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THE IMPACT OF CULTURE
IN LOGICAL THINKING

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EDITORIAL NOTES

INTRODUCTION

Logic is a product of the human mind. It is a method of consequential reasoning leading from premises to conclusions. Some principles of logic are considered to be universal, though this postulate is questionable: logical thinking varies, affected by both knowledge and beliefs.

People from the same cultural environment tend to have more similar logical thinking than people from different cultures. But even in the same national or cultural context different politicians and thinkers, like all human beings, may have different logical processes. The buyer and the seller of a product may follow different logics, one to pay less and the other to earn more. The logic of a kamikaze that led an airplane against the Twin Towers in New York is supposed to have been different from that of the employee quietly taking care of his job on the 30th floor of the same building at the same moment. Immediately thereafter, both of them were dead. We can just guess their thoughts in that instant lasting less than a second. On one side: "Mission accomplished!" On the other, trying to guess, using logic to understand the cause and outcome. No logic could have saved them. But likely both of them used logic to understand, the last part of a second of their life, from premises to conclusions.

Logic may vary with different states of mind. We know from archeological remains and from visual images, mainly in rock art, that some prehistoric people indulged in the use of hallucinogens. Indeed, alcohol or hallucinogens modify logical thinking, but also human relations, happiness, sadness or anger, love, hate or loneliness may orientate or deform it.

Logic may also vary according to religious or ethical beliefs and other conceptual conditioning. Bigotism and dogmatism condition logical thought. When the reasoning starts with "according to..." there is a shift of logic: if the right thing is "according to", any other orientation of logic is blocked.

Among recently converted native people, the logic of a converted to Islam is different from that of a convert to Christianity, though both are subdued by the newly

acquired doctrine. Indoctrination very fast modified the process of thinking logically.

The logic according to which the Egyptian pyramids were built derived from the concepts that led to their creation and from the power and intentions of the regime that disposed of the necessary means and manpower. The availability of manpower was a material factor; the ideology that determined their creation stemmed from the logic of the cultural, social, and political context.

The planning of gigantic residences for the afterlife is a sort of illogical logic. The dead body takes the space of just its size. The soul is not supposed to occupy physical space. Nevertheless, similar patterns of monumental tombs were produced by different societies, in different parts of the world, in Egypt, China, and elsewhere, by cultures that hardly even knew of the existence of each other. An element they had in common is that they were products of totalitarian regimes and cults of the personality. Big tombs were reserved for big chiefs. Poor people never had a pyramid or an army of statues for their burial.

The best monuments celebrated by the cultural glory of modern culture are products by forms of regime criticized by the same culture. Do bad regimes produce the best monuments and art? Is this a contradiction in logic?

The monuments survived but the ideological motivation changed. The embalmed pharaoh was then a divine being; now it is a good piece for a museum. The common factor is that logic varies, as does the cultural setting that gestates it.

Behavior reveals aspects of the logic of their makers. Some Australian tribes used to eat the meat of deceased people to make them continue living in the bodies of those who consumed their meat. It was a pious act. This sort of custom is the effect of pseudo-logic: meat of the dead is digested, alimentering the body of the living person. Thus, the dead person survives in the body that consumed his meat. The habit was still seen in 1914, when Walter B. Spencer described it. It does

not seem to be found today.

Animism was the result of a diffused pseudo-logic in early societies: whatever moves has an anima, a soul, and therefore the ability to make decisions. These abilities were also attributed to the sun and the moon, which move in the sky, appear and disappear, and so have a soul and a will. They were considered powerful divine entities, and people attributed to them events and facts that today's logic ascribes to other factors. In theory, logical thought varies with knowledge.

What about machines and cars: they move, do they have a soul? Some people believed this well before artificial intelligence became fashionable.

About half a century ago, in the middle of the bush, a few aborigines stood around a car they had turned upside down, with the wheels skyward. They were trying to detect the disease that prevented the car from moving. The happy encounter with a car of explorers helped define the disease and make the car move again. The car was turned back into the correct position, fuel was added, and the problem of the car was solved. The car was healthy again. To function, cars have to eat, like human beings, they need fuel to operate.

What affected prehistoric men's logical thought? Looking at the archeological remains that materialized their thought, prehistoric logic may well have been as diversified as contemporary logic, as evidenced by the articles of this issue.

The present issue of *EXPRESSION* journal considers aspects of both contemporary logic and prehistoric logic. Minor issues like deciding whether summaries in articles are useful or not, or facing the function of political trends in research, or considering whether a prehistoric painting in Borneo is or is not a scene, are part of contemporary logic. The present issue considers both, them and a variety of aspects of prehistoric logic.

An article by **David Lewis-Williams** reveals the logic of rain-making in terms rather different from those of a contemporary occidental mind. Among the San of southern Africa, a hunting-gathering people at the time of the described rock art and oral traditions, imaginary animals were involved in rain-making. The role and power of animals in the San spiritual and mystical invisible world were an essential part of the rich ideological patrimony.

The functioning of the rain-making process can be as

clear as it could be to an occidental mind, but the relative beliefs, the way of thinking, and the images in the rock art bring us into a fantastic peculiar logic.

Myths and beliefs lead to practices for water-getting that are successfully repeated; therefore, the logic of the actors performing these rites derives from the belief that it works, as it has worked for ages. However, such habits, after centuries of their application, are now being abandoned. Something is changing in the San logical way of thinking or in the power of the rain-making animals.

The article by **Emmanuel Anati** defines different styles and typology of rock art in the Negev desert, illustrating the varying figurative concepts from period to period. The Paleolithic early hunters used the spear for hunting and represented the prey in their rock art. Sometimes the animal is shown wounded by spears. It is caught in an image before being physically hunted. The figures are static. The prey is there, available, engraved on the rock surface. The syntax is that of simple association: animal and spear produce the story and the expected results.

Societies of late hunters, hunting with bow and arrow, on the other hand, used the syntactic system of the descriptive scene. The hunter is depicted while hunting the animal. Both hunter and hunted are in action; they are moving, running, acting. Even the arrow is moving, at times being described twice or three times: when it is delivered by the bow, in the air, and when it reaches its prey.

These are two different logical ways of conceiving the hunt. The Paleolithic early hunters synthesize the wished result in absolute, static images, a timeless permanent effect; the late hunters describe how to get it, having figured out the conceived scene of the moment of catching the prey. The images show two different logics in two different figurative styles. The typology, the iconographic style, and the syntax, the kind of association between graphemes, varies from period to period, expressing specific associative logical thought. In the Negev desert rock art, groups of different kinds of hunter-gatherers, pastoral societies, and caravan traders display different logical processes in their visual art. By considering recurring stylistic patterns it is then possible to define the type of society by the style of their art. Different patterns of life condition different logical systems, producing different typological

and stylistic significant patterns.

The article leaves some queries unsolved: how did the mental transition from one period to the subsequent take place? Why and how did logical thinking change from one period to the other?

Terence Meaden adds a new article to his research on the role of standing monoliths and their shadows in UK Bronze Age megalithic monuments. It unveils a logical pattern. Standing pillars produce shadows over other standing pillars; shadow and light reach different spots of the monuments at different times. The cooperation between the sun and moon and the builders of megalithic monuments created events in a conceptual cosmology, which Meaden is researching.

The story reveals aspects of the thought and of conceptual views of Bronze Age people. Figuring out what happened at these monuments at determined dates of the year, whether they were events, rituals, or future-telling, is interesting.

What was the purpose of planning these light and shadow effects and why the megalithic builders planned them is another query. Did these shadows have some functional goals? Are they just omens for determined economic activities, marriages, or other recurring events? What was the motivation of their conceivers?

Carol Patterson, analyzing North American rock art, explores the logical thinking of Pre-Columbian people. The rock art includes maps of valleys and territories. Geographical mapping appears to have been much more common among prehistoric people than previously thought. They had to understand and define the territory.

The decipherment of the pictograms and ideograms leads to reading the messages in an ideographic writing determined by a logic that had to be decoded. Once the system is defined, the way is open for reading the sequences of pictographic and ideographic messages of a pre-writing age, or rather, an age previous to phonetic writing.

A question remains open to debate: what was the function and use of this wonderful archive engraved on the rocks? Why did they make it?

Jitka Soucopova explores the logical reasoning of prehistoric nomads in the Sahara Desert. What was the purpose of quantities of grooves and cupmarks on the rocks of the desert? The author trusts that they are related with water, but why and how? Did they intend

to provoke rain? Was it part of a cult of water? Or did the habit have some practical functions?

Cupmarks and grooves are part of rock art all over the world and different interpretations are offered in Europe, Australia and elsewhere. Other hypotheses, like that of the sexual meaning of associating cupmarks and grooves, or that they had numerical meaning, being records of counting something, some time or some events, or conveying messages, are different expressions of researchers' logical thinking. Are indeed these grooves related to rainy water? With what purpose? The logic and reason of these grooves causes various assumptions to be made.

They are widely diffused in the Sahara Desert. The habit of making grooves seems to go back to a time in which the desert was not a desert but a green land full of game and other resources. Also, the age of these grooves remains a question: do they all belong to the early period of the green land, the age of hunter-gatherers, or did the habit of making grooves persist in successive dry periods? And what was its purpose? Why was it done? What did their makers think to obtain by making them?

In culture and research, creating new questions is as important as finding solutions. It is part of logical thought. Debates make research alive and solicit further research.

This issue of *EXPRESSION* journal brings together research results from southern Africa, northern Africa, the Middle East, Europe, and America. These various papers provide evidence for both the different trends of prehistoric logic and the different logical processes of the authors presenting the results of their research.

E.A.



Front page image

J.M. Orpen's copy of a painting showing the capture of a 'rain-animal'. The objects held by the men are probably containers with aromatic herbs believed to calm the animal. The copy was made in 1873. From Lewis Williams article, see p. 7.

A NOTE FOR THE AUTHORS

EXPRESSION is a quarterly journal on conceptual anthropology addressed to readers in over 90 countries. The readers are scholars and students in various fields of the humanities, mainly anthropology, archeology, art, sociology, and psychology, eager to keep alive the multidisciplinary dialogue, to communicate, to learn, and to open up new trends of humanistic studies. This journal offers space for expression and communication to researchers and authors from all over the world. Published papers are intended to be read, not just to be added to a bibliography. They are addressed to cultured and open-minded people.

If you wish to contribute a paper, consider that you are promoting your theme of concern and your ideas, try to make it interesting also to those who are not specialized in your specific research field. You have to talk to all of them, not just to the restricted circle of experts in your particular field. Articles are expected to be stimulating and agreeable to read by a broad audience. The target of EXPRESSION is to promote dialogue, communication, knowledge, and ideas concerning the intellectual and spiritual expressions of different cultures and societies. It is an open forum on conceptual anthropology where over 250 authors from 50 countries are publishing their research and their concepts. Your topic, even if related to a local or circumscribed theme, should awaken the interest of an international and interdisciplinary audience. The visual aspect is important for communication with the readers: images awaken interest and are memorized, enriching the impact of the article. Images and text should complement each other.

Authors should address readers openly, talk to them, be incisive, and avoid long descriptions, catalogues,

and rhetorical arguments. Refrain from unnecessary references, they may indicate the erudition of the author, but do not improve the scientific level of the article. Avoid excessive quotations, they may unveil an inability to express independent ideas. Use your own words and refrain from discursive sentences. Consider that short articles are more read and appreciated than long ones.

The main articles are proposing issues of broad interest. Communications on current topics, debates, and short notes can be included in the 'Discussion Forum' or in the 'Notes and News' sections.

Publication in EXPRESSION quarterly journal does not imply that the publisher and/or the editors agree with the ideas expressed. Authors are responsible for their ideas and for the information and the illustration they present.

Papers are submitted to reviewers, not in order to judge them but to help authors to better communicate with their readers, if needed. Controversial ideas are not censured if they make sense. Progress in research is often caused by debatable ideas. New thoughts and concepts are welcome; they may awaken debate and criticism and keep alive communication. Time will be their judge. If you have something new to say or to display you are welcome.

EXPRESSION is a free journal, independent and not submitted to formal traditional regulations. It offers space for ideas and discoveries, including contentious issues, healthy discussions, and imaginative and creative papers, if they contribute to research, are conceptually reliable, and respect the integrity, ethics, and dignity of authors, colleagues, and readers. For additional information on how to submit a paper, see the 'Notes and News' section.

DISCUSSION FORUM

The Discussion Forum invites readers to be active protagonists in debates of worldwide interest in Conceptual Anthropology.

CAPTURING THE RAIN IN SAN RITUAL AND ROCK ART*

J. D. Lewis-Williams
South Africa

In 1874 Wilhelm Bleek wrote: 'A Bushman painting will frequently help us to unearth a myth, legend, or fable, which otherwise would have been forgotten, and might have remained unrecorded.' More than that, he found a two-way pattern of illumination and wrote that what he called San 'mythology' and copies of their rock paintings 'will serve to illustrate each other'. Just such a case began to emerge when Bleek showed one of his |Xam informants a copy that Joseph Orpen had made in the Maloti Mountains.

This painting shows two quadrupeds of no identifiable species (Fig. 2). A group of four men is leading one of the creatures by means of a rope attached to its nose. Just below this group, two men with spears confront a second quadruped. Comparison of Orpen's copy with what remains of the images in the rock shelter shows that the lower animal is in fact by far the larger of the two. Moreover, numerous flecks of red paint, some of which are still visible on the rock face, are scattered amongst the images in Orpen's copy; unfortunately, they were omitted when the printer prepared the copy for publication. But, all in all, we can say that the copy that Bleek showed the |Xam man was accurate enough for us to be able to accept what he had to say about it. It was on 21 June 1874 that Bleek started recording his informant's remarks. But he seems to have been baffled by what he was hearing. What could all this about attaching a rope to a 'water cow', the |Xam in-

formant's phrase, possibly mean? He broke off writing down his translation on the second page, presumably so that he and Lucy Lloyd could discuss the meaning of what they were hearing. At the point where he suspended his translation he entered a note saying that the events that the |Xam man was describing appeared to him not to be 'literal', adding that 'the sense is apparently the reverse' – though he did not know exactly what 'the reverse' was.

A couple of days later Bleek received Orpen's accompanying article. It contains the explanation that his guide Qing gave for the painting. We are thus able to compare two independent explanations of the painting given by San men from different parts of southern Africa. When further copies made by George Stow of eastern Cape and eastern Free State rock paintings arrived in Cape Town, Bleek's |Xam people identified more instances of 'water cows,' each is in some ways unique, but they all clearly represent the same concept. In the end, these curious paintings, so baffling at first sight, came to be amongst the best attested components of San rock art.

The rain and its animals

The |Xam phrase that Bleek's informant used to denote the strange painted creatures was: *!khwa-ka xoro*. The first part of the phrase, *!khwa*, means both rain and water, but it is |Xam beliefs about rain that we must examine. The |Xam recognized two kinds of rain. A violent thunderstorm was said to be a 'male rain', while gentle soaking rains were known as 'female rain'. In the interior of southern Africa rain comes usually in the form of isolated 'male' thunderstorms. The San feared these storms because they sometimes blew

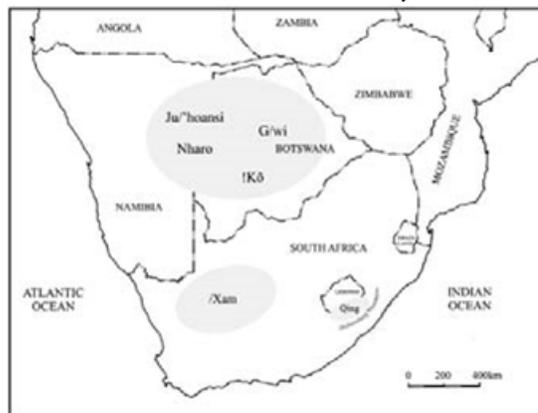


Fig. 1. A map of southern Africa showing the locations of San groups.

*This article, authorized by the author, derives from a chapter in a pocket guide, *San Rock Art*, by the same author (Jacana Media, Sunnyside, South Africa, 2011).



Fig. 2. J.M. Orpen's copy of a painting showing the capture of a 'rain-animal'. The objects held by the men are probably containers with aromatic herbs believed to calm the animal. The copy was made in 1873.

down their flimsy shelters. Nevertheless, when they saw a thunderstorm in the far distance across the vast semi-arid interior plains, they longed for it to move in the direction of their own camp. For them, rain was life. When it fell, tubers that had lain hidden beneath the parched land sprang up, and the veld was renewed. Then antelope were attracted to the new grass and bushes. Speaking of the much desired 'female' rain, a [Xam man put it like this: 'She will rain softly on the ground, so that it will be wet deep down in the middle. The bushes will sprout and become nicely green, so that the springbok come galloping.' Rain changed the life of the San, and the connotations of the [Xam word *!khwa* were thus different from those of the English word 'rain'.

The rain was also spoken of as if it were a person or being. It could be offended. If it was, it became violent. The [Xam said that it 'attacks the hut angrily, and the hail beats down on us breaking down the huts, and the cold wind gets in to the people in consequence'. Misfortune awaited any man who offended the rain: 'The man, because of whom the rain is angry with the people, is the one whom the wind first lifts up, and blows up to the sky. Then he goes floating about in the sky, then floats out of the sky and drops down into a pond, then he stays in the pond and becomes a frog.' The last word in the phrase, *!khwa-ka xoro* means any

large animal, such as a cow or ox; the suffix *-ka* forms the possessive case. The San in the eastern parts of the subcontinent were familiar with cattle owned by Bantu-speaking farmers and possibly Khoe-speaking herders. The whole phrase thus means 'large animal of the rain/water'. These animals were, like the rain itself, of two kinds. A rain-bull was the fierce thunderstorm, while a rain-cow was the gentler, soaking rain that often set in for some days.

Taking the parallels between rain and animals further, the [Xam named different parts of clouds after parts of an animal: columns of falling rain were called the rain's legs, while wisps of cloud were known as the rain's hair; mist was said to be the rain's breath. The thunderstorm was said to walk across the country on its 'legs'.

Controlling rain

Closely allied to the *!khwa-ka xoro* were *!khwa-ka !gi:ten* (sing. *!gi:xa*). The second part of this phrase means a shaman, one who is full of *!gi:*, that is, supernatural potency. The Bleek and Lloyd manuscripts suggest that these [Xam rain-controllers were mostly men, although women could be other kinds of *!gi:ten*. There is only one record of a female *!khwa-ka !gi:xa*. The *!khwa-ka !gi:ten* were said to capture a *!khwa-ka xoro* at night in a deep pool. They did this by throwing



Fig. 3. A rain-animal associated with a 'thread of light' and fish. (Eastern Free State)

a rope or thong over its horns. They then led the creature across the country to the place where rain was needed or to the top of a nearby hill, and then killed it so that its blood and milk fell as rain. If they did not take precautions, the rain-animal could break the thong and escape. Capturing the rain was a risky business. There was, however, a way of calming an angry rain: 'you do not seem to have remembered when you are seizing the water, that you should put buchu [aromatic herbs] on the things; you should have given the men who crept up with you buchu, so that they smelt of buchu. (If the bull had smelt buchu, it would have been calm and gone quietly without struggling.)'

A discrepancy between Qing's statement that the flecks among the images 'are things growing under water' and Bleek's informant's view that 'The strokes indicate rain' can be explained. The two men were thinking of different stages in a rain-making sequence. Qing thought that the painting depicted the capture of a rain-animal in a deep pool or river and therefore interpreted the strokes as some sort of aquatic plant. The [Xam man imagined a later phase in the rain-making ritual when the people were leading the animal across the country, the rain falling as they went.

The relationship between both kinds of rain and the *!khwa-ka !gi:ten* is crucial to understanding the activity of rain control. One [Xam man spoke about a *!khwa-ka !gi:xa* named ||Kunn, who was in fact his grandfather. The old man died between 1870 and 1873, but, when the informant was a child, he saw him and experienced his rain. We thus have here a first-hand account of a *!khwa-ka !gi:xa*. The informant said that 'his [emphasis added] rain came streaming from out of the west there, it went to the north, because he was from that part'. In another instance, it was said of a *!khwa-ka !gi:xa*, 'your rain feels that you do not speak

hastily. Therefore, your rain leaves off thundering and falls gently' (emphases added). Both these statements imply that a rain-controller possessed a specific, recognizable rain and that it was sometimes associated with the part of the land where he lived.

Bleek's oldest informant and himself a *!khwa-ka !gi:xa*, ||Kabbo (the name means 'dream'), spoke of a respected *!khwa-ka !gi:xa* who seems to have had the power to capture and kill either a rain-bull or a rain-cow, as he chose. But his preference was clear: 'I think that I will cut a mother rain that has milk, she moistens softly, her wind blows gently. She rains gently, because her clouds are soft.' Although an association between a *!khwa-ka !gi:xa* and a specific kind of rain rather than merely rain in general was repeatedly confirmed, some rain-controllers were able to exercise a measure of choice in the matter.

In view of the close association between a rain-controller and a particular rain, it seems that, in many instances, a rain-controller was associated with, and in all probability actually painted, a particular depiction of his own *!khwa-ka xoro*. A man could point to a painting of a *!khwa-ka xoro* and claim that it was his rain. That is why each painted rain-animal is in some measure unique, while at the same time being clearly a rain-animal. It does not follow that every painter was a shaman, or that every shaman was a painter. Nevertheless, the act of rock painting was closely associated with *!gi:ten* and the whole process of image-making was steeped in ritual.

This ritual context was characterized by the activities of San shamans. We may therefore wonder if the thong that rain-makers were said to throw over a rain-animal's horns was in fact another interpretation of a 'thread of light'. There are indeed paintings of rain-animals that are clearly associated with 'threads

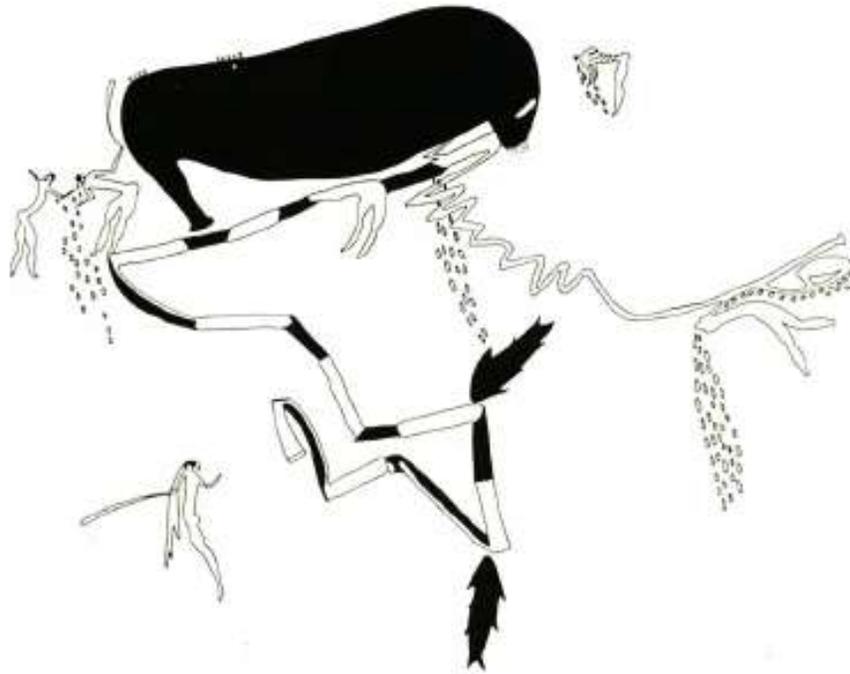


Fig.4. A rain-animal associated with a 'thread of light' painted in red and white segments. Human figures bleed from the nose. The fish indicate an underwater context. (Eastern Cape)

of light' that seemingly come from their noses. Some of these are associated with fish to indicate that they are underwater (Figs. 3, 4). Paintings like these are comparable to those that show shamans connected to antelope by 'threads of light': the line is the means by which both antelope and rain-animals could be controlled.

Rain-control locations

A study of rain-making gives us some valuable insights into the social life of |Xam bands. Many ethnographers have emphasized the essentially egalitarian nature of San society: no one appears to be richer or more powerful than anyone else. They have no chiefs and decisions (such as when to move camp) are communally taken following free discussion. But the activities of |Xam rain-makers give us new insights into how San shamans were regarded, even if they were in no sense wealthier or more overtly respected than other people.

Visiting between camps is a common feature of San life. Sometimes people undertook these journeys to solicit the aid of a rain-maker. In one instance, a |Xam informant spoke of people leaving early in the morning in order to reach the camp of a well-known

rain-maker. Such journeys were dramatizations of a rain-maker's social influence: suppliants had to travel to him. He was important.

This point brings us to the location and nature of rain-making sites. One rain-maker said that he would 'ride the rain up the mountain on top of which I always cut the rain'. The word 'always' suggests that this *!khwa-ka !gi:xa* had a specific, remote place to which he customarily went for his rain-making activities. Another |Xam man spoke of rain-makers killing and cutting up a rain-animal away from the camp. The rest of the people were at home when this happened, but they were watching the sky, and eventually saw that the *!khwa-ka !gi:ten* 'really seem to have their hands upon the rain-bull, for you see the rain clouds come gliding.' Later, the rain-makers returned to the camp. These reports raise interesting questions about the locations of painted rain-animal sites. Most San rituals are conducted in their camps. For example, when a Jul'hoan boy's coming-of-age scarification takes place after he has killed his first large antelope, the women, who should not see what is happening, simply leave the camp. (The isolation of boy initiates, now sometimes practiced, seems to be an idea recently borrowed from neighboring Bantu-speaking agriculturalists.) Si-

milarly, when a girl's puberty dance is held, the men leave the camp. The most important ritual of all, the trance dance, also takes place in the camp, but everyone is present. Most San rituals are thus not performed away from the place where people live their daily lives. While numerous rain-animals are painted in large sites where there are many other paintings and ample living space, there are other rain-animal sites that are small and isolated and have little or no living space. It is probable that these are sites to which rain-makers repaired when they wished to make rain out of sight of others. As such, these small sites were probably believed to be invested with special rain-control potency, and hence social importance. Each painted site was an element in a network of ritual locations that linked the various bands living in the extended landscape. In this way, rain-making differed from other shamanistic activities, such as healing, that were conducted in the camp where everyone could watch or take part. In many vastly different societies, knowledge of spiritual things is closely guarded and thus a foundation for social discrimination. But with the San it was not so much the knowledge itself that was secret (San shamans talk freely about their experiences in the spirit world) as the means of obtaining it: trans-cosmological travel by means of altered states of consciousness was not available to everyone. By travelling to an underwater realm, shamans had direct access to knowledge about rain-animals and rain-making procedures, whereas everyone else could access that knowledge only through the shamans. It was access to knowledge rather than its content that mattered. Secrecy associated with a remote place probably contributed to the San's ambivalent attitude to rain-makers: they feared and respected at least some of them.

In the nineteenth century, and probably before that as well, Bantu-speaking farmers employed the San to make rain for them. They sometimes paid them with cattle. The Bantu-speakers came to respect San shamans and on occasion sent their own ritual specialists to the San who lived in the Drakensberg to learn mystical techniques. Through prolonged contact and intermarriage, the southern Nguni Bantu-speakers absorbed clicks into their language and took over the San word !gi:xa, which became igqirha, usually translated as 'diviner' (in Bantu languages the palatal click is represented by q and the guttural sound x by an r). These thoughts about the importance of rain and rain-making lead us to wonder about the actual making of a painted image. Was the painting of an image as much a ritual as the trance dance itself?

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INDONESIA EARLIEST ART

CAVE ART IN INDONESIA BY 51,200 YEARS AGO: A PRESUMED HUNTING SCENE?

An article appeared in *NATURE* (631, 2024), signed by 25 authors, tells us about “Narrative cave art in Indonesia by 51,200 years ago”.

Both the conclusions and the images of this article raise some queries, since the figures defined as representing anthropomorphic beings are questionable. Should they really represent human beings, their sketchy way, according to the illustration in the publication, as compared to the naturalistic style of the animal figures, may arise doubts about their being conceptually conceived by the same mind and hand that painted the animal. The pig is about 1 m long and the presumed human figures are 10–20 cm in height. Being so much smaller than that of the figure of the pig they are supposed to be hunting, makes it unlikely to form a scene with that animal. The difference in size may signify evidence of the main subject in respect of the human actors; but the difference in style reveals the problem: a naturalistic large animal and hypothetical schematic traces of tiny human figures can hardly be considered a scene, unless the presumed human figures are a later addition by different hands, using the animal figure to produce a hunting scene.

If indeed they represent human beings, their style and concept are different, sketchy and approximate, facing a well depicted and far larger naturalistic and well-detailed animal figure. According to the published drawing, the posture of the presumed human figures does not seem to represent them in the act of hunting the animal.

And there is another query. There are other spots of

color in the illustration, near the so-called human figures. These color spots were part of some painting that has not been defined. What did they represent near the presumed hunters? The color patches interpreted as human figures could just be parts of painting accidentally having shapes resembling those of doubtful schematic humans.

Furthermore, naming the scene is daring speculative. Until all the traces of color are given a sense, the proper definition would be “a large animal figure and some traces of color near to it.”

The presence of a hunting scene would imply in the mind of the prehistoric painter the associative concept of fixing and representing a determinate moment or action. It is not impossible, but it would require more reliable documentation, including the explanation of the meaning of the other spots of color in the immediate vicinity. Animal figures being made individually, or in a sequence, or otherwise in association with each other, imply intention and mental processes different from the scene. Decoding the conceptual motivations for producing figurative images is a vital process of conceptual anthropology and each type of associative syntax has a different meaning. (Anati, 2023).

If indeed this is a hunting scene, and if indeed the age proposed is the same for the animal and the presumed human figures, it would be a scene, tens of thousands of years earlier than any other depiction of a scene known so far and would be a revolutionary statement in art history. But it is advisable first to be sure about it before promoting such an abnormal discovery.

References

- Anati, E., 2023. *The Typology of Rock Art* (Capodiponte: Atelier).
- Oktaviana, A.A., Joannes-Boyau, R., Hakim, B. et al., 2024. Narrative cave art in Indonesia by 51,200 years ago. *Nature* 631, 814–818. <https://doi.org/10.1038/s41586-024-07541-7>

E.A.

FORTHCOMING NEW DEBATES

Readers are proposing themes for debate. When at least three articles are submitted on the same theme, the topic is considered for a forthcoming issue.

