

Art, Gods, Neanderthals, and Hunter-Gatherer Sapiens of the Paleolithic and Postpaleolithic

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Abstract: Human beings have a sense of transcendence that leads them to seek explanations for their existence and their complex experiences with nature and their surroundings. The answers they obtain often go beyond the purely empirical, resorting to the existence of a supernatural world, even since the Paleolithic. Thus, we can define transcendence as the set of perceptions, feelings, beliefs, and behaviors related to the idea of the existence of forces, energies, and entities that are beyond the purely physical but connected to it, giving it meaning, and that in some cases can manifest to human beings, among other situations, in dreams and trance states. The human brain has developed both the ability to interpret the information it has, constructing a story, legend, or myth that explains the events it experiences, and the need to believe in that story, however implausible it may seem to reason, for the psychological tranquility it provides. The first manifestations of this feeling are observed in burials and the rock and portable art of the Paleolithic and post-paleolithic.

Introduction

In all current hunter-gatherer cultures, there is a belief in the existence of the soul and concentrations of powerful magical forces, the numen, in some natural elements (storms, rocks, volcanic eruptions...), objects (amulets, tools with which very good work is obtained, weapons with which many enemies are defeated...), or living beings that stand out for their qualities. In addition, individual or collective propitiatory rituals are practiced for good hunting and fertility or for transitions in the status changes that each person goes through throughout life (birth, maturity, marriage, death), etc. The soul is considered as a normally invisible and intangible being that resides within the visible and tangible body and manifests itself in dreams, trances, visions, shadows, and reflections, and intervenes in the loss of consciousness, birth, and death. Depending on the culture, a person may have more than one soul. On many occasions, a personal or protective guardian spirit must be acquired through a visionary experience, as a rite of passage or initiation, induced by fasting, self-inflicted torture, or the consumption of hallucinogens. The souls of the ancestors play a leading role in their ritual; the ancestral spirits of the community are commemorated and appeased, although the souls of the recently deceased are attempted to be banished as they are dangerous and their presence must be avoided. The deceased are buried with belongings so they can depart to the world of the dead, or all their possessions are burned so they leave them in peace. In totemism, the founders of their lineage are recognized, which takes the name of an animal or a natural phenomenon, which must be protected to grant health and wellbeing to the members of the community. In all these cultures, there is a person, the shaman or the sorcerer, who acts as an intermediary with the supernatural world, as a healer, and as a diviner. Shamans typically have personalities predisposed to hallucinatory experiences or frequent visionary dreams, necessary to communicate with the other world. In cultures that freely use hallucinogenic drugs, almost everyone reaches the trance state, essential for the practice of shamanism; in those that do not, the shamans, fewer in number, achieve self-hypnotic trance through rhythmic dances to the monotonous beat of drums or simply close their eyes and concentrate. The historical origin of transcendent behavior appears during the Paleolithic, the oldest known cultural period, characterized by societies of hunters and gatherers, which in Europe is divided, by the technical complexity of lithic tools, into Lower, Middle, and Upper Paleolithic, and which begins with the arrival of the first Homo (Note 1) from Africa over a million years ago and lasts until 14,000-12,000 years ago when the ice retreats from the fourth and last glaciation of the quaternary. After the Paleolithic, there is a transitional post-paleolithic period, in which the cult of the first gods appears. During this period, hunter-gatherer ways of life adapted to new climatic conditions may persist, Epipaleolithic, or in some hunter-gatherer groups, the way of life that presages food production and sedentarization may appear, Mesolithic, which will give rise to the Neolithic, with variable chronology depending on the geographical region.

Biological Anthropology of the Transcendent

Studies in genetics and neuroscience applied to experiences of transcendent feelings and behaviors bring us closer to a biological understanding of them, to how the physical substrate on which they are based is organized and responds, and to how this conditions them.

The brain and trance experiences

The study of cortical activity (N2) in sleep and trance helps us determine the regions of the brain that play a major role in the formation of visions and reveries. Thus, during the R.E.M. phase of sleep, i.e., the phase in which we dream when we sleep, the right hemisphere (responsible for a holistic, global, and spatial vision) exhibits an EEG (N3) with higher-than-normal activity. Trance, on the other hand, is a state of brain activity different from wakefulness and sleep, characterized by a theta wave EEG with a frequency between three and seven hertz or cycles per second, which can be reached through meditation, sensory or food deprivation, dances and music with rhythms similar to theta waves, and the ingestion of hallucinogens, among others. In trance, individuals experience paroxysms, hallucinations, or delusions. Through neuroimaging analyses, an increase in activity in the right hemisphere and a decrease in activity in the left frontal lobe (responsible for speech production) are observed in subjects induced into a trance state with lively rhythm dances. In people who achieve mystical ecstasy through meditation, an increase in activity in the frontal lobes (responsible for concentration) and a decrease in activity in the parietal lobes (responsible for selfawareness, object delimitation, and spatial location) are observed, possibly related to the sensation of no longer perceiving their own body and of union with the absolute. Furthermore, if the right angular gyrus, at the confluence between the parietal and temporal lobes, is electrically stimulated, one experiences the sensation of one's intangible self leaving the body and traveling outside it, perceiving the world. Similar sensations to those experienced in mystical ecstasy can be elicited during sexual climax. For example, no longer perceiving one's own body and that of the partner (as if the senses of somatosensory and touch were disconnected), each transforming into a large and powerful explosion of permanent white light (as if the sense of sight were hyperactivated), merging into one and accompanied by a profound feeling of happiness, union with totality, and absolute love. In near-death experiences, the temporal and parietal lobes are likely affected in the visions elicited, the hippocampus (N4) due to the individual's life review, and some parts of the limbic system (N5) (as must also occur in mystical ecstasy, sexual climax, and hypnotic trance) in the intense emotional states that occur, leading to delirium. Furthermore, if the right temporal lobe is stimulated in normal subjects with powerful magnetic fields applied with a helmet to the skull, visual or auditory sensations of appearances of mystical beings specific to the subjects' culture manifest, both in believers and agnostics. It is also known that many patients with epilepsy localized in the right temporal lobe experience mystical trances (accompanied by feelings of familiarity or unfamiliarity, joy, love, sexual pleasure, visual and auditory hallucinations, and delusions), sudden religious conversions, hyperreligiosity, hypermoralism, hypersexuality, and exaggerated philosophical and cosmological concerns.

Rationalization of transcendent experiences

In patients with split-brain syndrome (N6), it has been found that the left hemisphere interprets events, when lacking sufficient information, in a reasoned and coherent manner with reality, although this interpretation does not correspond to the true explanation of what happened. For example, when one of these patients, in conditions suitable for each hemisphere to receive different information, is shown an image of a snowy scene only perceived by the right hemisphere in the left visual field and a chicken leg only perceived by the left hemisphere in the right visual field, when asked to choose an image related to the previous one from several subsequently shown, with the left hand, controlled by the right hemisphere, they will indicate the shovel to clear the snow, and with the right hand, controlled by the left hemisphere, they will choose the chicken head. When asked why the left hand chose the shovel, they respond to clean the chicken coop, because the left hemisphere, responsible for language, did not see the snowy scene. With this response, coherent with the hemisphere's perceptions, it interprets them by providing a solution to the problem posed. This interpretation capacity of the left hemisphere seems to exist only in our species. If a person is asked to guess which light, out of two, will turn on a computer screen programmed for one to turn on 80% of the time, they will have a success rate lower than 80% because they try to figure out why one turns on more than the other. In rats and other animals, the success rate is 80% because, like us, they detect that one turns on more frequently than the other but do not bother to discover why and always choose the one that turns on more. The brains of other animals process information in the same way as our right hemisphere, which has an 80% success rate; they choose what is practical, unlike our left hemisphere, which prefers to be wrong to find a solution with which it would be right 100% of the time. From all this, we can deduce that a brain that has developed a left hemisphere capable of interpreting reality based on partial perceptions, sensations of disembodiment and union with the absolute in trances, hallucinations with mystical beings, and appearances of the deceased in dreams, all correlated with a variation in the activation of the right hemisphere, must underlie the belief in the existence of the soul and spirits.

