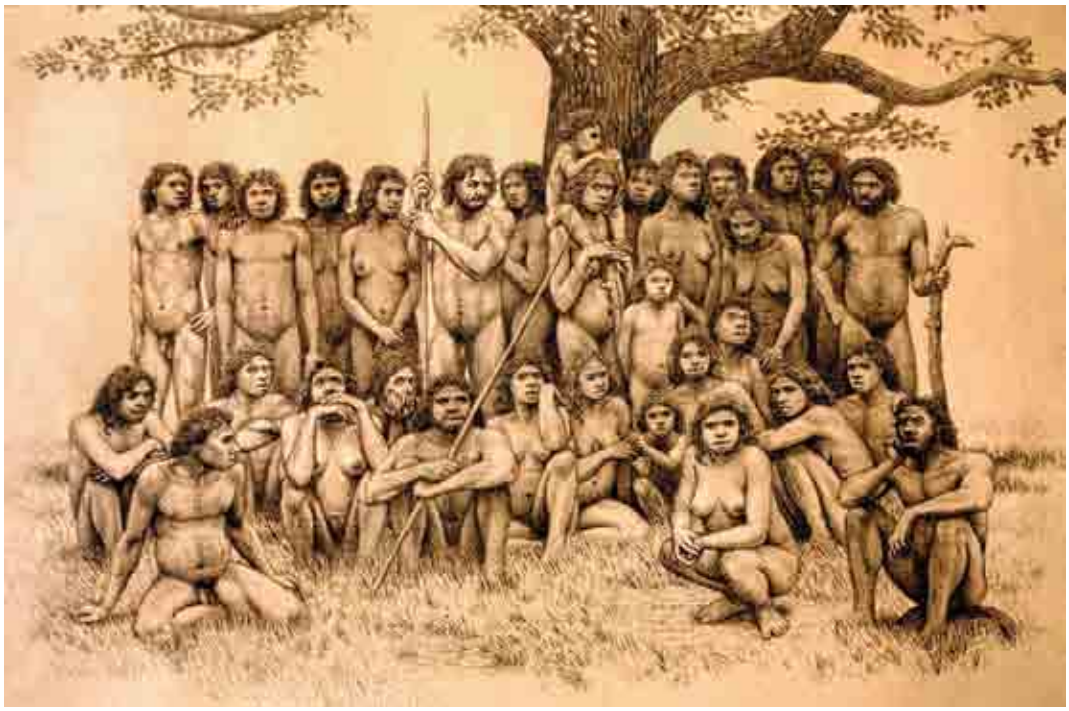
ISSN 2499-1341

EXPRESSION

BIMONTHLY E-LETTER OF THE COMMISSION ON INTELLECTUAL AND SPIRITUAL EXPRESSIONS OF NON-LITERATE PEOPLES

N°6 August 2014



Atapuerca Family Portrait. By Mauricio Antón. (*Homo heidelbergensis*). Burgos, Spain.
Image courtesy of National Geographic.

A MESSAGE FROM THE PRESIDENT

Dear Friends and Colleagues,

The International Committee on the "Intellectual and Spiritual Expression of Non-literate Peoples" is conveying in its session at the USPP Burgos Congress, as in previous occasions, for experts from various disciplines to share experience and scientific approaches for a better understanding of the human creativity and behavior. Thank you for your active participation. Over 70 summaries have been accepted, and several full texts of papers have reached our team already. Participants include colleagues with different scientific concerns and specializations, from five continents. A stimulating dialogue is in progress by skype and internet. It will continue at the Congress and thereafter.

UISPP-CISENP was founded in 2006 as an international scientific commission of The International Union of Prehistoric and Protohistoric Sciences (Union Internationale des Sciences Préhistoriques et Protohistoriques). Emmanuel Anati**,** President.

Our committee is progressing in a joint effort of its participants, for a cooperation of different branches of the humanistic and the social sciences, aiming at building up a new kind of broad-minded study and understanding of the past. It is a sincere pleasure to welcome this courageous common effort. Prehistoric archaeology is in urgent need of this new landscape of "Conceptual Anthropology", for a step forward. It is an important new academic approach for build up a solid future for the study of man.

In the last three generations, we have followed the tendency of some humanistic disciplines, in stabilizing conservative concepts, as a mean to preserve the past acquisitions and dictate the philosophical and ideological image of the discipline. Such trend creates a sort of mysticism of the discipline, a special glossary of conventional slangs, imposing a peculiar way of reasoning. This may turn out to become a handicap for innovation and progress. Each discipline has the tendency to find a comfortable refuge in its own ghetto. The spirit of conservation then favors the progress of those best integrated into the vernacular system. The obedient alumni are not necessarily the most brilliant ones. Such conservationism risks preventing new ideas and new concepts to compete with the old dogmas. Such a chain may have a negative effect on the progress of scientific research.

In each regime, to make a career, it is useful to be a "member of the party". Academic regimes tend to follow the same trend. Conformism helps to survive though it does not help much in the progress of research. To avoid criticism, young archeologists and prehistorians prefer to remain descriptive, limiting new ideas that may displease "peer reviewers". This is favoring mediocrity. For the advancement of scientific research, new ideas should have space: in any case, good ideas will survive while bad ideas will die. The debate will be the judge, rather than aprioristic dogmas.

Archaeology, both prehistoric and historic, needs a constant and open dialogue with other disciplines. The study of man includes anthropology, sociology, psychology, human geography, semiotics, art history, and other disciplines that have to join efforts. This is the aim of conceptual anthropology. Please join us in this effort.

For the last three generations the trend has been for researchers to be more and more specialized on limited research fields. Cultured humanistic formation has often been sacrificed, being replaced by specific technical knowledge. Rather than broadminded thinkers, this has favored the formation of technicians. They are welcome, as they are useful and needed, but it would be a dangerous dead end for the humanities if technicians would replace humanistic scholars and thinkers. Both have to coexist side by side, both being conscious of their task and role.

What is to be the image of Prehistoric and Protohistoric sciences in the future? Understanding the past is necessary to build a future. The knowledge of the past is the elementary base of culture. Even in the tribal world young people are being initiated to the knowledge of their past. Let us join efforts to develop public awareness, education, formation, engagement, research, for a broader understanding of our past. "Expression" will be glad to host a forum for debates on the future of the study of man. Ideas, comments, proposals, will be welcome.

Emmanuel Anati, President

Join the EXPRESSION discussion blog today.

cisenp.wordpress.com

EXPRESSION
The International Journal of Art, Archaeology & Conceptual Anthropology

ATELIER is pleased to announce that starting in 2014, EXPRESSION will evolve into a peer-reviewed journal, to be published quarterly.

Fall, Winter, Spring and Summer issues will be available by subscription.

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DISCUSSION FORUM

In our discussion forum, we are publishing papers which will be presented at the Atapuerca UISPP World Congress (1-5 September) in Burgos, Spain. Other papers from participants in Burgos will be published in EXPRESSION N°7 as we evolve into a quarterly over the next year.

Decoding prehistoric art: the messages behind the images

Emmanuel Anati
Ariela Fradkin
Italy

Introduction

The search for the decoding of prehistoric art has led to an analysis of the logical cognitive structure of the most ancient expressions of figurative art. The typological grammatical system and the associative syntactic one already revealed 30,000 years ago the same grammatical and syntactic structures of writing, and thus allow the reconstruction of the elementary roots of its formation. The present text examines the cognitive process that has led to the invention of writing and evidences constants of memorization and associative synthesis already present in the human mind from the very beginning of figurative art. It is postulated that the phonetic writing of the last five millennia are practical applications of an archetypal cognitive system that has had and will be able to have a range of solutions.

Some examples of decoding prehistoric art reopen the debate on the traditional concept of the beginning of the writing. It shows the presence of phenomena of graphical communication that transmit complex concepts, feelings and sensations since the early expressions of visual art. The visual art would then appear to have been born as a form of writing. That would lead to the deduction that visual art and writing are part of a single package of the cognitive system: the process of writing appears then to be part of the elementary intellectual heritage of *Homo sapiens*. The paper elaborates on this paradigm, which may appear at first as a bold paradox.

On the origins of writing

The traditional academic praxis considers that writing started approximately 5,000 years ago and the literature discusses whether it may have happened first in Mesopotamia or in Egypt. Similar processes of formation of formalized writing have taken place also elsewhere, at different times, in China, Mexico and elsewhere, where the ruling classes of complex political structures needed to standardize instruments of communication to control their territories and subjects. It was postulated that writing came contemporaneously with the birth of states. In that case, the origin of structured writing was related to economics and politics. Recent research doubts the validity of this idea.

Some years ago, Marija Gimbutas in her book *The Language of the Goddess* (1989) formalized the documentation for an ideographic proto-writing, consisting of the repetitive symbols appearing on statuettes and other Neolithic objects in the Balkans 8,000 years ago. These repetitive symbols appeared to have the role of adjectives or auspices referring to the images, like 'good', 'respected', 'producer of plenty', 'protector'. They were supposed to have had a magical religious function (Anati, 2007a). They were generally isolates and only rarely formed phrases. Analogous phenomena were documented also among tribal populations of incipient agriculturists and hunter-gatherers, and also in some assemblages of prehistoric art. An analogous use of visual symbols for words was considered for the schematic signs of European Mesolithic societies, such as the Azilian cultures in France, the Romanellian in Italy or the Maglemosian in the north of Europe, from 10,000 -8,000 years ago (Anati, 2007a, pp. 151–9). Then it was ascertained that the Natufian epipaleolitic cultures of the Mediterranean Levant also used repetitive signs with constant meaning 18,000 years ago (Anati, 2007a). These phenomena of using visual signs with agreed meanings implies the mental ability of symbolic graphic expression and its widespread diffusion, but they did not contain all the requirements for being considered as true complex writing.

Writing, apart from graphic symbols having constant values, implies the possibility of transmitting phrases and reasoning as graphic expressions even of complex thoughts and spoken language, in conventional forms, so as to be understood by the receiver. The examples provided above can hardly satisfy such criteria.

The documentation available so far is likely to be just a minimal part of what may have been produced in prehistoric times. Presumably if messages and other graphic documents were produced, most of them would have been executed on organic materials, as currently happens in the tribal world with wood, leaves, bark or animal skins, and would not have survived over a long time span. Such documents could have survived for ages only on durable materials like stone.

Documents aimed at communicating or memorizing have been produced since Paleolithic times. Since the early works of Denis Peyrony (1934) and Abbé Breuil (1912), it has been estimated that such expressions communicated attributes and also auspices, but had not shown the ability to transmit actions, feelings and concepts. Until yesterday they could not be defined as writing. The research on decoding prehistoric art is now demonstrating that hunter-gatherers formulated pictographic messages describing and transmitting information on actions, feelings and concepts already in the Paleolithic period. The early approaches to the origins of writing may require basic revision.

Language as defined by William Alston (and others) is a system of vocal symbols that writing transforms into visual symbols (Alston, 1971; Fodor, Katz ed., 1964). These symbols make sense if understood in the same way by the writer and by the interlocutor to whom it is addressed, in both cases, for oral messages as well as visual. The visual symbols have their typology responding to a grammar that defines their function and meaning. They follow an order of association which forms sentences or assemblages of concepts.

An isolated symbol-sound has a generic sense and the phrase-sequence acquires a specific sense. The symbol-sound 'hand' defines a part of the human body, the sequence of sounds 'give me your hand' or 'let us shake hands' inserts the symbol-sound 'hand' in a symbol-sound sequence that gives a specific sense to it. Writing follows the same principle, transforming vocal symbols into visual ones. The sequence of symbols of the vocal language becomes transformed into a visual sequence using syntactic rules. It is clear that before the development of phonetic writing, the same process took place with ideographic and pictographic messages.

Picture writing and phonetic writing

Writing by using graphic signs that communicate ideas, actions and feelings reflects the ability of human beings to formulate them, giving graphical shapes to ideas, making them comprehensible to others. In some prehistoric and tribal formulations such signs were not the legacy of a defined language, they were the expression of ideas shared beyond the various spoken languages. The phonetization of writing has tied up writing to the specific spoken language, thus losing the global ability provided by semiographic writing (picture writing and ideographic writing) to be read and understood in any spoken language. As core concept semiographic writing uses images or ideas having shapes of universal meaning. The figure of a man means 'man', that of a woman means 'woman' and that of an elephant means 'elephant'. That of a male or female sexual organ mean male or female sexual organ. In phonetic writing in order to mean *man* three phonemes (letters) are requested in English; in Italian, *uomo* is made of four phonemes and the Spanish *hombre* has six phonemes. The sequence of phonemes are successions of sounds creating words which are comprehensible only to those knowing that language of speech. The figure of a man is comprehensible in any spoken language.

The relation between the sign and its meaning has variable levels. As formulated by Jean-Paul Resweber, there are signs and also phonemes that have an implicit meaning; others may have acquired a metaphorical or vernacular meaning, which is variable from culture to culture but usually they tend to keep a relationship with its core meaning (Resweber, 1979). A recurring example is that of the grapheme representing the vulva or female sexual organ, which may mean not just 'sexual organ' but also 'having sex' in some cases, or simply 'female' or 'woman' in other cases. These considerations of possible alternatives are essential elements in the process of decoding.

The prints of the hand, as an act of presence, has an immediate reading, disregarding the language; the hand print is like a signature. It may mean 'I have been here' or 'This place is mine' or 'I swear here on this sacred rock'. The figures defining 'worshipper' (human figure with upraised hands) or 'hunter' (armed figure with spear or bow) or the figures of an elephant, bison or snake are readable in whatever language. When they are accompanied by ideograms that mean to adore, to hunt, to wish, to love, to hate, to fear, or other, they form sentences. The accumulation of comparable data, from obvious to less obvious documents, and from recent to ancient documents, sometimes leads to positive results.

Like recent tribal art, since its origins, prehistoric visual art has had the role of transmitting contents, and memorizing and fixing events, myths, concepts and wishes. It had a functional purpose expecting results. It was not produced just to embellish rock surfaces. Some rock art sites contain millions of graphemes accumulated in the course of millennia. This visual art constituted the Bible of their makers, the archives of their memory, their myths and their history. As we shall further discuss, progressing with the decoding project we had to reach a basic conclusion: that a large part of such production had a grammatical and syntactic structure similar to that which was later on applied to the various forms of structured writing.

Tribal populations of historic times, having a technological level of the Stone Age, considered to be without writing, like some groups of Australian Aborigines, or populations of Ba-Twa and Mbuti pygmies of the Congo river basin, currently transmit messages through message sticks which are read and understood by whoever they are addressed to.

From a global comparative study of the art of hunter-gatherer groups of the different continents, we have found out that the graphic visualization of ideas responds to systems which are common to various populations which do not have contacts with each other for ages. Such systems appear to have the same common matrix. We can deduce that some of the standards of graphic messages reflect a faculty of associative synthesis acquired in times much remoter than what had been previously assumed. Since then it has allowed wider perspectives of intellectualization and has immensely amplified its power of communication and memorization.

Before getting to the explanation of some examples of decoding, it may be useful to go into some aspects of the functions of visual art, its structure and motivation. Since this paper concentrates on the art of European Pleistocene hunter-gatherers, it seems to be useful to provide a background to the overview in which such art may be positioned.

Figure 1a Engraved bones from French Upper Paleolithic, considered to have had the task of message sticks, from Gourdan (Haute Garonne), Le Placard (Charente), Lorthet (Hautes Pyrénées) and La Madelaine (Dordogne) (Graziosi, 1960).

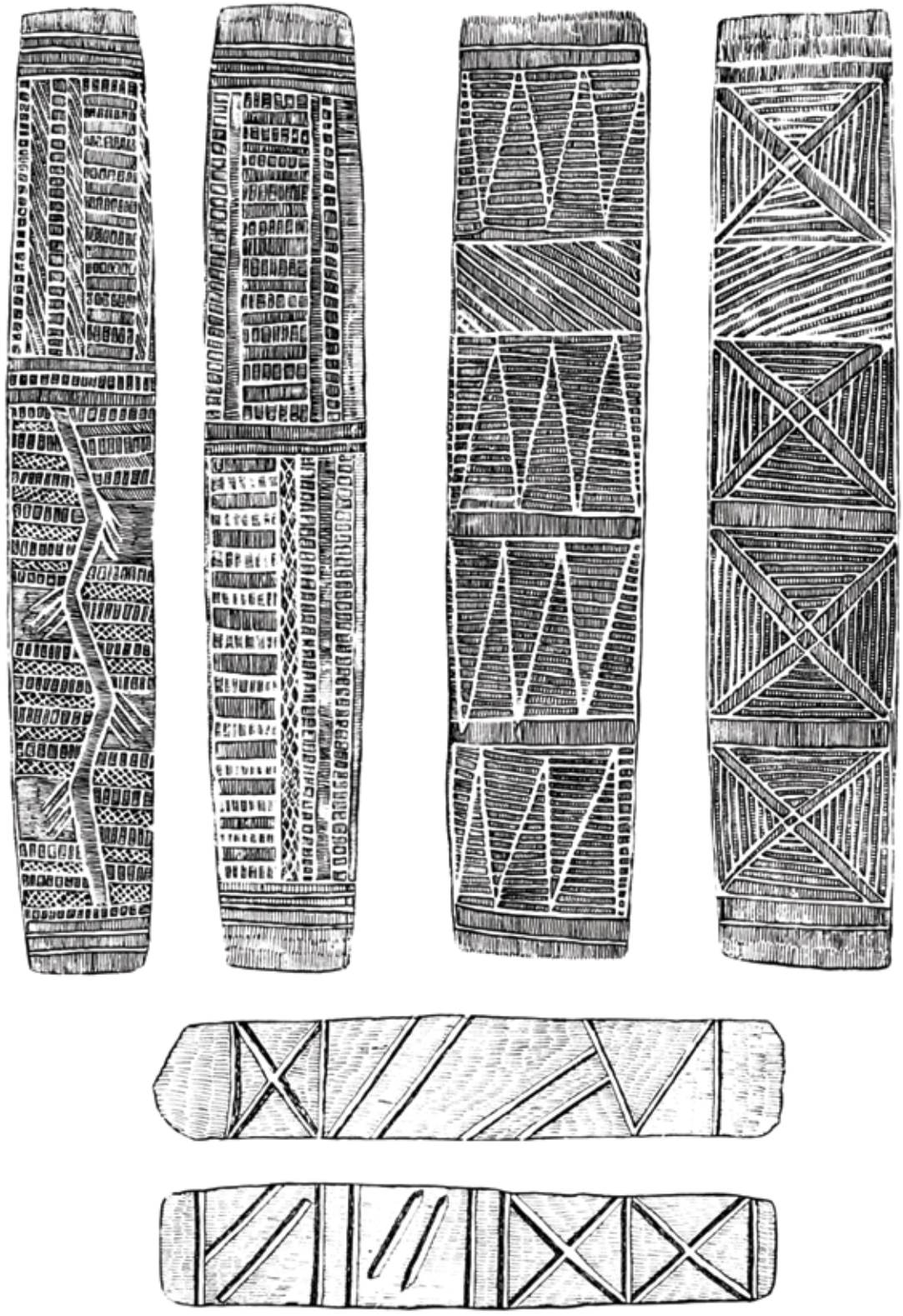

Figure 1b Message-sticks from Yirrkalla, Arnhem Land, Australia (Mountford, 1956).

Functions of prehistoric art

Prehistoric art, like all art, transmits memories, experiences, sensations and feelings, and reflects both the intellectual truth and the imagination of its society through the medium of the artist; it expresses the requirements of the main human impulses of memorization and communication.

Visual art is conceptualization as it gives visual shapes to ideas. A fundamental role of prehistoric and tribal art is and has been to transmit the doctrine from generation to generation. Recent studies evidence the function of sacred writing that rock art has had for millennia, as a 'Bible written on stone' which spread over five continents (Anati, 2010).

A variety of styles are present in prehistoric art, as they are seen by us, from naturalistic to schematic, to abstract, from descriptive and realistic to metaphoric. The works of this immense repertory have been described for over a century. The analytical studies now allow us to establish that they have rules, never written and yet followed for millennia, in sites very distant apart from each other, from Africa to Australia, to Argentina in South America. Such rules concern the logical grammatical and syntactic structure, which allowed the transmission not only of facts, but also of sensations and feelings. Prehistoric art, like other kinds of literature, was able to express pleasure, fear and desire.

The most ancient figurative art, for which reliable chronologies are available, was produced around 50,000 years ago in regions far apart like Africa and Australia. Intentional markings and signs still older, engraved on stone, shaped as points, lines, criss-cross lines, cupules or cup-marks, are unlikely to have been done for nothing. They are likely to have had some practical function, like memorization or communication. Some are considered to have numerical value, like series of lines or of points, which presumably indicate amounts, of what we do not know, as no figures accompany the signs and the accompanying signs have not been decoded as yet.

The first graphical signs of memorization are older than the figurative visual art which developed in successive stages, in Australia, Africa, Europe and the Near East (Chaloupka, 1993; Anati, 2003). Signs of this kind, in South Africa, the Middle East and Europe, exist from at least 70,000 years (Anati, 2010). It is not impossible that they represent a semiographic system of communication. We can postulate that the need to memorize and to transmit information is a motivation of graphic or visual expressions that preceded the search for aesthetic experiences. Such a postulate inverts the traditional vision that considers writing as a derivation of figurative art. Could it be instead that figurative art derives from early attempts at a sort of primary writing? (Anati, 2011).

Early figurative art transmitted messages with conventional metaphoric and allegoric systems, which still persist in the tribal world. A classic example is provided by the figure of the bison (or buffalo) designed in charcoal-black by American Indian people to represent their head, whose name was Black Bison. It was the promotion and the exaltation of the charismatic head whom they worshipped. They did not write his name in phonetic script, they designed his name: the drawing of a bison made with charcoal was big chief Black Bison. We may consider it a metaphoric representation but for the makers it was just a representation and everybody understood its meaning (Anati, 1989b).

Tribal people who do not use phonetic writing are still producing a large variety of graphic ways to communicate and memorize. Some of them appear to have styles and themes similar to those of prehistoric people. They also have a variety of styles and preferred subjects. All of them have also many elements in common, which are of great help in the decoding of artworks produced by extinct cultures. Still surviving human groups of hunter-gatherers, like some of the Australian Aborigines or South African Khoisan, continue to produce works of art with similar topics, displaying persistent millenary traditions of art production as a means of communicating and memorizing, mainly

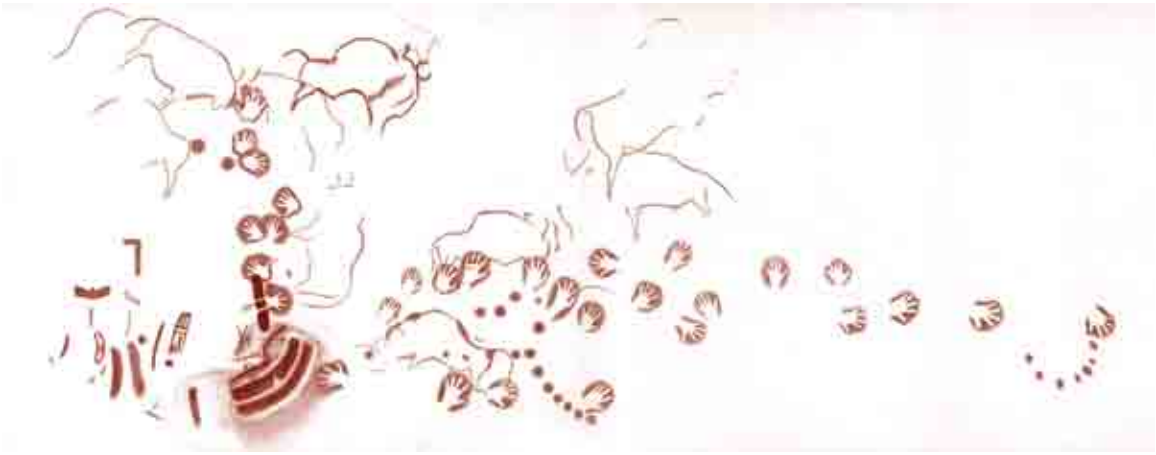

Figure 2a European cave art. Two phases of paintings are present on this tracing showing two different conceptual typologies. The later phase, typical of Franco-Cantabrian cave art, represents association of quadrupeds, bisons and horse. The early phase is an association of hand stencils and ideograms, some of which represent tools or objects. Series of dots may be numeric ideograms. This early phase displays a pattern which is widespread in Early Hunters art in all continents. Castillo Cave, Santander, Spain. Tracing by H. Breuil (Del Rio, Breuil, Sierra, 1911).

to preserve and transmit the fundamental messages of their own conceptual identity from generation to generation (Anati, 1997).

In these intellectual expressions intimately tied between language and visual art, the diversification process derives from the influence of several factors. Adaptation to landscape, climate and resources may have been joined by different social experiences. The process of diversification of the primordial style forming different styles and tendencies is expressing variations in the mechanism of conceptual development: a logical process of evolution. With regard to the languages, an analogous process is presumable, from a primordial language, defined as 'the sapiens mother language', through the development of local dialects that gradually became languages that have in their turn further developed dialects, in a constant process of diversification.

The visual communication has had analogous evolutions. The cognitive system has maintained one constant structure, with secondary variants reflecting the influence of the way of life determined by economic and social structures. As defined already in earlier works (Anati, 2002b; 2010), from worldwide comparative analysis it emerges that the style and the thematic of pre-literate art reveal the nature of the economic and social structures in which its production took place.

The localities to which men returned in the course of ages to execute rock art and leave on the rocks their messages and memories cover a role that we could define as sacred and social: they are meeting places where the communication with mythical beings or the spirits of ancestors was attempted, where humans had experiences of an imaginary dialogue with the invisible forces of nature. They were also places of meeting and joint meditation with other human beings.

Art and communication are still two major elements characterizing human society. Art is the spirit of society, the expression that defines its identity; communication is the spirit of society that allows single individuals to consider themselves part of one social community. In the last 50,000 years, art has had a vital role in transmitting the memory and defining the identity of the personality of the artist and his or her society. Among the people who do not have formal writing, the visual art is writing and has a fundamental role of communication beyond that of identity and social cohesion.

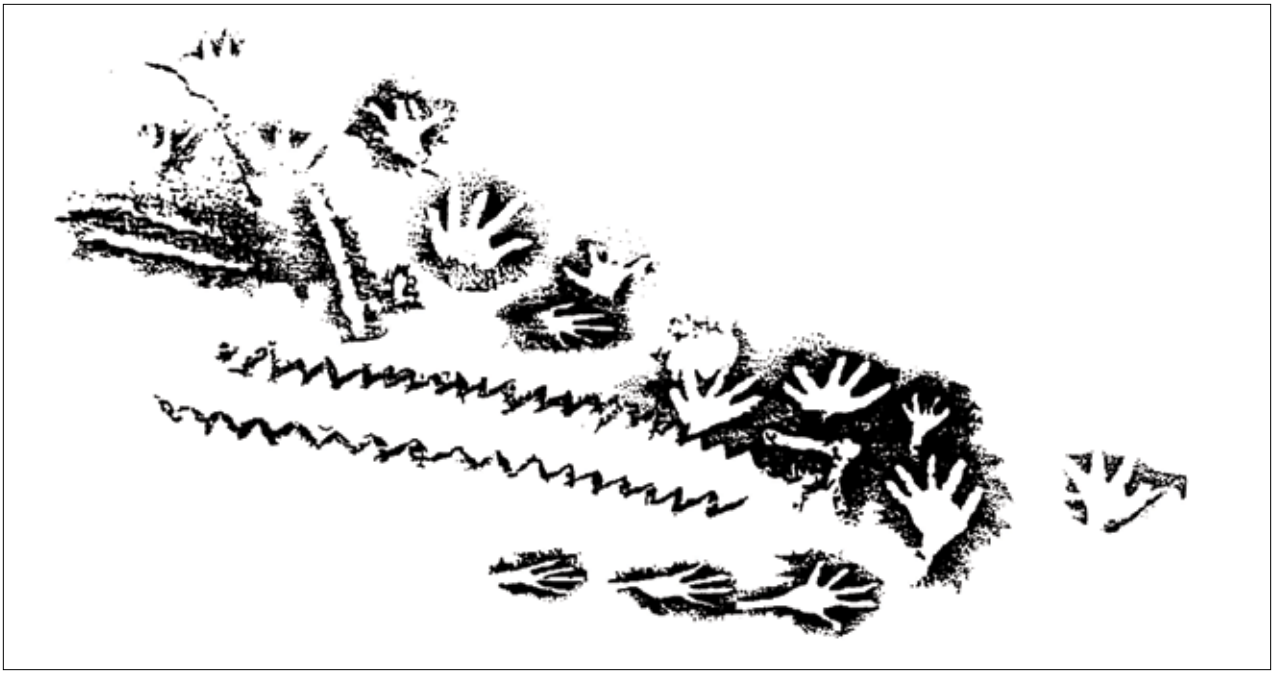

Figure 2b Association of ideograms of Early Hunters. Rock paintings in Queensland, Australia. There are also engravings (omitted in the drawing). Stencils of human hands are associated with stencils of animal limbs, zig-zags, series of dots and tools. Length of traced part 1.50 meters.(Later engravings overlapping the paintings are omitted in the tracing). (Drawn from a photograph of J. Clegg, 1983, in Anati 2002a).

The conceptual analysis of the global characters of the most ancient visual art reveals to us the mechanism of the logical process of sequential and consequential thought: the earliest art known in several parts of the world follows the same logical trend, is most likely to have a common matrix and reflects the existence of universal archetypes in the associations and the elementary structure of the process of memory, association, elaboration and synthesis. The species Homo, in his trend of expanding over the many lands of the planet, has carried the language, the canons of symbolization and abstraction, and possibly other expressions of his own intellectual identity to the different promised lands offered them by their gods or ancestral spirits.

The grammar of primary art

As already discussed in earlier works (2010), five main typological categories may be recognized in the visual art of non-literate people. Such subdivision concerns different variants of grammar and syntax of art production. These variations turned out to be connected to the type of economy and social structure. They are:

1 Early hunters: team hunters of big game making no use of bow and arrow;
2 Gatherers, food collectors relying primarily on vegetal or snail diet;
3 Late hunters, hunters of middle and small size game making use of bow and arrow;
4 Animal breeders, pastoralists, mainly nomadic clans having an economy based on domestic animals and their by-products; and
5 Complex economy people: sedentary or semi-sedentary tribal people relying primarily on agriculture.

Each one of these categories has its own selection of types of visual expression. It may look obvious that a hunter of bison does not tend to represent snails and a snail collector does not tend to represent bison, but the repertory of each one of these categories has also other specific characters concerning the type of asso-

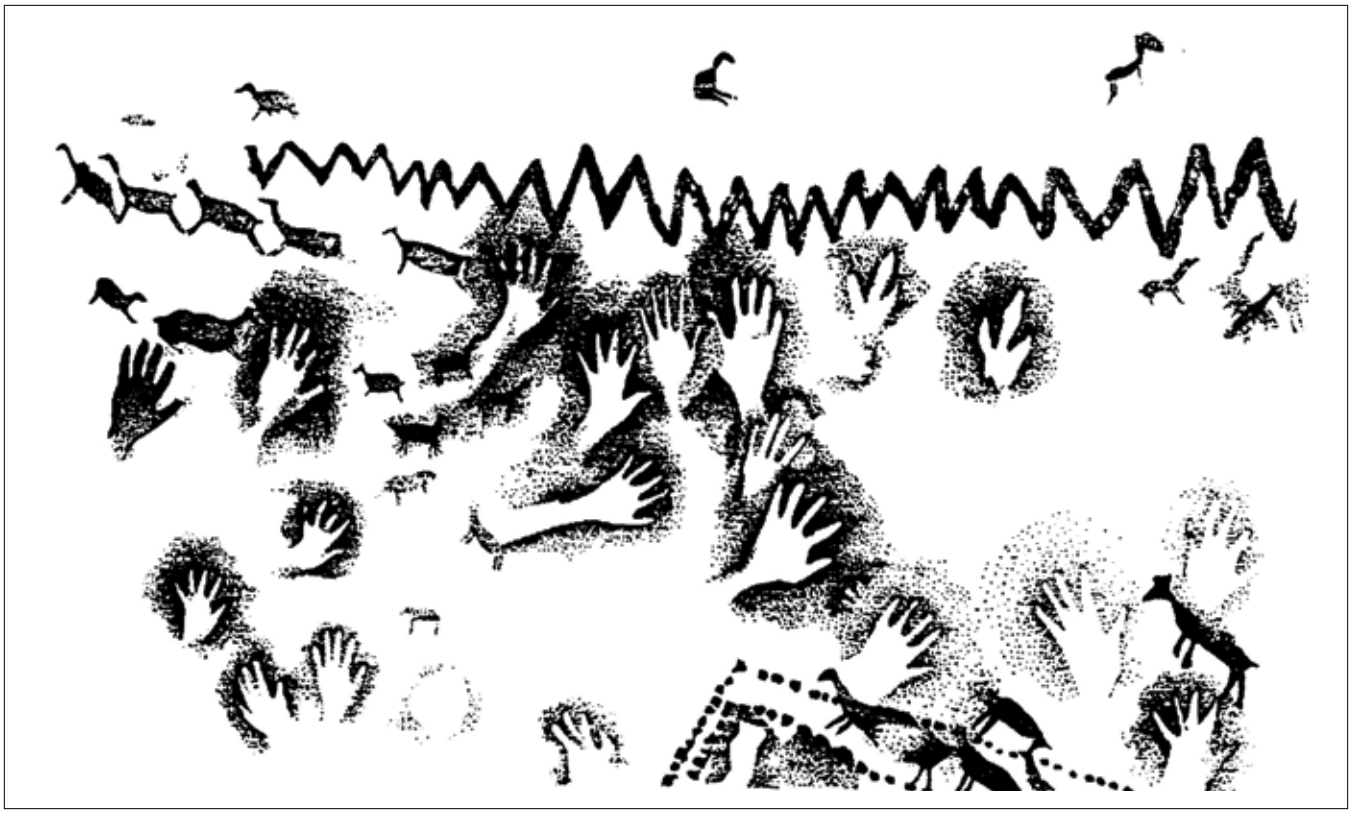

Figure 2c Hand stencils and other symbols of Early Hunters. Rock paintings of Rio Pinturas, Santa Cruz, Patagonia, Argentina. Stencils of human hands and of animal limbs are accompanied by a long zig-zag. The animal figures and the rows of dots are later additions. Length of traced part 2.60 meters. (Source: Drawn from a photograph of G.C. Ligabue in Anati, 2002a).

ciation or syntax, the repertory of images and signs, and stylistic tendencies which appear to reflect conditioning from the way of life (Anati, 2002b; 2010).

In the Pleistocene, until c. 14,000–12,000 years ago, only the first two of these categories were present; the other categories developed in the Holocene. All five categories are still performing among the various kinds of tribal groups. Early hunters and gatherers have the simpler and most evident grammatical and syntactic structure, but all the categories have their grammar built of three types of grammatically different signs: pictograms, ideograms and psychograms. Pictograms (and mythograms) are figures in which shapes of real or imaginary things can be recognized. Ideograms are repetitive and synthetic signs that sometimes can have male or female values or other conceptual values. The repetitions and the constants of association indicate the presence of conventional concepts. Psychograms are signs that do not represent either objects or symbols: they express feelings, evaluations or perceptions. They may express pleasure or displeasure, good or bad, positive or negative. These three types of signs, or semiogens, reveal an elementary associative mechanism. A common structural base appears to be shared by the visual arts, dance and music: the interaction between the three semiogens determines the theorem of the grammar of the arts, and in fact it reveals a constant trend of the cognitive function of the human mind.

Some repetitive signs in Paleolithic art appear to have constant values. A similar system is still in use by Australian Aborigines (Chaloupka, 1993). Some signs may indicate abstract or non-visual aspects such as noise, wind, rain, flood, thunder. The same graphic transfer of ideas is used also in the picture writing of the American Indians, as reported by G. Mallery (1889).

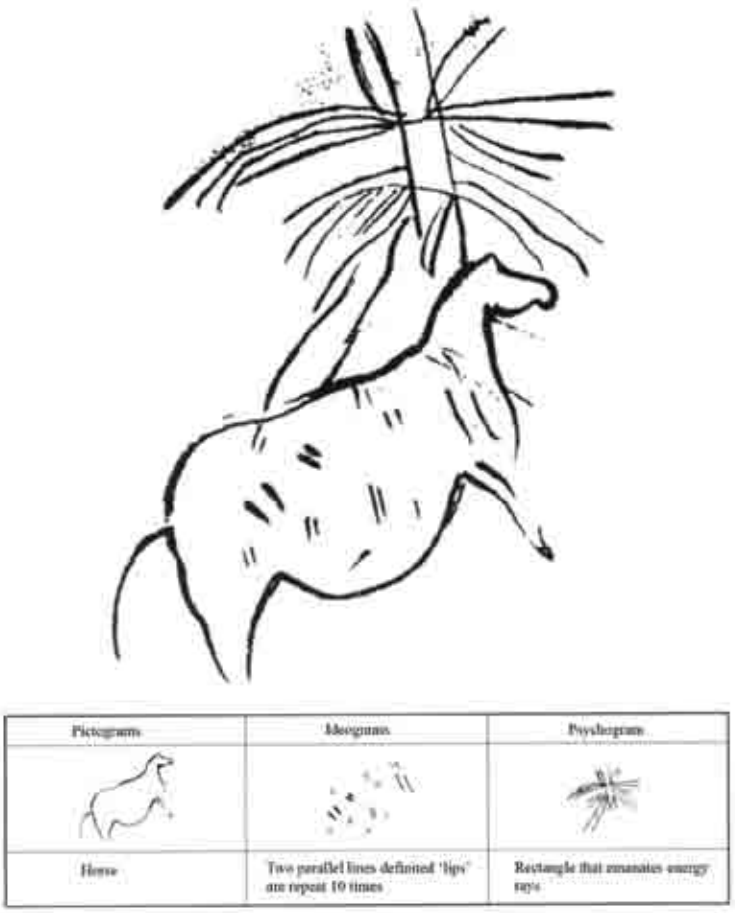

Figure 3 Prehistoric art elementary grammar. Pictograms, ideograms and a psychogram. Cave paintings from La Pileta, Spain. The pictogram is a brown horse, on his body an ideogram made of two parallel lines is repeated ten times. It is defined 'lips', and a meaning of female is attributed to it. These ideograms have been made by different hands and with different colour tones: red, brown and black. They are accumulation of the same ideogram on the area defined by the body of the pictogram. On top of the horse pictogram a black psychogram appears: it is a rectangle radiating outward. An apparently simple painting is an accumulation of several hands and times. What is the message behind this composition? An elementary reading would suggest: "Pleasure or satisfaction (the psychogram) for the horse (clan, name or totemic identity) related to 10 lips, female symbols, each one painted by a different hand. Tracing by H. Breuil (Breuil, Obermaier, Verner, 1915).

Since early times the association of pictograms, ideograms and psychograms appears to follow the same type of associations of ideas, the logic cerebral mechanism that characterized the first systems of planned writing many millennia later. The decoding of Paleolithic art may well indicate that the logical and conceptual process that carried on to the invention of the modern writing of the last 5,000 years was already present in the conceptual mechanisms of the makers of prehistoric art 50,000 years earlier, well before the birth of states and politically conceived writing as a means of land and human control.

The physical nature of an image creates in the man of European extraction of the 21st century a veristic interpretation that not always leads to its intended meaning. In our pragmatic vision, a horse is a horse and a bison is a bison. When in prehistoric art a figure represents a being having a human body and the head of a bison, how can such a being be defined – an anthropomorphic bison or a zoomorphic human being? Is it a masked man or the spirit of the bison? Or what else? We mentioned before Big Chief Black Buffalo represented as a black bison. It is the easiest and most logical solution, but may not look obvious to our conditioned minds.

The main gateway for decoding prehistoric art is finding hints to understand the associative process in the minds of the makers. Despite the scholastic approach that criticizes comparing ethnographic with prehistoric data, acquaintance with the traditional persistence of these processes among recent tribal people like the American Indians, the Khoisan of the Kalahari Desert or the Australian Aborigines has turned out to be very helpful, as it takes our minds away from the conventional, pragmatic associative system in which we have been brought up and conditioned.

Figure 4a Message sent by an old man of the Cheyenne tribe to his son. A man named 'Turtle-that-Follows-his-Wife' sends the pictographic message to his son named Little Man. Their names are indicated above their heads. The sign coming out of the mouth of the old man indicates that he is the one sending the message. The movement of the two figures towards each other indicates encounter. The series of small circles over the line that exits from the mouth of the father towards the son is a numerical indication of round objects. The pictographic message reads: 'Turtle-that-follows-his-wife sends to Little-Man 53 dollars so that he comes to visit him'. In other words the message says: 'Come to see me, I pay your travel expenses' (Mallery, 1889).

Figure 4b American Indian pictographic writing is recording a political and social event. It represents two individuals, one with a gun and the other with bow and arrows. On the head of each appears his identification ideogram. One has three stars and the other a cloud. The pictographic message reads: 'Mr Three Stars (referring to General Crook, whose degree is acknowledged from three stars on his pad) has talked to Red Cloud, in order to fight.' The reference is to a historical fact, an agreement that took place in 1876 between General Crook of the American army and the Indian chief Red Cloud to fight against the Cheyenne tribe (Mallery, 1889).

Some classical examples

The pictographic writing of the American Indians documented by Garrick Mallery (1889) displays a transfer system from the idea to the image that has analogies with that of other tribal peoples from other parts of the world, both recent and ancient. Some concepts appear to be globally widespread, others are more localized. But the system of this transfer among the producers of pictographic messages appears to follow some general rules of elementary logic. The traditional anthropological approach that recommends the study of each cultural unit as an isolated ghetto has caused a serious delay in the process of decoding. In fact it is thanks to a broad comparative work that it has become possible to understand certain transfer standards, from the idea to the sign.

An example is the message sent by an old man of the Cheyenne tribe to his son. A man named Turtle-that-follows-his-wife sends the pictographic message to his son named Little Man. Their names are indicated above their heads. The sign coming out of the mouth of the old man indicates that he is the one sending the message. The movement of the two figures towards each other indicates encounter. The series of small circles over the line that exits from the mouth of the father towards the son is a numerical indication of round objects. The pictographic message reads: 'Turtle-that-follows-his-wife sends to Little-Man 53 dollars so that he comes to visit him'. In other words the message says: 'Come to see me, I pay your travel expenses' (Fig. 4a).

Another example of American Indian pictographic writing is recording a political and social event. It represents two individuals, one with a gun and the other with bow and arrows (Fig. 4b). On the head of each appears his identification ideogram. One has three stars and the other a cloud. The pictographic message reads: 'Mr Three Stars (referring to General Crook, whose degree is acknowledged from three stars on his pad) has talked to Red Cloud, in order to fight.' The reference is to a historical fact, an agreement that took place in 1876 between General Crook of the American army and the Indian chief Red Cloud to fight against the Cheyenne tribe.

Below we shall provide some examples of attempts at decoding European Pleistocene Paleolithic art, showing various degrees of decoding. Often partial deciphering cannot proceed further because of lack of information on some specific graphemes. In such a case we go as far as possible and leave the complete reading incomplete until new elements become available. Doubts often exist, but without trial and error research would go nowhere. Errors may be corrected and do stimulate discussion; they are far more useful than silence, which may indicate the researcher is harmless but will contribute nothing to the advancement of research.

An example is the famous scene of the so-called 'pit' of Lascaux cave, reproduced in all the books, having already had several partial interpretations by various authors but never fully decoded. What is the message behind this intriguing depiction? An ithyphallic being with a human body and the head of a bird is accompanied by a sort of standard or coat of arms having a bird head on top of a vertical line or pole (Mr Bird of the bird totem). To the right there is a bison overlapped by a spear, which, according to various interpretations is or is not blessing the bison. The bison has a prominent ideogram or psychogram between its legs which looks like a wide-open vagina (other interpretations have been proposed). Below the bird-man there is a branch-like ideogram defined as an arbolet (a brunch-like ideogram), which in other cases indicates 'sex' or 'male sex' (see Fig. 5). To the

Figure 5 Rock engraving of Hunters-gatherers evidencing the sexual identity of a couple of human beings, male is defined by the "arbolet" ideogram, while the female is defined by the 'lips' ideogram. Gobustan, Azerbaijan (Anati, 2001).

left there is the image of a rhinoceros that may or may not have been added later. Near the back of the rhinoceros there is a presumably numeric ideogram of six dots. Technicians discuss whether or not the composition originated as it looks today. The rhinoceros could have been added later; several hands may have worked on it to obtain the present result. In any case, the composition is located in a selected place, it is neatly isolated, having no other signs in the vicinity, and appears to be an intentional composition with a purpose. It tells the story of an ithyphallic Mr Bird and a Ms Bison by the large vagina (being wounded, whatever this may mean, or having a spear as emblem), underlined by a sexual ideogram. The rhinoceros with its six dots probably provides additional details to the story, which so far we are unable to decode (Fig. 6). The painting of Mr Bird and Ms Bison tell a story or a myth, since it was located at a special point, difficult to reach, inside the cave. Why? What was its purpose?

Images which at first sight appear to have a pure aesthetic purpose tell stories through the association of pictograms and ideograms. We use famous images

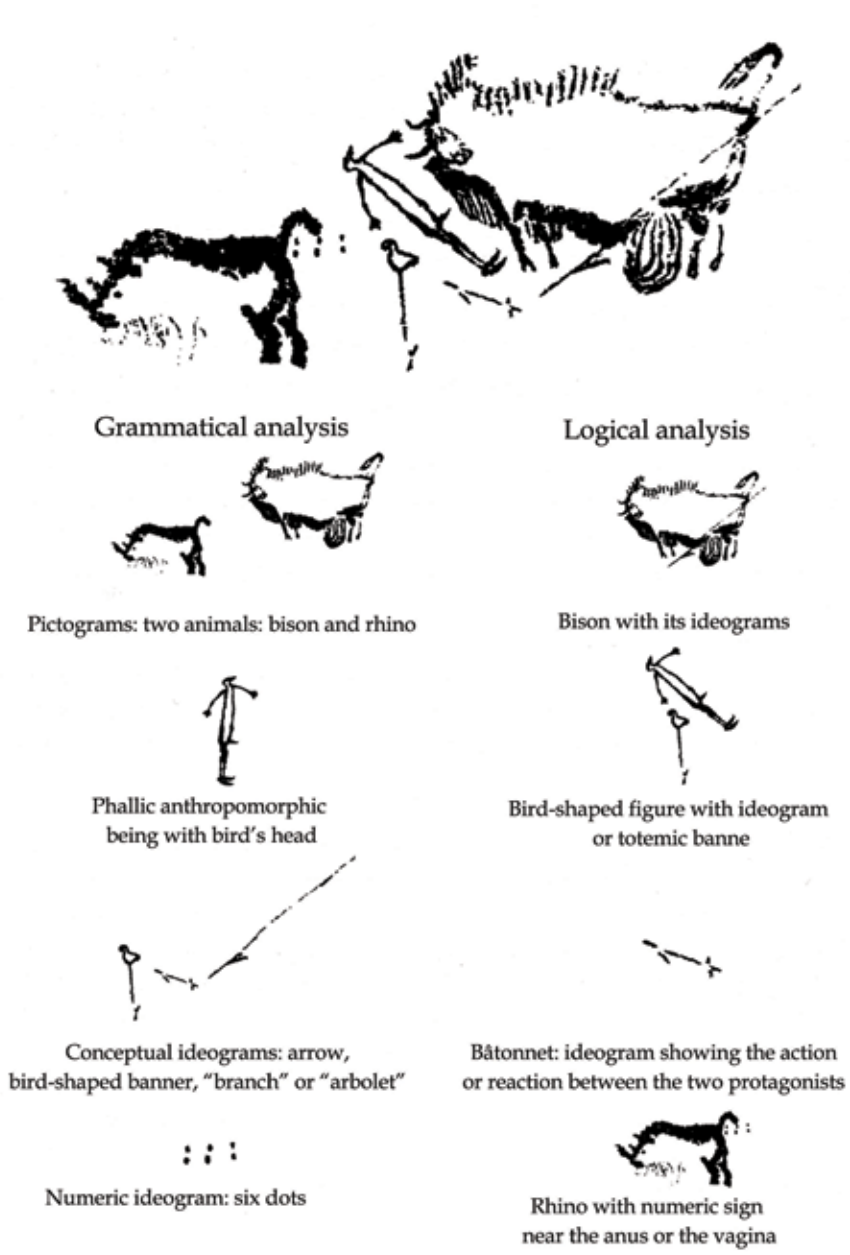

Figure 6 The composition is located in a selected place, it is neatly isolated, having no other signs in the vicinity, an appears to be an intentional composition with a purpose. It tells the story of an ithyphallic Mr. Bird and a Ms. Bison by the large vagina (being wounded, whatever this may mean, or having a spear as emblem), underlined by a sexua ideogram. The rhinoceros with its six dots probably provides additional detail to the story, which so far we are unable to decode. Lascaux Cave, Dordogne, France (Tracing from a photograph by Leroi-Gourhan, 1981).

repeatedly published, as most likely they have been seen before by the reader. The high relief of the rock shelter of Laussel, called 'The Laussel Venus', represents a mature woman with a horn in her hand, a horn which is marked by 13 vertical incisions executed using three different flint tools, respectively in groups of six, four and three. The hip of the woman displays the incision of a bifurcate bâtonnet. On the lower left side of the high relief there are traces of an obliterated or damaged relief of an animal, probably a tiger or other feline, placed vertically (Fig. 7).

The description is the first phase in the process of decoding. In order to proceed beyond this point it is sometimes necessary to dare to pronounce a hypothesis on the basis of analogy, according to the method of trial and error. We may assume that the animal was the name or the totemic identification of the matron (a senior respected female being). Such an animal figure, if it has been intentionally obliterated, as it seems, probably has disturbed whoever decided to cancel it. The bifurcate *bâtonnet* on the hip of the fat lady is probably an adjective. If, as appears in vari-

Figure 7 High relief of the rock shelter of Laussel, called 'The Laussel Venus' It represents a mature woman with a horn in her hand, a horn which is marked by 13 vertical incisions. The hip of the woman displays the incision of a bifurcate bâtonnet. On the lower left side of the high relief there are traces of an obliterated or damaged relief of an animal, probably a tiger or other feline, placed vertically. (Anati, 2002a)

ous other contexts, this ideogram means to walk, to travel, it would confer to the image the adjective of 'the one who travels' that is, the travelling matron. The horn has undoubtedly an important meaning and the numerical engraved lines repeat the meaning as many times as they are. The hypothesis that the horn is a musical instrument, as advocated by some authors, is not to be excluded, though other meanings are possible. The horn has been an expression of power since early times; equally it may be a symbol of plenty.

As a working hypothesis we assume that the matron is probably the image of a mythical being, commemorated by various other monuments and figurines, a primordial mother which was worshipped in Europe and Asia and also elsewhere in the course of millennia. The animal on its flank, probably a large feline, was her totem or the animal companion, or her name. In order to complete the reading it is necessary to know the meaning of the horn. The preliminary reading could be: 'The travelling matron (whose name or attribute is indicated by the animal) owns, offers or produces strength, prosperity, music or whatever the horn represents, many times as the lines engraved on the horn'.

This example, like the previous one, describes a decoding in progress but not fully concluded. In order to get the entire story it is necessary to know the meaning of components like the horn that are still missing. The monument appears to be the icon of a revered travelling matron, bearing her name or totem and her attributes, indicating what she is offering to her followers or believers.

In the same period and cultural context there are pictographic compositions having a narrative structure and others that have commemorative or iconic structures like the Laussel icon. Three-dimensional art, like figurines and high reliefs, is prevailingly an iconic art, producing images having protective or magic power. Most of the beautiful frescoes of the cave walls, on the other hand, are storytelling, reminder myths or historical events, often having allegoric or metaphorical meaning. They are likely to have had the role of sacred scripture, used for initiating the young generation to the knowledge of tribal traditions and sacred ceremonies. Both cave wall art and mobiliary art appear to have had also other purposes, like memorizing, agreements between different groups, magic spells, just as analogous purposes are still in use among surviving tribes.

Reading the messages

Some of the Paleolithic mobiliary art reminds one of the message sticks still in use among various populations of hunter-gatherers, like the pygmies of the Congo basin or some Aboriginal clans from Australia.

We will try to give some examples of more complete decoding, simplifying to the maximum the problems of reading the documents that are much more complex, in order to illustrate conceptual approach and contents of messages going back many millennia before the earliest writing.

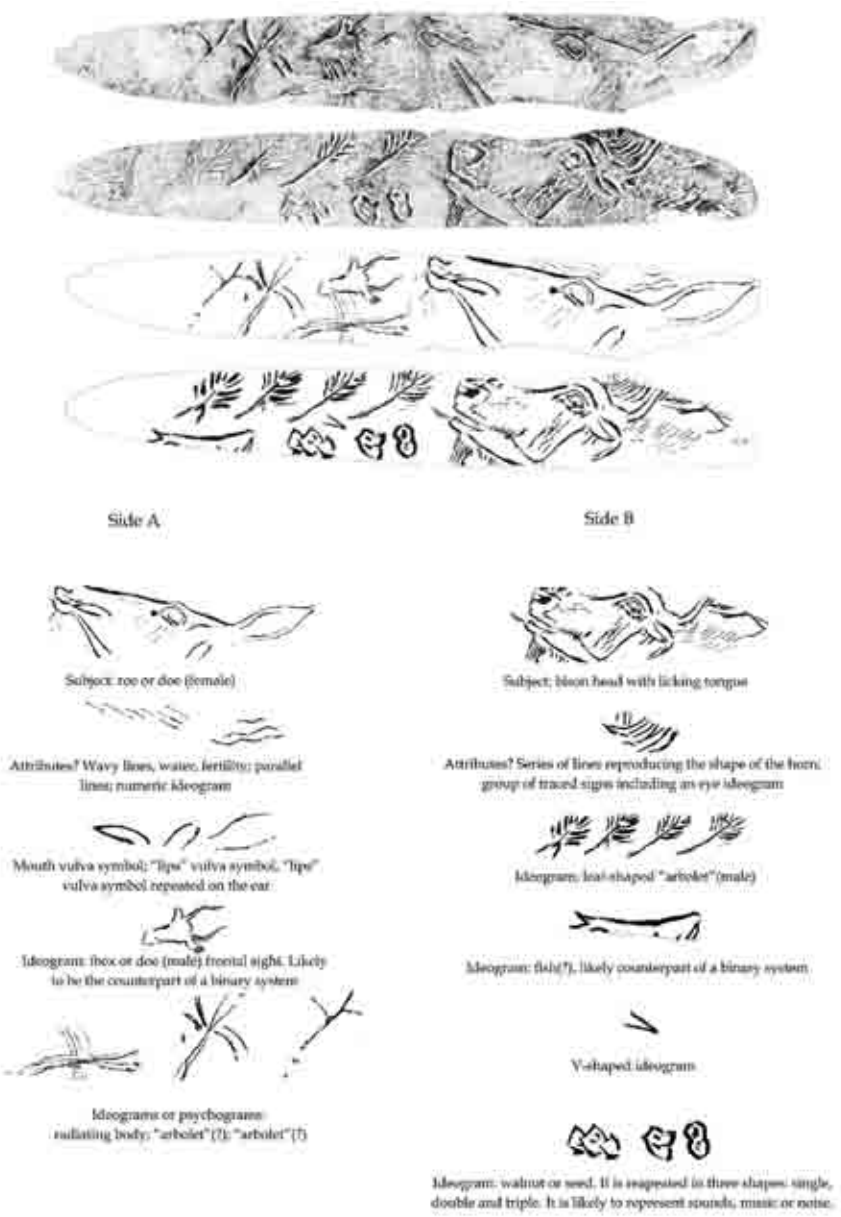

Figure 8 A bone object from the archeological excavations at La Vache cave, in Ariège, France, from a Magdalenian level of approximately 20,000 years, has two deliberate sequences of signs engraved on the two sides. On both sides the main subject is an animal head, on one side a gazelle, on the other a bison. These two animal heads are indications of identity, likely to be names of persons or of clans or their totemic identity. Each animal head is followed by a series of ideograms. The direction of the animal heads suggests that the reading goes from right on the left. This object, which may be defined as a document, is describing a transaction or an agreement on an exchange of items, between two subjects, named Gazelle and Bison, indicating the goods and their quantity (Anati, 2002a).

A bone object from the archeological excavations at La Vache cave, in Ariège, France, from a Magdalenian level of approximately 20,000 years, has two deliberate sequences of signs engraved on the two sides (Fig. 8). On both sides the main subject is an animal head, on one side a gazelle, on the other a bison. These two animal heads are indications of identity, possibly indicating names of persons or of clans or their totemic identity. Each animal head is followed by a series of ideograms. The direction of the animal heads suggests that the reading goes from right on the left. This object, which may be defined as a document, is describing a transaction or an agreement on an exchange of items, between two subjects, named Gazelle and Bison, indicating the goods and their quantity. It reminds us of those documents of Early Dynastic Egypt, with similar registrations of operations or economic transactions (Pritchard, 1950, p. 227). It reminds us also of several other such Paleolithic documents where two different animal images appear to be protagonists.

