

THE ROLE OF ART, ABSTRACT THINKING AND SOCIAL RELATIONS IN THE HUMAN EVOLUTION

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Abstract. Before the appearance of *Homo sapiens sapiens*, some pre-human genotypes that lived on the Earth, left material evidence concerning different events of their social, behavioural or artistic manifestations. One of the earliest proofs is the use of objects from the environment as primitive tools to extract bone marrow, action probably achieved by a population of *Australanthropus olteniensis* in Romania (Tetoiu, Bugiulești, Oltenia, about 2,000,000 BC). Current studies show that pre-human species originated in the African Rift Valley, which provided optimum benefits to its evolution and diversity. Proto-oceanic environmental quality and diet (rich source of polyunsaturated long fibres) ensured brain development and human evolution. Several pre-human species (*Homo habilis*, *H. naledi*, *H. erectus*, etc.) emerged and lived in this area prior to their migration to other continents. Fire making and use, both for cooking and protection against weather and wildlife, was the essential factor for human evolution. Benefiting from the cooked food, pre-human beings had access to richer food resources, which led to the increase of the skeleton, and, implicitly, of the skull and encephalus. This made possible the development of practical utilities, followed by abstract utilities, such as thinking and intelligence. Sexual dimorphism, the presence of the gene FOX-P2 and the development of language, social and tribal life led to the arrangement of the living spaces, family. The increase of the skull and brain development contributed to the transition from practical activities (manufacture of weapons and tools) to abstract activities, development of art and intelligence. By abstract modelling of the materials from nature (rock, bone, ivory or wood) there were created statues, wall paintings, there appeared burial, cremation and embalming practices, which represented the germs of religion through the belief in the afterlife (in tombs, there were found food, personal items to be useful by the deceased persons at their return in another life).

Keywords: pre-human populations, social relations, abstract thinking, artistic achievements, human evolution.

Rezumat. Rolul artei, al gândirii abstracte și al relațiilor sociale în evoluția omului. Înainte de apariția speciei *Homo sapiens sapiens*, unele genotipuri pre-humane care au locuit pe Terra, au lăsat dovezi materiale privind manifestările lor sociale, comportamentale sau artistice. Una din cele mai vechi dovezi este utilizarea unor obiecte din mediul înconjurător drept unelte primitive pentru a extrage măduva osoasă hematogenă, acțiune realizată probabil de o populație de *Australanthropus olteniensis*, din România (Tetoiu, Bugiulești, Oltenia, c. 2.000.000 BCE). Studiile actuale arată că speciile pre-humane au originea în zona Marele Rift African, care a oferit avantaje optime pentru evoluție și diversitate. Calitatea mediului proto-oceanic și a dietei (sursă bogată în fibre lungi polinesaturate), au asigurat dezvoltarea creierului și evoluția omului. Mai multe specii pre-humane (*Homo habilis*, *H. naledi*, *H. erectus*, ș.a.) au apărut și au conviețuit în această zonă, înainte de migrarea lor în alte continente. Producerea și utilizarea focului, atât pentru prepararea hranei, cât și cu rol protector față de intemperii și animalele sălbatice), a constituit un factor esențial pentru evoluția omului. Beneficiind de prelucrarea alimentelor prin gătit, ființele pre-humane au avut la dispoziție resurse bogate de hrană, fapt care a condus la mărirea scheletului, implicit a cutiei craniene și encefalului. Aceasta a făcut posibilă dezvoltarea utilităților practice, urmate de utilitățile abstracte, gândirea și inteligența. Dimorfismul sexual, prezența genei FOX-P2 și apariția limbajului, viața social-tribală, au condus la amenajarea spațiilor de locuit, familia. Mărirea cutiei craniene și dezvoltarea encefalului au contribuit la trecerea de la activități practice utilitare (confecționarea de arme și unelte), la activități abstracte, dezvoltarea artei și inteligenței. Prin modelarea abstractă a unor materiale din natură (rocă, os, fildeș, sau lemn), au fost create statuete, picturi rupestre, au apărut practici de înhumare, incinerare și îmbălsămare, care au reprezentat germenii religiei prin credința în viața de apoi (în morminte au fost găsite alimente, obiecte personale, pentru a fi utile decedaților la revenirea într-o altă viață).

Cuvinte cheie: populații prehumane, relații sociale, gândirea abstractă, realizări artistice, evoluția umană.

INTRODUCTION

Provision for descendants' development in optimal conditions. In the environment, there are numerous examples when parents manifest an interest for the descendants' development. Thus, in numerous vertebrata with external fecundation, the female parent deposits a big amount of vitellus, which assures the development of the descendants. Moreover, in case of many species of fish, amphibia or reptilia, the male builds the place in which the female will assure the development of the descendants. The nest presents an attractive aspect and the female inspects it to see if it is adequately built. Some insect species (termites and others) present a social organization. They build really nurseries of fungi as food source for the descendants. Many other species make up the food resources and protect them from other species or individuals. Also, there are used different materials (stone, wood, ivory, etc. for the development of the descendants, as resources of food, useful matter). In many cases, these actions present a genetic determinism. There is also an evolution theory. Some species deposit the food which is in excess: birds and small mammals preserve food in different places (in the thorns of some shrubs or buried in the soil). Other species use different materials from the environment for obtaining food (bone or vegetal fragments, etc.). After LESTEL (2001), affirm that the cultural compartment not represent a feature specific for humans, being also present in many animals.