Genetics and neurotransmitters of the transcendent

Perceptions and transcendent feelings, such as love for God or love for nature, or feeling united with the absolute or being able to sacrifice for a better world, seem to have a highly prominent genetic component, as evidenced by several studies conducted with monozygotic and dizygotic twins (N7) (approximately 50% of the detected variation in transcendent feelings in these twins is due to genetic involvement) or with the gene (N8) that encodes the VMAT protein (N9), which transports monoamine neurotransmitters (N10) into synaptic vesicles, where they are protected from premature degradation. An allele (N11) of this gene correlates with a greater predisposition towards transcendent feelings by modifying the amount of monoamines involved in synapses, although there must be at least fifty other genes with a similar impact.

Of the four monoamines synthesized in the brain, two are closely related to transcendent feelings: serotonin and dopamine. Serotonin induces states of peace and unity with the surroundings, lifts mood, dispels depression, fear, and insecurity, and alters perceptions, so drugs that increase serotonin production or are affinity with this neurotransmitter induce states of ecstasy. Dopamine triggers feelings of pleasure, such as when enjoying a delicacy or engaging in sexual relations. Both, acting together and in excess, activate an altered state of consciousness that we can call a transcendent experience.

Neanderthal Background in the Middle Paleolithic

There is currently an open debate that does not agree among specialists on whether Neanderthals (N12) had a fully human mind. There are enough arguments to support that they did, and detractors of this idea are influenced by past prejudices. The arguments supporting the human mind and the feeling of transcendence in Neanderthals are as follows:

1. Possession of a brain as voluminous as that of modern humans, even slightly larger, and of the Broca's and Wernicke's areas in the left hemisphere of the brain, which are fully developed and marked in fossil endocasts. It is very difficult to understand (bordering on the absurd) these characteristics if not to support that they spoke and had a human mind because otherwise, they would not need such a developed brain, and the metabolic requirements to maintain that large brain would be very costly and useless.
2. Possession of a hyoid bone with a configuration and metric range typically human and devoid of air sacs, which distinguishes it from male orangutans, gorillas, chimpanzees, and bonobos, as seen in the hyoid sample from the Anatomy museum of the University of Valladolid, in Spain. The metric range of female orangutans is greater than that of humans, and their morphology is not exactly the same. The hyoid is the only bone that does not articulate with any other; it is supported in the throat by muscles involved in the articulation of phonemes, so it plays an important role in speech. All this indicates that the vocal apparatus of Neanderthals allowed them to speak.
3. Neanderthals possessed the variant of the FOXP2 gene typically human, whose mutation causes severe alterations in language, so it is assumed that genetically they were also capable of speaking.
4. Hybridization between Neanderthals and modern humans, genetically documented, indicates that although they are two different species, the differences between them should not have been so marked as to prevent attraction between individuals of both species, which suggests that their minds and brains were very similar, at least. Perhaps the early sapiens saw the Neanderthal as "just another person in the New York subway."
5. Ritual practices of cannibalism. In some Neanderthal sites, cases of cannibalism have been documented in which cut marks made with stone tools follow a different pattern than those of the prey consumed at those same sites, and cut marks are observed on parts that lack nutritional value. This indicates the possession of a fully human mind in Neanderthals.
6. Ritual passage practices. In some Neanderthal sites, it has been found that hunting has focused on a single species and on adult males, the most dangerous, as ethnographically documented in many hunter-gatherer societies as a rite of passage into adulthood. This indicates the possession of a fully human mind in Neanderthals.
7. Burial practices of some Neanderthal group members in natural or anthropic construction pits. In several cases, the deceased are accompanied by grave goods and the use of dyes, perhaps the latter remnants of their adorned clothes or with a deeper meaning, not accepted by all, as will be analyzed later.
8. Use of feathers, claws, and shells as symbolic elements. Although some authors simply attribute a collector's meaning to them by arguing that they do not have any Neanderthal manufacture, it is more likely that they had a symbolic meaning for their owner and the group. In humans, collecting implies possessing, at least, the essence of what you collect, not attracting females as in birds, for example. And Neanderthals are much more biologically and evolutionarily distant from birds than from modern humans, as we have seen in point 4. In any case, not making ornaments does not imply that Neanderthals

had an evolutionary disadvantage, because ornaments do not imply an improvement in the survival of the individuals who wear them.

9. Absence of figurative rock and portable art in non-perishable materials in Neanderthals and contemporary sapiens. These arts do not leave archaeological records in Eurasia until 40,000-35,000 BP (although in a later chapter, we will make a clarification), at which time in Europe there are only populations of modern humans, some of which include hybrids with Neanderthals conceived a few generations ago and that maintain a mixture of anatomical characteristics. Previously, this type of art was not made, although it cannot be ruled out that they did elaborate it on perishable materials such as wood.
10. The sanctuary of Des-Cubierta, in Madrid. In this gallery with the collapsed ceiling, 35 skulls without facial skeletons were discovered, from which the brains had been extracted for consumption. All belong to herbivores with antlers (bison, aurochs, large deer with unmolted antlers) or with keratinous horns (rhinoceroses), all males in their prime. Some skulls are associated with hearths, with burnt remains. Taphonomic studies rule out use for survival. The deposition occurred over years, centuries, or millennia, indicating an intentional activity of a cultural and symbolic nature, dangerous and affirming of the group. It seems to be a precedent for the pictorial sanctuaries of the Upper Paleolithic, in which the real skulls of herbivores with antlers or horns are replaced by magnificent cave paintings of the torsos of these and other animals.

The Paleolithic: The Historical Origin of the Transcendent (Burials)

The results of archaeological, paleoanthropological, and ethological studies indicate that the origin of ideas about the afterlife, the soul, spirits, essences, etc., may arise even in other species of the Homo genus different from ours, as evidenced by possible burials or works of art by Neanderthals or perhaps some type of pre-Neanderthals (N13). Even in chimpanzees, behaviors of affection towards the corpses of their conspecifics have been observed after the death of a group member due to a predator or disease, and behaviors of excitement in response to natural forces such as rain or a thunderous waterfall of twenty-five meters located in a paradisiacal place that any human would describe as magical and transcendent. Also, chimpanzees, like many other animals, occasionally consume hallucinogenic substances, although their purpose does not seem to be other than enjoying the moment. Therefore, we can assume that hominins (N14) not included in the Homo genus would have attitudes similar to those of chimpanzees regarding the consumption of hallucinogenic substances, the recognition of death, and their responses to the force of some natural elements.

The Homo, thanks to the increase in brain size and the appearance of functional hemispheric specialization, at some point in human evolution, interpreted the sensation of an inner self, trance experiences, and visionary dreams as the existence of a soul within their bodies and spirits that manifest to them. It is possible that even the pre-Neanderthals from the Sima de los Huesos 300,000 years ago in Atapuerca, Burgos, Spain, during the Lower Paleolithic, practiced funerary rituals in which the corpses of community members were thrown into a natural chasm inside a cave, a place that would be considered a center of concentration of magical forces. In said cavity, the Sima de los Huesos, scattered and mixed bone remains of more than thirty individuals have been found, and it does not seem that this concentration of bones is due to a cause of natural origin. Additionally, a single lithic tool, a handaxe, without use marks and made of red and ochre quartzite, exceptional in the entire Atapuerca complex, appeared, which can be considered as an offering or burial offering. Although there are reasonable doubts for part of the scientific community about the purpose of this practice, it represents a precedent for Middle Paleolithic burials that must be taken into account.