An interesting case of decoding concerns the so-called Groupe de La Ferrassie. Twenty engraved stone blocks from six excavated sites in the range of 20 km in and

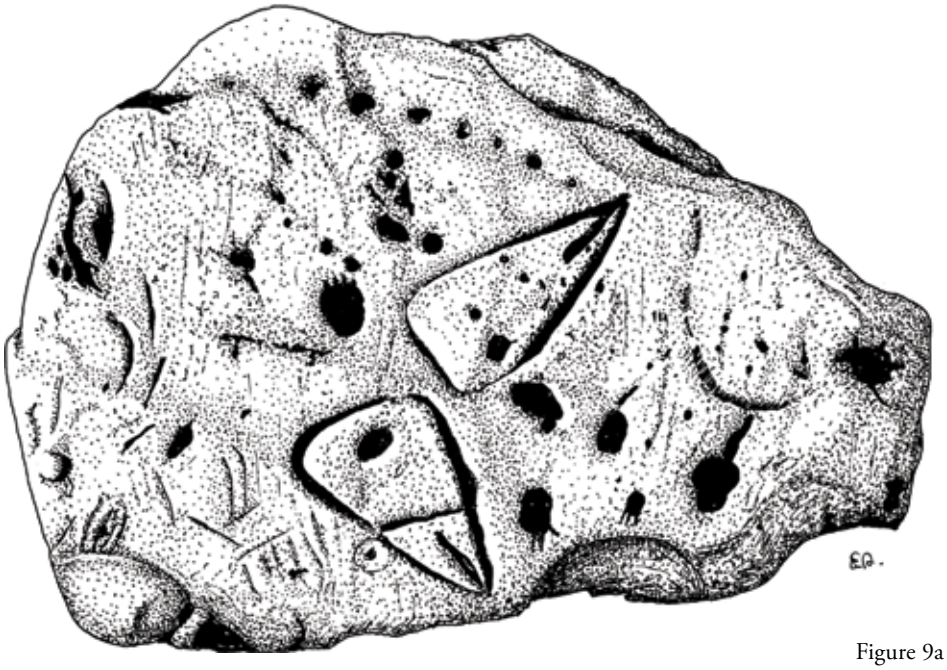

Figure 9a

Figures 9a,b,c,d Some of the engraved rocks of the La Ferrassie group, having animal heads and vulva ideograms. (Anati, 2008).

around the locality of La Ferrassie, Dordogne, France, come from archeological levels of the beginning of the Upper Paleolithic, going back 30,000–40,000 years. These monuments show repetitive associations of vulva signs and figures of animal heads. The constant association is 'such an animal, so many vulvas' (Anati, 2007b). The persistence of such an association in 20 different cases led to the consideration that the animal heads represent names or totemic identities, of individuals or of clans, and the engravings are documents of attribution or transaction of so many females to this or that totemic identity. Such an interpretation is opening up an interesting light on human and social relations in Europe at the beginning of the Upper Paleolithic. Somewhat jokingly they have been defined as the earliest marriage contracts. The animal figure indicates the name, the territory or the totemic sign of the clan and the signs of vulva, from one to four, the number of women as object. They are extremely schematic documents, sequences of ideograms that reflect a simple, essential attempt to transmit information, memorize agreements or fix records (Figs. 9a, 9b, 9c and 9d). The reading is of the type of 'Horse (clan of the horse or Mr Horse), four vulvas (four women)'.

The obvious elements are the feminine sex and the ethnic or totemic identity. They are comparable with proto-literate documents from Mesopotamia or Egypt, but the difference is that in the Near East they refer to wheat, oil or other kinds of food, and here they relate to females, and they are at least 25,000 years older. But the system of recording and memorization is the same and also the grammatical concept is the same, subject and object forming the message.

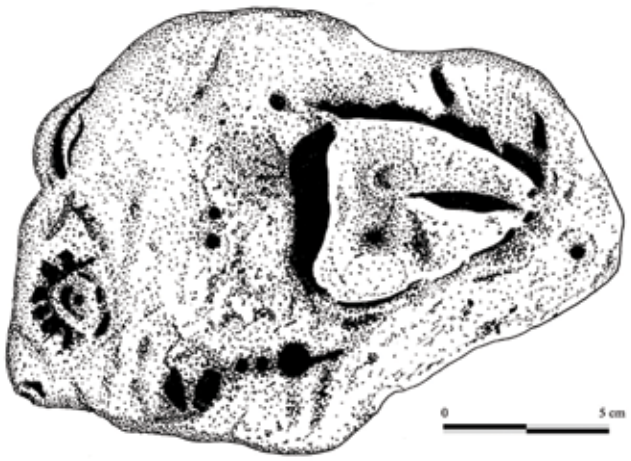

Figure 9b

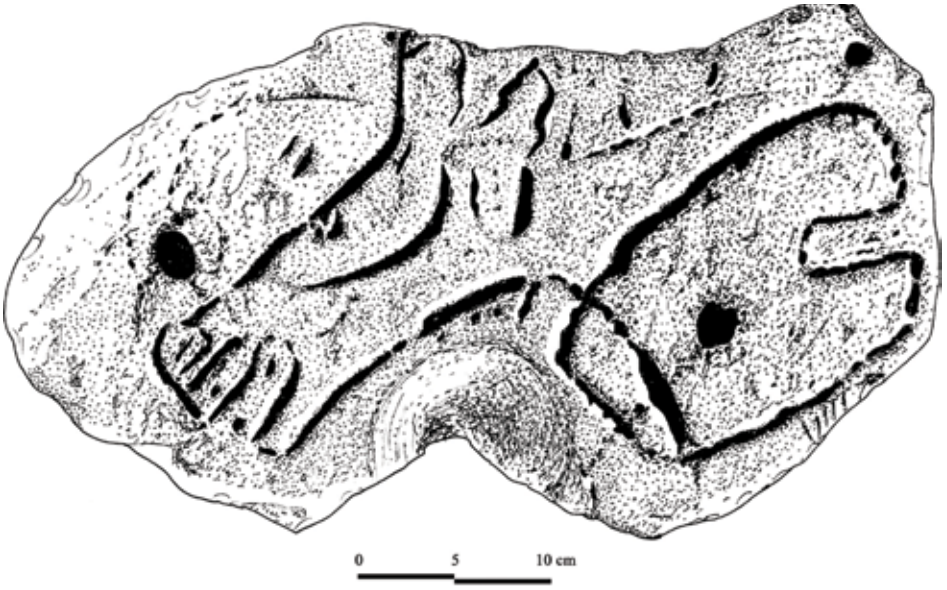

Figure 9c

In the Paleolithic iconography there are repetitive associations of animals that imply metaphorical narrations. They can perhaps be compared with Aesop's fables, though much older. (Fig. 10). A recurrent topic concerns two animals placed side by side: the body of a deer, a gazelle or an antelope and the head of a carnivore, sometimes with the toothed mouth wide open. Over 10 different documents of this sort are recorded, both in France and Spain, on portable objects and in rock art. The two animal figures are sometimes accompanied by numeric and other ideograms which vary from case to case, possibly concerning variants of the same tale.

This series of similar documents is likely to tell a popular and widespread tale of approximately 20,000 years ago. The two animals, traditionally predator and prey, have been considered as metaphors for male and female: as predator and prey they live in harmony one by the side of the other. The story sounds like the kind of moralizing tales that 'Sapient' grandmothers would tell to grandchildren. Small chapters of daily life are bringing back glimpses of lost memories.

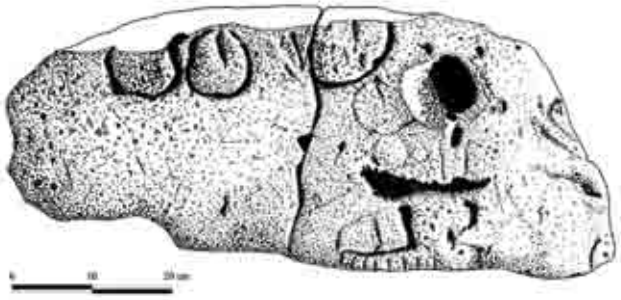

Figure 9d

An engraving in the cave of Altamira, Spain, first published by Abbé Breuil in 1912, has been reproduced numerous times by various authors during the last 100 years. It shows two horses, some ideograms and one psychogram (Fig, 11). The dart or spear usually has a male value, like the 'arbolet' ideogram. Vulva and lips ideograms have a female value. The ideograms have male values and female values. A vertical horse is accompanied by a male ideogram, a horizontal horse by a female ideogram. On top of them appear the depiction of the dart ideogram (male) penetrating the lips female ideogram. Below the composition a

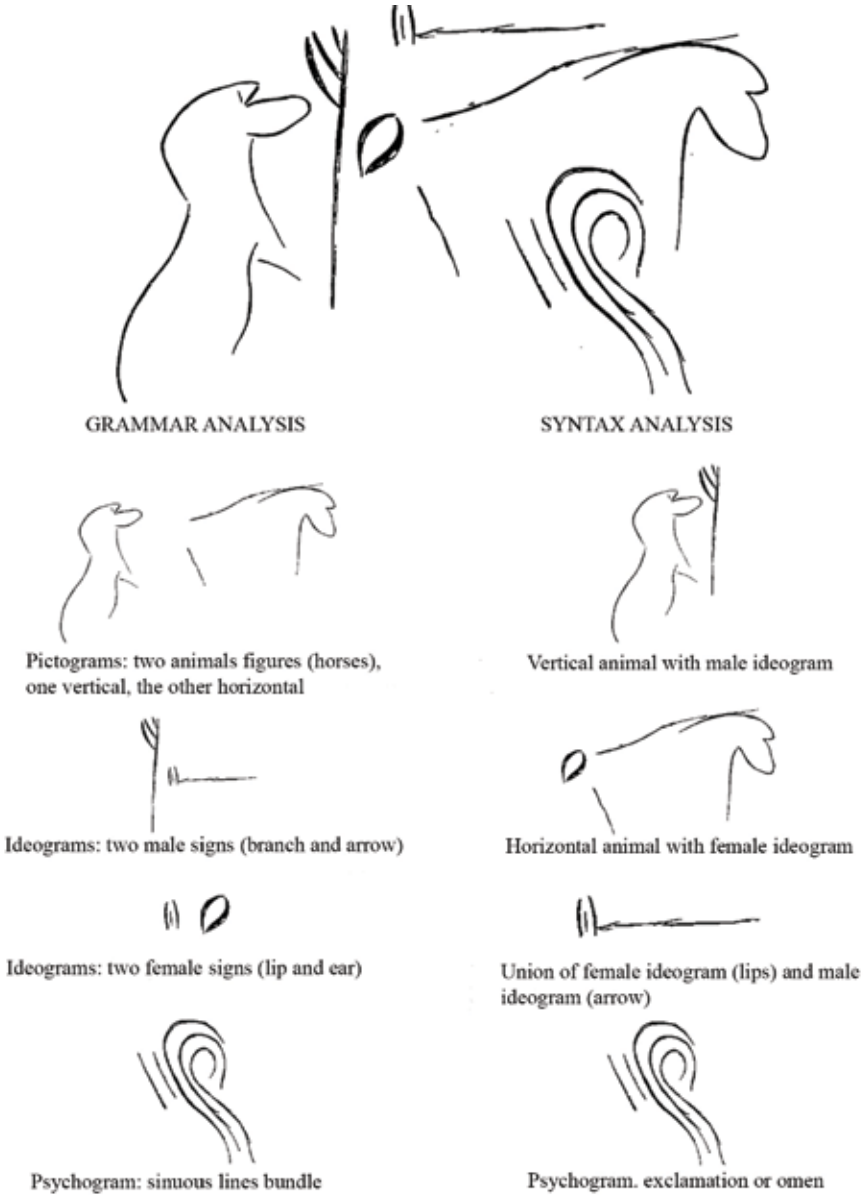

Figure 11 An engraving in the cave of Altamira, Spain. It shows two horses, some ideograms and one psychogram. The dart or spear usually has a male value, like the 'arbolet' ideogram. Vulva and lips ideograms have a female value. The ideograms have male values and female values. A vertical horse is accompanied by a male ideogram, a horizontal horse by a female ideogram. On top of them appear the depiction of the dart ideogram (male) penetrating the lips female ideogram. Below the composition a psychogram appears, a sort of exclamation. The document may read: 'Mr Vertical Horse met Ms Horizontal Horse: sexual union, Ohh!!' This Altamira engraving may simply tell a love story of 20,000 years ago (Tracing by Breuil, 1912).

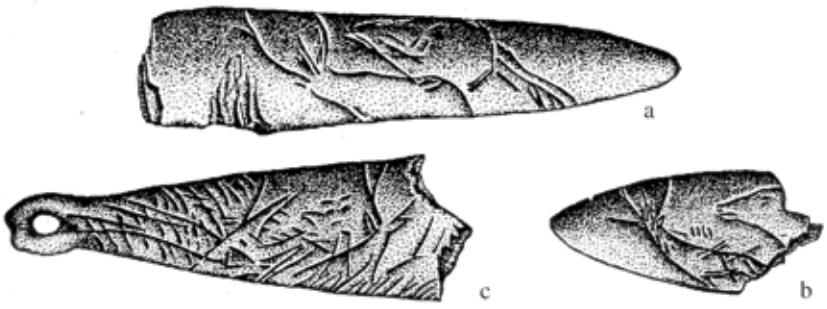

Figure 10 Examples of the repetitious association of caprine or cervine with head of carnivore on fragments of bone objects from different provinces of the Franco-cantabrian region: a) Mas d'Asile, Ariège, France; b) Lorthet, Hautes Pyrenées, France; c) El Pendo, Santader, Spain. Magdalenian Period, art of hunters-gatherers. In all cases, the carnivore is accompanied by an "arbolet" (male) ideogram and the rhuminant is accompanied by a 'lips' (female) ideogram. (Anati, 2002a).

psychogram appears, a sort of exclamation. The document may read: 'Mr Vertical Horse met Ms Horizontal Horse: sexual union, Ohh!!' This Altamira engraving may simply tell a love story of 20,000 years ago.

A common topic of early hunter iconography concerns descriptions of travels or migrations. Didactic or educational scopes are attributed to them, the memorization of events or myths intended to visualize the memory and teach the younger generation, like part of the formations for initiation rites. Recent hunter-gatherers also produce similar didactic tools and, in addition, create songs to exalt the events and make them a permanent feature of their memory.

A recording on bone at La Madeleine in the Dordogne, France, has the engraving of a personage in the position of marching, holding a *bâtonnet* on the shoulder (Fig. 12a). This ideogram, the *bâtonnet*, often bifurcate, is common in hunter art and is considered the indication of a person travelling (the traveller). The personage is defined by a horse's head above him, and he heads towards another similar horse's head. The reading is something like 'Mr Horse-head goes to the land of Horse-head'. The space behind him, which he leaves behind, is indicated as a snake with the tail as an 'arbolet'; the arbolet is a diffused ideogram, having a sexual male value. In such a case the image would indicate the name 'Male Snake'. At its two sides the space is marked by horizontal and vertical lines. Like various analogous drawings, this composition of interlocking lines indicates 'territory' thus meaning 'the territory of the Male Snake'. The working hypothesis leads to the reading of this document as follows: 'The man (or the group) whose name, symbol or totem, is the Horse-head goes (or returns) to his territory, to the Territory of the Horse-head, leaving behind the Territory of the Male Snake'. The document appears to be the recording of a story or of a myth of migration or travel.

Another document concerning travel or migration comes from Les Eyzies, Dordogne, France. It is a fragment of decorated bone from the Magdalenian period (Fig. 12b). A group of eight human figures in profile are defined by ideograms of a forked *bâtonnet*, which, as mentioned already, means 'travelling'. On the right side there is a bison in profile and on the top and the left side of the human figures two ideograms representing flames or fire are repeated. The

Figure 12a A recording on bone at La Madeleine in the Dordogne, France. This ideogram, the bâtonnet, often bifurcate, is common in hunter art and is considered the indication of a person travelling (the traveller). The personage is defined by a horse's head above him, and he heads towards another similar horse's head. The reading is something like 'Mr Horse-head goes to the land of Horse-head'. The space behind him, which he leaves behind, is indicated as a snake with the tail as an 'arbolet'; the arbolet is a diffused ideogram, having a sexual male value. At its two sides the space is marked by horizontal and vertical lines. Like various analogous drawings, this composition of interlocking lines indicates 'territory' thus meaning 'the territory of the Male Snake'. The working hypothesis leads to the reading of this document as follows: 'The man (or the group) whose name, symbol or totem, is the Horse-head goes (or returns) to his territory, to the Territory of the Horse-head, leaving behind the Territory of the Male Snake'. The document appears to be the recording of a story or of a myth of migration or travel. Tracing by H. Breuil (1952).

Figure 12b Fragment of decorated bone from the Magdalenian period. Les Eyzies, Dordogne, France. A group of eight human figures in profile are defined by ideograms of a forked bâtonnet, which, means 'travelling'. On the right side there is a bison in profile and on the top and the left side of the human figures two ideograms representing flames or fire are repeated. The repetition of the same ideogram means plural. Similar signs for fire are found among hunter-gatherer tribes. This plural ideogram is repeated twice, once behind the people and once over their heads (Anati, 2002a).

repetition of the same ideogram means plural. Other authors have described these ideograms as bush or vegetation, but similar signs for fire are found among hunter-gatherer tribes. Whatever the case, this plural ideogram is repeated twice, once behind the people and once over their heads. The ones over their heads are likely to determine the identity of the people, the ones behind their place of origin. As mentioned already on several occasions (Anati, 2001), it appears to describe the story of a migration. People defining themselves, according to the ideograms engraved above their heads, as people of the fires, or of the land of fires, are leaving behind the land of fires and marching in the direction of the bison, or to the land of the bison.

The bone was found in the Dordogne which, according to the numerous depictions of bison may well be considered to be the land of bison. They are coming from the land of fires. Since the beginning of written history, Azerbaijan has been known as the land of fires, where petroleum and gas emanations from the soil produce fire choreographies and permanent fires coming out of the bare soil. The land of the bison could be Dordogne or the Franco-Cantabrian area, where this fragment was found. The number of images of the bison in the paintings of Altamira, Lascaux and many other decorated caves may well hint that at that time this area was called the land of the bison. This small document is likely to provide a chapter of European history: the migration of a Magdalenian clan from the Land of Fires, entering Europe, crossing the Caucasus and reaching the land of plenty, the Far West of that time.

Conclusions

We have deliberately given an anecdotal tone to the preliminary results of research that might have revolutionary effects. We are trying to read millennia-old fables written in a pictographic script. Prehistoric art is acquiring a new dimension. These examples have given a glimpse of myths, beliefs, daily activities, personal events, social agreements, trade, territorial names, migrations, chapters of history, love stories, feelings. Prehistoric art is an immense archive, and decoding has just started. It is going to produce the history of prehistoric times. We realize that this picture -writing has the ability to transmit information, personal impressions and feelings.

We wonder to what point we may call this system that we are decoding writing. If such is the case, the information in textbooks should be modified: writing was not born 5,000 years ago but 50,000 years ago. Long or complex narrations have not yet been decoded. But we have discovered that these multi-millenary messages use the same grammatical concepts and the same syntactic system of association as modern writing; the way is now open to further progress in their decoding. What seems like a dream is that these messages can be read even without knowing the language in which they were conceived.

It is clear now that visual art was born as a system of communication, information and memorization. The progress in this project of decoding prehistoric art seems to demonstrate that writing was born with visual art. Visual art was writing before it was considered to be art. And it was and still is readable, in whatever language.

If a kind of writing allowing universal reading could be reinvented, entire humanity would communicate without the need of translation. Perhaps the faraway past has some suggestions to make for the culture of tomorrow.

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Intellectual and spiritual expressions of non-literate Societies: art and culture, a journey through the world of mankind

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France
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The intellectual and spiritual expressions of human beings are evidence of attempts to understand the forces of nature and life. The symbols, marks and lines found on rocks, in hidden caves, or in mountains or deserts are expressions of the endless endeavour of man to answer questions about the mysteries of the beginning of the world and its end.

Such expressions reflect man's intuitive ways of observing the unintelligible phenomena of life, while expressing his inner self and his questions about his existence, in a vast variety of interpretive forms. These forms of expression are our tools of communication. Among them are expressions of spiritual ideas via the creation of myths, while other fields of research include the continual observation of nature and the designing of new utilities, objects, notions, philosophies, ethics, aesthetics and methods.

To advance these ideas, I have had several exchanges with Luc Foubert, a neuroscientist, regarding the process between observation and the conceptualization of cognitive messages. According to Foubert:

> Nowadays, most of the studies in neuroscience stand on this background acceptance that the development of this particular cerebral structure (our neo-cortex) responsible for perception, consciousness and cultural assimilation is based on the repeated presentation of 'shapes' that our mind has been imprinted and trained during early life through (ontogenetic) processes of learning and plasticity, leading to a multi-sensory mapping of a world we re-create.

It is also clear that pre-wired but unachieved structures (phylogenetic constructions) are also present at birth, then reshaped and tuned so as to be adapted to the organism's environment. Among species and in

individual development, these phylogenetic or ontogenetic combinations are subject to shaded grades of plasticity of the sensory motor loops, from the lower levels (reflexes) to the higher levels (reflection) of our inner world's re-creation: a dynamics of a representation and recombination of prototypical forms.

The imprinting design of associations of past events can be acknowledged through conservative processes, from early-life individual developmental to the culturally trans-individual level (language and communication), each of which is providing networks of associations (co-occurrence of events, correlations of activities), giving rise to prototypes/archaic forms, any sensation, feeling, object, perception, concept, symbolic recognition, semantic field; the idea of an alter ego is an echo of an archaic form or prototypical association.

In our own consciousness, the resonances of archaic forms are evoked and reshaped by combinations of coincident colliding waves emerging on one side from the current states of our immersive environment, and the other side from the recurrent dynamics of our inner world.[1]

The practice of art illustrates this hypothesis, as a proposed explanation for the general schema of human function and of communication that transcends time and difference. It permits us to better understand our existence and our limits. Francesco d'Errico, archeologist, states:

> about the use of symbolic thinking, use of colors and forms, scientists go back as far as 250,000 years, in Europe or in Africa, their use was perhaps practical as symbolic; in one case to protect the body, from insects or sun, in the second case to draw with … in the second practice, we witness double lecture of reality, where things are attributed sense and a name, and the immaterial become transmittable.[2]

D'Errico's work reinforces my understanding that the most fantastic gift bestowed upon humanity is its ability to transform human intuition into abstract or figurative messages. Mythology is our way to understand nature and our own humanity, offering explanations, justifications, or enlightenment to our limited perceptions of the world's phenomena.

Mythic conception and interpretation do not add new elements to an empiric existence, but the premier 'experience' is gradually penetrated through the figures of myths, as saturated in the atmosphere. Man does not live with things because they exist. He lives with the mythical figures, not as an appropriation of reality, nor does he become open to the real. He lets the world and himself melt together in his imaginary space, and by so doing, letting not only himself be in contact with his observations and conceptions, but also, in parallel, attributing interpretations and sense to them.[3]

From an artist's point of view, I have initiated comparative vertical (chronological) and horizontal (intercultural) studies via objects and artistic expressions like stories and myth. I sought to recognize the themes that have preoccupied mankind since the moment people could leave traces behind them, to see them as tools that have given similar, even identical — and thus universal — forms of expression.

For certain writers, and no less than Noam Chomsky, language is associated with an inner presence of a neuronal module, which is based on one universal grammar, and only humans were given this function. All languages of Homo sapiens include this universal

1 Luc Foubert, PhD, The Introspective Mind', CNRS-UPR 3293, Unit for Neuroscience, Information and Complexity (http://www.unic.cnrs-gif.fr). His current research focuses on the structures and dynamics of the primary sensory cortices dealing with questions relative to the binding of the perceptive unity and multi-sensory integration.

2 *Science & Vie,* 1159, April 2014, p. 51, a symbolic thinking; Francesco d'Errico, archeologist, University of Bordeaux.

3 Ernest Cassirer, *Language and Myth,* Yale University Press, New Haven, CT, 1953, p. 18.

grammar, therefore it is part of humans' cognitive aptitudes since its appearance. All research that is interested in the origins of languages agrees with this logic and reason.[4]

My modest supposition is that the expressions of non-literate people, like that of literate people, are a universal consequence of humanity's constant observation of the world, an intuitive and sensitive functioning of the brain, stemming from a need to understand and comprehend life, to communicate, to leave a trace, to construct self-identity and culture. The birth of what becomes human culture includes the ability to create both technology and art. The sense of the sacred and the creation of myth seem to be a unique skill of human beings and a tool of their survival. As estimated by Joan Zilhao, archeologist at the University of Bristol (UK),

> Not only homo sapiens was given this trade of nature, the three hominids had phonatory tools (the hyoid bone) that connected to the pharynx. Therefore, humanity had the capacity to communicate ever since; the co-evolution between brain and language is a key point in the history of humanity … consequently, the brain's structure that is responsible to language was already developed in homo erectus, 1.5 million to 2 million years ago.[5]

Humanity, all over the world, seems to have used physical phenomena, like the elements and forces of nature and the body, as resources to form tools for communication. Mountains, deserts, night and days, animals, flowers, trees, colours, raging skies, light and winds, birth and death, dreams and memories became the bricks of all creation and communication.

Humanity explained the existence of the world and of the living through symbols. Goddesses and gods mirrored the miracles and wonders of the world; they incarnated stories of life and of creation, offering explanations for intangible phenomena. From intuitively observing, sensing, feeling, and comprehending the world, human beings rationalize, analyse, innovate, create, construct or destroy. Humanity accumulated prototypical forms and symbols as cultural references that served to cultivate complex ideas, and to create ethical and aesthetical compositions. Myths and philosophies are the expressions of those notions, emotions, thoughts, and questions, and the attempts to answer questions. Humanity developed its narrations, its representations of dynamic inner worlds, by the re-presentation and re-combination of accumulated impressions and expressions, acting together with cognitive thinking.

Jean-Louis Dessalles, professor at the Ecole Nationale Supérieure des Telecommunications, emphasizes two main functions of the communication of humans, illustrating the universality of communication apparent in all human societies, and that exist only in humans. The first he titles 'events functioning', which consists of accumulating information, images and signals that can cogenerate all facts that seem interesting. The second is 'argument functioning', which consists of the ability to discuss, judge and construct specific ideas such as 'true' or 'coherent' for the accumulated information.[6]

In *The Origins of the World's Mythologies*, Michael Witzel, Professor of Sanskrit at Harvard University, gives evidence not only of the origin but also the communal structure of the fundamental narrations found in all

4 Pascal Picq and Hélène Roche, *Les premiers outils: Les origines de la culture,* Le Pommier/Cité des Sciences et de l'industrie, 2006, p. 32.

5 *Science & Vie,* 1159, April 2014, p. 57, The birth of language.

6 Jean-Louis Dessalles, Les origines de la culture, Le Pommier/Cité des sciences et de l'industrie, 2006, p. 107.

of the grand myths of humanity, starting with the Paleolithic period:

> Comparative mythology… produced a lot of work since the nineteenth century… what had not been done is to compare all the great mythologies in historical perspective. I had to compare the Greek theology of Hesiod, the Icelandic Eddo, and the Popol-Vuh Mayan, the mythologies of ancient Egypt, Mesopotamia, Japan and India. Once you do that comparison, you realize how these mythologies are similar, how they share a common story line, a chain of fifteen elements found almost always in the same order since the creation of the universe.

Of these important representations of man and the universe, says Witzel, legends are echoes of the great mythologies of the world. The thesis is ambitious and fascinating: a part of our mental reflexes, our means of representing the universe, come from a time when Homo sapiens adorned the walls of Lascaux or Altamira, using only tools made of bone, wood, or flint for instruments.[7]

The senses, our receptors of the world, are an intuitive source, or rather a mechanism of observation. Various disciplines of expression are available to man to produce logical ideas that are in constant evolution. Mircea Eliade's comparative method allows readers and historians to synthesize the most disparate, cross-cultural religious and mythological records. Working horizontally and vertically, he unites references by synchronic methods, creating historical structures as traditional academic exercises, demonstrated in the patterns he described in Comparative Religion (1949). Eliade is aware that 'every manifestation of the sacred takes place in some historical situation,' and 'the fact that a hierophant is always an historical event — that is to say, always occurs in some definite situation — does not lessen its universal quality.'[8] Universal characteristics and cultural or individual diversities are complementary, parallel and opposite concepts that may conflict with each other.

In his Cahier d'un retours, Aimé Césaire underlines: 'There are two ways of losing one self; walled in segregation within a singularity or by dilution in the universal. My conception of the universal is of a rich universal composed of all coexistence and deepening differences.'[9] Everything man-made is a result of his emotions sustained with rational thinking, giving expression to our sensitive capacities to comprehend ourselves within the universe.

Myths and, later, religions are forms of intellectual spiritualism, an organization of people's sensitive inner worlds. They logically argue points of view, and compose roles and answers. Humanity is constantly aiming for the construction of organized societies, living in ethical circumstances, reflecting on universal realities, on our limits, on the cycle of nature and the cycle of life.

Myths offer an imaginative and creative organization of concepts that are significant to the understanding of values and functioning of peoples, later advancing into common laws and the building of collective organizations, while constantly remaining aware of the mystery of life and of the universe, that has become sacred.

Jean-Louis Dessalles concludes: 'at the same time as the appearance of argumentative functioning came the development of humans' aptitudes for reason and the practice of logic. Without any doubt, we

7 Michael Witzel (Professor of Sanskrit at Harvard University, 14 March, interview with Stephan Foucart, *Cahier du monde,* 21510, 15 March 2014.

8 Mircea Eliade, *Patterns in Comparative Religion,* trans. Rosemary Sheed, introduced John C. Holt, University of Nebraska, Sheed and Ward, New York, 1958, pp. 2–3.

9 Poem by Aimé Césaire (published in *Cahier d'un retour au pays natal*) found in a letter sent to Maurice Thorez in October 1956. (Césaire, then deputy for Martinique, left the French Communist Party as a protest against its silence during the Soviet Union's invasion of Hungary.)

talk here about a cognitive capacity of man that plays an essential role in the manner humans could master and understand their environment.'[10]

Conclusion

Humanity is a conscious life force, with ethics regarding property, belongings, relations, sexuality, interrogations, differences and similarities, birth, life, and death. Stories, traditions, habits, ceremonies and art are metaphors of nature and of man's life, often mixed with elements of history.

All traditions, myths, and religions evoke common ideas or similarities of notions, for example, a centre, an *axis mundi*, a centre of the world, similar to the centre of the body. An equivalent abstract form is the cross, a metaphor for man's form. The centre of the cross is parallel to a crossroads between the four corners of the world.

In all myth, we refer to an imaginative, idealistic, perfect place, free of laws, conforming to the ideals of perfection, a paradise that precedes our ordinary, struggling life and humanity. These similarities are found between visions of the world and the body, often using similar symbols and references borrowed from nature. The similarities of forms, signs, graphics and the use of references to bodies and animals illustrate a common functional behavior of the mind and body. These elements have served the arts and creativity of man ever since, until today's contemporary art.

This transconscious trade of human functioning allows us to understand messages, to communicate or debate with other cultures or civilizations. According to Emmanuel Anati:

> The latest research shows that the most ancient different artistic expressions, throughout the entire world, illustrate one similar typology, the same choice thematic, and the same type of association. Even their style is fundamentally inscribed in one and the same sequence limited in variations. Therefore it seems to be justified to speak about one and unique visual language, springing from the same language, from the exact same association of ideas and from universal symbolisms that compose the human mental essence, which produced his imprint, under the form we call art, and that is engraved on the rocks and walls the entire world where population lived in early civilization, before the birth of the written language.[11]

Eliade believed that modern novels, ideologies, customs and pastimes contain 'mythological elements', and that some mythological elements fall within the 'transconscious', which he defined as a set of universal human images, symbols, and sentiments.[12]

Religions, myths and art contain organized, traditional, sacred stories that are believed to express profound preoccupations and universal meaning. They are also beliefs that have become integrated into man's historical perspectives. According to Eliade, myths establish models for human behaviour.[13] Via the practice of the arts, we can illustrate a general schema of humanity and its works, reflecting a way of thinking that transcends time and difference, from Neolithic to contemporary, which permits us to better understand our existence.

Cognition drives from the Latin verb cognoscere, which means 'get to know'. This means that cognition focuses on knowledge, albeit not as a static substance or thing,

10 Jean-Louis Dessalles, *Les origines de la culture,* Le Pommier/Cité des sciences et de l'industrie, 2006, p. 109.

11 Emmanuel Anati, in *La religion des origines,* Bayard Editions-Centurion, Paris, 1999.

12 Mircea Eliade, *Myth and Reality,* trans. Willard R. Trask, Harper & Row, New York, 1963,. pp. 181–93; Eliade, *Images and Symbols,* pp. 16–17.

13 Eliade, *The Sacred and the Profane,* 1957015679201X (ISBN13: 9780156792011) p. 100.

but as a process. More generally, when we speak about cognition we are focusing on the mind as an information processor, i.e. a system that acquires uses and transforms information. It is important to note that cognition is not just about the kind of explicit knowledge and rational thinking that we typically find in scientific or philosophical reasoning. Cognition also includes subconscious, implicit, and affective experiences and feelings, since these too are based on the processing of information. For example, emotion, consciousness, and intention are all cognitive phenomena'.[14]

Creativity is an expression of the interaction between reality and the human psyche. Myth, religion and the arts are cultural agents for a dialogue between diversities, revealing that 'the universal cannot be otherwise than the sum of the qualities of each and every one'.[15]

14 Francis Heylighen, *Cognitive Systems a cybernetic perspective on the new science of the mind, Lecture notes 2008-2009 (ECCO: Evolution, Complexity and Cognition*, Vrije Universiteit Brussels), p. 5

15 Meeting around the work of Leopold Sedar Senghor and Aimé Césaire, Annals African Research of the Faculty of Arts, Humanities, Arts and Humanities of Bamako in partnership with the University of Gaston Berger of Saint Louis (Senegal), the University Cheikh Anta Diop of Dakar (Senegal) and the University of FALSH N'Gaoundéré (Cameroon), with the support of the university's Agency for the Francophone.

Carved footprints and prehistoric beliefs: examples of symbol and myth practice and ideology

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Background

Footprints are an image type often represented on prehistoric petroglyphs. The author made a first study of its design, sprawl, dating and interpretation in the archaeological source material as part of a further investigation of this theme (Bertilsson 2013). Case studies of significant rock art sites in Sweden, Norway, Italy and Israel showed that the footprint is quite a general phenomenon, occurring in all these areas during the time period starting c. 3000 BC and continuing until at least 500 BC. The earliest dating applies to Har Karkom in Israel, and the youngest, Zurla in Valcamonica in Italy. The widespread occurrence of the symbol on the prehistoric rock pictures means that it must be perceived as a pictogram or an archetypal symbol (Anati 1993, Fredell 2003: 9). The footprints have been interpreted in different ways; as the epitome of an otherwise invisible deity, a sign of reverence or as a symbol of a dead person (Almgren 1962, Anati 1994, Gavaldo 2009) (for a series of further proposals for interpretation of footprints see Coles 2005: 52).

Early research: Oscar Almgren

One of the first archeologists to describe the footprint, occurrence and interpretation was the Swedish archeology professor, Oscar Almgren, in his well-known work about the rock carvings in Tanum in Bohuslän, Sweden, *Hällristningar och kultbruk* (Petroglyphs and cults, translated here) (Almgren 1926–7). When Almgren in this study discusses the footprints, he describes several different types. Those which have marked toes he believed depicted bare feet and those having two horizontal cross bands inside an outer

Figure 2 Footprints consisting of a pair of naked feet in combination with solar symbols represented by two ring-crosses and a spoked wheel that together forms a chariot at Disåsen, Brastad. Source: www.shfa.se. Rubbing: Dietrich Evers.

contour to depict sandal-clad feet. He reported examples of the first type from Ryxö in Brastad and the second from Underslös in Tanum (Almgren 1926–7: 213, Bertilsson 2013: 172). His interpretation of the contour-carved foot with two transverse bands he supported by an earthen vessel with a foot, showing the same form elements on its underside. The vessel was found at Stassfurt in Saxony and belongs to the Lausitz culture, with a dating to the late Bronze Age or early Iron Age (Almgren 1926–7: 212). Regarding the interpretation of the footprints on the rock carvings, Almgren made the following reflection: 'Particularly noteworthy seems to me to be that footprints occur adjacent to both those as gods, or representatives of gods interpreted, large anthropomorphic images Fig. 92, 93 and at several of the solar cult images: Fig. 9, 60, 80', Almgren 1926–7: 213, translated here). The carvings Almgren discusses are in the first case, Backa in Brastad with 'The Shoemaker', and Litsleby in Tanum with 'The Spear God', and in the last case

Figure 1 Footprints in the form of a pair of naked feet depicted together with a ring-cross that is supported by three anthropomorphic figures. Source: www.shfa.se. Rubbing: Dietrich Evers.

the carvings at Kalleby, Disåsen in Brastad and Fossum Tanum. On the first two are, indeed, images of naked footprints in direct proximity to wheel crosses, being interpreted as a sign of the sun (Figs. 1 and 2). On the latter there is in the upper left part a fully carved pair of footprints along with a figure that has been interpreted as the sun disk being pulled across the sky by birds (Fig. 3). This illustrates the importance of the depiction of the sun disk's journey across the sky being a most important part of Bronze Age mythological narratives, and that can also be embodied in the form of a 'solar horse', an image n that was more common in Scandinavian Bronze Age rock art (Kaul 2004, Kristiansen and Larsson 2005).

Almgren presented, however, a different interpretation of the figures connected to the solar disk at Fossum and on the big Aspeberg carving. He suggested that they are instead dancing adorants, and referred to a similar, but more stylized, figurative representa-

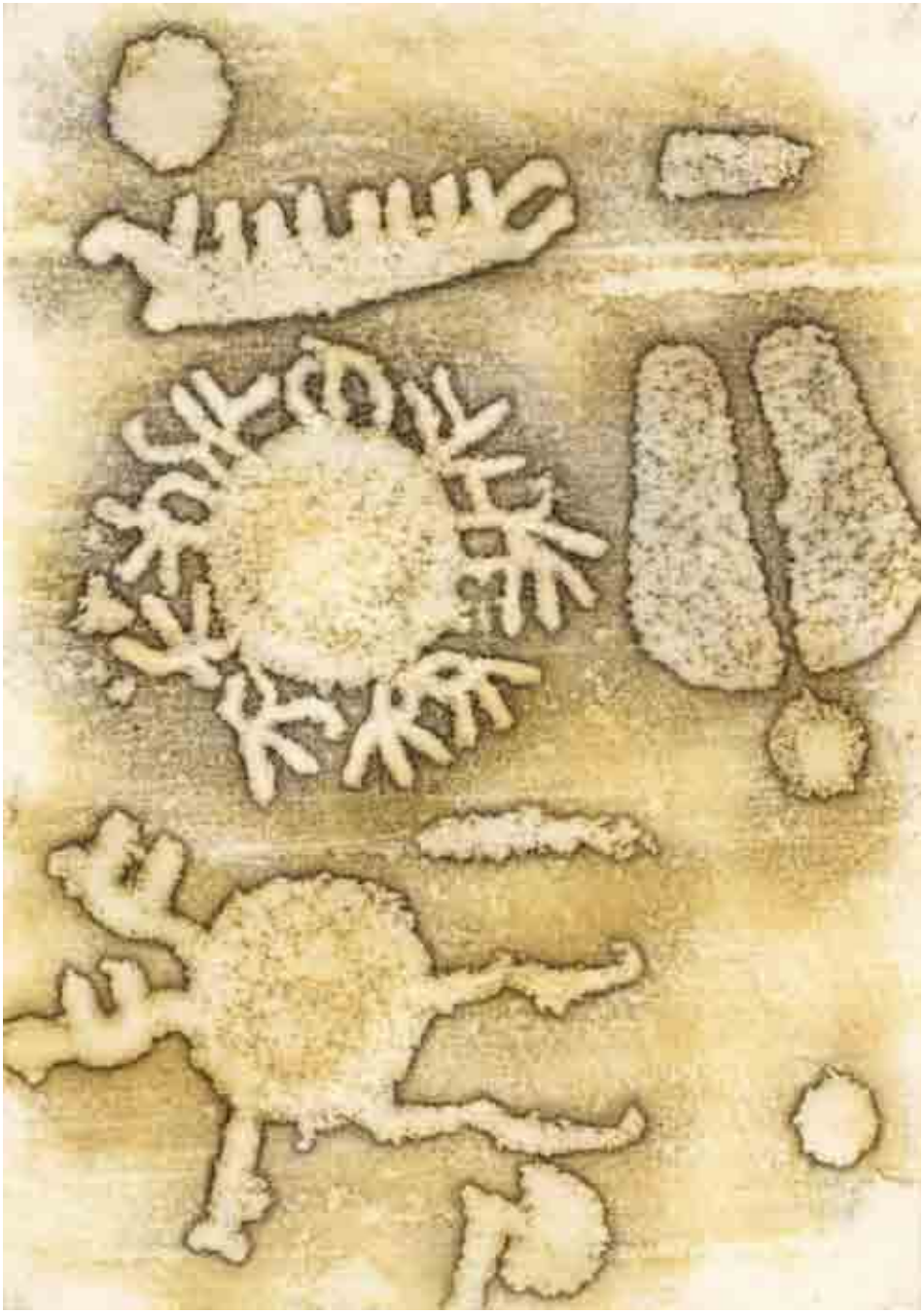

Figure 3 Footprint pair without marked toes and a solar disk that is supported by birds. Immediately below these figures is an anthropomorphic figure with a circular body, thin legs and two heads and a sword sheath from the Bronze Age. Source: www.shfa.se. Rubbing: Dietrich Evers.

tion, which is engraved on the famous Wismar Horn from the Bronze Age dated to c. 1400 BC (Almgren 1926–7: 90), recently revised to c. 1600 (Kristiansen and Larsson 2005: 195). Without penetrating too deeply into the solar cult mysteries that may be hidden in Bohuslän rock art, we wish to state that all the footprints that we have referred to which occur in this connection are completely carved and often provided with toes. This seems to correspond well with a dating of this type of footprint to the Early Bronze Age, which we have suggested for these at Järrestad (Bertilsson 2013; see Skoglund 2013 with references). For those who have studied Almgren and his contemporary colleagues' research into the symbols and images of the petroglyphs, it is obvious that they perceived these images as manifestations of religion and cult. Although this approach has been questioned and criticized, it nevertheless, in modified and developed form, has survived to the present day (Kristiansen 2012). A very broad, in-depth

and critical analysis of these causes has recently been presented in the study: *Fornnordisk religionsforskning mellan teori och empiri. Kulten av anfäder, solen och vegetationsandar i idéhistorisk belysning* (Old Norse religion research between theory and empirical data. The cult of ancestors, the sun and vegetation spirits in the history of ideas lighting) by Andreas Nordberg (2013, title translated here). This is also evident from the following quotation:

> Like the 1800s solar nature mythologists mainly perceived the sun as a medium in which the Infinite (holy, transcendent) was manifested, perceived many archaeological representative of the same school in Scandinavia sun as an indirect mediator of supernatural, sacred or divine power. Although, it is obvious this interpretation is liberal Protestant theology close. Possibly it is also this implicit heritage that has made the solar mythology as viable (Nordberg 2013: 389 translated here).

Nordberg also notes something interesting to us, in view of the introduction to this article, namely that:

> In the history of religions perspective must Almgren's interpretations of ' Petroglyphs and cults' despite their age are considered as the most plausible attempts to explain the contents of the Scandinavian rock art motifs (Nordberg 2013: 221 translated here).

Design and execution of the footprints – nude or shod?

After this digression into religious and historical research, we now want to return to the theme of this article, that consists of pictorial representations of footprints in prehistoric rock art. Of interest in this context may also be the reason why the footprints were designed in several different ways. In our first example from Bohuslän, it was entirely carved and fitted with clearly marked toes, in this respect showing similarities to many footprints on the large rock carving at Järrestad on Österlen in Scania (Bertilsson 2013: 171). The footprints on Fossum carving in Tanum partly look different because, although also

Figure 4 The Litsleby carving dominated by the 2.40-m tall 'Spear God' with a sun symbol connected to his phallus, and to the left of this two contour-carved, pairs of footprints with marked toes. Source: www.shfa.se. Photo: Åsa Fredell.

being completely carved, they lack marked toes. One may wonder why it looks that way. One possibility is that although there were certain conventions how the footprints would be designed and depicted, they were just determined to a certain degree, leaving the detailed design and final finishing to those who made the pictures. We deliberately use 'those who', since the wide variation of the design indicates that the images were performed by many different individuals. This would then be an example of an existing artistic freedom during the Early Bronze Age. Whether this was really the case, we cannot reasonably answer here, but only reflect on the possible cause. The issue becomes even more complicated if we bring yet another example into our investigation, this time from the Listleby (Fig. 4). To the left of 'The Spear God' there are two contour-carved footprints with toes, which thus gives us another variation on this particular prehistoric design theme.

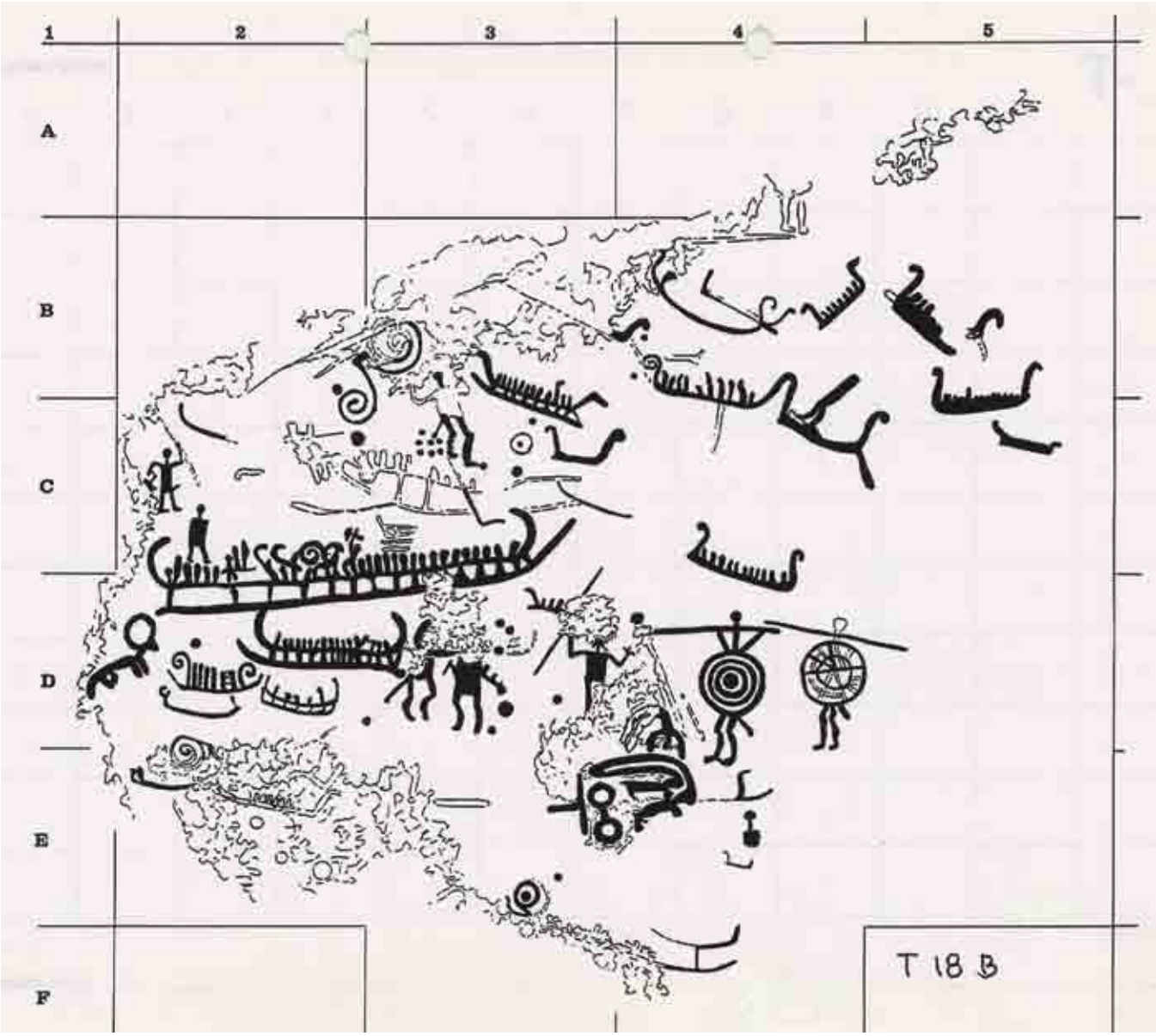

Figure 5. Graphic depiction of the rock carving at Aspeberget with two anthropomorphic figures with round torsos, decorated with concentric circles and a (solar) cross. Source: www.shfa.se. Graphics: THU.

The same is true, in fact, about the manner in which the solar symbols were executed. They occur in several variants, as a wheel cross, as a spoked wheel or as a fully carved disk. Overall, therefore, it seems as though there was no fully controlling convention on how the footprints or solar symbols would be executed. One thing was, however, obvious: the importance of being placed near each other on the rock surface, indicating that the combination of the two symbols was highly significant. It is also noteworthy that the fully carved soles with toes at Järrestad differ from those in our examples from Tanum in detail. A very typical trait of the former is that the arch is often clearly marked, although there are examples with completely straight sides. There are also several similar Early Bronze axes in the shape (Bertilsson 2013: 171, Kaul et al. 2005: 64). An example of an integration of two different elements, one materially valuable, and one physically expressive, in the Bronze Age world view that, as far as hitherto known, is missing in Tanum, and other areas with rock art in Sweden, except for Lökeberg in Foss, Bohuslän where, out of a total of 73 carved feet, there are several displaying some similarity, but also one having the clear shape of a flat copper axe from the

Figure 6 Part of Järrestad panel with three pairs of footprints illustrating the transformation process to wheel-crosses. Source: www.shfa.se. Photo: Catarina Bertilsson.

transitional period between the Neolithic and Bronze Age, the Chalcolithic (Fig. 8 and Montelius 1971:12, I:2). Indeed, there is at least one other example of such a shape, this time on the big rock carving at Madsebakke on Bornholm in Denmark. This axe-foot is located about 1 m above the familiar wheel-cross with a cup mark enrolled in each quadrant, with 16 cup marks surrounding the wheel (Kaul 2005: 59). Some metres away is a footprint with toes, and in addition two ring-crosses (Fig. 9). Immediately adjacent is one that is probably intended as a ship's prow with a spiral, and another incomplete boat, that with some imagination could possibly be a halberd. Although this interpretation may seem far-fetched, its shaft being certainly very short, it has an angled bottom which otherwise can be seen on carved axes from the Early Bronze Age in Valcamonica in Italy (e.g. Anati 1976: 106–07). There is also a possible axe-foot in Portugal that consists of a putative footprint at a hill fort at Briteiros in Guimarães (Fig. 12).

But there are also anthropomorphic figures of a different type, with circular torsos, sometimes in the form of wheel crosses, considered to symbolize a shield, like the so-called Wismar warrior. The shield has often also been considered to represent the sun, and if so, in the form of an image transformation consisting of an anthropomorphic figure and an element of nature. This relationship was discussed in earlier research, and the Danish religious scholar Vilhelm La Cour claimed they were actual representations of the sun god himself and a testament to his 'anthropomorphization' (Almgren 1926–7: 93, Kristiansen and Larsson 2005: 196 and Fig. 5). The integration of those two elements also signals the presence of a sliding scale of values and an 'animistication' of material things. But we can hardly call these phenomena merely animist transformations, since they also contain human bodily elements. In this context it may be appropriate to point out that the newer, postmodern research has also addressed this field. The footprints have been interpreted as representing single individuals and expressions of personhood, rather than deities or other higher beings:

> It is argued that these images (feet and shoe) represented ideas of dress and nakedness and that these concepts were ambiguous and manifold: nakedness was used in certain social and ritual contexts to express authority and rank, while in other contexts nakedness was used to express community and equality (Skoglund 2013: 1).

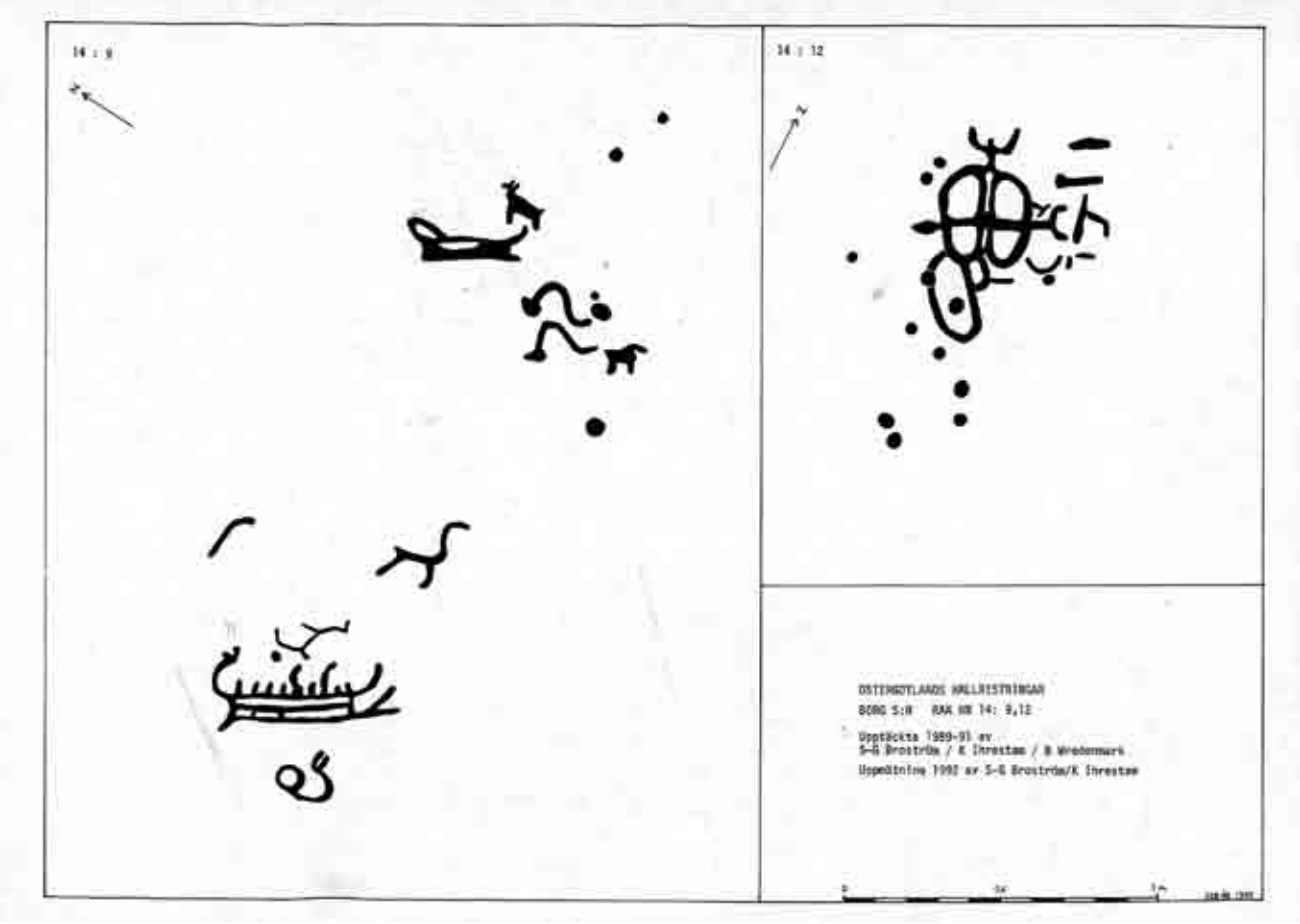

Figure 7 Pair of footprints with pendent adorant at front, pierced by a spear and fitted with a sword sheath of Bronze Age type at Borg in Norrköping, Sweden. Source: www.shfa.se. Drawing: Botark.