- 1. OUT OF AFRICA: THE ETERNAL DIASPORA. WHY DID STONE AGE PEOPLE MIGRATE?**
- 2. WHY MEGALITHISM: THE LOGIC BEHIND.**
- 3. SEAFARING DEPICTIONS: RECORDING MYTHS AND EVENTS** Considering the story of seafaring and its earliest documentation.
- 4. MYTHS OF ORIGINS: WHERE DID THE ANCESTORS COME FROM?** Global and local traditions.
- 5. VERNACULAR DECORATIVE PATTERNS AND THEIR SOURCES.** Decoration of objects, huts or rock surfaces as the expression of identity.
- 6. THE ART OF HUNTERS AND GATHERERS:** Different patterns as expressions of different lifestyles and different resources.
- 7. ASIA – AMERICA CONTACTS IN PRE-COLUMBIAN TIMES** Migrations, Seafaring and colonization.
- 8. THE ART OF HUNTERS AND THAT OF FOOD COLLECTORS: IS DIET INFLUENCING TYPOLOGY AND STYLE?**
- 9. IS HOMO SAPIENS THE INVENTOR OF FIGURATIVE ART? Is visual art the sign of his presence?**

PROPOSALS FOR NEW DEBATES

Proposals for papers and suggestions on these and other issues are welcome.



Fig. 2. A Bedouin in the process of engraving what is currently named Wassum, or tribal mark, on a rock in Nachal Avdat (Archives Anati 1954).

carpets enable one to define their time and cultural belonging. Like the shape and patterns of pottery or flint implements, the style of rock art reflects the culture that produced it.

The standard typology of rock art recognizes six major typological horizons determined by the pattern of life:

- Archaic hunters and hunter-gatherers (no bow and arrow)
- Archaic gatherers (food collectors)
- Evolved hunters (using bow and arrow)
- Animal breeders (pastoralists)
- Populations with a complex economy (farmers)

Others: minor rock art groups of fishers or snail collectors. The bulk of the rock art falls within the five categories *

The rock art of the Negev is mainly of the types 1, 3, and 4. As a working system each recognized horizon is given a code of reference in roman numbers.

*For areas of diffusion and comparative patterns see Anati, 2017. The terms used, as Neolithic or Bronze Age, refer to desert conditions. Neolithic is usually related to agricultural settlements which are not present in the desert. Bronze Age, in Near-eastern fertile lands, imply urban settlements which are not found in the desert. The material culture associates the cultural horizon of the desert to that of fertile lands, though the way of life and the archaeological remains are different.

- I: Early Hunters (Paleolithic to Neolithic).
- II and III: Late Hunters and Incipient Animal Breeders (Neolithic to Bronze Age).
- IV: Animal Breeders, Pastoralists (Bronze Age to the Roman period).
- V: Farmers and Traders, Complex Economy (Hellenistic, Roman and Byzantine Periods).
- VI and VII: Bedouin, Animal Breeders (Islamic period).

These same **horizons** of rock art are present in various areas of Jordan, the Arabian Peninsula, Sinai, the Eastern Desert of Egypt and in some cases, elsewhere in North Africa. *

ELEMENTARY ANALYTICAL PROCESSING

Relative chronology

In Near Eastern deserts, as elsewhere, one of the criteria according to which men chose the rock on which to engrave was the shade of patina. This patina is a crust of dark color which becomes darker with age. The engraving eliminates the surface, revealing the lighter interior part of the stone creating a contrast of colors between it and the surrounding surface. The process continues and the engravings also become patina-coated until acquiring the same shade as the surfaces.

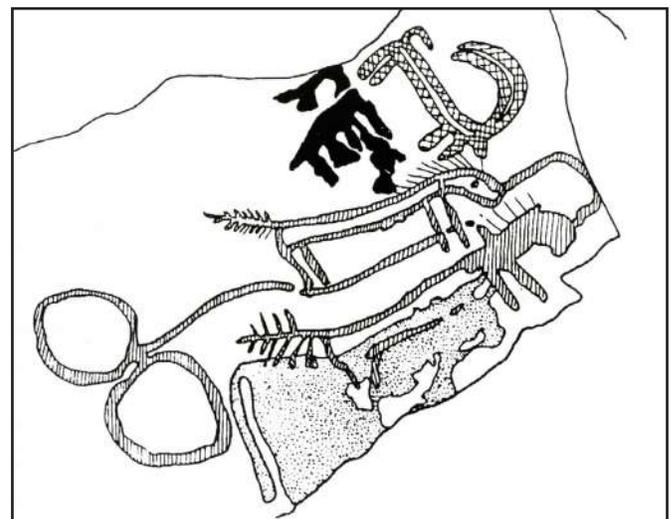


Fig.3. An example of engravings in superposition. Four different shades of patina. The oldest is that of a cow of horizon III. At the center of the tracing there is a two-wheeled chariot pulled by two animals, horses or donkeys, classified as horizon IV-B. On the top-right, the figure of an ibex, horizon IV-C or V. Finally, in black, a schematic animal figure of horizon VI. (Ein Qudeirat, Northern Sinai, Egypt. Archives Anati, 1979).

The postulate that light patina means recent and dark patina means old requires caution. The shade depends on the composition of the rock structure and on the varying influence of natural elements such as exposure to rain, humidity and sun.

In the area of Har Karkom, the engravings of a rock surface, which was excavated, under an Early Bronze archeological layer, had a light patina and appeared as recent (Anati, 1987a). The same concerns an engraving from the Uvda valley, found under an Early Bronze Age level in an excavated structure (Eytan, 1979). The shade of patina may provide a hint, but alone cannot be a reliable element of chronology. However, different shades of patina on the same rock surface can constitute a horizontal stratigraphy, defining the relative succession of phases. (Anati, 2006b).

Methods of direct dating rock art by analyses of organic or physical elements are so far experimental, having produced contradictory results, may be unreliable and misleading.

Figures of datable weapons and tools may provide their age. Figures of extinct fauna provide an antequem age, supposedly, they cannot be posterior to their extinction. Subject matter is another chronological element: the figure of a domestic dog cannot be older than the time in which the dog was domesticated. The content of a horizon defines its cultural identity. Horizontal stratigraphy defines the succession of horizons.

Typology

Typology is the grammar of rock art. The main subjects represented in world rock art are: 1-anthropomorphic; 2- zoomorphic; 3-objects, tools and weapons; 4-structures and topographic plans; 5-symbols or ideograms; 6-others (rare: vegetation, personal portraits or landscapes). Each grapheme is either a pictogram, an ideogram or a psychogram (Anati, 2023). Pictograms are often accompanied by ideograms and psychograms as a mean of communicating contents.

Each rock art assemblage focuses on one or more of these subjects. Usually there is a dominant subject defining the character of the assemblage. In the sequence of the Negev, the early styles tend to have zoomorphic pictograms as dominant theme, the evolved ones anthropomorphic, and the last phases symbols or ideograms. But there are exceptions to this general overview.

Syntax

The syntax (association of graphemes) of rock art reveals the cognitive processes of their makers. Four main types of syntax are present in world rock art: S1-single isolated graphemes; S2-simple association of two or more graphemes; S3- sequence and other graphically organized associations (inscriptions belong to this type); S4- scene describing an action or a moment; S5- other types, if any, are rare exceptions.

In the rock art of the Negev, the early phases usually follow the first two syntax types, the evolved phases the third and fourth, and the final phases various combinations including all four types. Single schematic ideograms, so-called wuassum or tribal marks (S1) are dominant in latest assemblages.

Style

Style may be defined as naturalistic, realistic, idealized, schematic, non-figurative or aniconic, then, static or dynamic, that is standing images like icons or images in action. **Naturalistic** implies careful presence of details in well-shaped figures. **Realistic** implies figures with essential typical features. **Idealized** implies the tendency to idealize shapes and/or details. **Schematic** implies a simplification of images. **Non-figurative** or **Abstract** is when the researcher is unable to define an image.

The primary definition of an assemblage could be limited to the basic three factors of grammar, syntax and style, defined with a single word each. The combination of these three words locates the class in its conceptual place and frequently also in its ethnological and chronological context.

Horizons and Classes

A rock art **horizon** is a conceptual assemblage which may represent a cultural pattern, an age or a regional typology. A **class** is a group of engravings or painting displaying specific characters in style and typology. It may look obvious but it is still worth saying that in order to classify a class such a class should first be identified and defined.

Several typological classes may exist in the same area and even on the same rock surface and may even be contemporary with each other. The class indicates a peculiar way of representing and therefore of looking at things, indicating a way of thinking.

A rock surface is a **unit**, which contains one or more

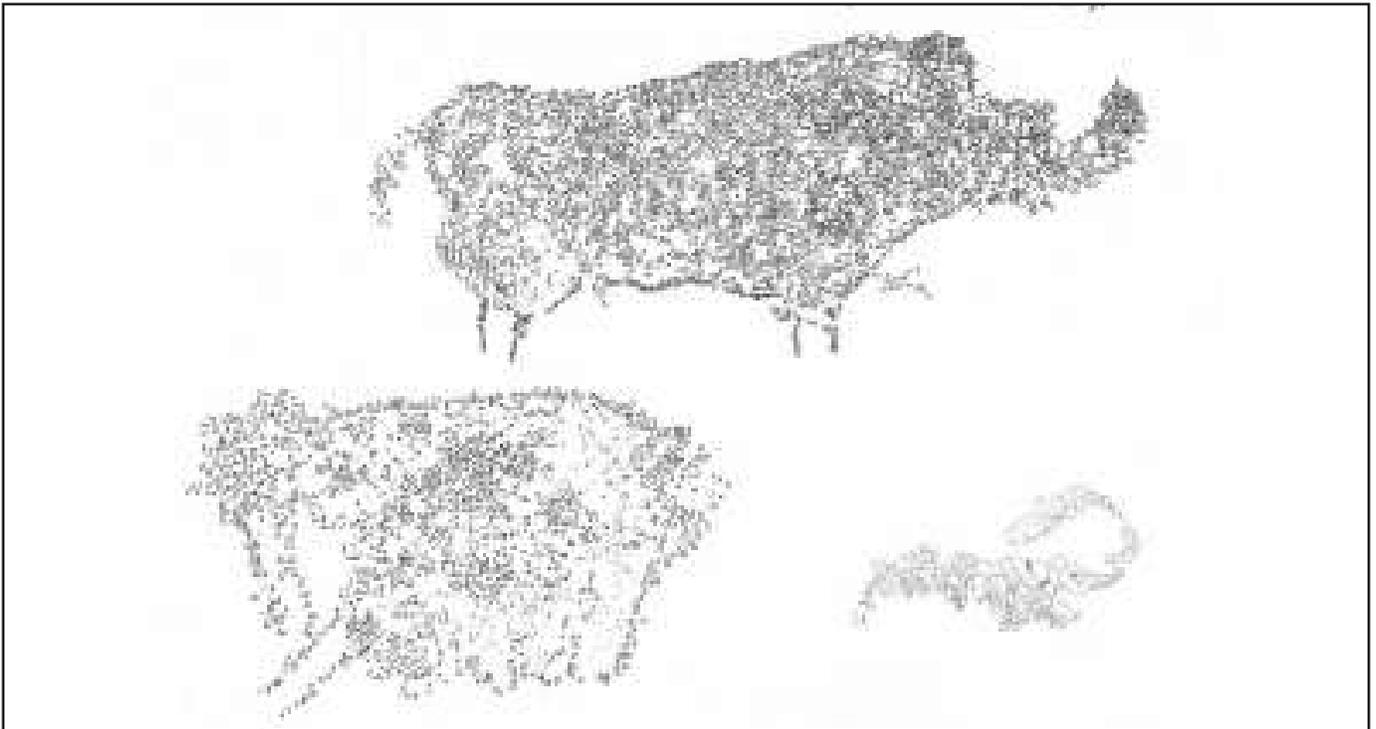


Fig. 4 A-B. Aerial view and tracing of geoglyphs, associated to Paleolithic basements of huts at Har Karkom, in the southern Negev. Some of the geoglyphs (pebble drawings) are over 30 m. long. The tracings show geoglyphs likely to represent a rhinoceros and two elephants (Photo EA94.II-27. Tracing by Mailland, cf. *Expression* 43, 2024).

horizons of rock art, which may have been produced by a single hand or by different people in different times.

Ethnographic analysis.

The ethnographic data deriving from the rock art is a mean of cultural definition deriving from the content of the graphemes. It consists in sorting out economic and social activities, types of weapons, tools and objects, details of dresses and hairstyles, images of living structures, animal enclosures or hunting traps, religious and magic icons and performances, and any other traits contributing to defining the ethnographic frame.

Ethnographic elements include equations between quantities of male and female figures, wild and domestic fauna. In the Negev rock art in most horizons, male figures prevail on female ones; wild animals prevail in early horizons and domestic ones in late horizons.

Such ethnographic analysis makes sense when referring to specific horizons or classes. It would have little meaning if it included all styles of all periods. The ethnographic analysis has to take place individually on previously defined horizons and define the society that depicted them.

Changing in style, changing in patterns of life

Every horizon of rock art is the effect of the socio-economic setting. Rock art is a mirror of its maker. The oldest Near-eastern engravings reflect a hunting life style. Wild animals are the dominant subject, extinct animals are represented, no domestic animals are represented, human figures are rare or absent.

The introduction of animal breeding is accompanied by new kinds of weapons and tools. The human figure becomes the protagonist. Besides such obvious elements, the style, the subject matter, the types of grammar and the syntax undertake changes.

Meaning

Typology and chronology are the necessary bases to go further. Defining the various aspects of grammar and syntax provides data for research, to allow the successive step: decoding what the makers of rock art intended to convey. This research may be carried on by comparative studies of defined horizons. Tribes having different traditions and languages may have different meaning for similar signs. The main target of rock art

studies is understanding the meaning of graphemes containing the thoughts and messages of their makers.

THE ROCK ART OF EARLY HUNTERS

Horizon I (Paleolithic to Neolithic)

The earliest figurative rock art known in the Near East is that of engravings from central Arabia, which include figures of extinct Pleistocene fauna. Kilwa in northern Arabia, is the major known concentration of Pleistocene rock art (Horsfield and Glueck, 1933; Rhotert, 1938).

Large size pebble-drawings (geoglyphs) of animals and small figurines in flint and other stones are other kinds of figurative art. The fauna represented includes the rhinoceros and the elephant, which became extinct in the region over 20,000 years ago.

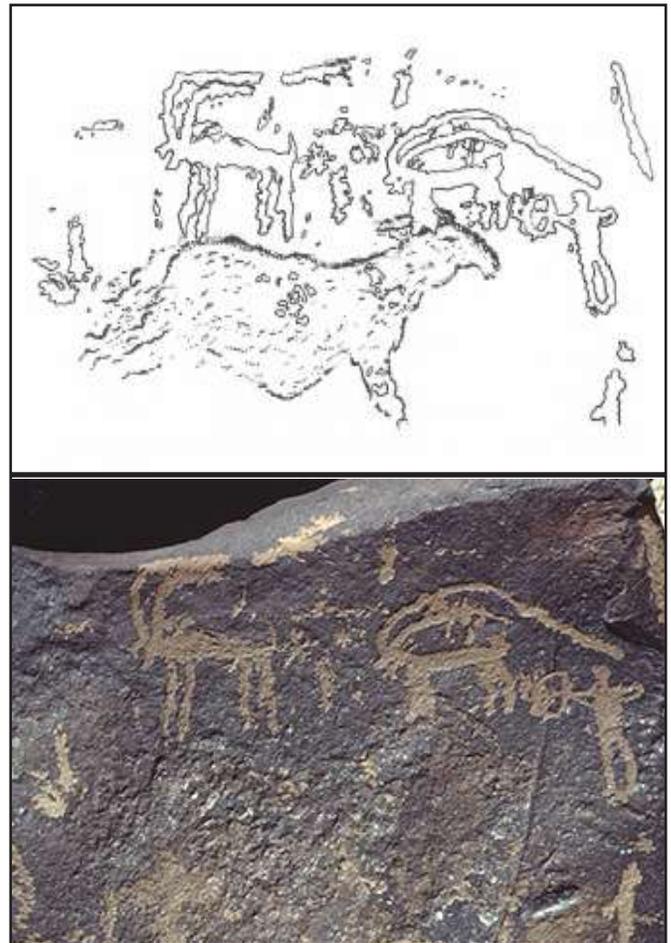


Fig. 5 A-B. Tracing and photo of an engraved rock surface at Har Karkom, with a large animal figure, likely an extinct type of caprine (Horizon I, Early Hunters), superimposed by a hunting scene of horizon IV-A (Chalcolithic or Early Bronze age). (Site HK79-b. Tracing after Anati,2001b; photo EA92 CIV-26. Base of tracing, m.1,30).



Fig.6, Engraving of headless steatopygic female figure with prominent breast and gluteus. (Hasna, Sinai, Egypt. After Zboray, 2014)

In a rock shelter in the region of Hasna, in northern Sinai, a number of wild caprines, camels, bovines and two anthropomorphic steatopygic figures are incised with a deep scraping technique reported by Zboray (2014). If indeed the engravings are authentic, the style is that of Early Hunters. Steatopygic people in this region are unknown. Considering also the depicted fauna, they could belong to the final Pleistocene and represent people reaching from Africa.

In the southern Negev, at Har Karkom, the large figure of a ruminant (base nearly 1 m.) is engraved with the body partly covered by peckings. A few thinly engraved small animal figures are tentatively attributed

to the Early Hunters. In the highlands, in a Nahal Avdat cave, some engraved lines and the retouching of natural fissures are likely belonging to this horizon. The engravings of this cave suggest that rock paintings, now disappeared, may have accompanied the surviving engravings.

Subject: The main subject of horizon I is zoomorphic figures. At Kilwa, one of them is over 2 m in length. There are also finely incised small figures, almost miniature. These are two different styles in the same horizon, not necessarily produced by the same people.

Technique: Incision has a varying depth, sometime it is rather deep, almost always a U-shaped section produced by pecking. Incised V-shaped sections are present in a few thin-line engravings. Small images are executed with both, the incision and the polishing technique.

Grammar: Some figures may include indirect psychograms, like two lines coming out of the mouth of a wild caprine, probably indicating its expiration or the numerous dots on the body of another animal figure, along with an arrow or a spear, likely to indicate wounds or blood. The main subject is game; some of the animal figures are depicted as wounded. The Breuil traditional school defined them as expression of "Sympathetic magic": catching the prey by representing it, before hunting it.

Early Hunters rock art, at Kilwa and elsewhere, has no figures of the domestic dog. The dog is considered the oldest animal to have been domesticated by man in



Fig. 7. Detail of a rock surface with pecked engravings of horizon VI (Islamic), and finely engravings of animal figures, of horizon I (Early Hunters). (Length of the central figure, cm.34. Beer Karkom, Southern Negev, site 183. Photo EA96 XVI-21).



Fig. 8 a-b-c- The cave near Avdat, in the Central Negev, with traces of engravings tentatively attributed to horizon I, during a seminar with Prof. Anati (Anati Archives 2012).



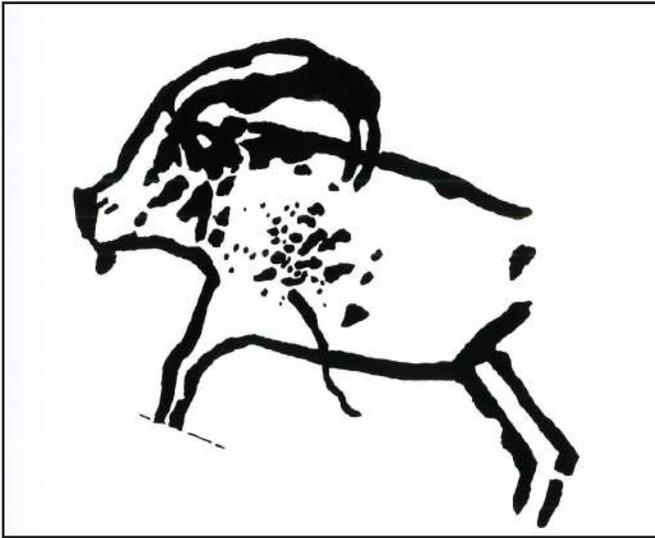
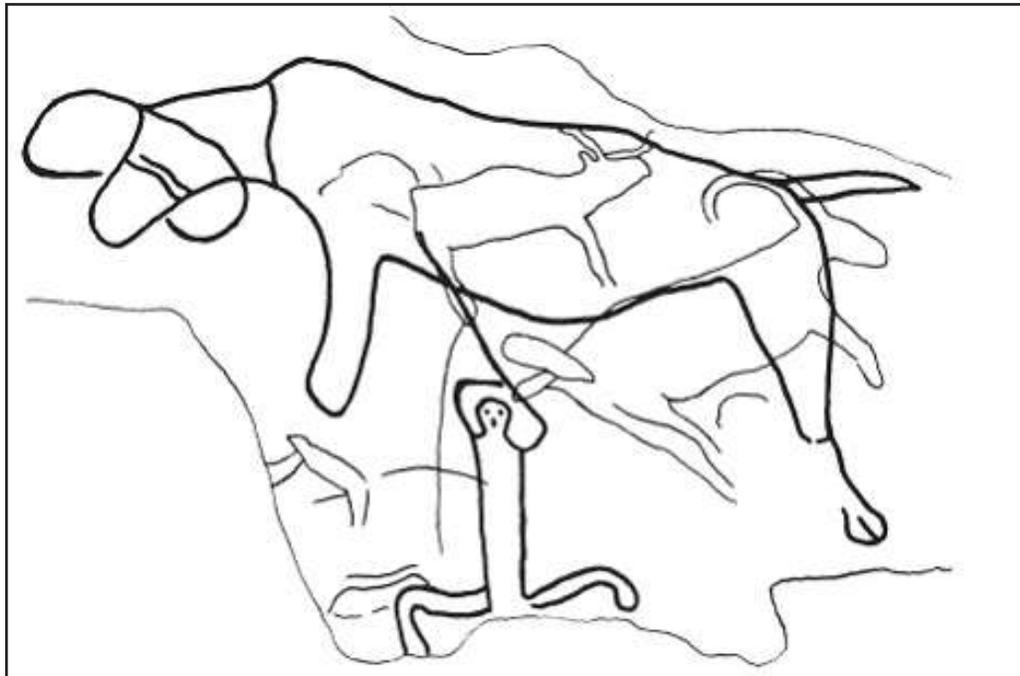
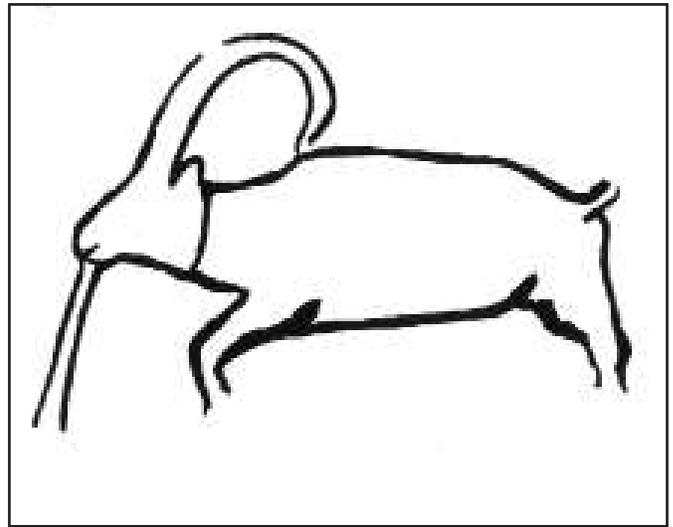
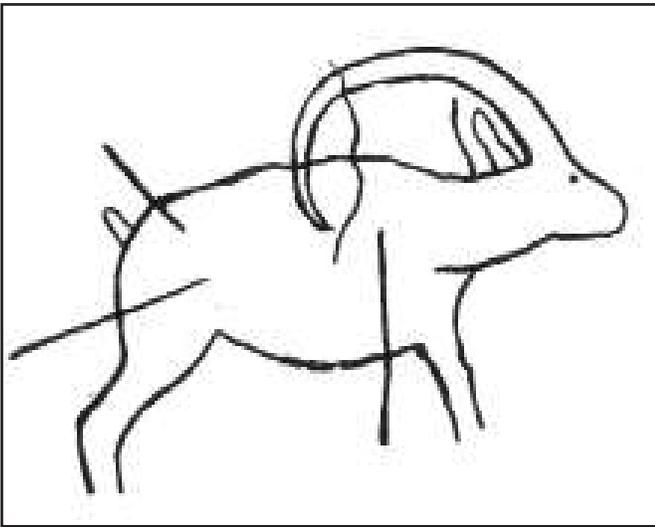


Fig. 9 a-b-c-d. Rock engravings of animal figures, some of them blessed by arrows or spears. In fig. D, superposition of two phases shows two different engraving techniques, thin engravings in the early phase and deep engravings in the second. The later phase shows what seems to be the hunting of a large bovine. (Kilwa, Northern Arabia. Base of tracing D over 2 m. After Anati 1979. To compare with photos cf. Rhotert, 1938).



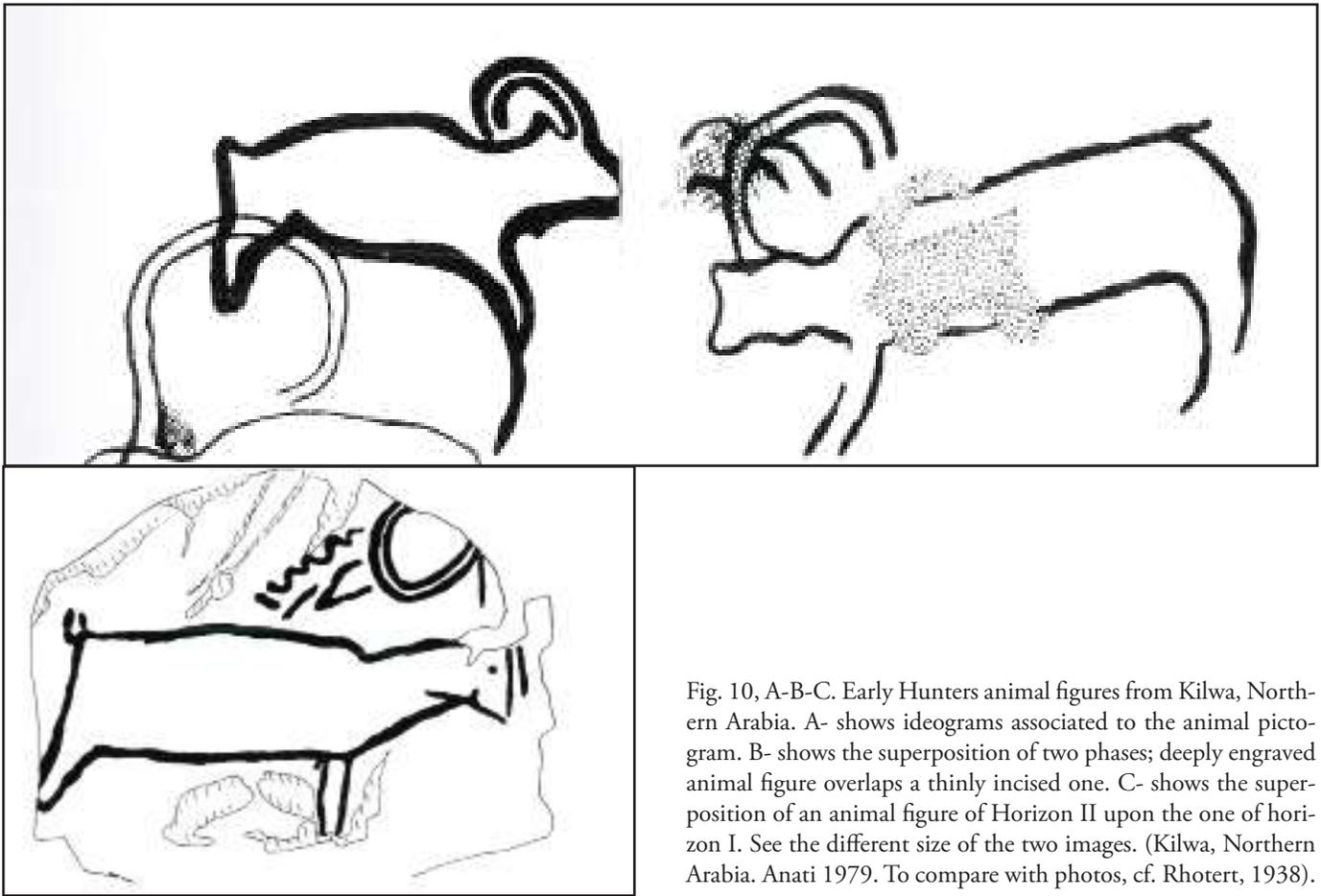


Fig. 10, A-B-C. Early Hunters animal figures from Kilwa, Northern Arabia. A- shows ideograms associated to the animal pictogram. B- shows the superposition of two phases; deeply engraved animal figure overlaps a thinly incised one. C- shows the superposition of an animal figure of Horizon II upon the one of horizon I. See the different size of the two images. (Kilwa, Northern Arabia. Anati 1979. To compare with photos, cf. Rhotert, 1938).

the Near East, and seems to be present already 15,000 years ago in the 'Mesolithic' Natufian culture. (Garrod, 1957).

The *syntax* is of the simplest kind: usually the animals appear as isolated, sometimes being accompanied by ideograms. The prevailing syntax is that of isolated graphemes (S1). A doubtful copulation scene and a probable scene describing the catching of a wild ox are the only presence of scenes and the only cases known of human figures. (S4). They could be late examples of Early Hunters art.

LATE HUNTERS AND EARLY PASTORALIST

Sedentary People living in the Fertile Crescent in the Neolithic and Chalcolithic periods developed a farming economy and various styles and types of art. The nomadic tribes moving in the arid zones produced rock art. Climate may have changed but where there are no permanent settlements the area is defined arid. Horizons II and III of rock art represent a period where the peripheral regions of the Middle East are populated by human groups relying on hunting, animal rearing and incipient metal exploitation. It broadly corresponds to what the in fertile areas is the Neo-

lithic, Chalcolithic and possibly the beginning of the Bronze Age.

Horizon II-A

This horizon has its main center is in the Arabian Peninsula and the Negev is a peripheral area of its diffusion (see *Expression 33*, 2021).

Typology and grammar: Horizon II-A is mainly composed of assemblages of animal figures. In the Negev images mostly represent a wild fauna, the ibex being the principal depicted subject. In Arabia this horizon includes, beside wild animals, large groups of domestic oxen and goats, accompanied by images of anthropomorphic herders. The economy is based on both hunting and pastoralism (Anati, 2021).

Style: Design shows a marked tendency to rounded forms. A few animals have all four legs shown as pairs of spindly lines but in most cases, they have C-shaped bellies whose arched form is continued downward by elongated wedges. These acquire a triangular shape and depict the front and hind pairs of legs.