MATERIALS AND METHODS

This synthesis was conducted based on information from the literature available by the end of 2015 on various features of the pre-human species, as well as on the geological and biochemical characteristics of the Great African Rift region. In the area of the Great Rift Valley, brain evolution was induced by two elements, namely the fresh water of the proto-oceanic environment (ecological elements) and a rich dietary source of long-chain polyunsaturated fatty acids, both being involved in the evolution of the human brain (SEIFU, 2004; BEDNARIK, 2008). Gun (1998) considers that a prolonged access to a rich dietary source of long-chain polyunsaturated fatty acids (LCPUFA) was a central feature of the evolution of the human brain (BEDNARIK, 2008).

Among the features of the pre-human species, there were collected information on the qualitative and quantitative involvement of a rich and diverse diet in the development of the skull and neurocranium; sexual dimorphism and social division of labour, which led to the family-tribal organization of the pre-human species; practical activities that brought firstly to the development of tools and weapons, and then to the emergence of abstract thinking and development of intelligence; the presence of the gene FOX-P2 and language developed the relationships between the members of pre-human species and strengthened their social relationships, etc.

The development of abstract thinking led to the development of art (processing of the materials from the surroundings – rock, wood, bone, ivory) and the representation of the animals of interest, hunting scenes by preserving and transmitting the accumulated experience, representation of fecundity (women with a lower pelvis and big phallus in case of men), arrangement of the residential spaces and their spatial representation, burial ceremonial with religious elements, etc. An early burial ceremonial (a mother with her child), dating to about 90,000-100,000 years ago, was found in the cave Qafzeh of Nazareth (Israel). Bodies buried in the foetal position (crouching) or placed on one side, dated to 6,500 BC, were found in the tombs from Gumelnița (ȘERBĂNESCU, 2000).

RESULTS AND DISCUSSIONS

The Great Rift Valley and hominid evolution. The Rift Valley or the Great Rift Valley is a vast geographical and geological formation that extends for about 6,000 km on a north-south direction, from northern Syria (south-west of Asia) to the centre of Mozambique (East of Africa). The valley varies in width from 30 to 100 km, in depth from a few hundred to several thousand meters. It is created by the separation of the African and Arabian tectonic plates, which began 35 million years ago, and the separation of East Africa from the rest of Africa, a process begun 15 million years ago (RING, 2014; Fig. 1). This area was a rich source of palaeo-anthropological discoveries, preserving human remains: bones of hominids, ancestors of human species (*Sahelanthropus tchadensis*, *Ardipithecus ramidus*, *Australopithecus afarensis*), the famous Lucy, which lives 3.2 million years ago, etc. The ecological conditions from the Great African Rift Valley offer optimal advantages for the evolution and diversity of the pre-human species. In the scientific literature, there is a dispute regarding the environment or diet importance (the food quality and quantity) in the brain evolution. In the brain evolution on the Great Rift Valley, the two elements are represented by fresh water of the proto-oceanic environment (ecological elements) and a rich dietary source of long-chain polyunsaturated fatty acids, both being involved in the evolution of the human brain (BROADHURST et al., 1998). Gun (1998) considers that a prolonged access to a rich dietary source of long-chain polyunsaturated fatty acids was a central feature of evolution of the human brain (BROADHURST et al., 1998).

On the Earth surface, there are areas with spring neutral water having a small content in deuterium. The human population from these regions present a high vitality, the life expectancy is over 100 years, man fertility is present even at one hundred years old, and people are affected by few diseases. In one of these areas, in Denisova Cave from the Pamir Mountains, 40,000 years ago, there were present three *Homo* species, at the same time: *Homo sapiens sapiens*, *H. denisovan* and *H. neanderthalensis*. A similar area is also in the mountain area from Tadjikistan (old population, the presence of water spring with small content in depleted-deuterium – D₂O). In this region, the existence of human fossil traces is also possible. The experiments performed with depleted deuterium water evidenced its protective role (CORNEANU et al., 2010), its action being a trap for the free radicals.

The Rift Valley in East Africa is a rich source of hominid fossils that allows the study of human evolution (CORTI, 2014). Several hominid ancestors of the modern humans were found here, including those of 'Lucy', a partial australopithecine skeleton discovered by Donald Johanson, dating to 3 million years ago. Recently, two other hominid ancestors were discovered in the Rift Valley region, (SEWARD, 2007), dating to the Miocene: *Chororapithecus abyssinicus* in Afar rift (eastern Ethiopia) and *Nakalipithecus nakayamai* that lived in the Nakay region (present Kenya), a possible common ancestor of humans and present great apies (*Gorilla*). *Chororapithecus abyssinicus* lived in Ethiopia, 10.0-10.5 million years ago, for 2 million years, and was probably a common ancestor of humans and chimpanzees. In the same time, in present Greece, it was another prehistoric hominid, *Ouranopithecus*. In a doctoral thesis preformed in different sites from Ethiopia (Afar Depression, the main Ethiopian Rift and the Blue Nile Basin), Kebede Seifu (2004) reported a different content in isotopic composition from meteoric water or in different places and analysed lakes. One explanation was the presence of a different evaporation degree.

The occurrence of pre-hominid species, with adaptation to specific ecological and geological conditions. Primitive hominids lived 2-4,000,000 years ago in Africa and Asia. In Romania (Bugiulești, Tetoiu, Vâlcea County), there were found traces that denote the presence of human ancestors, represented by bone fragments, bone tools and raw stone,

dating to about 1.8 - 2 million years ago (C. S. NICOLĂESCU-PLOPȘOR, 1956). Without the presence of bone fragments, it is supposed that these represent the activity of hominids called differently by researchers: *Australanthropus olteniensis*, *Archanthropus alutensis* or *A. carpathicus* (D. NICOLĂESCU-PLOPȘOR, 1976; VASILIU, 1996).