There can be little doubt that this approach reflects individual-centred postmodernism as it is expressed in some of today's archeological research. It may seem to be characterized by a certain lack of overall perspective and a desire for both decontextualization and deconstruction, but perhaps this is what has made it attractive. The chronological positioning of the various types of footprints, where the bare foot belongs to the older part of the Bronze Age and the sandal-clad to the late Bronze Age and early Iron Age shows that a temporal contextualization is still needed. But it is important to pay attention to the fact that the detailed design of these images often appears regionally or locally minted even down to a micro level. In this regard, it is interesting to note that on Järrestad a number of footprints look different, more stylized and looking like an integrated pair of footprints intended to be perceived as a wheel cross (Fig. 6). Let us, for a moment, reflect upon what this might mean for our understanding of what the footprint, as image and symbol, may represent. A footprint, alone or in pairs, according to the scientists that we have referred to, may represent a deity and especially when combined with a wheel cross or a circular disk; or it may represent an individual whose naked foot was depicted with an intention to communicate social status or rank for example. Then we must pose the question regarding the intention behind the representation of the integrated and stylized footprints on the Järrestad panel. It can hardly be reasonable to interpret them as a direct representation or depiction of a particular individual's feet. In this case, it seems more probable that it was a conscious effort towards a more stylized, abstract form, intended to symbolize, represent and

Figure 8 Group with pairs of footprints at Lökeberg in Foss, Bohuslän where three different types occur, all being carved out but one above lacking toes, the one below right, having toes, and the one below left, having only four toes and something looking like an axe-blade being placed between the feet. Source: www.shfa.se. Photo: Andreas Toreld.

communicate a phenomenon of more general, ideological significance for those who had the opportunity to see them when the place still had an active function (cf. the concept of 'the iconic order' in Aijmer 2001, here referenced from Ling 2008).

Dating-wise, this also helps to make the interpretation of rock carving a tad more complicated. If you strictly follow the suggested dating (Skoglund 2013, with references), so this hybridized symbol would date to the Late Bronze Age or early Iron Age. This should then also be applicable to other carvings of the same kind. Simultaneously we know that the sun cross, in its more original form or in combination with other images, appears on petroglyphs, in a context that suggests considerably earlier dating, like the Wismar warrior at Aspeberget in Tanum, possibly from Montelius Period 1 (Fig. 5). This suggests that the various forms of footprints may have more complex relationships that manifest themselves in a partly sliding form scale, which is also related to the time factor. Overall, this means that the footprints really stand out as symbols of great vitality and length and spread in the prehistoric imagery and world of conceptions. This in turn indicates that they can be attributed archetypal characteristics, and represent a phenomenon that in recent research has been termed a core universal.

Figure 9 Denmark's biggest rock carving, with boats, wheel-crosses, a naked foot with toes, a flat axe and a possible halberd. Source: www.shfa.se. Photo: Gerhard Milstreu.

Footprints from other areas

We have in other contexts studied footprints from other areas and in other archeological contexts, among others from Har Karkom in Israel and from Valcamonica in Italy. In the former case, dating to the Bronze Age, which means the third millennium BC, and in the latter the Iron Age, which means from c. 700 BC. Despite the large difference in time and archeological affiliation, there is a palpable shape similarity between the types of footprint found in the two areas. They are contour-carved and lack transverse bands. It is also the practice to place additional characters within its contour line at both locations. In one case, at Har Karkom, it consists of an anthropomorphic figure with the arms in a hip-attached pose similar to some terracotta figurines appearing in the Eastern Mediterranean Bronze Age cultures (Anati 2001: 134). In the Early Iron Age footprints in Valcamonica, the figures that are inserted within the footprints' contours are also of anthropomorphic type, but in the example from Zurla are spear-armed adorants (Bertilsson 2013). It seems that these carvings in their obvious stylized form have been designed according to a fairly strict standard, which also applies to the repertoire with depictions of warriors or adorers. In relation to the Israeli case, they may seem more narrative than depicting, even if the story itself also seems to have been rather limited and often repeated.

A footprint also linked to an anthropomorphic figure is found in Borg in Norrköping, Sweden, where an adorer is positioned on the fore end of the foot, seemingly in order to visualize the creature that the footprints belong to. There are also some other attributes: a spear that pierces the footprints and an attached scabbard (Fig. 7). An engraving of a similar representation is also found at Campanine Alta in Valcamonica (Gavaldo 2009: 299). There the footprints are carved over the lower part of the legs of an adorant and thereby made later. There are four additional footprints, fully or partially carved of the same type.

Figure 10 Rock carving at Gärde, Offerdal in Jämtland with an elk, to which leads up a row of ten anthropomorphic footprints. To the left there are two times two elk tracks in pairs and an idol-like figure. Source: www.shfa.se. Photo: Ulf Bertilsson.

A similar motif, but far more naturalistically portrayed, is found at Kåfjord in Alta in Norway, but there the feet are replaced with snowshoes. The image is elegantly made with fine details such as the network on the snowshoes. The difficulty of depicting various elements of the image in proper perspective is evident from the fact that the snowshoes as well as its carrier are depicted from the front with his leg in a curved shape outside the snowshoes (Helskog 2012: 55). This reflects the same problem, as the carver at Borg must have experienced, although the execution did not reach the same artistic level. If it reflects a presentation of a similar prehistoric conception we find less likely, although still possible.

Footprints in motion

The footprints that we have so far discussed, with the exception of some at Järrestad, may be called stationary, i.e. intentionally carved in a certain place and in a particular context of symbols with special meanings, such as wheel crosses. But there are footprints that were inscribed with the intention to convey something more than simply confirmation or repetition of an already known symbolic significance. We are thinking of carvings with footprints that can give the impression that an anthropomorphic figure has been walking across the rock. An exciting example of this is found at Gärde rapids in Offerdal, Jämtland where, among the naturalistically contour-carved elks, there also is a smaller, c. 40-cm large such figure with a highlighted heart. And leading up to its hind legs, there is a row of 10 anthropomorphic footprints, and in front of it is four, in two pairs, of elk track marks going in a direction away from the elk. To the left of these is a lying, idol-like image (Figs. 10/10b). A few yards further up the same rock surface is another elk of the same type, behind which is also a double track stamp of an elk. These two elks are carved with a technique similar to the one used in southern carvings and for that matter also at Glösa and Nämforsen, with relatively wide lines. This scene seems to convey that an anthropomorphic being is moving in the direction of the elk. If so, to

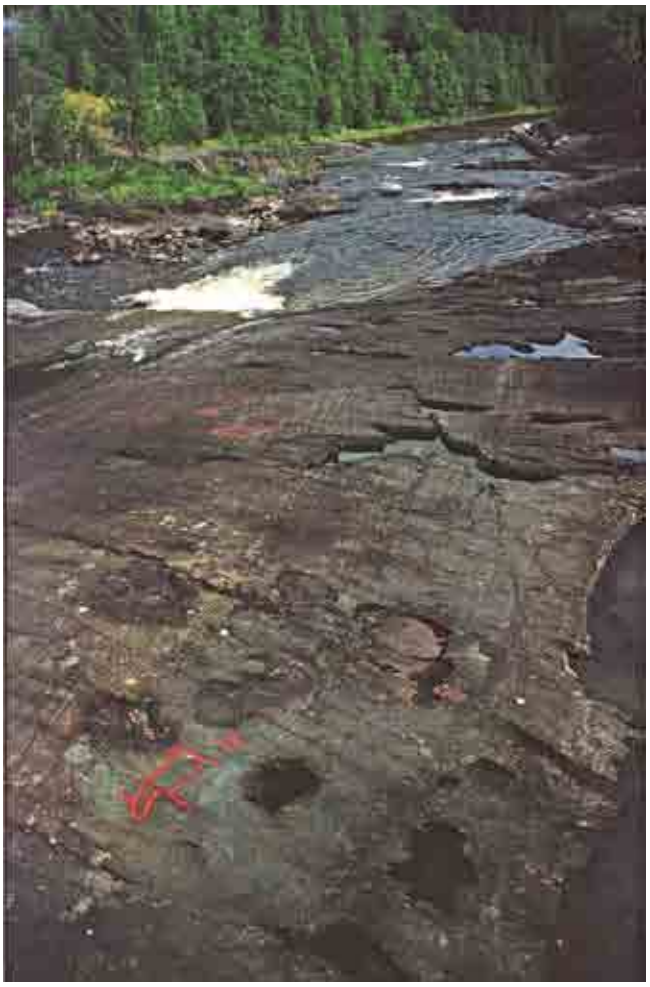

Figure 10b Contour-carved elk with marked heart, and a pair of elk track stamps at Gärde rapids in Offerdal, Jämtland in Sweden. Source: www.shfa.se. Photo: Ulf Bertilsson.

give the impression of a man sneaking up on an elk from behind as an expression of a kind of hunting magic? But maybe the scene has a deeper meaning than that? It is perhaps instead intended to convey that both man and elk were here, in a kind of physical and spiritual presence and contact, manifested in the rock carvings. And maybe it was that, by analogy with the theory of the invisible deity, that the man could not be imaged except for in form of footprints, while the animal, the elk, was probably also considered as divine, and actually could be depicted in his whole figure, but also in the form of his track stamps, to make him equal with the human god. And it is easy to realize that it was right here in this magical place, in the deep valley with the water-polished rock surfaces and the powerful and magical shimmering rapids, that these two beings could get into close contact with each other. Elks visited this site to drink water, usually at dusk, during thousands of years, as evidenced by the older, almost supernaturally large, cut and polished images of this magnificent animal, which to this day is called the king of the forest. When you visit the place it is easy to still perceive the shamanistic potential and the fact that it became the stage for this extremely rare but vibrant animistic integration, orchestrated almost 4,000 years ago (Bertilsson 2004).

Pictures of elks and footprints are also represented on several carvings in Alta, but nowhere where do they consist of track stamps with clear hooves, but instead are more schematically depicted. Footprints of bear directly linked to images of the animal itself, however, are frequent (Helskog 2012: 21,47, 82). Another more widely known scene is one where man and elk hold the lead roles, found on an engraving at Zalavruga in Belomorsk in Russia. There, two or three hunters with bows and spears and on skis pursue two elks. It also depicted clearly on the carving how they catch up with two of the elks and drive a spear into the back of one of them, and shoot arrows into the other (Bertilsson 2004: 77). The essence of this scene seems to be hunting and killing, unlike the one at Gärde, that seems to be marked by a more respectful relationship with the elk.

We will now leave the rock art in the north, and again turn our gaze south to see if there are any pictures of footprints in motion there. After a review of more than 1,000 images with footprints found in SHFA's comprehensive database, including the most significant rock art sites in Sweden and Denmark, it is clear that this is not so. One can certainly get the impression that some footprints on the Järrestad panel are in motion, but because they usually comprise of right feet, or are over-stylized, it is less likely. A similar example is found on a carving at Tisselskog in Högsbyn Dalsland, where some 10 carved feet with toes look as if they move across a gently curved outcrop. There is only one problem with that interpretation: all are left feet, which in this case would mean that the owner must have hopped on one leg. However, there is one example from Kyrkoryk in Tanum where

Figure 11 Photo of Bronze Age rock carving from Kyrkoryk in Tanum where, in the upper part, there is a horizontal row of three footprints with heel lines that seems to walk across the panel from right to left. Below the footprints there are two wheel-crosses superimposed on boats. Photo: Ellen Meier.

a series of three contour-carved footprints with cross bands give the impression of moving to the left in a horizontal direction on the upper part of the panel. Further, there is actually a fourth that may seem to move back in the opposite direction (Fig. 11).

After this survey, we note that virtually all feet except from the three above depicted in petroglyphs are intended to be static representations, and not to give the impression of being in motion. It probably means that they were primarily meant to serve as iconic symbols, and not as an illustrative basis for a story. The geographically widespread, frequent repetition of images of these types, also suggests that there was a need at recurring intervals to confirm prevailing beliefs, religious and ideological elements, essential for society's stability and survival. In this context it is also interesting to note that, especially in some major places, like Järrestad and Rickeby (www.shfa.se, Up Boglösa 138 Rickeby Almgren B 1983), the complete model series of feet from the nude to the shoe-clad, to the stylized, wheel cross similar type is represented. In light of the reasoning above, this should primarily be considered as having chronological implications, representing a change through time.

Footprints in hill forts

We will now briefly look at a completely different type of footprint that has been found in a completely different archeological context: the footprint in hill forts, of which we will present three examples from different parts of Europe. The first and most famous is from the hill fort at Dunadd, on the way to the carvings at Kilmartin in Scotland. The name, meaning 'the fortress on the River Add', indicates the significance of the place. On a rock high up on the hill are several carvings, and a wild boar in the Pictish style, an inscription in Ogham, and finally, a carving of a footprint. The carvings can be dated to around 800 AD. According to tradition, the footprint and an adjacent carved-out basin played an important role in the coronation rituals of the Dalrida kings, originally arriving from Ireland in the Argyle area (Butter 1999: 12, 98). Finds from the excavations show that the site was inhabited in different periods starting from around 500 AD. During the first centuries, the Scotti (the name of the people who came from Ireland) occupied the fort. In recent research, it is believed that the carvings and the inscription were actually accomplished by them and not by the Picts. The Dunadd footprint certainly resembles a foot, being deeply carved, having a slightly curved shape at the heel and forefoot, although looking much different from the older types of prehistoric footprint that we have discussed above.

In connection with Österlens Museum Rock Art Course on Ascension Day in May 2009 an excursion was undertaken to the hill-fort on Stenshuvud, where the goal was also to look at the feet carved into a rock on the mountain's crest. The foot has been locally known, but unclear for how long, and to have been made in modern times, although its eventual age has been just as unclear. The question therefore is whether the opinion is true and if it is possible to date the carved foot closer. The carved footprint was documented through photography, and also in the form of frottage (Fig. 13, showing the photo). The footprint is placed on the crest of Stenshuvud and is composed of five toes and forefoot, while the arch, rear footpad and heel are missing. To the right of the foot is one of the National Land Survey's fixed points marking the highest point of the mountain. If one examines the foot thoroughly in terms of its design, appearance and location, it seems not to have been carved with modern tools or in recent times because of its patination and overgrowth of slow-growing lichen; the appearance is anatomically correct but also designed in a way that is hardly reminiscent of older carvings; the placement of the crest of the cliff in the hill-fort with extensive views also suggest that the location is selected with great care. The extensive view means that in clear weather you can see the island of Bornholm, which is about 30 km away and the same distance from the Blekinge coast. That probably reflects the specific function and significance of the carving and can be seen as a symbolic illustration of the crowned king's power, at the footprint, and perhaps of the geographical area that constituted his domains, too.

It seems possible to assume that the footprints on Stenshuvud and Dunadd constitute expressions of a similar phenomenon. A phenomenon implicating both constituted an important element in the rituals of the coronation ceremonies for a new king dating to the migration period. There are in both cases the rock carvings premises from the Bronze Age in adjacent areas, although these particular places lack such. Unlike the hill-fort on Stenshuvud, in Dunadd archeological excavations have been conducted and several datable objects have been found. On Stenshuvud, the dating has been obtained through a C-14 analysis of coal residue from a wood structure that was part of the construction for the original embankment. The footprint in Portugal was placed inside a hill-fort too, and might of course be a result of a similar royal coronation process, like their counterparts in Scotland and Sweden (Figs. 12/12b, Coimbra 2008: 115 with references). The fact that it actually seems to have a shape looking very much like a flat copper axe is, however, an exciting complication. That is, however, a circumstance that we, unfortunately, have not have had the opportunity to delve further into here. In Portugal, there are simultaneously some footprints,

Figures 12 (left) and 12b (right) Putative footprints from Briteiros hill fort (Guimarães) Portugal, showing a great resemblance to similar carvings in Scandinavia, here interpreted as depictions of Chalcolithic flat axes of copper. Photo: Fernando Coimbra.

usually naked with toes, already during the Early Bronze Age, while another main type, the sandal-clad, is considered to represent a younger stage from the Late Bronze Age and early Iron Age.

The end of the walk

We note that footprints occur early: in a Bronze Age context, in the archeological complex of Har Karkom in Israel; and late, during the early Iron Age, in one of the largest petroglyph concentrations in Valcamonica in Italy, both of the contour-carved type. Early Iron Age there means about 800–500 BC, and therefore corresponds to the Late Bronze Age in Scandinavia, the geographical area that we put the most focus on here. This type of footprint is frequent at Järrestad too, where it is suggested to belong to the Late Bronze Age or the Early Iron Age, and preceded by the naked foot with toes that is older, at least from the Early Bronze Age. The author has previously stated that there it is also a type that originally has a great shape consistent with copper flat axes from the Chalcolithic period (Bertilsson 2013). Here is also presented further examples of this type, from Lökeberg in Bohuslän and Madsebakke on Bornholm. This relationship indicates that there has been a complicated connection between man and metal, which has been manifested and sealed in the carved rock, a relationship that also reveals the presence of a world where humans and matter have been integrated into an ideological discourse in a similar way as happened with humans and animals, or animals and matter both during the Stone Age and the Bronze Age in various types of animist transformations (Ling and Rowlands in press). If we look back at the various proposals of the meaning of footprints presented, we may conclude that this very careful, but memorable, reflection of John Coles can probably be considered as confirmed: 'this seems a simplistic view and there may well be more profound ideologies involved' (2005: 52). It has also been suggested that the footprints at Järrestad and in Bohuslän represented the 'soles of the dead', directing and commemorating the road from the grave to the sea of the dead (Bradley 1999: 665).

This could well be a plausible explanation, but however appealing it may appear, there are actually some complicating facts, such that some feet actually go upwards, and some also with a clear fusion of feet and wheel crosses. And besides, we have to consider the temporal discrepancy between the early, bare foot-type, and the tombs, relatively speaking, of a much later date. Richard Bradley later developed his view of this subject further, by contrasting the engraved images on the Bronze Age metalwork and in the rock art in

Figure 13 The deeply carved footprint placed on the crest of a hill fort, Stenshuvud, in Simrishamn, Scania. The hill fort has been dated to the migration period. The footprint is constituted of five toes and a forefoot while the arch, the rear footpad and heel are missing. To the right of the foot is one of Lantmäteriets/National Land Survey's fixed points marking the highest level of the rock. Photo: Catarina Bertilsson, SHFA.

Scandinavia (Bradley 2006, 2009). Our observation of the integration of metal axes and footprints suggests that the footprints after all are not to be perceived as of ordinary people or individuals, but instead of more divine beings but perhaps of people generally. Could early metal axes seem to possess almost supernatural qualities that could only be compared with those possessed by gods, and consequently, characteristics that made them extremely worthy of worship? That, if anything could be a good reason to carve axe feet on the Scandinavian rocks. This is also supported by the following quotation: 'But religion is, in culture stages, corresponding to the Nordic Bronze Age, particularly practical: people through religious acts want to obtain something from the divine powers' (Almgren 1914: 596, translated here). According to Almgren, it is also clear that the soles of the feet represent divine beings and apparitions that through the legends are still (2014 included) connected to the footprints, whether they be Buddha's or Christ's, or for that matter a Catholic saint's, and represents a modernization of the ancient pagan beliefs. This seems also a plausible explanation for the footprints' resurrection in the royal coronation rituals in the Iron Age hill forts.

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Sexual human representations in the paintings in the Serra da Capivara, Brazil: relations in action, narrative relations?

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The park of the Serra da Capivara in the Piauí, Nordeste region of Brazil, is known to be rich in rock art, paintings and engravings. More than 1,300 sites are known today in the park and other places, which make it one of the major sites of North and South America. This constitutes an important information source. Human figures — men, women and children — and animal figures whose numerous species reflect the endogenous fauna always present in the *caatinga* are mainly represented. These figures are painted in dynamic interactive situations, situations of relation, very often in movement, which confer on them a live character, as captured from life: something is happening. We say that there is life on the walls of the *tocas* (rock shelters) of the Serra da Capivara and that this life speaks to us. But what does it tell us? And can we say something about it?

We consider here specifically the observable relations between the human figures and, first, try to identify the various represented figures, starting with the elements which allow us to distinguish the characteristics according to genre, female or male. Given the very detailed characteristics of these paintings, realistic but not naturalistic, it is often easy to identify the represented subjects. They constitute a rich information source in domains for which we do not possess other remains, in particular material data made by perishable materials, accessories and costumes, for example.

Once these criteria have been established, we approach the question of their relations according to two aspects. On the wall, what makes the relation between the arrangement of the figures in the painted space and what takes place between them, the action, even the attitude, if there is one? What is told, even staged? This may supply us with information on immaterial data, in particular relational, individual and collective, for which we have no other remains in pre-literate societies.

Women and men

Among the paintings of the Serra da Capivara, the human representations are the most numerous. They recover a large diversity of depiction, in size, in style, not the cultural style but the artist's, in posture and in the numerous kind of representations of the human figure itself. However, within this diversity, constants are noticeable which allow us to distinguish various categories of human figures, to begin by a distinction of genre: women and men are present on the wall paintings of the Serra da Capivara. So we shall consider this question first: what criteria of representation can we recognize in each of them?

Recognizing women and men requires us to sharpen our eyes so that we get acquainted with the modalities of representation. However, if there are always ambiguous figures, difficult to identifiy, the detailed realism of these paintings means that most of them are without ambiguity.

From the point of view of physiology, it is the sexual organs, the primary sexual characteristics, which differentiate women and men, which are internal in women (the ovaries) and external for men (testicles), and may be differently represented. In fact, testicles are rarely represented in the paintings of the Serra da Capivara.

On the other hand, the secondary sexual characteristics, including the external genitalia, are better indications. Because of their exteriority, they are visible and thus can be represented. For women it is the vulva and the breasts, for men the beard and the penis. Other characteristics, in particular the respective distribution of the muscular and fat masses, are not relevant here and are often very schematic. Actually, the penis is represented almost always but we do not see the beard. The breasts of the women, when they are present, are often discreet. Finally, previous studies mentioned the possible representation of the vulva, but we have a different interpretation.

Figure 1 Toca du Caboclo, Serra da Capivara, Paiuí, Brazil.Couple with pregnant woman. (©P. Binant.)

The recognition of the principles of representation of these characteristics constitutes the first stage of establishing the genre of the represented human figures. Once established, their association with other elements constitutes a set of complementary data determining identification. These may be material, objects, accessories or clothes, or immaterial, like attitude, which are social and cultural sphere and can be considered as tertiary sexual characteristics. Their importance comes from their association with the secondary sexual characteristics. In the absence of one of these, only the presence of tertiary characteristics can allow us to identifiy certain human figures.

Round bellies and angled sexuality

Among the secondary sexual characteristics there are two predominant ones in the paintings of the Serra da Capivara: the first is the pronounced abdominal curve of some of them, seeming to indicate a pregnant woman; the second, a kind of a third lower limb which seems to be the representation of the male genital organ.

Concerning the pregnant woman, the abdominal curve can cover a large diversity of forms close to physiological reality: round bellies, sharp bellies, carried high or low, and more or less prominent (Fig. 1).

If there is a doubt about this representation, a figure of the Toca do Caboclinho supports our comment, where the belly of the woman was painted in transparency, letting us see the fœtus without ambiguity (Fig. 2). This detail indicates an excellent physiological knowledge. As for the method of the depiction in transparency, to reveal internal, known but not visible characteristics, is not a very frequent mode of representation.

This drawing supplies us with other information on the modalities of representation of the feminine figures. So, two small lines just above the stomach represent breasts on an excessively long trunk, or two small sticks, that in the absence of a big belly we can consider as a sign of feminity (Fig. 3).

For the men, the main attribute which allows us to distinguish them is their sex. Either a straight line represents the penis between the legs, or the organ is depicted rising upwards, strangely angled (Fig. 4). This characteristic was often interpreted as ithyphallic and as a possible sign of unbridled sexuality. However, this shape is not anatomical. We also find it on symbolic representations of the paintings of the Serra da Capivara, figures which seem to come towards you running or jumping, with tense arms (Fig. 5). The facelessness, in spite of their arms and their legs, makes it difficult to treat them as human strictly speaking.

To report the strength of their anthropomorphous character and of the importance of this one coupled with our incapacity to award them a particular identity, we called them *Characters.* Indeed, the absence of face transcends the notion of person even though the geometrical motives which recover them individualize them by being never identical. So, paradoxically, these *Characters,* with a non anatomical drawing, have no body and are only a body! Does not this body have a sex?

We compare this strange appendix in hook with the very often angled sex of the male figures and we think, on the contrary, that this attribute is sign of manliness. In parallel, we considered that these *Characters* could represent individuals dressed in 'costumes-masks,' such as those still used in Brazil today to the populations of culture *Jê*, as *Ticunas* (Goulard 2011, Binant 2013). So, that let us think that it is a representation of sexes wearing a penial case, a case which we can hang on on the side of the 'costume-mask' of which it is possible that is was important to mention the genre. Rare are

Figure 2 Toca do Caboclinho, Serra da Capivara, Piauí, Brazil. Representation of a couple of which a pregnant woman, with a depiction in "transparency" of the belly in which we can see the fœtus. (©P. Binant.)

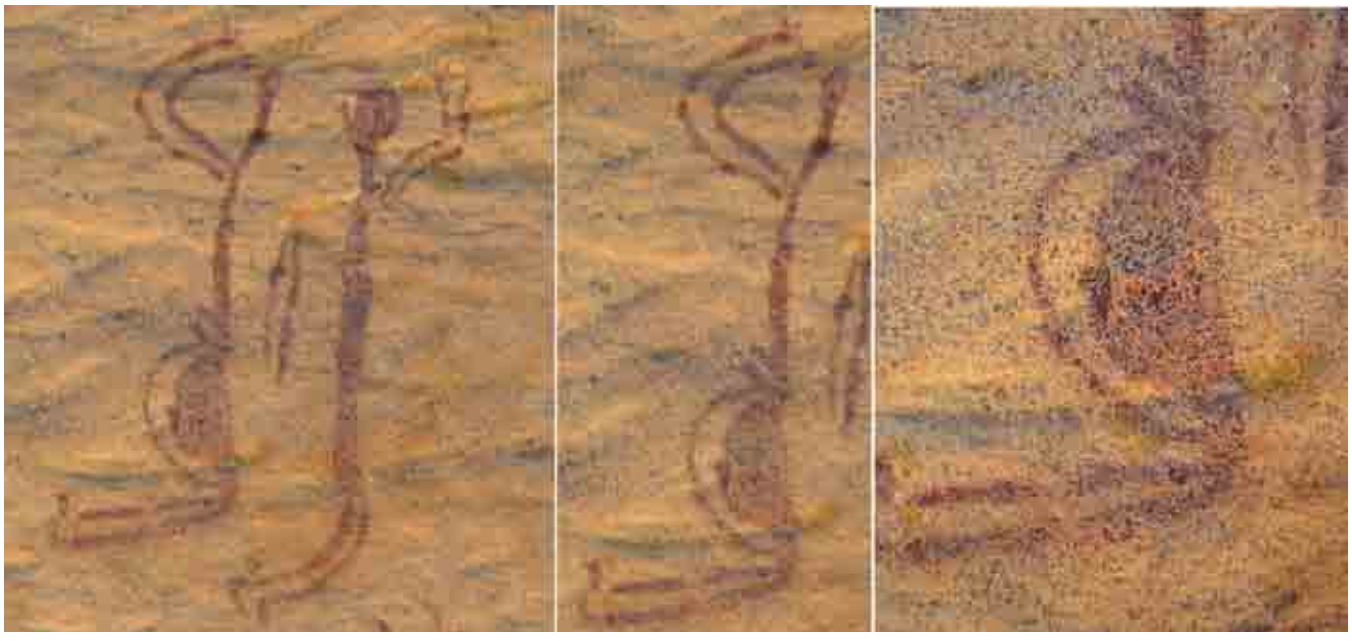

Figure 3 Toca do Boqueirao du Paraguaio I, Serra da Capivara, Piauí, Brazil. Ensemble de plusieurs figures humaines avec au centre une figure féminine aux seins en forme de traits. Several human figures with, in the center, a feminine figure with breasts in « sticks ». (©P. Binant.)

Figure 4 Serra da Capivara, Piauí, Brazil. Group of male human figures with the angled sex. (©P. Binant.)

Figure 5 Toca das Europas II, Serra da Capivara, Piauí, Brazil. Serie of three Characteristics. (©P. Binant.)

the *Characters* who do not wear this badge. By extension, except opposite element, we consider that all the *Characters* are male figures. Their very frequent association with another human, clearly feminine figure, seems to us to confirm it (Figs. 6 and 7). We called this associated figure *accomplice*, of smaller size, profile, arms up, folded down as well as legs, she is very often pregnant. To the *Toca do Zé Patú*, the feminity of this *accomplice* is confirmed by the fact that, besides being pregnant, she breast-feeds a baby (Fig. 8).

We are thus in presence of a couple of figures clearly posted as respectively male and feminine. The foundations of this conclusion result fron the addition of natural characteristics and cultural features of which repeated association asserts the significant importance.

The male and female principles necessary for the conception are gathered together here without giving evidence whether it is from the *Character* that the woman is pregnant. Except for the *accomplices* in the large panel of the *Toca' do Boqueirao do Paraguaio*, whose hand seems put on the *Character*, they never contact. The only link we can establish between these two figures is the one of their juxtaposition in the space of the representations. That is on the 'plan surface' of the wall which supports paintings. It is a link represented only by the relative position of figures in this space and confirmed by the repetition of it. To such a point, that the very frequent repetition of this juxtaposition allows us to consider it as an entity of representation which we defined as an 'associated situation' constituting an element of representation in itself (Binant 2013). We could also qualify this association as 'relation of composition,' as far as the repetition does not stop in the closeness of both figures in the space of representations but also concerns the codification of the organization of the one with regard to the other one (Figs. 6, 7 and 8).

The 'associated situation,' very often repeated, does not give us a sense to paintings but allows us to perceive a domain of meaning. We would say that this put in context is significant and opens new spaces of understanding.

Figure 6 Toca do Salitre, Serra da Capivara, Piauí, Brazil. Personnage et son acolyte féminin enceinte. (©P. Binant.)

Figure 7 Toca do Caboclo, Serra da Capivara, Piaui, Brazil. Character with an angled sign on the side which we interpret as a penial case. (©P. Binant.)

Figure 8 Toca du Zé Patú, Serra da Capivara, Piauí, Brazil. Character and his feminine accomplice, pregnant and breast-feeding a baby. (©P. Binant.)

Figure 9 Toca do Rodriguez 2, Serra da Capivara, Piauí, Brazil. Scene of coupling up. (©P. Binant.)

Sex in the paintings

Character and accomplice are not in contact but without union the only closeness is sterile. Pregnant women, scenes of delivery, breast-feeding women are so much representations of pregnancy, births and childbirths which we could summarize in a term: fecundity. So this 'associated situation' could illustrate the physical union necessary for the reproduction, such an allegory. Then, any need to represent the coupling to mean the strength 'genesic' immanent in the male principle of the Character as much as the fertile suscpetiility of the woman accomplice. More than man and woman, they would represent the Male and Feminine principles, actors by the strength of their reproductive power of the perpetuation of the life.

Representations of coupling also exist. However, they are not so frequent as he was able to said and are not characteristic of these paintings. Besides, contrary to the *Character* with his *accomplice*, they are not specially given to see and are painted in the groups as a commonplace scene which nothing justify to put forward. These scenes are without ambiguity. Nevertheless, we shall consider certain details.

First, we shall raise the durability of the angled sex of the men. If, as we think, this particular representation corresponds to the wearing of a penial case, it is surprising that in such situation it continues to be use (Fig. 9).

We shall also notice the repeated presence of a little circle between the legs of the woman (Fig. 10a). This detail was able to be interpreted as the representation of the vulva, an interpretation that we do not find very explicit. On the other hand, we were able to observe that a line joins frequently the legs of the women represented up, we think that it represents a loincloth (Fig. 10b) and that the circle is the same line when the women are lengthened.

Finally, we observed that in these scenes with sexual character the sexes are not in contact. As if the evocation was otherwise more important, more significant, as the act itself. Nevertheless, the nature of the represented act associates these representations with the theme of the fecundity which we underlined previously and which we could decline here with that of fertility, even that of virility.

Relation, action, story?

Consider in the first degree these representations which do not show so much that they suggest, would seem us to reduce their capacity to inform us just as our to get how much they are rich. We have just seen it, the realism of the paintings of the *Serra da Capivara*, allows us to catch numerous details. However, we insist, realism is not naturalism. There are in these paintings many depictions which, so explict they are, take liberties with the nature. Like the physical propotions, for example, as we already able to notice it by the pregnant woman of the *Toca do Caboclinho* (Fig. 2). This precision is important because it reminds the distance between the representation and its subject. Representation is not the represented subject. It is always a picture of it. As regards paintings of societies without writing, the considerations and the constraints ocurring in the realization of these pictures were not formalized otherwise than in and by paintings. In other words, to be interested in the rock paintings of these societies it is not only to identify the components and the composition, but also to keep in mind this distance of the object painted in the paintings which, so realistic is, is not the object but its representation; the object of our study is not *the* reality but *one* reality, that of the painted representations.

Concerning the subject which interests us, at first, the realistic details of these paintings allowed us to recognize several elements determining the genre, male or feminine, of the various human figures represented. Interesting us more in the situations of relation than in the isolated representations, we distinguished two main contexts which associate women and men in a repeated and not a trivial way: a couple of figures, that

Figure 10a (left) Toca da Entrada do Baixão da Vaca, Serra da Capivara, Piauí, Brazil.Women with the " little circle " which we interpret as a loincloth; left: scene of sexual relation right: possible beginnings of a childbirth. (©P. Binant.)

Figure 10b (right) Toca do Passagem, Serra da Capivara, Piauí, Brazil. Group of human figures among which four have no sex but an horizontal line between legs which we interpret as the drawing of a loincloth, worn by women. (©P. Binant.)

we respectively named *Character* and *accomplice* and representations of the sexual act. The one as the other associate one or several feminine and male figures and seem to relate to fertility.

In the case of the couple *Character/accomplice*, the fecundity is meant by the fact that the feminine figure, the *accomplice*, is often pregnant, sometimes accentuated by an additional datum as a child on the breast (Fig. 8). We could then add the maternity to the fecundity. However, we said it, the relation between these two figures is not physical— they do not contact, but spatial: it is their respective positioning in the space of representations — the wall, which indicates their relation. That the *Character* is an antrhopomorphous and not a man strictly spoken, because of what we interpret as a 'costume-mask' which recovers him from head to feet, introduces an additional distance. At the same time non-human being and nevertheless very human, by his hands, his legs and his dynamic attitude, he constitutes an abstract being. Abstracted but sexual because, penial case or not, looking like the angled sex of the majority of male human figures, the attribute in shape of hook which is attached almost always on the side of their costume asserts hitself as the sign of their manliness which others wear more simply between legs. Anthropomorphous abstract figure of whom it was important to mean the male genre which one way or another, perhaps a symbolic

Figure 11 Toca do Boqueirao da Pedra Furada, Serra da Capivara, Piaui, Brazil. Representation of childbirthes. (©P. Binant.)

one, had to be an actor of pregnancy of his feminine *accomplice*. So, to the maternity and the fertility, we could add the virility.

So, within this binomial, every figure represents a different sexual individual. Each of these figures is rich in further information which allow us to collect practices and lifestyles in relation with a disappeared society of which these paintings are among the last testimonies. According to the principle of what we called the 'associated situation', they form however a figure in itself, such an entity of agreed representation, with clearly codified modes of organization, insistent repetition of which on the walls of *tocas* shows its importance in the corpus of these opaintings. This importance is strengthened by the central, dominant position, which they occupy and their frequent big size.

In the sexual scenes, the sex of the human figures are also clearly represented: penis for the men, often angled; absence of penis for the women. In general, breasts are not represented, so it is the relative physical position of the feminine figure with regard to the male figure which is going to allow us to identify her. The positions of coupling are varied. The woman is not pregnant, not still… It happens that the male figure wears a headgear of feathers and the woman this little circle between the legs that we interpreted like a loincloth (Figs. 10a and 10b). But the look of each a rather sober, simple description of a commonplace reality. Except this detail: the sex of the man tense towards the body of the woman do not touch it! Here still, even though it is question of representing a physical relation, bodies are not in contact as in the couple *Character/accomplice*.

Nevertheless, pregancies happen, the figures of oregnant women testify of it, as well as the others representations among which those of childbirths (Fig. 11). In the nature, these pregnancies result from a physiological process requiring a physical relation between a man and a woman, but the paintings do not show it to us. We can find the distance maintened by the bodies in the relation painted of this report in another representation: a figure of a couple, woman and man, back with back, with, between two a sign, often a sort of trident (Figs. 2 and 12). The woman can be pregnant or not, the sex of the man marked or not. This figure associates a feminine and a male figures without showing anything else, otherwise, sometimes, the back with back with bent loins, introduces, by this detail, a possible sexual notion.

This absence of contact, in every case, lets us think, that it is not so much the act which it is important to mean but what to what it sends back, namely : the coupling up, the virility of the male member, the approval of the woman, for, doubtless, an expected fecundity and thus a maternity to come. All these concepts works not only in the reproduction of the individuals and in the perpetuation of the society but also, and maybe espacially, in the participation

Figure 12 Toca da Fumaça, Serra da Capivara, Piauí, Brazil. Human figures, feminine one to the left, male to the right, connected by a sign in trident. (©P. Binant.)

of each in the active principles of the vitals dynamic, force of the equilibrium of the balance of the world and protected from its perduration (Heritier 1996, Binant 2013).

Space to time

For us who have no more the necessary culture to understand the meaning of these paintings, the determination of the various elements which compose them alow us to establish the corpus of the figurative subjects. Taken individually, every elements constitutes an item that, often in the case of the paintings of the *Serra da Capivara*, we can identify again. So, it is about the item 'human figure'. The presence of additional elements sometimes comes to clarify this basic item, as here indications relative to the sex of the individuals which their physical nature allow us to distinguish with certainty. The addition oh the other characteristics, which we would say cultural, contributes to clarify the modes of representations agreed for each of these figures. But, as we are able to underline it besides: 'these representations constitute pictures limited to themselves' (Binant 2013). The steady rehearsal of their presence on walls gives evidence of their importance within the established corpus but it is in the relations that we can establish between the various items recognized that we can perceive one or several recurring subjects.

We have just seen it, there are relations between items which constitute units of representation separate, so it is for the *Character* and his *accomplice*. Both painted separately will induce different situations and subjects, indeed. Unity of the compound representation, codification of the representation and repetition of the representation constitute the principles from which we can begin to understand the figurative subject. Are we in the presence of narrative structures?

To limit ourselves to telling what these pictures show would amount to reducing these to their representational function alone and thereby remove any abstract dimension from consideration. Since these paintings have a sexual character, they would tell us no more than that there was a necessity to copulate to give birth, or in a more elementary way, that men and women had sexual relations. Even if the pictures are indeed representations of such, we do not believe that their function was to recall such obvious facts. As we have seen, the repetition asserted in these scenes respects various agreements of depiction and structure, which show that an idea is being represented, rather than a fact of life. Recognizing the multiple details in these scenes may be misleading since they are familiar. The real issue here is not to recognize what is depicted but rather to reconstruct the story or history — perhaps the myth ? — that they are illustrating more than recounting.

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The stargazers: the evolution of knowledge, beliefs and rock art

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Introduction

The knowledge and beliefs of non-literate societies have been the constant preoccupation of literate societies which tended to see in these others not only significant differences but also the symmetrical inverse of their own intellectual and religious values. In the 19th century abusive interpretations of Darwinism mapped these differences on to the successive scales of biological evolution conceived as a cumulative progress which reached its apex with *Homo sapiens* and, more particularly, its modern avatars, the western European males endowed with intellectual powers and moral righteousness. This view justified among other things the exploitation and even extermination of autochthonous populations whose backward evolutionary status was characterized by a lack of intelligence and an abundance of irrational beliefs. Jean-Jacques Rousseau's early idealization of primitive humans was drowned in the discourse which sustained the forceful civilizing process of colonization.

With the advent of ethnography, the way of life of non-literate societies was more empathically described and documented. Their religious beliefs and rituals were scrutinized, and some anthropologists and philosophers pointed out the cognitive consistency of their intellectual constructs and the ecological soundness of their usually sustainable exploitation of the environment. In attempting to assess the intellectual and spiritual expression of non-literate societies, we must be careful not to confuse cultural evolution and biological evolution. It is only very recently that dramatic technological advances have unleashed transformative forces which might durably affect the biology of humans and their cognitive capacities.

The purpose of this paper is to draw attention to the cognitive commonalities which account for both literate and non-literate cultures, including prehistoric cultures, and to point out that these adaptive competencies carry some liabilities in addition to their adaptive advantages. Adaptations are indeed biological and cognitive traits of the phenotypes which are selected by the environment. Some of these adaptive traits can be carried over into new environments in which they are less optimal since optimality is a relative quality not an absolute one. They can persist as long as they do not turn out to be lethal in the new environments. Some may even prove to be beneficial by exaptation. But they may also have unexpected, even perverse side-effects. The case can indeed be made that the intellectual and spiritual defining features of *Homo sapiens sapiens* result from evolutionary flukes rather than straightforward adaptations by natural selection. These critical reflections will be applied to the emergence and role of stargazing in the human cultural construction of knowledge and beliefs.

The advent of the stargazers

The tree-dwelling common ancestors of primates was a rather small-sized tetrapod which had adapted to tridimensional environments characterized by a limited horizon and populated by proximal vital resources such as branches, leaves, fruits, insects, mates and predators. Looking up beyond this niche concerned only the possible identification of birds of prey, a typical behaviour which meerkats exemplify from the ground.

Early primates had evolved the capacity to distinguish colours which were relevant to nutrition and to mating. They also were adapted to the perceptual and motor management of space which allowed them to reach out toward relatively distal objects; jump from branches to branches; and aim projectiles at intruders. All these capabilities implied a sense of perspective, albeit a limited one since there was no survival value attached to processing spatial information beyond this organism's relevant horizon.

When, under physical and/or social constraints, these hominids evolved bipedalism and developed cultures adapted to their new environments, their upward posture necessitated adjustments to a form of visual space with respect to which their body plan and perceptual systems had not evolved. Their upright position allowed them to include the sky as a part of their phenomenological world and to process distal information, although the acuity of their vision and their assessment of distance were far less optimal in this new context than other organisms which had adapted much earlier to long-distance perception, both visual and acoustic.

Brains are attuned to monitor the changes which occur in their environment within the thresholds of their perceptual capacity and to control adaptive behaviour in response to information which is relevant to their survival and reproduction. From *Homo erectus* on, the sky was bound to become an important focus of attention as it was a portion of space in which both predictable and unpredictable, that is, maximally informative events kept occurring: fog, overcast, moving clouds, thunderstorm, lightning, apparent movements of the sun and the moon, eclipses, comets, meteors, aurora borealis, rotation of the constellations and, naturally, rain and snow with, in addition, occasional meteorite showers. There can be little doubt that scrutinizing the sky became an increasing preoccupation of the early hominins, which started moving beyond their ancestral niches across open space, as it both provided orientation cues and resources. But how was this vital array of information interpreted by the brains of *Homo erectus,* then its further evolved successors and, finally, the anatomically modern humans, *Homo sapiens* and *Homo sapiens sapiens*?

The theory of mind

Psychologists have identified an early stage in ontogenetic development when the child becomes able to represent to himself/herself the mental states of those with whom he/she interacts and to behave accordingly. A mental state can be defined as a belief, an intention, or an emotion which will lead to action and whose result can be anticipated. The child is then able to intuit the points of view or attitudes of others which are different from his/her own. This competence was labelled 'theory of mind' (T.O.M.) because the child develops the concept of what it means to have a mind, both for his/her own and for others, and therefore can figure out that the two may not coincide.

From the point of view of phylogeny, it is obviously an advantage to be able to anticipate the behaviour of conspecifics as well as the likely strategies of prey and predators. Researchers in animal cognition have claimed that primates and even other mammals and some birds have evolved a nascent theory of mind which provided them with a vital adaptation to social life as it opened the way to manipulation and counter-strategies.

It is a reasonable assumption to consider that the common ancestor of apes and humans was endowed with such a nascent evolutionary asset. We can further assume that the progressive increase in brain volume and neuronal connections which characterize the *Homo* species from *Homo habilis* to *Homo erectus* and to *Homo sapiens* correlated with the improved capacity of representing with greater precision the mental states of others and to adjust physical and social survival strategies to such hypothetical information. We must, of course, keep in mind that evolution will necessarily favour poker game modes of interactions and will fuel an arms race both intra-specifically and inter-specifically.

Unpredictability of events is thus bound to be attributed to less decipherable minds in an environment in which recognizable behaviours enable the observers to anticipate the next expectable moves, or at least a limited range of possible actions. The scrutinizing of the sky offers many puzzling phenomena which can be attributed through analogical thinking to agencies endowed with states of mind and deliberate behaviour. The objects of the diurnal and nocturnal sky, and the events which occur there and directly affect humans, are naturally interpreted through applying the theory of mind and thus construing an intentional rather than gravitational cosmos. Early Babylonian astrology

produced cuneiforms which referred to the luminous gods which populated the sky. This bears witness to the social centrality of the priests whose function was to interpret the will and intention of these gods as they related to human affairs. It has often been pointed out that Babylonian astrology is not an absolute beginning but continued oral traditions whose origins are lost in the deep time of human cultural evolution. There is no real gap between non-literate and literate cultures as far as beliefs are concerned. The assumption of intentions to account for the movements and events occurring in the sky can be explained by the evolutionary selection and success of a species whose brains could represent other organisms' states of mind but placed no intrinsic limits on the range of entities to which such assumptions could apply. Evolution is a short-sighted tinkerer devoid of long-term vision.

An adaptive cognitive trait can thus lose its beneficial pay-off and lead to ill-adaptive behaviour such as sacrificing resources to placate hypothetical agencies, following the same logic which consists of a group providing predators with prepared preys in order to avoid being attacked themselves. Cosmic fear is indeed no less powerful than the fear of predators and competitors. Still in today's world countless humans experience this kind of fear and assign to invisible agencies telluric and celestial harms which affect them. Random positive turns of events are sufficient to validate the efficiency of the rituals, however ludicrous they may be.

The theory of mind carries a heavy cost when it is extrapolated to irrelevant delusional entities. This is why it can be reasonably claimed that spiritual expressions such as the worshipping of gods are the result of an evolutionary fluke which led humans to construe physical objects as intentional entities. But a fluke is a side-effect of an adaptation which can turn out to be a handicap or an advantage depending on the contexts of its applications.

Analogical thinking

The capacity to abstract from a situation or an object some abstract features, either morphological or functional, was a crucial cognitive adaptation whose first evidence in the archeological record comes from the prehistoric lithic industry. Survival depends on the proper identification of kinds of objects which vary in size, shape and motion but implement the essential features of the template which has become wired-in in the brain during phylogeny and ontogeny. We, anatomically modern humans, spontaneously recognize human faces as soon as we open our eyes, and our brains are so attuned to this basic morphology that we often see faces where there is none as long as sufficient combinations of dots and lines prime our perceptual system. Not missing a face is a crucial adaptation for any altricial species, that is, a species whose offspring cannot survive without the care of the mother or other conspecifics.

However, the power of this algorithm is also a liability, as it exposes us to falling victims to lures. Random natural patterns which happen to coincide even vaguely with the facial template or the template of other significant objects can trigger behaviour which is irrelevant if not detrimental to an organism's survival. Such generalizations are the source of delusional knowledge and behaviour which is ill-adaptive. The nocturnal sky, in particular, provides a rich ground for misperception of this sort.

The patchy nocturnal sky

Visual perception is a tricky source of information. As many psychological experiments show, figure and ground are prone to flip and thus reveal different significant patterns. Another source of variability in perception is that what we know, or think we know, biases what we see. It is extremely difficult for us to replicate the empathic perception of the nocturnal sky by Pleistocene observers. We can only infer what they plausibly saw by trying to subtract from our experience what we have learned from centuries of scientific scrutiny of the sky with the help of ever improving telescopes; most of this knowledge is mediated by mathematical calculation and our inability to intuit the space-time of astronomical magnitude creates a gap between what we see and what we know. The latter is mostly counter-intuitive.

But let us attempt to imagine the way in which the starry sky of a clear night might have appeared to *Homo erectus*, Denisovans, Neanderthals and anatomically modern humans. Let us also keep in mind that industrial pollution had not yet blurred the eyesight of these observers and that the atmosphere was crystal-clear except, of course, at times when volcanic eruptions spread gases and ashes. For an organism which has inherited from its tree-dwelling ancestors a very limited sense of distance and perspective the celestial ceiling must have seemed quite close, somewhat like a monumental cave ceiling.

Observation of the nocturnal sky reveals that some of the dots maintain constant relations with each other while others present different kinds of relations and movements. Stable clusters can prime the perception of familiar animals whose contours fit the space delimited by these luminous points. Both the Chinese and the Indian zodiacs, whose origins are lost in the deep time of oral cultures, express each one of these configurations through stylized zoomorphic or anthropomorphic images. Stylizations like the ones produced by the use of cuneiform in Mesopotamia are not likely to be the most ancient ones.

But there is more. The bright dots of the celestial dome are not evenly distributed. There are dark patches which appear foregrounded once they are noticed. Black holes and cosmic dust clouds abound. Flipping the ground-figure relationship reveals striking patterns which are evocative of the shapes of various animals. Once lexical labels have been affixed to such patterns it becomes impossible not to perceive them as the relevant figures. The classical psychological experiment which consists of projecting on a screen a set of black dots on a white background bears witness to this. At first, subjects report seeing random patches. But as soon as the word dog is uttered everyone sees a Dalmatian dog frolicking in the snow. Once this perceptual switch has been activated this image will never appear to be a mere set of random patches.

Modern astronomers have identified numerous dark patches which they call *nebulae*, the Latin word for clouds. Some of these are silhouetted against areas which are saturated by stars and are noticeable from the earth without the help of telescopes. One of the most famous examples is the Horsehead nebula in the constellation Orion. What has been labelled the Pipe nebula is a long dark nebula visible within the dense star cluster Ophiuchus. Instead of identifying this dark patch through its morphological analogy with a contemporary artifact, it would be equally easy to 'see' an animal form with legs and a tail. The native populations of the Atacama Desert in northern Chile could see dark patches which resembled lamas and they assumed the existence of a spiritual link between the presence in the sky of a heavenly embodiment and a species which was essential to their survival. Lama silhouettes are abundantly represented in the rock art of this region and we can raise the question of whether they are meant to refer to the live lamas found in their environment or to the dark patch found in the sky.

Atlases of the universe offer many examples of dark blotches endowed with suggestive forms which can be easily related to earthly animals, plants, or landscape. See, for instance, http://www.atlasoftheuniverse.com/darknebs.html and http://astronomy.swin.edu.au/cosmos/D/Dark+Nebula.

The perception of dark biomorphic patterns in the nocturnal sky might have preceded the geometrical constructions consisting of joining clusters of salient dots by straight lines and finding analogues of these schemata in the forms found in the natural environment. The latter is what gave rise to the zodiac and to the naming of the constellations. Such visual and intellectual elaborations presuppose cognitive competences which might have their source in the identification of blotches evoking familiar silhouettes in the mind of the hominins who had become stargazers as a side effect of bipedalism.

Only the systematic scanning of the nocturnal sky in conditions plausibly similar to some periods of time in the Pleistocene could yield interesting hypotheses, notably regarding rock art. This should include calibrating the patches thus identified, since cognitive biases precisely cause the natural calibrating of visual information towards known forms. Naturally, this scanning should not involve technological means which were not available to prehistoric populations.

Conclusion: stargazing and the meaning of rock art

The main hard evidence of the intellectual and spiritual expressions of non-literate populations is found in rock art. But this abundance of data in itself is far from being fully understood. Even in the case of contemporary productions of figurative and abstract paintings and engravings, their meaning remains elusive as they are often expressions of secret knowledge and sacred rituals. This is, of course, all the more true of prehistoric data as very little is known about the social and religious contexts in which these graphic representations made sense some thirty or forty thousand years ago. Moreover, the Pleistocene archeological record cannot be reliably interpreted through ethnographic analogies.

Many hypotheses have been proposed to explain the presence of rock art in its numerous forms all over the planet earth. Each one of these hypotheses concerns only a subset of the data available and attempts to find the function which might explain it, thus excluding from its purview numerous other signs. But if the visual sets of figures are approached from a comprehensive point of view which acknowledges the full range of both iconic and geometrical signs and the complexity of their combinations, we may find there an analogue of the starry sky and a representation of the powerful agencies which rule its movements and events. This hypothesis displaces the referents of rock art from the immediate environment which is populated by animals to the dark presence of their 'divine' prototypes which can be perceived in the nocturnal sky but which could only be rendered in the guise of their terrestrial forms on the walls of caves and cliffs. The distinction between the spiritual and the intellectual is a recent dichotomy which is also manifested in the equally recent distinction between astrology and astronomy. Looking at rock art as the earliest attempts to map the sky and record its predictable and unpredictable behaviour, possibly in order to anticipate events or even control them, may sound like a far-fetched hypothesis but one which would be consistent with the first evidence of literate cultures in Mesopotamia and in China, where the creation of writing as we understand it today was rooted in astrological preoccupations carried over by oral and graphic traditions originating in deep prehistoric time.

Archeology, rock art, archeoacoustics and neuroscience: what kind of relation?

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Abstract
The present paper is a multidisciplinary approach based on data available from archeology, rock art, archeoacoustics and neuroscience. After some introductory theoretical remarks, the article is organized in two parts: the first one analyses the relation between archeology, rock art and archeoacoustics, approaching some aspects of the early use of sound among hunter-gatherer societies and some examples regarding the presence of sound in post-Palaeolithic rock art. The second part discusses the relation between archeology, archeoacoustics and neuroscience, focusing on acoustical properties from prehistoric chambers in the UK, Italy and Malta. Among these acoustical effects, special attention is given to a common resonance in the vicinity of 110Hz, present in almost all the chambers, which was studied by neuroscientists for its effects on the human brain of several volunteers, monitored with electroencephalography. Some cases of mind/body experiences with acoustic origins within prehistoric chambers are also analysed.

Introduction

The archeologist is not digging things, but people.
– Sir Mortimer Wheeler

This quotation from the 1960s, by the British archeologist Mortimer Wheeler, is a good basis for starting the present article, because it is deeper than it looks at first sight. Indeed, archeology focuses initially on the study of material culture but, as R. Bradley (1998) mentioned, this approach represents no more than the first phase of an intellectual construction process, which resonates with other sciences, either social or exact.

Archeology has, therefore, an anthropological dimension and the initial studies of the material heritage can constitute a source to discover the immaterial heritage of past societies.

In order to fulfil that aim, the present article presents a multidisciplinary approach based on data available from archeology, rock art, archeoacoustics and neuroscience. From these four disciplines, archeoacoustics and neuroscience are obviously less familiar at a congress of archeology. Thus, it is necessary to make some statements about them.

Archeoacoustics can be considered as an interdisciplinary field of study, which tries to analyse the use of sound(s) in past societies, combining archeological data with modern acoustic engineering. Despite some methodological problems regarding the determination of deliberate actions by prehistoric human beings, as C. Scarre (2006: 9) said, 'the archeoacoustics of prehistoric contexts is potentially a vital part of the understanding of the lived experience of past societies.'

Neuroscience will be mentioned in this article following some pilot studies based on data resulting from experiments involving sound in prehistoric and protohistoric chambers in the UK and Italy[1] and their effects on the human brain, monitored with electroencephalography.

In the present text we first analyse the relation between archeology, rock art and archeoacoustics and, after that, the relation of archeology, archeoacoustics and neuroscience. Archeoacoustics is therefore used as a common link in an attempt to develop this discipline among the archeological community, since the past was surely not silent.

Archeology, rock art and archeoacoustics

Since the origins of mankind there have been sounds in nature: thunder, wind, rain and the sound of the

1 The hypogeum from Cividale del Friuli, near Udine.

waves in the sea, among others, were obviously familiar to the first human groups during the Palaeolithic. But did those men and women produce sound in that period?

Archeological records have revealed several Paleolithic objects making sound, such as the group of bone flutes and whistles from Isturitz and Maisières and the bullroarer from Laugerie-Basse (Dordogne), all in France (Otte, 1995) and the rasps (or idiophones) from Pekarna, Moravia (Czech Republic), Abri Lafaye Bruniquel (France) an7d Mas d'Azil, Ariège, France (Morley, 2006). These artefacts constitute archeological evidence of the intentional production of sounds in the Palaeolithic.[2]

Among the five human senses, besides vision, hearing has a crucial protective character and even today, when on the street we hear an unexpected sound, we immediately turn our heads to see if there is any danger for us.

Looking back at the Palaeolithic hunter-gatherer societies, there were predators such as lions, bears and also dangerous animals such as rhinoceros, boars and others, as well documented by cave art. When walking in open country outside the protection of the caves, groups of hunters might be attacked by any of these animals and certainly acoustical warnings from a distance would have been very helpful. This could be, for example, the function of whistles: to warn about imminent danger or call for help, producing louder sounds than the human voice (Coimbra, 2014).

In a pioneering work of archeoacoustics, I. Reznikoff and M. Dauvois (1988) suggested that caves were remarkable amplifiers of sounds, due to their inner resonance,[3] arguing that the acoustics of several caves

Figure 1 Dancing to the sound of chanting or music.(After Martynov, 1995.)

in France had an important role in determining where the Paleolithic paintings were located, leading to 'the supposition that music or chants were important elements in cave ceremonies around 20,000 years ago' (Scarre, 1989: 382). However, some sounds produced inside caves can have been made by the human body itself, when vocalizing, hand clapping and foot stamping.