The elegant, stylized lines of the figures display the peculiar graphic tendency and harmonious sense of esthetic. These rock pictures show similar stylistic tendencies with southern Mesopotamian ceramic deco-

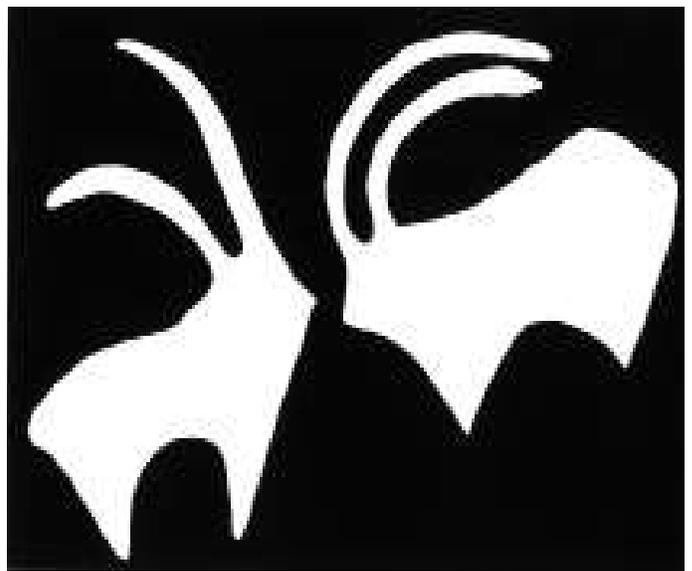
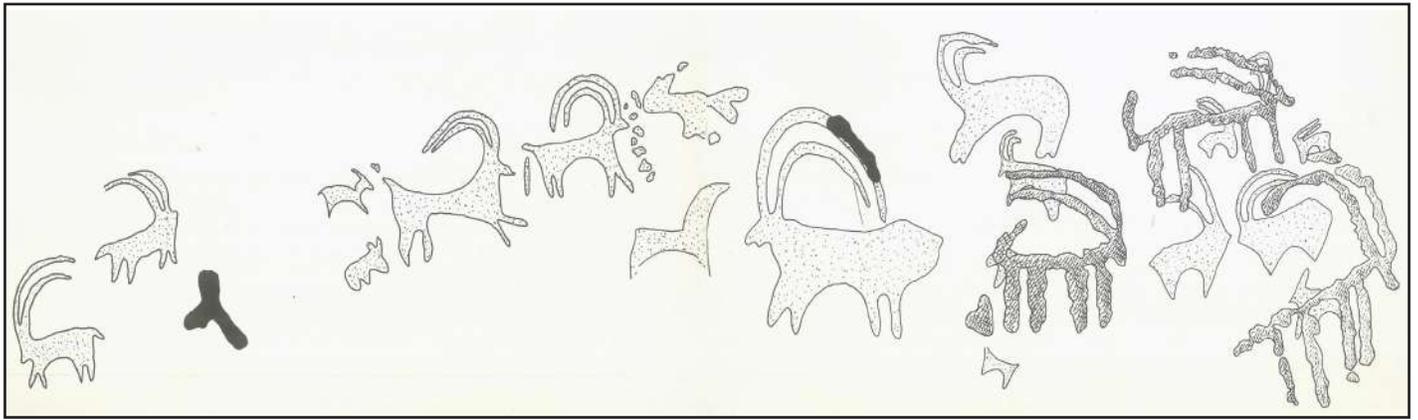


Fig. 11, A-B-C-D. Rock engravings of horizon II superimposed by engravings of horizon IV. Fig C- shows the material culture collected at its foot. Fig D is a detail of the same surface (Nachal Avdat, Central Negev. After Anati 1979).

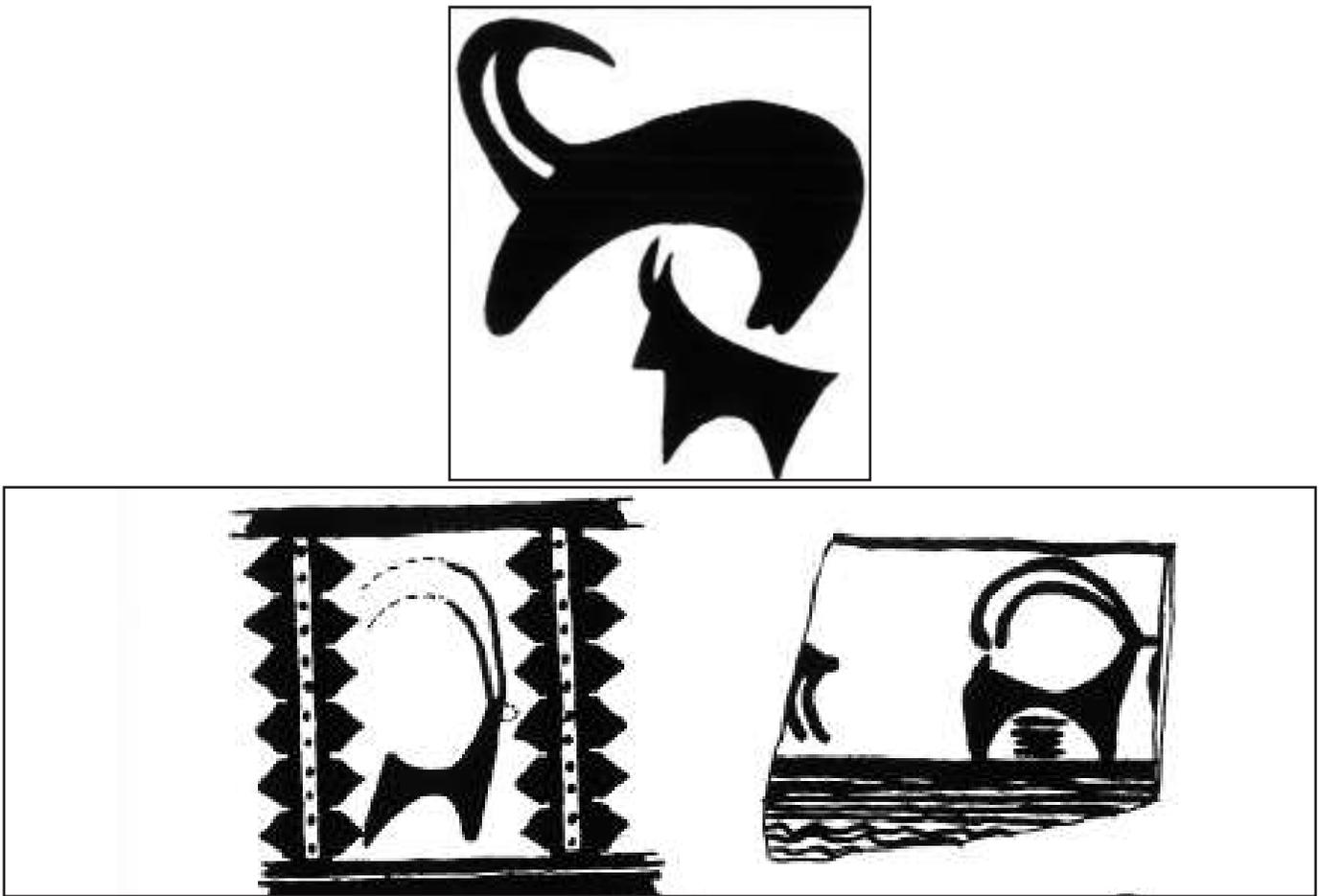


Fig. 12. A-B-C. Images of horizon II from the Negev, and figures of pottery from Tepe Giyan, Iran (After Conteneau, Ghirshman, 1935).

ration. This does not necessarily define the same date. This rock art style in Arabia is likely to have lasted a long period, both before and after the pottery images.

Engraving technique: The main engraving technique is characterized by thin and dense dotting and rather sharp outlines, indicating the use of indirect pecking, that is one hand holding the pecking tool and the other a hammering tool to beat on the pecking tool. This technique is more common in early horizons than in later ones.

Most of the images have entirely dotted areas. Linear design and outlined figures appear to have been sketched first and then filled in with dots. Outlines are precise and sharp.

Stratigraphy: At Kilwa (Northern Arabia), engravings of this horizon are overlying engravings of horizon I. In Nachal Avdat (Central Negev), three horned animals of horizon IV (at least 2,000 to 3,000 years old) overlie a group of ibexes of horizon II. The difference in patina between horizon II and the superimposed horizon IV seems to indicate that the lapse of time between the two phases is at least as long as the that from

the three late animals to present. It gives a general idea about its age.

Association to material culture: In a flat area, just in front of a rock engraved with this style, in Nachal Avdat, a quantity of surface pottery and flint implements were classified as belonging to several periods from Late Neolithic to Early Bronze Age. A similar way of life of hunting and herding people is represented by the Chalcolithic and Early Bronze Plaza Sites. Various horizons of rock art are present in their vicinity but without clear elements of association (Anati, 1987).

Cultural context: The Chalcolithic relations between the two edges of the Fertile Crescent, Mesopotamia and the Syro-palestinian area, are indicated also by findings of material culture, mainly in a hoard from the Judean Desert (Bar Adon, 1980).

The biblical stories in the book of Genesis, of migrations of the patriarchal clans from Mesopotamia to Canaan, to our mind, refer to traditions going back to the same period. Particularly relevant is the account memorized by Genesis 14: people from Southern Mesopotamia were colonizing the Negev.

Horizon- II-B

A different class, likely contemporary to horizon II-A was recorded at Har Karkom and in the Arava Valley. It was identified late, after the different rock art horizons were defined and it was given the attribution of II-B. It is primarily composed of ideograms, which include schematic anthropomorphic and zoomorphic schemes, ladder patterns and net patterns. Some ideograms may have a numerical value. Some association of graphemes looks like records of counting quantities of something. The repetition of ladder and net patterns must have a conceptual meaning.

The *syntax* is that of an accumulation of ideograms; sometimes there are schematic compositions looking like messages in a sort of ideographic writing. These patterns do not look as if they belong to either hunting or pastoral populations. They represent a different conceptuality

Diffusion: this style has been found so far in a limited number of sites in the Har Karkom area and in the Arava valley, where it is near the copper ores of Timna and at Nahal Odem. The similarity of the style and grammar to that of the Copper Age rock art related to metal ores in the Moroccan Atlas Mountains has suggested that it may be related to early metal surveyors (Anati, 1979, pp. 40-41).

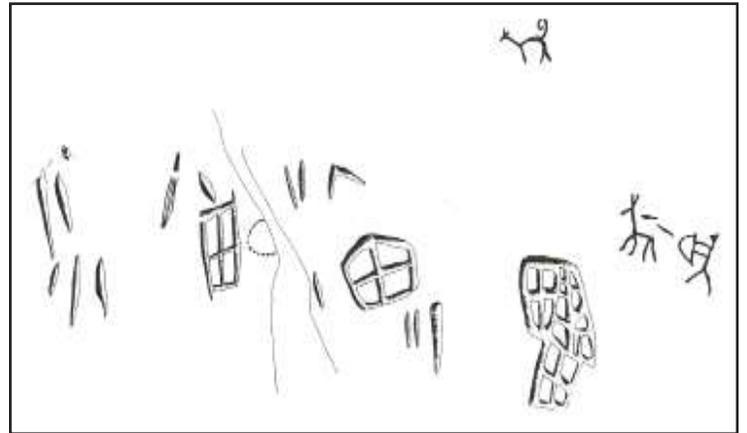
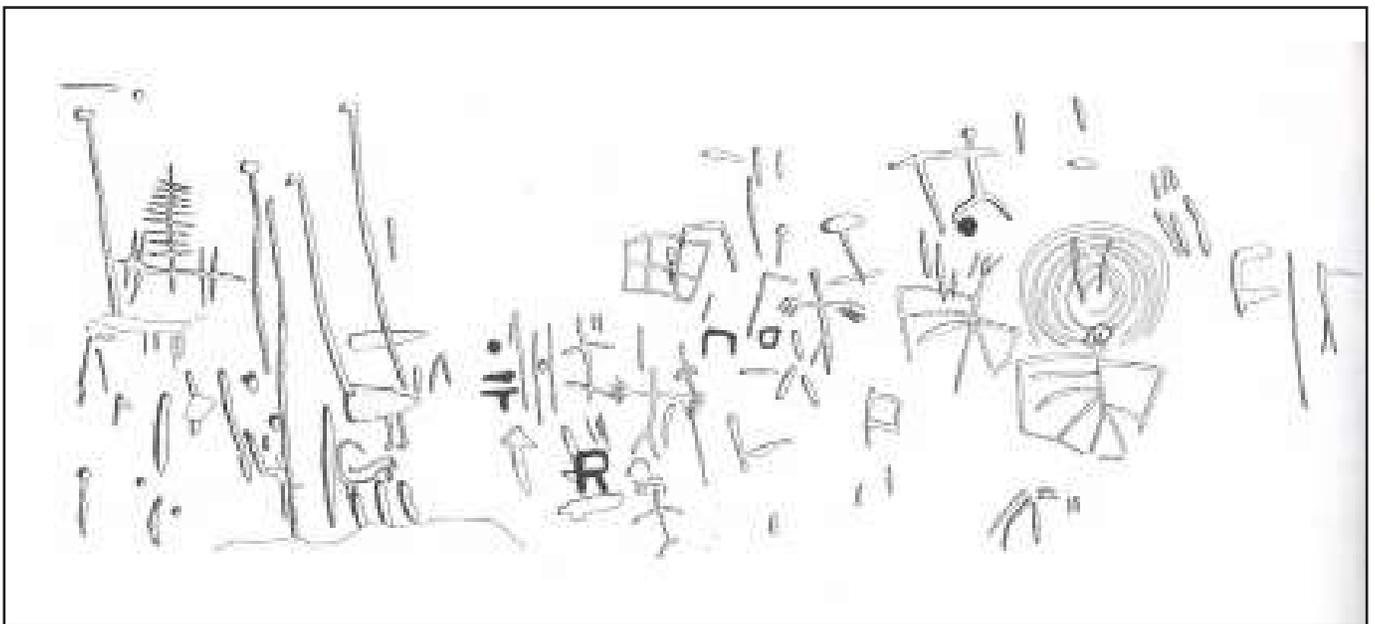


Fig. 13 A-B-C. Rock engravings of horizon IIB, from Nachal Odem, in the Arava Valley (After Anati, 1979).



Horizon III

The realistic-dynamic style represented by horizon III is a widespread stylistic pattern related to Late Hunters using the bow and arrow. It is characterized by well-proportioned, harmonious forms and sometimes by idealized exaggerations of horns of bovines or caprines.

Typology and Grammar: human figures, have both, long skirts and shorter garments around the ankles, likely of leather. Some of the human figures appear to be naked. Two kinds of bow appear, one is small and single-arched and the other is larger and double-arched.

In the Negev, the principal animal depicted is the ibex. In Sinai there are figures of long-horned oxen, it is not clear whether they are wild or domestic. Felines are part of the wild fauna and the lion is frequently represented.

Engraving techniques: usually, design is sure and precise. The engraved surfaces are homogeneously dotted and details like the eyes and the beards of ibexes and the open mouth of dogs running after game are emphasized. The four legs of the animals are marked separately, and the tails are frequently represented with special accuracy.

Both anthropomorphic and zoomorphic figures have entirely dotted, engraved or polished bodies. Outlined

figures are present but not common.

Syntax and style: The dominant syntax is that of the descriptive, anecdotal scene. In no other class of Near-eastern rock art does composition reach such well-conceived complex scenes including humans, dogs and game, even over 10 subjects in a dynamic action. They generally cover entire rock surfaces and have the irregular edge of the smooth surface on which they are depicted as the natural frame.

The composition concept of this style emerges in peculiar traits. In order to show that the arrow is aimed at a certain animal, the arrow is sometimes depicted several times, displaying its trajectory: when fired with the bow, then in the air and finally while wounding the game. The mouth of dogs running after wild game is frequently magnified, and a line connects it with the leg of the attacked animal. All the figures depicted are often made touching each other.

A difference in the size of each picture gives a rough, realistic image of a three-dimensional scene where each subject stands at a different distance from the eye of the observer. Scenes do not have a landscape background. The setting is just the shape of the rock surface.

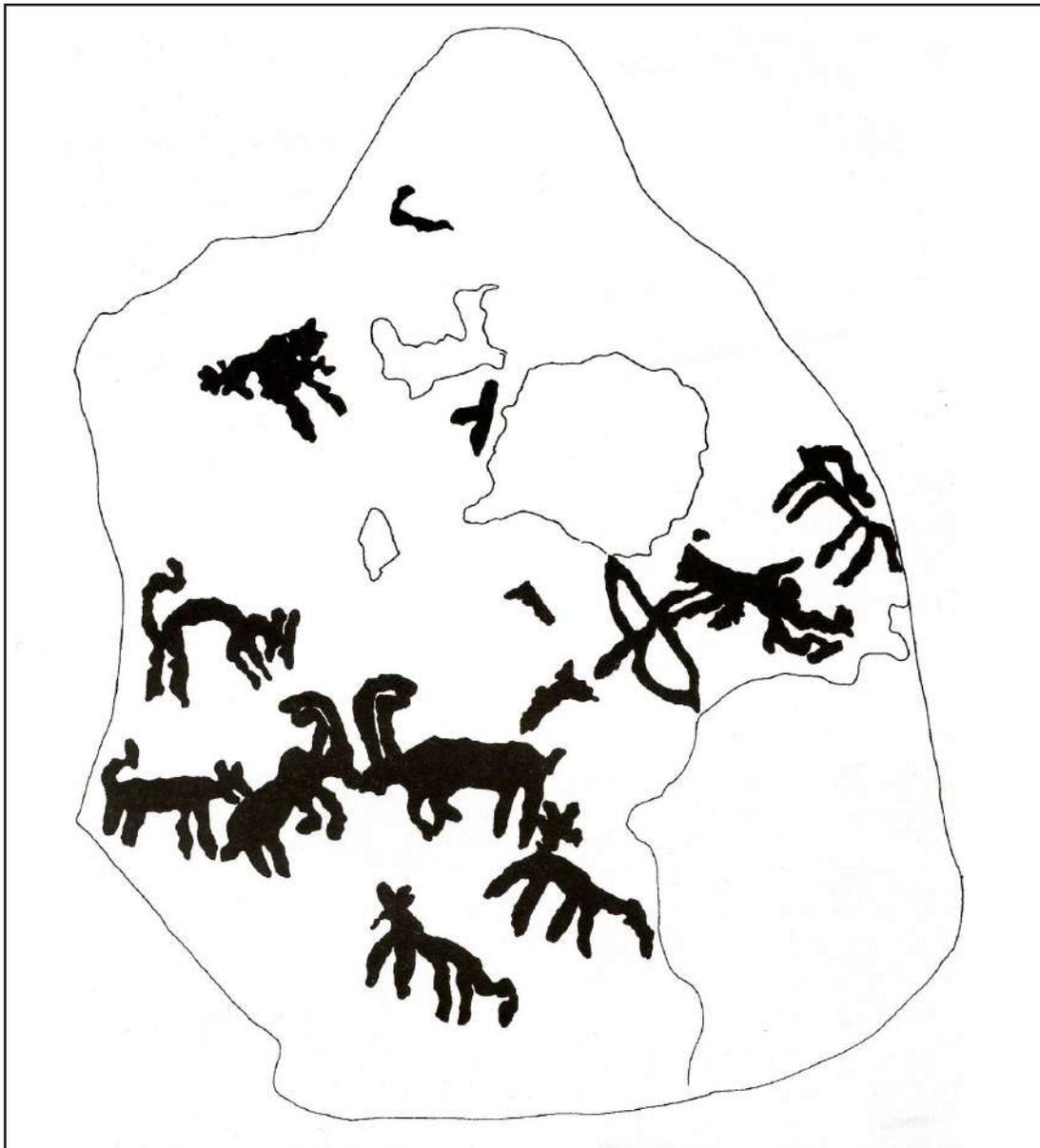
Cultural context: while not far away in the Fertile Crescent, urban civilization had a high degree of sophistication and the economy had the complex structures implied by public buildings, organized trade and



Fig. 14. Hunting scenes related to horizon III from Nachal Avdat in the Central Negev (After Anati 2023).



Fig. 15 A-B. Hunting scenes related to horizon III from Har Kar-kom in the Southern Negev.



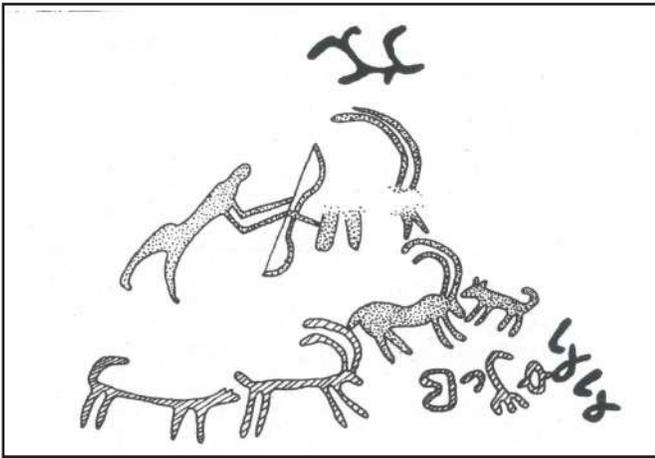
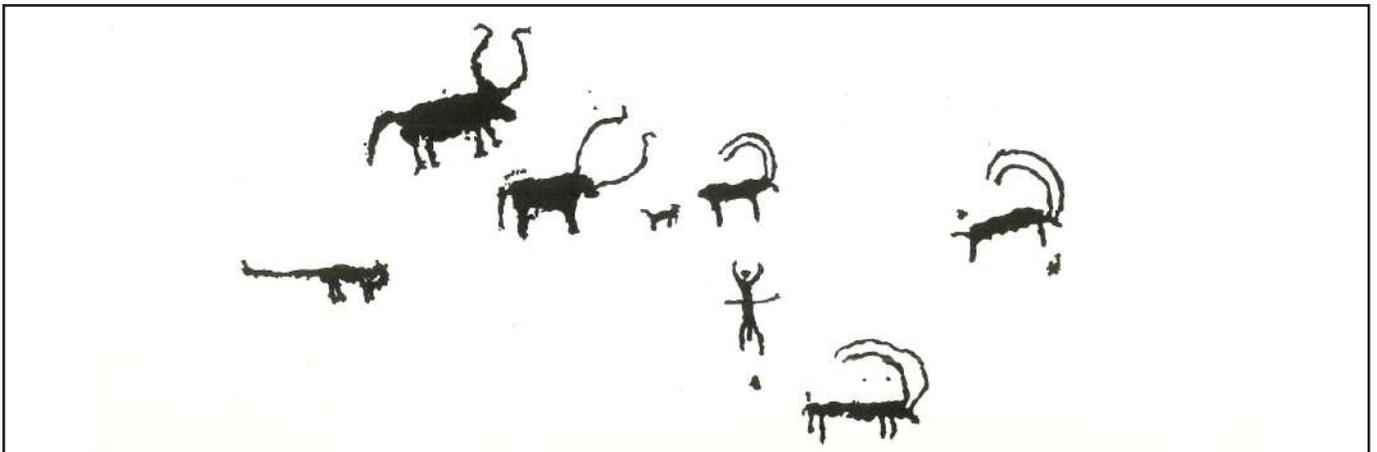


Fig. 16 A-B. A hunting scene from horizon III, shows a hunter having an Early Bronze age dagger at his belt. Engravings of horizon IV-C have a Thamudic inscription, and those of horizon VI have an Arabic inscription. Each phase is documenting its age. (After Anati 2023).



Fig. 17 A-B. Tracing of rock engravings where a scene of horizon III is superimposed by engravings of horizon IV and by a grapheme of horizon VI. The scene describes a lion approaching long horned oxen and ibexes (Wadi Huwara, Sinai, Egypt. For full tracing of the entire panel and photos cf. Anati 2022. Ref. Negev 79 A XIX-2; ISR 78 IX-11).



a centralized political structure, in the Negev desert there still were human bands basing their survival on hunting.

Their hunting scenes may remind one of the descriptions in Genesis of the son of Hagar, Ismael, father of the Arab nation, ‘...and God was with the lad; and he grew, and he dwelt in the wilderness, and became an archer. And he dwelt in the wilderness of Paran’ (Genesis 21, 20).

The following horizons indicate the arrival of new people, but local clans may have survived, integrating in a new age.

THE AGE OF PASTORALISM

Horizon IV



Fig. 18. Hunting scene from an archaic phase of horizon IV. The animal figures are linear, they do not have the same dimensions of the full body typical to horizon III. (Har Karkom, Southern Negev. After Anati 1979).

The rock art of Horizon IV displays a way of life of pastoral nomads. Their arrival and spread suggest a migration of these people at the Late Chalcolithic or the beginning of the Bronze Age from Southern Mesopotamia (Anati, 2017). The three **classes** of this horizon lead from their beginning to the Roman colonization (Anati, 2017).

In contrast to the previously described horizons, each of which had specific sites of localization, horizon IV is found wherever rocks are covered by dark patina and not only, also on lighter rocks. The previously described horizons were located in defined areas, often cult sites, while horizon IV is spread all over. This change of location seems to indicate a laicization of rock art.

Rock art appears now to be produced anywhere and probably also by almost anybody. The entire horizon IV has in common the dominant presence of caprines, both domestic and wild, stock-breeding as the main economic activity. Hunting scenes are frequent in

class A and decrease later.

While in horizon III the body of animals are full, in horizon IV they are more linear. Images related to rituals and spirituality are common in early phases, especially at Har Karkom, and decrease in later classes. The style displays a progressive process of schematization which imply a mental trend to progressive synthesizing.

Besides style, the major differences between the three classes are the presence of long horned cattle and recurrence of hunting scenes in the first, wheeled vehicles, short horned cattle and anecdotal scenes in the second, and horses and camels in the third.

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Class IV-A

Class IV-A displays figures of wild and domestic caprines and long-horned oxen. It includes several hunting scenes which diminish and almost disappear in later phases. Figures are accompanied by ideograms



Fig. 19. Two orants, figures with upraised arms retained to be worshipping, are beneath an elaborate ideogram, a sort of abstract entity in the sky. At their foot there is a U-shaped ideogram likely to indicate a name or identity of the two people. This engraving, like similar others along the main trail leading to the plateau of Har Karkom, is considered to be a sort of ex-voto of two people at the foot of the holy mountain. (Horizon IV-A. Har Karkom, site HK3b, photo ISR82 C-16; tracing Anati Archives).



Fig. 20. Rock engraving of horizon IV-A representing a person wearing a ceremonial dress with prominent a collar. He appears to have a peculiar hat or a mask with horns. By its left side two ideograms may indicate his name or identity. He seems to hold something in his left hand. Likely the image represents a Bronze Age priest or dignitary (Har Karkom, site HK36. Source: Anati, 2022).

which appear as intended to convey information. Human figures often display peculiarities, hats, masked or animal faces, likely indicating the identity of the represented beings.

Class IV-A has figures of footprints in front of the ibex, which appears to have been worshipped. One such composition is on a vertical stone inside an Early Bronze Age circular structure in the Uvda valley. (Eytan, 1979; Beit-Arieh, 2001; Ora, 1983).

At Har Karkom cult scenes are particularly frequent

with ideograms probably related to worship or myths. Human beings with upraised arms, in the 'orant' position, are associated to a simple line or abstract ideograms. (Anati, 2022).

Anthropomorphic figures are of two different kinds, some are generic, others are much detailed intended to indicate specific beings. Some have, at their belt, daggers with triangular blades and lunate pommel typical of the Early Bronze Age (Anati, 2017). Sometimes their heads are surrounded by signs, as if ideas were emerging.

Some difference is recorded in human figures between Har Karkom, in the southern Negev and the central Negev highlands. The southern ones are more often associated to ideograms likely to have a conceptual meaning. Some images appear to be masked or have non-human faces. Human figures ceremonially dressed seem to display hieratic attitudes (Anati, 2022).

In the highlands the human figures are armed with daggers and bows and have strange hats. The southern and the central Negev may have been inhabited by different tribes. It is tempting to associate them to the people mentioned in the biblical narrations:

Amalekites in the highlands and Midianites in the southern Negev. Different kinds of semi-nomadic or seasonal Bronze Age living sites from the Negev, courtyard sites and hamlet sites, could possibly be related to the different human groups producing these two different tendencies of rock art image. (Anati, 2017b).

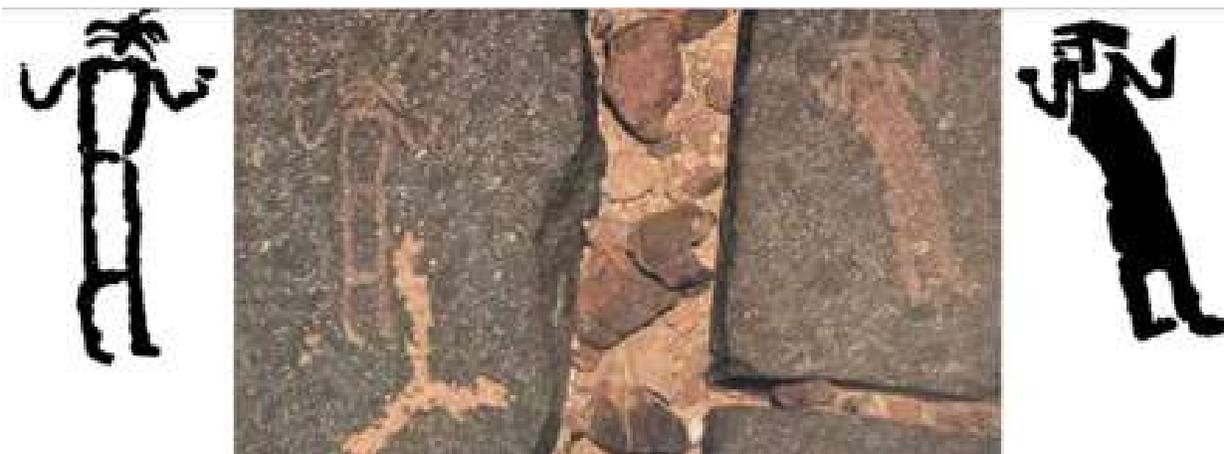


Fig. 21. Two masked anthropomorphic images of horizon IV-A, with animal heads or masks. One of them has a fully engraved body, the other is outlined. Both of them seem to hold something in their left hand. They are by the side of a crack of the rock and likely intentionally located where they are, related to the rock fissure. The lighter grapheme, of horizon VII, may have been made intentionally in relation to the early images, to take possession of them or to prevent their alleged power. (Har Karkom, site HK45g. Anati Archives).