Homo habilis, the first species of the genus *Homo* possessing a large brain (550-687 cm³) lived 2,000,000-1,900,000 years ago in Olduvai Gorge, Tanzania (south-east Africa), and was discovered by Mary and Louis Leakey (LEAKEY et al., 1964; LEAKEY, 1971). It manufactured about 11 types of stone tools of Olduvan type and communicated with its peers using speech (the speech gene FOX-P2 was active), exhibiting sexual dimorphism. Bipedal walking led to the hand liberation from locomotion, thus the hand being used for capturing and handling different objects and manufacturing tools and weapons from different materials. The sexual dimorphism conducted to tribal organization of the hominid group: the division of labour in the group, social organization and family appearance. Sexual dimorphism was characterized by differences in size between the two sexes. Males being higher hunted large animals in groups. Females presented a wider pelvis, which facilitated easy birth, having children earlier than before. The presence of the gene FOX-P2 made possible verbal communication between the members of the same population.

Tribal social organization, verbal and sexual dimorphism led to the tribal division of labour in the hunter-gatherer group. Males captured large game, females gave birth and took care of their children and other community members; they captured small game and were gatherers of herbs and fruits. It co-existed with *Homo erectus*. They were the shortest modern humans, having a body height up to 1.3 m and a weight of 35-55 kg. Previous estimates indicated an endocranial volume of 550-687 cm³, but measurements made in 2015 showed a cranial capacity of 729-824 cm³. Although it had a smaller cranial capacity than modern humans, its presence is associated with the most primitive tools found at Olduvai Gorge (Tanzania) and Lake Turkana (Kenya). An intermediate fossil between *Australopithecus* sp. and *Homo habilis* was found in the Afar depression, Ethiopia, being the earliest record of the genus *Homo*. *H. habilis* remained in Africa for 500,000 years and disappeared after 1.4 million years. It is considered that *H. habilis* is an ancestor species of *H. ergaster*, from which *H. erectus* evolved.

Homo naledi lived in Africa 2,500,000-2,800,000 years ago. It was short (150 cm, 45 kg) and presented sexual dimorphism. Males had a cranial capacity of 560 cm³, while females of 450 cm³ (HENSHIL WOODSS et al., 2009).

Homo erectus appeared in the Pleistocene and lived from 1,900,000 to 70,000 years ago. Originating in Africa, it spread in Eurasia (Java, China, India, the Caucasus). It was characterized by an increased body size (height 180 cm, weight 60 kg) and a cranial capacity between 850 and 1100 cm³. The rich and varied diet and food preparation by fire led to the increase of the cranial volume and, implicitly, increase of the encephalus. The presence of a voluminous brain, varied and rich diet, use of the anterior limbs to handle tools and weapons, social life led to the development of abstract thinking and activities. Thus, there occurred the passage from activities with practical results (use of stone, bone, ivory, wood tools for getting more efficient tools and weapons) to activities with abstract results: modelling bone, stone, ivory, wood and getting statuettes (animals, numerous copies of Venus that personalized fertility, personalities such as the thinker of Hamangia, deities, parietal drawings – animals, hunting scenes specifying the vital points for hunting), elements of cosmology, etc. Referring to its origins, there are several hypotheses: (a) *H. erectus* is a species similar to *H. ergaster*, being the direct ancestor of *H. heidelbergensis*, *H. neanderthalensis*, *H. sapiens*; (b) *H. erectus* is an African species, distinct from *H. ergaster*; (c) *H. ergaster* is the variety of the African *H. erectus*; (d) under the name *H. erectus*, there were more ancestors in the same area; (e) the archaic human species (*H. habilis*, *H. rudolfensis*, *H. ergaster*, etc.) are variations of the same species. *Pithecanthropus erectus* species, discovered by the Dutchman Eugene Dubois in 1891 on the island of Java, was renamed *H. erectus*.

Homo ergaster. It appeared in the Pleistocene in Africa, being the earliest hominid. It lived between 1,900,000 and 1,400,000 years ago. There are several hypotheses about its origins: (a) *H. ergaster* represents the African variety of *H. erectus* species; (b) *H. ergaster* is the ancestor of *H. erectus* species; (c) there are no distinct differences between *H. ergaster* and *H. erectus*. It had 60-70 kg, a height of 190 cm and a cranial capacity of 700-900 cm³. Later, some specimens had a cranial capacity of 900-1,100 cm³. Some authors consider that after the separation of *H. erectus* from *H. habilis* (1.8 million years ago) it emigrated from Africa, resulting *H. erectus*. *H. ergaster* developed a technique for tool making, superior to those used by *H. habilis*. In addition, *H. ergaster* is considered as the first hominid that used fire (it is not known if it could produce it). It seems to possess the gene FOX-P2, responsible for articulated language, which facilitated social life. The superior techniques, which allowed manufacturing of various more sophisticated tools and the use of fire that enabled the improvement and diversification of diet and the use of language in social life, were defining factors for its evolution and that of its descendants.

Other species on the path of humanization:

(a) **Archaic people** that appeared and lived 500,000 years (500 ka), represented by: *Homo neanderthalensis* (40-300 ka); *H. rhodesiensis* (125 – 300 ka); *H. heidelbergensis* (200 – 300 ka); *H. antecessor* (800 – 1200 ka).