Besides the evidence of sound production from these archeological artefacts, post-Paleolithic rock art provides some examples of the depiction of sound, as in engravings from Saimaly-Tash (Kazakhstan), dating from the second millennium BC, representing ritual dancing in front of a man holding a sun (Fig. 1). Observing this scene carefully, it is surely difficult to conceive it independently from chanting or music, because nobody dances without any kind of sound.

2 We are not going to discuss here if they were used for making any kind of music or just to produce sound, because this is not the aim of this article.

3 Resonance is not considered here as an echo but as the amplification of sound in intensity or in duration.

Furthermore, Reznikoff and Dauvois (1988: 238) also said that 'il n'y a pas de sociétés sans chants et plus précisément il n'y a pas de rituel ou de célébration qui ne soit aussi sonore.' This seems to be the case in another rock art scene depicted on Rock 32 from Naquane (Valcamonica, Italy), where seven female 'praying figures' are mourning the prone female (possibly dead), or praying for her health.

The importance of sound when producing different rock engravings in the Scandinavian Bronze Age tradition is mentioned by the Swedish archeologist Mats Malmer: 'If you smash two stones into each other you get a loud sound and the sound alters with the shape and bedrock of the panel. A solid panel gives a bright sound, a cracked panel a more hollow sound … The rhythm of the pounding was most certainly a well-known sound for the people during the Bronze Age, and it certainly transmitted the message that there was something very important going on out there on the rocks.' (Malmer, quoted by Goldhahn, 2002: 38)

P. Nordström developed Malmer's arguments, suggesting that 'the sound of the stones can also be understood as a form of ritual communication with the various spirits that were thought to dwell in the rocks'[4] and that 'the echo that emanated from the pecking and pounding of engravings could have been interpreted as a carrier of messages between the world of the living and the dead ancestors' (Nordström, quoted by Goldhahn, 2002: 38).

The relation between rock art and sound can also be seen in several examples which represent musical instruments, for instance the drums depicted in the Bronze Age rock art from Bhimbetka, India (Meshkeris, 1999) and the representation of people dancing to the sound of the asymmetric lyre in the rock art from Wadi Harash (Negev, Israel), dating from the second millennium BC (Anati, 1994), among other examples.[5]

Archeology, archeoacoustics and neuroscience

Archeology only can mature when the philosopher and the archeologist are the same person. – Richard Bradley[6]

Several studies of megalithic structures from the UK revealed that 'some possess remarkable acoustic properties, suggesting that sound may have played an important role in any ceremonies held at the monuments in prehistory' (Watson, 1997). Indeed in the chambers of monuments such as Camster Round (Scotland) and Maeshowe (Orkney Islands) an acoustic effect known as standing waves occurs. According to Watson (2007) sound waves interact while reflected between walls, being either enhanced or cancelled, changing the nature of the sound.in To a listener passing by the patterns of these standing waves some effects may happen, the sounds becoming louder with distance from the source; some frequencies can also resonate parts of the body.[7]

Aaron Watson (2007) argued that 'standing waves might have been understood as the voices of spirits, ancestors or other forces. They might have contributed to the special character of the monument as these sounds could not have been reproduced anywhere else.' Furthermore, Jahn et al. (1995) reported the similarities between some cases of megalithic art from Newgrange and Loughcrew and the resonant sound

4 The idea of a spiritual world within the rock can also be seen among the San (Bushmen) of South Africa, besides other cultures (Waller, 2006). That is probably why some rock art figures in different parts of the world seem to emerge from cracks in the rock surfaces.

5 Men playing flutes often appear in the rock art from North and South America, dating from more recent periods (Coimbra, 2014).

6 Author's translation of a quote from Bradley's article in Portuguese (1998), after the original in English: R. Bradley, 'The philosopher and the field archeologist: Collingwood, Bersu and the excavation of King Arthur's Round Table', *Proceedings of the Prehistoric Society, 60* (1994), pp.27–34.

7 Sound effects and bodily sensations also happened in the interior of the Hal Saflieni hypogeum in Malta, during an experiment in which the author participated. They are described below.

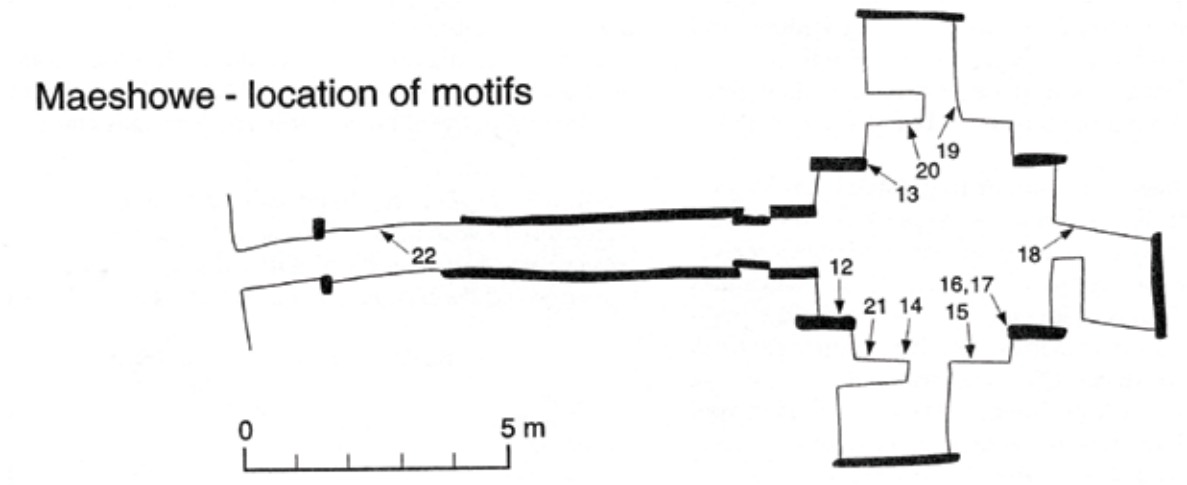

Figure 2 The plan of Maeshowe passage grave and the location of rock art motifs. (After Bradley et al. 2000.)

patterns that characterize these chambers. For example, these authors argue that two zigzag figures 'etched on the corbel at the left side of the west sub-chamber of Newgrange have precisely the same number of "nodes" and "antinodes" as the resonant standing wave pattern we mapped from the chamber centre out along the passage' (Jahn et al., 1995: 9).

Other acoustic phenomenona occur in some chambered mounds, like the so-called Helmholtz resonance, being 'caused by the repeated oscillation of sound waves between an enclosed chamber and the outside world along a confined passageway. Under certain conditions a single frequency can be powerfully amplified to levels that far exceed the original source' (Watson, 2007). Watson also argues that the format of the passage grave of Maeshowe (Fig. 2) is very similar to the classic Helmholtz Resonator.

Some acoustic tests were carried out at Maeshowe by A. Watson and D. Keating using a single drum, which caused a resonance with a frequency of 2Hz. Although this infrasound cannot be heard by humans it can induce a variety of sensations such as dizziness, headaches and disorientation (Watson, 2007). Some individuals who participated in acoustic tests inside chambered cairns reported other physiological effects, such as changes in breathing and pulse pattern (Watson and Keating, 1999). Furthermore, according to P. Debertolis and N. Bisconti (2014), infrasound can create feelings of awe or fear in humans, in some cases resulting in a misplaced belief that some strange or supernatural event is taking place.

Other experiments carried out at the chambered cairns of Camster (Caithness, Scotland) revealed interesting results. For example, drumming in the chamber of Camster Round created a bass sound that was felt around the back of the monument as if it were 'emerging from beneath the ground rather than from inside the cairn' (Watson, 2007). The sound of that drumming was heard within another chamber (Camster Long) 200 m away, although it could not be heard in the open air between the two monuments.

Aaron Watson and D. Keating (1999: 330) argue that 'drumming could have been used as a form of communication between tombs which were in close proximity', mentioning the examples from Camster and also from Knowth, 'where a large tomb is surrounded by a number of smaller cairns' (Watson and Keating, 1999: 330). Curiously, 'many of these satellite tombs have their passages oriented towards the main mound, perhaps assisting the transmission of

sound between what were otherwise separate components of a cemetery' (Watson and Keating, 1999: 330–1) (Fig. 3).

Standing waves, Helmholtz resonance and infrasound don't prove, of course, that prehistoric megalithic chambers were built with the aim of producing expected acoustic results. However, 'it seems unlikely that acoustic effects would have gone unnoticed in prehistory' (Cook and Watson, 2006: 107). For example, in the hypogeum of Hal Saflieni (Malta) there is archeological evidence of prehistoric burials during a long period of time (Pace, 2004), where funerary rituals took place, probably accompanied by the sound of chants or instruments such as drums or horns. This human permanence in the hypogeum is also confirmed by the presence of several groups of red ochre prehistoric paintings, consisting of intricate spirals, some disks and other geometric patterns (Fig. 4). According to A. Pace (2004: 37) some of these motifs 'in certain places, they overlap slightly, suggesting that they may have been painted at different times.' Thus, the continuous presence of people inside the hypogeum surely led to the perception of several sound effects (Coimbra, 2014), that would be impossible to be unnoticed[8].

The permanence of human groups inside prehistoric chambers occurred also at Irish passage graves, where megalithic art 'might have celebrated the passage of the deceased into another world' (Bradley et al., 2000: 64). It occurred also at Maeshowe, where filiform carvings (Fig. 5) are very similar to others found in nearby Neolithic settlements, seeming to 'create a

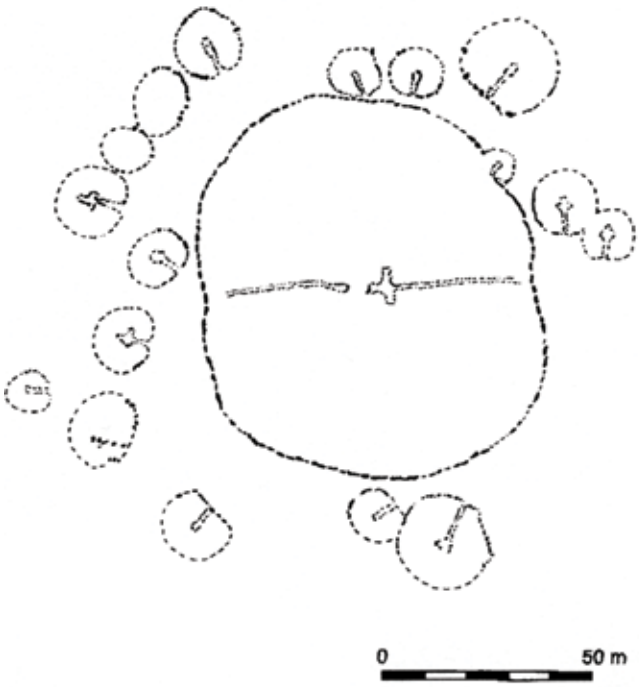

Figure 3 Knowth and its satellite tombs. (After Watson & Keating.)

Figure 4 Prehistoric paintings from Hal Saflieni. (Photo: OTSF.)

Figure 5 Filiform carvings from Maeshowe. (Adapted from Bradley et al. 2000.)

8 Indeed, the acoustic properties of the hypogeum are very impressive. During the author's recent visit to this monument he decided to vocalize a sound that, in fact, reverberated to a great extent throughout the entire structure. It is also interesting to mention that some sounds inside the hypogeum reverberate for 7.8 seconds after the original sound had stopped (reported by Dr Rupert Till during the conclusions of the Archeoacoustics Conference, Malta, February 2014), which must have highly impressed the prehistoric listeners.

sense of community in which the deceased remained involved in the everyday activities of the living' (Bradley et al., 2000: 64).

Now we are going to relate some of the acoustical effects in prehistoric chambers in connection with recent research in neuroscience.[9] Archeoacoustic investigations inside prehistoric chambers such as Newgrange, Loughcrew, Chun Quoit (Cornwall) and Wayland's Smithy (Berkshire), among others, identified acoustic resonances between 95Hz and 120Hz (Jahn et al., 1995). In a later neurophysiologic study, 30 healthy adults listened, in sequence, to tones of 90–130Hz, while their brain activity was monitored with electroencephalography. It was noticed then that brain activity in language at 110Hz is significantly lower[10] than at other frequencies, allowing other processes to become more prominent (Cook et al., 2008). This process results also in 'a shift in prefrontal activity that may be related to emotional processing' (Cook et al., 2008: 96).

Similar research carried out by P. Debertolis, G. Tirelli[11] and F. Monti[12] at the hypogeum of Cividale del Friuli[13], Italy (Fig. 6), revealed that activity in the left temporal region was found to be significantly lower, closer to 110Hz, than at other frequencies. Additionally, the pattern of asymmetric activity over the prefrontal cortex shifted from one of higher activity, on

Figure 6 Stone head from the Hypogeum of Cividale del Friuli. (Photo: P. Debertolis.)

the left at most frequencies, to right-sided dominance at 110 Hz. The results of these experiments showed that each volunteer had his/her own individual frequency of activation that can be significantly different from 110Hz, but always in the range of 90–120Hz (Debertolis et al., 2014).

The same researchers reported that the volunteers with frontal lobe prevalence, during the tone hearing, received ideas and thoughts similar to what happens during meditation, while those with occipital lobe prevalence visualized images (Debertolis et al., 2014).

Recent neurophysiologic research regarding meditation based on hearing a traditional mantra, or a non-semantic meditation sound, seems to support not only the discoveries of Cook et al. (2008) but mainly these arguments of Debertolis, Tirreli and Monti. Indeed, studies assessing brain activity by functional magnetic resonance imaging, in experienced practitioners of meditation, revealed that this practice 'increased activity in the prefrontal cortex, showing a large cluster with the point of maximal activation in the straight gyrus, covering a large part of the right orbiofrontal cortex as well as medial prefrontal areas' (Xu et al., 2014: 5). The same authors (2014: 9) argue that this activity 'is related to the relaxed focus of attention, which allows spontaneous thoughts, images, sensations, memories and emotions'.

Returning to the acoustical properties of some prehistoric chambers, it has been noticed that they can result in the experience of sensations and emotions. For example, P. Devereux mentions that the acoustician David Keating, during one acoustic experiment at Maeshowe, 'reported being put into a state in

9 We are not going to discuss here the theory of phosphenes in prehistoric art, because it would be a theme for a separate article.

10 Paul Devereux (2006) argues that this kind of brain activity is associated with the half-awake/half-asleep hypnogogic state with vivid mental imagery and auditory hallucinations. According to J. Goldhahn (2002: 50), 'visual and aural hallucinations can also be induced through the application of loud and repetitive noise, so called audio-driving'.

11 Debertolis and Tirelli are at the Department of Medical Science, University of Trieste, Italy.

12 Head of Clinical Neurophysiologic Unity. Department of Neurology, University Hospital of Trieste.

13 Some stone heads discovered in this hypogeum seem to date it from the Iron Age (Debertolis et al., 2014).

which his body became relaxed but his mind alert, an initial stage of deep trance' (Landscape perception, not dated).

Also the author of this paper experienced bodily sensations[14] caused by sounds during the experiments carried out at Hal Saflieni in February 2014. In fact, standing in front of the prehistoric paintings in Room 20, the sound of a horn played in the Oracle Room was felt 'crossing' the author's body at high speed, leaving a sensation of relaxation. The instrument was played again, after a short break, with the result similar but even more relaxing, followed by the illusion that the sound was reflected from the author's body to the wall that contains the engravings (Coimbra, 2014).

In the sequence of these two cases of mind/body experiences, with acoustic origins, reported by two different researchers and in two different places, some questions arise: did Neolithic human beings feel similar sensations, caused by sound, while inside chambered monuments? Could the prehistoric art that exists in some of these chambers be the depiction of bodily experiences with acoustic origins?

It is not easy, of course, to answer these questions without being speculative. In order to reach more objective and conclusive results further research must be done in several European prehistoric chambers, especially in those that have megalithic art on their walls and sound reverberations with a frequency around 110Hz. These studies should involve obviously not only archeologists but also acousticians and neuroscientists, among other researchers.

Meanwhile, the discovery inside the Hal Saflieni hypogeum of the clay model known as the 'Sleeping Lady', lying on a couch (Fig. 7), led to the feasible and acceptable idea that it 'was partially a dream incubation temple, a practice that was widespread in at least the later ancient Mediterranean world' (Devereux, 2009: 226). In fact, being laid on a couch inside a highly resonant chamber could be a procedure for comfortably hearing reverberating sounds and getting mind/body experience through them, involving probably similar experiences to those reported by Xu et al. (2014: 9), such as 'spontaneous thoughts, images, sensations, memories and emotions'.

Figure 7 Sleeping Lady. (Photo: F. Coimbra.)

Could some sounds produced inside prehistoric chambers be related to the origin of traditional mantras? It is curious to note that in the middle of the second millennium BC the Vedanta tradition (4.22) mentions that 'by sound vibration one becomes liberated', meaning that sound is already known to be a vibration by those times. It could be the case of the traditional mantra 'AUM', that has, of course, a specific frequency leading to a desirable (or expected) influence on people, that is, a socially organized sound (Coimbra, 2014).

Final note

In this article we have discussed some aspects of the relation of a recent field of research, archeoacoustics, with disciplines such as archeology, rock art and neuroscience. It was also mentioned that archeoacoustics has some methodological problems about deliberate actions by prehistoric human beings, or in another

14 Goldhahn (2002: 41) argues that 'bodily experiences of a place are vital for the interpretation of the prehistoric 'mindscape' of that landscape', quoting authors such as Tilley, Nash and Ouzman.

words, the intentionality of their acts. However, these difficulties can be reduced with the work of an interdisciplinary team, never forgetting that archeoacoustics deals with the human past and therefore it is indispensable to have the contribution of an archeologist (Coimbra, 2014).

Furthermore, as I. Cross and A. Watson (2006: 115) outlined, 'it is critical that, alongside the application of rigorous methods, acoustical investigations acknowledge the social contexts within which sound may have been experienced, and remain aware that is easy to impose modern cultural understandings and experiences onto past societies' and, therefore, 'to risk hearing only echoes of ourselves' (Cross and Watson, 2006: 115).

Indeed, it is not enough to measure very precisely standing waves, resonant patterns and other sound effects if the past social contexts where those acoustic phenomena were experienced are ignored. Therefore, in disciplines like archeoacoustics it is important to first establish a coherent theoretical basis, which will contribute to the definition of a scientific methodology, which is indispensable for further interpretation.

Nevertheless, a multidisciplinary research involving archeology, rock art, archeoacoustics and neuroscience can be very useful for better understanding past ways of thought.

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Abstract
The lull of the last 7,000 years in the sea-level rise suggests that clear skies finally allowed Homo Sapiens to herald the sun. We will refer to this period of cultural revolution as the Heliocene. The solar-related event dated 2 March 1336 precisely locating both in space and time, will be discussed as the first one no longer being the expression of non-literate people.

The recent compilation by Robert Rohde for the Global Warming Art Project of the World data on sea-level rise for the last 20 millennia (Fig. 1), suggests that the lull of those last 7,000 years might have cleared the sky and allowed Homo Sapiens to herald the sun, a period we will refer to as Heliocene. In contrast, between 14,000 and 7,000 years before present was a period of a breathtakingly fast rise of the sea level at a rate of 1.5 cm per year. Such a rise might have generated permanent overcast skies and for the inhabitants near the seashore, it must have been a source of deep mental frustration.

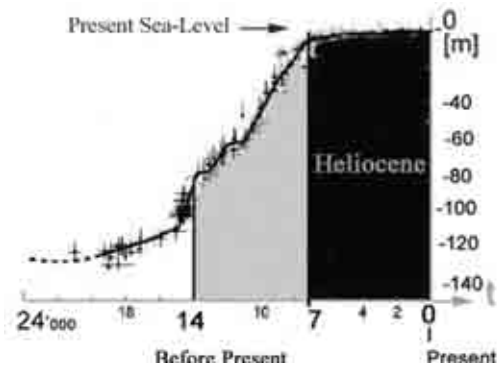


Figure 1 Post-glacial sea-level rise after R. Rohde. (Gobal Warming Art Project.)

Figure 2 Photo M. Larrey/Anthropomorphic sun at Helanshan. (PRC)

The relative calm prevailing through the Heliocene has obviously created the necessary peace of mind to herald the sun, to engrave its face. These pieces of rock art sometimes had anthropomorphic features, like in Helanshan (Ninxia) (Fig. 2) or in Murujuga (Dampier).

Other testimonies of those early Heliocene activities are the records in the landscape of the apparent behaviour of the sun. Some of these records are located in the middle of urban centres, e.g. the cathedral of Zürich, whose orientation stands out in sharp contrast to the other buildings facing the river (Fig. 3). This cathedral was built in the twelfth century, but not just anywhere. Carolus Magnus ordered the cathedral to be built on the ruins of a proto-Celtic temple, which had features connected with solstitial sunrises and sunsets. Today, dusk on summer solstice days is still worth seeing. The aerial view on Google Earth includes a depiction of the rays of the setting sun threading their way between the two towers towards the Grossmünster's spire. (The picture of this solstitial show on 21 June 2003 is in the inset of Fig. 3.)

The discovery in 1963 at Newgrange by Michael O'Kelly of a 19-m long corridor funnelling the light of the winter solstice sunrise on to a labyrinthic figure for the week of 17–25 December (Fig. 4) was a major

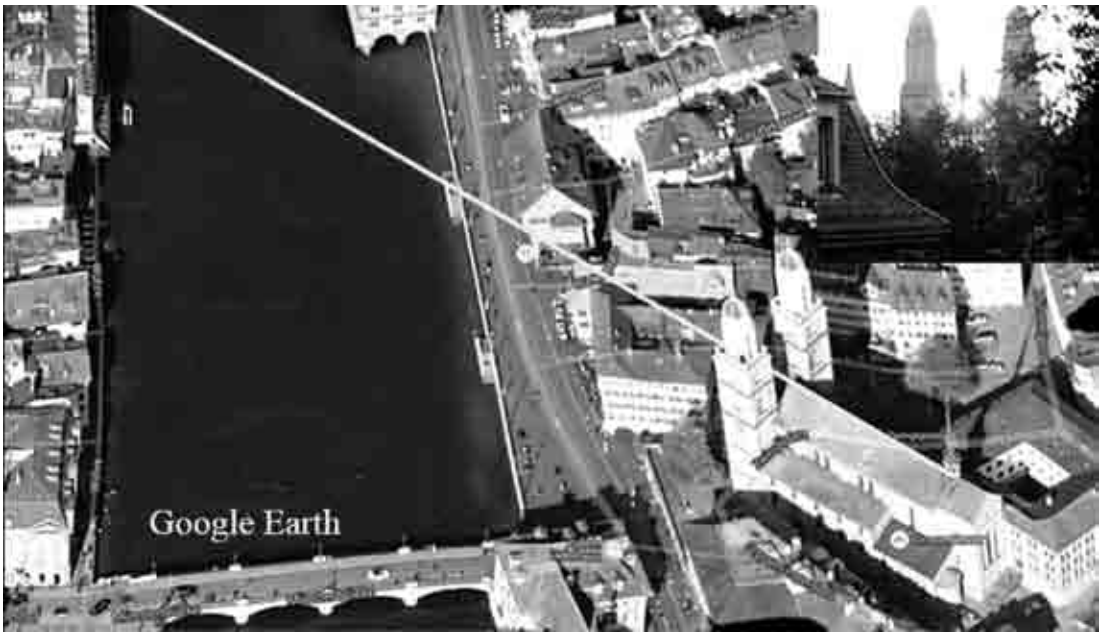


Figure 3 Photo M. Larrey/Summer solstice sunset at Zürich Grossmünster. (CH).

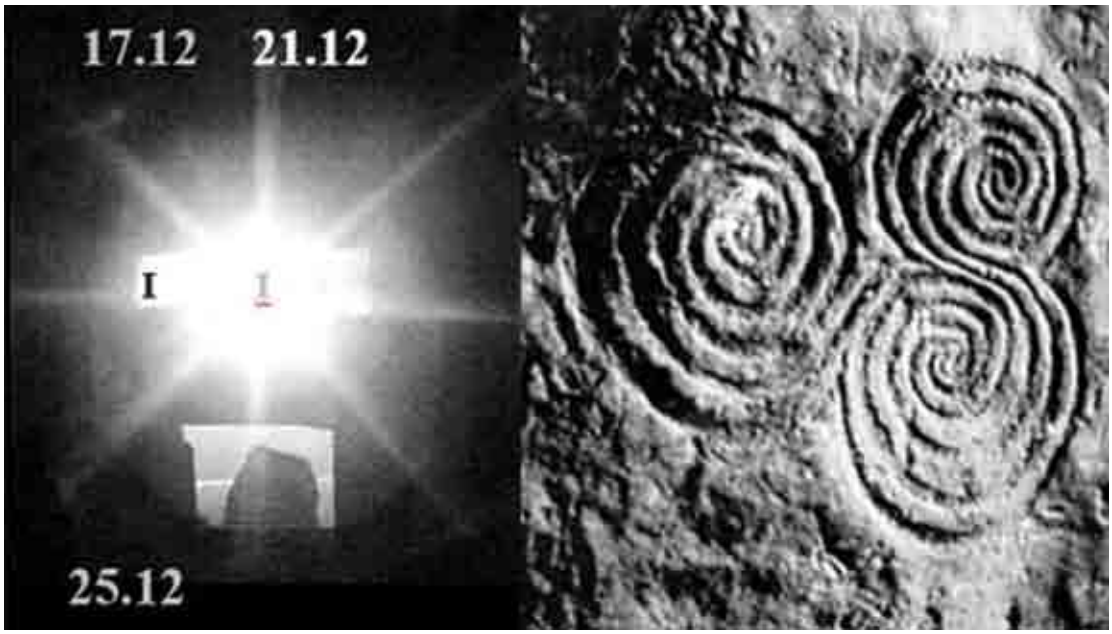


Figure 4 Photo M.O'Kelly/Labyrinth and winter solstice sunrise at Newgrange. (IRL)

breakthrough in the understanding of the heritage of non-literate people. It is not yet clear, though, if the existence of the roof-box, the separate light-box over the entrance, is of significance (Fig. 4).

At Hal Saflieni in Malta, we heard an elderly visitor reporting that, as a youngster around Christmas time, he used to go down with friends and without the need of any torch deep into the Hypogeum.

Long before the Heliocene, as shown for Lascaux by Chantal Jègues-Wolkiewiez and Jean-Michel Geneste, the entrance of decorated caves might have been selected on the basis of their orientation towards the solstitial point. The use of megaliths to frame solstitial points expresses a great faith in the sun. Captive of his own magical way of thinking, Homo Sapiens conceived time as cyclic in order to reassure himself. Labyrinthic figures such as the one in Newgrange

Figure 5 Labyrinth of Mogor (SP)/Sunset between Ons and Onza 590 hours before vernal equinox. (Photo P. Galovar.)

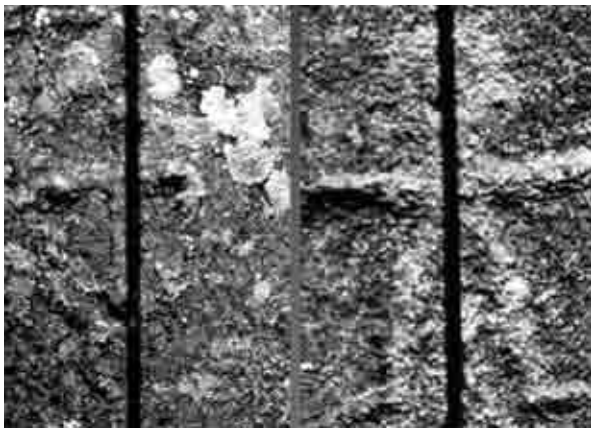
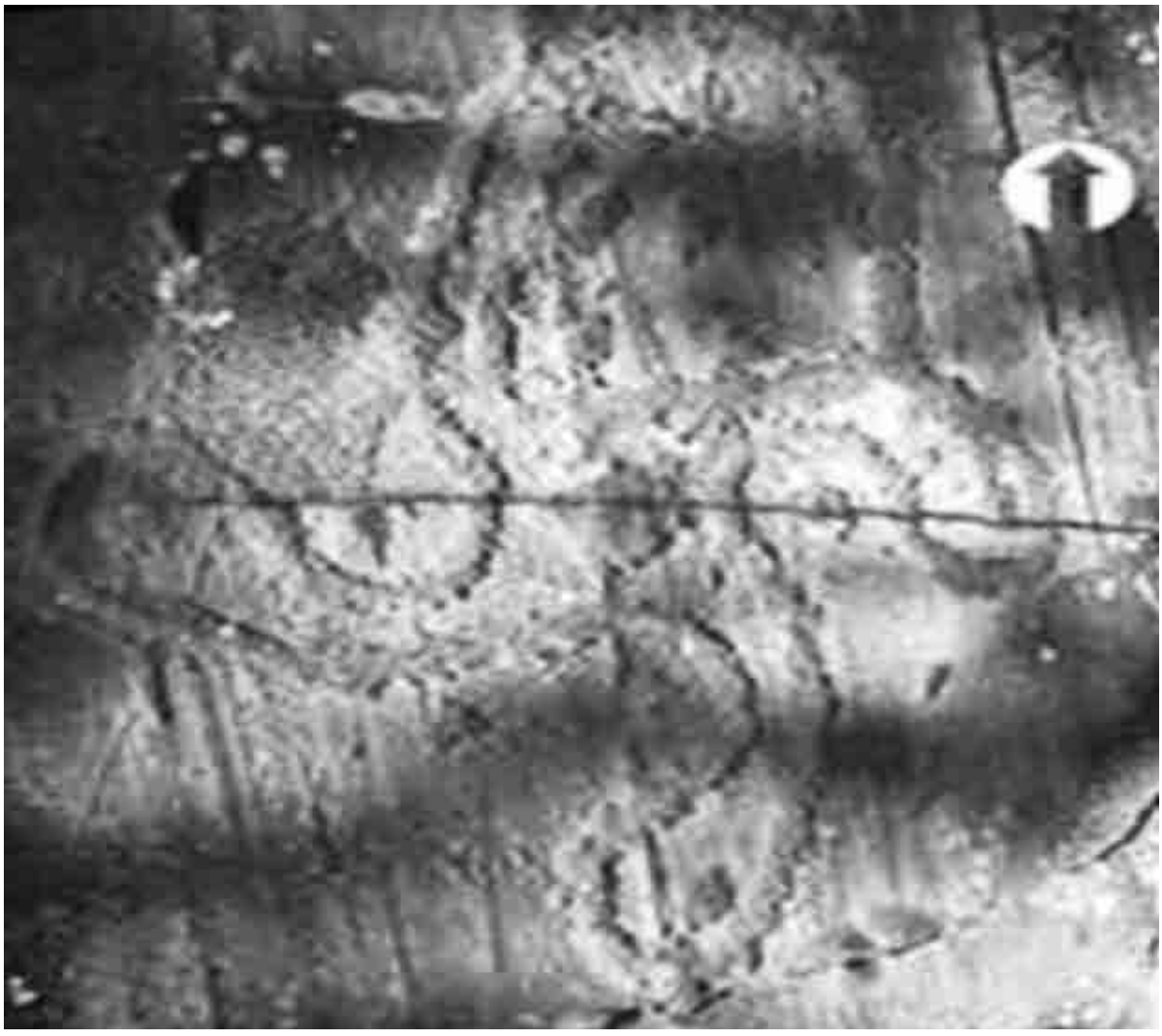


Figure 7 Winter solstice sunrise at La Gardette s/Cèze (F) (Photo M. Larrey.)

Figure 6 Summer solstice sunrise at Dos Sulif (I) (Photo M. Larrey.)



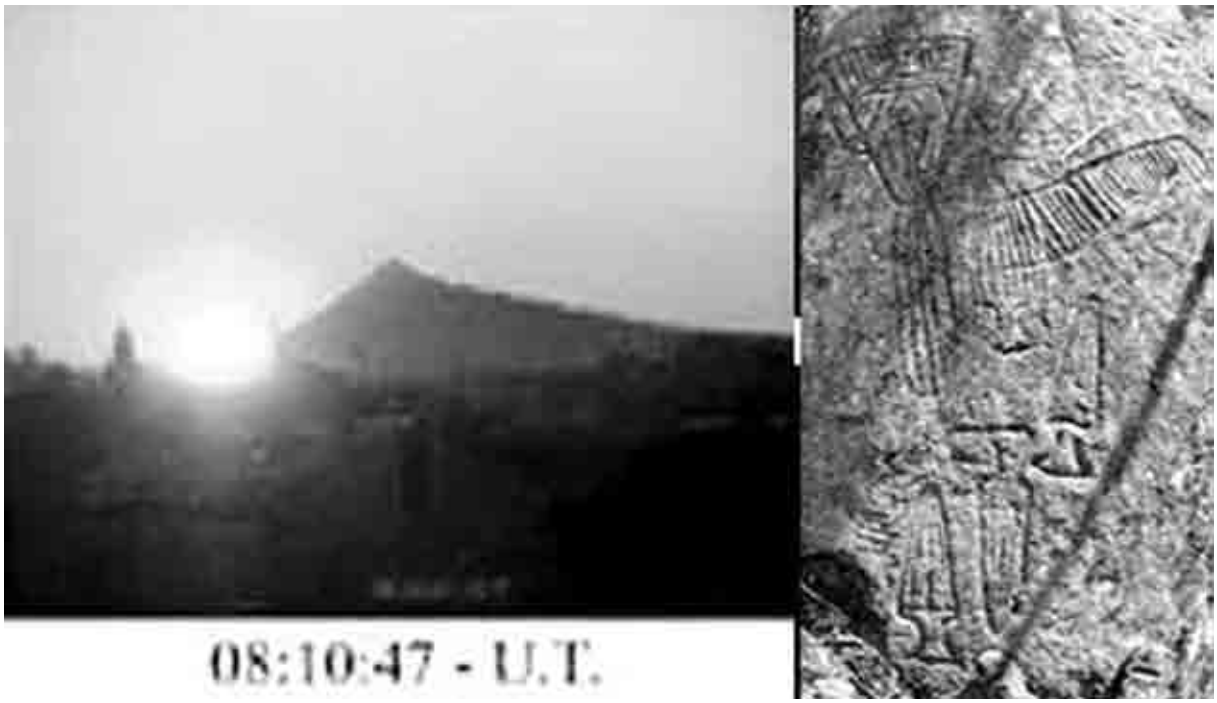


Figure 8 Winter solstice sunrise at Conxo (SP) (Photo A. Bouzas.)

are the perfect metaphor of this cyclic time and it is not a surprise to find open-air engraved labyrinths pointed towards the setting sun. Jose Luis Galovart discovered that 590 hours before the vernal equinox, seen from the labyrinth of Mogor (Galicia), the sun is setting, between two 'Finisterrial' islets, Ons and Onza, located 11 km away from Mogor (Fig. 5).

At Dos Sulif (Valcamonica), the rising summer soltitial sun casts the shadow of the plumb-line on the axis of Camunian roses (Fig. 6). The sun first appears there at 9:30 a.m.

Seen from La Gardettes/Cèze (Gard) the winter soltitial sun rises against the slope of La Loubière. The shadow on the plumb-line falls parallel to the symmetry axis of the numerous anthropomorphs and crucifoms of this gneiss outcrop (Fig. 7).

Seen from the Castriño de Conxo (Galicia), at the winter solstice, the sun is rising against the slope of Pico Sacro, as shown in the picture of Anton Bouzas (Fig. 8). The engraving looks more like a sledge than a labyrinth, and might well be at the origin of the ninth-century legend of the transportation of St James's sarcophagus from Pico Sacro to Compostela.

At other sites, the challenge to freeze the location of the origin of cyclic time led to modification of the landscape in order to stage the sun in its solstitial turn-around. The amount of labour involved depends of course on local conditions. Figure 9 shows the sign *akhet* as drawn by Champollion. He translated this hieroglyph of 'the sun coiling up two mountains' by 'horizon'. In the lower half is an anonymous picture whose caption was suggestive: 'Seen from the sphinx at summer solstice, the sun is drawing, between the two large pyramids, the hieroglyph horizon.' This sounds like an invitation to look at the pyramids from the sphinx.

The sphinx head, studied by K. Lal Gauri in the early 1990s, was carved out of hard grey limestone, standing out of the sand of the desert, while the rest of

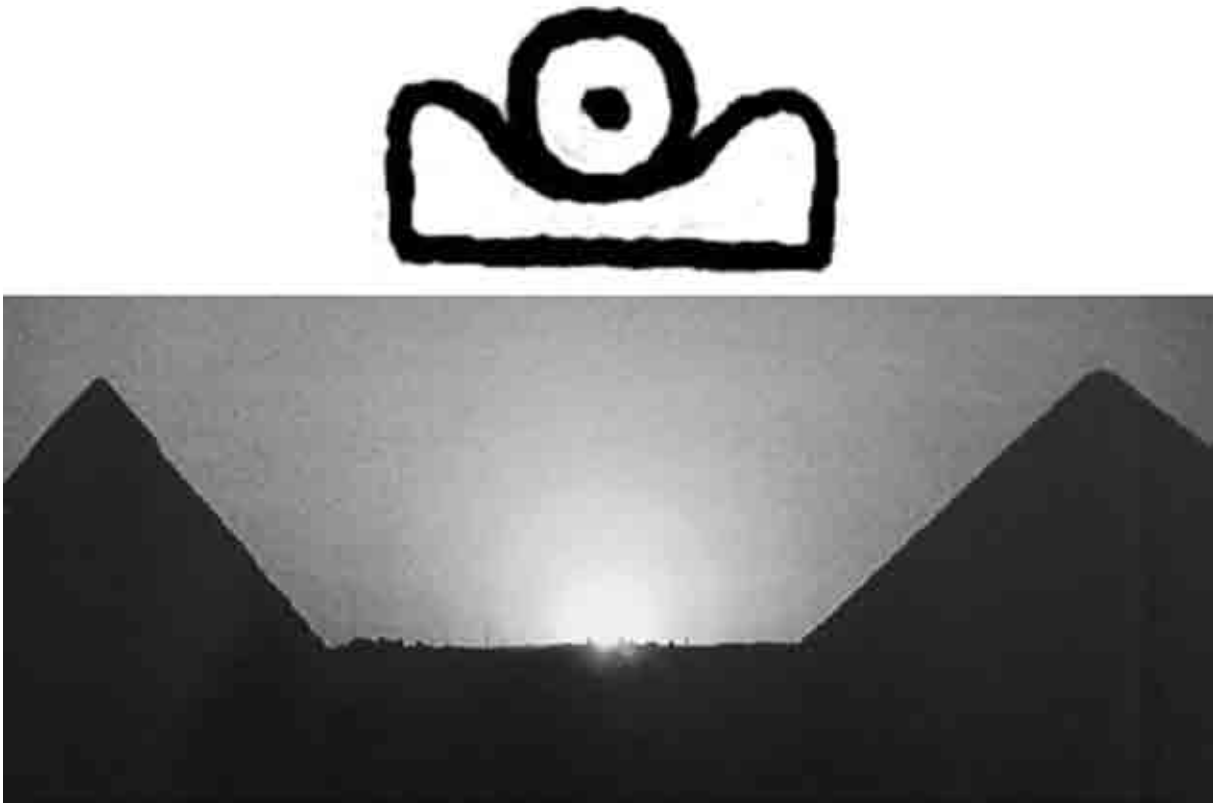


Figure 9 Artificial landscape in front of the sphinx heralding the sun before its shortest night/Champollion's horizon. (Photo anonymous.)

Figure 10 The sphinx's head as pivot for the summer solstice sunset at Giza (UAR) on Google Earth.

Figure 11 Stela of Amenhotep IV as sphinx decoding the 'atenic' message. Geneva Museum. Solar eclipse path 14 May -1337 on GoogleEarth & 5MCSE. (Photo anonymous.)

the body was carved out of a much softer limestone. Thanks to Google Earth, anybody can now study the structure of the solar scene at Giza, and one has to admit that the setting of the pyramids and the sphinx is not fortuitous. Figure 10 shows the direction of the summer solstice setting sun just between the two large pyramids, taking the head of the sphinx as the pivot. It sounds as if, in the absence of an adequate landscape to stage the hieroglyph *akhet*, the pharaoh Kheops simply decided to erect two hills.

Thirteen hundred years later, Amenhotep IV, while he was still living in Thebes with his wife Nefertiti, witnessed on 14 May -1337, a partial solar eclipse of magnitude 94 per cent. Thanks to the retrodiction freeware 5MCSE, one can investigate the uncertainties here, which are concerned with the time of occurrence of the maximal obscuration, 12:12 or 12:25? This eclipse was total for four minutes over Akhet-Aten/Tell el Amarna, midway between Memphis and Thebes. Totality would have probably threatened the pharaoh and his wife to death. As five stelae recorded (Fig. 11), the pharaoh disguised himself as a sphinx in order to decode the 'atenic' message, which was an injunction of the solar disk Aten: ' He shall build the horizon of Aten in Akhet-Aten'.

The monumental boundary stela K at Akhet-Aten provides us with precious information on the foundation stone ceremony for the first temple to Aten. It occurred during the fifth royal year and *peret* season, in its fourth month and 13th day. On Google Earth the aerial view shows the direction of the rising sun, 103°N, pointing towards a wadi indentation, 764 hours before vernal equinox. The photo of M. Gabolde (Fig. 12) depicts the scene at the same time in the seasonal cycle, actually on 19 February 2005, at 04:38UT, 704 hours before equinox. Again the *akhet* symbolism was at work...

The most remarkable feature of the reign of Akhenaten is the time span between the solar eclipse on 14 May -1337 and the foundation of Akhet-Aten on 2 March -1336. It is ten lunar months, just about the period of a lengthy human gestation. The day the founder event of the cult to the solar disk Aten took place was a new

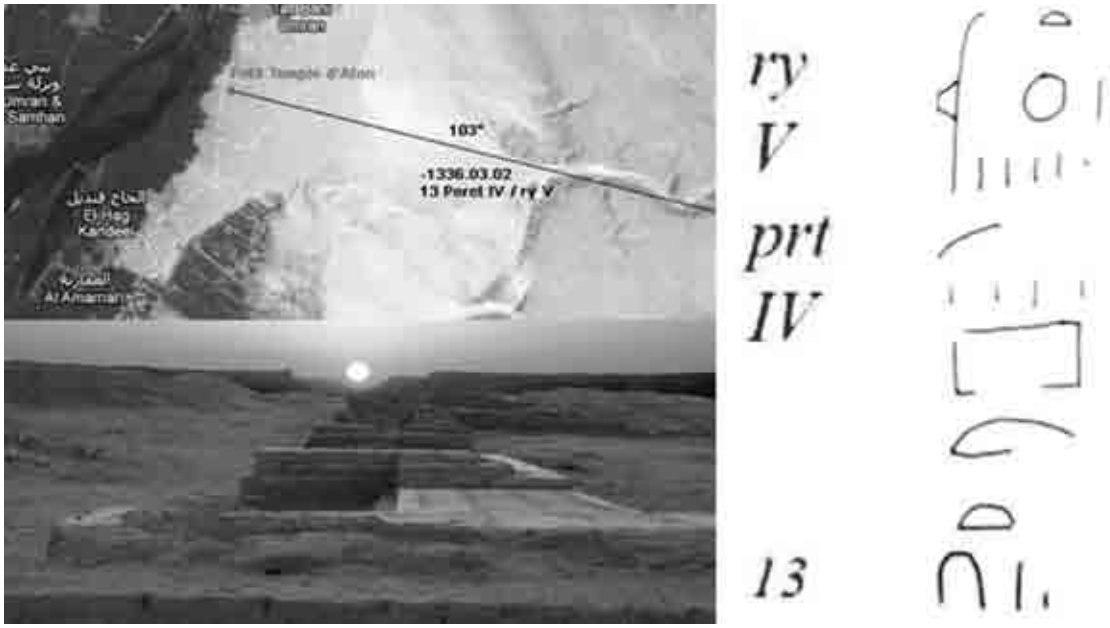


Figure 12 Sunrise from Aten small temple, =704 hour before vernal equinox Google Earth view of Tell el-Amarna 3 February -1336. Celebration date on Boundary Stela K. (Photo M. Gabolde.)

moon day, a day when the solar disk reigns alone in the sky. This solar event of 2 March -1336, precisely located in both space and time, might well be the first expression of a literate people.

One may argue that the very first event, precisely located in space and time, is when the great architect Imhotep might have declared solstice day 16 July -2767, the first day of the first month of the inundation season (i.e. 1 akhet I, the first day of the Egyptian calendar). Indeed, it is in agreement with: the recent radiodating of the Zoser pyramid; the coming of Imhotep described on the starvation stela on Sehel Island; the start of the rise of the Nile level which by a mere geographical accident occurs normally at summer solstice; and the lighting of the bottom of the Elephantine's nilometer when the soltitial sun reaches its zenith. Unfortunately there was no solar eclipse at this date.

The treasures from the russian city of Zaraysk

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Abstract
This contribution considers the intellectual and spiritual expressions of non-literate people through the example of two outstanding portable art figurines from the Russian city of Zaraysk. These figurines were made by employing flint tools on mammoth ivory which were discovered by the archeological expedition of Dr Khizry Amirkhanov (Moscow), while he was working at Zaraysk from 1995. The great discoveries were made during the excavations in 2001 and 2005 near the entrance to the Zaraysk Kremlin with the date of 22,000 years old.

Figure 1 The bison figurine made from mammoth ivory.

At the same time, it is just the very beginning of the story, which is 12 years old and has an outstanding international scientific context. The real possibilities of the analyses of those ivory figurines are considered here, in order to obtain important objective evidence of the intellectual and spiritual expressions of non-literate people.

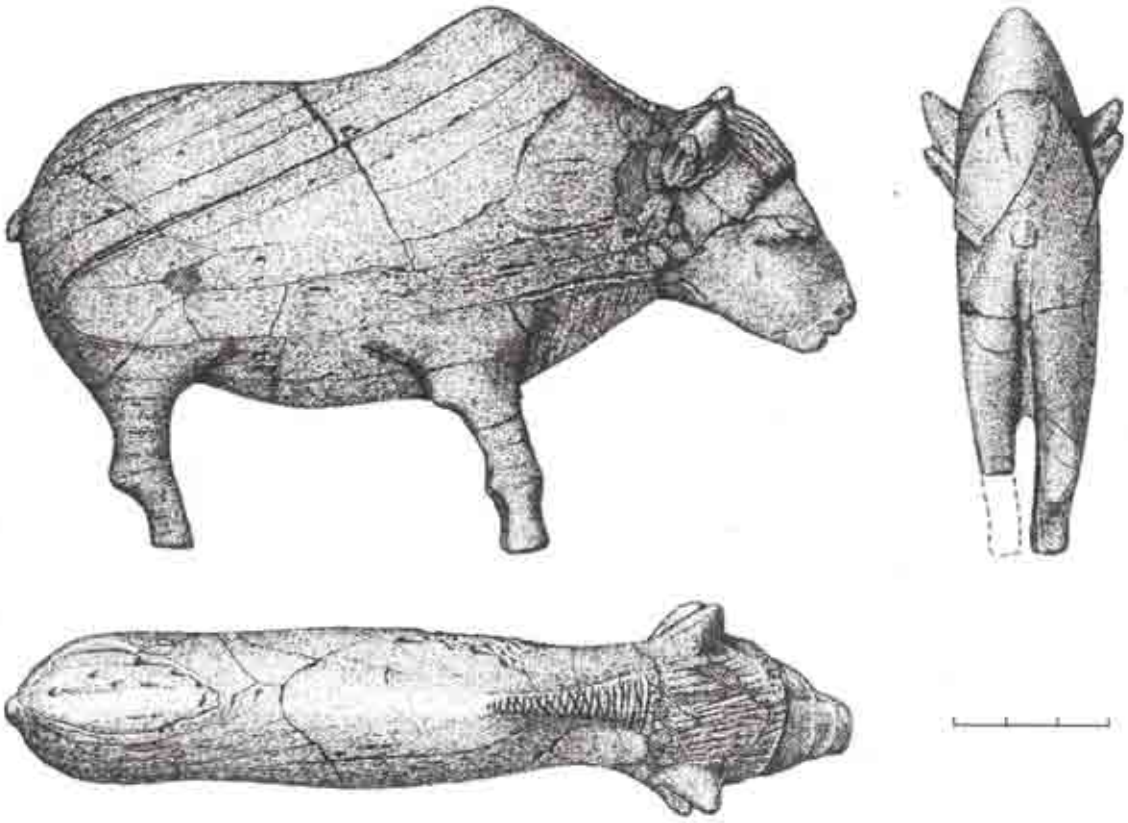
The field discoveries at Zaraysk in 2001 and 2005

The scientific investigation of the intellectual and spiritual expressions of non-literate people means presenting the physical evidence which should be available to check at any time. This is mainly a question of private personal luck. The very beginning of the discovery was 13 years ago at the city named 'Beyond Paradise'(translation of Zaraysk, a city located 162 km southwest of Moscow. The bison figurine made from mammoth ivory (Fig. 1) was found near the ancient walls of the Zaraysk Kremlin in 2001 (Fig. 2).

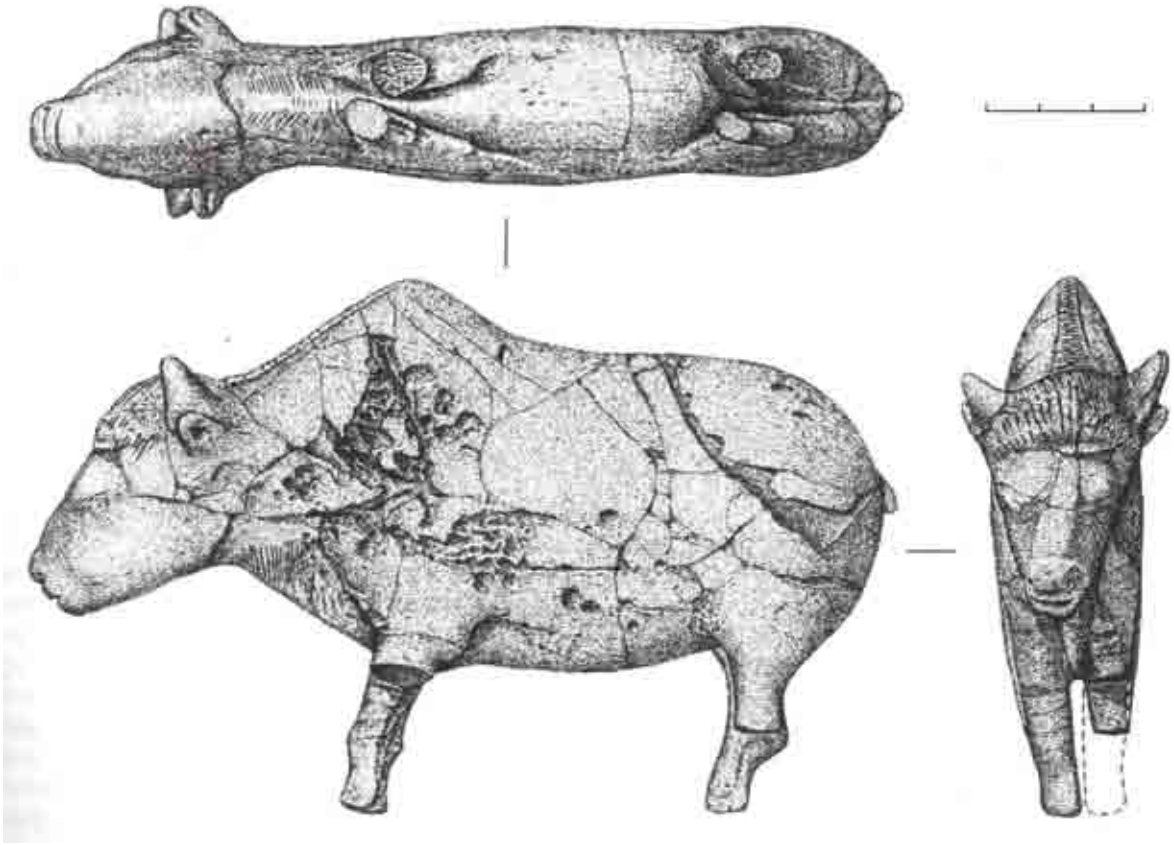
The Russian archaeologist from Zaraysk, Dr Sergey Lev, found this portable figure in pit no. 71, 2.14 m deep in situ surrounded by the wider archeological context of the mammoth's tooth and shoulder-blade, as well as some other unknown animal bones and red ochre pigment. The bison figure is 16.4 cm long, 10.4 cm tall and 3 cm wide with the date of 22,000 years old. The left side of the beautiful ivory figure of the bison was artificially destroyed, with two legs from the left side (of four) of the figure artificially broken, and red ochre was found on the front part of the bison's right side chest (Amirkhanov and Lev 2004).

The artifact's first publication with six pictures taken from all sides was in 2004 (Figs. 3, 4). The damage to the figurine was for some spiritual reason, and happened before it was placed on the specially prepared small podium at the bottom of the pit, according to the authors' point of view. After the detailed investigation Amirkhanov and Lev wrote that this is 'an ordinary three-dimensional portable young

Figure 2 Excavation near the ancient walls of the Zaraysk Kremlin in 2001.



Figures 3 (above) and 4 (below) Bison pictures from three sides (above) and the other three sides (below) after Kravtsov.



female bison sculpture' and they could not feel 'any attempt of specific expression of the author of figurine' (Amirkhanov and Lev 2004, pp. 311–12).

The Zaraysk site became very famous immediately after the bison figurine's publication. Many foreign colleagues from all over the world visited the excavations of the Russian archaeologists in Zaraysk. Some of them were from the UK. A British scientist, Dr B. Bradley, visited Zaraysk in 2005, as well as a group of British students from the archeological department, who participated in the Zaraysk excavations in 2005 (Fig. 5). They were very lucky to discover the three-dimensional mammoth ivory figurine of the first Zaraysk Venus 16.6 cm tall, 4–5 cm wide and 3 cm thick (Fig. 6).

Figure 5 Group of English students from the archaeological department, who participated at the Zaraysk excavations in 2005.

Figure 6 The Zaraysk Venus.

The next big publication of Zaraysk art objects was in 2009 with very short summaries in English: 'Zaraysk figurine represents an artistic advance in comparison with the portable art from the Aurignacian layers of caves such as Vogelherd and Geissenklösterle (more than 32–30,000 years BP) in southwest Germany' (Amirkhanov 2009, p. 449). Concerning the female figurine no.1 the English summaries included the next: 'The figurine had been carefully placed in the pit when it was about one-third full of sediment. The pit apparently was covered by a mammoth scapula at the same time … The figurine's overall preservation is poor. Its head and legs are the best preserved parts; they exhibit traces of polish. The head is particularly accurate in shape; it was rendered with short, regular vertical cuts. The figurine is typical of the "Avdeevo style" of such objects.' (Amirkhanov 2009, p. 450)

However, it was impossible to see the treasures from Zaraysk anywhere else in Russia as three-dimensional portable art for many different reasons. Nobody thought of it in Russia and there was no official exhibition in Russia or media advertisement. It was not exhibited at the local Zaraysk museum, or at the

world-famous Hermitage museum at St Petersburg, or at the State Historical Museum at Moscow (originally built in Red Square in 1875–81 on the inspiration of the Russian archeologist, Alexey Uvarov, as a special state archaeological museum). Even nowadays the Zaraysk treasures of portable art are not available to the general public at the local Zaraysk museum, though they are available at any time for special guests, according to the internet.

Therefore, the great luck for the Zaraysk portable art discoveries was after eight years, in 2013. The British Museum organized the outstanding exhibition named 'Ice Age art. Arrival of the modern mind' a first in the museum's history. British archeologists invited their Russian colleagues to participate in this unusual London exhibition.

The exhibition at the British Museum 2013

The exhibition took place under the professional supervision of Dr Jill Cook, a senior curator in the Department of Prehistory and Europe at the British Museum. She wrote the preface to the museum catalogue: 'The British Museum is exceptional among the world's museums in curating such works together with those of the great civilizations … Consequently, starting the first major British exhibition of Ice Age art here suggested the need for an approach that lifts Ice Age images out of their archaeological confines and the unwitting prejudices of traditional art history. This is art made by fully modern humans with brains like us. It is treated as part of the deep history of art and the mind' (Cook 2013, p. 8).