Middle Paleolithic burials

The first archaeological manifestations that allow us to deduce the belief in something transcendent come from intentional burials of the corpses of modern humans (N15) in two sites in the Near East, about 100,000 years old, and of several dozen Neanderthals in almost twenty sites, mainly located in the Near East and southwest France, dated as a whole between approximately 100,000 years and the transition to the Upper Paleolithic. The burials practiced between the two species in the Middle Paleolithic do not show great differences between them, although the scarcity of findings of those of modern humans for such a prolonged period of time is surprising, especially when compared with the quantity discovered of Neanderthals. Even so, the total number is very small. This indicates that burial was not a widespread social practice; rather, it would be a minority personal option adopted by some individuals out of their own conviction or reserved for exceptional members or events. From the Upper Paleolithic onwards, however, there was a change in mentality in many populations of modern humans, and its use became widespread in large geographical regions, excluding the Iberian Peninsula, where only one burial has been documented in Cantabria.

Description

The graves of Neanderthals and early modern humans appear in caves or shelters where there are Middle Paleolithic levels, except for one from the early Upper Paleolithic, and consist, in some cases, of simple pits dug into the sediments of living areas or into the rock that forms the floor, while in others, they consist of earth or stone coverings over the corpse deposited on the ground. The bones appear in anatomical connection and laid on their backs or sides, with flexed arms, crossed over the chest or abdomen, or extended, positions that could not have been preserved if they were not protected from scavengers by burial. It is possible that in two cases a ritual of separating the skull from the rest of the body was practiced, as indicated, in one case, by the disappearance of the skull, the fracture of the upper regions of the jaw, and the anatomical position of the hyoid and cervical vertebrae, and in the other, the separation of the skull 1.25 m away from the rest of the skeleton in a pit where three stone tools were also found on the body and an almost triangular stone with 12 or 13 small anthropic cavities on the head.

In some graves, tools or worked stones (such as those mentioned above), articulated remains of fauna, a turtle shell, powdered hematite sprinkled, etc., appear, which can be interpreted as grave goods, offerings, or rituals. In one case, the head of the deceased rests on a rectangular stone, and over the heart area, there is a piece of flint, perhaps representing eternal rest.

Interpretations

Some authors argue that all these intentional burials were carried out for practical purposes, being a prophylactic or hygienic measure to prevent diseases or, at best, to preserve the corpses from scavengers due to the affection or respect they felt for the deceased, with pigments such as ochre possibly used as a disinfectant or to preserve the bodies from decomposition due to the preserving power of collagen. But if there was an interest in keeping the bodies of the dead intact with these products and through burial, it must be because the deceased conferred a very deep respect upon them, and this respect and preservation of the bodies, which can be considered the first practices of embalming, are fully transcendent behavior and imply beliefs more complex than supposed. The scarcity of burials before the Upper Paleolithic suggests that it contradicts the utilitarian opinion because if truly their function had been this, they would be much more numerous to fulfill that purpose. The burials must have responded, therefore, to a very minority conception in society, even of a purely individual nature, in which the incipient idea of a future life or something similar, along with the accompanying feeling of transcendence, was the motivation that led them to the practice of burial behavior. Hence, most corpses are in fetal positions or well-accommodated, in some cases accompanied by possible grave goods or offerings, all to facilitate the transition to that life or allow subsistence in it. It is also possible that the separation of the skull obeyed the belief that in this way the dead were prevented from returning and bothering the living. Already in the Upper Paleolithic, modern humans developed and almost generalized funeral behaviors, appearing in the archaeological record of this period both individual and collective burials and funerary offerings composed of thousands of ornamental pieces that would be inserted in clothing and by very elaborate ivory statuettes and pieces, implying a complexity and an idea in the afterlife very clear.

The Paleolithic: The Historical Origin of the Transcendent (Figurative Art)

Art is not just aesthetics. It is also communication and, especially, the conveyance of ideas about mythological beliefs in preliterate cultures or those where illiteracy predominates. Interpreting or "reading" correctly the images of art from hunter-gatherer societies of the Stone Age, both in cave art and portable art, brings us closer to understanding the spirituality of this period. The complexity of Upper Paleolithic and Epipaleolithic art, both in the perfection of image representation and the use of imperishable materials or the choice of locations where it is found, gives us an idea of the importance of beliefs among the hunters and gatherers of these periods. The perfection in technical execution makes a supernatural world real for those societies, merging with the tangible as it does in present-day hunters and gatherers. The use of imperishable materials gives that world an eternal character that endures through generations, conferring greater value, and the precise choice of special places, with symbolic meaning in themselves, along with the previous two aspects, gives it a powerful and fascinating numinous quality.

The first idols and cults in Paleolithic art

The earliest clear manifestations of figurative art that have reached us and that we can associate with images related to the transcendent world belong to the beginning of the Upper Paleolithic of Eurasia. They consist of portable works of small format on imperishable materials (portable art) and representations on the rock inside caves or shelters (parietal art). Among all of these, we must highlight, for their antiquity and

symbolism, the steatopygous venuses, the ivory statuette of the lion-man discovered in the Stadel Cave in Germany, and the paintings in the Chauvet Cave in France, the latter being of exquisite artistic quality.

Description of the steatopygous Venuses

The steatopygous venuses are more than a hundred small-sized sculptures and more than a hundred engravings or paintings that depict a naked female figure with exaggerated and prominent sexual attributes (pubis, vulva, breasts, buttocks, and abdomen), with the head and extremities in a secondary plane of lesser importance if they are represented, although sometimes the hands are detailed. The oldest one found is an ivory statuette, the Venus of Hohle Fels, in southern Germany, dated between 40,000 and 35,000 years ago, although it could be older because it was passed down from generation to generation, and because the sediments where it was found have the same chronology as those of the Mousterian, the name given to the lithic technology of the Neanderthals. It has a small hole in the place of the head through which a cord could be passed, presumably to hang it. It differs from the rest of the venuses because it has a wide pelvis and thorax, and a short and compact trunk. Also, the breasts, abdomen, hips, and buttocks are robust and not covered by fatty tissue. The same occurs with the back and shoulders, which in later venuses are much more graceful. Regarding the upper and lower extremities, they are shorter in the Venus of Hohle Fels, giving it a more squat appearance. It is also noteworthy that the right shoulder of the Venus of Hohle Fels is higher than the left, as if in a gesture of body expression to communicate with the observer or in a dance movement. In short, later venuses appear more realistic, representing the physical characteristics of an obese woman with great precision. In contrast, the Venus of Hohle Fels can be configured in several simple and geometric volumes, with an almost Cubist style, which at first glance seems to symbolize a concept, but recent studies suggest that it represents one of the last Neanderthal women or a Neanderthal-Sapiens hybrid, stout, robust, and chubby, following a realistic style.