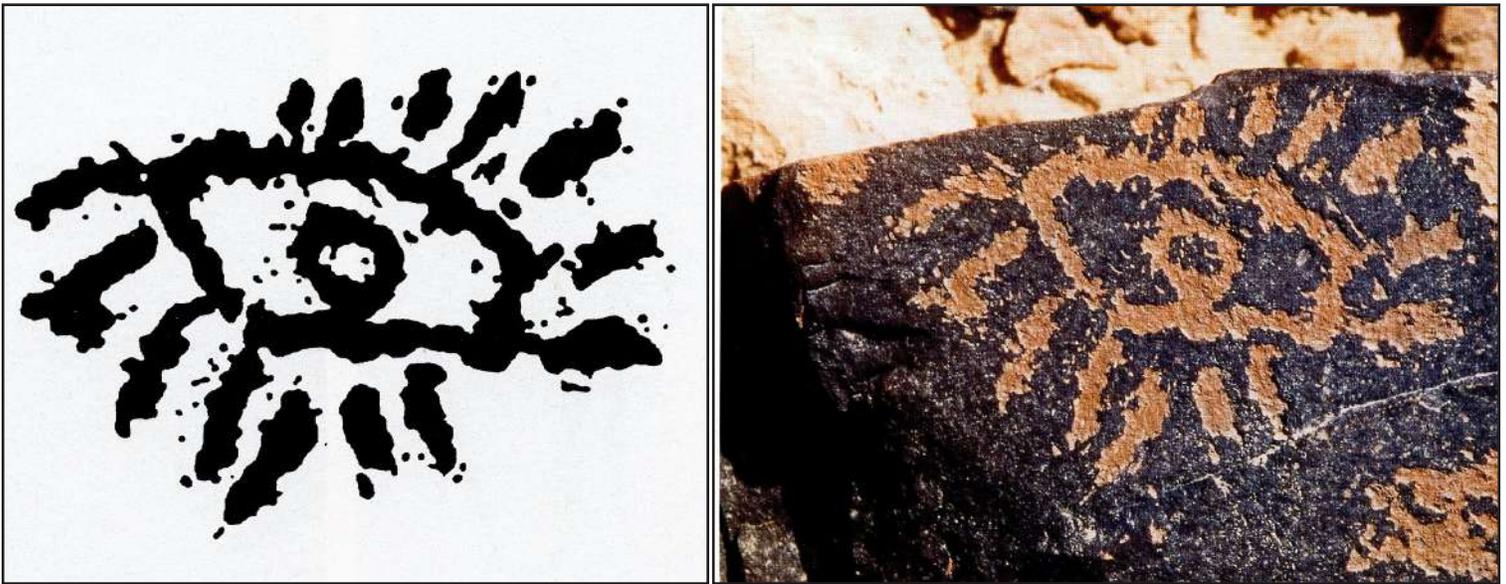


Fig. 22. The large eye has seven lines raying out of the bottom and seven from the top. The number seven may have a meaning. Tentatively attributed to horizon IV-A., the eye on the rock seems to indicate that something is watching around from inside the rock. The lighter grapheme, of horizon VII, may have been made intentionally in relation to the early image, to take possession of it or to prevent its alleged power. (Har Karkom, site HK36b. Source Anati 2022. Photo EA98: LVIII-05).

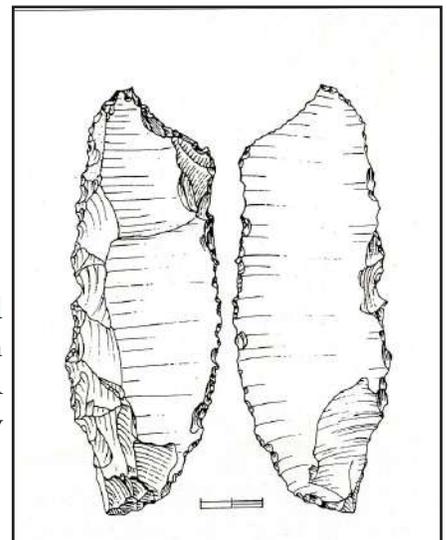
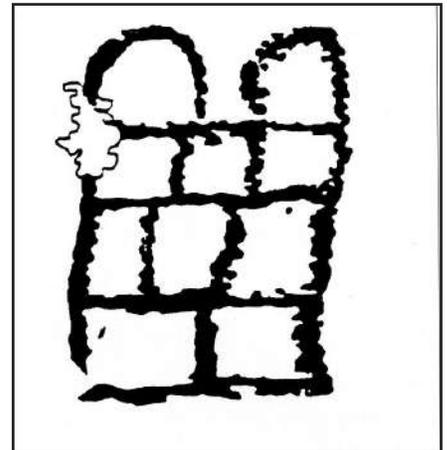


Fig. 23. Rock engraving having dual rounded tops and ten partitions, named “The Tablets of the Law” is attributed to horizon IV-A. Some peckings with lighter patina seem to have been intended to damage the early image. A Chalcolithic or Early Bronze age flint tool was found in the crack just below the engraving. It is not the kind of tool used to make the rock.



Fig. 24, A-B. Two anthropomorphic figures of Horizon IV-A from the rock engravings of the Central Negev. A- The left one (from Nachal Ezuz) holds the bow and arrow and has a dagger at his belt showing a Bronze age lunate pommel. Above his head, vaguely shaped peckings seem like something coming out of his head (Intents? Ideas?). Ideograms on both sides may indicate name or identity. B- On the right side, the figure (from Ramat Matred) holds two different objects in his hands. Probably he is intended to represent something he is doing with his objects. The shape of his hat is repeated in other images of the central Negev. (From Anati 2017).

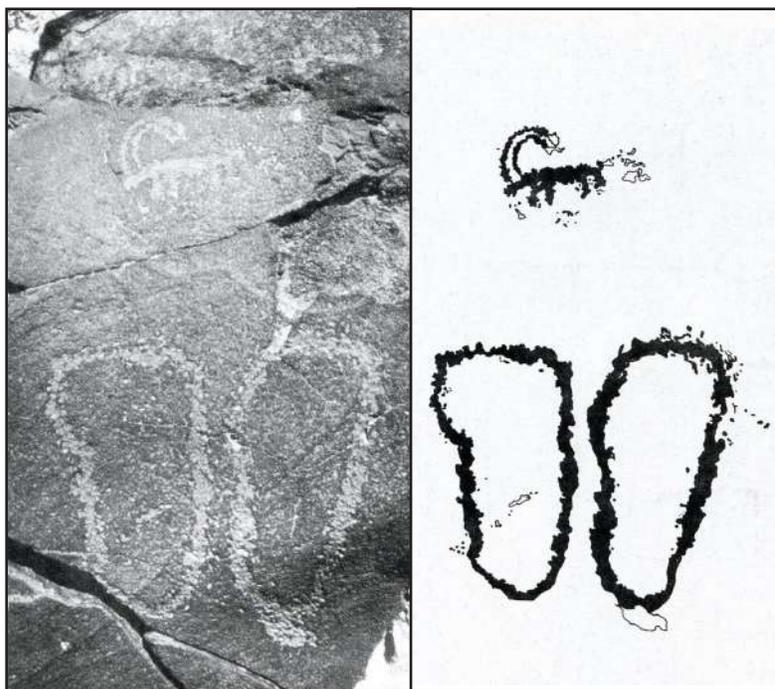


Fig. 25. The ibex and foot-prints is a repeated association in horizon IV-A, likely indicating an act of cult for the ibex. (Har Karkom, site HK38. Photo ISR84: XX-37).

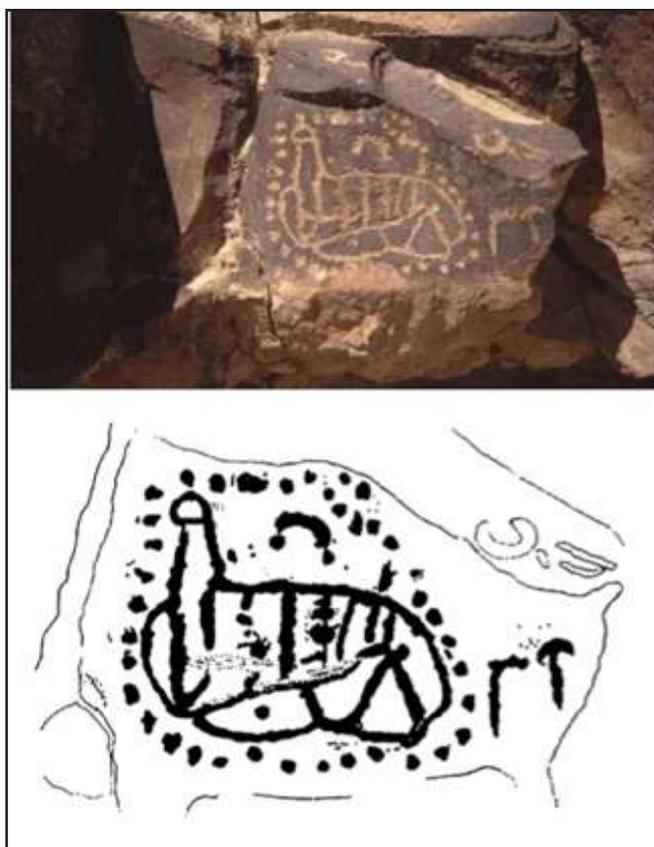


Fig. 26. Rock engraving considered to be a map of Har Karkom, surrounded by dots defining the area around it. It is accompanied by the figures of an ax and a dagger with lunate pommel of Early Bronze age type, likely to be some sort of indicator or name. (Har Karkom, site HK38. Photo EA95: XXVI-26).

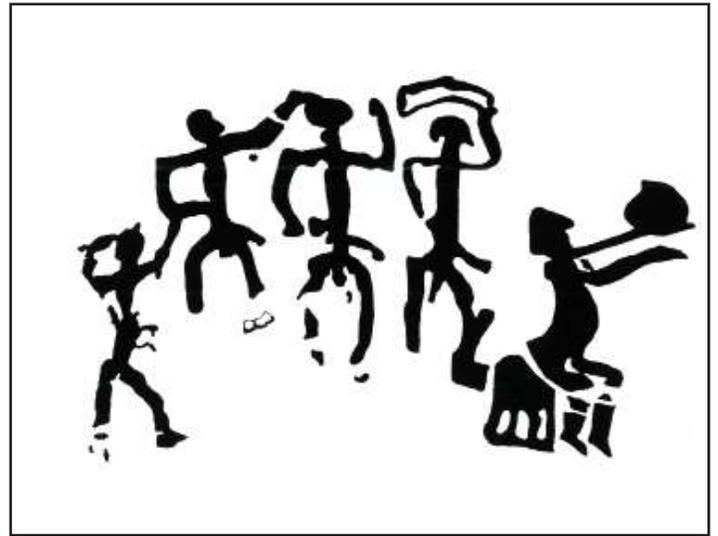
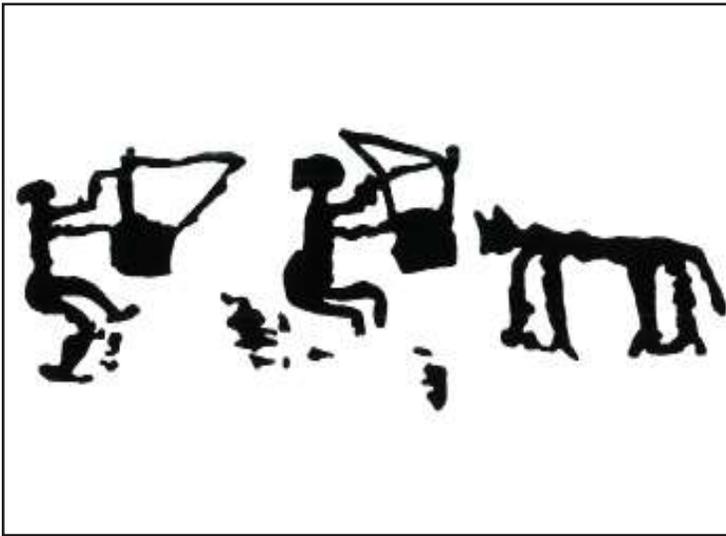


Fig. 27. Rock engravings of a scene of music and dance, in two sectors of the same surface, attributed to horizon IV-B. Two musicians dance in front of an animal. Two lyres have Mesopotamian parallels of Middle or Late Bronze age. In the lower sector, a seated figure seems to play a drum. (Reference Anati, 2017).

Horizon IV, class B

Class B of horizon IV has the peculiarity of being particularly anecdotal. The scenes describe events. This class, like the previous one, includes also abstract signs, ideograms which may have conventional meaning. Class IV-B is lacking at Har Karkom and in most of the Sinai sites. It seems to be present mainly near government-run sites like the mining area at Timna in the Arava valley, or in the water rich oasis of Ein Quderat, in Northern Egyptian Sinai (considered to be the biblical Kadesh Barnea), and in a few cases in the Central Negev highland. It may coincide with a period of drought with low presence of tribal life but intense activities like mining, led by regime institutions.

Figures of weapons, like daggers, swords and axes, as well as the wheeled vehicles and some figures of musical instruments, point to the second millennium BC (Middle and Late Bronze Age). It is a period in which institutional activities such as mining, trade and military operations are intrusions into the pastoral tribal life.

There are figures of donkeys and oxen, and possibly horses in one doubtful case at Ein Qudeirat. There are no camels recorded so far. Wheeled vehicles are mostly concentrated in this class, including two-wheeled war chariots. Trade and warfare appear to be of concern to the makers.

A peculiar scene of dance and music is attributed to this class. The two lyres from the Negev scene have

their nearest comparisons in the Mesopotamian context of the late third and the beginning of the second millennia BC. (Anati, 1955d).

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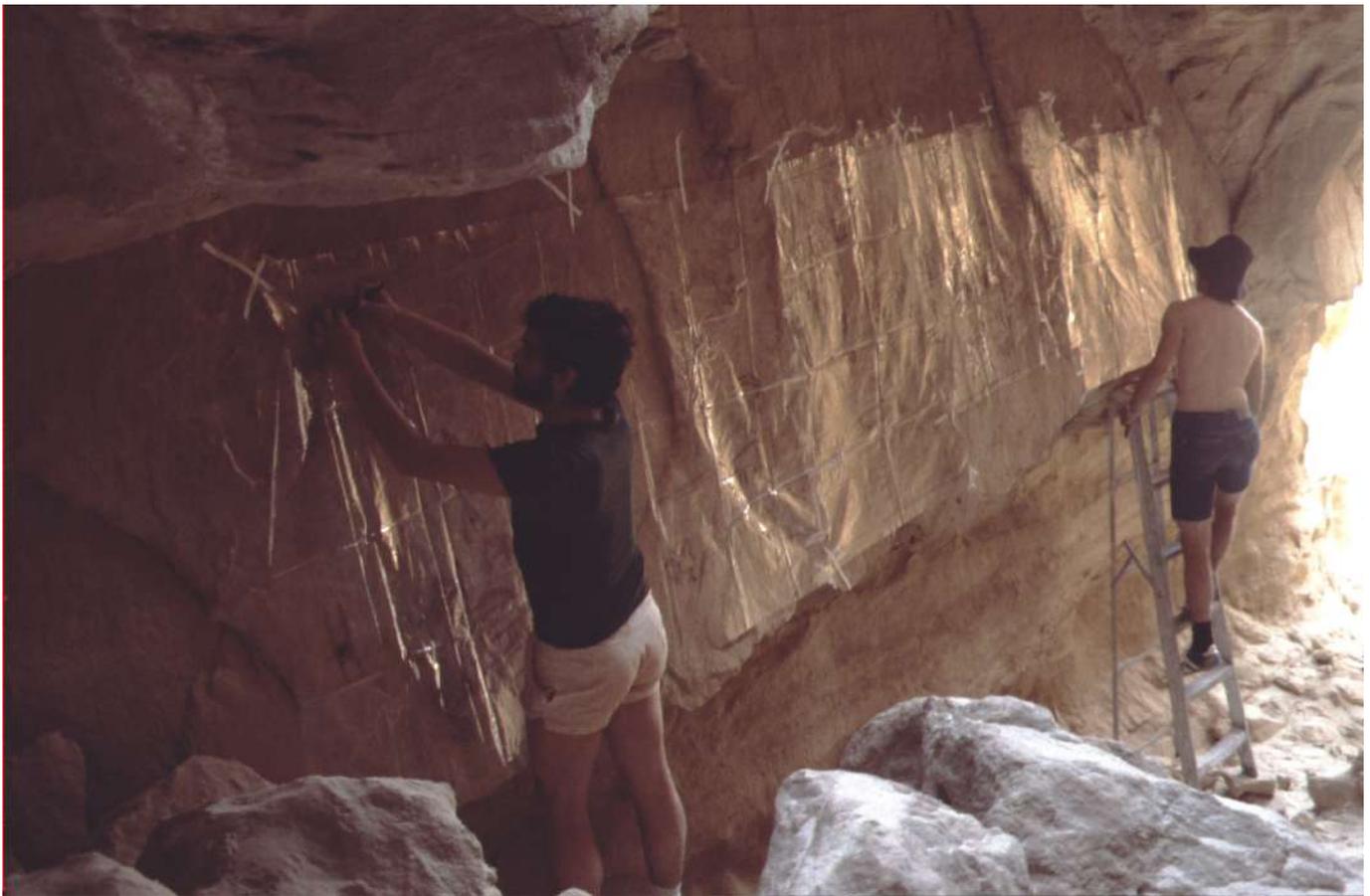
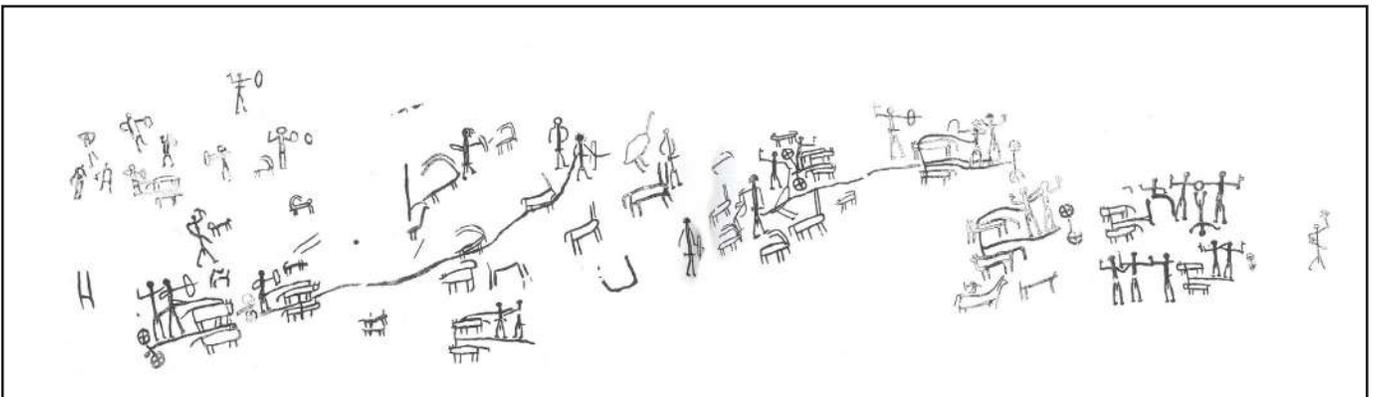
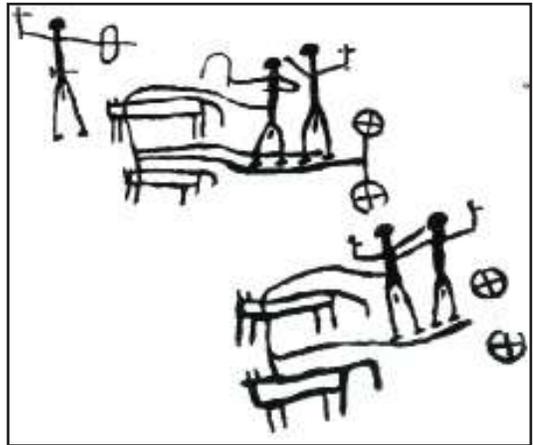
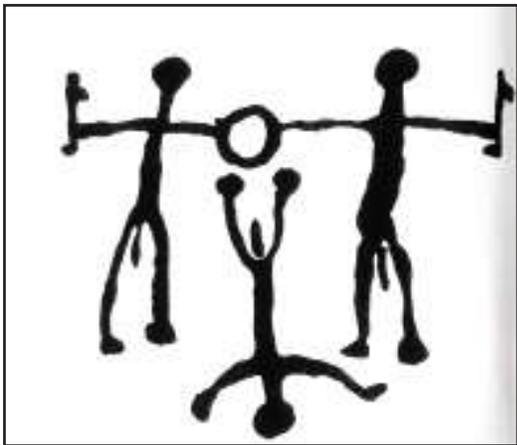


Fig.28 A-B-C-D. Tracing of a panel including 3 phases all attributed to horizon IV-B. One of them describes a battle with war-chariots facing each other. (Arava Valley, Timna, Cave of the wagons. After Anati, 1979).



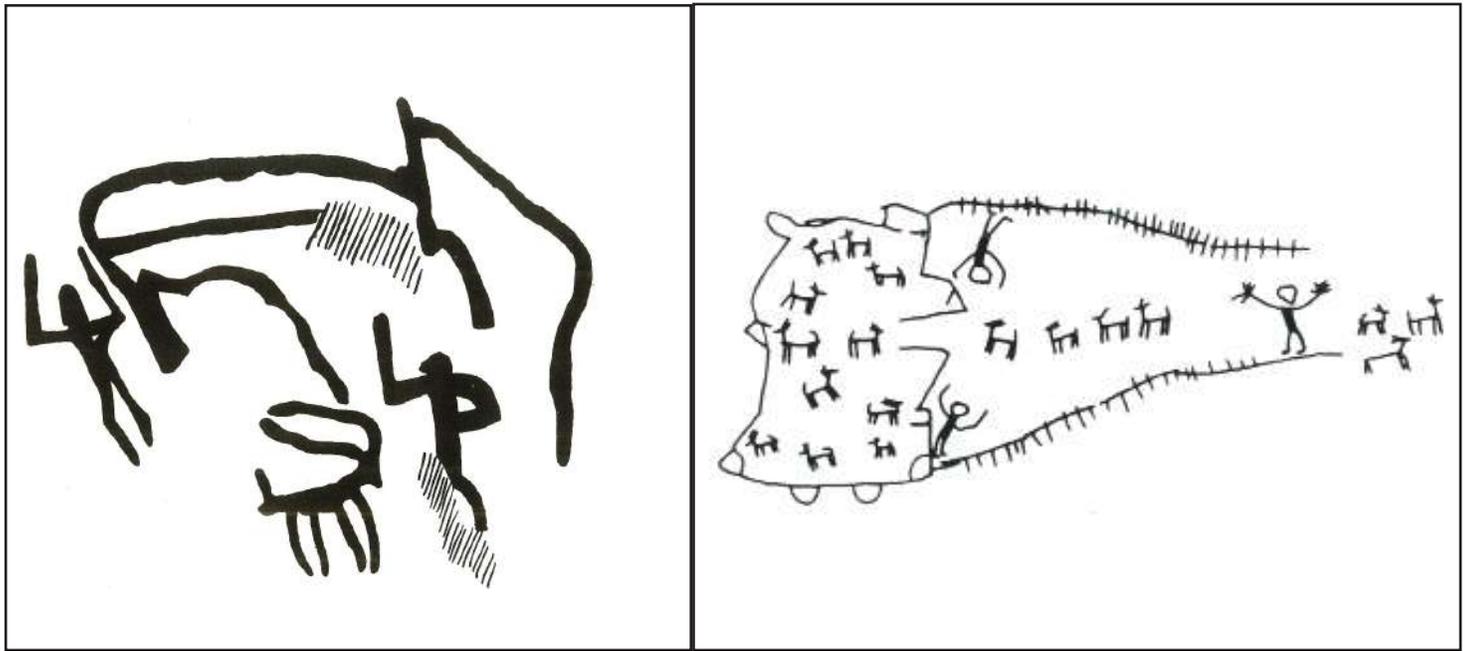


Fig. 29 A-B. Scenes of animal breeding of horizon IV-C: A-Two men try to lead a caprine into an enclosure (Nachal Avdat, Central Negev. After Anati,1979). B- Animals are led into an enclosure (Jordanian plateau. After Harding, 1953).

millennia BC. (Anati, 1955d).

Class IV-C

Rock art of class IV-C is widespread over the entire territory. Thamudic, Nabatean and other inscriptions indicate the spread of literacy. Major concentrations of engravings occur on top of hills near cairns and tumuli. Some of this art is likely related to the cult of these structures, tombs or memorial monuments.

As a general trend, images are more schematic than in previous classes. A net change in the depicted fauna takes place, as camels and horses appear and become dominant. Fighting scenes are far more common in the Central Highlands than at Har Karkom.

This class is evidencing the expansion of peoples using writing in Nabataean, Safaitic, Thamudic and other scripts in the second half of the first millennium BC., and in the first centuries of the first millennium AD. There are different opinions about the dates of the early inscriptions. The beginning of this class is however older, probably coinciding with the end of the previous class, or the beginning of the Iron Age. It may be related to new trading and caravan activities from Arabia to the shores of the Mediterranean Sea: goods like precious stones, perfumes, incense and myrrh, imported goods in the Helladic world and other Mediterranean shores.

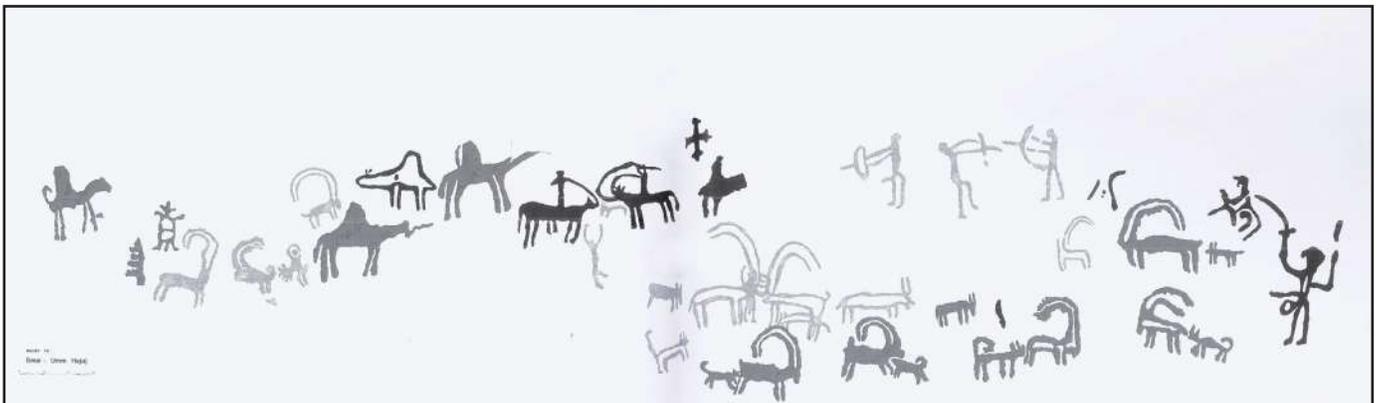


Fig. 30. A large rock surface where various phases are present, from horizon III to horizon VI, recording various stories and event: a sort of archive in a corner of the desert. (Umm Hajaj, Sinai, Egypt. Anati Archives).

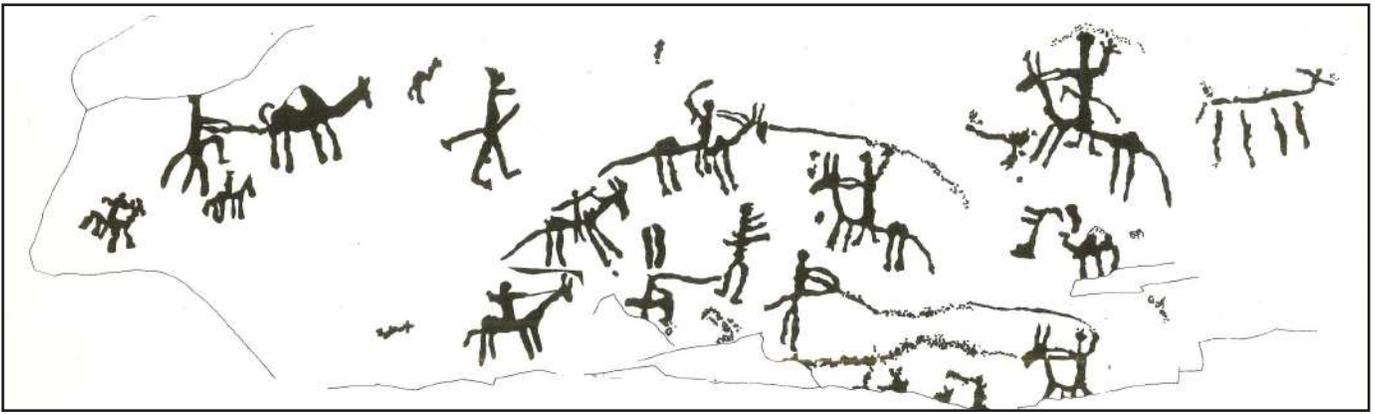


Fig. 31. A large panel of rock art describing battles or mock fighting games from Horizon V, with an addition of horizon VI. (Wadi Hawara, Sinai, Egypt. Source Anati 2017).

HERDERS AND CARAVAN TRADES

Horizon V

Sometime towards the beginning of our era a new class of rock pictures makes its appearance and coexists with the late phases of class IV-C. It represents a cultural wave coming from the Hellenistic and Roman cultures. It differs from both horizons IV and VI, with figures displaying a naturalistic-realistic style, which is unusual both before and after. Scenes of camels and horses in action characterize horizon V, illustrating caravans, trade, warfare, along with equestrian games, lion hunting and other leisure activities represented in a new narrative style illustrating an affluent society never seen before. People are no longer concentrated on food and religion; a new wave from the west introduced wider conceptual horizons. It lasted just for horizon V, a few glorious centuries.

In the Negev, horizons IV-C and V correspond to an age of proliferation of the human presence in the highlands, with plenty of both archeological sites and rock art. Caravan cities were flourishing. Avdat, Kur-

nub and Subeita are sedentary trading centers. Many wadis had farming terracing, implying an unprecedented development of agriculture. Besides Thamudic and Nabatean there are inscriptions in Greek, Latin and other non-local scripts. Probably the local population included also alien soldiers and traders.

Horizon V may have started at the beginning of our era or shortly before, when style IV-C was at its peak. The greatest development of style V probably took place between the third and the seventh centuries

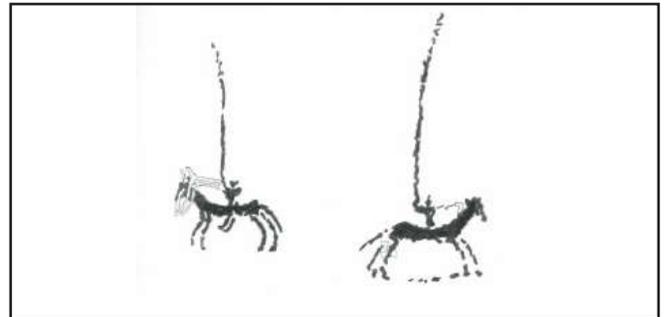


Fig. 32. Rock engraving of two knights with long spears, probable image of martial games. (Wadi Huwara, Sinai, Egypt. Source Anati, 2017).