Homo heidelbergensis, called like this as it was described based on a mandibles found in Heidelberg (Germany) in 1907. It lived in Africa, Europe and Western Asia, between 600,000 and 200,000 years ago. Their skull shows common characteristics with the skull of *H. erectus* and anatomically modern human. *H. heidelbergensis* had relations with *H. neanderthalensis*, *H. denisovan* and *H. sapiens* (anatomically modern humans). Between 300,000 and 400,000 years ago, a group of *H. heidelbergensis* migrated to Europe and Western Asia, reaching Spain, Italy, France, England, Germany, Hungary, Greece. Another group arrived in mainland Asia, having relationships with *H. denisovan*. The African population of *H. heidelbergensis* (or *H. rhodesiensis*) merged with *H. sapiens* for about 130,000 years,

after which it migrated to Europe and Asia, between 125,000 and 60,000 years ago. Some anthropologists support an association between *H. heidelbergensis* and *H. erectus*. Anatomically, *H. heidelbergensis* is more primitive than the anatomically modern human, the dental arch being harmonious, with complete teeth and a skull capacity of 1,100 – 1,400 cm³. It was also registered sexual dimorphism, as males had 1.75 m and 62 kg, while women 1.57 m and 51 kg. It seems that *H. heidelbergensis* was first humanoid that could vocalize.

Homo rhodesiensis was discovered in 1921 in Rhodesia (Zambia). It lived between 300,000 and 125,000 years ago. It is believed that *H. rhodesiensis* would represent a local population (African) of the species *H. heidelbergensis*. Individuals were robust, having a well-developed skeletal system. The cranial capacity was 1,230 cm³.

Homo neanderthalensis (100,000-40,000 BC / 27,000 BC) sheltered in caves, caverns or in huts on the soil surface, using the fur of the hunted animals for protection against cold. Traces of these prehuman populations were discovered in Romania, at Baia de Fier (Oltenia), Cheia and Adam (Dobrogea), Ripiceni-Izvor (Moldova), Ohaba-Ponor (Transylvania), etc. The first recognized and dated *H. neanderthalis* footprint was found in Vârtopeș Cave (Apuseni Mountains, Romania) in 1974 (VIEHMANN, 1987). Researches performed by ONAC et al. (2005) established the age [uranium (U)–thorium (Th) dating] of this footprint to ~ 62,000 years. Recent research conducted at Peștera cu Oase (The Cave with Bones) located near Anina, Caraș-Severin County revealed the oldest fossils of modern humans in Europe (approx. 37,000 BC). The analysis of the nuclear DNA from a bone fragment of a *H. neanderthalensis* ancestor (2015) revealed that a share of 5-11% of the autosomal comes from the Neanderthals. Maxillary, the cave with bones, 34,000 to 36,000 BC (TRINKAUS & ZILHÃO, 2002; TRINKAUS et al., 2006; TRINKAUS, 2007; REICH et al., 2010).

(b) **Anatomically modern humans** represented by *Homo sapiens idaltu* and *H. sapiens sapiens*.

H. sapiens idaltu, with a cranial capacity of 1,450 cm³, appeared in the Pleistocene (Lower Palaeolithic) in Africa (Ethiopia) and lived between 154,000 and 160,000 years ago.

H. sapiens sapiens that appeared 200,000 – 70,000 years ago populated the entire planet. The oldest fossil of the species *H. sapiens sapiens*, found in Europe, dated to 34,000 – 36,000 BC, is a maxillary belonging to a male called “Ion de la Anina”/’John from Anina’ (TRINKAUS, 2007).

(c) **Species stranded or eliminated on the path to humanization**, represented by *Homo denisovan* and *H. floresiensis*.

(d) SUTIKNA (2016) consider that ***H. floresiensis* was eliminated by *H. sapiens sapiens***.

In the rapid evolution of hominids and the appearance of modern humans, an important role was played by social and artistic activities and achievements that contributed to the development of the capacity of the skull. As the Neanderthals became gatherers and hunters, they assured a rich and varied food source (due to the use of fire to prepare food, its diet was rich and diversified) and its artistic preoccupations contributed to its detachment from the animal world and evolution on the path of humanization. Its artistic preoccupations led to the increase of the volume of the skull and hence of the brain, facilitated the exploration of the internal and external environment and thus an accelerated evolution in comparison with other genotypes (species) that went on the path to humanization (*H. floresiensis*, *H. denisovan*, etc.), but failed.

Diet (food quantity and quality) and the development of the nervous system

The discovery, preservation and use of fire are attributed to *Homo erectus* and it occurred in the Lower Palaeolithic. Fire was essential for the protection of prehuman beings against weather and large animals, as well as for food preparation and ensuring an optimum diet.

Cooking food on fire led to higher food quality, process expressed in the increase of the volume of the skull and brain. The increase of the brain volume was beneficial to the development of practical necessities (use of environmental resources such as stone, ivory, bone, etc. as tools or weapons) and to the emergence and sustaining of abstract representations, characterized by the appearance of thinking and intelligence development. In the Palaeolithic, burial of the deceased people was practiced and there were also some burial ceremonials. The faith in the existence of an afterlife determined the storage of personal items and food near the deceased. In the tomb of Tut-ank-Hamun Pharaoh (1341-1323 a.Ch.), there were found the seeds of an adaptogen plant (*Nigella sativa*), which would have served to help him get into another world. Being alone in front of the environment with wild animals and various spectacular phenomena (volcanic eruptions, earthquakes, eclipses, meteor showers, etc.), the first humans gained knowledge of cosmology, which is as old as humanity. Nebra Sky Disc is a bronze disc with a diameter of 32 cm and a weight of 2.2 kg. On its surface, there are represented the sun (or full moon) and the stars of the Pleiades constellation. It dates back to about 3,600 years (1,600 BC) and is exposed in the Pergamon Museum, Berlin. Nebra sky disk represents the oldest concrete depiction of the cosmos worldwide, being considered as “one of the most important archaeological findings of the 20th century”.

