a symbol of the Pole.

Modern research indicates that even the intellect of chimpanzees is enough to produce the drawing, which is an image of some object, for example, an apple (Gudoll, 1992). Palaeoanthropus excelled chimpanzees by all of the indices of intellect. Moreover, he had new brain structures, which were enough for space orienting activity in the forms which led them to realize and determine the points of the compass (Kochetkova, 1973).

Bunak (1966) supposed that realizing such definitions as changing day and night and moving sky luminaries was completed in the epoch of Middle Palaeolithic

(Acheulian and Early-Moustierian tools) and connected with early Palaeoanthropus of Eringsdorf and/or the "pre-sapiens" (a term of Bunak) of Steinheim.

The American arhaeologist T. Winn turns his attention to the connection between such determinations as establishing the symmetry of the structure of Acheulian tools and accordingly the process of realizing the geometrical (Euclidian) properties of space, in particular properties such as direction in space (see Alekseev, 1984).

It should be noted that Drachenloch is situated in one of the highest points of the Alpine region and above it is the celestial dome only. Paths to the bear caves in the Alps marked only directions in space – toward the celestial sphere – and it symbolized the approach of the Pole and apparently of the Dipper of Ursa Major. It should be noted that the main direction of orientation of the Alpine bear caves is to E and to N–E; particularly, the cave of Drachenloch is oriented, concerning the entrance, from E to W. This direction, with the direction toward the Pole, maintain together a visible model of crossing lines of S–N and E–W, which were probably fixed by means of the structure of the symbolics on the bone from Wilen.

Thus the space-orientation essence of Moustierian burials may be determined by the following connected statements.

Moustierian burials are evidently constructed on the grounds of fixing of the S–N direction connected, probably, with realizing and fixing the location of the Pole on the celestial sphere.

Some elements of the Moustierian burial complex connect with the symbolics of a bear and with the configuration of stars of the circumpolar Dipper, being a marker of the Pole. This Dipper was associated with bear symbolics, too.

Sign drawings, particularly of cross-wise forms, fix the realization and differentation of two cross-perpendicular directions in space, being the basis of space-orienting activity.

Taking into account both these statements and the direction of movement of the Pole (Kaurov, 1997) it should be supposed that the configuration of circumpolar Dipper, as a marker of the Pole, was distinguished not later than the time when fixing the stars situated near the trajectory of the movement of the Pole began. This gives an opportunity to estimate that the time of distinguishing the circumpolar Dipper as a marker of the Pole was not later than 80–100 thousand years.

CONCLUSIONS

(1) The space-orienting activity of Palaeoanthropus connected with the process of distinguishing the points of the compass began in the Moustierian epoch (Middle Palaeolithic). It was reflected particularly in the Moustierian burial phenomenon.

(2) The determination of the points of the compass began with a primary fixing of the North Pole of the celestial sphere.

(3) Primary realization and distinguishing of the Pole were fixed by means of the contour of bright circumpolar stars of the Dipper, resulting in the symbol associated with the image of Great Bear.

(4) The distinguishing of two cross-perpendicular directions in space was fixed by means of Moustierian sign creation, particularly of cross-wise symbolics.

(5) The age of primary distinguishing of the Dipper of Ursa Major is not less than 80–100 thousand years.

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