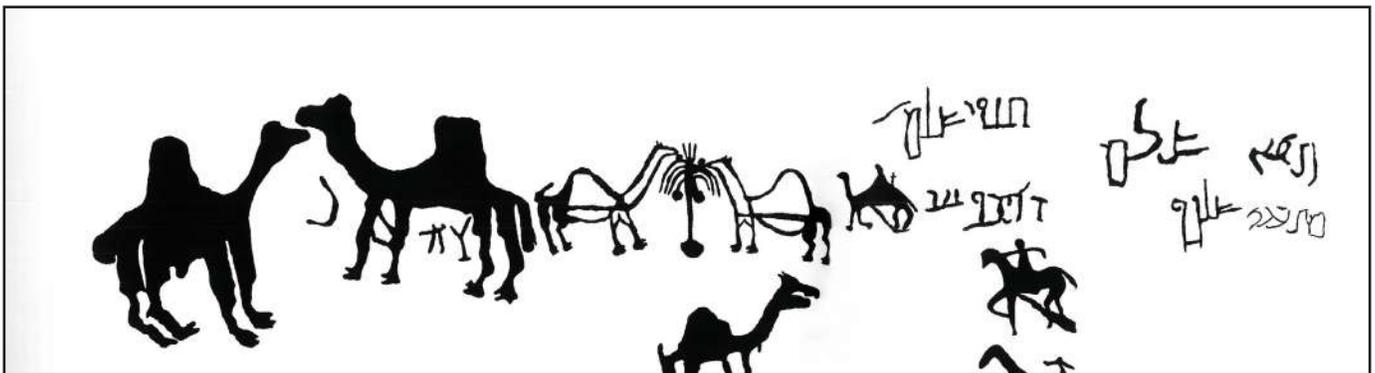


Fig. 33 A panel of horizon V with Nabataean inscriptions. (Ein Hudra, Sinai, Egypt. Source Anati, 2017).

while class IV-C persisted. When the Byzantine influence ceased, horizon V disappeared, and was replaced by horizon VI, which appears as a decadent and poor persistence of class IV-C. This horizon V is a sort of intrusion of Greco-Roman influence. It is the dominant rock art style in places like Petra stressing the external influence. This horizon full of realism and dynamism, reflects the presence of a western wind, in contrast with the monotonous and static subjects of late class IV-C and of the following horizon VI. The rock art tells us of a curious story. Some hunting and stock-raising bands of the desert must have undergone a quick change, making trade and caravan services their main economic activities. Not all the tribes did undergo that change. Side by side with the merchants, purely pastoral bands continued to inhabit the area depicting their pictures. The result was that human groups living in the same area, near to each other, acquired different experiences, and had various rates of cultural intercourse with the world of Greece and Rome.

From the historical background and from the archeological traces in the area we know that in Hellenistic, Roman and Byzantine times, for almost one millennium, large parts of the Negev became more densely populated than ever before. Farms, cultivated terraces and caravan cities indicate a new rhythm of life. Likely, this period also corresponds to a climatic episode that facilitated agriculture. The coexistence of two cultures caused progress. It started and then ended with

the start and the end of the external cultural influence: a meaningful historical process.

THE ISLAMIC PERIODS

Horizons VI and VII

The renaissance represented by horizon V died down in the Negev with the decrease of Byzantine influence and the early waves of Islam, bringing back the static and monotonous art of stock-raising semi-nomadic bands. The lively and dynamic figures that filled up the rocks for a few centuries gave way to static figures of goats, camels, ibexes, and human beings. Style VI appears to be a degenerated form of style IV, and follows a slow process of further schematization until it falls into entirely non-figurative patterns.

Kufic and other Arabic inscriptions accompany class-VI: new types of inscriptions but just further tendency toward schematization and abstraction. Islam imposes the prohibition of making figurative art. The iconoclastic process, however, was not applied entirely, as camels, goats and other figures persisted, in a sketchy style.

Horizon VI includes figures while Horizon VII is that of the abstract signs still produced today by the Bedouin. The Islamic horizons are characterized by the abundance of tribal marks, wuassum, and other schematic representations. Some of the non-figurative graphemes appear to have been intentionally engraved on top of previous images to damage them. Horizon VII is mostly aniconic, though some images are pres-



Fig. 34 A-B. Rock engravings of horizon VI. A- Camel rider. (Nachal Avdat, Central Negev. Source Anati 2017). B- Zoomorphic ideograms with central dot of horizon VI, and non-figurative signs of horizon VII. In the upper right side, a miniature hunting scene.(Har Karkom, Southern Negev. Photo ISR 80 CIX-1).

ent. Goats and camels are the most commonly depicted. There are rare cases representing vegetation. Bedouin still persisted in making rock engravings until recently. (Anati, 1987).

The sequence of horizons and classes of the Negev rock art has recently added a new horizon. The last engravings are names and other short texts in Hebrew, Arabic, English and even in Russian, self-commemorating the travelers who left their names on the rocks. Sometimes such names are accompanied by new ideograms such as the cross, the star of David or the figure of a heart crossed by an arrow. Such engravings may become Horizon VIII.

CONCLUSIONS

A new history

The rock art of the Negev desert constitutes a source for the history of thousands of years. Ancient texts tell us about specific events, people, migrants and armies that crossed this territory between Egypt and Canaan, but little historical evidence is available about the people that lived here. Archeology unearthed and recorded monuments contributing to chapters of history of specific periods. For this desert rock art is the source of a conceptual history. It is a record produced by the direct protagonists that tell their own vision of a history that starts in the Pleistocene when elephants and rhinos roamed in the area and were depicted, to present day reality, well over 20,000 years of history.

The definition of styles and typologies, evidence the

succession of horizons and classes of rock art, a history of human adventures, a record of patterns of life at the southern edges of the Fertile Crescent, in the land bridge connecting Africa to Asia.

Pleistocene Early Hunters mainly depicted animal game. The extinction of the Pleistocene fauna was followed by a middle size game, mainly bovines and caprines. The rock art style of Early Hunters evolved acquiring a dynamic style with the introduction of bow and arrow. Animal breeding developed while hunting still was a major economic resource. Herding became the main way of life in arid zones where conditions did not allow permanent settlements and agriculture.

In the early Metal Ages, new typology and style of rock art suggest the arrival of new people, likely giving a historical base to traditions of migration stories in the biblical book of Genesis. The difference of Bronze Age images, at Har Karkom in the southern Negev and in the Central Negev highlands, illustrates the characters of two people. The southern one produced figures of spiritual symbols and images of priests or other hieratic people, the highlanders, have figures of armed people with daggers and bows, and aggressive attitudes. They illustrate the conceptual difference of two people. Who are they? It is tempting to consider them the art of two people mentioned by the Bible in this region: Midianites in the south and Amalekites in the highlands. Their figures seem to reflect their biblical descriptions and also the images they had of them-



Fig. 35 A-B. The pastoral life continues: A- Stock breeding in the wilderness (Ein el Murra, Northern Sinai, Egypt. Photo EA92 CL-11).



35 B- Bedouin on their way to the well to collect water (Ein Kseime, Northern Sinai, Egypt. Photo ISR80: CXIII-18).

selves: an interesting case of people who, by their own images, are defining themselves in the Bronze Age.

In the Late Bronze Age war chariots and fighting scenes describe a moment of instability, of mining exploitation and of Egyptian influence.

In the first millennium BC rock art illustrates the expansions of the first literate people using inscriptions in Thamudic, Nabatean and other languages.

In the Hellenistic, Roman and Byzantine periods, the rock art style reveals the influence of occidental culture. A creative age due to the encounter of two cultures that spread all over the Middle East. And finally, the Islamic period, the Bedouin culture of nomadic pastoral life.

The sequence shown by the succession of rock art horizons leads from the age of Hunting and Gathering, to an age of hunting and pastoralism, to pastoralism, to trade and farming, and then again to pastoralism.

Besides hunting-gathering and pastoral rock art, other activities are revealed by the sequence: Explorers of ores and metal copper seekers in the Chalcolithic. Traders and caravan people crossing the Negev to reach the Mediterranean shores, in Hellenistic and Roman-Byzantine times.

A sharp change in literacy took place in class IV-C with alphabetic writings like Thamudic and Nabatean. Literacy spread over the desert in the first millennium BC. but signs and ideograms likely to convey notions as means of communication are present all the time, since the art of Early Hunters. In each horizon and class there are conventional signs having meaning

and content, well before the introduction of alphabetic writing. Decoding these signs, reading them, is a challenge of research.

This article is an introduction to the Negev Rock art, a summary, for those unwilling to handle a book of 250 pages (Anati, 2017). Despite over half a century since the first published articles on the Negev rock art (Anati 1955, a, b, c), and the first book on this topic (Anati, 1979), the study of rock art is still at its beginning. Pictograms, ideograms and psychograms are there, engraved on the rocks, ready to be decoded. What is their meaning, what do they intend to convey? Measuring the tail or the horns of a depicted ibex is an expression of good will. Reading the rock art, understanding the minds and the intents of their makers are what is expected from the progress of the research. Wishing good luck to those taking the task upon themselves.

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THE STONE CIRCLES OF BOHONAGH AND CARRIGAPHOOCA, COUNTRY CORK, IRELAND

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Introduction and objectives

This paper reports fieldwork studies on two of the 60 axial recumbent stone circles in County Cork and Kerry, Ireland. They are Bohonagh and Carrigaphoooca (Figure 1). The Bohonagh circle was in a slightly damaged condition before archaeological excavation and restoration in 1959. Nine stones of the original 13 stones remained where they had been positioned thousands of years ago, but, as regards the missing stones, excavator Edward Fahy (1961: 93-104) positioned very short stones, as obviously indicative replacements, in the original stone holes.

The other stone circle, at Carrigaphoooca, having never been subject to excavation, remains in a seriously damaged condition. Only three stones stand, and a fourth lies fallen, from an original number of either 9 or 11 perimeter stones.

The two stone circles were chosen for this study because of their contrasting condition, hence the greatly differing conceptual features that they preserve. The intention is to use extractable information from the Bohonagh site as an exercise in helping to interpret to best advantage the badly damaged Carrigaphoooca site. For eight years beginning June 2012 the author made numerous expeditions to Ireland to study the stone circles of Cork and Kerry. The number of known stone circles of axial multiple-stone type in these counties is now known to be 60 although several have been wholly destroyed since their first recording in the 19th and 20th centuries (Meaden 2020; Meaden 2024). The author has now inspected over 50 of the stone-circle sites.

One of the objectives of this paper is to demonstrate how practical knowledge of the Bohonagh stone circle can help reveal positional and cultural information latent in the badly damaged Carrigaphoooca circle. This was achieved through diagnostic inter-comparison after fieldwork elsewhere had clarified that other stone-circle monuments had been created for the pur-



Fig. 1. Ireland: Bohonagh is close to the coast. Carrigaphoooca is 40 km inland to the north.

pose of specifying the eight dates of the calendar year. The prehistoric builders had accomplished this by watching every morning the points of sunrise on the horizon until particular significant dates of the calendar important for the communities were reached. Analysis leads to an understanding by conceptual anthropological reasoning the needs and thinking of the people involved. On every date that mattered a contrasting dimorphic stone pair had been arranged on the circle's circumference to align with the point of sunrise. Stones that were intentionally set up to indicate such dates are called functional stones because they have a known definite purpose. All the stone circles studied and reported by the present author across Ireland Britain and Britain reveal something of the culture of the tribal peoples when interpreting their planning ideas. To appreciate and better understand what the communities had been witnessing, photographic proof was obtained at sunrise at Bohonagh on or close to the eight relevant dates when the weather was good enough to allow this approach to fieldwork. Regret-



Fig. 2. Bohonagh Stone Circle looking east over the axial recumbent stone to the portal stones in the west.

tably, at Carrigaphooca no sunrise photographs with paired stone alignments could ever be taken because so many of the original stones are missing. However, a reconstruction of the original Carrigaphooca site can be made using the methods of fieldwork and technical analysis that the author has developed and tested at other sites. In the future the positions of the stone holes of missing stones, as proposed here, can be checked by excavation.

The Irish stone circles that have been the subjects of previous papers by the author in this international journal of conceptual anthropology, *Expression*, include Drombeg (Meaden 2017), Ardgroom Outward (2022a) and Templebryan (2023a). For Scotland the results of fieldwork at Loanhead of Daviot have been published (2023b).

From the viewpoint of the enquiring analyst who wants to determine what the prehistoric people were thinking, a meaningful diagnostic approach involves studying positions, shapes and other figurative indications of particular megaliths in relation to directions of specific sunrises and sunsets as exemplified by Bohonagh and Carrigaphooca. This proved to be achievable at these two sites chiefly because both circles conform to the same classical type in which a focal recumbent stone is located at the west, viz. at or close to 270 degrees east of north, although this was unknown for Carrigaphooca when the study began. The two circles were found to share decipherable symbolic elements that had been integrated into both of them by the care and resourcefulness of the planners.

In the stone-circle type reported in this paper, the re-

cumbent stone, as typified by Bohonagh, is on the medial east-to-west diameter at the west where its length is aligned tangentially north-to-south. In Cork and Kerry a dozen stone circles are known for this type, called Type 1 (cf. Meaden 2020; and Meaden 2024 for details of them all). It is innovative that predictions can be made ahead of excavation and the forecasts subsequently checked.

This class of multiple-stone circles has a single target stone, the recumbent stone, which is the functional focus for deciding all eight festival dates of the year. The exact focal point is the vertical middle section of its internal east-facing side. Functional stones standing in the east are often tall and narrow. Five such stones on the eastern perimeter at Bohonagh function by shadow casting at sunrise in conjunction with the centre part of the recumbent stone to accommodate all eight of the year's indicated quarter dates and cross-quarter dates.

Previous Work

The only comprehensive work previously undertaken on the stone circles of southwest Ireland is a review by Ó Nualláin (1984) who surveyed all the circles then known for the Ordnance Survey in the early 1970s. Brief descriptions were made and small-scale plans included for a total of 48 multiple stone circles (those having 7 to 17 perimeter stones) and a further 45 circles of the five-stone type. No attempts at explaining the purpose and meaning of the stones were made.

Ruggles (1999: 100) analyzed his own fieldwork surveys of 1994 on 31 stone circles in Cork and Kerry,

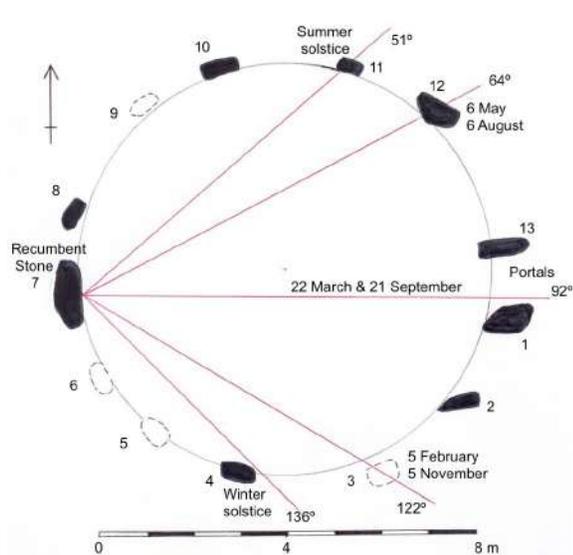


Fig. 3. Plan of Bohonagh Stone Circle showing directions of major calendar sunrises.

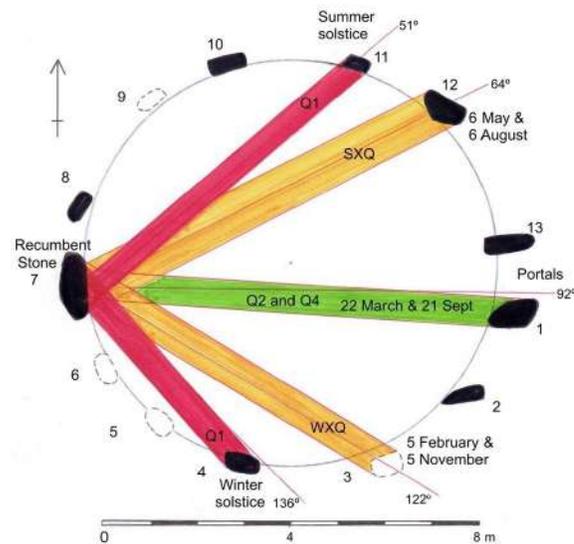


Fig. 4. Plan illustrating the directions of optimum shadow-casting for these dates.

namely, those “where the axial stone and/or both the portals were still present.” He concluded that the axial stone circles “bear no consistent relationship with any specific astronomical body or event ... Viewing the axial stone circles as a group, then it seems that we can say little about their orientations beyond the basic fact that they aim for the quarter of the horizon between due south and due west.” On p. 101 he concluded, “Certainly, there is no logical interpretation.”

Ruggles and Prendergast (1996: 12) three years earlier had written, “There is also no evidence whatsoever for a systematic interest in the sun ... This preliminary result was quite unexpected and raises a number of serious questions in the wider archaeological context.” These workers failed to notice how important the sun was because they sought to obtain answers by searching for potential solar (and lunar) alignments from the point of view of standing at the circle centre. Instead, the focal point decided by the ancient planners is the middle of the internal face of the recumbent stone, and in many cases, as at Bohonagh, it is shadow casting upon this stone that is critical and decisive because of the astute alignments.

At Bohonagh, and at least six other stone circles, on eight pre-established calendar dates a shadow at sunrise from one of the tall narrow stones in the east falls medially upon a recumbent stone waiting on the circumference at the west. The target is the middle of this stone. This drama of union by shadow, prearranged by the circle builders, starts at or soon after sunrise

and proceeds for several minutes. This makes it certain that there was a huge systematic and purposeful interest in the sun.

The heart of the matter is that this happens on eight particular dates of the calendar year spaced at intervals of 45-46 days, counting from either the winter solstice or the summer solstice.

Methodology

Seeing that the tribes-people had no theodolites and no compasses, but only unaided human eyes, we should not need to overwhelm ourselves with modern technology. In principle, it can be almost enough to do much the same as the ancients did, that is to say, by direct observation on-site at all times of the year. Thus, the approach should be simple and straightforward while nonetheless following the principles of the scientific method. The fieldwork should be carried out at sunrise, with cameras and a high-quality compass and clinometer, using the scientific method, viz. seeking reliable data by inspection, measurement and photography for cautious evaluation from which to suggest logical hypotheses for testing against proven facts. This can lead to a testable theory by which predictions can be made and put to the proof. Such verification of predictions has been achieved multiple times in this approach to research.

Aspects crucial to the program include the knowledge of relevant astronomy with respect to solar and lunar movements together with considering traditio-



Fig. 5. Sunrise 19 September 2017. Two days later the sun would rise about one solar diameter to the right. Photographs by Austin Kinsley.



Fig. 6. The shadow has reached the middle of the recumbent stone.

nal symbolism and their meanings. A high-quality clinometer or a theodolite can be used to determine horizon elevations.

Additional to this is being aware of how most sunrise positions have altered slightly since the Bronze Age because of the changing tilt of the earth's axis. Differences are slight, and occasionally of little consequence for the modern observer. They amount to about one degree of arc at the solstice dates while being effectively zero at the March and September quarter dates.

Like so many today, farming folk worked the long hours of daylight from sunrise to sunset. Therefore, to retrieve the thinking of the builders, modern investigators are advised to commence fieldwork at sunrise, and not erroneously treat circle centers as the places for practical observation. In this research sun watching and shadow watching at Bohonagh were done or attempted many times but occasionally unexpected cloudy conditions at the eastern horizon interfered.

To put it succinctly, it is found that the directions of sunrise on particular dates of the year articulate the original prehistoric planning policy. This was the primary purpose. A secondary purpose was that at many sites (including Bohonagh) it is also helpful to watch and interpret the moving shadows cast by select sunlit stones. This awareness has led to the confirmed recognition of intentional inbuilt, lithic symbolism, and the fundamentals of an observable operating calendar. To read about the calendar, refer to Meaden (2016, 2020b or 2021b).

This eightfold calendar of annual events was in use

during Neolithic and Bronze Age prehistory in Ireland and Britain. Eight significant dates were recognized, each separated by 45 or 46 days from the next. It is convenient to commence at 21 December by numbering it Day 1. This is the first quarter day of a four-quarter 365-day year. Mackie (2009) has usefully reviewed such matters and related work by himself and others.

At several sites Midsummer Day appears to be the principal date (as deduced for Drombeg and Templebryan).

At Bohonagh Stone Circle and other shadow-casting Type-1 sites, the March and September quarter dates appear to be the most highly esteemed festivals of the year.

On a 365-day calendar the four quarter days are:

- Q1 Day 1: 21 December, the winter solstice;
- Q2 Day 92: 22 March, the spring quarter day;
- Q3 Day 183: 21 June, the summer solstice;
- Q4 Day 275: 21 September, the autumn quarter day.

The summer cross-quarter days, SXQ, are Day 137 (6 May) and Day 229 (6 August).

The winter cross-quarter days, WXQ, are Day 47 (5 February) and Day 320 (5 November).

Survey and research: Bohonagh Stone circle

Bohonagh Stone Circle is on elevated ground, currently pasture, altitude 35 m, 4 km from Rosscarbery, on the southwest Atlantic coast. Grid reference W 3073 3686. Latitude 51.581° N; longitude 9.000°. The cir-



Fig. 7. Bohonagh winter-solstice shadow of Stone 4 makes union with the axial stone. Photo: Austin Kinsley.

cle is number 36 in Ó’Nualláin’s review (1984) and in the present author’s gazetteer (Meaden 2024).

The circle was planned with 13 perimeter stones (Figures 3 and 4). The axial recumbent stone is Stone 7. Four tall stones in the east are impressive, numbers 1, 2, 12, and 13. Portal Stones 1 and 13 stand 2.41 and 2.87 m high respectively and are set radially, not tangentially. Four stones are missing (3, 5, 6 and 9). Instead, their stone-hole sockets hold short dummy stones as position indicators put there by archaeologist Edward Fahy. Stones 4, 10 and 11, which had fallen were raised and positioned in their original stone-holes. Stone 4 denotes the winter solstice, and Stone 11 (which is broken short) the summer solstice.

The circle, as measured and as drawn on the plans, corresponds to a diameter of 8.9 metres.

Bohonagh for the mid-year quarter days Q2 and Q4 in March and September.

The date of Q2 is what we call 22 March. This is Day 92 on the 365-day-count which is 91 days after the winter solstice if the latter is regarded as Day 1.

Q4 is what we know as 21 September on a 365-day count. This is Day 275 which is 91 days before Day 1 (i.e., the day after Day 365).

The ancients, without clocks, would not have recognized what we term the equinoxes as defined by today’s astronomers.

Bohonagh Stone Circle at the winter solstice sunrise, Q1

In the week of the winter solstice at Bohonagh the sun is aligned with Stone 4, whose shadow falls upon the recumbent axial stone (Figure 7).



Fig. 8. The summer-solstice Stone 11 (centre) photographed from low down at the front of the recumbent Stone 7 showing how the former (though broken) stands above the horizon.

Bohonagh midsummer sunrise, Q3

At the Type-1 site of Bohonagh, alignment analysis with photographic proof dated 21 June 2019 shows that at the summer solstice Stone 11 was planned to unite with the middle of the axial stone (as per plan in Figure 4). Regrettably Stone 11, although still standing, is broken short but the sun does rise in alignment with the paired stones.

Shadow events at the winter solstice and the two cross-quarter days of summer have been successfully photographed, but shadow photographs were not obtained at the summer solstice in 2019 because as the sun began to rise sunshine became blocked by thicke-



Fig. 9. Sunrise of 22 June 2019 photographed across the top of the middle of the recumbent stone a little later in time than the next photograph. Sunlight is weakened by the approaching cloud. Position of the sun is emphasized by an orange ring. Soon afterwards, the sun was concealed by cloud. The shadow-casting stone is the broken pointed dark stone. In the absence of cloud the shadow would have fallen in the middle of the recumbent stone.



Fig. 10. Sunrise 22 June 2019. This unretouched photograph was taken from the north side (not the middle) of the recumbent stone. The photograph was taken a little before Figure 9, but the sunlight, instead of strengthening, weakened because of approaching cloud.

ning cloud (Figures 9 and 10).

On 22 June 2019 the first gleams of the rising sun were observed just as thick cloud was arriving (Figures 9 and 10). The alignments demonstrate that under clear sky conditions a shadow from Stone 11 would have fallen on the middle of the recumbent stone. Figure 8 is helpful in proving how much Stone 11 (pointed because broken short) stands proud of the horizon when observed from the inner side of the recumbent stone. Until Fahy raised Stone 11 again in its original stone-hole the broken stone had lain on the ground for a long time (decades or centuries) during which parts of it were removed.

Bohonagh at the summer cross-quarter days of May and August

For the August and May events at Type-1 Bohonagh a good shadow is thrown by the tall straight-sided Stone

12 upon the axial stone (Figure 11). Refer also to the survey plan of Figure 9.

The prehistoric equivalent of what we call May Day occurred 45 days after the quarter day that we know as 22 March (Day 92) and 46 days before the summer solstice (Day 183). On this reckoning the date is Day 137, which is what we call 6 May, and not the modernized Roman calendar's first day of May.

This sunrise photograph (Figure 11) at Bohonagh was taken on 5 May 2019 a day before the optimum date. The shadow of Stone 12 covers about half of the recumbent axial stone at sunrise. Because the date is 5 May, not 6 May, the alignment is imperfect by 0.6 degree in this photograph, and it is further displaced by 0.8 degree because of the passage of time since the planning was done in the Bronze Age (because of the precession of the equinoxes). Allowing for these factors, the union by shadow is good.

Note that if the date of 1 May had been chosen for analysis instead of 6 May, the difference along the horizon would worsen by another 2.5 degrees.

In Figure 11 the photograph of the rising sun at Bohonagh offers a cautionary explanation about the advantage of filming on optimum dates. At this time of year in early May, the sunrise direction changes at a rate of half-a-degree daily which equals a solar diameter every day. The photograph was taken on 5 May 2019. So next day the sun rose one solar diameter to the left. Moreover, in the Bronze Age about 4000 years ago, it rose a further one-and-a-half solar diameters to the left, that is, fully behind the shadow-casting stone which is Stone 12 (refer to the plan, Figure 8). Finally, consider where the point of sunrise would be if the modern date for May Day (using our Roman calen-



Fig. 11. Sunrise over high ground east of Bohonagh on 5 May 2019. Photo: John Davies.



Fig. 12. Bohonagh, on a frosty morning near Samhain 2019. Sun rising at 07.52 GMT on 1 November in line with the proxy for Stone 3 and the middle of the axial stone.

dar) had been tried instead. The difference in azimuth between ‘May Day’ if wrongly set at 1 May (Day 168) as compared with 6 May (Day 173, as in Table 1) is 2.5 degrees. This is five solar diameters. It shows that on 1 May a shadow of Stone 12 cannot fall medially on the recumbent stone. At best it only just touches a far corner of the recumbent axial stone. In short, the stones were indeed likely planned for the day that we know as 6 May. This helps to confirm that the prehistoric calendar of these communities was indeed based on day counting. On 5 May 2019 at sunrise the shadow of Stone 12 covered half of recumbent at sunrise.

Bohonagh at the winter cross-quarter days in November and February

The plans in Figures 7 and 8 demonstrate the intentions of the builders for sunrise on the Samhain and Imbolc cross-quarter days. For these occasions the key stone is Stone 3. Unfortunately, it is missing. Dr Fahy, as excavator in 1959, set a short stone in its stone hole. However, it is too short to serve as a replacement shadow-caster, so in November 2018 two boxes were placed on top of the stone for experimental testing at sunrise (Figure 7) but, of course, the stone’s original height is unknown.

Figures 12 and 13 illustrate the situation for 1 November 2019 using a proxy for the missing Stone 3 planned for the November cross-quarter day of observation. This picture was taken with the camera at eye level (1.7m above ground level) and positioned abo-



Fig. 13. November Samhain 2019 on a frosty morning. The sun is shining on the top part of the far side of the dummy stone 3, which is heightened by two boxes.

ve the axial stone whose top is 1.35m above modern ground level.

From this it appears that the Bohonagh community arranged for the shadow of Stone 3 to unite with the axial stone at the cross-quarter dates of late autumn (Samhain) and winter (Imbolc). Because the stone is missing, Dr Fahy the excavator positioned a short stone at the stone hole as a dummy marker (Fahy 1961). For photographic test purposes two boxes were placed by the author on this stone to compensate for the missing height (Figures 12, 13) by assuming that the original height was much like its surviving eastern



Fig. 14. Shadow of the proxy Stone 3 upon the recumbent stone at Samhain 2018 at 08.01 GMT. Part of the shadow of Stone 3 is obscured by a broad interfering shadow cast by the high thick bracken immediately behind Stone 3.



Fig. 15. Professor John Atkins and the author at the surviving stones of Carrigaphoooca, June 2019. The tall stone at the left is 2.0 m high. The one nearest the camera stands 1 metre high. Photo: Geraldine Wales.

neighbours (Stones 12, 13, 1 and 2), but the proxy for the stone should probably have stood straighter. The resulting shadow on 1 November 2019 is shown medially on the axial stone (Figure 14) but its planned potential as a reconstruction is reduced by additional unwelcome shadow cast by a vast zone of gorse, bracken and bramble that in 2019 stood a metre high closely alongside the several stones between east and south (cf. Figure 13).

Survey and research: Carrigaphoooca Stone Circle

Irish Map 79. Grid reference W 293 735. Altitude 79 m. 51.909° N, 9.025° W.

SMR Number: CO 070-035. The circle is number 11 in Ó’Nualláin’s (1984) review and in the present author’s gazetteer (Meaden 2024).

The stones are in pasture 4.5 km west of Macroom, 250 m south of the N22 and 250 m from the confluence of the Sullane and Foherish rivers. The ruins of Carrigaphoooca Castle provide a helpful landmark. Horizons in the east are low.

The site is bleak because five stones or more are missing but, surprisingly, enough survive as to render a reconstruction possible.

When John Windele visited a century-and-a-half ago four perimeter stones were standing and another lay fallen. Additionally, a metre-high quartz stone stood in the central area although not centrally. It has long since gone, but hopefully it survives in someone’s property nearby. An appeal could be made. Windele called it “the cloch greine or central Sun Stone”. He

further wrote “cloch greine is the Irish name given to any quartz stone.”

Only three stones now stand, and a fourth lies fallen. The tallest is 2.0 m high.