Description of the Lion-Man of Stadel

The sculpture, found in southern Germany, depicts a hybrid anthropomorphic figure, upright and stylized, possibly a woman due to the triangular pubis and abdominal folds, with a lion's head, slightly separated legs, and arms extended to the sides of the body, anticipating the iconography of several deities of ancient Egypt thousands of years later, especially that of Sekhmet, goddess of war and vengeance, symbol of strength and power, and protector of the pharaohs. On the left arm, there are seven short parallel horizontal incisions. The lion's head is very realistic in the representation of the muzzle, eyes, and ears. It is dated between 40,000 and 32,000 years ago, making it one of the oldest in the archaeological record.

Description of the paintings in the Chauvet cave

Located in southern France, they consist of more than four hundred cave paintings of animals of fourteen different species and an incomplete hybrid female figure, all of them located in the depths of the cave, in addition to numerous signs and hand impressions in positive and negative. They are dated by radiocarbon and the formation of calcite concretions between 32,000 and 30,000 years ago, making them among the oldest found to date. The animals (lions, bears, rhinoceroses, mammoths, a leopard, a hyena, an owl, bison, aurochs, horses, megaloceros or giant deer, other cervids...) are represented with ideal beauty, profuse naturalism, and realism using various techniques, often forming part of scenes of herds, fighting, mating, fleeing, stalking, resting, etc.

The only human figure that appears is a steatopygous venus hybrid drawn in black, limited to an exaggerated pubic triangle and legs with wide hips, showing the vulvar groove through a white engraved stroke that stands out on the blurred surface of the pubis. The upper body is absent, replaced by the representation of a bison's head at the level of what would be the abdomen, and, contiguous above the right hip, the head of a feline.

Interpretations

Since about 40,000 to 35,000 years ago, the Homo genus began to represent human figures in Europe on imperishable supports with a marked symbolic character, in which the face, deliberately, receives no attention or is that of a lion. It seems to indicate that these are not portraits but personifications of the vital forces of nature, which are worshiped a few millennia later in the wild fauna scenes of Chauvet, emanating a profound transcendent numen. The steatopygous venuses can be interpreted as the creative and sustaining forces of life, symbolized by the exaggerated female sexual attributes. Venuses of this type are, consequently, the image of the Mother of creation and life and the protector of the group, without defined face or name. On the other hand, the lion-man, or more probably the lion-woman, may indicate, due to the careful representation of the eyes, external ears, and muzzle, the forces of hunting and knowledge, whose attribute of stealthy and cunning hunter was well known to humans, as demonstrated in the paintings of Chauvet. This hybrid image would, therefore, be a

representation of hunting, strength, power, and cunning, with a clearly assigned face and name, which would also have a protective character over the group. Later, between 32,000 and 30,000 years ago, figurative art decorates the interior of the Chauvet Cave. In a relatively short period of time, about two thousand years, the deep chambers of the cave become a sanctuary with hundreds of images represented on its walls, like a temple of two thousand years in which, over time, additional motifs and rooms are added according to new needs and particularities. We do not know the rituals practiced in view of this imagery, whether they were shamanic, totemic, propitiatory, initiatory, magical... but they would surely have already been an ancestral tradition, perhaps since the time of the Des-Cuvierta cave. In Chauvet, in addition to all the artwork represented, the privileged and preconceived location of the hybrid steatopygous venus must be highlighted. It is located at the end of a suggestive stalactite shape that hangs just over a meter above the ground, in the heart of the Hall of the Background, facing a large bestiary frieze that seems to preside over it, as if observing the work of its creation: Paradise. We do not know if it is earthly, from the Hereafter, or both. What seems clear is that the authors of these representations handed down the myth of Paradise that many later religions adopt. On the other hand, the Chauvet venus forms a figurative ensemble with a bison and the head of a lion. A triad is represented, in which the bison seems to take the venus. It seems to narrate the myth of the most powerful Being or Divinity, the bison, taking the beautiful venus to engender the race of lion-men (represented by the lion's head and the venus) who have acquired the qualities of this majestic feline, which are honored in many of the Chauvet paintings. Between 30,000 and 14,000 years ago, the conceptions and iconography of the previous millennia persist, although peculiarities are introduced depending on the place and chronological moment. The steatopygous venuses (Willendorf, Lausell, Lespugue, Dolní-Věstonice...) continue to be elaborated throughout almost all of Europe, and even some regions of Asia, for a large part of the Upper Paleolithic, until in the final period of it, some female representations are stylized, showing a change of model and probably functionality. The hybrid figures of human and animal continue to appear both in portable and parietal art, although not abundantly, and can be interpreted as shamans dressed in skins and antlers of cervids or bovids in various rituals, or as visions of metamorphosis in states of altered consciousness through trance or vivid dreaming. Finally, in the later Upper Paleolithic, the great pictorial and magical-religious sanctuaries of France and Spain, areas where parietal art spread the most, reach their artistic peak, along with Chauvet, with their magnificent bestiary in Lascaux (Hall of the Bulls) and Altamira (Hall of the Bison), among other caves. A particular mention is required for the Parpalló Cave, in eastern Spain, not only for the more than 5000 works of portable art made on stone plaques through painting or engraving, mainly of animals, but also for the orientation of the cave entrance, which allows during the sunrise of the winter solstice and the days before and after, the illumination by sunlight of the internal chamber of the cave. We can imagine that for more than 21,000 years and until the end of the Paleolithic, festive rituals were celebrated during the day of said solstice and the days surrounding it, celebrating the rebirth of the solar cycle, as well as the rebirth of the life cycle it entails.

The Post-Palaeolithic of the Eastern Iberian Peninsula: The Origin of the Gods

14000 years ago, as the ice of the last glaciation begins to retreat towards the Arctic, a climatic and ecological change begins, which was abruptly reversed by a new cold and dry period, the Younger Dryas, between 12900 and 11700 years ago. The variations in ecosystems persist during the Epipaleolithic/Mesolithic, conditioning a profound environmental crisis that affected the type of beliefs. Two are the places where this profound change of mentality is manifested, expressed in a new type of art far from the ideal beauty of the previous period. These sites are the sanctuary of Pla de Petracos and Göbekli Tepe.

The sanctuary of Pla de Petracos

The Pla de Petracos site consists of a set of four well-preserved shelters decorated with Macro-schematic Art (N17) and one of Levantine Art on the left bank of a valley near the town of Castell de Castells, Alicante, Spain. It stands out both for the iconography represented and for the choice of the painted shelters, which take the form of natural niches aligned from east to west and arranged like an altarpiece (N18) on the rock of the valley, forming a kind of transcendent place, where even a large flat stone in front of the shelters could serve as an altar. In addition, sound is transmitted very clearly, making the site the ideal space for the celebration of ceremonies due to its good acoustics. The painted motifs are clearly visible from the opposite bank of the valley at the point opposite them.

Description of the main shelters (see images in Urbano et al., 2020)

Four of the macro-schematic shelters stand out: V, VIII, IV, and VII, for their exceptional expressionist scenes of almost surrealistic style, the mythological symbolism they represent, and the good state of conservation in which they have reached the present day.

Shelter V, located in the center of the natural rock altarpiece, consists of serpentine motifs, thick dots, and two central anthropomorphic figures (called orants for having their arms raised with their hands above their heads) arranged in a position, one above the other. The lower anthropomorph has its upper limbs directed towards the other anthropomorph, as well as the lower limbs (as in a fighting action) that emerge from the trunk very elongated and thin with a course towards the upper, unnatural and serpentine figure.

Shelter VIII, located to the west of the entire complex, contains several panels with paintings, but the one occupying the central wall of the natural niche is of greater symbolic value, with several motifs, one next to the other. On the left, a possibly headless anthropomorphic figure is represented with a Levantine-style flared skirt related to some geometric structures, and on the right, an abstract composition facing the anthropomorphic figure is interpreted as the head of a bull.