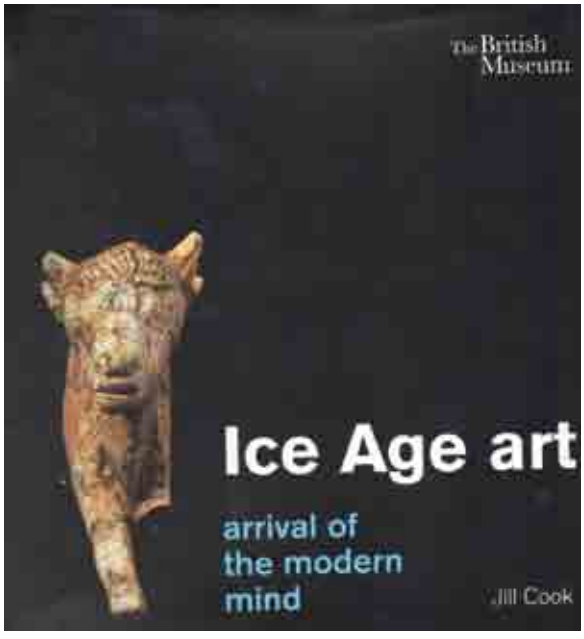
Dr. Cook mentioned that the task of the museum was to borrow for exhibition unique, fragile pieces, some of which are national treasures. It is also important that without the support for the project of many of the British Museum's sponsors this exhibition would have foundered , not to speak of the great team work of many colleagues of Dr. Cook, without which this exhibition would never have happened. However, from my point of view the key point is what Dr. Cook offered in the catalogue when she wrote 'of two unrelated Robinsons: the sculptor, John, who encouraged my artistic eye and my father, Kenneth, who taught me to be curious' (Cook 2013, p. 9).

The exhibition included a collection of Europe's oldest sculptures 40,000–30,000 years old, soft curves and full figures: female sculptures 30,000–20,000 years old, art and identity 40,000–20,000 years old, animals in art 30,000–20,000 years old, Renaissance art in western Europe 22,000–12,000 years old, sex or symbol? Images of woman 18,000–11,000 years old and the late drawings, sculptures and stories, 15,000–10,000 years old.

For the jacket of the museum catalogue it was obvious that there were many to select from; however, the period of 30,000 years ago was selected for the jacket of the museum volume. This selection took place and it was the beautiful photo of the ivory bison figure from Zaraysk by Khizry Amirkhanov and Sergey Lev (Fig. 7).

The windows of the exhibition hall were completely covered with thick fabric to avoid the daylight from outside the hall entering in. There were large spaces between the showcases to let visitors walk all round the

Figure 7 Catalogue of the exhibition Ice Age art. Arrival of the modern mind, 2013.



exhibits. The visitors felt themselves inside mysterious prehistoric time as a reality 'that lifts Ice Age images out of their archaeological confines' and concentrated their attention on the artifacts. The showcases were well lit, and underlined the unique aspects of the artifacts in the showcases. The bison figurine from Zaraysk was in a separate showcase which allowed visitors to observe this three-dimensional artifact from all sides.

Description of the Zaraysk artifact

According to Dr Cook, who studied the bison artifact, she wrote in a chapter in the catalogue entitled 'Animals in art 30,000–20,000 years old':

The figure is produced from a substantial piece of tusk and is fully sculpted in the round. It represents an adult female bison scaled down in exact proportion from the living animal. The detail does not stop there. As in life the forequarters of the bison are more developed than the hindquarters and the taper of the tusk has been cleverly exploited to achieve this.

The higher shoulder area comes from the wider diameter of the cone and the dip in the center of the back, which is a distinguishing feature of European bison, follows the upper curvature of the tusk. Even utilizing this geometry to advantage, the sculptor's task to achieve the shape of the head and body and to separate the legs using stone tools was considerable … Seen in front view the animal is clearly animated. With her head slightly angled to one side she appears to be walking or, perhaps, trotting forward if the missing left leg was raised.

Her mouth is slightly open as if she is calling and the characteristically broad nostrils give vivacity to the gentle face with its typically small eyes shown in relief and an incised line for the lids. The bump on the forehead between the horns is covered with incised lines to indicate the mass of curly hair forming the forelock covering this chignon and the top of the nose. The short, broad ears below and slightly behind the horns are also incised to show the curls of hair found there. The top of the thick mane, which covers the shoulders adding to their massive appearance in life, is simply represented by transverse incisions crossed by oblique lines along the neck and shoulder and the bottom of this fleece is shown by oblique incisions on the front of the chest.

Horizontal lines on the top of the right leg coincide with the area thickly covered by hair. There is no shading on the rear of the animal because there is much less hair towards the end of the back. The tail is shown in the correct position by a thin, short stalk although in life it is long with a tassel of curls at the bottom. The joints between the legs and the body are detailed with the musculature sculpted in relief. The hock and prominent heel are clear on the surviving back leg and the knee is defined on the front leg but the hooves do not show the split into two parts. (Cook 2013, pp. 165–8).

The other example of portable art from Zaraysk is the figure of a woman in the early stages of pregnancy. It was found during the excavation in 2005 in a pit located between hearths. This figure, called the Zaraysk Venus, was portrayed holding her abdomen. It was shown at the exhibition in a large showcase together with many other Pleistocene 'Venuses' from different Russian sites, such as Kostienky-1, Avdeevo, Eliseevitchi. They are different in shape, size and materials and give a rare opportunity to the public and paleoart specialists to compare them.

Dr. Cook wrote this about the figure: 'tall but pregnant, the ivory figure from Zaraysk … is sculpted in a style reminiscent of the Avdeevo examples. Her bowed head has no face but a hairstyle or hat is indicated by short vertical incisions. The object was carefully placed on a small lenticular-shaped spread of fine sand in a pit with a patch of red ochre behind her head and covered by a mammoth shoulder blade. Although poorly preserved, the skilful separation of her legs

slightly bent at the knee gives a sense of movement to the figure' (Cook 2013, p. 84). This is a rare detail for Venus portable art figures created 22,000 years ago.

The intellectual and spiritual expressions of non-literate people at Zaraysk 22,000 years ago and now

The Zaraysk archaeological excavations continued for more than 20 years before the great discovery of the bison figure in 2001. Amirkhanov and Lev published information concerning the archaeological context: the mammoth's tooth and shoulder-blade, as well as some other unknown animal bones and red ochre pigment. The left side of the beautiful ivory figure of the bison was deliberately damaged in several places, for instance two legs from the left side, and red ochre was found on the front part of the bison's right chest. This could be evidence of the spiritual expressions of non-literate people 22,000 years ago. they felt that was 'an ordinary three-dimensional portable young female bison sculpture' and did not see 'any attempt of specific expression of the author of figurine' (Amirkhanov and Lev 2004, pp. 311–12).

Many different things needed to happen before Dr. Cook could make a scientific investigation of the Zaraysk artifacts in proper laboratory conditions.

As the result, Dr. Cook wrote in 2013 about the bison figurine: 'Seen in front view the animal is clearly animated. With her head slightly angled to one side she appears to be walking' (Cook 2013, p. 165–8). On the other hand, she wrote concerning the Zaraysk Venus found in 2005 that: 'the skilful separation of her legs slightly bent at the knee gives a sense of movement to the figure' (Cook 2013, p. 84). This is evidence of the intellectual expression of the non-literate people at Zaraysk.

Conclusion

This is the very beginning of discoveries of the treasures from Zaraysk. They are useful in several senses. First they are different from the many other static Pleistocene figurines that visitors could see in the exhibition. The bison and the Venus portable art look very modern, are full of intellectual and spiritual expression, and 'give a sense of movement to the figure'. Second, it is not difficult to see that the Zaraysk portable art treasures showing the differences between the intellectual and spiritual expressions of non-literate people.

The spiritual evidences of expressions could be identified only during the proper professional excavations. They are very fragile, and therefore, could only be found in situ at the excavations. It is very important to emphasize that the two legs from the left side of the figure were artificially broken..

The full detailed story is available in the museum volume (Cook 2013, pp. 267–71). I would like to draw attention to the fact that in 1887 two pieces of ivory portable art: 'were sold to the British Museum but it was not until a visit by the French archaeologist Abbé Henry Breuil (in 1904) that they were finally recognized as parts of a single sculpture' (Cook 2013, p. 271).

Acknowledgement

I am grateful to my friend Jeffrey Kottmyer for his great help in editing this article.

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Earth and underground in early Sumerian sources

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Abstract
In this paper, through an analysis of the Mesopotamian sources, I will try to reconstruct the pre-protohistoric perception of subterraneity developed between the two rivers. Before the formation of a bipartite underworld, that contained and separated the two opposite poles connected to fertility and death in a structure that denied any form of cyclicity, the subterraneity related exclusively to the liquid, potential, chaotic sphere of the primordial substance. In early Sumer, before the subterranean sinking of the afterlife and all the other levels of alterity, the afterlife was confined to a purely geographical, horizontal, otherness (the mountains, the steppes). The beliefs of a civilization without writing will be extrapolated tentatively from iconographical but also written sources, since the demarcation between non-literate and literate people was fluid and often ambiguous, especially at the turn of the problematic period of the invention of writing (but what is writing?).

The two poles of the classical Mesopotamian underworld

In the late Neo-Assyrian cosmological systematization (from Assur) called KAR 307 (30–38), dating to the first millennium, but that could be traced back (for the list of cosmic regions) to the Kassite period,[1] the universe was elegantly divided into six symmetrical levels, thee celestial and three earthly. The top half, also described by other texts (*AO* 8196, *Etana Epic*[2]), was composed of three spheres of different stones: the upper sky, of dispro[ɪ], seat of Anu;[3] the median sky, of lapis lazuli, seat of the Igigi; and the lower sky, of *luludânîtu*,[4] seat of the stars. The three lower were symmetrical (34–37): the higher ground, seat of men; the median ground, aquatic seat of Ea (Apsu); and the lower ground, where dwelt the 600 Anunnaki, chthonic deities.[5]

Following this tradition, the underworld appears to be vertically bipartite, constituted by a huge 'cistern' of fresh water, reification of the primordial god Apsu, creative source of life and of first matter, to which the realm of the dead, arid and barren, is subjected. To reach the latter it seems necessary to go through the former, and hence, according to some scholars, the function of rivers and streams as an obligatory passage to the hereafter,[6] and the same image for the infernal river Ḫubur.[7]

This view, due to its rare—within the fluid, 'incoherent',[8] Mesopotamian mythology—systematic nature, has often been taken as a model for the reconstruction of Mesopotamian cosmology, although nothing indicates that it was actually very widespread, and even less unique. Indeed, in addition to being of non-unique interpretation,[9] it cohabits with (or was preceded by) different systematizations, such as the seven heavens and seven earths of the Sumerian spells, perhaps referring to a cosmographic tradition,[10] and the *Enuma Eliš* cosmogony (tab. V),[11] in which the underworld is not mentioned and the cosmos, created by Marduk from the body of Tiamat, seems divided not into six but five levels—and, what is even more important, with different 'imaginaries', often far away from the rigour of theological systematizations. In fact, if the hereafter is always placed underground[12] from the

1 See Horowitz 1998, pp. 4–5.
2 See Horowitz 1998, respectively pp. 3–19, 43–65.
3 Powerful celestial god who according to a mechanism well known in the history of religions, *otiosus*, was replaced by a more dynamic god (Enlil, or Marduk); see Eliade 1976, §19.
4 Unidentified red stone, see Verardi 2006, p. 40. Sumerian words are written in roman type, Akkadian ones in italics.
5 See Horowitz 1998, pp. 3–4 and Verardi 2006, pp. 39–40.
6 See *inter alia* Chiodi 1994, passim.
7 See George 2003, pp. 500–01.
8 See e.g. Kramer 1960, p. 65.
9 See Bottéro 1980, p. 31.
10 See Horowitz 1998, pp. 208–20.
11 See Bottéro, Kramer 1989, pp. 602–79.
12 See Van der Stede 2007, pp. 38–42.

second millennium onwards, its 'specific' position (just below the earth's surface, deep, located under, or not, the Apsu) is far from stable. In the words of Jean Bottéro (1980):

> De la disposition interne de cet Enfer ainsi meublé, il est probable qu'on n'avait qu'une idée fort confuse: tout ce qui touche à l'Au-delà étant, de soi, absolument incontrôlable, se trouvait donc, en Mésopotamie comme partout ailleurs, plongé dans le même à-peu-près, le même flou, le même vague et, peut-être encore davantage que d'autres secteurs de la Mythologie, farci d'inconséquences et de données variables et contradictoires.

Two aspects should be pointed out: on the one hand, the substantial relationship, ontological and not geographical, between the two poles of the underground, a highly significant relationship that has attracted little interest among scholars; on the other hand, the importance in the Mesopotamian imagination that gradually only one of these two poles takes on.

Regarding the relationship between the place of *post mortem* and the Apsu, it is interesting to look at their subterranean co-presence and at the same time at their rigid separation (sometimes embodied in the hard surface of the cistern of fresh water, the *dannatu*[13]): they convey opposite and complementary values that together account for those assigned to the subterranean world. Hence, under this interesting decoupling, the cistern of fresh water (and the deities and figures related to it) absorbs all the values associated with the beginning (life): purity, potential, dynamism, creativity, fecundity, fertility. By contrast, the opposite values are absorbed by the other pole: the end (death), dirt, staticity, sterility, dryness.[14]

Every culture, in constructing its imaginary picture of the underground, must somehow deal with its dialectical nature, with one eye towards death and the other towards birth; elsewhere through a kind of *coincidentia oppositorum*, while the Mesopotamian culture, which for most of its was indifferent to eschatological conceptions and the cyclical structuration of *post mortem*, developed an interesting split, a real bipartition of the underground.

The two poles of the underground live together, but do not occupy the same space in the Mesopotamian imagination. The pole of death seems more and more extended and ramified,[15] reaching an apex with the baroque and terrorizing images of the Neo-Assyrian period, perhaps increased or favoured, as has been suggested,[16] also by rhetoric and imperialistic propaganda. The subterranean world increasingly recalls dark atmospheres: 'I cannot tell you, my friend, I cannot tell you! / If I am going to tell you the rules

13 See Horowitz 1998, p. 345.

14 Significantly, Enkidu's description of the underworld in the 12th tablet of *Gilgameš* begins, at lines 96–7, not entirely known to Andrew George 2003 (see Cooper 2009, p. 29) with an allusion to infertility, and in particular to to atrophy of the sexual organs: 'the penis is like a rotten beam, termites devour it ... the vulva is like a crevice filled with dust' (Cooper in 2009, p. 29). The infertility of the underworld (see also Kirk 1970, p. 110 and Van der Stede 2006, p. 34), interwoven with that of other peripheral places (see Wiggermann 1997, pp. 216–17) such as deserts and steppes, emerges from a number of images (e.g. the salt water which Ur-Nammu must drink (see Hays 2011, p. 50)) and descriptions, such as, in particular, that of Ningišzida's journey to the netherworld (29–31): 'The river of the netherworld no water flows, Its You Should not drink water, / would you sail then? / The field of the netherworld grows no grain, flour milled from it is not, / then would you sail? / The sheep of the netherworld carries no wool, cloth is not woven from it, / would you sail then?' (Katz 2005, p. 67. See also Horowitz 1998, pp. 351–2). This non-productive (and therefore antisocial) conception of the underworld is intertwined, on the other hand, with the subject of the constant dependence of the dead on the offerings of the living (see Scurlock 1997, pp. 92–3 and Hays 2007, p. 322).

15 See e.g. Jacobsen 1976, p. 228 ('The ubiquity of the powers of sudden death led understandably to an increased interest in what these powers and their domain, the netherworld, were like; stories and descriptions of them became popular') and Hays 2011, p. 34 ('there was a flourishing of baroque portraits of the underworld and of protective spells against demons and the dead').

16 See Hays 2011, p. 56.

of the Netherworld That I saw, / sit you down (and) weep!' These are the first agitated words of Enkidu resurfacing in front of his friend.[17]

The underground becomes, first of all, the glum house of the dead (*Erṣetu mītūti*, *bit dumb*, 'the land/house of the dead') similar to shadows and demonic beings, the realm of non-life, non-existence, otherness'. As opposed to life, health, virility, there was a huge (as the quantity of the dead is huge[18]) anti-kingdom, a 'big city' (urugal), mirroring that of Earth.[19]

The image of *post mortem* is interwoven with the image of subterraneity ever more closely, creating a reality where the borders of the two constituent elements are fluid, no longer distinguishable. The subterranean world is more and more dominated by the idea of afterlife, but at the same time provides the images with which afterlife itself is conceived. Beginning with the concreteness of the grave, the underworld will be built on the images of darkness (é.kukku, *bit eṭuṭi/ekleti*, 'the house of darkness'[20]), and dust (*bīt epri*, 'the house of dust'[21]):

> […] to the house whose residents are
> deprived of light,
> Where dust is their sustenance, their food clay.
> They are clad like birds in coats of feathers,
> And they cannot see light but dwell in
> darkness.[22]

This kind of the underworld is usually associated with Mesopotamian beliefs, an underworld that is, *pars pro toto*, the seat of the afterlife. Actually, the ideas of early Sumerians were almost antithetical. What could be defined as the essence of the underground was conceived as something primordial and fertile, apparently extraneous to the realm of death, in spite of the fact that the dead were buried.

The aquatic underworld in early Sumerian sources

The relief of the famous Uruk vase,[23] of the end of the fourth millennium, is highly representative of Mesopotamian ideology of early history, displaying 'the hierarchical relations between the physical world, mankind, the ruler and the gods'[24] (Fig. 1).

The lower register shows the natural world divided into three levels: at the bottom, as the foundation of the whole iconographic system, there is water, the underground principal source of life, and above that the livelihoods of men and gods, starting with water and human labour: wheat and flax (agriculture) and rams and ewes (sheep). In the middle register the

17 *The Epic of Gilgameš* XII, transl. by George 2003, p. 733. With 'Epic of Gilgameš' I mean the Standard Babylonian Epic; see George 2003, pp. 418–43. The edition and translation of reference are those of Andrew George.

18 Obviously much higher than that of the living, as pointed out by Ištar (*The Descent of Ištar, The Epic of Gilgameš* VI) and Ereškigal (*Nergal and Ereškigal*) in their threat to pick up the dead on earth: 'I shall make the dead outnumber the living' (*The Epic of Gilgameš* VI, 100, George 2003, p. 625).

19 The process of urbanization of the afterlife, from the later centuries of the third millennium, becomes more systematic and complex, contextually with the evolution of real Mesopotamian urbanization. The image of the afterlife as an urban society is attested by the middle of the third millennium by the name urugal, the 'big city', while an inscription dedicated to Ereškigal 'queen of the underworld', dated to 2300 BC, is the first secure evidence of the concept of the netherworld as a kingdom. In the funeral laments for the death of King Ur-Nammu, comparisons with the terrestrial kingdom become even closer, with a defined hierarchy (Ereškigal the queen, Namtar the vizier and scribes, judges, officers) and an administrative system that, from then on, will often be the image of the contemporary and real one (see Katz 2004, p. 478 and 2005, p. 82). Even at the architectural level — think of the doors, the walls, the palaces (è.gal) of the deities and even, in rare cases, the roads — the afterlife is often built, although not necessarily in a realistic manner, through urban elements. The idea of the artificiality of the underworld emerges also from its classification as e, *bītu,* 'home': house of the dead (*bīt mūti*), of darkness (é.kukku, *bīt eṭuṭi/ekleti*), of dust (*bīt epri*), house of Dumuzi (*bīt ddumuzi*), house of Irkalla (*bīt dIrkalla*).

20 See Horowitz 1998, pp. 289–90, 352; Katz 2005, p. 70; and Van der Stede 2006, pp. 30–1.

21 Particularly *Gilameš* VII; see George 2003, pp. 632–47.

22 George 2003, p. 645. See Pettinato 1992a, pp. 185–7.

23 See Avery 2007 and Wiggermann 2011, pp. 663–4.

24 Wiggermann 2011, p. 663.

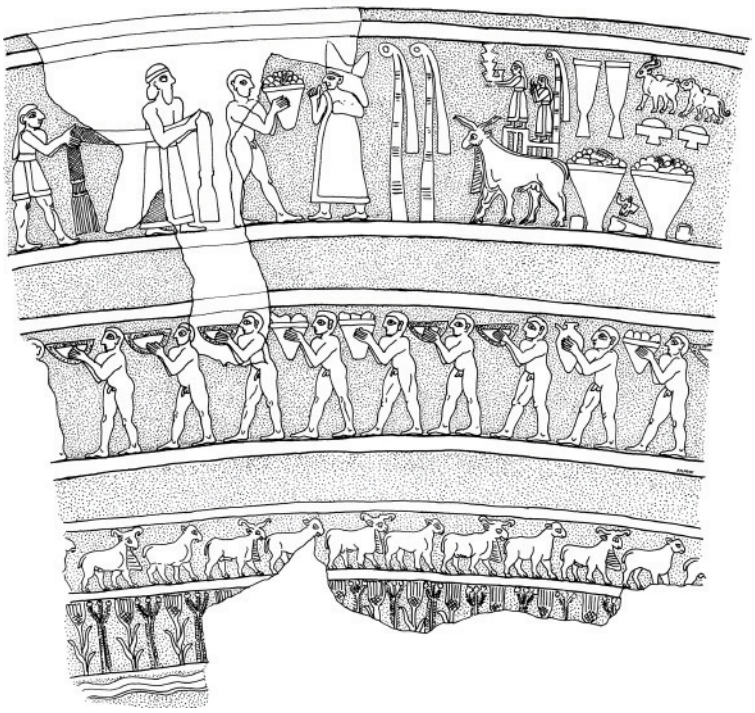

Figure 1 'Warka vase'. Relief-carved alabaster vessel, late fourth millennium, from Uruk. After F. Wiggermann 2011, p. 664.

population bears the fruit of the harvest to Inanna, patron goddess of the city, and in the upper one the priest-king (*en*) and his assistant (*lagar?*) present themselves to the goddess in front of her temple. The cloth that the main figure is holding could recall, according to Jacobsen's interpretation,[25] a dramatization of the marriage of the goddess with Dumuzi,[26] an important theme for the dynasty of Ur III,[27] which would close the circle with a return to earth and fertility, to which everything refers in this 'exceptionally explicit iconographic monument'.[28]

Later, the first written texts also insist on similar conceptions. Since the second half of the third millennium royal inscriptions often focus on specific problems relating to irrigation, the maintenance of gardens and water management. Up to the first part of the second millennium, literary sources show a great interest in issues related to cultivation and fertility. To the *hegal*: the opulence, abundance, prosperity.[29]

In the Uruk vase, water is placed as foundation, basis and principle of that agricultural pyramid; water in Sumerian significantly is indicated by the same sign as for 'seed', a.[30] Water as *fons et origo*: Enki / Ea, the god of water, was 'Lord of depth' ((en.) engur) and 'Lord of Life' (en.ti).

25 Jacobsen 1976, pp. 24 ff. See Pisi 2001, p. 39.

26 On the theme of sacred marriage, see in particular Kramer 1972b, Frankfort 1978, pp. 295–8, Sanmartín 1993, pp. 311–16 and Pisi 2001, pp. 43–5.

27 See Kramer 1972b, p. 131.

28 See Wiggermann 2011, p. 663.

29 Kramer 1972a, p. 130.

30 About the association of water-sperm into other cultures see Eliade 1976 §60.

As pointed out by Mircea Eliade (1976, §61), in ancient cultures cosmic manifestations are usually supported by water, not by earth. Under earth there was that watery dark matter, chaotic, from which the entire universe was formed, and about whose role there was substantial agreement in the ancient Mesopotamian cosmogonies.[31]

It is not surprising that in this way it was in Eridu, an ancient sacred city, small but extremely important,[32] placed in the marshes and seat of Enki's shrine. In the theology of Eridu, clearly reaching out towards chthonic and material aspects,[33] the cosmos is derived by the female element (ki) remaining an, the sky, a secondary actor. Everything originates from the parthenogenetic (as initial, original) procreation[34] of the primordial goddess Nammu, ^{d}Ama-tu-an-ki, 'the mother who gave birth to Heaven and Earth' in a god list,[35] a kind of a huge matrix intimately connected, beginning with her name (usually written with the same sign, engur, used for 'Apsu') with the fruitful waters, the 'deification of the river bed', according to Jacobsen (1976).

Even more interesting is, perhaps, the essentially coeval cosmogony elaborated in Nippur, a powerful sacred and political city theologically 'rival'[36] of Eridu, seat of the Enkur, the sanctuary of Enlil, and heading towards the height and the male and bright element. Although in the sacred texts here elaborated the role of the earth will soon become secondary to the celestial one, everything began in the dark, in the depths. Everything had its origin in the 'City of Ancient Times' (uru-ul-la), black city, inhabited by ghosts, immersed in the primeval waters, a sort of proto-Ade who suddenly generates, again parthenogenetically, the first deities, An and Ki, closely together, heaven and earth (an-ki) until the division (at the origin of creative evolution) made, as in Greece but here peacefully, by a divine son.

In some ways these views are resumed much later in the Babylonian cosmogony, recited annually to stimulate the renewal of the world, water being considered the raw material from which everything originates. From the union of stagnant water, the Apsu, and the flowing one, Tiamat (or maybe the fresh and the salt water), possible ancestors of the Greek Okeanos and Tethys, originates the creation.

The same conceptions emerge from many images, scattered in Mesopotamian traditions, combining sexual activity witho work, especially ploughing[37] the earth (*uraš*, the arable surface, 'the tilth' in the translation of Jacobsen[38]), the birth of man[39] and that of gods[40] such as plants, with a furrow in the ground. In Mesopotamia, as in other Middle Eastern cultures and unlike the Egyptian one, which recognizes a creative role only (or almost[41]) for male gods (Re-Atum, Ptah, Khnum), creation is associated with chthonic female energy.[42]

In a famous text translated by Diane Wolkstein and Samuel Noah Kramer (1983, pp. 35–9), the goddess Inanna compares her vulva to an uncultivated land, that Dumuzi is invited to plough: 'Who will plough my vulva? / Who will plough my high field? / Who will plough my wet ground? [...] / Then plough my vulva, man of my heart! Plough my vulva.' Without breaks, therefore, the narrative celebrates the rebirth of

31 About oppositions and parallels between the Mesopotamian and Egyptian cosmologies see Frankfort 1978, pp. 233–6.

32 See Roux 1994, p. 36 ; Sanmartín 1998, p. 25.

33 See van Dijk 1964, pp. 6–12.

34 See Wiggermann 1992, p. 289.

35 See Wiggermann 1992, p. 283.

36 The first one to oppose the 'chthonic and agricultural' theology of Eridu to that, 'cosmic and pastoral', of Nippur, was probably Jan van Dijk (1964, p. 5–28). On this theme, see also, recently, Snell 2011, pp. 22–3.

37 See Wiggermann 2011, p. 681.

38 1976, pp. 95 and 249.

39 See particularly, *The song of the hoe,* 6–21 (Pettinato 1992b, p. 312).

40 *Teogony of Dunnu*; see Wiggermann 2011, p. 672.

41 With the notable exception of the goddess Neith.

42 See Frankfort 1978, p. 284.

nature: 'At the king's lap stood the rising cedar. / Plants grew by high their side. / Grains grew there high by side. / Gardens flourished luxuriantly.'[43]

As in almost all polytheistic religions, depth and darkness precede light and height. They precede creation. The mythologeme of the battle, more or less violent, between chaos and cosmos, between old, chthonic disorder and new heavenly order (which will take in Greece, among others, the form of titanomachy'; and we find, implicitly, the same theme in the Hurrian image of the 'ancient gods' (*karuileš šiuneš*), chthonic, and in India in the opposition Asura-Deva) tersely emerges from some Mesopotamian myths.

Shortly explained in what William Moran (1987) defines as the 'Igigu myth', in the *Atra-Ḫasīs* (I i 1 – v, 248),[44] in the relationship between 'inferior' and 'superior' gods, between Igigi, primal gods, collective and anonymous,[45] pisciform (in this theriomorphism a further indication of their antiquity),[46] chthonic (only after celestial) and linked to the waters, and the heavenly gods (the Anunna[47]), which forced them to work 'as men' (*Inuma ilu awilum*, 'When gods were men [...]') until their rebellion. Much more explicit in the *Götterkämpfe* (celebrated, what 'for the mythopoeic mind, means "realized once more"'[48]) between Enki and Apsu and (according to the same pattern) between Marduk and Tiamat in the already mentioned *Enuma Eliš*, model for future struggles between Indra and Vrtra, Yahweh and Leviathan, Tannin, Behemoth, Baal and Yam, Zeus and Typhon, Apollo and Python,[49] and for the numerous, successive traditions of St George, up to the parodic inversion of the classical canon in the Tolkienesque *Farmer Giles of Ham*.

The 'essence of the underground' is something ancestral, chaotic and fertile, prior to the new world order, and to represent this generating and potentially dangerous charge there are, on the one hand, the various mother goddesses, such as Tiamat and Nammu, and on the other, above all, the image of abzu / *apsû*, or engu / *engurru*[50], at first perhaps a representation of the fertile waters of the marshes, then cosmic place and finally, etiologically, the primordial divinity defeated.[51] The fact that no Sumerian text testifies its creation or separation from sky and earth at the beginning of time seems to corroborate, as claimed by Wayne Horowitz (1998, p. 335), that the Sumerians conceived this entity as a 'primordial element'.[52]

43 Paola Pisi (2001, p. 44) is sceptic: 'Né tantomeno può essere indicativo di una finalità fertilistica del rituale l'utilizzo, nei dialoghi amorosi tra i due amanti, di un codice espressivo vegetale, ricorrente, peraltro, più nei canti d'amore che nei testi ierogamici veri e propri: si tratta infatti di metafore sessuali ben note nel linguaggio erotico sumerico, e non di simboli di fecondità del suolo.' What the researcher avoids explaining, however, is the crux of the matter, namely the conceptual basis on which such metaphors have been developed.

44 See Kvanvig 2011, pp. 19–20.

45 Aside from the head of the rebellion, ša īšû ilu ṭēma, 'the god who had planning capacity' in a Late Babylonian fragment.

46 Maybe linked with the subsequent figures of the 'seven wise men'; see Lara Peinado 1984, pp. 123–4.

47 In the third millennium the Anunna were seven celestial deities (see Katz 2005, p. 83). Only from the Kassite period the Anunnaki become infernal gods. On the complex issue of the Igigi and Anunna see also Sanmartín 1993, pp. 335–6.

48 Frankfort 1978, p. 327.

49 See Fontenrose 1974, p. 151.

50 Engu is the most common name in Sumerian, *apsû* in Akkadian; see particularly Horowitz 1998, pp. 306–17 and Espak 2010, p. 216.

51 See Wiggermann 1992, p. 283.

52 'Just as the divine Apsu exists at the very start of *Enuma Elish*. In Enki and Ninmaḫ, for example, the Apsu already exists in EN 12–14, where Enki is present in engur.buru 'the deep Apsu', although the Apsu is not mentioned when heaven and earth are separated in EN 1–2'. An exception is the spell *When Anu Built the Heavens*: 'When Anu built the heavens; / Nudimmud built the Apsu, his home / Ea in the Apsu pinched off cla[y]' (transl by Horowitz 1998, p. 335).

Apsu, 'pure' place,[53] primeval, translatable (maybe) with 'the waters' (ab) 'of wisdom' (zu),[54] represents the underground setting of the beneficial and chthonic Enki / Ea who, in the *Enuma Eliš* knew how to tame and reify it.[55] Source of the subterranean, aquatic and primigenial 'raw material',[56] it plays an essential role not only at the cosmogonic level, but also at an anthropogonic one. In the anthropogony developed in Eridu (*Enki e Ninmaḫ*), the craftsman god Enki finds in Apsu the clay that, according to a widespread mythologeme,[57] mixes with the form (wisdom) of primordial man (*lullû*), and presumably also in the anthropogony of Nippur there was an implicit reference to the underground fresh waters, bearing the primordial man directly from the earth like a plant (*Song of the hoe*).

If this aspect of the underworld related to the moisture is probably the oldest one in southern Mesopotamian conception, and always will survive, materialized and defined in the 'tank' of Apsu, as part of the underground, nevertheless soon it will not constitute yet its 'essence'. Since the end of the third millennium, subterraneity itself, as well as the theme of agricultural fertility, raises less interest; sensitivity becomes more urban and increasingly less interested in the sphere of food production, and into this vacuum penetrates a new vision, perhaps of a Semitic matrix, with which, from the beginning of the second millennium, the underground returns to gradually acquire centrality and vitality. But its essence is now quite different: during the Babylonian empire, Kassite and then Assyrian, the essence of the underground, as we have seen, is connected to the frightfulness and darkness of the afterlife.

Inside-outside, above-below: the verticalization of the otherworld

Where therefore was the afterworld placed before its sinking underground, and when and why did this change happen? For ancient Sumerians, the realm of the *post mortem* was located in an undefined peripheral, outside world, the realm of the monstrous, demonic and bestial, extraneous to civilization, that is, the cultural package (agriculture, urbanization, writing, religion) created and taught to men by the gods (or, in later texts, by intermediary figures, the *apkallū*, the sages) to be adequately served.[58]

Other is what is beyond civilization, the white space on the map of Fara[59] (Fig. 2) and, at the same time, without a clear disjunction between the two plans, what is before it (the cosmos of the origins, the demons, the wild primeval man): 'synchronic and diachronic other', according to the wording of Wig-

53 *Enki e la fondazione del Eengurra*; see Lara Peinado 1984, pp. 69–76.

54 According to a probable but not certain hypothesis; see Horowitz 1998, pp. 307–08: 'The origins of the word are uncertain. Akkadian *apsû* may be a loanword from Sumerian abzu, but it is also possible that abzu is borrowed from Akkadian, or that both abzu and *apsû* are borrowed from a third language. If the term is originally Sumerian, abzu may derive from the Sumerian name for the sea, ab. If so, abzu may mean 'knowing sea' (ab.zu), since the Apsu belongs to Enki, the Sumerian god of wisdom. A later interpretation of the word as 'distant sea' may be found in a hymn to Enlil: […] 'Its (Ekur's) *mes* are *mes* of the Apsu which no one can understand. Its interior is a distant sea which 'Heaven's Edge' cannot comprehend.'

55 See Bianchi 1987: 'uno schema che parte da entità immani e precosmiche, le quali del cosmo saranno peraltro le fondamenta immancabili, allorché la vittoria degli dei giovani avrà per così dire reificate quelle medesime, primordiali presenze'.

56 See Verderame, in press.

57 Consider for example the Ugaritic epic of Kirta or the biblical theme (*Gen*. 2.7) of the formation of *'ādām* from *hā'adāmā*, 'earth'; see Kvanvig 2011, p. 48 and n. 112.

58 See Wiggermann 1997, pp. 216–17.

59 At the centre of the world, identified by the cuneiform sign for kur, 'mountain', there is Nippur (seat of the Ekur, 'house mountain'), and all around the four cuneiform signs asag indicate fields (irrigated). The city centre is surrounded by lands devoted to agriculture, and these lands are watered by four rivers surrounding the composition, developing in four directions. The text and other images make it clear that in the empty space outside the four waterways l*e monde géographique* and *le monde imaginaire*, to use an image of Gabriel Germain (1954, p. 536), interact. Here (*hic sunt leones*) is located the 'other', the enemy, beasts, nomads (*āšib namê, āšib kultāri*), monsters, demons, spirits of the dead.

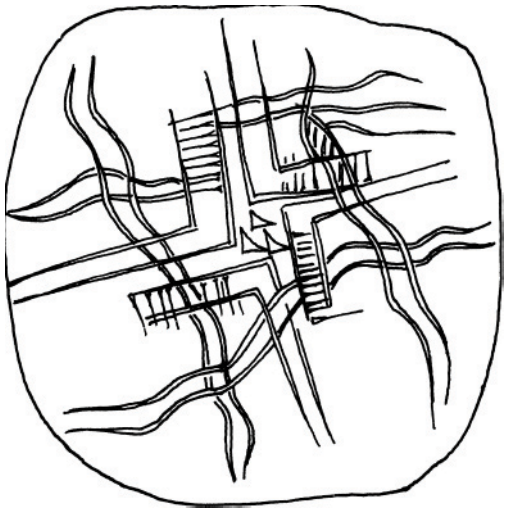

Figure 2 Schematic map of the world. Clay tablet of the middle of the third millennium, from Fara. After Wiggermann 2011, p. 673.

germann (2011, pp. 668–76). The imagery of the afterlife was interwoven with all the other plans of otherness, which are essentially interchangeable: 'the inimical fuses with the demonic, and the peripheral with death and the Underworld, thus resulting in a more or less unified image of all that is evil and conspires against civilized life'.[60]

In a fluid overlap of the mythic and natural place, the afterworld, located 'sur le même plan horizontal que celui des vivants»,[61] as in many other traditions,[62] was identified through a geographical terminology; the dead lived where demons and monsters lived, where the animals were wild, where the enemies came from: the mountains (kur) and steppes (edin, *ṣēru*). The journey of the dead was a horizontal journey from the centre to the periphery westbound, across the desert,[63] like the journey of Lamatšu and, once a year, of (the dead?[64]) Dumuzi, that brings the dead along with him,[65] or towards the northeast towards the Iranian mountains.[66] This view, as we shall see, remains rooted in the Mesopotamian mentality: in the *Death of Gilgames* the phrase 'climb the mountain' seems to be used as a euphemism for 'to die'.[67]

A beautiful representation approaching this imagery comes from a lyre of the third millennium, placed as a grave good in the grave PG 789 in Ur (Fig. 3).[68] The panel describes the preparation of a banquet and it is divided into four registers that, starting from the bottom, represent: a scorpion man (*girtablullû*) holding a dipper and a gazelle with two beakers (first register), a donkey playing the lyre and other animal figures (a fawn, a jerboa or jackal and a dancing bear) (second register), a wolf-butcher with a butcher's knife in his belt, holding pieces of animals (lamb's and wild boar's heads and a leg of mutton) and a lion with a large vessel and a lamp (third register); and finally a hairy hero (*laḫmu*) holding two alim (man-faced bisons). As the lyre in the third register is probably the same on which the panel is represented, it is easy to assume, with Wiggermann (1997), that the animal figures were preparing the feast awaiting the arrival

60 Wiggermann 1996, p. 215. See Graziani 2011, p. 781.

61 Van der Stede 2007, p. 38.

62 See particularly West 1997, pp. 153–4. About the process of superimposition of the vertical and the horizontal plane in the conception of the afterlife in the Greek world, see West 1996, p. 359 and especially Burgess 1999, pp. 184 ff.

63 See Bottéro 1980, pp. 31 ff., Hays 2011 and Graziani 2011, p. 781.

64 See Chirassi Colombo 2001, p. 204.

65 See Bottéro 1983, pp. 191ff.

66 See Chiodi 1994 and Katz 2005.

67 See Horowitz 1998, p. 361. On the diffusion of this image in other cultures see Eliade 1976, §32: 'In assiro 'morire' si esprime abitualmente con 'aggrapparsi alla montagna'. Lo stesso in egiziano, '*myny*', 'aggrapparsi', eufemismo per 'morire'. Il sole tramonta fra le montagne, e la strada del defunto verso l'altro mondo deve passare sempre di là. Yama, il primo morto della tradizione mitica indiana, ha percorso 'le alte gole dei monti' per mostrare 'la strada a molti uomini'. Nelle credenze uralo-altaiche, la strada dei morti varca i monti; Bolot, l'eroe kara-kirghiso, come Kesar, re leggendario dei Mongoli, penetra nel mondo di là, nella prova iniziatica, attraverso una grotta in cima ai monti; il viaggio all'Inferno dello sciamano si svolge superando qualche altissima montagna.'

68 See Wiggermann 1997, pp. 229–30.

of the dead, which is absent (as was observed already by Frankfort) because he is still in the other (that is, in this) world.[69] The scorpion man, liminal figure connected to Utu, as in the *Epic of Gilgameš* (Table IX), is placed in transition between one world and another, and awaits the invitee with a beverage. In the upper register, the two alim 'signify the dominion of Utu', the sun, divinity that every day illuminates the peripheral lands, and the wild animals behaving unnaturally 'signify the shift into the demonic which is typical for the periphery'.[70]

The system of images that defined otherness in the third millennium is always intertwined with the image of the *post mortem*, even when the otherworld is turned into something profoundly different. Even when the otherworld is firmly anchored in the underground reality, it continues to be called Kur, 'mountain',[71] and therefore also 'foreign land' (as opposed to kalam, 'our land').[72]

Between the late third and early second millennia[73] we see a profound cultural and religious change,[74] visible, rather than at mythological level, in the perception and imagination, in the *Weltanschauung*. The nodal period around which these changes gravitate is that of the decline of the southern cities with the Sumerian linguistic tradition, which died as a spoken language, of the destruction or abandonment of many religious centres as a result of the fall of Ur III and of the simultaneous ascension of the dynasties of pastoral and nomadic origin, the Amorites (*amurrû*) and the northern cities.

Figure 3 Fantastic representation of the preparation of a banquet in the hereafter. Panel on lyre from the tomb PG 789 in Ur, third millennium. After Wiggermann 1996, p. 230.

In this period of transition it can be observed, in particular, a shift of interest towards the figure of man, and a greater systematization — and at the same time a strong reworking, the result of new ideologies and a different sensitivity — of what Jean Bottéro (1980) termed *la mythologie de la mort*.[75] With regard to the conception of the underworld, perhaps the more interesting revolution lies in the process of verticalization of the *post mortem* localization, that takes root in the earth, the underground.

Véronique Van der Stede (2007, p. 34) suggests that this change is attributable to the Sumerians' advances in

69 About the imaginary of banquet in the hereafter see George 2003, pp. 487–8.

70 See Wiggermann 1996, p. 213.

71 The word is rendered by a graphic sign that summarizes a mountain.

72 The more thorough study on the concept of kur is that of Françoise Bruschweiler (1987, in part. pp. 97–9).

73 That is between the end of the first phase and the beginning of the next in the schematization reported by Joaquín Sanmartín (1998, pp. 24–7).

74 See Kirk 1970, p. 86; Sanmartín 1993, p. 221, 1998, pp. 26–27; and Katz 2005.

75 See Dina Katz 2005, pp. 87–9: 'Man shows concern about his own existence, he recognizes and defines his limitations, describes his fears and helplessness, and looks for explanation and guidance. Thus the netherworld came into focus.'

geographical knowledge,[76] but this hypothesis by itself has only partial validity: the Sumerians had known and been present in the mountains and steppes for a long time, but this physical knowledge did not interfere rigidly with their beliefs: monsters and demons continued, albeit with less intensity than before, to inhabit deserts and mountains even when the spirits of the dead were firmly located underground.[77]

Of course, it is normal that the expansion of trade and knowledge of neighbouring territories affected the perception of the natural world, but this does not explain why the movement of the *post mortem* took place underground and not simply in different 'geographical *non lieux*' (as happened to the monsters that were partially moved from the mountains to the sea in the second millennium[78]). A probable concomitant cause seems instead to be external, specifically linked to the increasingly influential Semitic culture in the north.[79] At the same time, changes in internal sensitivity made it possible: on the one hand familiarization with the environment, and on the other, above all, the constant process of emancipation of the land from the idea of fertility.

At the end of this important process of cosmic verticalization, and after an interesting liminal phase (in which religious conceptions of southern Mesopotamia are focused on the figures of the snake gods[80] and the spheres of death and life seem to be closer), which cannot be analyzed here, man, at the end of his life, returns to the earth, from which it also was, according to an ancient ideology, shaped, following the cyclic imaginary, familiar to us through the mediation of the Old Testament, of the link dust / earth – life – death – dust / earth.[81] The traditional mode of disposal of the dead, the burial, returned to convey, as perhaps previously in human history, a series of images, myths, rituals related to the descent, the final entry into the new underground environment.[82]

76 See also Katz 2004, p. 478.

77 See Burgess 1999, p. 191: 'Real places that had political and economic ties with the homeland would be known, but only in an inexact manner which could easily become semi-mythical'.

78 See Wiggermann 1994, p. 228.

79 See Mender 1999, p. 93.

80 Ninazu, Ningišzida, Tišpak, Inšušinak, Ištarian Ninmada. See Wiggermann 1997.

81 See *Epic of Gilgameš* VII, 187–92 (George 2003, p. 645).

82 See Bottéro 1980, p. 30.

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Aspects of the nature and purpose of specific symbols and images in the non-literate world of neolithic and bronze age Britain and Ireland, including Stonehenge

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Abstract
For Neolithic and Bronze Age Britain and Ireland this research explores aspects of the nature, range and meaning of symbols and images used for storing knowledge, transmitting information and expressing the spiritual concepts of religious non-literate agricultural communities.

Portable stone artifacts and megalithic settings and structures including recently found sites in southern England and southern Ireland were studied with regard to shapes, artwork and positioning — together with the place of megaliths in the broader archeological context of the open landscape — for evidence of planned symbolism.

It was found that skilful flintwork had produced what devotees saw as spiritually expressive forms that could serve as meaningful charms or talismans. Thus at a newly recognized Neolithic site in Wessex in southern England — namely, a megalithic shrine with a cavity used for long-term storage — the author found artifacts including nine stones chipped roughly into lozenges which is a shape anciently and enduringly associated with the female gender. Also at this site among related examples, a13-kg isosceles-triangular stone had been drilled through at the apex to articulate its feminine fertility significance. At another site 1 km distant two similar triangular portable stones bore a cup-mark hollowed at the apex. The lozenge and triangular forms are found at the scale of huge

Figure 1 Eight flints chipped roughly into lozenges at a Neolithic shrine rock-cavity on the Avebury Hills in Southern England.

Figure 2 Some of the flint objects from inside the rock cavity: skull top, figurine, and a ninth chipped lozenge-like stone. 27 primitive objects have come from this shrine.

megaliths too. The usefulness and eloquence of such images and symbolism stem from a belief that divinities would comprehend and react sympathetically. Symbols served as signs without writing**.**

Furthermore, the lozenge and pillar megaliths at Drombeg Stone Circle when seasonally paired by sunshine and shadow at the equinoctial sunrises create a breathtaking communicative fertility spectacle, the same as visibly happens at Stonehenge at midsummer sunrise via the principle of the *hieros gamos.* This same symbolic intercourse by sunlight and shadow between positioned stones has been witnessed and photographed at Drombeg for all eight festival dates of the ancient agricultural year. Avebury is explained similarly. Symbolic coupling between male and female stones is a sensational dramatic stage-set. It is the ultimate in a community's articulate expression of earth/sky union and displays high spirituality. As a consequence, the meaning of the design plan of Stonehenge is fully explained, not only for the summer-solstice union at sunrise but for a midwinter sunrise coupling between two other positioned stones. In this fashion dramatic artistry is intelligently combined with religion in a manifestly moving spectacle.

Introduction

Before the invention of writing, much knowledge was stored and safeguarded by a community's collective memory, and passed orally through the generations using mnemonic techniques like story-telling and legends, saga traditions and various poetic devices, some of which were descriptively anchored to features of local panoramas — e.g. Basso (1996); Bowker (1997), Darvill (2008) — that can be recalled and recapitulated from the ancestral landscapes.

Communication involving symbols and images was immensely helpful. For instance, non-literate people who had reason to preserve astronomical data or give instruction regarding seasonal timekeeping for the benefit of the community and descendants created symbols and memorable visual effects when designing monuments and deciding on orientations and alignments. This aided discourse with divinities who were held to be responsible for celestial and terrestrial matters, in addition to the usual concerns regarding wisdom, ethics, manners, morals, and agricultural and fertility expectations.

The research reported in this paper focuses on aspects of information storage and transmission using shaped stones and positioned stones, great and small, found by the author.

Besides the purposeful shaping of lithic outlines of all sizes and the application of careful — often ingenious — inter-megalith positioning, symbols were carved on portable objects, standing stones and immovable earthbound megaliths and rock slabs.

Using examples from the British and Irish Neolithic Age, we examine aspects of the nature, range and meaning of symbols and images. Some are familiar worldwide. Where there is an absence of migratory contact, the ubiquity of cerebral talent would have arisen from the universal nature of the human psyche.

As for the survival of artifacts bearing symbols and images, it is unfortunate that, where wood, bone, and soft or perishable materials like chalk and leather were used, little has survived to the age of archeological discovery and examination. Hence, in providing examples for discussion, this is why we are largely dealing with stone monuments and portable stone objects.

Figure 3 Front of a sarsen triangular stone weighing 13 kg pierced at the apex. From the same shrine as indicated in Figures 1, 2 and 4.

However, among rare examples of surviving fragility in this context one may cite the example of a shaped lozenge cut from fairly soft chalk found at Neolithic Windmill Hill at Avebury in England. It survived only because it lay in the trench of a causewayed enclosure, backfilled with chalk rubble, until excavated by Alexander Keiller in the 1930s (Smith 1965, 134 and Plate XXIb; Meaden 1991, 136 with illustration).

Struck Flints and Shaped Stones

The careful striking of flints produced distinctive shapes that worshippers used as talismanic amulets and personal offerings that the community comprehended for their spiritual significance, sometimes with gendered connotation. The expectation was that deities would understand the message and respond favourably. Thus the isosceles triangle and the lozenge shape were widely recognized and much valued.

To exemplify, inside and alongside a small natural shrine-like cavity at a Neolithic site discovered by the author east of Avebury in southern England, there were eight flints and one stone chipped into lozenges along with a flint saw, a scraper and a concentration of other objects, some of which are presented in Figs. 1–4. The lozenges are crudely chipped, as if hurriedly made for immediate service as symbol-bearing offerings to the divine. The appeal of the lozenge in this fashion helps to introduce the meaning of the lozenge-shaped

Fig. 4. A face carved from hard sarsen rock, weight 27 kg, found with the triangle. From the same shrine as indicated in Figures 1, 2, and 3.

Figures 5a (above) and 5b (following page) Two sides of the same 31-kg portable stone artificially shaped front and back. Figure 5a, a cup mark 70mm diameter and nearly 50 mm deep is chiseled at the apex. The reverse side, Figure 5b, has been smoothed, as if for the better comfort of bare buttocks.

megaliths discussed below. Three more lozenges came from a nearby megalith. Otherwise only three more came from the vast area that is Upper Overton Down.

The next examples, from inside the cavity, would have expressed meanings familiar to believers. These pieces could be paraphernalia that a spiritual practitioner or medical specialist might use, say for spiritual purposes including sympathetic magic (Fig. 2). One object, weighing 1.090 kg, has the meaningful form of a skull-top or cranium with grainy brain-like interior.

Directly outside the cavity that had likely sheltered it long-term was a 13-kg triangular stone made of sarsen that had been artificially drilled right through at the apex (Fig. 3). Sarsen is a silica-cemented sandstone local to the Avebury area, and almost as hard as granite.

Nearby lay an artificially rounded sarsen stone (27 kg) fashioned primitively as a human face (Fig. 4). Together, triangle and face constitute a purposeful pair presenting an inimitable duality of raw beauty, pregnant with meaning for an impressionable religious tribal society.

The eloquence of such symbolism stems from a strong belief that divinities would comprehend the community's symbolic language and react sympathetically. Symbols are signs without writing.

Cup-marks and isosceles triangles

Although the meanings of cup-marks are unclear in many situations, occasionally circumstances emerge where the intended meaning is irrefutable. Examined next are pertinent cases from Wessex. Support from prehistoric India is helpfully proposed by Das (2014a) as to the meanings of some cup-marks (see also Das 2014b and Meaden 2012).

The next figure illustrates a variation on the common theme about cup-marks (see Fig. 5). On this piece of hard sarsen the sculptor pecked a cup-mark 70 mm diameter and nearly 60 mm deep, signifying the female opening, at the exact point of the triangle's apex. The reverse side of this stone had been carved and polished in a double-dished fashion that suggests it was intended to be comfortably sat upon, as might happen in a fertility-appeal ritual. With a woman's legs astride the main triangular point and the cup-mark pressed against the soil.

What might this mean? The piece could have been a bridestone. If so, the idea may have been a wish for pregnancy from the Earth Mother, or a prayer for safe delivery or some related idea based on a hope that a spirit or soul emanating from Earth and from the Earth Mother might enter the womb of an expectant woman. It is another example of intelligent supplication and interaction with a deity in a non-literate society.

Elsewhere in the prehistoric world there are cup-marks in rock carvings of the human figure that are positioned as to clearly indicate the female sex. Numerous examples are known for Bronze Age

Figure 6 Drombeg Stone Circle. View across the recumbent stone towards the point on the hillside where the sun rises on midsummer morning.The lozenge stone and the pillar stone are among the stones on the left, compare with Figure 7.

Sweden, for instance, Coimbra (2001) who also cites anthropomorphic examples from Valcamonica (Italy) at Paspardo (rock 4), Naquane (rock 32) and Campanine. Another is at Valtellina on Rupe Magna. Gradoli (2014) reports a newly-found example from Sardinia of a rock-art carving of a figure with a cup-mark placed at the female opening.

At and near what is a second Neolithic shrine (in the form of a huge triangular megalith) three worked sarsen objects were found. One is a masked head (22 kg), its base rubbed smooth to flatten it. Another, weighing 20 kg, resembles a female bosom. Third is a pubic triangle (weight 11 kg) with a cup-mark (diameter 40 mm, depth 15 mm) hollowed into the narrow end-tip of the apex. Together the parts form a tripartite representation of a female figure such as could be realistically mounted on a wooden framework as an intelligible tribute to the feminine divine (Meaden 2014a).

Sunlit action resulting from the careful pairing of positioned stones at Drombeg

A quite different and visually appealing expression of religiosity in Neolithic and Bronze Age cultures in Britain and Ireland is expressed through theatrical drama involving sunshine and stones. It is a newly-recognized variation of the principal of the *hieros gamos,* or the earth-sky sacred marriage.

The *hieros gamos* is one of the highest levels of intellectual spirituality to have been recognized as part of ritual and worship in prehistoric times. The megalithic examples identified here for the Irish and British Neolithic Age precede by two millennia the staged theatrical dramas of sacred marriage known for the era of the classical Greeks in south-eastern Europe, and which had begun in Asia up to two millennia earlier than in Greek literature, for example the agricultural Sumerians known through cuneiform writings. Among numerous scholars Kramer (1969: 49) has

Figure 7 The union between a pillar stone and a lozenge stone: Drombeg Stone Circle, 21 September 2012, showing how at sunrise, and for a few minutes afterwards, sunlight passes through a prepared gap between the next two perimeter stones to fall upon the offset pillar stone and cast its shadow to the middle of the lozenge stone

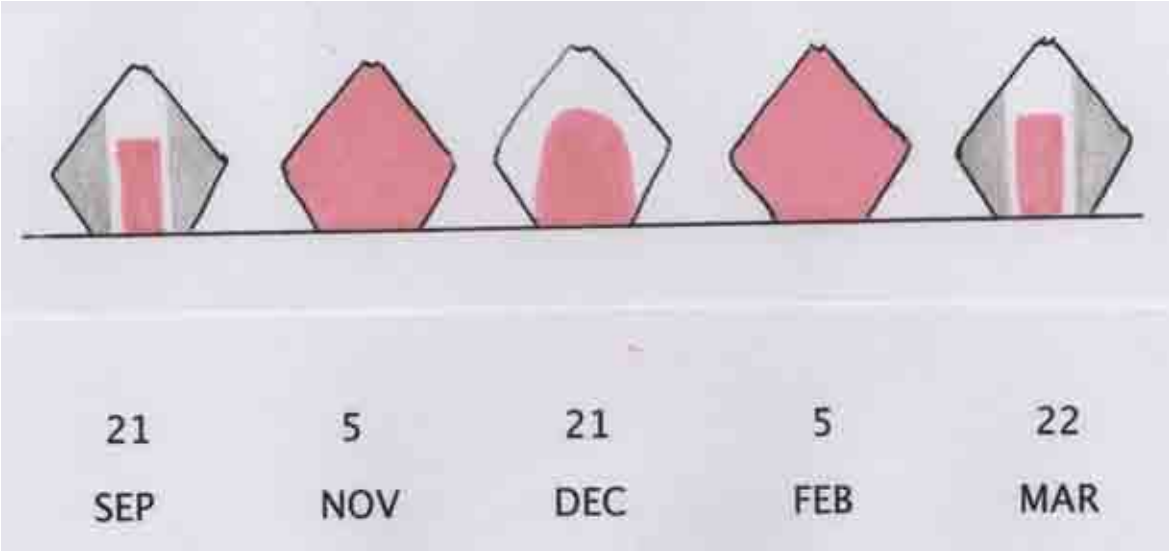

Figure 8 At sunrise on each indicated date of the year a shadow from one of several male-type standing stones falls on the lozenge stone. All these occasions have been photographed.

examined usefully the sacred marriage in ancient Sumer (see also Jacobsen 1976: 46 and Bowker 1997 for summaries and earlier references).

The principal idea in the megalithic world of the Neolithic and Bronze Ages is explained using examples deduced for the stone circles at Drombeg and Stonehenge. At Drombeg in County Cork (southern Ireland) there is a splendid example of deliberate pillar-and-lozenge megalith pairing. The chosen megaliths when seasonally united by the action of the rising sun provide communicative symbology via the unfolding of a spiritually visual drama. It is a play without words, a serene masterwork resulting from accurate planning.

The photograph in Fig. 6 shows 17 perimeter stones in a circle 9 m in diameter. The 6-tonne recumbent stone, 2.05 m long and 1.1 m high above ground level is impressive. Perimeter stones were carefully selected and positioned so that a momentous union between particular pairs would result. The axis of the monument bisects the supine stone and the gap between a pair of tall portal stones opposite. The recumbent stone is positioned to work with the rising sun at the summer solstice.