The circle on the author’s plan, which best accords with the positions of the three standing stones and the base of the fallen stone, indicates a diameter of 6.0 metres. Windele ((R.I.A. MS 12.I.9, 375) provided a rough sketch plan without north arrow that Ó’Nualláin (1984: 15, 65) reproduced.

Note that because the tall stone in Figure 15 is in the south-southeast, it was never a functioning portal stone. Portal stones are in the eastern part of the circle between southeast and northeast. There are several sites where a prominent very tall stone is not a portal, among them Derreenataggart (Stone circle 26) and Gurteen (Stone circle 43). Perhaps the builders had some practical or mystical reason at Carrigaphoooca for making use of this fine stone that so excels in height.

The one-metre-high stone, which is north of the tall stone (in Figure 15 it is nearest the camera; in Figure 16 it is the second from the left), could be the northerly portal of a pair from which the southerly portal is missing. It has the stature of a portal stone, as similarly at Knocknaneirk (Circle 19) and Dromkeal (Circle 54).

Figure 17 is a new plan of the surviving stones of the circle. Consider their positions. Omitted from this plan are additional badly cracked biggish stones that lie flat near these stones and continue to be trampled



Fig. 16. This photograph was taken from point R on the calculated perimeter on the plan of Figure 17. Point R is opposite the proposed pair of portal stones. Author's photograph.

and fractured by cattle.

Compare the plans of Figures 17 to 19.

Firstly, Figure 18 demonstrates the consequence of introducing a best-fit circle to the stones in Figure 17. Next note the symmetrical positions of stones labelled S and W relative to the position at the extreme west of the circle, which is labelled R in the third plan, Figure 19.

R is a proposed location of a missing recumbent stone because the survey shows that sunrise shadows coming from stones S and W if standing would correspond well with the directions of sunrise at the summer and winter solstices, as clarified in Figure 19.

Furthermore, the survey reveals that the tall stone labelled WX would then be positioned correctly for the sunrise directions of the winter cross-quarter dates (WXQ) of 5 February and 5 November.

The stone still standing at P1 may then represent the

location of the northerly of a pair of portal stones— whereas the southerly portal Stone P2 has long been missing.

A stone absent from between P1 and S could then account for the summer cross-quarter dates (SXQ) in May and August.

This line of reasoning supports an inference that a missing southerly portal stone, P2, being close to 90° east of north from the direction of R had been positioned to establish the spring and autumn quarter dates. Hence, with an unobstructed far horizon, the suggested positions for recumbent stone R and the portal stone P2 logically generate six of the eight agricultural festival calendar dates. Other tested options deliver nothing. Lastly, the plan itself points to a circle diameter of 6.0 m.

Conclusions

Much of anthropological interest has been recovered for the epoch in the Irish Bronze Age when stone circles were being built. Above all, the use of a calendar promoting eight particular seasonal dates is confirmed for the people of Bohonagh in County Cork. By also reconstructing the builders' plan of the badly damaged Carrigaphoooca Stone Circle it is inferred that it, too, was likely a Type-1 shadow-casting circle in which a recumbent stone, now missing, formerly stood axially at the west as one of either 9 or 11 circumferential stones.

The Bohonagh fieldwork was undertaken on occasions as near as possible to each date pertinent to the workings of an eight-season calendar in which successive dates were 45 or 46 days apart. The main opera-

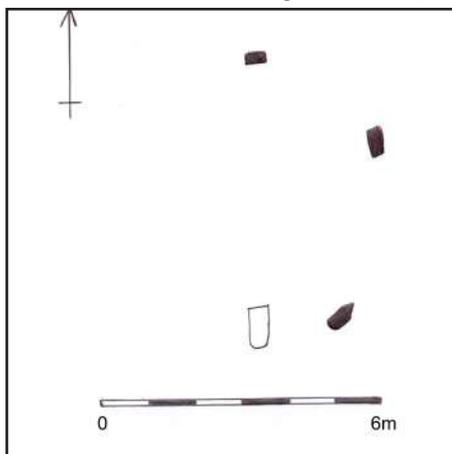


Fig. 17. The four stones at Carrigaphoooca as surveyed.

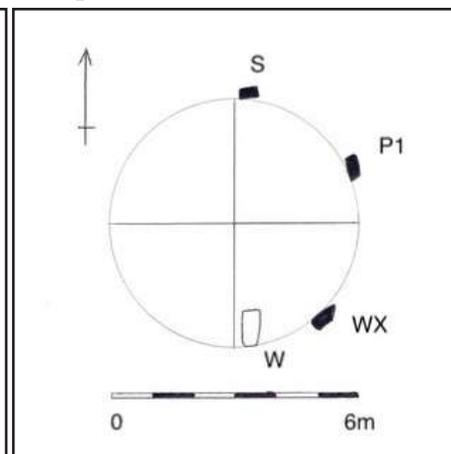


Fig. 18. A plan of the four stones with a best-fit circle that touches the stones.

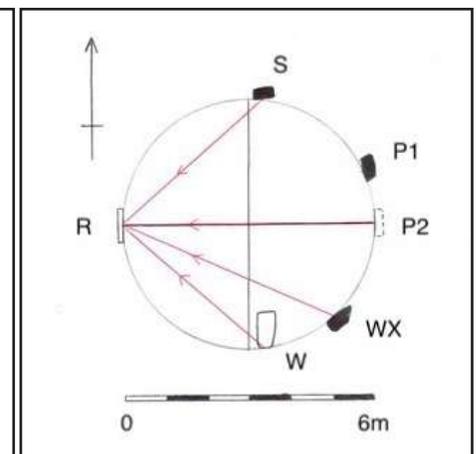


Fig. 19. A logical interpretation of the survey data.

tional feature of the monument was the planned casting of shadows between paired stones of dimorphic character. The dimorphism was sexually symbolic as would be appropriate for folk believing in animism and the principle of the hieros gamos (Meaden 2021a, 2022b). Shadow casting stones in the east at Carrigaphoooca would have been male symbolic as at Bohonagh. The female-symbolic shadow-receiving stone lay purposefully horizontal in the west. Recognizing such features provide clues as to the motivations and the social implications of the beliefs of the Bronze Age monument users.

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The author is grateful to the farmer Mr. Nigel Vickery for allowing numerous visits to the Bohonagh stones on his farmland repeatedly over several years. His is an important working dairy farm and permission to visit must first be obtained. My everlasting thanks go to Prof. John Fuller Atkins for help in so many ways at both stone circles, and for sunrise photography at Bohonagh to Austin Kinsley (Figures 5 to 7) and John Davies (Figure 11). Geraldine Wales supplied Figure 15 at Carrigaphoooca. Photographs, where not specifically credited, are the author's copyright.

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NARRATIVE PETROGLYPHS OF WESTERN COLORADO; ARCHAIC – PROTO-HISTORIC ERAS

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Introduction

The petroglyphs of Western Colorado, specifically the Gunnison River drainages, reveal the activities of prehistoric people in an uninterrupted sequence from the late Holocene to the present. The imagery reflects a keen knowledge of the environment and survival techniques in the high desert and deep canyons. This study centers on the Smith Fork Canyon, a microcosm of early narrative petroglyph panels, set within the macrocosm of the Gunnison Basin with dozens of comparative examples.

Archaic era (3000 BC to AD 400) rock images of 'elk' and 'deer' typically have large tree-like antlers and long tapered legs. In the Formative era (AD 400 to AD 1300), there is a change in form to animals with medium-sized horns and antlers, short legs and rounded bodies and anthropomorphic figures with large hands and feet. The Proto-historic era (AD 1300 to 1700), develops conventional symbols with tree and plant-like motifs, spirals, wavy lines, bear paws, and human figures are larger and fully pecked. Symbolic headdress, hair styles, and preferences for right or left bow straps reflect and identify traditional cultures. Rather than hunting scenes, there are intertribal battle scenes, mythic deities and culture heroes in the narrative displays.

The interpretations and analysis presented here are based on a 'relational thinking' that is inclusive of the landscape, physiographic, and biological context. It assumes that the petroglyphs are a form of human visual communication that conveys meaning by the representation of gestures, icons, and spatial syntax. Ethnographic studies provide an insight to geocentric referencing of the cardinal directions that placed people in the landscape. Duplication of an image is interpreted through spatial syntax to understand spatial/temporal associations. It was a surprise to find how early in time, the introduction of the horned quadruped as a 'sign vehicle' was used to indicate motion and direction. Thanks to Google Earth photographs that

provide context of the landscape identifying rockslide areas, river flood zones, and hunting vantage points.

The narrative imagery in these very old panels, relates to the lifeways of early hunting and gathering groups whose awareness of the natural world was highly tuned to the rhythms of life through the seasons. Petroglyphs placed on certain rock faces integrated the cracks, lumps, and spatial positioning to provide the physiographic context; the rock face being a microcosm of the landscape where the story takes place.

The sitemap of the Gunnison River Basin, in Figure 1 provides the locations of similar images discussed in this study. The topics are arranged in order from cartographic images or 'maps' to animals and bird behaviour, and finally to people and warnings of dangerous situations.

Archaeological studies of the Gunnison River Basin have identified hunting and processing sites from the archaic through the historic eras. Family groups camped in the adjacent canyons and used trails that are still in use by game animals, cattle drives, and recreational hikers (Baker 1988, Gardner and Hadden 2011, Patterson and Watchman 2006, Reed and Metcalf 1999).

Methodology of Interpretation.

Gesture and non-verbal communication

The methodology for interpreting these panels, employs gesture and posture identification as a diagnostic tool in interpreting the narrative activities of animals, birds and people. Form follows function: that forms are purposeful rather than random and meaning is their function. Meaning is conveyed through gestures such as the articulations of arms and legs, which are integral to what Henley (1977) terms the 'body politic'. Gestures, associated with 'birthing' and 'death', are generally universal. Charles Darwin, a pioneer in documenting nonverbal communication, believed the body motions convey information in human and animal contexts. Basic human nonverbal communication

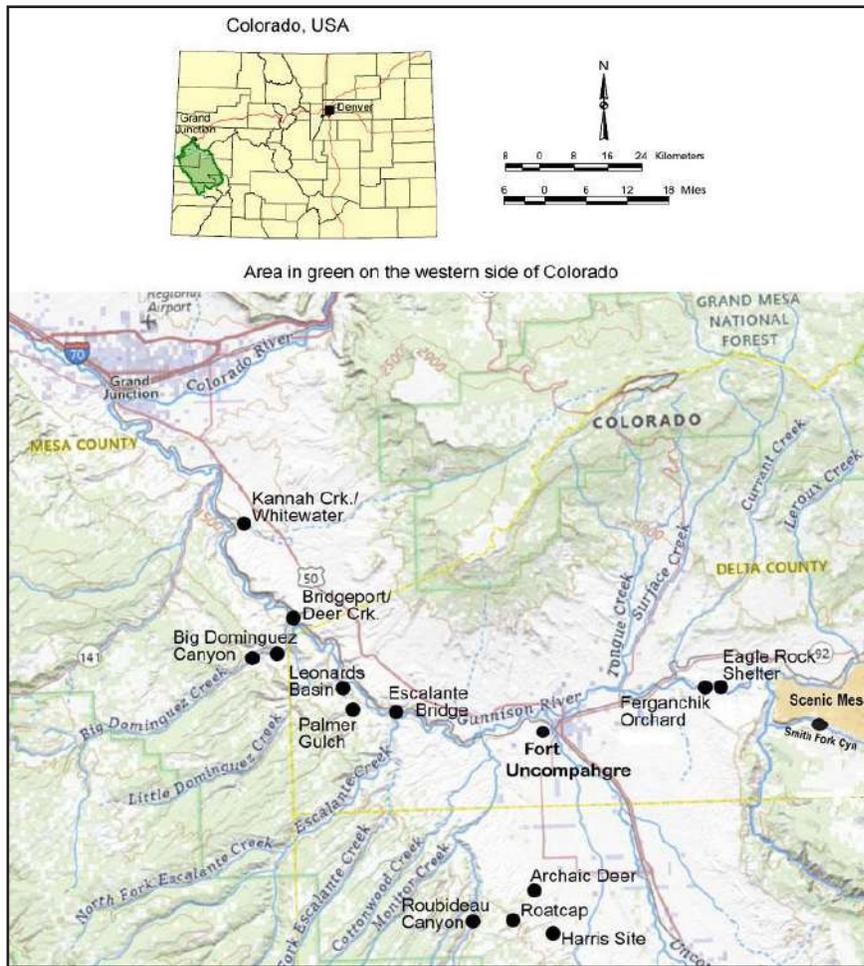


Fig. 1. Site map of the Gunnison River Basin in Western Colorado. The petroglyph sites that have comparative images are labeled and referred to throughout this report. (Map by Dave Arnlovich)

kinetic systems (postures and gestures) have enduring significance across societies and eras. Animal body postures and limb gestures were vital tools for ancient peoples to convey information that hunters were familiar with. It stands to reason those depictions of gestures in prehistoric rock images offer insights into the intended meanings being conveyed. As Thomas (1991) aptly states, every aspect of the human (or animal) body—from its size and shape to its color—conveys social meaning to the observers.

Spatial syntax, refers to the placement of images on a panel. Their arrangements are also functional and serve to convey three-dimensional space on a two-dimensional surface, a technique employed by artists across all periods of time. Objects, individuals, or animals drawn in the foreground space signify ‘present time’, while those depicted in duplication, smaller in size and elevated above the foreground portray ‘distance’ in space and ‘past’ in time. Prehistoric art is no exception as demonstrated with examples of narrative

panels from the late Archaic through the Proto-historic eras.

Beyond Style – Form Follows Function

Form follows function aligns with what David Wilkins calls a ‘multi-media performance’ (Wilkins 2001). In his view, language is composed of three modalities as part of the whole human communication system. These are 1) the spoken or verbal narration, 2) the simultaneously gestured aspect, and 3) the visual display, in art and literature, that includes rock images. Each medium (spoken, gestured and written and drawn), is a component of a larger communication grammar. Neither verbal, gestured nor painted stories are autonomous. Like bound morphs, each needs the other as part of a multi-faceted communication system.

In prehistoric art, we typically encounter two of these modalities: the visual depictions of human and animal gestures and the context of rock incorporation, and its setting within the geographic landscape. The gestures

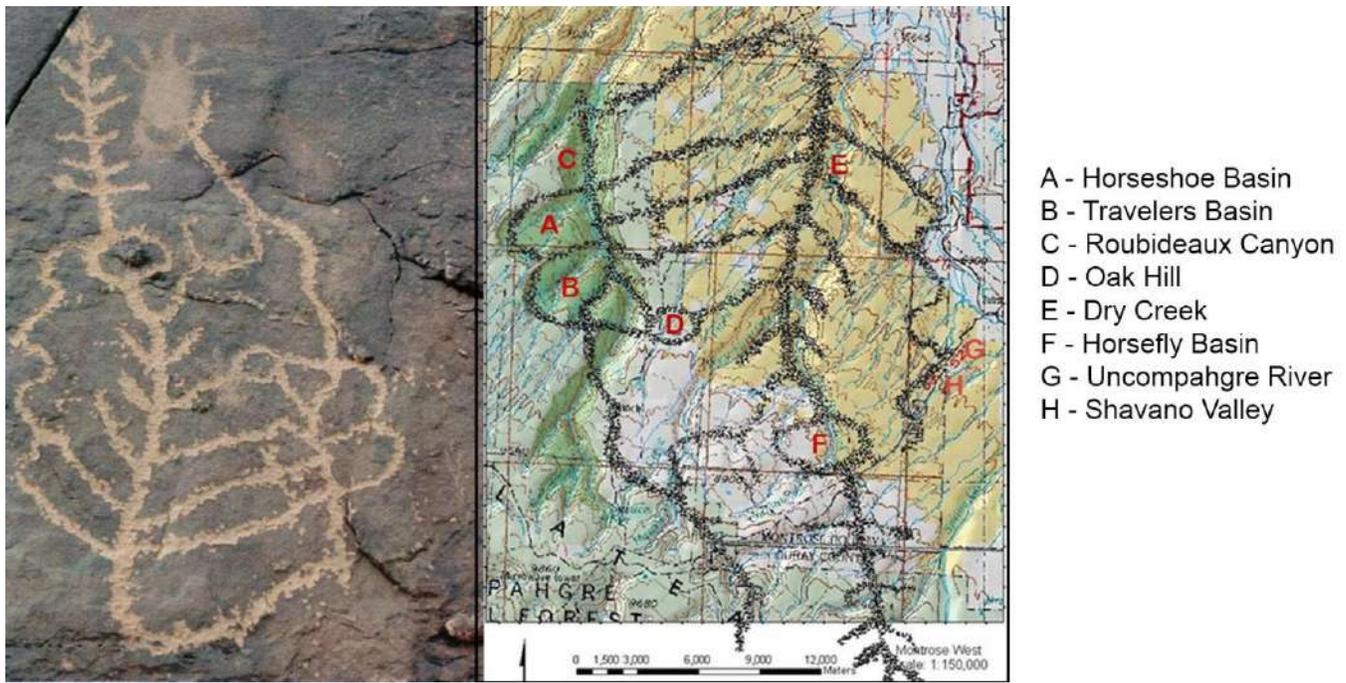


Fig. 2. Shavano Valley petroglyph of the Proto-Historic era, that Clifford claimed was a terrain map oriented to the south. The drawing of it has been turned 180 degrees to orient to the south and superimposed over a topo map. Then the bottom is oriented to the north, in agreement with the topo map that is oriented to the north. One can see the corresponding features to those found in the area map of the Uncompahgre plateau. The green areas are basins where game animals congregate in the winter and are located along Roubideaux Canyon. Down the center is Dry Creek. To the far right is the Uncompahgre River.

are intricately linked with verbal narration that for the Proto-Historic era can often be found in the ethnographic literature recorded in the nineteenth century from living descendants. For the earlier periods, we can only rely on a vigorous analysis using these two methods to hypothesize what the verbal narratives might have been. They serve as a powerful tool for interpretation of many archaic sites in the Gunnison River Basin.

Cartographic Images

People often identify petroglyph ‘maps’ that are abstract linear elements within an asymmetrical composition, and rarely have contextual references with animals or humans. In order to interpret a ‘map’, one has to consider the Geocentric Reference that is the preference of orientation to the cardinal direction. Early ethnographic documentation has shown that not all indigenous peoples of this continent were oriented to the north as western Europeans have always assumed. Native people refer to “sun-wise” directions. If they are oriented to the north, they travel from east to west ‘sunwise’ from right-to-left (as Plains and Pueblo cultures do). If they are oriented to the south, they tra-

vel ‘sunwise’ direction from left-to-right as the Numic (Utes and Paiutes) do. If they are oriented to the east, they travel sunwise from east to south to west to north as the Apache and Navajo people do. So, when investigating ‘map-like’ images of the landscape, the first task is testing its orientation to the north, the east, or the south.

In a study with Ute Elder Clifford Duncan, we examined potential ‘map’ petroglyphs in the Gunnison River Basin and Uncompahgre Plateau, that dated during the Formative and Proto-Historic eras. Duncan believed they represented “terrain maps” showing trails and important features in the landscape. In Mr. Duncan’s view, a system for recording such knowledge in a place would have offered significant advantages to highly mobile, widely dispersed small family groups, particularly when fluctuating climates drew them into unfamiliar locales or areas that had been abandoned perhaps after several generations.

Duncan (2005) proposed several cartographic and interpretive conventions:

1. **Southern orientation:** Unlike Western norms, Ute ‘map’ petroglyphs are oriented to the south where the sun comes from and sun-wise direction

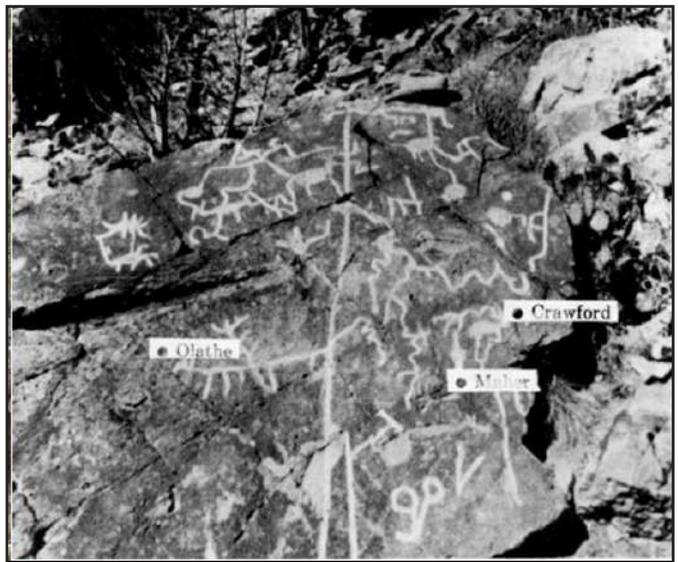


Fig. 3. The “map rock” in the Upper Smith Fork Canyon is of the Formative era and was interpretation by Galeb Casebier published in 1979 showing what he thought were trails to the towns of Olathe, Crawford and Maher. He naturally assumed the petroglyph map was oriented to the north. The petroglyph features do not resemble the topography of the local area. Figure 3. The “map rock” in the Upper Smith Fork Canyon is of the Formative era and was interpretation by Galeb Casebier published in 1979 showing what he thought were trails to the towns of Olathe, Crawford and Maher. He naturally assumed the petroglyph map was oriented to the north. The petroglyph features do not resemble the topography of the local area.

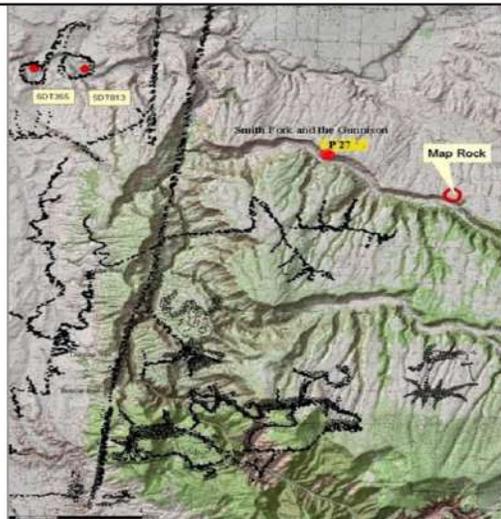
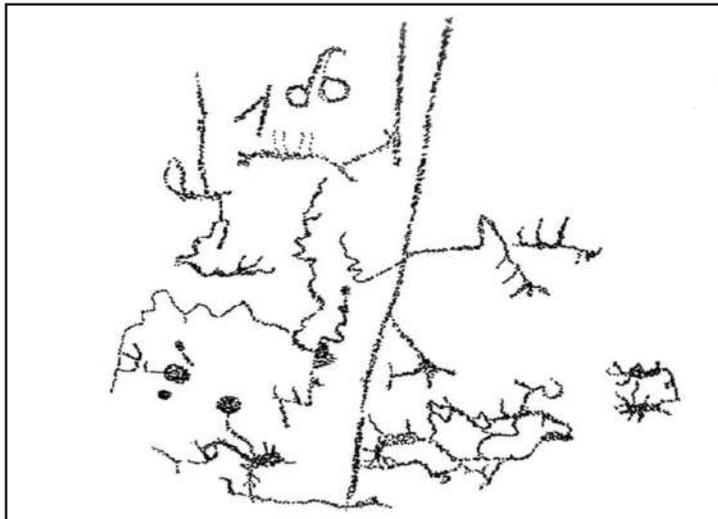


Fig 4. A drawing of the petroglyph, with Clifford’s advice, was rotated 180 degrees and superimposed over the topo map. At the top of the map, are two circles joined by a line “stem” that lines up with Lawhead Gulch and corresponds to two petroglyph sites on either side. Gulch Smith Fork Canyon is shown on the right with ‘Map Rock’ labeled.

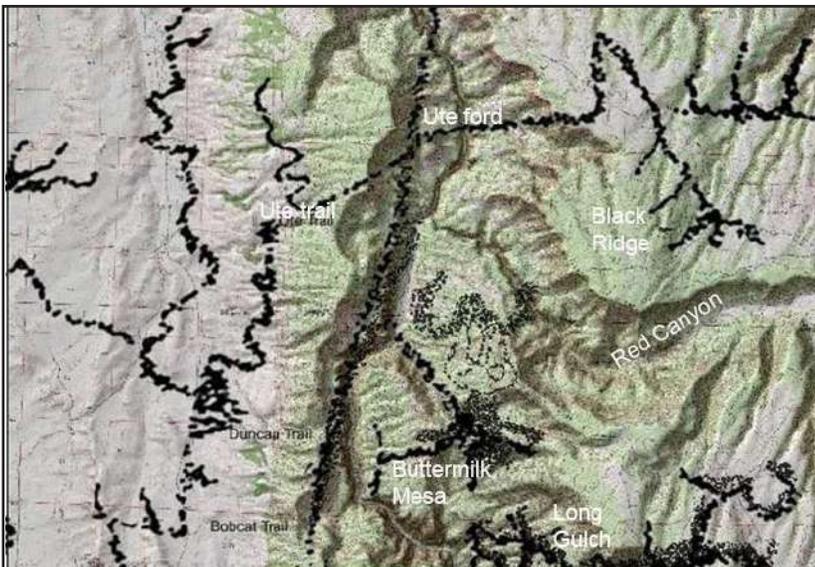


Fig. 5. shows the traced lines on top of the “Ute Trail down to the “Ute Trail ford” that cross the river and continue up on to Black Ridge. The labyrinth of game trails lead off of Buttermilk Ridge and converge at Long Gulch.

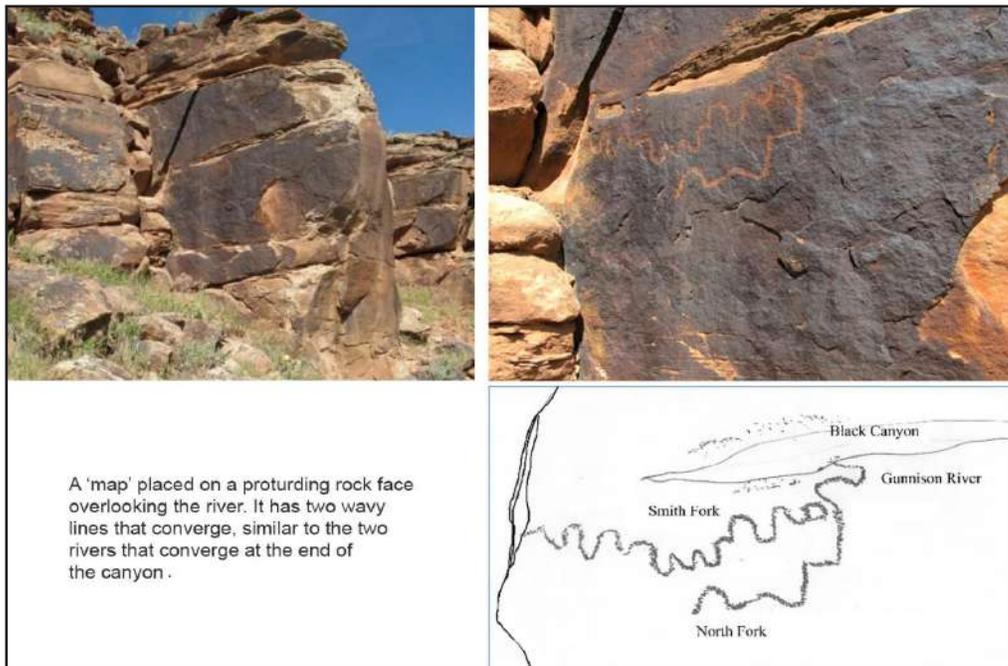


Fig. 7, is a simple 'map' found in the Lower Smith Fork Canyon, tributary of the Gunnison, on a protruding rock face overlooking the river. The panel has two wavy lines that converge and may represent the joining of the rivers systems not far from this site. Both wavy lines begin at natural fissures in the rock face. The very large, spalled crack enhanced by pecking may represent the impressive Black Canyon that the Gunnison River flows out of. The circle at the end of one line may represent a collection pond.

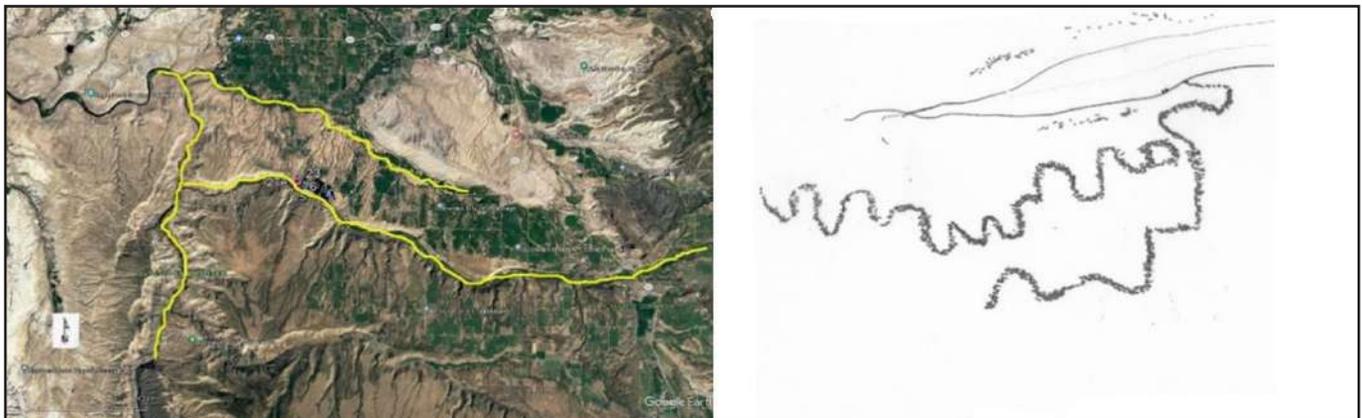


Fig. 8, in Google Earth's view oriented to the north, the rivers of this area flow from right to left, opposite to what is indicated in the petroglyph drawing. As you can see, the lines engraved on the rock face do not simulate this configuration of the rivers in the photograph.