Shelter IV, located to the east of the altarpiece, represents three erect anthropomorphic figures dressed in long tunics side by side. To the right, a slightly curved bar frames the scene. Above the head of the central anthropomorphic figure, a series of thick dots make up a triangular geometric figure that crowns said anthropomorphic figure. Between the three human figures, two fine lines in the shape of a double Y appear.

Shelter VII, located between the three previously described shelters, also of macro-schematic style, represents a series of thin lines and thicker bands of serpentine trace related to each other. In addition to Macro-schematic art, at Petracos there is a Levantine art shelter, shelter I, showing a wounded animal that would be part of a hunting scene (typical of this style) that has been partially lost and located beyond the natural rock altarpiece, indicating that it is disconnected from the rest of the shelters.

Archeoastronomy, chronology, and mythology at Petracos

The comparison of the macro-schematic shelters of Petracos with the official drawings of the current constellations presented on the website of the National Astronomical Observatory of Spain and with other paleoastronomical events show a great similarity that is not casual, showing that celestial phenomena served as a model to represent those scenes. The Stellarium software program also allows us to date the shelters by the events shown.

Shelter V

The anthropomorphic figures of shelter V represent the constellations of Ophiuchus and Hercules and the adjacent stars, while the thick dots and serpentine motifs symbolize the celestial and primordial waters, just as they were represented in ancient Egyptian civilization. During the 10th millennium BC, Ophiuchus and Hercules were located very close to the North Pole of the celestial vault, being circumpolar (N19) or imperishable constellations, as they would later be called in Pharaonic Egypt, which in the Pyramid Texts (N20) is mentioned as the place to which the deceased pharaoh ascended in various ways to achieve eternity. Furthermore, in the 10th millennium BC, the Sun was located in the constellation of Ophiuchus during the summer solstice (N21). To reinforce this chronology, we have archaeological datings, during the transition between the Upper Paleolithic and the Epipaleolithic, and paleoanthropological datings, 10000 years ago, obtained from the nearby Santa Maira cave in which remains and evidence of braided rope use were discovered, which is shown in the upper anthropomorph carrying a loop of this material on the right arm, and bone remains with signs of cannibalism, one of the possible mythological interpretations of this scene as a precedent for the Cannibal Hymn of the Pyramid Texts. For the author, they seem to symbolize the eternal and imperishable dance or confrontation between the Hero or the Divinity against the Monster or the Demon, represented by the circumpolar constellations of Hercules and Ophiuchus, respectively, a precedent for the epic mythological battles between Horus and Seth, Gilgamesh and Enkidu, or Zeus and Typhon of the ancient civilizations of Egypt, Mesopotamia, and Greece, respectively. This change of mentality in the 10th millennium BC was conditioned by a climatic change that resulted in the expansion of thermophilic forests in the Mediterranean once the Younger Dryas ended in 11700 BP and that is reflected in the abandonment of the artistic expressions of the great pictorial sanctuaries of the Upper Paleolithic, characterized by naturalism and ideal beauty, reflecting an idyllic conception of nature, by the expressionism and drama of a new convulsive world that generates uncertainty.

Shelter VIII

The anthropomorphic figure represents the constellation of Orion, the bull's head to Taurus, the geometric figures to the constellations of Canis Major and Minor, and the vertical lines of Taurus to the primordial waters. This celestial region is also mentioned in the Pyramid Texts and is related to the Hereafter to which the deceased pharaoh accesses and the Celestial Bull that welcomes him, therefore the scene of this shelter suggests that it represents an important character, possibly a recently deceased pregnant woman, hence it

is headless, welcomed by the divinity. Its chronology is less than 6500 BC because until those years the constellations of Orion and Canis Major were not seen again from these latitudes in the sky after several millennia in which they remained below the southern horizon, partially or totally, due to the precession movement of the Earth.

Shelter IV

The scene in shelter IV represents the Pleiades crowning the planet Mars in 6500 BC, as shown by the Stellarium software program, along with two other planets in conjunction in their orbits around the ecliptic. This shelter along with the previous one are from the Mesolithic period and occupy a peripheral position in the natural altarpiece of Petracos. This chronology coincides, again, with a new climatic change after a first cold and dry period in the Holocene (the current geological epoch). Shelter IV suggests to us the idea of how hunters and gatherers could have discovered three of the five planets visible to the naked eye. In their journey near the ecliptic (line that the sun travels in a year through the zodiacal constellations, close to which the planets and other celestial bodies of the solar system move in their trajectories) they pass near the Pleiades. The observation of this star cluster over periods of time of several decades (the time it takes Jupiter and Saturn, the slowest, to travel through the celestial sphere) allowed them to see these planets and the conjunction of several of them. Ethnology and Archaeology have documented that hunter-gatherer peoples during seasonal changes hold celebrations in which several communities gather to socialize and avoid endogamy. This scene is precisely what it depicts: a seasonal festivity during the Mesolithic presided over by the Pleiades and the planet Mars, perhaps in 6500 BC.

Shelter VII

The scene in shelter VII represents the W-shaped asterism of Cassiopeia and the band of the Milky Way associated with it. It seems to show us the origin of the river or the path of the firmament that guides us at night, sprouting from the breasts laden with milk of the divinity. By being located in an intermediate position between shelters V, IV, and VIII, it suggests that its chronology is between the end of the Magdalenian and the end of the Mesolithic.

Shelter I

Shelter I, of Levantine style, being located outside the natural rock altarpiece suggests that it has a dating later than those of the Macroscopic art, which is consistent with the absolute chronology that we have for Levantine art and with the chromatic superpositions between figures when one style, the Levantine, appears over the other, the Macroscopic, in the same shelter, which indicates that this one is earlier. In addition, this shelter lacks similarity to any paleoastronomical phenomenon, and the scene represented reflects a different mythology.

Other sites

In addition to Pla de Petracos, at the Barranc de l'Infern site, in Vall de Laguart, Alicante, Spain, there is a shelter of Macroscopic Art in which the panel of the twin figures stands out. It consists of two elongated figures joined at the trunk, as if they were Siamese twins. One figure is slightly larger than the other and only two upper limbs are indicated, which are in a praying position. The lower limbs are very short and emerge upwards. They represent the Gemini constellation, the northern stars of Orion, and other adjacent stars, suggesting that the chronology of this panel is from the 10th millennium BC because during this period the northern stars of Orion are the only ones that can be observed from the latitude where the site is located. Very close to the Santa Maira caves, in Castell de Castells, Alicante, we find another shelter, Famorca V, which represents a planetary alignment along with the Scorpio constellation, which occurred in -8002, and which can be associated with the cannibalized remains discovered in said cave, which are dated to that date, and whose previous ceremony, of a shamanic type that includes Altered States of Consciousness, also seems to be represented in Famorca V (see image in Urbano, PJ, 2024b) and be the precedent of the Cannibal Hymn of the Old Kingdom of Egypt.

The Post-Palaeolithic of Upper Mesopotamia: The Earliest Religious Monumental Constructions

Between the end of the Paleolithic, 14,000 years ago, and the appearance of productive societies based on agriculture and animal husbandry, 10,000 years ago, in Upper Mesopotamia and the southern Mediterranean Levant, transitional cultures emerged that did not abandon the huntergatherer exploitation system but incorporated some elements that would later develop fully. These elements included a certain degree of

sedentarization in villages, sustained during this period by the care and harvesting of wild cereals. The first part of the phase was characterized by ecological and climatic prosperity, but from 12,900 years ago, environmental conditions deteriorated drastically, laying the groundwork for a spiritual modification that introduced new religious concepts. This modification found expression in the construction of monumental structures, which in a site in Upper Mesopotamia, Göbekli Tepe, at the end of the climatic crisis 11,700 years ago, represented a significant departure from the Paleolithic.