The winter six months at Drombeg stone circle

One megalith is lozenge-shaped (Fig. 7, Fig. 8). Next to it, a pillar stone was set inwards from the circle's circumference such that at the equinoctial sunrises the light of the sun passes through an arranged gap between the next two perimeter stones, allowing the sun to cast a shadow of the pillar stone on to the middle of the lozenge stone (Fig. 7 and Fig. 8). This has never previously been noticed in modern times, although it is has been happening year after year ever since the stones were raised thousands of years ago. Fig. 7 is a photograph taken on 21 September 2012.

The excavator E. Fahy (1958: 20–1) recorded that the lozenge stone 'seems to have been fashioned into its present shape in antiquity. Lozenge-shaped boulders associated with pillar stones have been recognized at Avebury and are taken to represent or to be symbolical of the male and female sexes and to be connected with a fertility cult (Keiller and Piggott 1936)'. Fahy quotes Gordon Childe (1952: 102): 'They are clearly male and female symbols.' Fahy concludes 'that at Drombeg we are dealing with another instance of symbolism which by its nature ought to be connected with a fertility cult.'

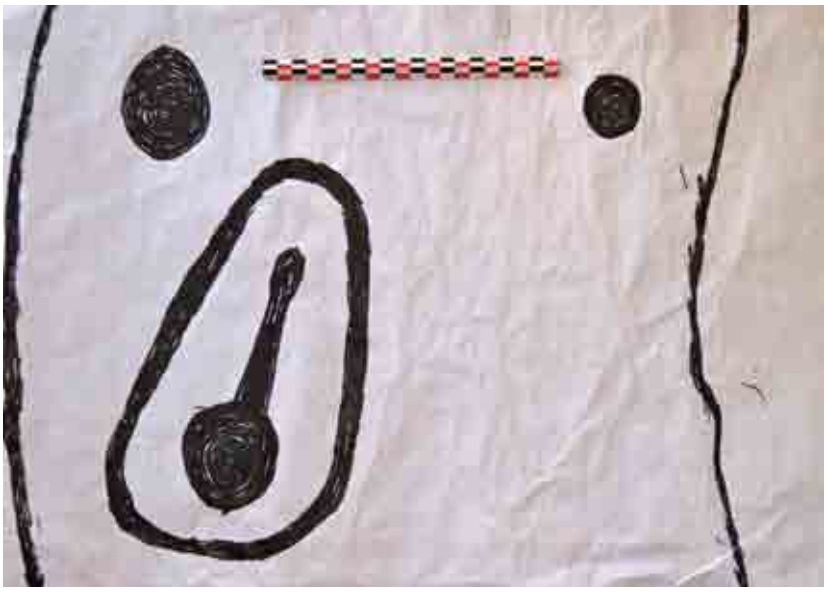

Figure 9 Symbols on the horizontal flat surface of the recumbent stone at Drombeg: a photograph of the original, full-size, ink-on-paper tracing (note the 20 cm ruler).

The lozenge stone and pillar stone are 1.2 m apart measured centre to centre. At sunrise on 21 September 2012 the shadow from the narrow pillar stone fell centrally upon the broad lozenge megalith. The offset alignment of the pillar stone helped to make this possible (and, importantly, there is a similar situation at Stonehenge with its offset Stone 11, as explained in Meaden (2014b) and mentioned later in this paper).

Figure 8 shows how at sunrise shadows are thrown from various stones on to the great lozenge stone for five of the eight ancient agricultural festival dates. Photographs for all five occasions, from equinox to equinox through the winter months, have been taken (Meaden 2014b).

Next to be considered is the run of months from equinox to equinox through the summer.

The summer six months at Drombeg stone circle

For the stones of Drombeg in the summer half of the year there is solar action involving shadow play from another range of perimeter stones carefully arranged relative to the great recumbent stone, whose spacious horizontal surface was artificially flattened (Fig. 6). On this surface are pecked cup-marks and a more complex feature that recalls the numerous yoni female carvings at various rock art sites around the world. An ink-and-paper tracing is reproduced in Fig. 9.

On the occasion of the Drombeg midsummer sunrise the shadow of a tall phallic portal stone is thrown upon the female carving 9 m away. Then during subsequent minutes, as the sun rises and moves southwards, the carving is released from the phallic shade and receives the light and energy of the midsummer sun. Moreover, the portal stone that casts this shadow bears a geological feature suggestive of male anthropomorphism. The builders of the monument, having found the stone with this appropriate feature, then deliberately positioned it to be the key sunrise stone in this arguably male/female relationship involving sexual union.

Similar awe-inspiring shadow-and-light phenomena take place with respect to this recumbent stone at the two equinoxes and at the two intermediate quarter dates. All five sunrise events, from equinox to equinox through the summer half of the year, have been photographed. They are reported in the UISPP lecture (Meaden 2014b) and will be published in subsequent papers.

Figure 10 View from the interior of the stones of Stonehenge along the major axis as it would have been in midsummer week in Late Neolithic times. The sun then rose to the left of the Heel Stone whose shadow a few minutes later penetrated to the centre of the monument—as it still does.

The axial orientation of the Drombeg recumbent stone is not exactly at right angles to the circle's axis as defined by the line of the summer-solstice sunrise to the middle of the recumbent stone. The stone is turned more southwards than this, such that it nearly aligns to the point of midwinter sunrise. This is peculiar, the more so because, unexpectedly, a similar curious arrangement is found at the altar stone at Stonehenge, as explained below.

Dramatic action at Stonehenge at the summer solstice

At Stonehenge in every midsummer week for the last 4,500 years, the sun on clear-sky mornings has cast a shadow through the middle arch to the centre of Stonehenge. The optimum situation happens on the day of the summer solstice, but there is little difference for the sunrises from three days before and up to three days after this date. The master plan depends chiefly on the placement of two principal stones, as at Drombeg:

1. the solitary megalith known as the heel stone that stands in the direction of summer-solstice sunrise beyond the ditch and bank encircling the monument, and

Figure 11 In midsummer week on a clear-sky morning the shadow of the Heel Stone penetrates the monument soon after sunrise and reaches the mica-bearing Altar Stone.

2. the focal stone, called the altar stone, set on the midsummer-sunrise axis that bisects the interior of the circular monument. This micaceous stone is reflective because of its myriads of tiny mica platelets. When freshly scraped and wetted, it sparkles in the reflected light of the rising sun.

At first, in midsummer week, the light of the rising sun shines past the heel stone (Fig. 10). Four minutes later on days when the atmosphere is clear the strong shadow of the phallic heel stone is seen entering the monument (Fig. 11). The photograph was taken with the author's back against the heel stone.

The shadow enters the medial arch of the outer sarsen ring and reaches part of the light-reflecting altar stone whether or not the latter was lying prone or standing upright. The former alternative is depicted in the reconstruction of Fig.12.

The author knows of observers (among them, Simon Banton of English Heritage) who were inside the monument on such an occasion, and saw that it is so. An earlier account was published in the *Wiltshire Times*, and a sketch was drawn by the witness, Terry Snailum. He wrote in the newspaper dated 9 August 1985 that he had witnessed this happening on 21 June some 65 years earlier. The horizon was less affected by trees then.

Unluckily, occasions of a very clear atmosphere are not common. More often, the sun rises through haze and appears red and dimmed casting a faint shadow that is nonetheless sometimes visible to the eye. This is the primary point. Even a weak shadow can be seen by eye, which would have been good enough for the attentive spectators of the Neolithic and Bronze Ages.

Figure 12 Whether the Altar Atone was recumbent (as shown here) or standing, the shadow of the external Heel Stone reaches it after sunrise on midsummer morning.

After the entry of the shadow into the monument, withdrawal occurs as is the nature of phallic detumescence. Multiple photographs demonstrate this.

Slaughter Stone

The misnamed slaughter stone lying prone inside the circular ditch has no relevance to the final-phase Stonehenge monument. There is well-argued reason to believe that the stone dates from an earlier period of use in which it served its purpose in the drama until replaced by the present heel stone (Meaden 2014b). It was retained, although in a prone position, out of respect for its former ancestral importance.

Altar Stone

This recumbent stone at the focus of the monument lies across the Stonehenge summer-solstice axis. It is exactly bisected by this axis, and its own axial orientation is not perpendicular to the summer-solstice axis but precisely matches the direction of the winter-solstice sunrise. This suggests that the altar stone has not toppled from some earlier standing position but was deliberately laid flat this way. It further suggests, perhaps through an indication of sympathetic spirituality, that there is another inbuilt pairing of stones in the monument that features and promotes the direction of the midwinter sunrise. This pair has been found (Meaden 2014b).

Action at Stonehenge at the winter-solstice sunrise

In the outer sarsen ring there is a mysterious stone, 40% shorter than the others, round-topped and phallic shaped. It is Stone 11, which stands about 50 cm out from the line of the otherwise perfectly circular lithic perimeter. This deliberate adjustment, though minor, ensures that at sunrise on the winter solstice sunlight falls upon this stone and throws a phallic shadow on to the waiting Welsh bluestone number 40. The latter is damaged but its base survives in its original setting. The self-orientation of this bluestone is anomalous in not being tangential to the circumference of the true circle of bluestones but is instead angled to that of the summer-solstice sunrise. This attribute is not fortuitous because it complements the behaviour of the setting of the Altar Stone as a matter of symmetry. The explanation is that Stone 11 is likely to be a survivor, held in continuing respect, from an earlier epoch of the Stonehenge monument, here being re-used in a useful way.

In short, shadow-play at sunrise is another manifestation of the power of visual drama that articulates the people's expression of their celestial-terrestrial spiritual beliefs.

Action at Stonehenge at the winter-solstice sunset

The point of sunset at the winter solstice is in opposition to that of midsummer sunrise, when viewed past the heel stone. If the altar stone lay flat in prehistory, then celebrants approaching Stonehenge from along the Stonehenge avenue would see the sun setting through the monument into the horizon which is Normanton down. If the altar stone stood vertical, this view would be blocked. Again, the images brought into play by preplanning the stone emplacements relative to the setting sun attest to the architectural aptitude of the leaders of what was evidently a high culture.

Conclusions

The paper considers two fundamental expedients by which prehistoric tribal cultures in Britain and Ireland treated religious concepts using meaningful symbology. One made use of familiar well-loved shapes, the other drama.

The first explores the use of images, including symbolic outlines and engravings, to transmit meanings among devotional communities. The symbols discussed are lozenge shapes, isosceles triangular shapes and cup-marks when associated with either of the former. Instinctive demonstrations of the feminine result. Examples include the hollowed cup-mark and the stone circle where they delineate feminine

sacred space. These studies help to introduce the ensuing explanations as regards interpreting the underlying design plans for the stone circles at Drombeg and Stonehenge.

Thus the second part of the study considers watchable drama in which solar movement at preselected optimal sunrises creates lithic shadows that cross the surfaces of carefully positioned standing stones and recumbent stones. Such action, possibly accompanied by spoken narrative, is another means by which nonliterate societies may have expressed their spirituality. Examples begin with the highly-sophisticated stone circles of Drombeg in Ireland and Stonehenge in England, while other monuments that promise similar rationalization include Avebury (Wiltshire), Bryn Celli Dhu (Anglesey), Maeshowe (Orkney), and Newgrange and Knowth (Ireland), among many others in Britain and Ireland. Meaden (2014b) gives many more details.

At Drombeg enchantment sublime comes from the shadow motion produced by the light of the rising sun. This follows from the deliberately irregular yet positive positioning of the circumferential stones that allow a series of shadows at sunrise – cast by pillar-like stones – to fall upon one or other of two female stones. One of the waiting stones is lozenge-shaped, the other broad and recumbent. The occasions are the eight festival dates known to us from Celtic times, here demonstrated for the much earlier Neolithic and Bronze Ages. At Stonehenge similar effects are convincingly demonstrated for midsummer sunrise when the shadow of the externally-located heel stone encounters the altar stone waiting in the middle of the monument. Again at Stonehenge, another recent discovery is that a different lithic pair functions likewise at the midwinter sunrise (Meaden 2014b).

The story of moving sun and phallic shade unfolds like the drama of a silent movie expressed in wordless mime. By linking stones that represent the sexes, interpretation is viewed through the concept and desire for fertility, an understandable core feature of life for farming communities. The vision was unmistakable and heartening for the hardworking people who toiled the land and suffered the vicissitudes of changing fortune according to the times of arrival of seasonal and unseasonal weather.

Perceptions of a long-lost spirituality have been rediscovered in the art and religion of the British and Irish Neolithic. What had been intelligently built into monuments long ago using symbolic artistry and cosmic motion is being decoded and clarified by interdisciplinary analyses in the 21st century.

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The Arroyo de las Flechas' rock art engravings: symbolic associations in Sierra el Alamo (Aborca, Sonora, Mexico)

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Abstract
We present the first results from the Arroyo de las Flechas rock art set in Sierra El Alamo, Caborca, obtained as part of the 'Ocupación Humana durante el Cuaternario en el Noroeste de Sonora' (OHCNS) project (2013). The iconographic and symbolic richness of this place evidences the existence of a ceremonial site comprised mainly of rock art engravings of human, animal, geometrical and astronomic figures. The study focuses on the archeological contextualization and formal analysis of the rupestrian figures engraved at ritual sites in Caborca, where compositions and associated patterns suggest the presence of rituals related to the solar and lunar cycle, as well as fertility.

The site has been identified with the Trincheras tradition (Trincheras, Sonora) in connection with the rock art styles in northern Mexico and southwestern United States, whose similarities can be traced down to the Gila petroglyph style, closely related to the Hohokam culture (AD 800–1400) in northwest Sonora and southwest Arizona.

Introduction
This paper shows the first results from the Arroyo de las Flechas rock art set in Sierra El Alamo (Caborca, Sonora) obtained during the 2013 season. The study is part of the 'Ocupación Humana durante el Cuaternario en el Noroeste de Sonora' (OHCNS) project led by the Instituto de Investigaciones Antropológicas of the Universidad Nacional Autónoma de México (IIA-UNAM) in collaboration with the Institut Català de Paleoecologia Humana i Evolució Social of Tarragona (IPHES). The study focuses on the archeological, anthropological and paleontological records of the early population in America.

Our participation in the project consists mainly in the analysis of the rock art representations by establishing possible connections between the Arroyo de las Flechas rock art set, and the engravings in northern Sonora, as well as their chronocultural affiliation based on the typology, and the relation between figures and compositions. The analysis has given us some insights into a solar lunar cycle related to fertility.

Site location and description
The Sonora region is located in northwestern Mexico and southwestern United States. The study area is part of the Sonoran desert physiographic province.

Figure 1 Location of Arroyo de las Flechas with respect to La Proveedora and La Calera hills and the Trincheras site, where most rock art representations in the region are concentrated. (Map by Juan F. Ruiz).

Sierra el Alamo constitutes a mountain system 40 km (24 miles) west of the city of Caborca. It has a strategic position in Sierra el Pinacate and the Great Altar Desert to the north, and El Desemboque and Puerto Lobos at the Gulf of California to the west. Sierra el Alamo has a surface area of 15 km (9 miles) in diameter, and a maximum elevation of 900 m (2,950 ft). The site known as Arroyo de las Flechas or Aguaje de las Palomas is located at its southeastern side, displaying a major set of rock art engravings.

Beside the hills of La Proveedora and La Calera, which concentrate the largest set of engravings in the region, the area also includes a place known as El Arenoso,

Figure 2 Surface covered by the OHCNS project at Sierra el Alamo. (Map by Alejandro Terrazas).

north of Caborca. The rock art engravings are ascribed to the Trincheras culture, which occupied the region between 800 and 1300 AD (Fig. 1).

The Arroyo de las Flechas rock art set is located on the dry course of a tributary of the river Asuncion. There are several areas with engravings along the stream up to Arroyo de las Flechas or Aguaje de las Palomas at coordinates 0350674E and 3393256N (WGS84), and an elevation of 443 m (1,452 ft) (Fig. 2).

The only reference to this site comes from the French researcher D. Ballereau, who recorded 300 figures from the main panel in 1987 (Ballereau, 1991).

During the first season of the OHCNS project (2013), the main panel was recorded again. It is located on the right bank of the stream heading N–S on one of the basaltic rock exposures. The site presents a frontline 32 m long and 5 m high distributed in 55 sections or panels for a total of 766 graphic units. In order to facilitate the record-keeping process the set was divided into three sectors. The largest number of representations corresponds to Sector 2. The engravings were heavily damaged by thermal oscillations, while the surface of the rock panels shows several fractures used by the creators for the arrangement of figures. However, we have confirmed that a great number of engravings were done before the fractures occurred (Fig. 3).

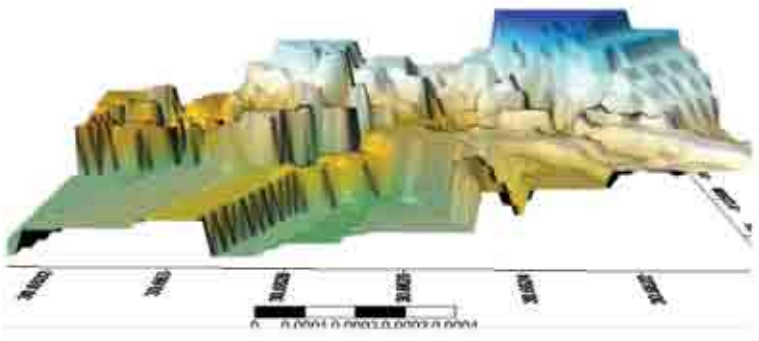
Methodology

The research process for the analysis of the rock art representations at Arroyo de las Flechas was divided in two stages: field work by surface-surveying the stream area (on-site documentation), and subsequent lab typological and associative analysis.

During the field work stage, the topography was made using a satellite positioning system (GPS), whose data were later processed by the Surfer™ software program to produce topographic maps (Fig. 4). These maps

Figure 3 Main panel in Arroyo de las Flechas (Sector 2), which shows the site's most characteristic features, including astronomical motifs on top of the rock panel. (Photo by: Beatriz Menéndez).

Figure 4 Topographic survey of Arroyo de las Flechas using the SurferTM mapping program to generate topographic maps. (Map by Alejandro Terrazas).



were later georeferenced in a Geographic Information System (GIS) using the Qgis™ application to project the results on Google Earth™ 3D images.

In addition, the engravings or petroglyphs were recorded in an inventory of panels, which included all the required data for their analysis: GPS coordinates of each rock or panel, dimensions, orientation, number of figures, typology, engraving techniques and patina. It was completed with a digital photographic register, which provides for the creation of digital tracings (Fig. 5).

The lab analysis ordered and classified the records in a database according to their motifs, features and associated patterns.

Figure 5 Recording the rock art representations in the Arroyo de las Flechas. (Photo by Beatriz Menéndez).

The tracings from Arroyo de las Flechas are being processed from the digital photographs and the imaging software using the DStretch plug-in to Image-J (Harman, 2005) and Adobe Photoshop CS 5.5. The process consists of contrasting the images in Adobe Photoshop to clearly differentiate the figures from the surface of the rock, and then go through different filters with the DStretch plug-in to get a better contrast. Sometimes the filters provide not only an enhanced sharpness, but they also reveal figures that were almost lost due to erosion. Subsequently the images are further processed using Adobe Photoshop to produce a final digital tracing.

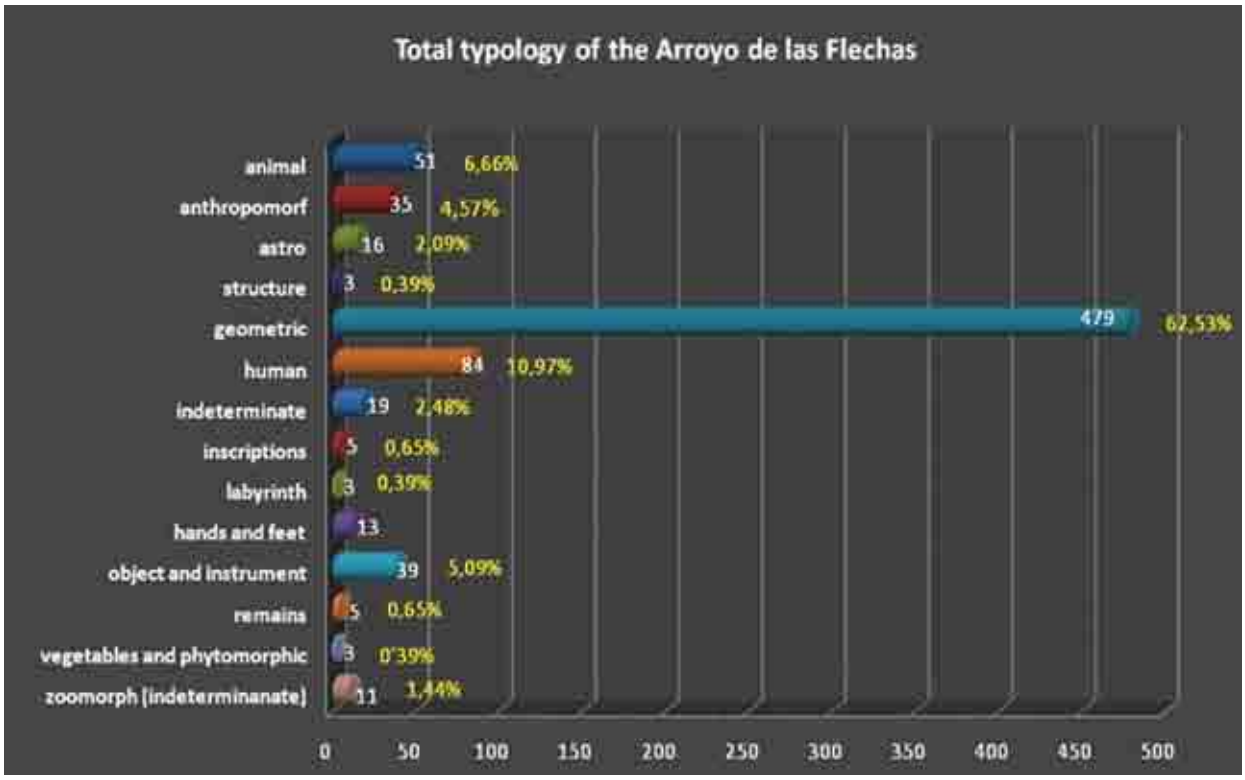
This imaging process is effective for 90 per cent of the rock art engravings, even though some of them must be finished in the traditional manual way. Only a few tracings have to be worked out manually, but always supported by digital photography, and projecting the figures for the final digital tracing.

The lab stage also includes entering the data from the inventory records into an Excel database to produce typological and thematic charts, and display data graphics.

Results

Together with the rock art remains at the nearby hills of La Proveedora and La Calera, the main panel forms a thematic and stylistic unit. However, up to date no other diagnostic archaeological and paleontological remains have been found which could provide more information about the culture that produced them, other than being characterized as part of the Trincheras tradition.

Figure 6. Sector 2 engravings representing several female figures among a great number of geometric elements. (Photo by Beatriz Menéndez).



Graphic 1 Typology chart specifying the total number (white colour) and percentage (yellow colour) for each category. (Graphic by Beatriz Menéndez.)

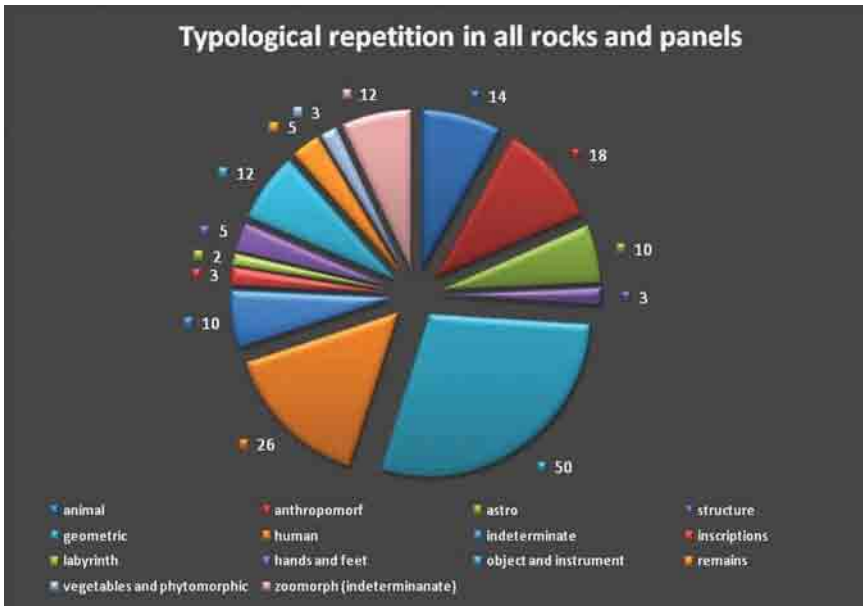
As for the typology, it has been divided into the following categories: animal, zoomorph (indeterminate), human, anthropomorph, hands and feet, object and instrument, vegetal or phytomorph, structure, geometric, labyrinth, astronomical, indeterminate, 'historical' inscriptions and remains (Graphic 1), for a total of 766 graphic units. This classification is based on D. Ballereau's proposal for La Proveedora and La Calera, though with some modifications (Ballereau, 1987, 1988).

The most common motifs are the geometric elements, distributed in 50 out of 55 panels, while the less common motifs are the vegetal or phytomorphic and structure-type figures, as well as labyrinths identified in only two panels.

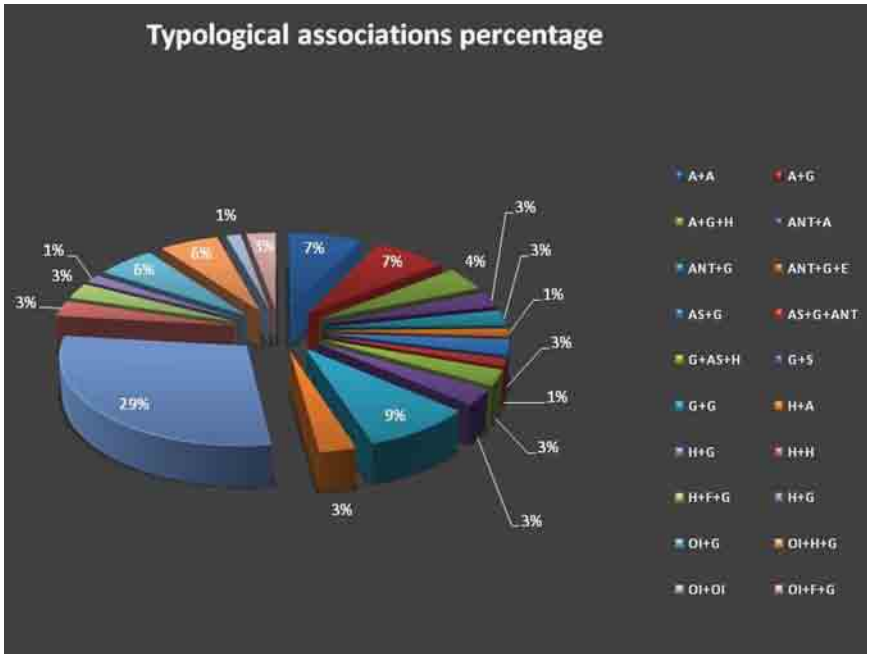
One outstanding category is human figures; all its variants are similar to those from La Proveedora and La Calera, as well as from other sites in northern Mexico and southwestern United States. Most remarkable are the male figures with their sexual attributes schematically represented. In addition, three female figures, two of them pregnant, have been recorded (Fig. 6). Another outstanding motif is a turtle-like figure, which apparently represents a woman giving birth, as she holds a rectangle between the legs that could be a blanket or another object for the delivery of the child.

A composition made up of human figures 11, 25, 20, 26 and 31 on panel 32 displays an unusual arrangement, characterized by the lack of limbs and short extremities. In fact, one of the figures seems to have a fishtail, suggesting a sea creature, or it may just be kneeling down. These representations are not unique in their singularity. On the same panel a two-leg body comes out from a human figure, resembling a centaur. It represents a combination or superposition of two converging categories: human and animal, a concept that combines both mythological and supernatural beliefs.

Graphic 2 Typological quantification of the rock art set according to the number of rocks and panels. (Graphic by Beatriz Menéndez).



Graphic 3 Typological associations percentage in the Arroyo de las Flechas set. (Graphic by Beatriz Menéndez).



The typological analysis provides a correlation among categories that could be reproduced on every panel to identify possible connections, graphic patterns and symbolic associations (Graphic 2).

The preliminary analysis has revealed the following combinations:

The categories that display the largest number of combinations are two: human and geometric (H+G), for a total of 20 symbolic associations.

- Other associated categories, though in a lower proportion, are: geometric and geometric (G+G); animal and animal (A+A); animal and geometric (A+G); object-instrument and geometric (OI+G); object-instrument, human and geometric (OI+H+G); and animal, geometric and human (A+G+H).
- Less frequent typological associations are: anthropomorph and animal (ANT+A); anthropomorph and geometric (ANT+G); astronomical and geometric (AS+G); geometric, astronomical

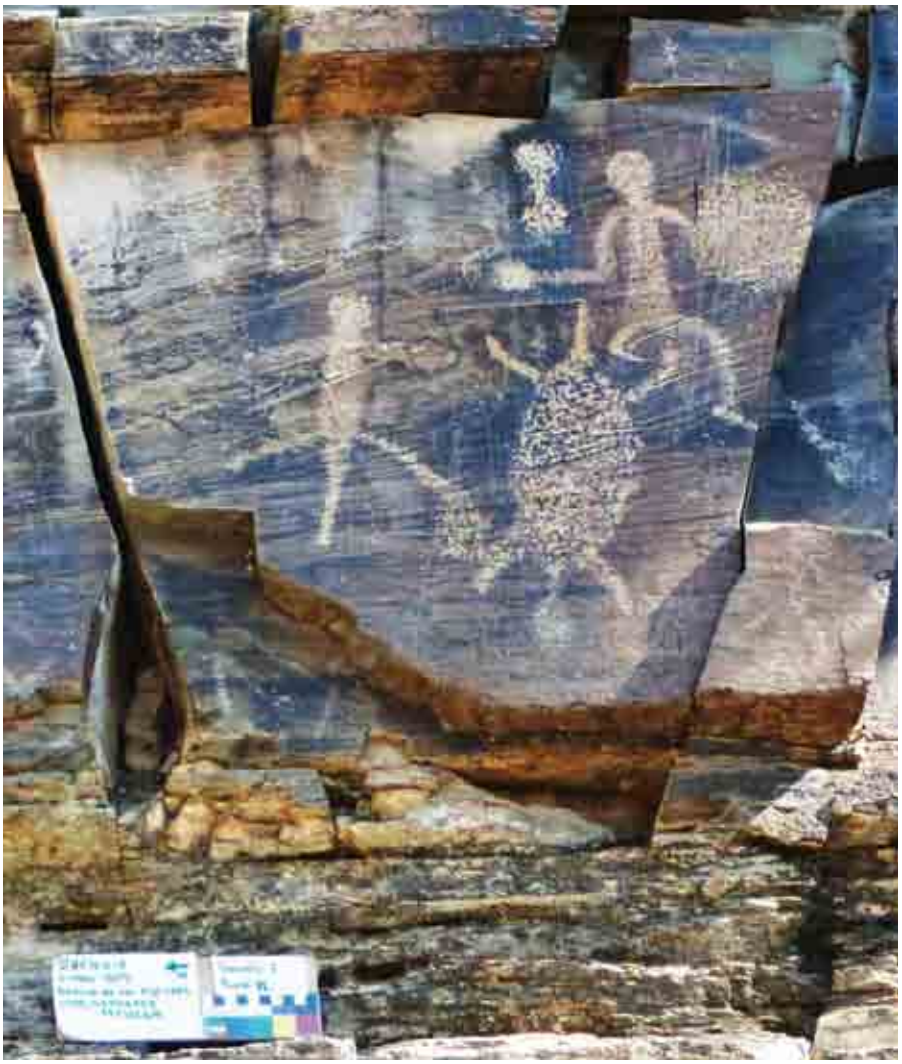


Figure 7 A scene where a human figure is playing a drum next to a lizard man and a turtle with its head facing downwards. (Photo by Beatriz Menéndez).

and human (G+AS+H); geometric and structure (G+S); human and animal (H+A); human and human (H+H); human, foot and geometric (H+F+G); object-instrument, foot and geometric (OI+F+G); anthropomorph, geometric and structure (ANT+G+S); astronomic, geometric and anthropomorph (AS+G+ANT); hand and geometric (H+G); and objects and/or instruments together (OI+OI).

- Two combinations stand out for their symbolic content: astronomical motifs, and projectile-like objects and instruments.
- Finally, there is a clear symbolic association on panel 26 that combines astronomical, geometric and anthropomorph motifs (AS+G+ANT). It is the only one in the whole set of Arroyo de las Flechas that suggests a composition related to rain petition ceremonies, and thus fertility, in a broader sense. This interpretation is based on the presence of certain symbols such as the so-called Mesoamerican cross which, according to some researchers, can be found in multiple sites in the American continent in connection with the planet Venus (Sanchez P., D., 2006). In addition, the presence of other astronomical motifs like an empty circle apparently representing the new or full moon, a solar form or soliforme, an anthropomorph and several geometric designs seem to make reference to rain symbols (Graphic 3).

The set contains other two singular scenic combinations. The first one is located on panel 32, and it is represented by an association of animal, geometric and

Figure 8 Engraving of an archer, in which we can observe the pecking technique and the degree of patina. (Photo by Beatriz Menéndez).

human (A+G+H) motifs. The scene is composed of an angled trace or rabbit stick, a halteriform or two circles joined by a line, a lizard man, an inverted turtle and a human figure playing a drum (Fig. 7). The whole scene seems to indicate a ritual dance related to these animals, since the turtle was a sacred being among pre-Hispanic societies in ancient Mexico (Rentería Valencia, 2001). The second combination consists of three deer classified as (A+A). These motifs are located on panel 49 in Sector 3 (related to the main panel). The three animals form a circle near the remains of an apparently similar figure. At the bottom of the scene another deer lies in a horizontal position. The deer was a highly venerated creature due to its connection with the sun, renovation and fertility, and its presence is still alive among many indigenous groups in Sonora and Mexico. Its image can be seen in rites and ceremonial festivities of the Yaqui and Mayo groups where the deer dance is still performed (Moctezuma and Lopez, 2005; Castro, 2011).

With respect to the technique, the engravings were made by pecking, probably through indirect percussion using a hammerstone, incision and abrasion (or scratching for historical inscriptions). Emphasis should be made, however, on a single figure painted in red with a high degree of deterioration due to environmental erosion. It consists of a straight horizontal trace with short vertical traces,[1] which is a common motif in northwest Mexico and southwest United States (Grant, 1967). The grooves of some engravings show varying degrees of patina (Fig. 8), particularly among figures at the bottom of the panels, suggesting different moments for the execution of the engravings set.

Discussion

Like in all rock art, the main problematic is determined by the chronocultural affiliation, the symbolic content and the state of conservation. Prehistory in northwest Sonora is closely related to that of the southwest of the United States. Consequently, all research on the area should seek a global perspective (Cordell, 1997).

At the beginning of the 20th century, Carl Lumholtz (Lumholtz, 1990) lived with some members of the Tohono O´odham Nation (known as the Pápago), and rescued some of their traditions and legends, which he captured in some papers and ethnographic reports of great interest for research studies in the region. This group is considered to be a descendant of the former Hohokam people, who are also attributed with the authorship of the rock art representations in the Caborca region (Lumholtz and Dracopoli, 1912).

Up to date, we do not have direct dates for the Arroyo de las Flechas engravings. Nevertheless, the analogy among the elements represented in various sites in Sonora (La Proveedora) and Arizona (Sears Point) (Billo, Mark and Weaver, 2013) let us identify Arroyo de las Flechas within the Gila petroglyph style (Schaafsma, 1980), which is characteristic of both the Hohokam influence area (northern Sonora and southwestern Arizona) and the Trincheras tradition.

Consequently, we consider that the Arroyo de las Flechas rock art set presents a former substrate, common to the Sonora and Arizona regions, which originated

1 It is what Breil defined as pectiform or comb-shaped, but in this case we would rather describe it as geometric traces.

in the archaic period, and took hold in the early agricultural period, a rock art closely related to the Hohokam groups and the Trincheras tradition up to the 15th century.

Conclusions

Arroyo de las Flechas is located in a privileged landscape at the bed of a dry stream that fills with water during the rainstorm season.

The most remarkable content on its 55 panels consists of geometric, human and animal motifs. The rock art set stands out, however, for its scenic representations of objects and instruments, such as the human figure playing a drum, or the group of projectile-like figures, whose concentration makes of it an exceptional site in Sonora (Fig. 9).

The shape of the projectile tips corresponds to the spearheads generally used in the region during the late archaic and early agricultural periods, up to the time of the Trincheras culture.

As we have noted, the techniques for the execution of the engravings were pecking, abrasion, scratching and incision. The grooves left by these techniques show varying degrees of patina, which indicates a temporal process intensified by the accretion of motifs that, on some panels, produced a horror vacui, leaving no empty spaces among figures.

Following the analogy of the art styles, the representations resemble the Gila petroglyph style (Schaafsma, 1980), which is characteristic of the Hohokam area

Figure 9 Symbolic associations with projectile-like representations .(Photo by Beatriz Menéndez).

in northern Sonora and southwestern Arizona, and was developed by the Trincheras tradition (McGuire and Villalpando, 1993; Sanchez and Carpenter, 2003; Villalpando, 1997). Even if the origin of some figures may be dated back to a former substrate at the archaic period, most engravings were done during the early agricultural and Trincheras periods (Braniff, 1992).

Regarding the interpretation of the rock art set, we have already mentioned the existence of a symbolic association of human figures, animals and geometric motifs, which presumably represent a clear cosmogonical vision related to the sun and fertility rites. These contents are still present among some indigenous groups in Sonora and Mexico, such as the Yaqui and Mayo, who still perform the deer dance.

However, it is too early for archeological research in Northern Mexico to establish with greater accuracy both the cultural ascription of the rock art engravings and their symbolic content. Its iconography has been inherited to a great extent by current indigenous groups, such as the Papago, Opata, Pima, Seris, Mayo, Guarijio and Apache, who can provide a better understanding of the rock art representations within their archeological context.

Acknowledgements
We want to acknowledge the team that took part in the 2013 OHCNS project (IIA-UNAM): Lucía Ivonne Lopez, Sergio Sotelo and Jose Ramon Sotelo. We also want to thank Dr Manuel Garibaldi, Javier Gómez, Dr Mario Zaragoza, Dr Javier Reynoso, Jesús Millán and Dr Juan Francisco Ruiz for their collaboration, as well as CONACyT and PAPITT for their economic support to the project.

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Review of Guangxi cliff drawing research

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Abstract
Guangxi is located on the southwest border of China and has abundant cliff drawings. On the miles-long cliffs along the Zuojiang River, there are over 80 sites discontinuously distributed there, forming a unique art corridor of cliff drawings.

From the 1950s, survey teams of ethnology, anthropology, history, archeology and art have been to the Zuojiang River for field investigations of cliff drawing. Serial studies on aspects like clansmanship, dating, themes and techniques have been carried out and have resulted in rich achievements.

Since 2012, based on the former researches, we have done in-depth and painstaking research work from aspects of ethnology, archeology, chronology, ontology and digitization. New fruit has been harvested. The following are the results the study of cliff drawings in Guangxi.

As a global cultural phenomenon, cliff drawing is the general name of decorative paintings, line carvings and cameos on grottos, rocky cliffs and standing rocks. Chinese cliff drawing is an essential part of world cliff drawing. According to techniques, distribution scope and content themes, Chinese cliff drawing may be divided into three systems: the north, southwest and southeast (Fig. 1). The cliff drawings of the north system are works of the hunters and nomads in the northern prairie region, dominated by chip carving, with large scope and great quantities, mainly animals and in a realistic style. The cliff drawings of

Figure 1 Distribution map of the Chinese cliff drawings.

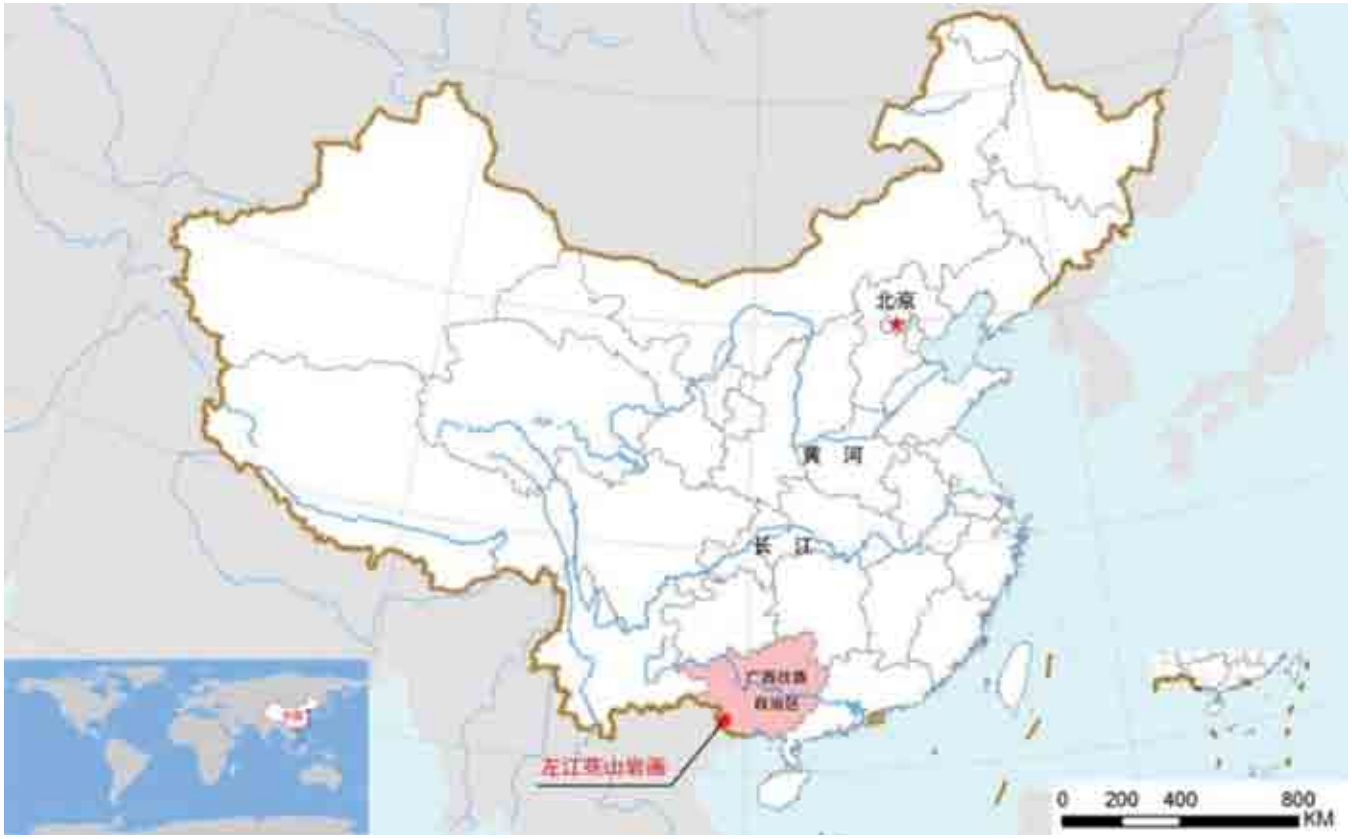
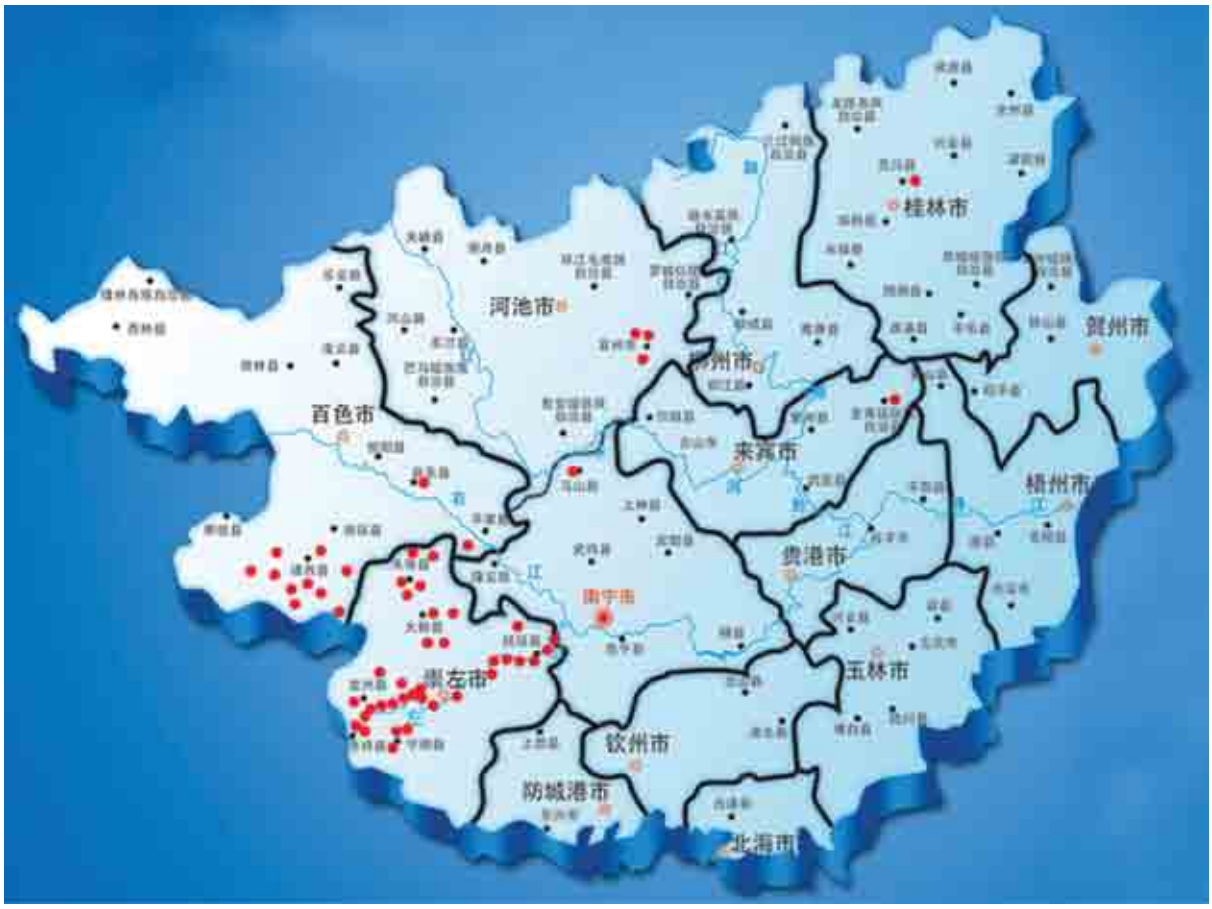


Figure 2 Geographic location of Guangxi.

Figure 3 Distribution map of Guangxi cliff drawing.



the southwest system are mainly drawn with red pigment and the content covers human figures, animals and symbols. The cliff drawings in the southeast sea areas mainly show abstract pictures, most of which are carved. Guangxi cliff drawing is a typical representative of the southwest system.

Introduction to Guangxi cliff drawing

Guangxi is located in the southwest border of China (Fig. 2). Its cliff drawings are generally painted with red colour. At present, there are 113 sites of cliff drawings, mainly distributed in the Zuojiang River of the southern Guangxi, Youjiang River of the western Guangxi and a few in the central and northern areas (Fig. 3). The content, expressive forms and the ideas of the cliff drawing are closely connected with social development. The time sequence is formed into through three periods: Rentoushan cliff drawing, Zuojiang Huashan cliff drawing and western, central and northern Guangxi cliff drawing.

As the study focus of Guangxi cliff drawing is mainly in the Zuojiang Huashan, this paper will describe the research situation and relevant results.

The study of Zuojiang Huashan cliff drawing

General review of Zuojiang Huashan cliff drawing

Zuojiang River, also named Lishui River, is a river going through the southwest Guangxi. On the cliffs along the Zuojiang River and its branch Mingjiang River and Ping'er River and its nearby cliffs, there are lots of reddish-brown cliff drawings. The cliff drawings

Table 1 Distribution of Guangxi cliff drawing.

Geographic Scope	Administrative Area	Number of Sites
85 sites in the southern Guangxi (Zuojiang Huashan cliff drawing)	Pingxiang City	3
	Longzhou County	21
	Ningming County	5
	Chongzuo City (Jiangzhou Area)	29
	Fusui County	27
26 sites in the southern and western Guangxi (including Zuojiang River and Youjiang River and their nearby areas)	Daxin County	6
	Tiandeng County	3
	Jingxi County	13
	Tiandong County	1
	Mashan County	1
	Yizhou City	2
1 site in the central Guangxi	Jinxiu Yao Autonomous County	1
1 site in the Northern Guangxi	Lingchuan County	1

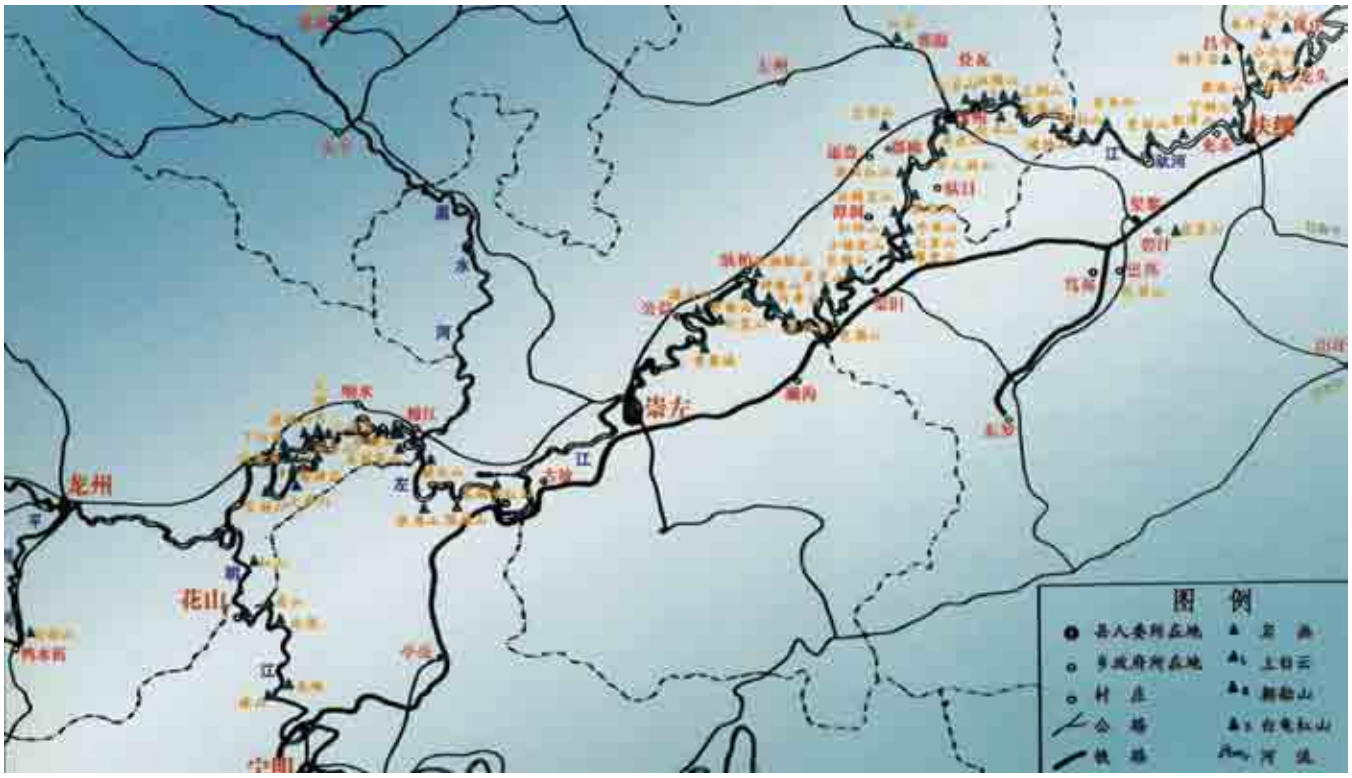


Figure 4 Distribution map of Zuojiang Huashan cliff drawing.

are dominated by human figures supplemented with animals, utensils and symbols. The themes are wishing for favourable weather, a bumper harvest, prosperous offspring and flourishing nationality, having primitive religious meanings and some group sacrifice scenes.

These cliff drawing sites are generally about 50–100 m above the river and mostly at the bends in the river.

Over 80 sites have been found in the Zuojiang River, discontinuously distributed in the seven counties under the jurisdiction of Chongzuo city. They are miles long, forming a unique art corridor of cliff drawings, which is called Zuojiang Huashan cliff drawing or Zuojiang cliff drawing (Fig. 4). Among them, Ningming Huashan cliff drawing is the most typical.

Figure 5 Panorama of Ningming Huashan cliff drawing.

With a length of 172 m, a height of 50 m and a total area of over 8,000 square m, Ningming Huashan cliff drawing so far has the largest scope and the richest content and is the best preserved. There are more than 1,800 recognizable figures, mainly human figures. The largest figure is 3 m while the smallest is about 0.3 m. The whole cliff drawing is of great momentum and rich content (Figs. 5 and 6).

Study and results on Zuojiang Huashan cliff drawing

The historical records for Zuojiang Huashan cliff drawing are rare and late, making this historical art treasure unknown in the outside world for a long time. The systematic investigations started in the 1950s. The summary of its large-scale investigation study is below.

In August 1956, the Guangxi Ethnic Minority Social History Survey Group and teachers and students from Minzu University of China did scientific investigations into Huashan cliff drawing. They found seven sites in the downstream of Mingjiang River and some relics like a bronze axe, net sinker, bone needle, stiff pottery sherds with coarse rope pattern.

In July 1962, the Guangxi Ethnic Affairs Commission organized a multidisciplinary experts survey group to do a comprehensive survey of Zuojiang Huashan cliff drawing and 43 new sites was found. After this survey, the book *Huashan cliff drawing Corpus* was edited and published.

In 1985, the Government of Guangxi Zhuang Autonomous Region invited seven experts and scholars within and outside Guangxi to do another survey of Zuojiang Huashan cliff drawing. After three months' work, the group wrote *Survey Report of Zuojiang Huashan cliff drawing* with the material. In November, more than 80 professors and experts inspected more than ten sites and held an academic conference (Fig. 7).

Figure 6 Part of Huashan cliff drawing.

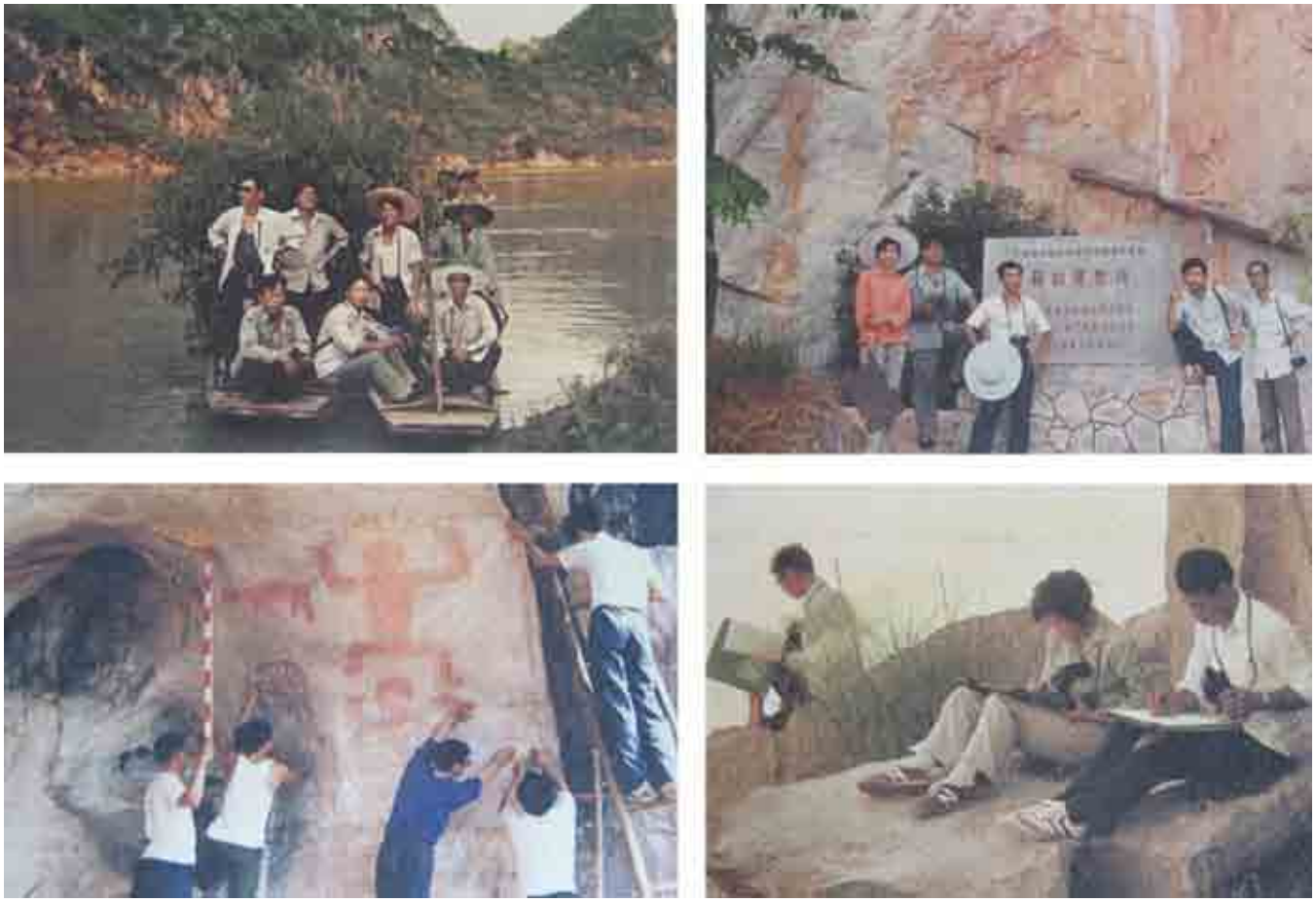


Figure 7 Group photos of former research.