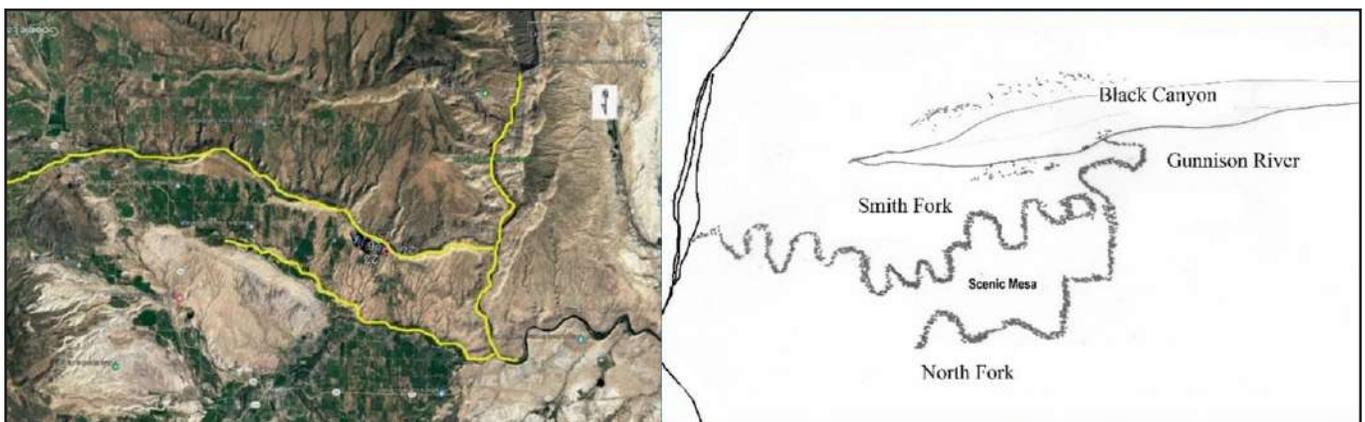


Fig. 9, has turned the Google Earth map 180 degrees, and one can see the similarities between both images. The Smith Fork, and the North Fork flow left-to-right towards the Gunnison River. The two rivers border Scenic Mesa, a table mesa with multiple springs across the top.

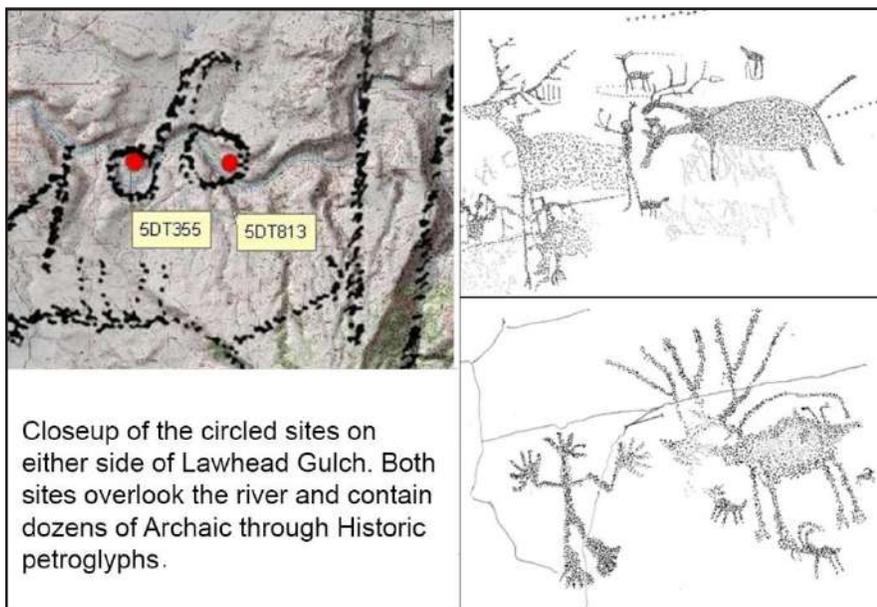


Fig. 10. Close up of the circled sites on either side of Lawhead Gulch. These contain dozens of Archaic through Historic Ute petroglyphs. They are found on cliff faces overlooking the Gunnison River.

from east to west (clockwise) is the preferred direction of travel.

2. **Variable scale:** Maps vary in scale, with rock surface features mimicking the surrounding landscape.
3. **Symbolic elements:** Circles may represent places or areas, lines represent trails, undulating lines represent rivers.
4. **Human-animal interaction:** Animal tracks, figures, and humans associated with linear elements may indicate hunting or plant procurement locations.
5. **Complex linear figures:** These may represent trails and routes through a large area, forming a “terrain map.”

The following example is located in the heart of Ute traditional homeland, in Shavano Valley just west of Montrose, Colorado, (Figure 2).

The ‘map rock’ petroglyph in Smith Fork Canyon does not incorporate the natural rock features. The deeply engraved line runs vertically across the rock face avoiding the natural cracks in the bedding planes and follows the contours of the Gunnison Gorge, (see Figure 3).

Elk and Deer

Examples of Archaic renderings of Elk and Deer from the regional locations shown on the map are illustrated in Table 1. They are large animals with branching tree-like antlers and a rare human stick figures is

shown quite small. The animals have limited animative body gestures, simply “balking” with the front legs suggesting caution or danger ahead. The following illustration shows the different antler formations that distinguishes a deer from an elk.

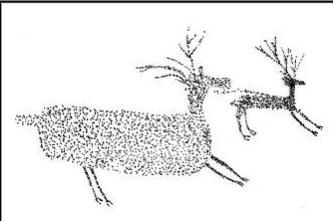
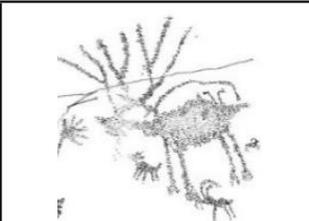
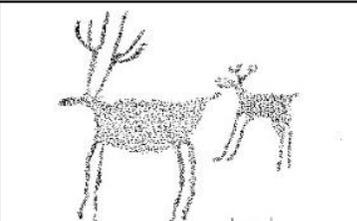
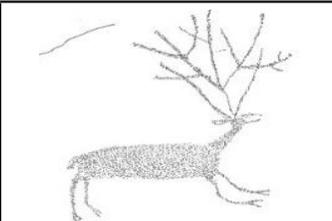
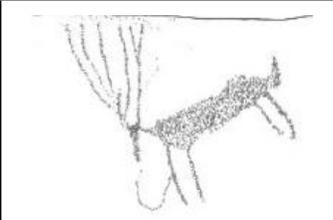
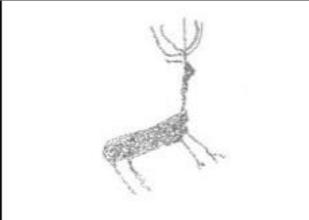
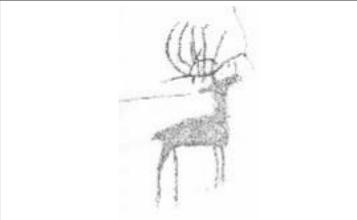
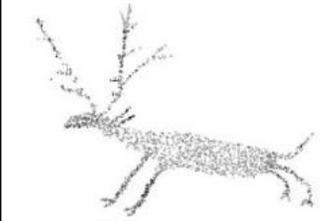
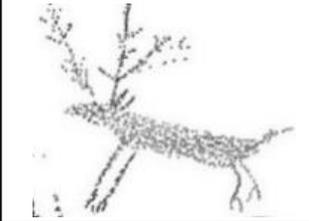
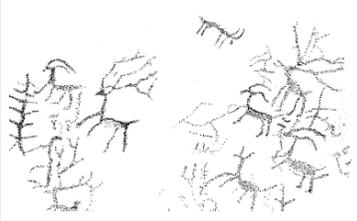
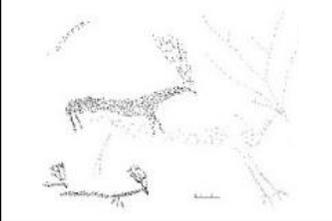
During the Late Archaic narratives appear with animals and people using gestures and postures as dualistic components of human language. The body gestures supply the actions that create a narrative display. Alpine Archaeological Consultants in their article entitled a Prehistoric Use of the Escalante Game Drive Site (Reed 1997), reports “the Escalante Game Drive site is composed of a combination of rock and brush fences and rock blinds strategically situated on the landscape. It has: 1) a collection area, where animals are first encountered; 2) a concentration area, formed by natural and architectural features; 3) a kill area, where the concentrated animals are dispatched.

The animals were driven up a very steep hill by staged hunters all along the drive line. It worked to tire them by the time they reached the top. There, hunters killed and processed the meat and hides.

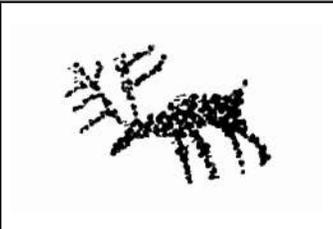
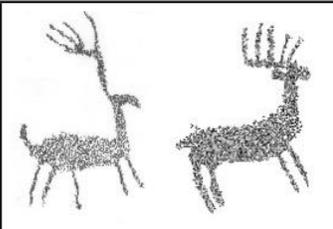
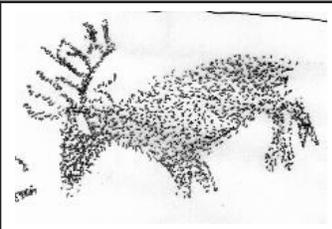
Addition of the horned quadruped

Martineau (1973) coined the term “horned quadruped” or “goat” to label the sheep-like images. They are omnifarious, comprising all sorts of body shapes, postures, limb positions, hooves or no hooves, and varieties of horn configurations. They appear in just about every complicated, narrative panel from every state in the western United States. The real bighorn she-

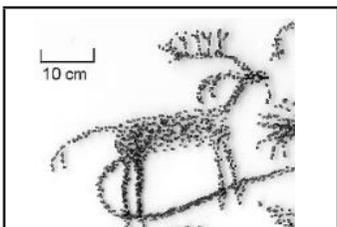
DEER

			
Escalante Bridge	Ferganchick orchard	Smith Fork	Plateau Creek
			
Smith Fork	Smith Fork	Smith Fork	Escalante Bridge
			
Escalante Bridge	Palmer Gulch	Roubideaux Canyon	Leonards Basin

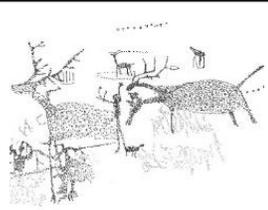
ELK

			
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SMITH FORK



Eagle Rock Shelter

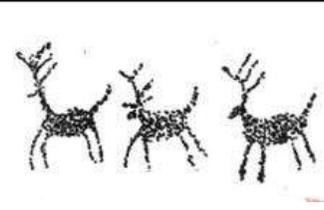


Eagle Rock Shelter



Alpine Springs

ROATCAP



Roatcap Gulch



Fig. 10, a), Mule deer with tree-like branching points, b), Elk with swept horizontal line with vertical points and c), elk from under his head showing the wide spread of his rack. The differentiation between the two species is represented in the petroglyphs during the Formative era.

ep are depicted in several areas, without abstractions. Martineau argues that theories of hunting scenes “just don’t add up when under close examination... Hunting was so common among Indians that they would hardly have mentioned such one-sided and profuse depictions... Only in the case of an unusual hunt or the unusual animal.” (Martineau 1973, 7). The only real ‘hunting scene I have observed is on the Colorado River near Moab, Utah (see Chart of ‘sheep’). Martineau points to horned quadrupeds with the purpose of expressing an action and the direction of travel in a narrative sequence. “The purpose for these neutral figures being to depict ideas such as running, walking, climbing, lying down and to show the direction of movement,” (Martineau 1973, 11).

Real sheep, or sign vehicles

“The horns of the common goat symbol were the most difficult symbols in Indian pictography to crack.” (Martineau 1973, 48).

Martineau’s breakthrough solves the mystery, as the quadrupeds supply the context for the motion in the battle with this bear. Each horn shape and body shape is a ‘word’ and added together form a phrase. This is called, a semasiographic system of communication that “conveys ideas independently from language and on the same logical level as spoken language rather than being parasitic on them as ordinary scripts are. They are supralinguistic because they can function outside of language” (Boon and Mignolo, 1994,15). Gestures and speech have evolved together (Kendon, 2004). Gesture is a constant companion to spoken language, as a dualistic arrangement. What is spoken is augmented by gestures for emphasis, directionality, emotions, behavior, feelings, tone, humor, metaphor, etc. Today we see emoji inserted with text messages and emails to provide the missing gesture words that accompany spoken words. Think of the horned quadruped as an emoji used by hunting and gathering cultures to communicate kinetic information.

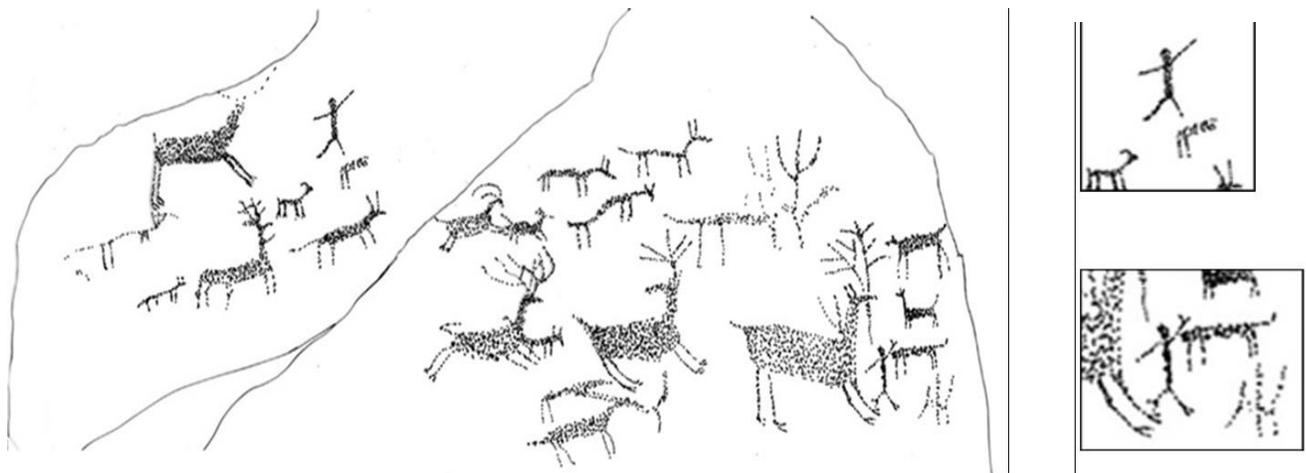


Fig. 11. Escalante Bridge, showing animated animals and humans with arm gestures indicating ‘blocking’ and ‘driving’. This panel is located near a game drive up the slope from the Gunnison River to a hunting camp on the rim of the canyon.

Real sheep, or sign vehicles

“The horns of the common goat symbol were the most difficult symbols in Indian pictography to crack.” (Martineau 1973, 48).

CHART OF HORNED QUADRUPEDS

			
<p>Desert Bighorn sheep</p>	<p>Sheep hunt panel, Colorado River near Moab, Ut Drawing by C.P.</p>		<p>(drawing by Martineau 1973,8)</p>
			 To knock off
<p>“direction”, or “movement”</p>	<p>“Nothing there” “wiped, or knocked off” “a good journey”</p>	<p>“Encumbered movement”, “something on it”</p>	<p>(Martineau, 1973 49-50)</p>
	<p>  Nothing There  Not Turning Aside </p>	<p>  Something There </p>	<p>Martineau 1981 Symbol chart 149 Martineau 1973 Chart 8, 160)</p>
<p>Horns on the face</p>		<p>‘under, beneath, shielded, protected</p>	<p>Martineau’s unpublished dictionary.</p>
<p>Horns on the face</p>		<p>“Ahead or in front”, or “in the future”</p>	<p>Martineau’s unpublished dictionary.</p>

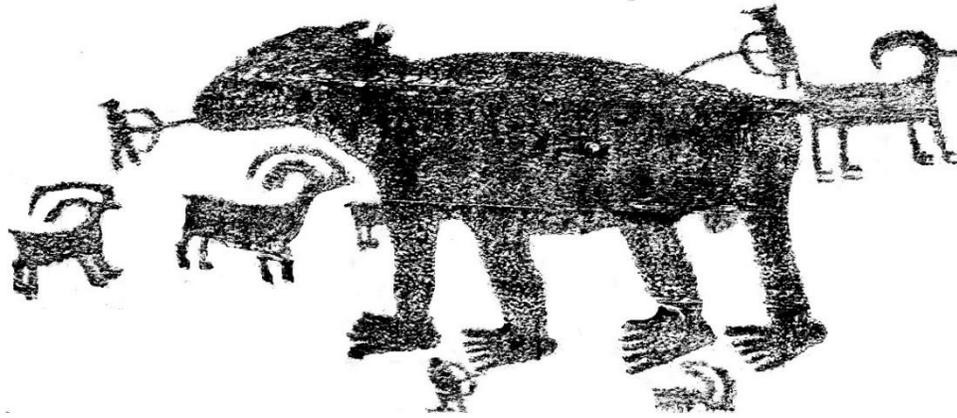


Fig. 12, is a puzzling panel of the Formative era, depicting hunters attached to horned quadrupeds while shooting at a bear. The quadrupeds all have different horn configurations. They are vectors supplying kinetic information for the motion of the hunter and his spatial context. According to Martineau, the first one on the left tells us the bowman is 'ahead' or in front of the bear, (see chart for "horns on the face'). The second quadruped indicates the bowman has gone 'under cover' from the bear. The bowman on the right is attached to a quadruped with a solid horn. This could be interpreted 'as he was traveling, he encountered "something there" (the Bear) and he turned around and shot the bear from behind.'

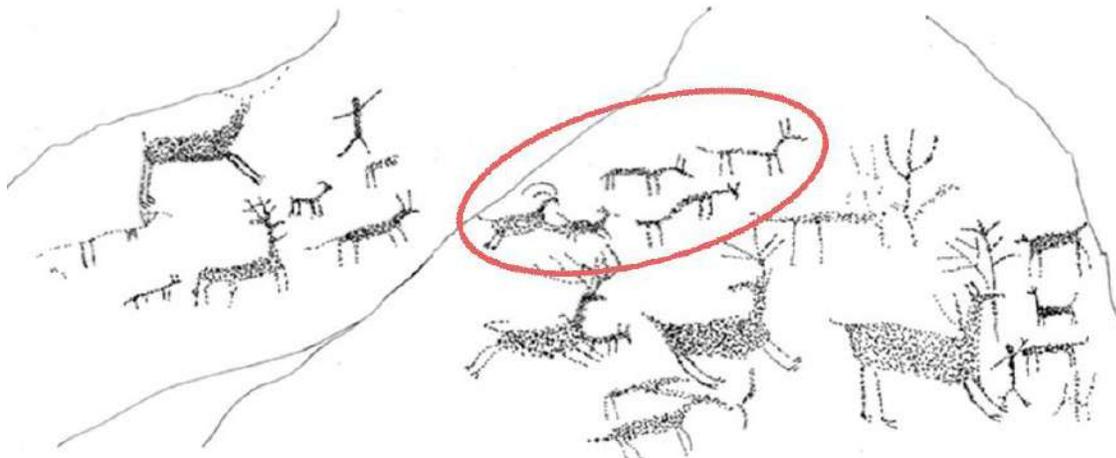


Fig. 13. Closeup of the Escalante Bridge game drive panel of the Archaic era, showing the horned quadruped providing the action verb for the direction of motion of the dogs and the deer. The hunters are staged in strategic places using gestures to drive them up the hill to the kill site.

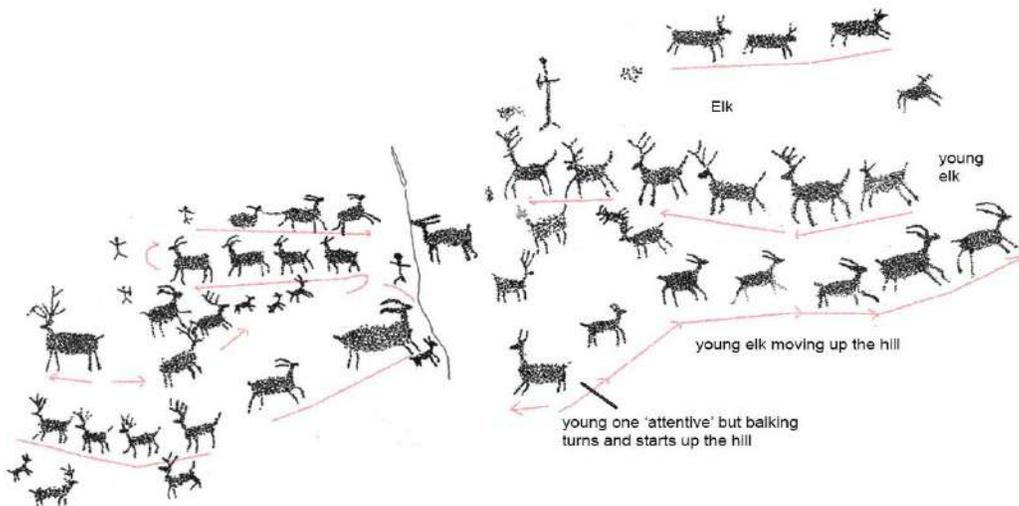


Fig. 14. Roatcap Gulch, game drive panel of the Formative era, where the animals are clearly identified as 'deer' and 'elk' with rounder bodies and shorter legs. The gestures of the hunter-stick figures with their gestures, cause the animals to change direction as they are driven up the slope. This site is located on a large cliff face midway up the slope and next to a natural game trail that leads to the top. The catchment area is a large gulch that requires a communal effort to corral the animals and without scaring them, push them up the hill.

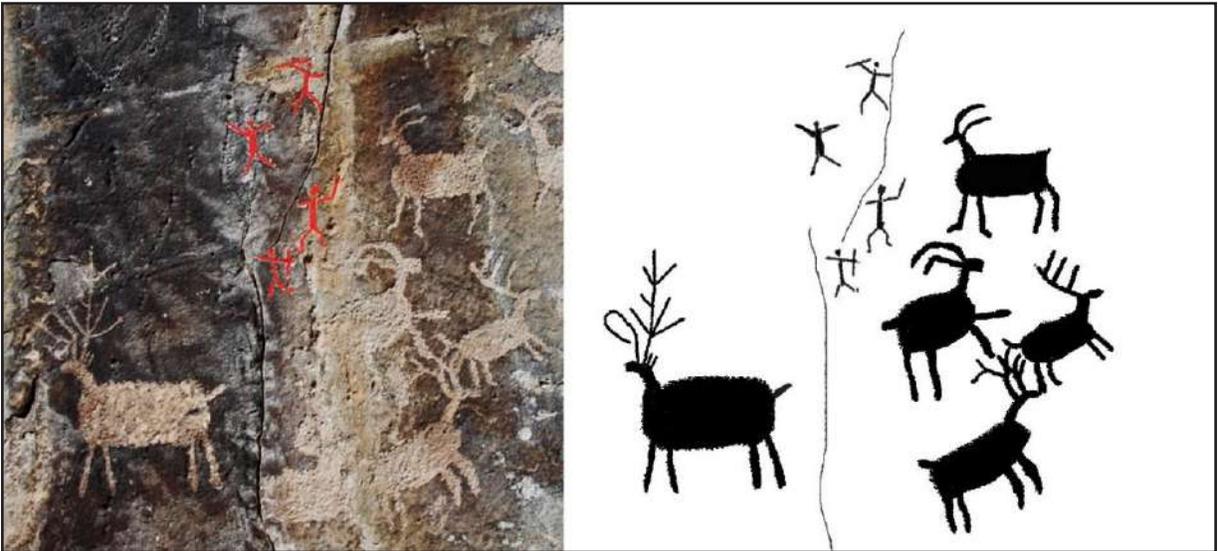


Fig. 15. A close up of Roatcap game drive with deer, elk, and two quadrupeds to show the change of direction of movement. The hunters (in red) are using gestures to block their escape. The quadruped facing the hunters has front feet pointed in two directions, signaling it is undecided which way to turn. The quadruped below it, with the bent horn and uplifted leg, is indicating two things. The bent horn is a symbol for 'not veering' or "going straight ahead," while the front leg is pointing up the hill. The phrase being "the hunters effectively "sent the elk up the trail".

Variation of Bear Figures in the Gunnison Basin

Leonards Basin	Escalante Canyon	Palmer Gulch
'starving bears' Dolores River	Smith Fork River	Smith Fork River
Gunnison River	Kannah Creek	Kannah Creek

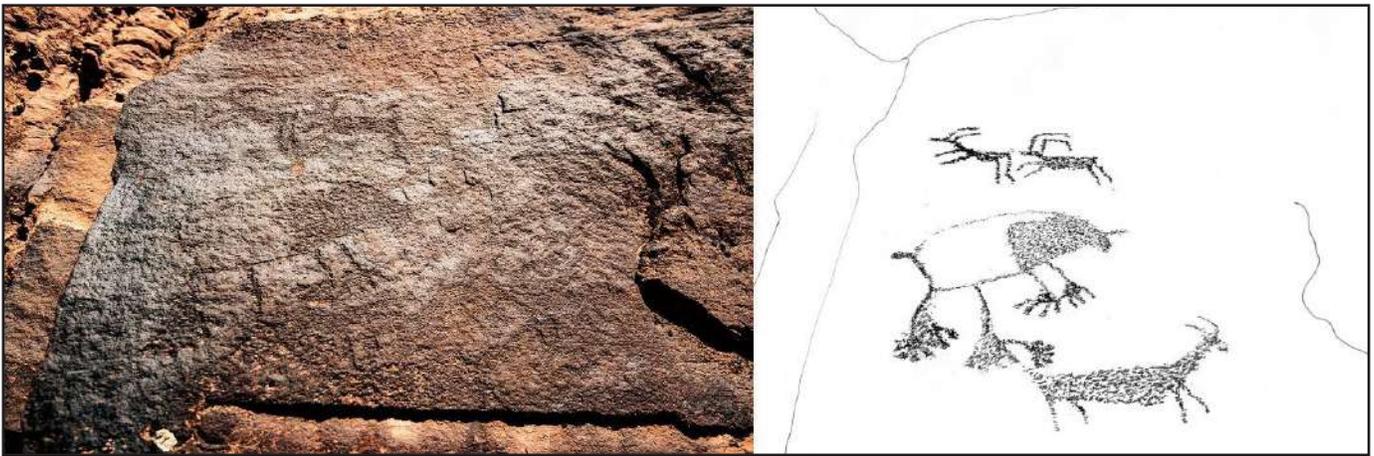


Fig. 16. In the Smith Fork Canyon is a very old, weathered late Archaic bear figure with two horned quadrupeds above it, running in the opposite direction. Another horned quadruped is attached to the bear's foot by its tail, as if leading it forward. The quadrupeds supply the active motion of the 'bear coming out' of hibernation. The body language of the upper quadrupeds' projects fear as they are fleeing the area, while the lower one supplies the movement of the bear with flared paws searching for food as he 'travels' along.

Bears can be a present and immediate danger. They are depicted in animated and exaggerated forms throughout the study area. Their heavy claws are lethal to any animal and for humans, it is wise to give them a wide berth. Table 2, highlights the use animal behavior and threats to human safety by exaggerating the bear paws to show the fierceness and power of this animal.

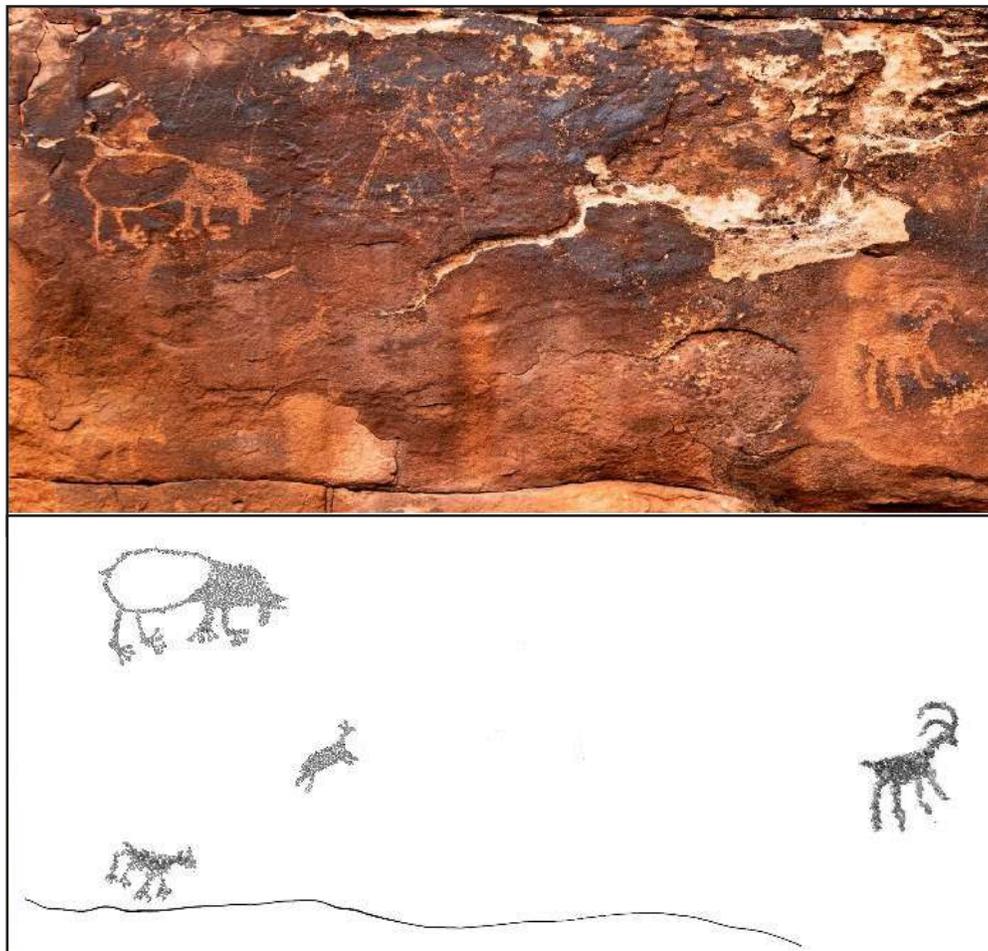


Fig. 17. A photograph and drawing of a large bear and two small cubs. This panel is of the Formative to Proto-Historic. One can see the details of toes and ears and the position of the nose pointed to the ground. The two figures below her look like cubs, with their micky-mouse ears that typify young bears. This bear has an 'open' round belly that might indicate it is empty. Her head is down towards the ground and toes spread as if scratching the ground as she looks for food. Her two cubs are climbing up with her. Again, the quadruped indicates 'heading' and 'up' to clarify what the bears intentions may be.

Birds: *When the Two are One*



Fig. 18. Smith Fork Canyon has two large-bodied wingless birds that fit the profile of wild turkeys who rarely fly. They often roost up on the ledges, where they can take off from a higher elevation and glide down to the valley floor to forage. Spatial syntax is used in this composition placing a smaller bird “up on top” and the larger one below to simulate perspective. In other words, the two birds are one, first roosting up high, and presently arriving down low. Its feet are touching the horns of a quadruped with long hind legs and short front legs, that suggest ‘climbing upwards’.