The role of culture in human evolution. Earlier Olduwan stone culture dates to about 2,500,000 BC before the migration of the ancestors of prehuman populations from Africa. The characteristic of this culture is the stone carving methods to obtain sharp corners, useful for carving or cutting. The first stone tools from the Lower Palaeolithic were found in Hadar, Ethiopia. Human evolution may be defined by the development of stone tools, process with an impact on the development of ancient art.

Reconsidering the age of the first artistic manifestations. Initially, classical paleontological studies admitted that the first paleoart manifestations of the pre-hominids date about 1,000,000 BC (HARROD, 2012). The reconsideration of the oldest traces found so far led to their earlier dating, respectively almost two million years ago (HARROD, 2014). The first evidences of the intended use of objects as simple tools of bone and wood found in Romania (Bugiulești, the

Dârjov Valley), which probably belonged to some individuals of *Australopithecus*, are also of about 2 million years old (C.S. NICOLĂESCU-PLOPȘOR, 1956). The artifacts identified at Olduvai Gorge (Fig. 2) are non-utilitarian (perhaps with a symbolic function, abstract) and dates to 1,800,000-1,500,000 years ago (HARROD, 2014).

These are represented through different artistic representations: [a] Grooved and pecked cobble, Olduvai Gorge, 1,800,000 BC, (LEAKEY, 1971); [b] Subspheroid with apparent dot-and-undulating-line motif framed in hexagon shape, Olduvai Gorge, around 1,500,000 BC, (LEAKEY, 1971); [c] Four core choppers, around 1,900,000 BC, (HARROD, 2014). Top-right, “broken core” with rhomboid shape after four cortical flake removals; [d] Cast of the broken core with rhomboid shape after four cortical flake removals (HARROD, 2014, around 1,900,000 BC). Among the seven stone tools, the three strongest candidates are the Olduvai Gorge, the FLK North grooved and pecked cobble, about 1.80 million years ago, and MNK Main sub-spheroid with hexagon shape framing an apparent natural dot-and-undulating-line motif, about 1.5–1.6 million years ago, both initially reported and described by Mary Leakey; and the curated Koobi Fora FxJj1 “broken core” with inner rhomboid shape, about 1.87 million years ago. All six stone tools from Olduvai Gorge need scientific re-examination to determine their chaîne opératoire and assess non-utilitarian features. If even one of the Olduvai Gorge artifacts were validated as having a symbolic behaviour this would indicate the emergence of paleoart one million years earlier than current proposals. These findings suggest that *Homo habilis* and/or *Homo rudolfensis* or very early *Homo erectus* individuals had symbolic abilities. These findings imply the reconsideration of the paleoart implication in the cultural evolution of the hominids. The creation of cupules and petroglyphs in caves or near stone quarries, in the sites for stone processing for tools, weapons, coincided with the moment the pre-hominids moved into sheltered places to protect themselves against wildlife and harsh weather.

Cupules are the earliest known prehistoric art forms, which were discovered on every continent except Antarctica (Fig. 3). They were produced during all three eras of the Stone Age (Palaeolithic, Mesolithic and Neolithic), as well as in the historical times. Also, they represent the most common type of rock art. After BEDNARIK et al. (1996), a cupule is a hemispherical petroglyph, created by percussion, existing on a horizontal or vertical surface. Their size is between 1.5 and 10.0 cm in diameter. The oldest cupule dates to approximately 1.7 million BC from Olduvai Gorge, Tanzania, Africa. The earliest known cupule art, dating between 290,000 and 700,000 BC, is that from Central India, Mathai Pradesh, Auditorium Cave Bhimbetka and Daraki-Chattan (500 specimens) from the same period.

Petroglyphs are images created by removing part of a rock surface by incision, picking, carving or abrading as a form of rock art (Fig. 4). They are world-wide associated with prehistoric peoples. The painted or drawn images on rocks are not petroglyphs. They are dated to the Neolithic period, about 8,200 BC. A recent petroglyph is the Decebalus rex petroglyph, from Danube Valley.

Art and social development in the *Homo* genus evolution. Other palaeontologists consider the non-utilitarian artistic cupules discovered at Olduvai Gorge (Tanzania, 1,700,000 BC), as the oldest manifestations of art belonging to the tribes of pre-hominids. The end of the Pliocene and the beginning of the geological period Pleistocene coincided with the replacement of less efficient stone tools of the Olduvai culture with more efficient tools of the Acheulean culture. In the Lower Palaeolithic, tool manufacturing was dominant throughout Africa and in many parts of Europe and Asia. Armed with weapons to capture prey, pre-human species became the main predator (1,500,000 BC). The appearance of the European culture Clactonian led to the manufacturing of flint tools (400,000 BC). Early flint Mousterian culture in Europe, Middle East and North Africa has been associated with the production of sharp blades. According to some authors, the earliest manifestations of prehistoric art are represented by the cupules and petroglyphs from Bhimbetka, Auditorium Cave, Bhimbetka (Fig. 5) and Daraki-Chattan Cave (both in Madhya Pradesh, Central India, c. 290,000 - 700,000 BC or later). It is noted the presence of *Homo sapiens arhaicus*. According to DAWKINS, (2004) under the name of *Homo sapiens arhaicus*, met in the last 500,000 years, it is understood the presence of the species *H. sapiens neanderthalensis*, *H. sapiens heidelbergensis* and *H. sapiens rhodensis*, to which other authors add the species *H. antecessor*. BEDNARIK (2008) sustains the presence of the species *H. erectus marmandesis* and *H. sapiens* and of an individual of *H. floresiensis* at Auditorium Cave, Bhimbetka.