In October 1986, the Bureau of Geology and Mineral Exploration of Guangxi and Institute of Geological Sciences formed a survey team and inspected 42 sites from aspects of stratum, rocks, paleontology, depositional faces, geological structure, topographic feature and geologic history.

In January 1991, the Guangxi Culture Department organized an expert team for cultural relic study, an integrated survey, remote sensing mapping and hydrogeology to do a detailed survey of the geology of Huashan cliff drawing. Suggestions for Zuojiang Huashan cliff drawing Geological Environment Disease and Prevention Countermeasures were proposed. About 1:500 and 1:50 engineering geological map, 1:10000 Huashan geology map, 1:500 geologic section map of Huashan standing cliff rock conditions were mapped and the rock mineral component was appraised.

In November 2004, the Institute of Aerial Remote Sensing Surveying and Mapping of Guangxi Surveying and Mapping Bureau did close-range photogrammetry of Huashan cliff drawing and completed 50 joint images of 1:20DOM.

In January 2005, the Institute of Aerial Remote Sensing Surveying and Mapping of Guangxi Surveying and Mapping Bureau spent more than one month mapping the geology map of Ningming Huashan conservation drawing topographical map of 1:500 and 1:2000 over 2 sq m.

From 2007 to 2011, in the third national cultural relic general survey, the counties did another comprehensive survey of Zuojiang Huashan cliff drawing, recording the sites and finding out the current preservation situation and archeological site distribution in the surrounding areas.

In December 2009, the Guangxi Cultural Relic Bureau organized anexploration team to survey Zuojiang cultural relics and one Han site was discovered in the crossing points of Mingjiang, Lijiang and Zuojiang Rivers.

In September 2010, the Guangxi Cultural Relic Bureau applied to be put on the world heritage list, and the Guangxi Institute of Archaeology, Nanning Museum and four counties (Ningming, Longzhou, Jiangzhou and Fusui) surveyed Zuojiang cliff drawing for about three months. And one ancient tomb of the late Neolithic period was found, along with a batch of stoneware with important research value. Ningming Huashan Beiqiu site was confirmed as one of the exploration sites.

For years our survey and research work on Zuojiang Huashan cliff drawing never stopped. The obtained research results have been the richest in domestic cliff drawing study and have caught attention in world cliff drawing academic circles. Through systematic survey research, issues like clansmanship, date, tools and materials, content and artistic style have become clear, uncovering the mysterious veil of Zuojiang Huashan cliff drawing (Fig. 8).

New research results of Zuojiang Huashan cliff drawing

Based on the former studies, since 201, we have carried out in-depth research work on aspects of ethnology, archeology, chronology, ontology and digitization and a new series of research results have been obtained.

Village investigation in cliff drawing areas

Since 2012, the Guangxi Museum of Nationalities has been setting up survey groups on cliff drawing and inspected the whole cliff drawing group along the Zuojiang River area. Trying to survey the villagers in the typical villages, the group searched for human information connected with cliff drawing. Through the survey, relevant information has been found and survey reports of the villages around the cliff drawing have been written. These is the relevant information.

a. In the Guanyin Temple of Laijiangtun, the paper-cutting pattern of the Xianpo, the upside down 八 head ornament in the 'people-riding-horse' is similar to those of cliff drawing.

b. The survey area still has the tradition of water burial, with the site in water bends, which is correspondent to the chosen sites of cliff drawing.

Figure 8 Parts of former research results.

Research Aspect	Conclusion
Clansmanship	Zuojiang Huashan cliff drawing was painted by Luoyue clans or clans living along the Zuojiang River.
Dating	From the Zhou to Han dynasty, i.e. From the Late Bronze Age to the Early Iron Age, from 5th century BC to 2nd century AD.
Tools and Material	The paintbrush is soft brush. The colour is iron-based natural mineral pigments dominated by Fe2O3, which is hematite, fresh plant sap as adhesive, and then the two are mixed together in appropriate proportions.
Content	Dominated by human figures with animals, utensils and symbols. True recording of group sacrifice scene in expression of themes as praying for favourable weather, bumper harvests, prosperous offspring and flourishing nationality.
Forms of Approach to the Cliff	Climbing from down to up, direct staging, suspending from up to down, ship-floating at high-water level

Table 2 Research and conclusions on Zuojiang Huashan cliff drawing.

c. At the Dragon-boat Festival, the local people have a dragon boat race. Its images are similar to the feather-decorated people rowing a boat in cliff drawing.

d. The tableland in the river bends is rushed and the river course is changed. The residents on the table land therefore move to higher place to live. The residents have the tradition of moving.

e. From the circulating folk songs, the local residents and the river have a relationship of mutual dependence and mutual struggle.

f. From the area and output of rice-planting by the local people, the number of population in that area could be analysed.

The emergence of culture in one place has an inevitable connection with the dominating economic activity and social model. The acquisition of the information explains that the production of Zuojiang cliff drawing culture must have an interdependent relationship with the culture of the local residents.

Digital recording and application in cliff drawing

With the constant update of research technology, means and forms in cliff drawing, digital technology has been widely applied in fields like recording, monitoring, protecting, studying and exploiting. In order to boost the development of the Guangxi cliff drawing undertaking, in October 2012 the Guangxi Museum of Nationalities cooperated with the Science and Technology Research Institute of Hubei Haida Cultural Heritage Protection. Based on the GIS system, they adopted technologies like the 3D laser scanner, UAV aerial, right sight image and 360-degree tour shooting to collect accurate digital information of the 25 sites of cliff drawing in the Zuojiang River area. They obtained their original data, making up, correcting and completing the former recordings of cliff drawing ontology.

The implementation of this project obtained a batch of digital achievements of Zuojiang cliff drawing like 3D GIS display system, digital rubbings of 25 sites, aerial photos, right sight images, 360-degree tour shooting image and 3D animation display of three sites.

Figures 9-1, 9-2, 9-3 and 9-4 Four drawing methods.

These digital achievements provided accurate image data and digital support for interdisciplinary research, cliff drawing protection and restoration, establishment of a cliff drawing basic database, application for the list of world heritage and museum exhibitions; and help for the establishment of a digital system of cliff drawing (recording, monitoring, protecting and exploiting).

Drawing skills of cliff drawing

Before 2012, due to the inability to closely observe the cliff drawing, the former people put up four kinds of approaching forms (shown in Table 2). To the knee-tuck figures drawn with the method of projection monochrome flat daubing empty inside skeleton display, the descriptions were generally very simple and brief in lack of convincing evidence. The studies on drawing skills and procedures in cliff drawing were rarely involved.

The government has invested a lot in setting up scaffolds in front of the cliff drawing sites for rescue conservation, which provides condition for researchers to approach it at close range. From the perspective of art and adopting the method of plastic arts in systematic classification of the drawing figures, the researchers have systematically summarized four drawing methods (Fig. 9): freehand brushwork (Fig. 9-1), outline filling (Fig. 9-2), repeated drawing (Fig. 9-3) and spot positioning (Fig. 9-4), which are breakthroughs in drawing methods.

Argument of U dating chronology

In 2013, invited by the local government, scholars from the University of Western Australia and the University of Wollongong collected 12 pieces of calcium carbonate samples directly connected with the cliff drawings in Ningming Huashan cliff drawing (some are covered on the surface while some are overlaid

Figure 10 Archaeological excavation and some unearthed relics.

by the cliff drawing). Calcium carbonate will have a small amount of soluble U (238U and 234U) when it precipitates in the saturated solution, and will decay into 230Th, which in nature is insoluble in water nor will precipitate with calcium carbonate. This will result in an imbalance in the decay chain. The systematic isotopes will not decay at the same rate. Then 238U and 234U decay into 230Th till the long-term radioactive equilibrium is formed. As the decay rate is already known, the age of carbonate layer maybe calculated through exact isotope measurement.

According to observations, the cliff drawing of one sample was between two layers of calcites, thus providing an excellent sample for dating. From analysis, this site of cliff drawing was drawn between 2,070 years ago (dating pluses 2σ) and 940 years ago (dating deducts 2σ) (c. 55 BC to 1075 AD). Among the collected samples, two samples had the highest purity. From the dating, its connected cliff drawings were drawn between 1,920 years ago (dating pluses 2σ) and 940 years ago (dating deducts 2σ) (c. 95–1075 AD).

Archaeological excavation around cliff drawing sites

From August to December 2013, the Guangxi Institute of Cultural Relics Protection and Archeology, associated with units like the Institute of Archeology of China Academy of Social Science (CASS), and made up an archeological survey and trial excavation group of more than 20 people. The group had done archeological survey and trial excavation in Longzhou, Ningming, Jiangzhou and Fusui along Zuojiang River for over four months (Fig. 10).

Through this archeological survey, trial excavation and research, the ancient culture distribution around Zuojiang River, especially the cliff drawings, had become clearer. The types of cliff drawings and archeological culture had been enriched. The local cultural context had been roughly outlined. Physical evidence had been provided for studying the origin of Zuojiang cliff drawing. The systematic study on cliff drawing was more deep and detailed. The connections between cliff drawing and the sites to a certain extent were established. In addition, the abundant unearthed cultural relics would be beneficial to setting the order of prehistoric culture development in Zuojiang River areas.

Other thematic studies

Centring on Zuojiang Huashan cliff drawing, the researchers have done a series of projects such as cultural value study, disease analysis and protective study. The development of these projects and the results will make the protection, exploitation and use of cliff drawing more scientific and reasonable; the arguments about the cliff drawing will be clearer as the true face of it emerges.

Study of cliff drawing in Southern, Western, Central and Northern Guangxi

Note that except Zuojiang Huashan cliff drawing in the southern Guangxi, according to the age and feature of cliff drawing, the cliff drawing of Zuojiang River, Youjiang River and its nearby areas coming after that of Zuojaing is named as Southern Guangxi and Western Guangxi type.

At present, a total of 28 sites of cliff drawing have been found in southern, western, central and northern Guangxi.

The survey work on cliff drawings includes taking pictures, photographing, word descriptions, relevant anthropological and ethnological survey and sur-

Table 3 Relevant research projects.

Serial No.	Project Name
1	Artistic Value Study on Ethnic Culture in Guangxi Chongzuo Huashan Cliff Drawing
2	Study of Social Environment of Formation of Guangxi Huashan Cliff Drawing Culture
3	Study of Cultural Connotation and Uniqueness in Guangxi Zuojiang Cliff Drawing
4	Study of Cultural Connotation and Uniqueness in Guangxi Huashan Cliff Drawing's Music and Dance
5	Thermal Infrared Imaging Detection and Its Mechanism Study on Water Penetration Disease in Cliff Drawing
6	Study of Pigment Shedding and Depigmentation Protective Restoration Technology in Guangxi Huashan Cliff Drawing
7	Study of Grouting Material and Craft in Limestone Relics
8	Study of Environment Monitoring Method and Index in Huashan Cliff Drawing
9	Application Research of Natural Hard Lime in Consolidation Repair of Rock Relics and Sites
10	Natural Environment Situation in Guangxi Zuojiang Cliff Drawing Area

Figure 11 Copying and measuring the data of cliff drawing.

rounding site survey. We have classified and set up archives for the collected original data, in the convenience of providing data and material support for subsequent studies (Fig. 11).

Southern Guangxi cliff drawing

The introductions to southern and western Guangxi cliff drawing in the academic world are very rare, nor do they describe their dates. Its scale and figures are small. The contents have human figures, heads, hand shapes, footprints, people riding horse, warriors, sedans, weapons, bronze drums, animals, unicorns, star cloud, flying apsaras, sun patterns, dots, rings and geometrical symbols. The most frequent patterns are the human figure, horses and people riding horses.

The age of cliff drawings in western and central Guangxi is different. Seen from the drawing skills and traces, the lower limit of its age is before the Qing Dynasty. The figure of Gupo cliff drawing in Yizhou is dominated by horse patterns, of which there are more than 200 in various poses. The large one reaches over 30 cm while the small about 7 cm. There are also a few human figures and knights. The inscription '5th of Ming Dynasty (1577AD)' has been left on the cliff. Thus it may be thought that this site has the great possibility of being drawn in the Ming Dynasty. The cliff drawings in Houshan, Bajiaoshan, Nayangshan of Tiandeng, Banongshan of Jingxi have similar horse or horse-riding figures; their age should be very close (Figs. 12-1 and 2).

Central Guangxi cliff drawing

There is only one site discovered in the central Guangxi, Maoheshan cliff drawing in Jinxiu Yao Autonomous Region. With a width of 8.7 m and a height of 2.2 m, this site is located on the cliff of the middle mountains. It was drawn in red pigment. The drawing content is dominated by human figures, with accessories of horse, dragon, star, bird, beast, cloud, round ring and word-like symbols. According to the analysis of figure decoration and the plate-shape head, this cliff drawing might be drawn by the local Yao ethnic group. The content is relevant to religion and totems. Its date is probably the Ming Dynasty, according to the academic world (Fig. 12-3).

Northern Guangxi cliff drawing

Mao'ershan cliff drawing is one site of cliff drawing which has been found in Lingchuan, the northern Guangxi. Its major patterns are birds and flowers, expressing the wishes for a peaceful world (Fig. 12-4).

Figures 12-1 Nayangshan cliff drawing; 12-2 Yizhou Horse Rock cliff drawing; 12-3 Maoheshan cliff drawing; 12-4 Maoershan cliff drawing.

Conclusion

As the essential component and typical representative of the southwest system, Guangxi cliff drawing is the precious cultural heritage left by the ancestors living on the land, witnessing their outstanding wisdom and brilliant creativity. Through the unremitting efforts of researchers, the survey record, archive establishment according to types and systematic study have been completed and the issues like distribution area, original date, period development, content theme, styles and features have become no more obscure.

However, the comparative studies of cliff drawing between Guangxi and the southwest system, Guangxi and other continents are not yet sufficient. The study of Guangxi cliff drawing needs more depth and width.

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The rock art of Saracahi River Basin: the El Arco and Blanca de la Pulsera caves, Sonora (Mexico)

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Abstract
This work is part of the project Biodiversidad y Sociedades Cazadoras recolectoras del Cuaternario de México led by the Institut Català de Paleoecologia Humana i Evolució Social (Tarragona, Spain) and the Instituto Nacional de Antropología e Historia de México.

The project began in 2007 with the study of shelters with rock paintings and Blanca Arch Strap, at around the Saracachi River (Cucurpe, Sonora).

Documentation of the murals was performed and support microsamples and pigments were extracted for study by the Department of Chemistry at the UNED (Universidad Nacional de Educación a Distancia).

The thematic content of picture sets and a variety of types of possible aspects related to puberty rites for girls (Cueva Blanca de la Pulsera) and linked to fertility aspects (Cueva de El Arco) were noted.

Introduction

Cucurpe is located at the beginning of the San Miguel River basin, in central Sonora (Mexico). In this region ravines and cliffs with shelters and caves abound, that were used since prehistoric times by the inhabitants to execute panels of petroglyphs (or engravings) and painted murals. Among these sets are the El Arco and Blanca de la Pulsera caves.

In the late 1920s, the North American researchers Carl Sauer and Donald Brand toured different parts of upstate and first reported some archeological sites in Cucurpe (Sauer and Brand 1932: 83).

Figure 1 Cucurpe area indicating the caves El Arco and Blanca de la Pulsera.

Later, between 1973 and 1974, Professor Armando Quijada Hernández recorded and compiled new sets with engravings and paintings in the Cupurpe area, which were presented at the XLI Congreso Internacional Americanista, held in Ciudad de Mexico (1974) and later in the Primer Simposio de Historia de la Universidad de Sonora (1975).

This author noted that one of the largest concentrations of rock art in Sonora – paintings and engravings – is in this territory, containing mainly geometric elements, human figures (including printing of hands in positive) and animals, among which the deer stands out.

Additionally, he said that the most used colour was red and the figures were in an acceptable condition. He stressed the importance of these representations and the need for a detailed record being made. Quijada recorded the following sites: La Higueritas, Las Caleritas, Los Potreritos, San Javier, El Potrero Tápielo, El Carrizo, La Pulsera, Las Manos Pintas, El Jumbo, El Match, El Cajón de los Borregos, El Cajón del Baisimaco, El Caracol, La Tijera, El Pintor, La Cueva Pintada, El Tápiro and El Potrerito y Los Nogales (Quijada 1976: 443–4).

In the late 1970s the archeologist Beatriz Braniff began a research project in the basin of the San Miguel River and highlighted the Cururpe region due to the richness of its representations. In her project, Braniff studied 32 archeological sites that were included in her doctoral thesis, including the caves of El Arco and Blanca de la Pulsera, which makes a first description of the painted mural and points to the absence of archeological material on its surface (Braniff 1992: 799).

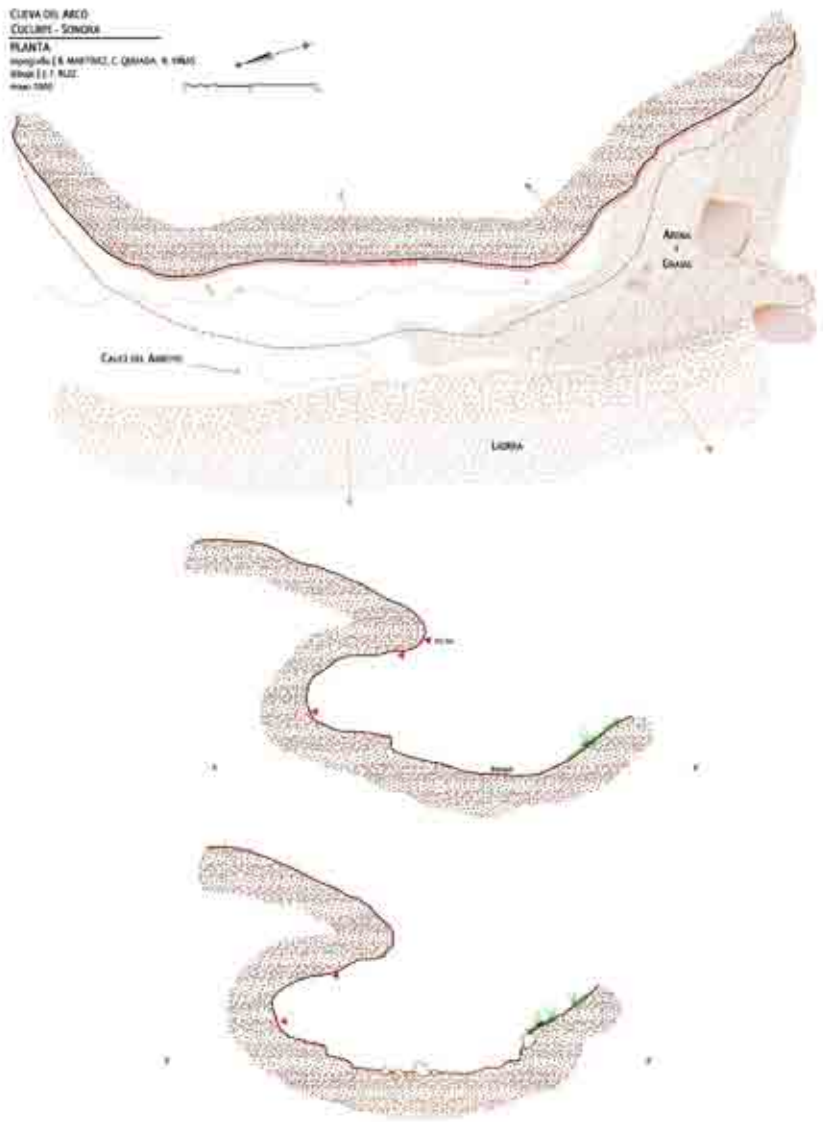


Figure 2 Topographic sketches of El Arco cave, Cucurpe, with distribution of the paintings and indication of the cupmarks.

Soon after, in 1990 and 1993, in the area known as Los pies del viejo, César Quijada discovered the first rock art engravings in the region of Cucurpe (López Quijada 1996). There are various geometric representations in two ridges, one horizontal and one vertical, composing lines that form right angles. Also in 1993, were located the first engravings with various geometric shapes in Blanca de la Pulsera cave, and became the only known site in Cucurpe area with paintings and engravings (Quijada 1996). This author performed the record of paintings and engravings in Cueva de la Pulsera, in collaboration with the researchers Jane Kolber, Daniel Frey and some students of Arte Rupestre Indígena Americano of the Cochise College. The results of this work were presented at the congress of the American Rock Art Research Association. In them the main features of the cavity and the rock art were described (Frey, Quijada and Kolber 2005).

In 2007, members of the project Biodiversidad y Sociedades cazadoras recolectoras del Cuaternario de México, directed by Ramon Viñas, visited some of the rock art areas of Sonora, led by César Quijada and, a year later, the rock art of Cucurpe was included with the study of the El Arco and Blanca de la Pulsera caves in the overall project Investigaciones prehistóricas

Figure 3 View of El Arco cave, Cucurpe. (Photograph: Beatriz Menéndez).

en el Noroeste de México: Baja California y Sonora (2008–2009), directed by Ramon Viñas and involving Cesar Quijada, Albert Rubio, Juan F. Ruiz and Beatriz Menéndez.

The study area is located in the western foothills of the Sierra Madre Occidental. It is a semi-arid region with a terrain marked by abundant cliffs, through which flows the Saracachi River, which together with the Dolores, creates the San Miguel River (Fig. 1).

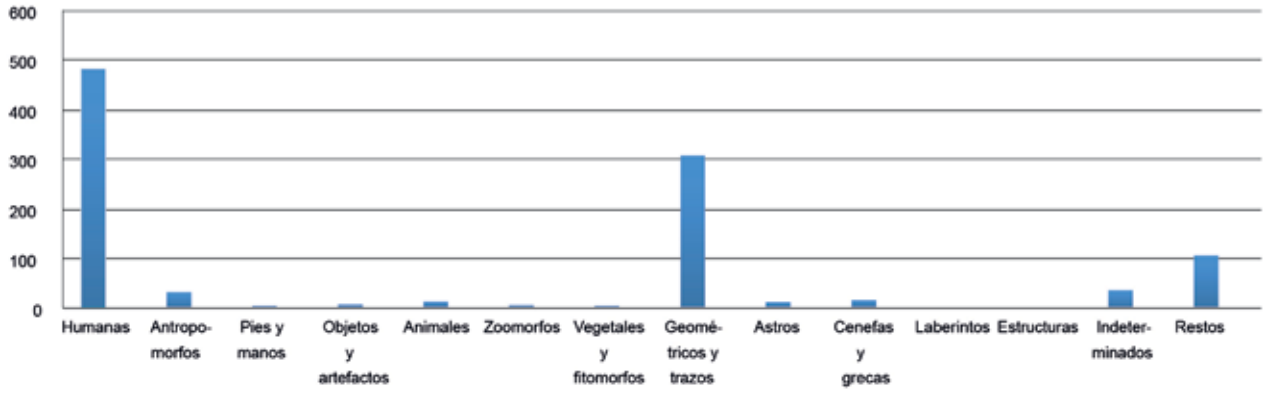
The El Arco cave is in volcanic tuffs about 8 km from Cucurpe town, on the left bank of the glen Guaysimaco or Baysimaco. It is registered by the INAH with the code SON: G: 10:31 and the UTM coordinates are Zone 12R 530300 E, 3361125 N, at an altitude of 928 m asl (H12B71 INEGI topographic map, scale 1.50.000).

The Blanca de la Pulsera cave, also formed in volcanic sedimentary materials, is located 1.7 km from the La Pulsera ranch, on the Saracachi River entrance. It is registered by the INAH with the code SON: G 10:10 and their UTM coordinates are Zone 12 R 529100 E, 3356550 N at an altitude of 880 m asl (H12B71 INEGI topographic map, scale 1.50.000).

The work in progress consists of the record of both caves to establish a database for further investigation. The objective is focused on the identification, comparison and interpretation of the theme of the two sets that show ceremonial aspects related to specific practices or female fertility ritual. Moreover, an approach to the chrono-cultural framework of these panels was made by the researchers.

Materials and methods

The documentation process involved the survey of the two cavities, the photographic record for individual figures and panels, material inventories and the collection of support pigment microsamples for non-destructive analysis by physicochemical techniques, which maintains the original state of these samples for further studies and possible tThermoluminescence microstratigraphy AMS 14C, among others.



Total	482	32	1	7	13	6	3	307	12	16	0	0	36	106
Porcentaje	47,21	3,13	0,10	0,69	1,27	0,59	0,29	30,07	1,18	1,57	0,00	0,00	3,53	10,38

Figure 4 Graphic and table of the represented motifs in El Arco cave.

With the collection of this material has begun the development of a database that contains the characteristics of the rock art of this region and the digital reproduction of the murals.

The analysis of microsamples was performed in the chemistry laboratory of the UNED (Universidad Nacional de Educación a Distancia) by micro-Raman spectroscopy using a Jobin Yvon Raman confocal microscope Labram IR HR 800, exciting at 632 nm. Registration conditions for most of the samples were 8 seconds integration time and 36 averaged spectra.

Results

The painted murals of El Arco and Blanca de la Pulsera are being studied. Here we present the first preliminary results pending confirmation, in order to advance the analysis of the documentation and study of analytical samples.

The painted mural of El Arco

The El Arco cave is a dug shelter or a hollow in the same bed of the stream, about 17 m long, 1.65 m deep and 1.40 m tall (Fig. 2). It contains a heavily painted panel with over 1,000 representations and some cupmarks in the floor of the assemblage (Fig. 3).

The average size of the pictographs is around 20 cm and they occupy the ceiling and wall to the floor. They are mostly painted in shades of red, some dark brown and a few figures are white or very light cream that, judging by the overlappings, would be the oldest stages of the mural. All this rock art iconography is in a schematic abstract style.

The first record of the El Arco cave stands at 1.021 painted motifs. Overall, the condition of the paintings is correct and most of the figures are identifiable, although 10.38% of the motifs are damaged and cannot be recognized, and 36 motifs have a design that we have not identified (Fig. 4).

The thematic represented in the wall is formed by a predominant core of human representations and animals in fewer numbers, that are linked with a wide iconography of geometrical and abstract elements (Fig. 5).

The human representations are in frontal position, with arms raised or angled down and generally with open legs. Usually they show neither feet nor hands and sometimes only this part of the body is indicated by the design of their fingers. We have also identified the figure of a small hand. Most bodies have an

Figure 5 Digital reproduction of the northern wall of El Arco. (Drawing: Albert Rubio).

elongated shape made from a trait, though some have anatomical variations with a triangular or rounded head and trunk. Several human figures have head ornaments with straight appendages (like a plume), bent into a hook or with a double-curved downward appendix. Representation of facial features or internal decorations on the bodies is rare, but sometimes a few points on the faces indicate the eyes, nose or mouth, and in other cases, similar points surround part of the images. All these designs give to the figures a unique element that characterizes them.

All these figures appear isolated or combined in repeating groups of pairs, trios or groups of figures holding hands, making 17 individuals. These associations can be horizontal or vertical alignments.

The human figures are usually represented without sexual attributes, so 79.46% of the cases have been called indeterminate human figures. However, ten cases show the male member (representing 2% of the human representations). In other cases, the design of

Figure 6 Figure in birthing position on a textile item. (Photograph: Albert Rubio).

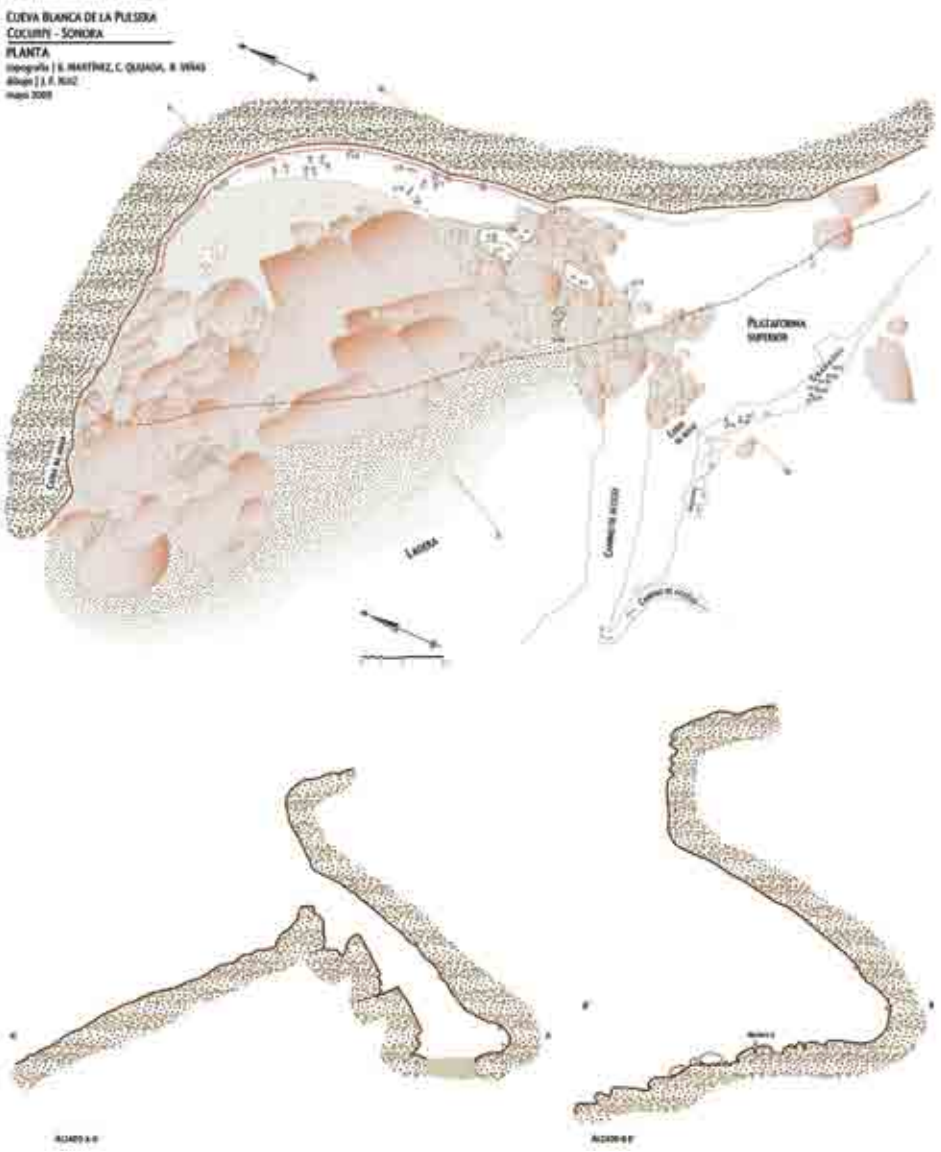


Figure 7 Topographic sketches of Blanca de la Pulsera cave, Cucurpe, with distribution of the paintings, engravings and cupmarks.

rounded belly and leg position (wide open or squatting) suggests the representation of pregnant women (36 figures representing 7.47% of all human figures) and 12 of them seem to represent childbirth.

This idea is reinforced by an appendix that protrudes from between the legs of the figures and the case of one of which appears to be associated with a textile element with a decoration of triangular motifs and fringes (Fig. 6). Only occasionally the design of the breasts is seen.

We classified other figures as young children in relation to the size of the accompanying figures (53 figures that represent 11% of all humans). These child figures appear in clusters and are often joined by a series of characters' hands.

These human characters are associated with geometric shapes and abstract elements that form the other main group of representations on the frieze. They consist of clusters of points, sun-shaped elements, undulating and angular shapes, crosses, concentric crosses, circles, sets of rhomboid-shaped elements, zigzags,

Figure 8 View of the Blanca de la Pulsera cave, Cucurpe, and the outer wall with engravings.(Photograph: Albert Rubio).

the 'X' or cross of San Andrés, axles with appendages in trait or triangles and squares formats. Among the fauna the representations of dogs, lizards and possible batrachians stand out. All these are related to human representations or schematic and abstract elements. In terms of plant elements, we can distinguish circular shapes with lobed profiles that are interpreted as possible cacti, viewed as a section.

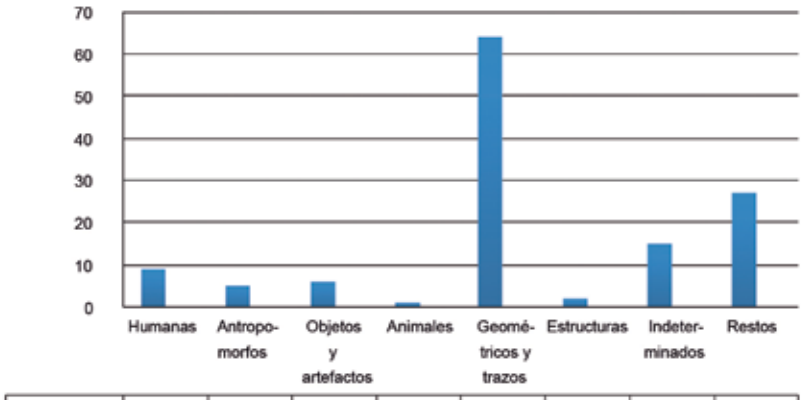
From the formal point of view, the mural may be framed within a canon, style or schematic abstract tradition. The compositions comprise association patterns that reveal an ideographic and symbolic language.

The techniques used to perform this mural were the simple trace, flat ink and the point or fingering, and the range of colours were red, brown or coffee and white or light cream. The mural stretches across the frieze and offers a uniform appearance with a small number of overlays documenting the process of production. We have found that white and light cream colours with which some anthropomorphic and fingering figures were painted correspond to an earliest phase of the paintings on the mural, perhaps the initial phases.

The pigment samples analyzed by Raman spectrometry found evidence of α-quartz (SiO_2), hematite (α-Fe_2O_3), amorphous carbon, calcium sulfate anhydrite type ($CaSO_4$) and gypsum ($CaSO_4 \cdot 2H_2O$). The rocky support is characterized by calcium oxalate presence, as whewellite ($CaC_2O_4.H_2O$) and weddellita [CaC_2O_4 (2 + x) H_2O, x 0.5], which indicates the possibility of dating these surfaces by radiocarbon (AMS 14C).

Pinturas y grabados de la cueva Blanca de la Pulsera

The cave is known by the names of Blanca de la Pulsera cave or Los Figurines. The cavity is about 40 m long, 12 m deep and about 12 m in height (Fig. 7). Much of the entrance is occupied by huge blocks that have generated an inner space where the largest amount of rock art is concentrated (Fig. 8).



Total	9	5	6	1	64	2	15	27
Porcentaje	6,98	3,88	4,65	0,78	49,61	1,55	11,63	20,93

Figure 9 Graphic and table of the motifs represented in Blanca de la Pulsera cave.

The set consists of rock paintings and engravings. The provisional registration of the painted cave Blanca de la Pulsera sums 129 motifs on two panels inside the cavity (Fig. 9). Different kinds of white, black and red pigments were used to make them. The figures occupy the inner wall of the cavity, from the darkest area to practically outside. The stylistic pattern is schematic and abstract with figures of just 20 cm and others exceeding 50 cm in height. The theme focuses on symbolic compositions related to human figures, structures and possible textile elements.

The conservation status of the pigments is acceptable; however, lately there have been acts of vandalism in graffiti and modern paintings over the archeological figures, sometimes in white plaster, which can be confused with the original drawings.

This is due to uncontrolled visits to the site and lack of public education about how we all have to respect this cultural heritage. Another problem that threatens the conservation of the mural is the path of water inside the cave during seasonal rains.

To this painted mural we must add five engravings recorded on the same wall, corresponding to four human figures and a trace, and nine circular perforations, ranging between 2 cm in diameter and 1 cm depth to 13 cm in diameter and 9.5 cm deep.

Also, inside the cave are seven blocks with different cupmarks that might have been used for processing materials used in ritual events held there, and traces; one of these blocks is a stone of 155 x 73 cm having a plurality of engraved grooves that form possibly an anthropomorphic figure. Most of the engravings are located on the outside of the cavity, in the base of a wall of about 4m, showing curvilinear shapes, concentric circles, a group of three vertical rectangles, each around a vertical line, a spiral and a double cross (Fig. 10).

Panel I, or main panel, a strip extending from the wall about 15 m long and between 50 cm and 2 m in height. In this panel are three main figures painted in white colour and classified as females. These three figures hold, in their heads, headdress-shaped antennae with spiral endings or *espiritrompas de mariposas*. Between the legs, and at the height of the genitals, is a small semirectangular red motif (perhaps indicating blood). These characters are associated with four rectangular shapes, possibly fringed textiles or blankets and with internal drawings based on intersecting lines divided into four sections, and other drawings, possibly ceremonial tents as *tipis*, in which it is possible to find, inside or adjacent to them, some small anthropomorphic figures (Fig. 11). This panel is complete with serpents, dots, concentric circles, radiating circles and crosses.

Figure 10 On the left, engravings on the exterior zone of the cavity; right, human figure engraved on Panel I, along with the paintings. (Photograph: Albert Rubio).

Panel II corresponds to the outermost images of the cavity. They were painted in the vault, about 5 m in height, apparently made with a tool like a paintbrush strapped to a stick, forming curved traces and intertwined and tangled lines.

Also, they are surrounded by small patches of red paint that probably correspond to splashes made from the base of the cavity.

In the pigment samples analyzed by Raman spectroscopy we found evidence of hematite, gypsum and anhydrite, quartz, anatase (TiO2) and amorphous carbon. There is also the presence of calcium oxalate as whewellite and weddellita which indicates the possibility of dating these surfaces by radiocarbon (AMS 14C). It is expected to get more details about the composition of the samples with complementary analyses and additional studies of the obtained spectra.

Discussion

Among the rock art sets of northern Mexico and southwestern United States, an ancient and rich cultural substrate that has survived over time is perceived. This substrate was generated in the desert regions of Sonora, Chihuahua, Arizona, New Mexico, Texas and Utah, and in the areas of the rivers Grande, Colorado, Gila and Pecos, with various rock art styles: Great Basin abstract, Chihuahua polychrome, Glen Canyon linear, Calendaria painted, Gila petroglyph, Mogollon, Jornada, Anasazi rock art, and the latest Apache rock art and historic Navajo rock art, among others (Schaafsma 1986).

The art was made by groups of hunter-fisher-gatherers (some of them reaching the historical period), and by the first farming semi-nomadic and sedentary groups that continued their rock art practice until about a century ago, including the Papago, the Ute, the Pima and the Seri (Messmacher 1981).

At the moment, for lack of a more precise chronocultural distinction, the rock art of the Cucurpe shelters can be framed within the styles of Great Basin abstract and Gila petroglyph, developed between the first millennium BC and about the 14th century AD; although we can not exclude that the rock art tradition had been able to reach more recent times with past practices by known indigenous groups.

The rock art of Cucurpe shows formal similarities with other sets of rock art engravings, or petroglyphs, of Sonora, like La Proveedora (Ballereau 1988), located near the Trinceras site. This archeological site shows

Figure 11 Panel I, human figures with headdress and textiles, with a structure like a hut. (Photograph: Albert Rubio).

several phases with a first pre-ceramic period and other fully agricultural stages, known as Cultura Trincheras (Schaafsma 1986, Villalpando and McGuire 2009).

From the record of the painted motifs present in El Arco and Blanca de la Pulsera caves, we hypothesized that both caves are linked to female rites.

In the case of El Arco, the iconography gives us a topic related to pregnant women and with the same childbirth. Bulging bellies, open legs or squatting positions and dashing out of the wombs indicate that. Moreover, some additional items like a blanket under one of these open-legged figures, or elements that we have identified as possible cacti viewed in sectional cut, are consistent with this interpretation. Also games are made with these cactus slices that Griffen documented in connection with puberty ceremonies of Seri girls (quoted in Apocada, 2001).

The use of cactus pieces is complemented by the use of tilled stones, namely, jagged circles that sometimes have a central hole, both among the Seri and the Pima (Apocada 2001). It is remarkable that among the Seri, in the Sonoran coast of the Gulf of California, the ritual use of a cactus-type column has been documented, like the *cardones* or *sahuaros*, that are thrown sliced into the fire with the intention of appeasing the wind and rain.

Moreover, we have the information that Apache women usually wore belts when giving birth, through which they invoked an easy and less painful childbirth.

On one of these belts, reported by E.S. Curtis, may be seen figures that show similarity to the representations of El Arco cave, some with triangular heads with eyes and mouth indicated, with similar leg positions and also linked by zigzag lines identified as lightning (Curtis 1993). These elements are not sufficient to establish a chronocultural link between the painted mural and Apache groups, whose incursions into northern Sonora datefrom the 16th century, but they show an intercultural environment in the area.

Regarding the Blanca de la Pulsera cave, the mural consists of a main subject in which the central figures of Panel I, with special headgear and legs open, the red lines in the pubic area and the presentation interspersed with textile items (blankets or rugs) show the relationship with cabin-style structures commonly used among Pima and other southwest groups during puberty rites for girls (Weaver 1992).

Also in the ethnographic context, Apache girls celebrate their puberty ritual for four days, when they are dressed in white robes, lying on a carpet and wearing a white head-dress with a stone and a shell in their hair. All these elements link the composition with female puberty rituals in relation to the menarche.

On the other hand, we also suggest the physical characteristics of the site chosen for the implementation of this mural. We considered why the closed site was chosen to develop the mural, next to a few concrete engravings, and its relationship with the outside petroglyphs: the themes in the frieze linking it with the physical characteristics of the cave, specifically the upwelling and water circulation at the feet of the mural to its outlet in the outer petroglyphs.

This relation has been established in Red Woman Tank, an enclosed space containing rock art engravings in Arizona, attributed to the Hohokam culture, which refers to thematic elements of sexuality and fertility, and possibly linked to puberty rituals. According to researchers who have documented the site, in this enclosed space water circulation occurs intermittently depending on the time of year, that is, there was a landscape element in the choice of location (Will et al. 2009).

Conclusion

The archaeological and ethnographic context places the rock art of El Arco and Blanca de la Pulsera caves in a recent prehistoric environment, linked to female rituals.

This hypothesis should be deepened and diagnostic elements of the chronocultural framework in which to place the murals should be identified, enhancing also its meaning. To this end it is necessary first to establish the links between the figures in each frieze and its relations with other rock art sites in the southwest United States and northwest Mexico, and also improve the physico-chemical analysis of pigments and surfaces to help us answer the history questions.

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3D reconstructions of sculptured emotions in the Copper Age Eastern Balkans

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Philosophical background

Recent anthropological studies compare Husserlian transcendental phenomenology with the Native Americans' reflections on their relationship between humans and nature. Native Americans see the human body as entirely governed or as a direct continuation of cosmic spirits. This omnipresent top-down hierarchy is radically opposed to the bottom-up structure found in the Husserlian phenomenology. The latter sees the human body as a fertile ground upon which the diversity of personality, cultures and worldviews is erected (Lerner 2013).

These two reflective perspectives created two antagonistic conceptualizations of the human body. The first one views the body as a direct emanation of the spiritual world which puts it at equal with the entire living and non-living worlds. The Husserlian understanding of nature and the human body in particular leaves space for the personal development of each creature and phenomenon based on the rich canopy of nature.

This opposition seems quite different from the point of view of the modern understanding of mass consumerism. The spiritual world holds in firm limits mass consumption and thus controls the possibilities for social conflict. The world characterized by the inexhaustible development of personalities' and consumers' aspirations grows fast and leaves space for sparking diverse kinds of social conflicts. Consumption is an essential and ancient part of human politics, an inevitable consequence of the unique way our species has developed its relationship with the material world (Wilk 2001, 2010).

These theoretical premises outline a perspective that opens the door for exploration of the origin of religion through the accumulation of intuitive and rational knowledge. Furthermore, the same perspective may be used in a somewhat different direction that seeks out an explanation of the origin of artistic behaviour and the human relationship to fine arts. This viewpoint may be reformulated into the following one: why has archeology revolved around visual media since its early steps as a systematic discipline? Michael Shanks and Timothy Webmoor defined it as the immediacy of discovering the past through defining two relationships complementary to each other: the actuality of the juxtaposition of the present on to the past and the *kairos*, the time of connection between past and present (that key opportune moment when the past appears to us) (Shanks and Webmoor 2011: 88). The natural conclusion drawn from this conceptualization of the encounter between past and present is the importance of the moment when a viewer engages in intense observation with an object of art or architecture. This is a peculiar moment where the encounter of a person with the past may be interpreted in terms of modern social semiotic theory. It defines different semiotic resources other than language and analyzes their relations with each other, specified as interrelated semantic systems. These semantic systems are expected to fulfil four functions: to construe our experience of the world (experiential meaning); to create logical relations between experiential meanings (logical meaning), to enact social relations (interpersonal meaning); and to organize meanings into coherent messages (Halliday 1978). A relatively straightforward approach to such data may be the one that quantifies data coming from different semiotic resources such as camera angle, gaze and framing (O`Halloran 2012). From this point of view social semiotic theory makes an important contribution for better understanding of the effects of semiotic resources on public presentations on a TV screen. Their importance for the public's understanding is that they represent pseudo-3D reality where the important elements are the camera angle, gaze and framing.

Thus the key opportune moment of personal encounter with the past (or with an interesting art object or monument) defined by M. Shanks and T. Webmoor (2011) involves three components: embodied experience (unconscious), logical meaning and enactment of social relations. Out of this series of human experiences the first one, the creation of embodied (experiential) meaning, seems to be the primary (in terms of an immediate intuitive reaction) one. It acts as a primary source of information that triggers the next stages of personal familiarization (the greater part of it involves rational experiences) with an unknown object, monument or phenomenon.

In addition to this mechanism M. Foucault (1994: 50–77) involved language, which plays an important role in an artist's creation of an art object and enhances the public's understanding of a particular artwork. In general, language and speech concern both the intuitive and rational parts of any personal familiarization with an unknown object. Thus the important element in the proper representation of an art object is the frame that unites the artist's and observer's standpoint. It consists of different forms of comparison of language similitudes that create a frontier situation, a marginal position and archaically profound silhouette. Considered as prototypes of typical human behaviour, this general definition outlines particular mechanics where the frame moves either around the object or the object rotates around the observer and makes possible the unique human ability to physically experience the constant interplay between the viewer's motion and emotion.

The difference between 2D and 3D representations of human emotions

The theoretical premises presented above make clear the existence of human necessity to either rotate or make moves around any object of interest. In practice, an observer establishes experiential meaning through the particular mechanics of rotation. A question arises as to how to describe in a concise way this mechanical

process of rotation. A possible approach to answering this question is to borrow the qualitative description of the process of rotation of an object in a liquid environment from physics. The rotating movements (real or mental) of an object of interest may be defined in the following way: the actual movements per minute are proportional to the initial impulse for rotating the object. In turn this initial human impulse for manipulation is slowed down by a rapidly decaying function/relationship that directly depends on the observer's educational, cultural and religious background and the purpose with which he/she studies the object of interest. This is the well-known differential equation that describes in exact quantitative relations the number of rotations of an object in a liquid environment. This is of great practical use in engineering and natural sciences.

On the other hand, the above qualitative description helps to present in a concise way the human necessity to rotate or move around an object of intense interest. This cognitive reality has been established not only through theoretical enquiries such as those of M. Foucault (1994), but has been observed and described by anthropological research on traditional communities and by modern artists. For example, an Eskimo carver of a piece of unworked ivory would hold it in his hand and ask different questions: 'Who are you? Who hides there?' In most cases the carver works aimlessly until he sees the form emerging out of the ivory piece (Layton 1992: 32–3). In this case the rotation is mental (the carver unconsciously rotates the piece of ivory), that corresponds to tightly related (in terms of culture, tradition, craftsmanship) expressions through language. These cognitive resources complementary to one another become integrated in the moment of engagement with the unworked piece of ivory in order to help the carver realize a logically coherent tangible form that is related to his cultural background.

The above behaviour is related to the artisan that creates an object of art, but there is another human natural capability possessed by any observer when he/she focuses attention on this art object. The human eye is able to partially register movements that can nowadays be fully registered and documented with the aid of high-frame electronic-rate imaging. It was established that during the detection of biological motion humans assess both the facing direction and the motion direction, that have a different impact on their attention. Of particular interest is the difference in reaction times and accuracy ratings between passive and active viewing. The results show that the facing direction of a point-light walker (figure) directs attention to the side of the Gabor (specific side-marks on both sides of the figure) with the least amount of time when the cue and target are congruent (Chan 2011).

In terms of artistic behaviour the very moment the artisan catches the particular frame out of a series of frames that contain discrete movements and after he/she represents it in a tangible form, the observer is able to reconstruct this series of movements out of the artistic representation of a movement contained in one or a few frames. Both the artisan and the observer need to focus their attention by involving in this process all the possible cognitive resources, that is, visual and auditory in combination with language and speech. This combination occurs often in classrooms where some pupils repeat in a loud voice some parts of a difficult definition presented by the teacher. This is not a deviant behaviour but rather that some pupils need to involve language and speech in order to grasp better the incoming auditory and visual elements of a piece of abstract information.

In summary, nature provided humans with the necessity to physically and mentally manipulate an object of interest and in difficult cognitive situations combine it with words pronounced in a loud voice. A question arises as to how much culture influences this natural impulse. The answer to this question may be sought in the cultural origins of 2D and 3D imagery. The origins of both types of representation go back to the Upper Paleolithic. It will not be wrong to say that the contents of all the imagery from that period are a cultural product based entirely on appreciation of the animal world. Perhaps human emotions were presented through the imagery of animals. There

are excellent examples of representing the similarity between animal and human emotions. Although the perspective in 2D images has not been well elaborated the attempts to enlarge space may be viewed in the representation of series of animals. These series add volume and perhaps time. I have in mind the famous images of horses in the Chauvet cave, France (White 2003, photo on the back cover). Probably they represent one and the same horse taken from slightly different positions and coloured with slightly different colours. It seems as if the Paleolithic artisan was able to catch with his/her eyes a series of high-frame electronic-rate imaging of horse movement and through it represent the lifetime of a horse by adding space, time and emotions. The well-marked eyes and the position of the series of heads represent a state of sadness which is a typical feature of highly emotional animals such as horses and all the more typical of humans. The Paleolithic artisan had an eye not only for the physical movement of horses but also for the fleeting facial appearances of a state of emotion that is so typical both for horses and humans.

3D sculptures (figurines) follow similar patterns of the expression of human feelings through the movement of animals. For example, the sculptured headless bodies of two ibexes confronting each other on a Magdalenian propulsion arm made of antler represent the vigour and aggressiveness of both animals and humans (White 2003, photo on page 5). In this cultural background the absence of emotions in the presentation of the well-known Venuses and male figurines is not a surprise. Although they have heads, most of these figurines do not show any emotions or movement. There is one exception, the Venus from Galgenberg called 'Fanny', from the town of Krems, Austria. Probably it catches a moment of a dancing women (or man) but the whole body does not convey any emotion of the type seen in the fighting ibexes or the panel of horses. The explanation for this way of presentation may be sought in the sites where these artefacts were found. Most of them were found in year-round or semi-residential camps or in places of special importance for the travelling hunting Paleolithic groups who lived in the periglacial zones of Middle Eurasia. Although these figurines are ascribed to the class of mobiliary art they may be considered as signs of human presence and the territoriality of long-distance migrating human groups. This lifestyle cannot be compared with the semi-residential short-distance mobility of the human groups living in the temperate climates of the Balkans and the Near East where such figurines have not been found. However, the key knowledge these figurines bring with them is that although they are small, through their ability to be physically and mentally rotated and manipulated they allow humans to incorporate through focusing on them the surrounding landscapes in the form of an abstract 3D model of his or her existence. In its essence the entirety of human art is a transformation of 2D- into 3D-models of human existence that involves spatial orientation. Art is never alone; it has the ability to frame either the surrounding urban or natural landscapes.

Some works of modern artists come as a confirmation of this observation, as they are similar to what Paleolithic artisans did. They experiment with motion- and emotionless 3D sculptures of ancient Roman-style female figurines in combination with emotionally coloured panels. The overall representation aims to depict psychological moods triggered by the experience of living in an urban environment (representations on the board in the foyer of Hilton Hotel, Malta) (Lagana 20XX). In order to better understand how powerful the relation is between an object of art and its 3D environment one can think for a moment of placing the representations on the board in the foyer of the Hilton hotel in a cave, or the Venus of Willendorf II in a Hilton hotel foyer. Both directions of this replacement are impossible and perhaps this is the reason why the Venus of Willendorf II is exhibited in a special dark hub in the exhibition in the Naturhistorisches Museum, Vienna. The role of this hub is to protect the figurine from the surrounding urban environment and it conveys in a better way the spatial (and special) place this figurine has on the travelling routes of Paleolithic hunting groups along the Danube River.

All the above considerations give rise to the following opposition: while all types of artworks develop 2D sketches into 3D or pseudo-3D objects intimately related to the surrounding built or natural landscapes, the replication of artworks mostly done through printing on paper severs them from the natural impulse of humans to physically and mentally manipulate them and from their original relationship with the appropriate surrounding settings. From this point of view the 3D monument erected at the Willendorf II site matters more for the local people and tourists than the original figurine housed in the Naturhistorisches Museum, Vienna. This is because the monument, no matter that as a replica it is far away from the original dimensions of the figurine, becomes a landmark located on a critical observation point along the Danube River. This also means that no matter how good the photos representing any artwork in a book, album, etc are, the two-dimensionality disables observers from properly registering the human motions and emotions that the artists meant to represent through their original work.

Thus from the point of view of traditional publishing techniques this is a serious problem. The solution of this drawback comes from the modern geospatial and 3D technologies that will increasingly play an important role in developing 3D representations not only of individual art objects but also situate them in digital elevation models of the natural and built environment. They provide two major advantages: the obvious one is the growing availability of a range of techniques at low cost that give satisfactory results and the second one is that these techniques allow observers to create and manipulate not only individual figures and representations but the entire landscape associated with these artworks.

Motion and emotion attached to Copper Age figurines

Unless traditional focus on the role the economy plays in social change of Copper and Early Bronze Age societies alters, my understanding of the major social mechanisms that distinguish their lifestyle in contrast to the previous ones (Late Paleolithic and Early Neolithic) involves numerous domains of social behaviour. It is sufficient to point out some out of many drivers of social change in prehistoric societies are: the diversification of consumption practices; the diversification of settlement structure including mountaintops; the development of copper and tin mining and metallurgy (Vitov 2014); the diversification of craftsmanship, ritual practices, in-site settlement structure and their dynamics of evolution focused on settlements' periphery and on natural landscape features. All these diverse communities by the nature of their varied specializations were able to develop a series of risk avoidance strategies. They involved short- and long-distance exchange networks that joined different communities and improved knowledge and communication. The focus on risk avoidance practices created new circumstances that led to the development of rational knowledge about the natural and social phenomena: astronomical and weather observations, communication practices, direct community and individual accumulation of goods and resources, practices of distribution and the redistribution and aggregation of human and natural resources. Among these achievements the most important one seems to be the focus on humans as individual and social beings, which leads to increasing ability to communicate with neighbours and pass down stories based on individual and collective experiences. Perhaps this is the time of the beginning of the process of anthropomorphic transformation of the pantheon of gods. For example, the famous scene of figurines from the Ovcharovo tell site, northeast Bulgaria (Todorova et al. 1983), has been given an interpretation based on the representation of a cult scene which depicts humans and gods in human form. Generally, this may be true as a community's cults are represented by group dances and scenes. Behind these mass cult practices, however, there is a real story of individual and group experiences that remains hidden. The fact is that the Ovcharovo scene consists of free-standing figurines that resemble a theatrical scene or a game. If it were to represent religious cult then the place of each figurine (god) would have taken only one and the same position relative to the other figurines. As this scene is the only known one that involves a large number of figurines they, in turn,

Figure 1 'The Thinker'. Cernavoda site, Romania. The photo is taken from a souvenir from the archeological museum in the town of Cernavoda, Romania.

may be considered as mnemonic tokens that convey a popular scene(s) of a theatrical presentation, and even games could have been played, as the figurines allow their free manipulation.