Göbekli Tepe. Megalithism

The site, located in southeastern Turkey, consists of at least twenty megalithic structures, of which eight have been excavated, the oldest dating back 11,600 years. Each structure consists of several monumental monolithic limestone pillars in a T-shape, with an elongated rectangular section, distributed in circular, oval, quadrangular, or polygonal plans. The largest structures, with diameters of over twenty meters, are also the oldest and most monumental. Most of the enclosures are likely oriented for astronomical reasons, although it is very difficult to determine which ones, in a south-southeast direction. Inside each structure, in the center, there are two monoliths facing each other, with identical characteristics but more monumental than those on the perimeter, and to which the latter point with the horizontal pseudo-capital of the T. To delimit the internal space of each enclosure, a dry stone wall with seating benches is externally attached to the perimeter pillars, connecting them and separating the interior from the exterior. In some enclosures, structures that would form the large access openings to the interior and exit to the exterior have been found, but since they were found fallen on the ground, it is unknown whether they were originally located on the side walls or on a possible roof.

Göbekli Tepe.

Reliefs Some of the T-shaped pillars contain carved reliefs of animals, and one, a headless phallic human figure, or they show a human arm flexed at the elbow on each of the broad faces of the pillar, with the hands found on the narrow face facing the central pillars (indicating that they are all interpreted as representations of stylized anthropomorphic beings) or pieces of clothing covering what would be the chest or genitals of these beings. The access gates to the enclosures also contain animal reliefs. Additionally, various round sculptures have been found at the site. Most of these works follow an expressionist style intended to highlight the terror they inspire rather than the ideal beauty that inspired much of Paleolithic art. Thus, snakes, reptiles, scorpions, spiders, vultures, other birds, wild boars, foxes, lions, unidentified predators, etc., are depicted in threatening attitudes, some showing exaggerated size or dentition, or in attacking postures, adopting violent and intensely dramatic movements, or in association with the headless phallic human figure. Rams, other herbivores, bulls, and bucrania also appear, but all with a more naturalistic style.

Göbekli Tepe.

Modifications to Human Skulls At the Göbekli Tepe site, remains of three artificially modified human skulls have been found in separate pits, corresponding to three adult individuals aged between 20 and 50 years, whose sex could not be determined. The modifications were postmortem, as there are no signs of healing, and consist of a perforation (in one left parietal), three types of incisions (in two frontal and one right parietal of different skulls), small cut marks, and the application of color on one skull. Additionally, two anthropomorphic sculptures related to a decapitation ritual have been found. One, about 60 cm in height, is intentionally severed at the neck; the other, 26 cm tall, known as the bearer of offerings, holds a human head between its hands. If we include the relief of the headless phallic human figure located on one of the aforementioned pillars, we observe that decapitation was practiced for subsequent treatments of the skull and the rest of the body.

Other sites

Nevalı Çori is a settlement located about 50 kilometers northwest of Göbekli Tepe, dated 11,000 years ago, one millennium later. Here, for the first time, a sanctuary with T-shaped pillars similar to those described above was found, in this case forming a sub-square plan. The entrance is well preserved and features a small staircase oriented southwest (identical to the orientation found in one of the enclosures at Göbekli), leading to the axis of the two central pillars. There may have been a roof as a secondary addition, which was probably not present in the older circular sanctuaries of Göbekli due to the distance between pillars and their varied heights, although it may have been present in similar-plan sanctuaries like Nevalı Çori. Skulls stacked in piles have also been found at this site. Sefer Tepe and Karahan are other sites in the area where sanctuaries with T-shaped pillars have been found, indicating that these beliefs spread and were not limited to a specific location.

Interpretations

It seems clear that the T-shaped pillars represent stylized anthropomorphic beings standing upright, both because of the human arms and hands depicted on some of them, as well as the clothing on others, or the silhouette of the pseudo-shaft of all the pillars. The false capital symbolizes the head, which, by analogy with other statues found at the Nevali Çori site, would have been adorned with a hairstyle in which the hair is wound around the upper and posterior part of the head, giving it an elongated appearance represented by the horizontal section of the pillar's T. These lack details, something common in Paleolithic venus figurines, indicating that they are not portraits but personifications of spiritual or mythological beings that played an important role in the populations of post-Paleolithic Upper Mesopotamia. They may be the deities that make up the first pantheon believed in by humanity, consisting of two primordial beings, located in the center of each structure and larger in size, and their first descendants or local heroes, of inferior treatment, arranged around them. In this pantheon, perhaps, lies the origin of the first generation of gods referred to by the Sumerians and ancient Greeks. Some of these beings, and the entrance gates (perhaps symbolizing access to the Afterlife or the Home of the Gods), give rise to the protective aurochs, bucrania, and rams with their horns or defenses, but also to the terror inspired by predators, snakes, and giant scorpions emerging from parts of their bodies, as if wanting to drive away anyone who sees them. These deities are no longer the friendly forms of Paleolithic venus figurines and lion-men but terrible entities that instill fear. The idyllic life of the cave art period of Chauvet, Lascaux, and Altamira has given way to a new era presided over by tyrannical and violent supernatural beings that are the expression of an environmental restriction era imposing a harsher way of life or a hierarchical society seeking to preserve the status of a few, the class of priests. It is as if humanity had been expelled from the Paradise in which it previously lived and had been relegated to suffering. In one of the megalithic structures at Göbekli, a large stone plate has been found fixed to the ground in front of the eastern central pillar, belonging to the immovable installations of the enclosure and representing a vestige of a ritual involving the handling of liquids, for libations, sacrifices, or feasts, playing an important role. As for the treatment of the deceased, on the one hand, the relief of the headless phallic human figure at Göbekli, in a schematic style, in association with an oversized scorpion and various types of birds, including the vulture, suggests that the decapitated bodies of the deceased, at least some of them, were left exposed under the protection of a scorpion deity (a precursor to the Egyptian scorpion goddess Serket-Heru or Selket, protector of the pharaoh's sarcophagus) to be picked clean and cleaned by vultures or to accompany the soul of the deceased to the Afterlife. It seems as if it was believed that in this way they would become these birds or needed them to ascend to the sky, which would be a precursor to the divine falcons of Egypt and the celestial animals that devour the gods mentioned in the Pyramid Texts. Similar scenes of vultures flying over decapitated human bodies are also found a few millennia later in mural paintings in sanctuaries of Çatalhöyük, in southern Anatolia, indicating the long history of this belief. On the other hand, the statuette holding a human head documents a ritual in which the head of the deceased was offered or treated in a transcendent manner separately from the body, while the skull modifications found at Göbekli Tepe seem to have been made to hang from a rope and be stabilized by it. Rituals with skulls will reach their zenith a few millennia later with the modeled skulls found in a large part of the Neolithic sites of the Near East, to which lime or plaster modeling is applied once defleshed to mimic soft tissues, as in Jericho, in the West Bank, where shells are also inserted into each eye socket as a substitute for the eye, and details such as the beard, hair, and ears are indicated with paint.