Spiritual elements and social arrangements. **Chief's Rock** from Bhimbetka, situated in a central position in the cave system from Bhimbetka, is over 1.5 m high and 3.4 m wide, having forty tons. There are several barely perceptible marks of red mineral pigment (probably an iron mineral such as haematite). None of the paint traces on the Chief's Rock art panel are superimposed over the petroglyphs. All the petroglyphs on this panel are cupules as hemispherical depressions. Nine cupules were produced by percussion with a stone tool, which was probably hand held. The ensemble from Bhimbetka was used by pre-humans as living space, providing protection and having many spiritual elements (Fig. 5). An early burial ritual of the species *H. sapiens sapiens* dating to 90,000-100,000 years ago was highlighted in the cave Qafzeh in Nazareth, Israel, where a mother and her baby were buried (Fig. 6).

Social arrangements and human evolution. In the same geological niche, it was signalled another outstanding achievement of prehuman populations, namely the arrangement of the spaces for living and social activity, which were properly equipped for this need (Auditorium Cave from Bhimbetka or Daraki-Chattan Cave from Madhya Pradesh, Central India, dating to 290,000 to 700,000 BC). The arrangement of megalithic structures as living spaces (similar to Bhimbetka assembly) has been reported in many cultures and we mention the outstanding example of Stonehenge megalithic monument (England). Recently, in southeastern Turkey, Urfa province, it was discovered a towering monument named Göbekli Tepe (big-bellied hill) located on the coast of a hill (Fig. 7). It is believed that this was a religious sanctuary, built in the early Neolithic, 11,500 years ago, by a nomadic hunter-gatherer population. With

the transition from hunter-gatherer populations to sedentary populations of farmers-breeders, Neolithic people began to set up communities in different areas. People built and arranged houses, thus emerging ancient villages. The largest Neolithic village was discovered in a flat region in central Turkey at Çatalhöyük, dating to 7,500 BC, with an estimated population of about 8,000 inhabitants (STRINGER, 2003; MLODINOV, 2016).

The construction of megalithic monuments required the processing of building materials. The processing of stone blocks and obtaining slabs of stone or flint nodules, currently occurs in the same way as in prehistory. In Valea Țâței settlement, Pietroșița commune, Dâmbovița County, Romania, for stone exploitation and obtaining tiles, three groups of workers work in pairs. As tools, they use mallets or hard stone chisels. The blocks of stone that must be processed (crystalline schists, basalt, slate, flint, etc.) are placed in front of them on an inclined plane of the soil. With hammer and chisel, handled rhythmically, repeated blows are applied to the block of raw material, following the lines of weak resistance of the stone, which is divided into tiles. The three teams trim and break the initial block, obtaining plates of different sizes adapted to their target: roofing slate, stone for pavement, stone pieces of different sizes from which they shape objects with different utilities, etc. Recently, the famous scholar Claude Lévi-Strauss compared the way flint was processed in prehistory and in our era of industrial production (1986).

The oldest artistic achievements. The oldest artifacts were made by pre-humanoid species. As food diversified after the discovery of fire, there occurred the increase of the body size, respectively of the cranial capacity and encephalus. The pre-humanoid species passed from representing the practical aspects of their existence (manufacture of tools and weapons to procure food and defend) to the abstract representations (modelling of the animals of interest in stone, horn, ivory, source of food or raw material, arrangement of the shelters, etc.), sculptures, cave paintings on the shelter walls (caves) of the animals of interest, divinities and personalities of the tribe, etc. There are many examples rendering the use of natural materials (rock, bone, wood, ivory) as tools for the production of weapons and other tools. Their processing by our human ancestors is very old, seen in *Australanthropus oltenicus*, etc.

MORRIS-KAY GILLIAN (2010) considers that the origin of the artistic behaviour of pre-human beings is in Africa, dating before the migration and dispersion of these species in the Great Rift area. Artistic behaviour represented by painting the human body is a process outlined at Blombos Cave, South Africa (70,000 BC). The aspects of the zigzag and criss-cross pattern (curves and parallel lines) are the result of phenomena involuntary produced by the visual system, suggesting a physiological disorder. The analysis of the fossils of different artistic manifestations of pre-human species indicates their participation in the artistic process (WOOD & LONERGAN, 2008).

Material evidence of the conscious artistic activity of pre-humans dates back in time, being found in all areas and their geological and biological niches. Among them we can mention several categories of examples.

The living spaces where petroglyphs and cupules can be found are: (a) Auditorium Cave Petroglyphs, Bhimbetka. A cupule dates to 290,000 – 700,000 BC. Acheulian Period. Madhya Pradesh, India; (b) Auditorium Rock Shelter, Madhya Pradesh, Central India; (c) Daraki-Chattan Cave Petroglyphs, 290,000 – 700,000 BC. Rock engraving from the Acheulian Period. Indragarh Hill, Madhya Pradesh, Central India.

Venus of Berekhat Ram, 230,000 – 700,000 BC (or 200,000 – 470,000 BC, Marshak, 1997) is the oldest stone statuette created by *Homo erectus*, found at Berekhat Ram, Gollan Hills (North Hills), Israel.

Venus of Tan-Tan, 200,000 – 500,000 BC, quartz figurine, Acheulian period, Tan-Tan, Morocco (Fig. 8). The microscopic analysis confirms that the pre-human populations manufactured this figurine (GIBBONS, 2002). In the same site from Israel, it was discovered a necklace manufactured from snails (100,000 BC).

The prehistoric hunter-gatherers used the natural pigments for body painting (75,000 BC, Blombos Cave Snail Beads, Southern Coast of South Africa).