As it was pointed out above when the 3D images become reduced (printed out on paper) to 2D ones, they lose their natural ability to influence the observer properly. Once published, the scene of Ovcharovo remains memorized in the configuration it was originally set. As long as it is represented in 2D, the self-deception seems to have greater influence on humans, as it makes most of the observers believe in its reduced symbolic. For example, the Galilean intuition about the existence of colours, 'these tastes, odours, colours, on the side of the object they seem to exist, are nothing else than mere names, but hold their residence in the sensitive body … as we impose names on them … we induce ourselves to believe that they also exist' (Boghossian and Velleman 1989), reduces these qualities to secondary ones. This self-deceptive attitude has a scientific explanation. An individual does not give arbitrary names to coloured stains but both registers and names the matches between the incoming from outside information and his/her capabilities to sense it. Thus the spectrum of light reflected from a surface matches the visible spectrum sensors in human eyes and then the ranges of matches become named with terms specific for each match. For example, a healthy European will recognize green from red apples equally well in Europe and China although he/she does not speak any Chinese.

In opposition to the reduced 2D symbolic, the three-dimensionality enhances it. In order to underline how great the difference between the two ways of representation is, I will focus on the problem of expressing emotion through the means of representing motion. Paleolithic art offers good examples of this means of presentation of emotions and emotive links to the surrounding landscapes. Some Copper and Early Bronze Age figurines offer quite a different perspective. The difference lies in the fact that Paleolithic art puts greater accent on animals whose behaviour reminds us of that of humans. It entirely relies on rational observation. Copper and Early Bronze Age figurines add to it a cultural compensatory mechanism based on rational knowledge about the world and humans. Human representations and portraits reflect not only a single psychological state such as anger, melancholy, pleasure or satisfaction. They represent such emotions but always in relation to the person's rank in human society or through establishing specific emotional and rational links to observers. For example, the famous figurine called 'The Thinker' from the Chernavoda site, Romania,

Figure 2 The spouse of the thinker'. Cernavoda site, Romania. The photo is taken from a souvenir from the archeological museum in the town of Cernavoda, Romania.

makes a unique impression of the state of relaxation and reflective thoughts, but within the frame of an ordinary person sitting next to his wife (spouse) (the second female figurine representing a similar mental state) (Figs. 1 and 2). The artisan captured unique behaviour that is typical of humans. In creating these figurines the artistic approach is interesting because of the means of representation. Human faces are schematic but this is compensated for by the elongated bodies and limbs that weave around in the form of a pyramid (head at the top). The total effect of representation comes from the natural position of the head as the natural centre for the rotation of the figurine (when held in hand or represented in 3D). Thus the tensions and the body proportions give the best impression of the state of mind of the represented persons.

Copper Age figurines often represent human portraits with typical facial expressions. They show that the artisan had close relations with the represented person and made a kind of a photo in order to remember him. This interpretation is underlined by the fact that a certain amount of these figurines were found in the form of heads with pronounced necks while the rest of the body is missing. Perhaps this way of presenting a human being was a deliberate action of representing heads with portrait features that were arranged on shelves in the house. Thus these human faces signify the importance of the represented persons for the inhabitants of the house and the community as a whole. Another fact that supports this interpretation is that these human heads have not been found in the mortuary domain, they come exclusively from settlements. All this evidence and the representations of the facial expressions themselves suggest that there exists a wider cultural compensatory mechanism that is built over the human capability for detailed observation of personal behaviour. More than that, the experimentation with the human body as 'physical mechanics', healing injuries and broken limbs, led to the elaboration of social fashions of complex design such as body

decorations, jewellery and details of particular facial features. This seems to be established as a permanent practice among the Late Copper Age communities in the Eastern Balkans, as can be seen from the ubiquitous presence of human portraits (Mitkova and Popov 2011). The same authors indicate that human facial expressions become visible in a better way if observed from different angles and under different light. This technical detail only shows the potential of 3D imagery. In my interpretation of a number of figurines I will use the potential of their 3D reconstruction or where not possible (at present I have no access to the originals or copies of the Smyadovo and Balbunar figurines) I will use photos taken from different angles. For this purpose I will confine my study to a presentation of three portraits from the tell site located near the town of Smyadovo (Mitkova and Popov 2011) and one from Tell Balbunar, near the town of Kubrat, northern Bulgaria (Mikov 1927).

The general understanding involved in my interpretation of these figurines is that they capture an authentic moment of human behaviour that is intimately linked with the artisan and the settlement and surrounding landscapes they lived in. The reason for these realistic presentations lies not so much in the ability for detailed observation which is typical also of the Paleolithic artisans but rather the already accumulated rational knowledge that clarifies the social position of each person in the human and natural world. This is based on the increasing rational understanding of the human body as a mechanic device that can be manipulated and cured when necessary. It is radically opposed to the immortal human soul that cannot be touched or repaired with ordinary tools. The only link between the body and soul in an everyday environment can be detected by closely examining the human face and eyes. Thus the essence of a human being is focused in his/her face and particularly in the eyes. This was well understood by the artisans who created these human portraits. The intensity of their feelings and memories can be viewed in the way they present the eyes and faces of real persons who were probably closely related to them. They are rendered individual features that differ from one another. Among them the most pronounced features are the eyes. In Fig. 3 the head of a person seemingly posing for a portrait is presented. The bulging, rounded eyes may be a real physical feature but they also represent the feeling of personal expectation while posing for a portrait or in some other public activity which the artisan managed to capture in his/her work. The artisan's mastery lies in his/her ability to capture a fleeting facial expression that otherwise can be recorded and documented

Figure 3 Portrait of a man with bulging eyes. After Mitkova and Popov 2011, photo 28.

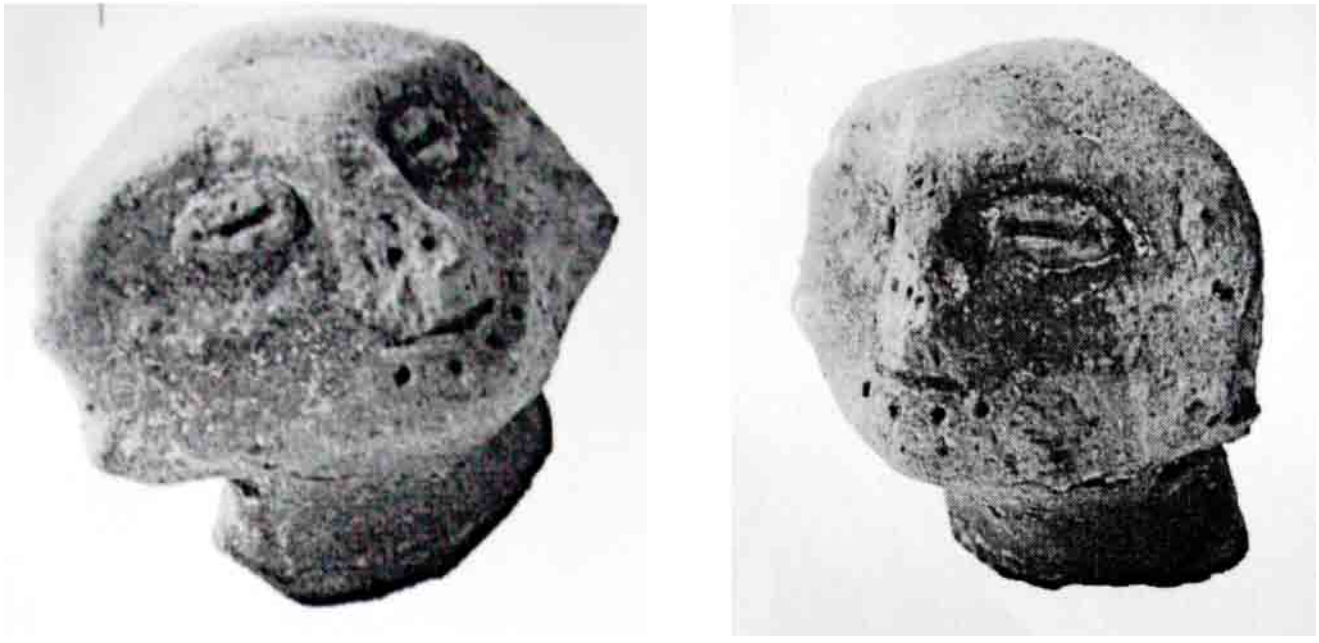
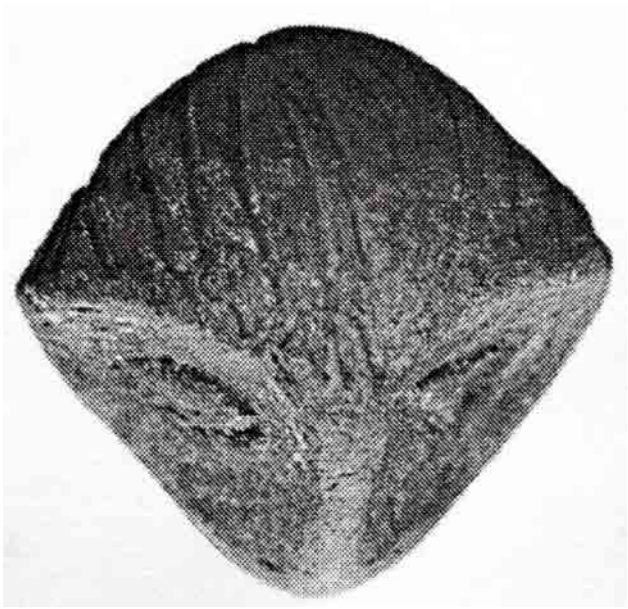


Figure 4 Portrait of a man with one eye. After Mitkova and Popov 2011, photo 29.

only by using a modern high-speed camera. The next human portrait is quite opposite in terms of fleeting expressions. It is rather static except for the noticeable absence of one eye. This is a permanent human disability which might be related to a particular story that happened in a specific locality in the village's surroundings that continued to be significant to the inhabitants of the house (Fig. 4). The third human face also focuses on the eyes but they are presented by inverted right-angle triangles (Fig. 5). It has a careful hairstyle which covers the ears. These features make the head look more feminine and probably represents a portrait of a woman. The fourth head is the most interesting one as it represents a person with a wide-open mouth (Fig. 6). Also there are traces of white paint on the head. Contrary to the previous portraits the eyes are represented by simple lines as if the eyes are almost closed. The entire face represents a person reacting to extreme physical or mental pain. According to Mitkova and Popov (2011) this head represents a priest, shaman or a dying person. I am more inclined to think that this is an ordinary person who agonized over a long period of time and this also represents the side of the humanity of suffering people. A rational body of knowledge would require a meticulous representation of human suffering as a link between the mechanical body and immortal soul as viewed in their common meeting ground, the human face. Quite opposite is the figurine from the Balbunar tell site near the town of Kubrat, northern Bulgaria (Fig. 7). The eyes are ellipsoid, the right one half-closed. The head has also a careful hairstyle that covers the ears and it has an elaborate and coloured necklace. This may also represent a portrait of a female who had an important public position that imbued her with feelings of self-content.

It should be noted that all these figurines are free-standing miniature portraits that can be manipulated by the inhabitants of the house as well as by the members of the community as a whole. Unless the figurines from the scene of Ovcharovo which may be considered as free-standing models that may equally well represent group rituals or various games, the free-standing portraits may be considered as miniatures (Bailey 2005). In terms of situated semiotics these miniatures can

Figure 5 Portrait of a man (woman) with inverted right-angle triangles. After Mitkova and Popov 2011, photo 30.



stimulate a number of analytical components in the observer's mind: the frequency with which they occur in a given settlement, the fidelity with which portraits resemble the original facial expressions, and the distances and direction (including social) of the spread of similarities (Knappett 2012). Thus the miniature portraits, through the involvement of all possible cognitive resources, have the ability to stimulate not only shared experience and rational understanding but also form a spatially structured shared intentionality.

In two-mode inter-artefactual networks it is important to make a distinction between nodes and links (Knappett 2012). When the links (representing humans according to the cited scheme) are confronted with 3D artistic representations, the connections to the nodes (miniatures, portraits, etc. behave in two distinct ways. A portrait of an ancestor is able to make a constant number of matches in the common memory of the inhabitants of a house or a village. At a personal level

Figure 6 Portrait of an agonizing man. After Mitkova and Popov 2011, photo 31.

the number of the matches will vary enormously. This is governed by a cultural compensatory mechanism that depends on personal affiliations to the portrait and on his/her educational, social and religious status. The group and personal attachments to the nodes of the network (3D images) may create instant imaginative explanations: for example, a prehistoric figurine may be considered by a modern observer as an encoded message from extraterrestrials. On the other hand, these logically uncritical explanations may be radically reduced with growth and development in the educational, cultural, religious background of observers.

Figure 7 Portrait of a woman (man) in a high social position. Photo from www.naim-bas.com/arche (Prehistoric part).

Conclusions

It has been shown here that the cognitive recognition of space between the 2D and 3D imagery is imbued with self-deceptive practices. The major difference between them lies in the fact that 2D images are being perceived by using only one cognitive resource, the visual one. Perhaps this fact was noticed at the dawn of humanity and Paleolithic artisans started to develop perspective and used the natural convex surfaces of the cave walls for their paintings in order to make their art more comprehensible to their observers. The development of perspective in 2D images and 3D imagery allowed artisans to exert greater influence on their audience. When confronted with a free-standing figurine an observer instinctively involves the entire range of cognitive resources: visual, auditory (knocking on the object and on surfaces close to it), language (confirming his/her thoughts about the object with words pronounced in a loud voice), and motor (moving the figurine around or moving themselves around it). This natural impulse designed by nature for better understanding of an object of interest is not enough. It is controlled by a cultural compensatory mechanism that allows of both imaginative (irrational in the common sense) and rational explanations. Historically the appearance of this cultural compensatory mechanism may be found in the times when there is a visible change in human art: the sharp division between representation of the human body and heads and the distinction between the human body and soul. Archeologically this can be detected in the societies that made the first human portraits. Their particularity is that they are able to reflect not only the physical reality but relate it to their human and natural environment. Thus human portraits and all the other objects of art from the Copper Age onwards bear the social position of the represented person, object, scene and their wider cultural environment, and they are able to establish a personal relationship between a long-gone artist and any modern observer. Artistic representations of human suffering as a result of conflicts, diseases and the stigmatization of human groups can be traced down also from the Copper Age. Conflicts and illness did exist before but their rational involvement in human culture (as means of increasing power, prestige and wealth) can be mostly identified with Copper/Bronze Age societies in the Balkans. This dividing timeline is not a universal one and may vary in different geographical regions depending on the local evolution of this cultural compensatory mechanism.

From the point of view of a modern observer a noticeable feature of this cultural compensatory mechanism is that it consists of two parts: the imaginative (uncritical acceptance of unreal explanations) and the rational (critical attitude to any explanation). It is not hard to assume that the uncritical explanations are rapidly reduced in magnitude and range with the increase of educational level and overall knowledge and awareness of audiences about the cultural and social significance of a given piece of art, or another object or phenomenon of interest. The mechanics of this interaction can be modelled formally in order to get insights on its complex workings, but further detailed research on the brain activities involved in this mechanism of acquiring knowledge and their correspondence with the cognitive behaviour of different audiences should be carried out.

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The beginnings of Natural Philosophy and Metaphysics in the Rock Art of Armenia

Gregor Vahanyan
Armenia

Abstract
Ideas about the origins of natural philosophy and metaphysics have been reconstructed by the author in relation to Armenian rock arts (10000-5000 BC). The article presents the images that indicate the existence of prehistoric ideas about the four elements of nature. These ideas are described in various compositions a tree of life, a man, family, direct and winged crosses, swastikas, spirals, eight-pointed stars, circles and balls - the earthly and heavenly worlds, carts, tridents and the sun's rays, as well as natural phenomena such as volcanic eruptions and earthquakes.

Reconstructing ideas of natural philosophy and metaphysical subjects using the cognitive abilities demonstrated in rock art, the author relies on the context of systems engineering, which describes the genesis of knowledge (in particular, as it is based on the asymmetry of logical and visual thinking), as well as on the language of communication. Based on recurring elements of language, their frames, and audio information, the content of rock arts of the Araratian mountains, can be interpreted and compared with Anatolian, Indo-Iranian, European, Balkan and Italian (Alpine) rock art. Signs show that the basic philosophical study of nature and the universe as well as the intellectual and spiritual expressions of the knowledge of the basic causes and nature of things, were "documented" on Araratian mountains.

As a result of catastrophic earthquakes and volcanic eruptions, surviving archaic civilizations endured with knowledge, which had been transformed or implemented in the universal mythological motifs in Old Europe, in the river delta Tanais, Scandinavia, Sumer, Egypt, Phoenicia, East and Minor Asia.

The four elements in Greece

The ancient Greek belief in five basic elements, these being earth, water, air, fire and ether, dates from pre-Socratic times and persisted throughout the Middle Ages and into the Renaissance, deeply influencing European thought and culture. These five elements are sometimes associated with the five platonic solids.

It was Empedocles who established four ultimate elements which make all the structures in the world - fire, air, water, earth. Empedocles called these four elements "roots", which he also identified with the mythical names of Zeus, Hera, Nestis, and Aidoneus (e.g., "Now hear the fourfold roots of everything: enlivening Hera, Hades, shining Zeus"). This theory of the four elements became the standard dogma for the next two thousand years. Many philosophies and worldviews have a set of classical elements believed to reflect the simplest essential parts and principles of which anything can consist or upon which the constitution and fundamental powers of everything are based. In classical thought, the four elements earth, water, air, and fire frequently occur; sometimes including a fifth element or *quintessence* (after "quint" meaning "fifth") called ether in ancient Greece and *akasha* in India. The concept of the five elements formed a basis of analysis in both Hinduism and Buddhism.

Cosmic elements in Babylonia

In Babylonian mythology, the cosmogony called *Enûma Eliš*, a text written between the 18th and 16th centuries BC, involves five gods that we might see as personified cosmic elements: sea, earth, sky, wind. In other Babylonian texts these phenomena are considered independent of their association with deities, though they are not treated as the component elements of the universe, as later in Empedocles.

Araradian Mountains and the Caucasus

The action of four forces of nature partaking in volcanic activity is evident in Armenian rock art, as well as in the song about Vahagn where the hero - the thunder, *Dragon Reaper* releases water, earth, sun and fire from the dragons (serpents). The author has demonstrated that the Araradian Mountains preserve the origins of the cult of Zeus-Yahweh, ideas about the four forces of natural philosophy, which were transformed into the names of the gods Zeus (Zeus) and Yahweh (Yahwe), which has four letters. Biblical names, such as the first man Adam, also have four letters. Zeus imprisoned Prometheus in the Caucasus Mountains for telling people the secret of fire. Zeus kidnapped Europe (Cadmos sister). Cadmos was Armenian Hayk's grandson, who had returned from Babylon after the collapse of language on father's land– Askanaz'es and Torgom's house. Precisely in Colchis (Caucasus) Greek Argonauts stole the "golden fleece".

Vahagn Vishapakagh and act of birthday

Vahagn Vishapakagh *(Vahagn the Dragon Reaper)* or Vahag(k)n was a first human, god of fire and war worshiped anciently and historically in Armenia. Vahagn was identified with the Greek Heracles. The priests of Vahévahian temple, who claimed Vahagn as their own ancestor, placed a statue of the Greek hero in their sanctuary. In the Armenian translation of the Bible, "Heracles, worshipped at Tyr" is renamed "Vahagn". Historian Khorenatsi's report of an ancient song gives a clue to his nature and ancient Armenian origin in Vahagn's birth song:

> In travail were heaven and earth,
> In travail, too, the purple sea!
> The travail held in the sea the small red reed.
> Through the hollow of the stalk came forth smoke,
> Through the hollow of the stalk came forth flame,
> And out of the flame a youth ran!
> Fiery hair had he,
> Ay, too, he had flaming beard,
> And his eyes, they were as suns!

Other parts of the song, now lost, said that Vahagn fought and conquered dragons (snakes), hence his title Vishabakagh, "dragon reaper", where dragons in Armenian lore are identified as "Vishaps". The Vahag-

nian song was sung to the accompaniment of the lyre by the bards of Goghten (modern Akulis). The stalk or reed, key to the situation, is an important word in Indo-European mythology, in connection with *heaven, earth, sea, fire* in its forms (fire, air, water, earth).

The oldest myths and legends

Prometheus, in eternal punishment, is chained to a rock in the Caucasus, where his liver is eaten daily by an eagle, only to be regenerated by night, due to his immortality. The eagle is a symbol of Zeus Himself. Years later, the Greek hero Heracles (Hercules) slays the eagle and frees Prometheus from his chains.

The four most ancient sources for understanding the origin of the Prometheus myths and legends all rely on the images represented in the *Titanomachia*, or the cosmological climactic struggle between the Greek gods and their parents, the Titans. Prometheus himself was a titan who managed to avoid being in the direct confrontational cosmic battle between Zeus and his followers against Cronus, Uranus and their followers.

The first temple of knowledge

The first temple of Jerusalem was built during the 10th c. - 586 BC. As noted by M. Khorenatsy the first Temple of knowledge built Hayk, which passed by inheritance to his (his grandson) Cadmos. The whole galaxy of Armenian aristocratic families considers its overall direct primogenitor to be Hayk Nahapet, the patriarch of the Armenian people, whose epithet was "dyutsazn" that was "derived from ditsov", "son of the deity" (meaning Vahagn).

The idea of the four elements in the alphabets

Ideas of four elements are embedded into the structure of the Armenian alphabet (the inventor of the alphabet M. Mashtots is M. Khorenatsy's teacher). The Armenian alphabet is divided into 4 rows under the signs of 4 elements. The structure of four elements is also inherent to the Greek and Phoenician alphabet, as well as Daniels ancient Armenian signs for writing are implementing the system of four elements (S. Babayan, G. Pogosyan). Daniels old Armenian signs were used by M. Mashtots, but in a couple of years the teacher refused them, as the signs could not reflect all the sounds of the Armenian language any longer.

As per legend, the Greek alphabet was invented from Phoenician on the basis of Phoenician alphabet established by Cadmus nearly 1,000 years before the invention of the modern Armenian alphabet. However, some works of the Greek scholars of antiquity are preserved only in Armenian translations. During the creation of the Greek alphabet, Greeks were not familiar with the doctrine of the four forces. Greek Cadmus is the hellenized Armenian Cadmos (master of the temple of knowledge). The Armenian Cadmos initially invented for the Phoenician alphabet and then for the Greek alphabet, based on Daniel's writing systems which embodied ideas about the four forces of nature.

It should be noted that, according to one ancient manuscript from Matenadaran (N 6962, 68 A), in the Armenian alphabet, written in four columns, each of them has the following names (left to right): fire, air, water and earth. S. Babayan showed that the line elements (9 x 4) correspond to the philosophical elements in this order, and if the line rotated 90 degrees clockwise, then these series get the reverse order, as evidenced by the said manuscript from Matenada-

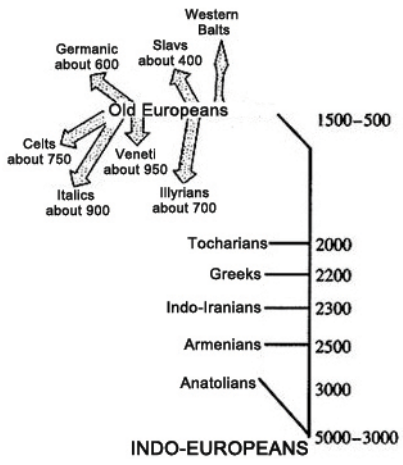

Figure 1 Differentiation of Indo-European (by S. Sedov), http://slavya.ru/trad/history/genezis/sed.htm.

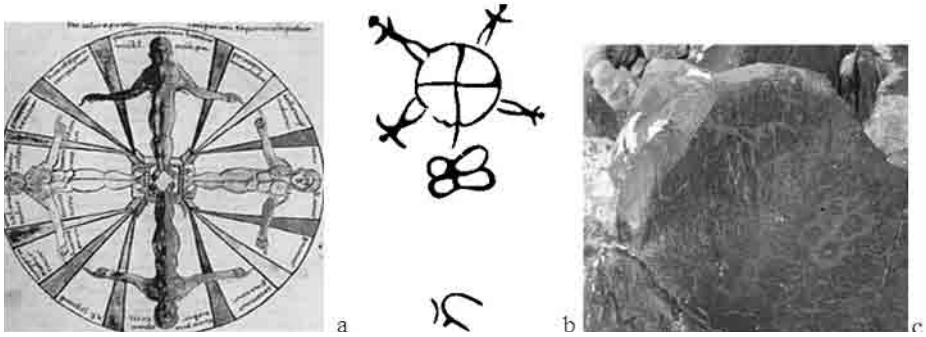

Figure 2 Allegory of the four elements of ancient natural philosophy (the manuscript of Isidore of Seville "On the Nature of Things": (a), http://commons.wikimedia.org/wiki/File:Isidore_of_Seville_Four_elements_.jpg?uselang=ru. Armenian rock art "Holy Cross "in the spherical shape of the Earth with four antipodes or four ends of the earth (b, c).

ran (S. Babayan in "Ancient alphabets - graphical models, reflecting the philosophical concept of the soul" (www.iatp.am) provides additional information on this topic).

In the ancient tradition, the fifth element is typically the Armenian word "ban" or "logo" (Marr). The terms "Ban" and "Van" are interconnected as Water and Logos. N. Marr believed that all languages were composed of four elements within language (universal language frame elements).

Chronology

V. Sedov leads some studies in the field of ethnogenesis (Fig. 1), where the emphasis is on a multidisciplinary approach in addressing issues (*Proceedings of the Russian Academy of Sciences, Volume 73, No. 7, p. 594-605, 2003*, http://slavya.ru/trad/history/genezis/sed.htm).

Name of the first man Vahagn

The name of the first human (man) Vahagn is split into four elements - fire, air, water and earth. Before Aristotle, the rock art of the Araradian Mountains taught that the Earth is a sphere and the center of the universe (Figs. 2b and 2c).

Figures 3a and 3b are examples of rock art from the treasury of the history of natural philosophy and metaphysics, intellectual and spiritual knowledge. Man (3b) consists of four elements - earth, water, air and fire; it contains the same heat and cold, moisture and dryness, as well as his soul consist of three parts.

"Adam"

The name "Adam" is regarded as an abbreviation consisting of the names of the four cardinal directions,

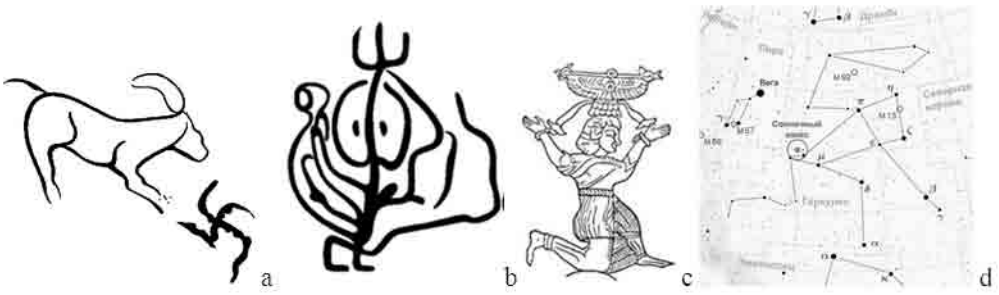

Figure 3 Cave drawing depicting the solar deity in the form of a swastika levorotatory (four elements - thunder, lightning, fire and flames). Cosmic battle between Hayk (swastika) with Bull (Bel) (a). Image of the human soul, which is the light of the four elements (b). Kneeling Vahagn - "message", man and nature, the four elements, 7-5 millennium BC, Armenia (c). Kneeling man from the Urartian bronze belt (c), Historical Museum of Armenia. Constellation "Kneeling" (d).

Figure 4 Petroglyphs of the four elements, solar (heavenly) and ideograms with crosses, swastikas, eight-pointed star, snakes and deer.

and it is believed that God took the dust for the creation of Adam, respectively, from all ends of the earth (Sibylline Oracles, 3:26): east, west, and north, south.

Cadmus

Cadmus (Ancient Greek: Κάδμος), in Greek mythology, was a Phoenician prince, the son of king Agenor and queen Telephassa of Tyre and the brother of Phoenix, Cilix and Europa. He was originally sent by his royal parents to seek out and escort his sister Europa back to Tyre after she was abducted from the shores of Phoenicia by Zeus. Cadmus was credited by the ancient Greeks (Herodotus is an example) with introducing the original Alphabet or Phoenician alphabet—*phoinikeia grammata,* "Phoenician letters"—to the Greeks, who adapted it to form their Greek alphabet. Herodotus estimates that Cadmus lived sixteen hundred years before his time, or around 2000 BC. Mikael Chamchyan date leads battle with Hayk and Bel - 2492 BC.

Moon as the result of collision between earth and another planet?
June 6, 2014

"One possible explanation for how the moon formed is that another planet, which some scientists refer to as Theia, collided with Earth billions of years ago. Scientists have attempted to find enough differences in moon rock samples compared to rocks found on Earth to prove that the moon was created when our planet collided with another world in the distant past. Now, they may have discovered enough of a difference in the lunar rocks, though it's a minor one, to validate the theory that the moon has both Earthly and other-worldly origins. Three lunar rocks which Apollo astronauts collected from the moon's surface and returned to Earth with in the 1960s have been re-analysed by scientists from Germany's Georg-August-Universität Göttingen. The rocks might offer proof that they are different enough from Earth rocks that they came from another planet when it collided with our own. After another world, let's say one called "Theia," slammed into Earth, the theory goes that molten rock was formed and flung up into orbit around our planet where it cooled and became Earth's largest natural satellite. In mythology, the Greek goddess, Theia, was the mother of the moon.

Scientists may never know with 100 percent certainty how the moon was formed, but the re-analysis of the three lunar rocks by scientists from Germany has helped add validity to the giant impact idea. Douglas Cobb, *http://guardianlv.com/2014/06/moon-result-of-collision-of-earth-with-another-planet/.*

Figure 5 Petroglyphs rides bulls (a, b) Ukhtasar, Armenia and stone tomb stone (c), Ukraine.

Figure 6 Philosophical picture of the world: the four forces and acts of birth, Geghama Mountains, Armenia.

Conclusions

1. Names of gods Vahagn (Vahagn), Zeus (Zeus) and Yahweh (Yahwe) consist of four letters, as well as the name of the Biblical Adam, and symbolize the four elements of nature.

2. Traditional views of scientists on the impact of prehistoric Armenian culture and art on the genesis of the world's culture and science do not correspond to the history of M. Khorenatsy and the modern theory of the collapse of the language, especially in Armenian rock art and language in its prehistoric connections with the European, Greek (Phrygian, Thracian) rock art and language which do not conform to the basic features of Armenian-Greek and Biblical mythologies. Re-assessment is called for to address these issues.

3. Petroglyphs from the Araradian Mountains indicate intellectually and spiritually keep many elements of prehistoric knowledge. They are priceless and not yet fully deciphered. They can learn a lot, in particular, how the moon was formed, tell us about the role of man and his place in the cosmos, as well as the future of humanity.

Figure 7 How the moon was created by modern scientists (a) and ancient people by the rock art from Araradian Mountains (b).

a

b

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1991 *Karedaran The Database of Armenian Rock Art* (Tracce #12, Online Bulletin by Footsteps of Man), Italy.

Conferences

Ifrao-aearc first international rock art and ethnography conference

The first International Rock Art and Ethnography Conference hosted in Cochabamba, Bolivia, by the Asociación de Estudios del Arte Rupestre de Cochabamba (AEARC), 23 – 26 September, 2014, following the successful First International Cupule Conference (Cochabamba, 2007), will be chaired by Professor Roy Querejazu Lewis, the IFRAO Representative of AEARC.

The event includes four days of presentations and discussions, followed by three days of fieldtrips to rock art sites in central Bolivia. The four sessions are Ethnographically Recorded Rock Art Production (Robert G. Bednarik, Chair); Rock Art Sites as Sacral Spaces (Roy Querejazu Lewis, Chair), Ceremonial Use of Rock aArt Sites, Past and Present (Gori Tumi Echevarría López, Chair), and Traditional Interpretations of Rock Art sites (David Camacho, Chair).

Interested participants may provide a proposed paper title and abstract for one or more of the sessions to the Chairpersons before 30 June 2014:

Roy Querejazu Lewis and David Camacho
Asociación de Estudios del Arte Rupestre
de Cochabamba (AEARC)
Cochabamba, Bolivia
aearcb@gmail.com

Gori Tumi Echevarría López
Asociación Peruana de Arte Rupestre (APAR)
Lima, Peru
aparperu@gmail.com

Robert G. Bednarik, Convener of IFRAO
Melbourne, Australia
robertbednarik@hotmail.com

XVII WORLD UISPP CONGRESS 2014

The International Union of the Prehistoric and Protohistoric Sciences (UISPP) will hold its World Congress in Burgos, Spain from 1-7 September, 2014. All participants in the UISPP-CISENP sessions are invited to register online for the World Congress in Burgos: http://www.burgos2014uispp.com. Deadline for registration is 28 August 2014. Scientific information: uispp2014@fundacionatapuerca.es

For more information:

Rocío Barra / Mercedes Sanz
Secretariat for the UISPP 2014
Viajes El Corte Inglés, S.A.
Congress Department
C/ Alberto Bosch, 13, 5º Plta - 28014 Madrid
Tfn: +34 91 330 05 65 - Fax;: +34 91 420 39 52
uispp2014@viajeseci.es

Rock Art Links

Rock Art Studies: A Bibliographic Database

Open access:
http://bancroft.berkeley.edu/collections/rockart.html

- Compilation began in 1993.
- Currently offers over 29,000 citations to the World's rock art literature.
- Available online through University of California/ Berkeley in co-operation with the Bay Area Rock Art Research Association.
- Over 100 archives, web portals, bibliographies, library catalogs and other miscellaneous sources are actively consulted.
- Includes books in and out of print, journals, conference proceedings, periodicals, gray literature and ephemera.
- The bibliographic data is searchable in the following fields: author, title, place name, subject keyword, abstract, and ISBN/ISSN.
- Recipient of the 2002 ARARA Castellon Award for excellence in Rock Art research.

"This is to certify that the RAS Data Base (on world rock art) is a most useful comprehensive tool as an aid to research and preservation of all rock art heritage the world over."

Jean Clottes, INORA Editor

"The most important resource of its kind."

Robert Bednarik, IFRAO Convener

"…This is of great interest for the scholars, student[s], institutions and museums working on Rock Art."

Dario Seglie, Liason Officer
IFRAO – UNESCO –ICOM

Interested in rock-art in Wales? Go to:
http://www.rock-art-in-wales.co.uk/.

TARA

Trust for African Rock Art (TARA, Kenya) continues to develop community museums and educational tools to teach about rock art.

Starting this Fall, TARA Chairman and founder, photographer, writer, and rock art specialist, David Coulson will be leading safaris into African rock art areas, also known for their incredible landscapes, rich wildlife and proud nomadic peoples. TARA's main international partner is Kenya-based Royal African Safaris who also have an office in the USA (Colorado). The first safari will be to NAMIBIA 13-21 September 2014. http://africanrockart.org.

Download TARA's Guide to Rock Art in Kondoa Irangi, Tanzania, UNESCO World Heritage site: http://africanrockart.org/wp-content/uploads/2013/12/Kondoa-guide-Booklet.pdf.

Take a look at The British Museum and Trust for African Rock Art (TARA) image project, a database cataloguing over 20,000 images from TARA's collection geographcially by country: http://africanrockart.org/news/tara-archive-online-with-british-museum/.

Publications

ATELIER

ATELIER colloqui

To order Atelier publications: http://www.atelier-etno.it or atelier.etno@gmail.com.

APPRENTICESHIP IN CONCEPTUAL ANTHROPOLOGY

Applications for the position of Research Assistant at Atlier in the Camonica Valley, in the Italian Alps, are now being considered.

The apprenticeship, under the guidance of Prof. Emmanuel Anati, may last from a minimum of two months to a maximum of one year. It grants the apprentice the title of "Research Assistant". It involves the apprentice in active participation in research, compilation, organization and layout of exhibitions and publications, arrangement and cataloguing of ethnological collections, and planning of cultural and scientific projects.

During the active presence in the Camonica Valley, the selected apprentice will have access to self-catering accommodation on campus, at a symbolic fee.

The application, as an informal letter, should specify the motivations and skills of the candidate and be accompanied by a curriculum vitae. Preference is given to university students or graduates. Credits can be acquired.

Applications are considered throughout the year, with the timing of apprenticeship to be agreed upon with the candidate. Applications should be addressed by email to: atelier.etno@gmail.com.

LETTER TO FRIENDS AND COLLEAGUES OF ATELIER

August 2014

Dear Friends,

Atelier, a cultural association founded on July 29, 2011, is celebrating its third anniversary. The meetings, exhibits, and publications have forged a path to the new discipline of conceptual anthropology.

This fact is of great relevance to human and social sciences in that it confirms the role of activities taking place in the remote periphery. In this same Alpine valley, the Valcamonica, half a century ago, another new discipline was born and disseminated: the scientific study of rock art. In synergy with CCSP, CISNEP and CISPE, these are the same laboratories, and the same people working on the pioneering task of research and culture in Valcamonica, in Europe, in the Middle East, and elsewhere in the world. Atelier is a laboratory of ideas for the renewal of culture.

Today, in collaboration with the UISPP (Union internationale des sciences préhistoriques et protohistoriques), Atelier is promoting a new online peer-reviewed international journal called EXPRESSION, a human sciences quarterly focusing on art, archaeology and anthropology, in which authors from twenty countries are participating. The journal is published in English, but with online translation now widely available, we foresee its circulating in other languages. For subscriptions received before September 30, 2014, we are offering a one-year free of charge for the four upcoming issues (2014-2015).

For individuals and institutions, to promote the wider distribution of our publications, Atelier is also offering half-price on all orders received before September 15th, 2014, including a choice of books from our catalogue of 20 publications (http://www.atelier-etno.it/info-e-news/). All are available in print and as reasonably priced e-books. Some of the first books published are reaching our stock limits, and will soon be sold out. Atelier publications make excellent holiday gifts: content-oriented, we aim at all audiences with humanistic interests. The high quality of the graphic presentation makes these books an excellent gift idea, as disseminating them contributes to expanding new horizons of research and culture.

Atelier will be present at the XVII World Congress of the UISPP in Burgos, Spain, from 1-7 September 2014, and we will have meetings within session A20 "The Intellectual and Spiritual Expressions of Non-literate Peoples". Friends and colleagues are invited to join us.

On October 12, 2014, we are planning to have a one-day seminar meeting, in Valcamonica, on "Il pensiero dell'uomo preistorico" (Thought of Prehistoric Man). Participants will include archeologists, psychologists and psychoanalysts. Friends and associates are invited to reserve: atelier.etno@gmail.com

The latest news is that we have also launched a volunteer program in Valcamonica! This program concerns not only university students seeking internships, but is also open to all interested in actively participating in the cultural and scientific dynamics of Atelier. Individuals competent in data-entry, information technologies, publishing, exhibit design and museography, audiovisual production, writing, editing, translating into various languages, researchers and graphic artists are welcome. Lodging is available in the township hostel of Valcamonica for minimal cost. Please see the information published in EXPRESSION on page 167. If you, or students and colleagues, are interested in making an application for an internship period of 2-4 months during 2014-2015, we will be pleased to examine it before October 1st.

Let's stay in touch. Looking forward to hearing from you soon.

Best regards,

Emmanuel

EXPRESSION

N°6 August 2014

In EXPRESSION N°7 (August 2014) we will include the remaining papers presented at the UISPP World Congress in Burgos (1-7 September). Please note that CISENP's blog remains open for UISPP-CISENP's ongoing dialogue, collaboration and discussions. Join us at cisenp.wordpress.com.

EXPRESSION is the e-letter of the Commission on Intellectual and Spiritual Expressions of Non-literate Peoples (CISENP), an international scientific commission of the Union Internationale des Sciences Préhistoriques et Protohistoriques (UISPP).

Atelier Research Center
Città della Cultura, via Marconi, 7
25044 Capo di Ponte (BS), Italy

Join cisenp.wordpress.com for Congress updates!

EXPRESSION is published in cooperation with Atelier Editions. Proposed news and texts should be sent to expression.cisenp@gmail.com.

To subscribe or unsubscribe to this mailing list contact expression.cisenp@gmail.com.

A20 BURGOS SESSION: THE INTELLECTUAL AND SPIRITUAL EXPRESSIONS OF NON LITERATE PEOPLES
Papers proposed and abstracts published

	Name	Country	Profile	Title of communication	no EXPRESSION
1	Anati Emmanuel and Ariela Fradkin	Italy		Decoding prehistoric art: the messages behind the images	EXP. 4
2	Arsenault Daniel	Canada	Director of the Centre interuniversitaire d'Études sur les Lettres, les Arts et les Traditions (CÉLAT) à l'Université du Québec à Montréal (UQAM), Montréal, Québec, Canada	Canadian Shield rock art and its spiritual dimension. An informed approach to the tangible and intangible dimensions of rock art sites in the Canadian Shield	EXP. 4
3	Belfer-Cohen Anna	Israel	Researcher, Hebrew University, Jerusalem,Israel	A Natufian mask-face figurine: an insight into the nature of the supernatural being	EXP. 5
	Shaham Dana	Israel	Researcher, Hebrew University, Jerusalem,Israel		
4	Berriet Margalit	France	President of the Association Mémoire de L'Avenir	Art and Culture, a Journey through the World of Mankind	EXP. 5
5	Bertilsson Ulf	Sweden	Svenskt Hällristnings Forsknings Arkiv (SHFA) (Swedish Rock Art Research Archives) University of Gothenburg	Carved footprints and prehistoric beliefs: examples of symbol and myth-practice and ideology	EXP. 4
6	Bettencourt Ana	Portugal	Auxiliary Professor of Archaeology Department of History, University of Minho Institute of Social Sciences, Braga, Portugal	Grid patterns in nw Iberia rock art. Iconography, contexts and interpretations	EXP. 5
7	Binant Pascale	France	CNRS / UMR 7041 ArScAn / AnTET Anthropologie des Techniques, des Espaces et des Territoires au Pliocène et Pleistocène, Prigonrieux, France	Sexual human representations of the paintings in the Serra da Capivara, Brazil: relations in action, narrative relations?	EXP. 4
8	Bouissac Paul	Canada	University of Toronto, Victoria College, Canada	Celestial patterns and the dawn of cosmological knowledge	EXP. 4
9	Burley Paul	UK	Consulting Engineer and Geologist, Blandford Forum, Dorset, England	The Stonehenge sacred Landscape - Pathway to the Stars	EXP. 4
10	Chakraverty Somnath	India	Professor (Dr.) Somnath Chakraverty Head, department of Anthropology. BEC. University of Calcutta. Kolkata. India	Preliterate Art in India : a Source of Indigenous knowledge, ethnohistory and Collective Wisdom	EXP. 5
11	Coimbra Fernando	Portugal	Instituto Terra e Memória Centre for Geosciences, Portugal	Archaeology, rock art, archaeoacoustics and neuroscience: What kind of relation?	EXP. 4
12	Dubal Léo	France	Virtual laboratory for archaeometry Soulages, France	Heralding the sun	EXP. 4
13	Faradzhev Arsen	Russia	Professor of Prehistory, Moscow	The treasures from the Russian city of Zaraysk	EXP. 4

14	Ghilotti Francesco	Italy		Earth and subterraneity in early Sumerian sources	**EXP. 4**
15	Hochroth Lysa	USA/France		From Survival to Conatus: Comparative Axiology From Engraving To Painting	**EXP. 4**
16	Imam Bulu	India	Director, Sanskriti Centre Director, Dipugarha, Jharkhand, India	Changing intellectual and spiritual expressions of the nomadic Birhor in Jharkhand	**EXP. 4**
17	Krasniqi Shemsi	Kosovo	Department of Sociology Faculty of Philosophy, University of Prishtina, Republic of Kosovo	Some Aspects of Contemporary Use of Ancient Symbols	**EXP. 4**
18	Mailland Federico	Switzerland	Centro internazionale di Studi Preistorici, Lugano, Switzerland	Lifestyle of human groups during Palaeolithic at Har Karkom	**EXP. 5**
19	Meaden Terence	UK	Prof Dr Terence Meaden Kellogg College, Oxford University, UK	The nature and purpose of specific symbols and images in non-literate Neolithic and Bronze Age Britain and Ireland	**EXP. 4**
20	Oosterbeek Luiz	Portugal	Pró-Presidente do Instituto Politécnico de Tomar, Portugal Secretary-General of UISPP	Symbols as *Persona* in the dawn of food production in the Alto Ribatejo, Portugal	**EXP. 4**
21	Otte Marcel	Belgium	Professor of Prehistory, University of Liège, Belgium	The prehistory of portrait	**EXP. 4**
22	Rocchitelli Andrea	Italy		The dynamics of mental movements as a base for the intellectual and spiritual expressions of non-literate people and the origin of development of the human being	**EXP. 4**
23	Sansoni Umberto	Italy	Centro Camuno di Studi Preistorici Dipartimento Valcamonica e Lombardia	The rock art of Indo-European cultures: concordances, logics and possible common values	**EXP. 4**
24	Tanda Giuseppa	Italia	Interdepartmental Centre for Prehistory and Early History of the Mediterranean / Department of History, Cultural Heritage and Territory, University of Cagliari. Cagliari	The use of burial space and social relations between the Late Neolithic Age and the Copper Age in Sardinia.	**/**
25	Tsonev Tsoni	Bulgaria	Professor of Prehistory National Institute of Archaeology and Museum of Sofia, Bulgaria	3D reconstructions of the sculptured emotions in the Copper Age Eastern Balkans	**EXP. 4**
26	Vahanyan Gregor	Armenia		Beginning of natural philosophy and metaphysics in the rock arts of Armenia	**EXP. 4**
27	Vetrov Viktor	Ukraine	Institute of archaeology of NAS of Ukraine, Lugansk, Ukraine	A Complex Research of Paleolithic Art in Ukraine	**EXP. 5**

Group from Spain and Mexico

	Name	Country	Profile	Title of communication	no EXPRESSION
28	Arroyo Joaquín	Mexico	Instituto Nacional de Antropología e Historia (INAH) (México)	A ritual space with paintings and engravings in the La Calera rock art set, Sonora, Mexico	**EXP. 5**
	Menéndez Beatriz	Spain	PhD Candidate in "Cuaternario y Prehistoria", Universidad Rovira i Virgili (URV), Tarragona. Institut Català de Paleoecologia Humana i Evolució Social (IPHES), Tarragona (Spain)		
	Quijada César	Mexico	Instituto Nacional de Antropología e Historia (INAH) (México)		
	Rubio Albert	Spain	Seminari d'Estudis i Recerques Prehistòriques (SERP), Universidad de Barcelona (Spain)		
	Santos Neemias	Spain	PhD Candidate in "Cuaternario y Prehistoria", Universitat Rovira i Virgili (URV) (Tarragona, Spain)		
	Viñas Ramon	Spain	Institut Català de Paleoecologia Humana i Evolució Social (IPHES), Tarragona. Universidad Rovira i Virgili (URV), Tarragona (Spain)		
29	Arroyo Joaquín	Mexico	Instituto Nacional de Antropología e Historia (INAH) (México)	The rock art of Saracachi River Basin: the El Arco and Blanca de la Pulsera caves, Sonora (Mexico)	**EXP. 5**
	Hernanz Antonio	Spain	Nacional de Educación a Distancia (UNED) (Madrid, Spain)		
	Iriarte Mercedes	Spain	Nacional de Educación a Distancia (UNED) (Madrid, Spain)		
	Menéndez Beatriz	Spain	PhD Candidate in "Cuaternario y Prehistoria", Universidad Rovira i Virgili (URV), Tarragona. Institut Català de Paleoecologia Humana i Evolució Social (IPHES), Tarragona (Spain)		
	Quijada César	Mexico	Instituto Nacional de Antropología e Historia (INAH) (México)		
	Rubio Albert	Spain	Seminari d'Estudis i Recerques Prehistòriques (SERP), Universidad de Barcelona (Spain)		
	Santos Neemias	Spain	PhD Candidate in "Cuaternario y Prehistoria", Universitat Rovira i Virgili (URV) (Tarragona, Spain)		
	Viñas Ramon	Spain	Institut Català de Paleoecologia Humana i Evolució Social (IPHES), Tarragona. Universidad Rovira i Virgili (URV), Tarragona (Spain)		

30	Menéndez Beatriz	Spain	PhD Candidate in “Cuaternario y Prehistoria”, Universidad Rovira i Virgili (URV), Tarragona. Institut Català de Paleoecologia Humana i Evolució Social (IPHES), Tarragona (Spain)	El Arroyo de las Flechas: a site with petroglyphs in the Sierra El Álamo, Caborca (Sonora, Mexico)	**EXP. 5**
	Viñas Ramon	Spain	Institut Català de Paleoecologia Humana i Evolució Social (IPHES), Tarragona. Universidad Rovira i Virgili (URV), Tarragona (Spain)		
	Rubio Albert	Spain	Seminari d’Estudis i Recerques Prehistòriques (SERP), Universidad de Barcelona (Spain)		
	Benavente Martha E.	Mexico	Área de Prehistoria y Evolución Humana. Instituto de Investigaciones Antropológicas de la Universidad Nacional Autónoma de México (IIA-UNAM) (Mexico)		
	Terrazas Alejandro	Mexico	Instituto de Investigaciones Antropológicas de la Universidad Nacional Autónoma de México (IIA-UNAM) (Mexico)		
31	Antolín Ferran	Spain	CIPAG. Col•lectiu per la investigación de la prehistòria i l’arqueologia del Garraf-Ordal	The anthropomorphic figurine of Can Sadurní Cave (Begues, Barcelona)	**/**
	Bardera Remei	Spain			
	Barrio Mª Jesús	Spain			
	Concepció Castellana	Spain			
	Castillo Trinidad	Spain			
	Edo Manuel	Spain			
	Fierro Elicínia	Spain			
	Fornell Eva	Spain			
	Prats Georgina	Spain			

Group from Rock Art Association of China (RARAC)

	Name	Country	Profile	Title of communication	no EXPRESSION
32	An Li	China	Research fellow with Inner Mongolia Museum	Primitive Religious Information Embodied in Human-face Images of Rock Art on Zhuozishan Mountain, Wuhai, Inner Mongolia	**EXP. 5**
	Wu Junsheng	China	Head and Associate Research Fellow of Wuhai Museum		
33	Aoyungerile	China	Associate Research Fellow with Alxa Museum	Prairie Economy Development Seen from Rock Art in W. Range of Langshan Mount, Inner Mongolia	**EXP. 5**
	An Ying	China	Associate Research Fellow with Art Research Institute of Inner Mongolia		
34	Cao Bo	China	Guizhou Institute of Archaeology	Research and Study on the Guizhou Rock Art Heritage	**EXP. 5**
35	Gong Li Bin	China		Research on File Construction System of the Rock Art	**EXP. 5**
	Liu Hui	China			
	Qiao Hua	China	Director of Rock Art Research Center, Ningxia Province		
36	Hu Pengcheng	China	Researcher of the GuangXi Province Nationalities Museum	New Findings in Huashan Cliff Painting Techniques	**EXP. 5**
37	Jing Yanqing	China	Doctor of Rock Art Research Association of China, Minzu University of China	Prehistoric Rock Art, the Information Era of Humans Which has been Overlooked	**EXP. 5**
	Zhang Xiaoxia	China	Master of Rock Art Research Association of China, Minzu University of China		
38	Li Fei	China	Guizhou Provincial Institute of Archaeology, Department of Archeology, Sichuan University	The Regression of the Soul: Rock Paintings in Southwest China, Focusing on the Coffin Paintings in the Rock Cave at Xianren Bridge, Huishui County, Guizhou Province	**EXP. 5**
39	Li Hao	China	PhD, Associate Professor at Guizhou Nationalities University	Survey of the Status and Protection Strategy for the Ancient Rock Paintings in Guizhou	**EXP. 5**
	He Biao	China	Guizhou Nationalities University, Guiyang, Guizhou		
40	Li Gang	China	Cultural Relics Control Station of Diqing Tibetan Autonomous Prefecture, Yunnan Province	Discovery and Pilot Study of the Jinsha River Chiselled Rock Art in Shangri-La	**EXP. 4**
41	Li Hao	China	PhD, Associate Professor at Guizhou Nationalities University	Research on the Development and Utilization of the Guizhou Ancient Petrography Resource	**EXP. 5**
	Wu Xiaoping	China	President, Guizhou Nationalities University		

42	Mu Xiaomei	China	Arts Department, Zunyi Normal College, Zunyi, School of Ethnology and Sociology, Minzu University of China, Beijing	The Special Characteristics of the Zhenfeng Rock Art in Guizhou	**EXP. 5**
	Zhang Li-Na	China	Arts Department Zunyi Normal College, Zunyi		
43	Ni Xifeng	China		Several understandings on the cave paintings on the turtle stone in Anshan	**EXP. 4**
	Li Gang	China	Cultural Relics control station of Diqing Tibetan Autonomous Prefecture,Yunnan Province		
44	Shi Zeming	China	Master of Rock Art Research Association of China, Minzu University of China	Investgation and Research of Dahongyan Rock Art in Zhengfeng County, Guizhou Province	**EXP. 5**
	Zhang Xiaoxia	China	Master of Rock Art Research Association of China, Minzu University of China		
45	Shi Zeming	China	Master of Rock Art Research Association of China, Minzu University of China	Research on the Classification and Staging of the Rock Art on Lusen Mountain in Qinghai	**EXP. 5**
	Jing Yanqing	China	Doctor of Rock Art Research Association of China, Minzu University of China		
46	Sun Xiaoyong	China	PhD, Rock Art Association of China, Associate Professor of LanZhou University	Field Survey and Analysis of Eye Mask Worship in the Xiliaohe River Basin	**EXP. 5**
	Zhang Jiaxin	China	Rock Art Association of China		
47	Wang Liangfan	China	Professor, College of humanities, Guizhou University	Manipulation Tactics: a Cultural Interpretation of Rock Art Images Massed in Southwest China	**EXP. 5**
	Luo Xiaoming	China	Professor, Journal of Guizhou University		
48	Wu Jiacai	China		Discovery and Study of Two Groups of Writing on the Cliff in the Hongshan Culture Area	**EXP. 5**
49	Xiao Bo	China		Discussion of Reproduction Worship in Chinese Rock Art	**EXP. 5**
	Wang Zhaohui	China	Foreign Language college, Minzu University of China		
	Zhang Jiaxin	China			
50	Yang Huiling	China	Associate researcher in Rock Art Association Center of Ningxia	Communication and Transformation: In-Depth Reflection of Helan Mountain Rock Art	**EXP. 4**

51	You Qian Sheng	China	Director of The world heritage projects, Guizhou Province	Using the Montage Technique to Read Various Cave Painting Sites on Guizhou Plateau	**EXP. 5**
52	Yu Zhuoran	China	Rock Art Research Association of China, Minzu University of China	On the disciplines of taking image in Chinese rock art	**EXP. 4**
	Zhu Yuan	China	Lecturer, School of Humanities & Social Science, ECNU, Shanghai		
53	Zhang Wenjing	China	Centre for Post-doctoral Studies, Communication University of China	Research on Face Rock Carvings in Northern China	**EXP. 5**
	Wang Xiaokun	China	School of History, Renmin University of China		
54	Zhang Yasha	China	Rock Art Research Association of China, Minzu University of China, Beijing	Image Classification and the Symbolic Structure of the Rock Art at the Zuojiang River, Guangxi	**EXP. 5**
	Lu Xiaohong	China	Rock Art Research Association of China, Minzu University of China, Beijing		
	Wang Mingshui	China	Rock Art Research Association of China, Minzu University of China		
55	Zhang Jiaxin	China		Agricultural Worship in the Rock Art of Jiangjunya, Lianyungang City, East China	**EXP. 5**
	Huang Yaqi	China	College of art, Sanxia University		
56	Zhu Houqiu	China	Wenguang bureau of Xianju county	An Ancient Sacrificial Place: Research into Rock Art in Xianju	**EXP. 5**
57	Zhu Lifeng	China	Associate Professor of China Women's University, Beijing	Petroglyphs of the Northern Pacific Rim: the Rock Art of the Xiliaohe River and the Amur River	**EXP. 5**
	Wang Xu	China	Director of the Management Office of Helan Mountain Rock Art, Yinchuan City, Ningxia		
58	Zhu Qiuping	China	Cultural Relics Management of Ningming District, Guangxi Province	Significance of the Stabilization Works Which Protect the Rock Art Painting in Ningming District	**EXP. 5**