Astronomical Orientations

A small bone plaque discovered at Göbekli Tepe with an engraved relief suggests that the megalithic enclosures were also centers for astronomical observation. On this 6 cm plaque, a human figure is depicted between two T-shaped pillars (presumably the central ones of the different structures due to their arrangement), looking towards the small opening of a stone located in front, on the wall. These openings, 25-30 cm in size, appear in the main excavated enclosures, in the retaining walls, with a location identical to that indicated by the bone plaque and an orientation north-northwest. It seems that they were aligned towards the place of the setting of the star Deneb, in the constellation of the Swan, during the time when the constructions are dated. This star and its constellation were likely the subject of attention since the times of Lascaux, when they were the pole star and a circumpolar constellation, respectively. Some researchers indicate that they are even symbolically represented in one of the paintings in the Paleolithic cave, which could be considered equivalent to the scene of the scorpion, the birds, and the headless anthropomorphic figure at Göbekli. However, the scorpion there is a bison (and likewise, we do not know if it protects the corpse or causes its death), the birds are a small bird on an axis holding it (perhaps indicating the axis of celestial rotation, through which one can ascend to the heavens), and the phallic figure appears complete. The constellation of the Swan during the post-Paleolithic could have been associated with the figure of a vulture, a bird that, as we have seen, played a central role in the funerary

beliefs of the time, as well as being interpreted as a gateway to the Afterlife because the Milky Way nebula bifurcates in this celestial region, giving rise to a large dark cleft.

Post-Palaeolithic in North Africa

Between approximately 8000-6000 BC, North Africa was a region wetter than it is today, and the Sahara was a savannah prairie dotted with forests around water concentrations, which were very numerous. This is due to the cyclical movement of the angle between the Earth's axis of rotation and the plane of the planet's orbit, which oscillates between 22° and 24.5° over a period of 41,000 years, resulting in variations in solar radiation.

The cave of the Beasts

The site is located in the desert, in southwestern Egypt, 400 km from the Nile, bordering Libya and Sudan south of the Gifl Kebir plateau in the Wadi Sora (N22). It consists of more than 5000 figures of rock art, of considerable value, ranging from 8800 to over 7000 years old, from the North African Epipalaeolithic. They depict scenes of hunting, fishing, dancing, men swimming, domestic life, dogs, giraffes, lions, etc., irregularly and without order. All of them are reminiscent of Levantine art in the Iberian Peninsula, although with the differences typical of the region. Thirty exceptional scenes stand out for their mythological character, depicting a creature, the beast, headless, with a bull's body and human lower limbs, devouring or vomiting people. Serpentine beings with a triangular distal appendage devouring people by the head and being hunted by human archers are also represented. This theme is consistent with that of shelter V in Petracos and the representations of monstrous predatory animals from Göbekli Tepe, and also with the chronology of Fomorca V.

Nabta Playa: Megalithism and Archaeoastronomy

The site is located in the desert, in Sudan, about 800 km south of Cairo and about 100 km west of the White Nile. It features circular structures (cromlechs) and megalithic alignments with astral orientations. For some researchers, the megalith alignments were oriented with the stars of Orion's Belt, Shoulders, and Head around 6270 BC, and the megaliths inside one of the circular structures, called the calendar circle, correlate with Orion's Belt between 6400 and 4900 BC, coinciding with the radiocarbon dating of the fire pits found nearby and the mass sacrifice of animals between 6100 and 5600 BC, indicating gatherings of individuals from various places for ceremonial meetings. Subsequently, around 4800 BC, the calendar circle would be erected, oriented approximately at sunrise on the summer solstice. These dates are compatible with those of shelter VIII in Petracos, suggesting that by the end of the 7th millennium BC, astral worship of the Orion constellation was widespread between the southeast of the Iberian Peninsula and the vicinity of the Nile.

Notes

Note 1

The genus Homo is composed of several extinct species and modern humans. Among the fossil species, we can highlight, among others, *H erectus/ergaster*, *H neanderthalensis*, their ancestral species, and the ancestral species of modern humans. They are characterized by having a common general morphology with body proportions similar to modern humans, except for the earliest Homo species, and a large endocranial capacity. The genus appears in Africa approximately 2 million years ago and created and developed the lithic cultures of the Paleolithic.

Note 2

The cerebral cortex is the superficial region of the cerebral hemispheres. It contains the cell bodies of millions of neurons, the specialized nerve cells in transmitting electrical and chemical impulses. Each hemisphere is divided into four lobes: frontal, in the anterior region; temporal, at the level of the ear; occipital, in the posterior region; and parietal, in the region located between the other three.

Note 3

The electroencephalogram or EEG records the electrical activity of the brain, mainly the cerebral cortex, by attaching electrodes to the scalp. Depending on the state of alertness, relaxation, or sleep of the individual, the bioelectrical patterns of the brain differ.

Note 4

The hippocampus is a deep structure that contains neuronal bodies, located inside the temporal lobe, and is essential in processes involving long-term memory and recall.

Note 5

The limbic system is a set of brain structures responsible for the activation of emotional states. It consists of the cingulate gyrus, on the medial surface of the cerebral hemisphere, and the amygdala, in the depth of the temporal lobe, among others.

Note 6

Patients with split-brain are individuals in whom, through surgical intervention, most of the connections between the two cerebral hemispheres have been severed, so if information reaches only one hemisphere, the other hemisphere is unaware of that information.

Note 7

Monozygotic twins come from the same fertilized egg by one sperm, which divides to form two separate embryos with the same genetic content, always of the same sex. Dizygotic twins come from two fertilized eggs, each fertilized by a different sperm, sharing 50% of the genetic content and possibly being of different sexes.

Note 8

In the cell, a gene is a section, or a set of separate sections, of the DNA chain whose sequence pattern of its most basic constituents, nucleotides, is used to form a specific protein, although there is a small percentage of genes that instead of encoding proteins, sequence only small RNA chains. Our species contains between 20,000 and 30,000 genes encoding their reciprocal proteins.

Note 9

A protein is a complex molecule with a specific function, structural, regulatory, transport, functional, etc. For example, the fleshy part of muscles, the muscle belly, is formed by several types of proteins that allow muscle contraction. The set of all an individual's proteins determines their own characteristics. In a species, the degree of variability in each type of protein is more limited than when compared to other species. Each different type of protein is encoded by the sequencing of a specific gene.

Note 10

Neurotransmitters are a set of molecules involved in chemical synaptic transmission between neurons or between neurons and muscles or glands. In such synapses, neurotransmitters are released by neurons from synaptic vesicles, stored in synaptic vesicles, into a small space between cells, the synaptic cleft, and captured by specific receptors on other neurons to activate or inhibit electrical impulses, or in muscle or glandular cells to activate muscle contraction or secretion of substances, respectively.

Note 11

An allele is each of the existing varieties of the same gene in a biological species. Each allele accumulates mutations that differentiate it from other alleles, resulting in a different phenotype, such as the light or dark color of the iris of the eyes in humans.

Note 12

The Neanderthal (*H neanderthalensis*) is an extinct species of humans that lived between slightly over 300,000 years and 40,000 years ago in Europe, the Near and Middle East, and Central Asia. Among other physical characteristics compared to modern humans are: more robust bones, shorter forearms and shins, a larger average volume inside the skull, and a receding forehead. Genetic and paleoanthropological studies conclude that there was hybridization between them and modern humans. In turn, recent archaeological studies indicate that the first geometric rock engravings are of Neanderthal origin. During the last millennia of their existence, they competed with modern humans from Africa for the supply of proteins obtained from the hunting of large animals. As their requirements were much higher to maintain their hypertrophied muscles and robust bodies, their reproductive capacity was lower than that of modern humans, which over time led to the extinction of Neanderthals. Archaeological data seems to support this hypothesis. In the Arctic Circle, there are two sites dated to 28,500 BP, one from the Mousterian culture and the other from an Upper Paleolithic culture. In both, mammoths were hunted, but there is a big difference between them: in the Mousterian, associated in the rest of Europe with Neanderthals, they did it to feed their, surely, robust bodies, while in the Upper Paleolithic one, they did it to take advantage of their skins and tusks, not needing to eat as much meat for the slender bodies of modern humans with which it is associated.