The female symbol is represented by a statuette of a woman with a lower pelvis and subsequent particular features. Statuettes were found in different regions of the planet (mainly in Europe, Asia and Africa) and they represent female figurines called Venus plus the name of the place of origin. Among these, there can be mentioned: Venus from Blombos Cave (70,000 BC, South Africa); Venus of Kostenky (30,000 BC, Russia); Venus of Dolni Vestonice (Danube Valley, Romania, Serbia), first ceramic figurine (26,000 BC); Venus of Willendorf (25,000 BC, Austria); Venus of Craiova (12,000 – 17,000 BC, Romania), etc.

The first figurative figurine dates to 33,000 – 30,000 BC, Swabian Jura, Germany. In numerous caves, there were found sculptures and parietal art, being represented numerous animal species.

Utilization of mineral pigments, both in parietal paintings and body painting, had a mystic, protection and camouflage role. The prehistoric hunter-gatherers used the natural pigments for body painting (75,000 BC, Blombos Cave Snail Beads, Southern Coast of South Africa). *Homo erectus* used mineral pigments for the paintings on the Twin River.

Parietal art and the use of mineral pigments. Parietal paintings in Chauvet Cave, France rendering horses and fighting (30,000 BC); bulls in Lascaux, France, (17,000 BC); Altamira, Spain (15,000 BC; Fig. 9); Peștera cu Oase (The Cave with Bones), Romania (15,000 BC), etc. In the Upper Palaeolithic, cave art emerged, represented by drawings, sculptures, paintings on cave walls or rocks, as well as artcraft resulted by modelling different materials (bone, horn, ivory, stone and other minerals). Besides the famous sites such as Lascaux, La Madeleine, Les Combarelles (France), Altamira (Spain), Thaur (Switzerland), Tassili, Abergong or Messauda (Africa) or Asia (China, India), examples of cave art were found in Romania at Cuciulac, Sendriceni, Poștile de Fier/Iron Gates, Pârcalabul Cave, Polovraci, etc. (VASILIU, 1996), Peștera cu Oase/The Cave with Bones, 38,000 – 40,000 BC (TRINKHAUS et al., 2006; ZILHÃO, 2006; ZILHÃO et al. 2006; ROUGIER et al., 2007).

The parietal art represents animals (horses, bison, bulls, used as food and protection sources), as well as the chase scenes, animal and hunter behaviour (a bison in Altamira Cave; Fig. 9). The achieved figurines represent different animals (horses and mammoth ivory figurine, 33,000 BC, Vogelhend Cave; horses from Chauvet Cave, France, 30,000 BC), personalities (*thinker of Cernavoda* (Romania, 5,000 BC, Hamangia culture, terracotta sculpture), divinities, etc. We have to mention that the first writing system (alphabet) was discovered at Tărtăria, Alba County, Romania (7,000 – 7.500 BC), preceding the Summerian hieroglyphs (3,200 BC).

Homo heidelbergensis used ochre pigment 250,000 years ago in Netherlands and *H. neanderthalensis* used black and red pigments in cave paintings in Cioara cave, Gorj County.

At Ferrasie Cave Couples, about 70,000 – 40,000 BC, there is a Neanderthal tomb, Mousterian / Aurignacian Period, Les Enzies, Dordogne, France.

Venus of Hohle Fels, 35,000 – 40,000 BC, is an ivory sculpture, Aurignacian culture, Swabian Jura, SW Germany.

Swabian Jura Ivory Carrings, about 30,000 – 33,000 BC, Aurignacian Period, Hohle Fels, Hohlenstein-Stadel, Germany.

Venus of Kostenky (Bone Venus), about 30,000 BC, Aurignacian Period, Kostenky, Russia.

Chauvet Cave Painting, about 30,000 – 23,000 BC, monochrome painting, Aurignacian & Gravethian Period, Ardèche, France.

Pre-human populations recorded different cultural aspects, contributing to their integration into the environment and evolution. Knowledge contributed to their evolution and the development of intelligence made possible the accumulation of knowledge from and about the surrounding environment. They made many inventions that eased the living conditions: they invented the wheel, bow, used animal fur as a means of protection against harsh climate conditions during the ice ages; cosmogony knowledge enabled knowledge of the surrounding world.

Cosmology is as old as humanity; the earliest cosmology elements date to the Neolithic (20,000 – 100,000 years ago). In the Sub-Saharan Africa, it was found a bone fragment dated to about 20,000 BC, representing a lunar calendar. That evidences the astronomical and cosmological thinking of the human populations. The megalithic structures with astronomical purpose appear in Africa and Europe (Stonehenge complex in the Great Britain) around 5,000 BC, realized by different populations and cultures, which had no contact with each other.

CONCLUSIONS

The ecological conditions and the water quality from the area of the Great African Rift were favourable to the appearance of proto-hominids.

The existence of many pre-human species in the same area (the Great African Rift) favoured the selection processes of the valuable genetic structures before the migration towards other areas of the globe.

The quality of the diet, characterized by food prepared with fire, led to the increase of the cranial capacity at several pre-human species (*Homo habilis*, *H. naledi*, *H. ergaster*) before their migration to other continents.

Sexual dimorphism (difference in size between males and females, low pelvic position which favoured early birth, etc.), the presence of the gene FOX-P2 for articulated language, etc. favoured the development of a social-tribal life.

Initially, pre-human species had a practical thinking referring to the utilization of different environment resources to obtain weapons and tools.

The proper diet led to the shift from practical thinking to abstract thinking. In this way, pre-human beings passed to artistic representations: manufacture of statuettes made of different materials, parietal paintings that rendered the hunting experience to the entire tribal group; arrangement of the living space, etc.

It is remarked the age of the artistic achievements of pre-human beings, representatives of different species: *H. habilis*, probably *H. naledi*, *H. erectus*, *H. neanderthalensis*, *H. sapiensis sapiensis*, etc.

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Received: March 31, 2016
Accepted: August 22, 2016

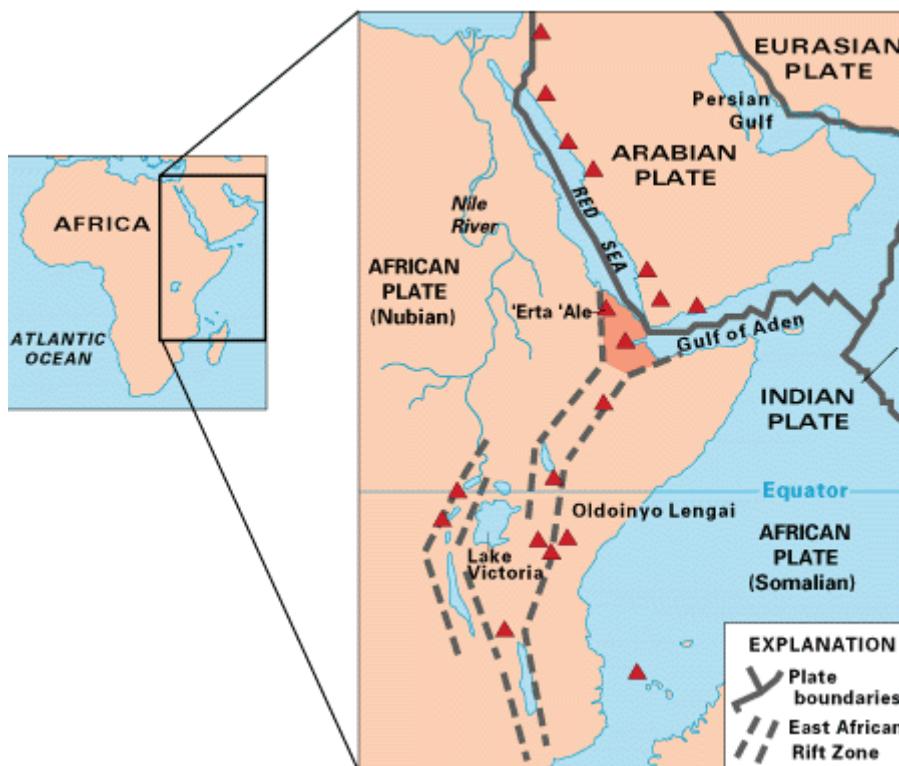


Figure 1. Great African Rift Valley (from Wikipedia, 2016).



Figure 2. Non-utilitarian artefacts identified at Olduvai Gorge (1,800,000 – 1,500,000 years ago) (LEAKEY et al., 1964).



Figure 3. Cupules in an Acheulian deposit, Auditorium Cave, Bhimbetka, India (BEDNARIK, 2008).



Figure 4. Petroglyphs from Scandinavia (Nordic Bronze Age). Häljesta, Västmanland in Sweden December 2005, Haljesta.jpg (after BEDNARIK, 2008).

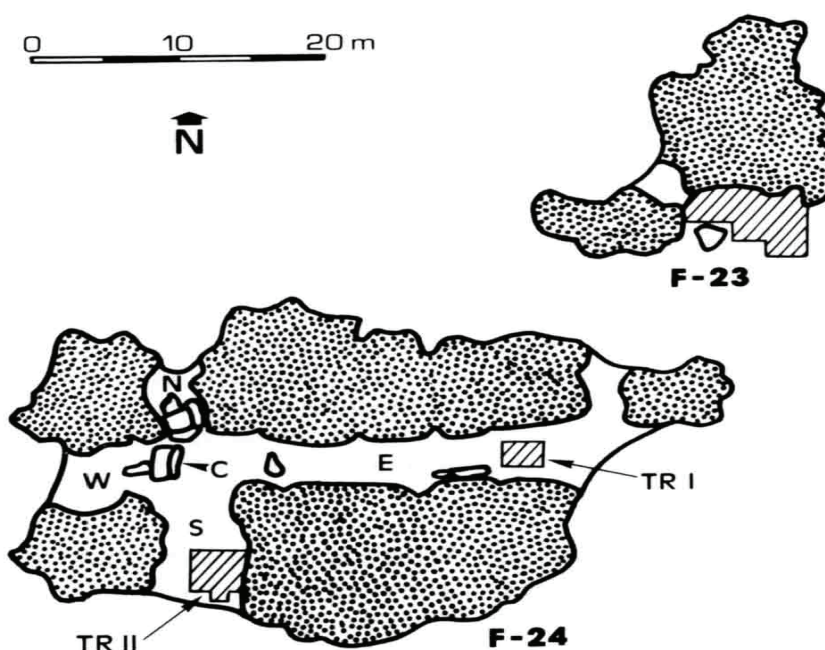


Figure 5. The plan of the Auditorium Cave, Bhimbetka, India, 290,000 – 700,000 BCE (after BEDNARIK, 1996).



Figure 6. Inhumation ritual, Qafzeh Cave, Nazareth, Israel. A mother with his child (*Homo sapiens*, 90,000 – 100,000 BCE) (after HARROD, 2012).



Figure 7. Massive stone pillars at Göbekii Tepe, Turkey, 11,000–11,500 years ago (from Wikipedia Free Encyclopedia 2016).



Figure 8. Venus from Tan Tan (Morocco) 200,000-500,000 BCE (from Wikipedia Free Encyclopedia 2016).



Figure 9. Parietal picture, a bison in Altamira Cave, Spain (15,000 BCE) (from Wikipedia Free Encyclopedia 2016).