Note 13

Pre-Neanderthals belong to extinct species of the Homo genus in the exclusive lineage of Neanderthals. Recent genetic studies of nuclear DNA (which contains the genetic information of anatomical characteristics) from individuals of the Sima de los Huesos, Burgos, Spain, confirm their Neanderthal lineage.

Note 14

Hominins are a group of primates adapted to the posture and bipedal locomotion that separated from the specific lineage of the Pan genus (chimpanzees and bonobos). According to paleoanthropological data, they appear in the fossil record about 6 million years ago. Genetic studies, on the other hand, confirm that hominins diverged from chimpanzees and bonobos between 7 and 6 million years ago.

Note 15

Modern humans (anatomically modern humans) are individuals belonging to the only living species of hominins and the Homo genus. They appear in the fossil record in Africa about 200,000 to 150,000 years ago. They later spread to the rest of the planet. All current humans are modern humans or H. sapiens.

Note 16

At the latitude of the Parpalló cave, a mid-latitude of the northern hemisphere, the winter solstice occurs on the day of the annual solar cycle when the Sun rises furthest south along the eastern horizon and sets furthest south along the western horizon, culminating at noon with the lowest altitude of the year over the south, and therefore, casting the longest shadows. The night of this day is the longest of the year. From the winter solstice onwards, the Sun rises in the east and sets in the west each passing day a little further north, recording an increase in its altitude over the south at noon, while increasing the time the Sun is above the horizon, shortening the duration of the night. All this continues until the summer solstice, when the events are reversed until the next winter solstice to close the annual solar cycle. This is because the Earth's axis of rotation is not perpendicular to the plane of the Earth's orbit but has a certain degree of inclination, which results in an apparent annual movement of the Sun in an inclined orbit around the Earth. Hence, at the winter solstice at the North Pole, a six-month night begins, at the Arctic Circle, the Sun does not rise for 24 hours, and in the Arctic, the night lasts an intermediate time between the two depending on whether it is closer to one or the other. The situation in the South Pole, the Antarctic Circle, and in places between them is the reverse of that in the northern hemisphere, beginning a six-month day, 24 hours without sunset, and an intermediate-length day, respectively. The apparent inclined orbit of the Sun is also responsible for the fact that in the intertropical zone, the Sun oscillates between north and south at noon at its culmination depending on the time of year and the latitude of the place.

Note 17

Macro-schematic art is located almost exclusively in the interior of the province of Alicante, in the eastern foothills of the Betic Cordillera, in a dozen shelters in several of the valleys that individualize the mountain ranges that mark the geography of the northern part of the province. It is characterized by complex schematic figures of large format. Its first study was carried out by Mauro Hernández Pérez. The recent archaeoastronomical study is the work of Pedro Juan Urbano Cardona.

Note 18

A retablo is the architectural element located behind an altar. It may be decorated with sculptures and paintings that narrate a sequence of relevant mythological events.

N19

Circumpolar stars are the stars that are visible every night of the year, weather permitting, and are always above the horizon, describing circles around the celestial pole, without rising or setting. Currently, the Pole Star occupies almost the celestial north pole, so it appears to be always still for those who can see it, while the rest of the circumpolar stars of the northern celestial hemisphere rotate around it. Whether a star is seen as circumpolar or not depends on the latitude of the observation site because the Earth, not being flat, varies the celestial perspective according to the orientation of each point with respect to the angle it forms with the Earth's axis of rotation. At the poles, all the stars observed are circumpolar; at the equator, none are, and at Petracos and Egypt, an intermediate amount. It also depends on the historical period in which we place ourselves because the Earth's axis of rotation rotates in a complete cycle of almost 26,000 years, describing a cone in a movement in which the orientation of said axis varies slowly. This is the so-called precession movement, due to the effect of gravity on a body that rotates on itself while moving in a translational motion. Thus, Deneb was the Pole Star during the

Upper Paleolithic phase when the Lascaux paintings were made, and in the future, it will be again, and the constellation of Hercules approached very close in the 10th millennium BCE. Consequently, the Pole Star will leave its current position, and until the next cycle, it will not occupy it again. In turn, the precession movement implies that the celestial sphere and, with it, the apparent orbit of the Sun seem to rotate around the earth in a complete turn every 26,000 years, so each year there is a slight advance of the solstices and equinoxes, anticipating the seasons slightly. Thus, at the end of the Paleolithic, the winter months would correspond to the current summer months and vice versa.

N20

The Pyramid Texts of Ancient Egypt, from the 3rd millennium BC, are the oldest written documents that have reached us referring to religious beliefs. In them, we can observe that the first religious ideas of this civilization were very varied and even antagonistic, the result of a long cultural tradition in which syncretism had played a unifying role among the different communities that formed it. There is a cult of the Afterlife (the Duat), presided over by Horus (the Falcon god); a cult of body preservation after death, of resurrection, and reincarnation; a cult of animals (zoolatry); an astral cult (circumpolar stars); a solar cult (perhaps relaunched with the recent establishment of the 365-day calendar by the Egyptians); a cult of magic, etc. Among their statements, it is stated that the deceased pharaoh:

- ascends to the imperishable and to heaven like the divine falcons either by a ladder or an earthquake to attain the immortality of the soul;
- ascends to the Duat, the place where Orion is found;
- resurrects and reincarnates as a god (Osiris) or as a falcon;
- travels in the boat with the Sun god (Ra) accompanying him on his celestial journey;
- is the Bull of the sky that devours gods and human sacrifices (following an older tradition that is no longer practiced). It is the so-called Cannibal Hymn;
- feeds on and lives off the essence of offerings; and • is freed from all evils that may afflict him on the journey to the Afterlife through protective magical declarations against scorpions, snakes, etc. Additionally, they refer to the complex ritual of embalming practiced with the body of the deceased pharaoh, especially the opening of the mouth.

N21

At the latitude of Plá de Petracos, a mid-latitude of the northern hemisphere, the summer solstice occurs on the day of the annual solar cycle when the Sun rises furthest north along the eastern horizon and sets furthest north along the western horizon, culminating at noon with the highest altitude of the year over the south and, therefore, projecting the shortest shadows. The night of this day is the shortest of the year. From the summer solstice onwards, the Sun rises in the east and sets in the west each passing day a little further south, recording a decrease in its altitude over the south at noon, while reducing the time the Sun is above the horizon, lengthening the duration of the night. All this continues until the winter solstice, when the events are reversed until the next summer solstice to close the annual solar cycle. This is because the Earth's axis of rotation is not perpendicular to the plane of the Earth's orbit but has a certain degree of inclination, resulting in an apparent annual movement of the Sun in an inclined orbit around the Earth. Hence, at the summer solstice at the North Pole, a day begins that lasts six months, at the Arctic Circle, the Sun does not set for 24 hours, and in the Arctic, the day lasts an intermediate time between the two depending on whether it is closer to one or the other. The situation at the South Pole, the Antarctic Circle, and in places between them is the reverse of that in the northern hemisphere, beginning a six-month night, 24 hours without sunrise, and a night of intermediate duration, respectively.

N22

A Wadi, in Arabic, is a river valley in the desert that is generally dry, although sometimes it has surface watercourses or concentrations. The subsoil may contain wells of water.

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