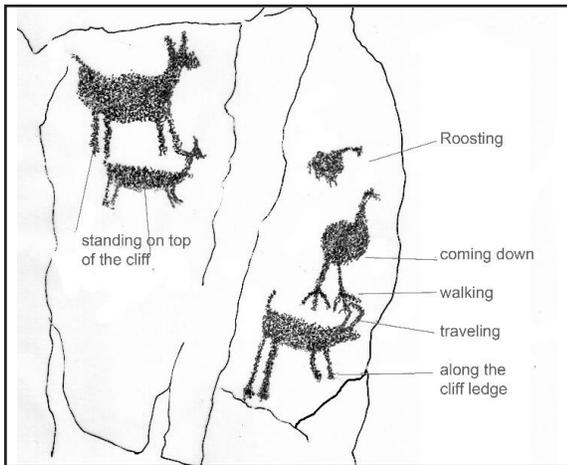


Fig. 19. The two quadrupeds on the left represent a phrase “standing on top” by using spatial syntax. The difference in body shape is significant, with the roundish quadruped positioned ‘on top’ of the flat-backed lower quadruped. They provide the context of where the bird is roosting. On the right is a quadruped positioned along the natural rock features with the back legs near the horizontal crack and the front legs shortened to look as though it is climbing up along the crack. The combination of all three elements; spatial syntax, gestures and a sign vehicle (quadruped) create a narrative describing the bird coming down from its perch up on the cliff and moving along the rock outcrop. All together, these symbols form a semasiographic (writing with signs) phrase using picture writing

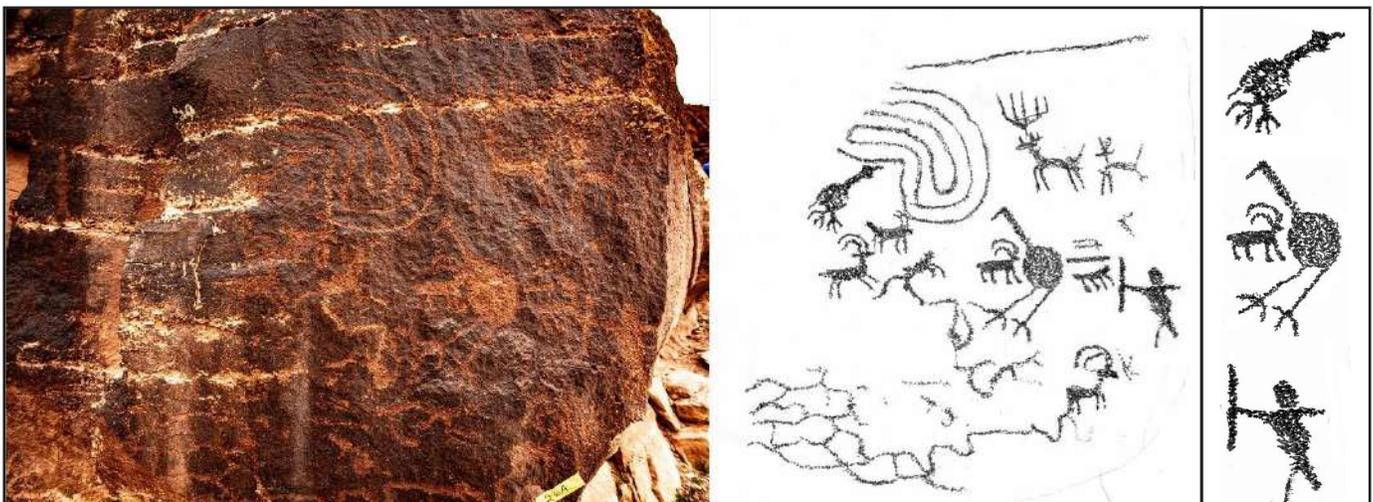


Fig. 20a. Nearby is another very weathered panel shown in the drawing depicting two birds as one, in a narrative composition. At the top are curled lines that simulate swirling water, or a river oxbow. Around it are elk and deer that seem to be ‘approaching’ on either side. The large bird at the top is stretching his neck to look out over the water. In the center is a very small horned quadruped in front of the very large bird, who is falling backwards. On the far right is an anthropomorph holding a bird throwing stick. The horned quadruped is a sign vehicle used to show the action of knocking the bird over. Figure 20b.

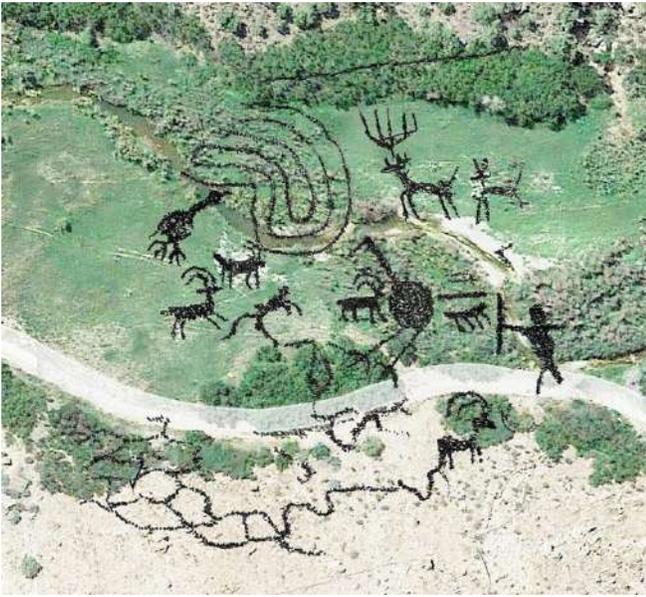


Fig. 21, is a view from the site of the petroglyph panel. The drawing is superimposed over the photograph to illustrate the whole event at the actual location. When the river floods this area, it attracts animals and birds to the marshes and although the river eddies and oxbows change constantly over time, the river course is limited by the narrow canyon formation. The combination of images creates a narrative, depicting the hunter with a bird stick, able to 'knock over' a large bird (turkey). (See the chart on quadrupeds).



Fig. 23. The Google map shows a close up of the location of this panel overlooking the shallow wading ponds that flood every spring.

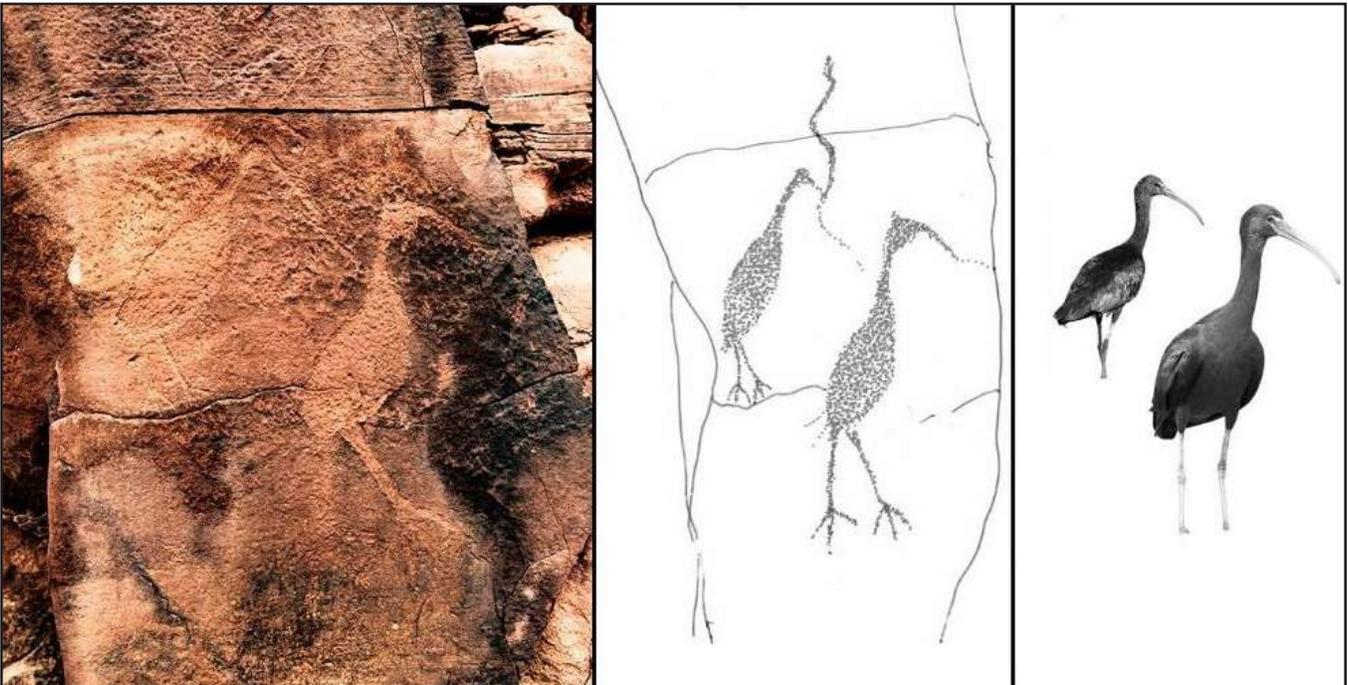


Fig. 22, shows two-as-one long-legged water bird, first holding something in its bill (possibly nesting material) and a second, stepping forward. It has a short tail and rather long curved bill. When compared with the profile of a crane, the Ibis has a long-curved bill, while the crane has a short one. The Ibis are reported to feed in the narrow marshy areas of the Smith Fork Canyon every spring. The cranes prefer larger open areas with lakes and marshes.

People and Places

Anthropomorphs with outstretched arms, large hands and feet is a gesture that is a warning of some kind of danger. Hands 'talk' and very large hands call attention to what ever is in the immediate area might be dangerous. Three panels located on steep slopes depict anthropomorphs with large hands and feet. The horned quadrupeds supply the context needed to understand in what direction the danger might be in.

The features in the rock face mimic the surrounding landscape. For example, the next panel is divided in two parts by an eroding fissure that runs clear across the rock face. The petroglyph tells a story using two perspectives.

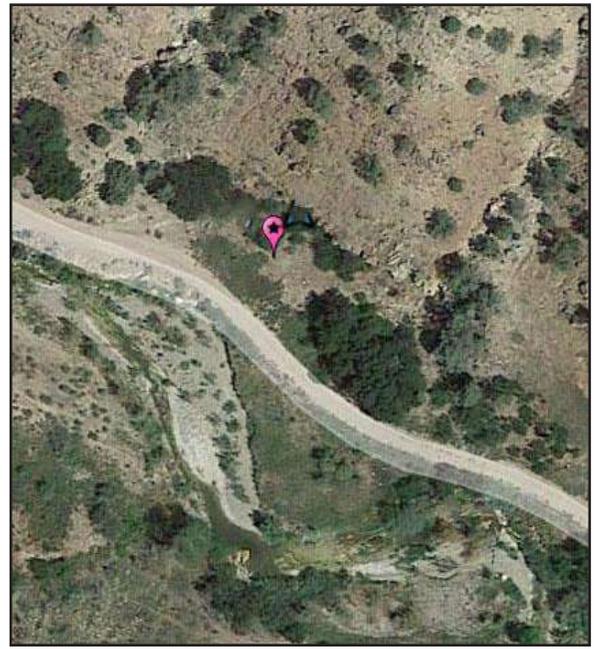


Fig. 28. A close up in Google Earth shows the meander of the river that swells much wider as it flows past the two-part panel. During spring flooding, this could be a raging torrent with quicksand and especially dangerous to cross.

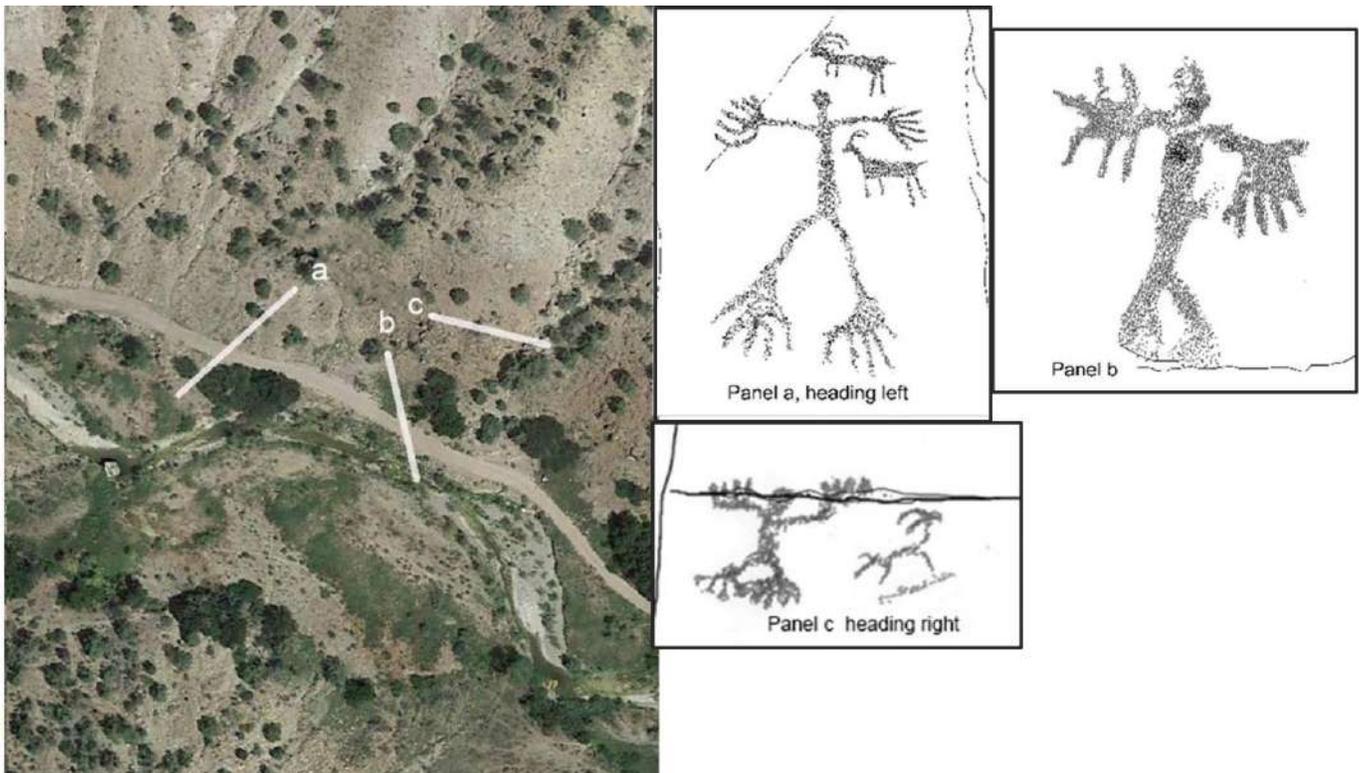


Fig. 24. Panel a), with quadrupeds heading to the left, and Panel b), right over the river, and Panel c), with a quadruped heading to the right, are all positioned in precarious locations above the river. Google Earth shows the location of these three panels perched up above a rockslide adjacent to the site. On the right is a rough drainage prone to flashflood events and rockslides. To the south is an area of the riverbed that floods during the spring runoffs. The narrow canyon can easily flood without warning that causes concern for personal safety.

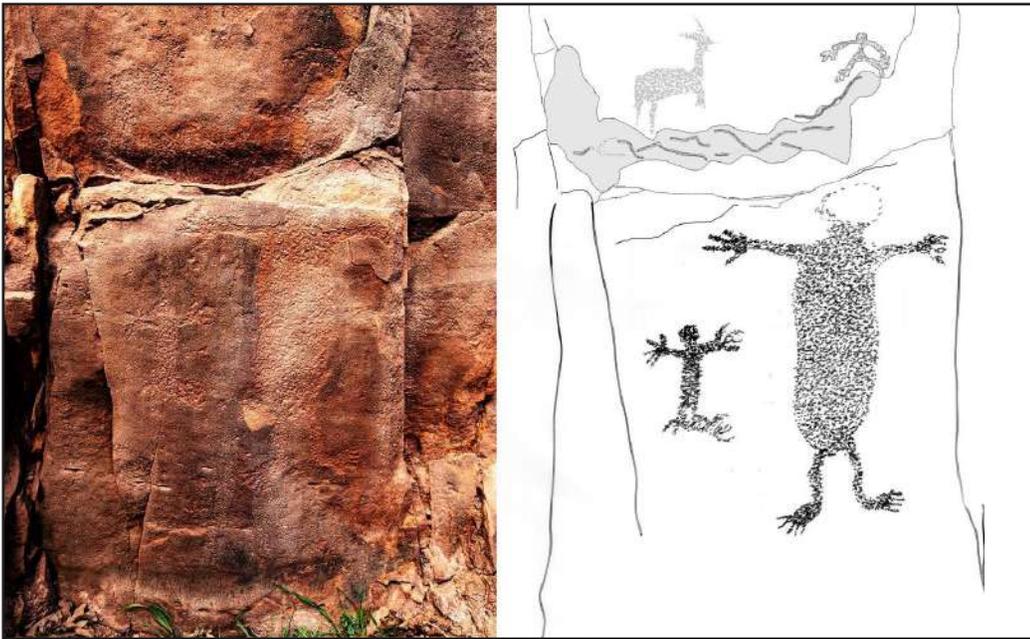


Fig. 25. A photo and drawing of the two-part panel

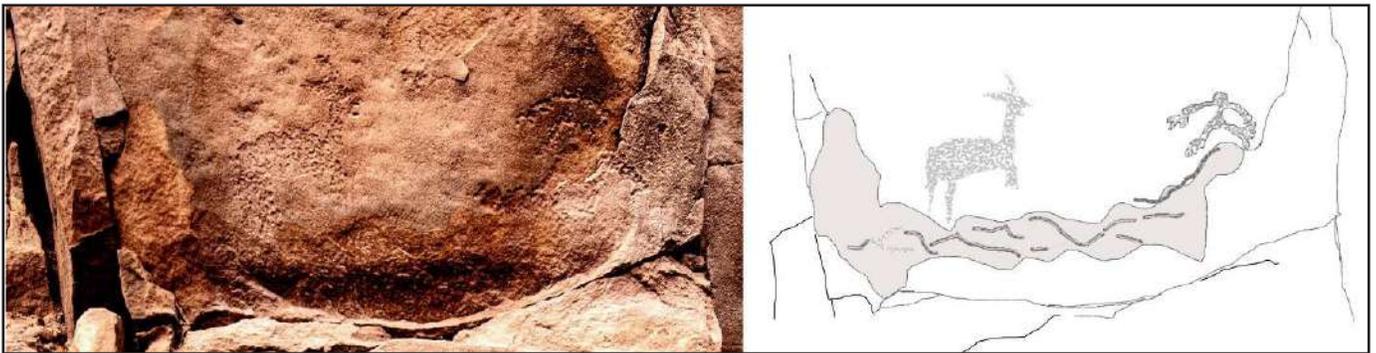


Fig. 26. The top half that depicts a side view action of a quadruped on the left about to leap over a moving river. On the right is an anthropomorph with legs stretching on both sides as if trying to straddle the river. The river itself is composed of wave forms abraded into the rock surface (shown in grey). Then, thin zigzag lines are added to symbolize 'waves'.

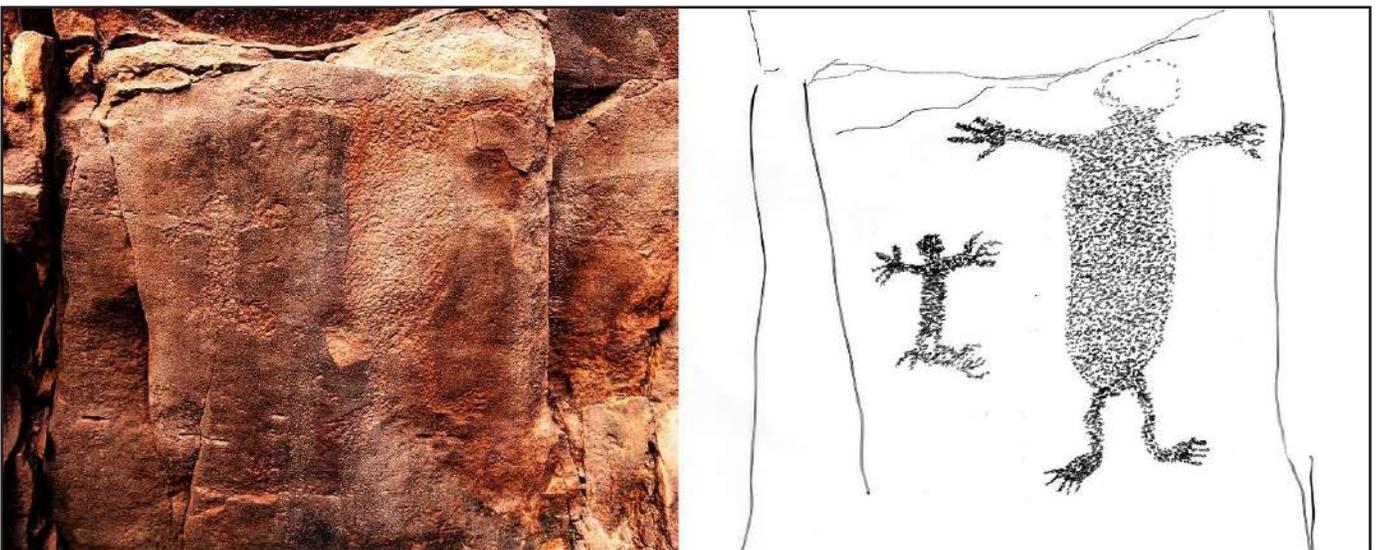


Fig. 27. The second half depicts a frontal view showing two-as-one anthropomorphic figure in the distance, and appearing closer to the viewer in the foreground. The legs of the large anthropomorph are not straight and sturdy, but wavy as if walking on unstable ground, sand, or under water. Put in context with the landscape, shown in Google Earth, and with the upper panel, the message might be to "avoid" a dangerously flooded area of the river.

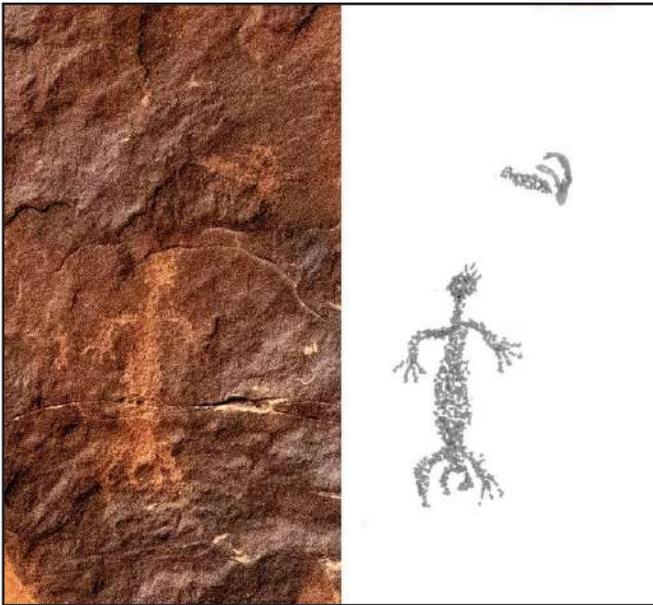


Fig. 29. The birthing panel has two images, the first looks like a woman giving birth with the feet of the infant sticking out between her legs. The image on the right just above her head, is a horned quadruped without legs, symbolizing 'lying down', in reference to the woman giving birth. She is drawn vertically to show the breech birth. The horned quadruped is the 'verb' describing her position, 'lying down'. It would be impossible to show the details of this event with a realistic rendering.

Birthing

This panel is possibly of the Formative era, because of the full body with a pronounced arm and leg gestures. The arm gestures suggest a downward movement and the spread legs with either an enlarged vulva or the legs of a breech birth seem to be indicated.

Rock Falls in motion

The 'rocks' are raining down upon the horned quadrupeds as they pass by. Again, the 'quads' supply the motion of 'walking' and the 'stone' knife and round 'rocks', add context as a warning about rockslides. The next figure is an annotated photograph of the landscape context.

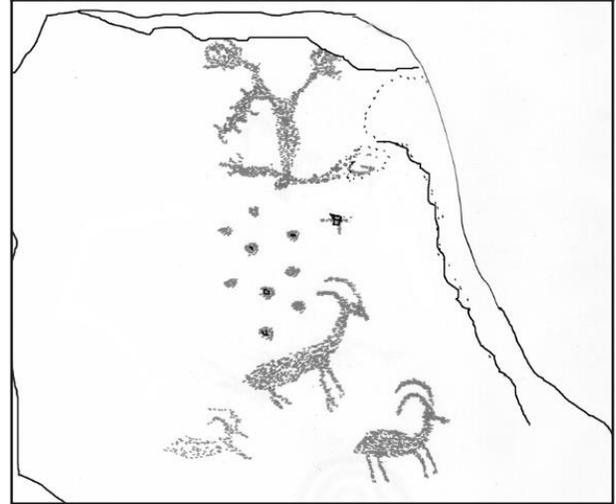
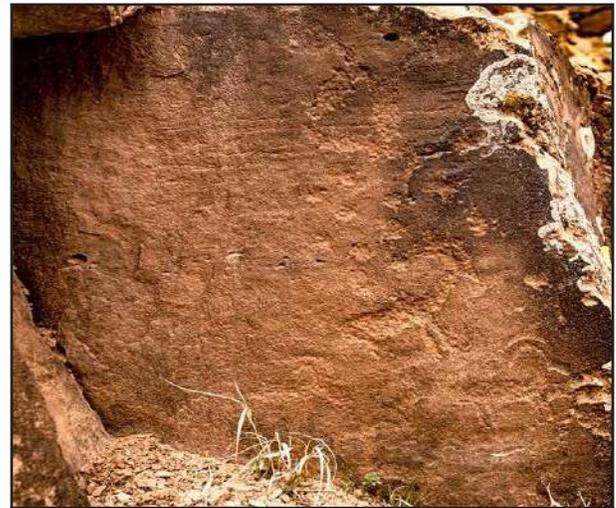


Fig. 30 is a panel situated in a rocky outcrop surrounded by step ravines and loose rock. The panel portrays an upside-down anthropomorphic figure with both feet with toes flared and both arms outstretched horizontally with fingers flared, though one hand is partially spalled off from lichen growth. Both feet are touching the edge of the boulder that is heavily eroded and pock-marked. Below him are large round dots and below the dots are three horned quadrupeds. The upside man has a spiky thing attached to his leg. It may illustrate a sharp stone knife in reference to a sharp rock. His body posture indicates he has fallen over off the edge and hurt his leg on a sharp rock. The large round dots represent rocks falling down.

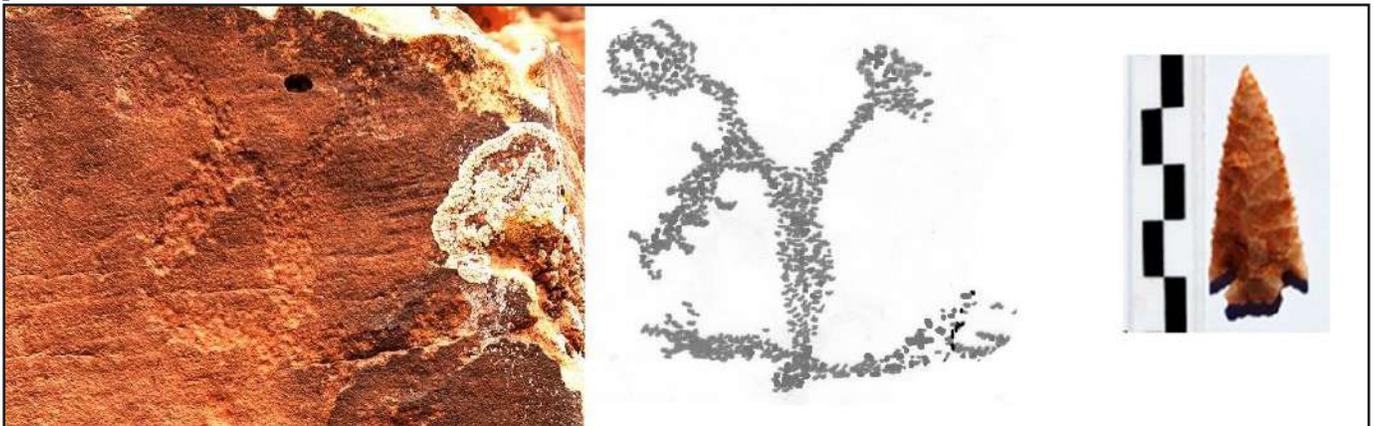


Fig. 31. Shown here is a spikey stone point called a serrated edge, from collected samples in this area. The drawing is a close up of the 'spikey' stone sticking in the leg of the inverted figure.



Fig. 32. Overview of the panel location with rock falls on either side. The surrounding landscape at this site confirms this hypothesis

Summary and Conclusions

The study is only a brief sampling of petroglyphs in Western Colorado, particularly in the Gunnison River drainages, spanning from the late Holocene to the present. These petroglyphs showcase a progression from Archaic to Formative eras, with changes in imagery like 'elk' and 'deer' representations. Most surprising was the high number of quadrupeds that occurred prior to the Formative and Proto-Historic eras. Both animals and human figures are animated with gestures and placed in spatial arrangements that communicate information about their environment. Eth-

nographic studies have enhanced our understanding of cultural preferences for geocentric referencing that make interpreting petroglyph maps more plausible. Relational thinking ties these stories into the landscape and lifeways of people who lived here for centuries. The gesture analysis and sign vehicle assistance give context for the suggested meanings communicated in these petroglyphs.

The Archaic narrative petroglyph panels discussed in this study are semasiographic, a picture writing. They "can be understood once one understands the logical system (grammar) that drives and orders them," (Boon

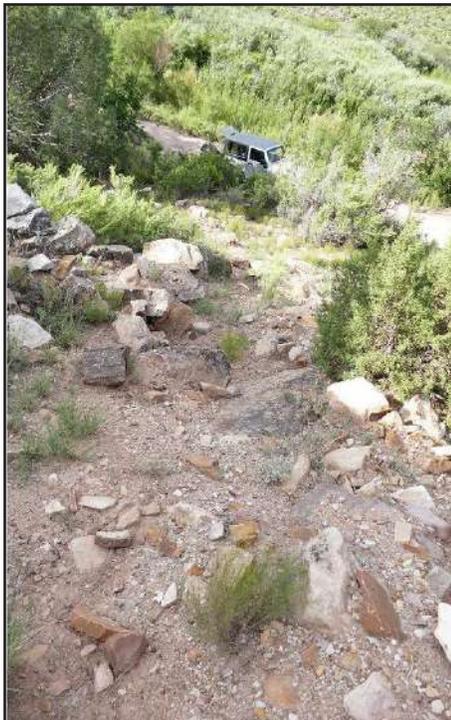


Fig. 33. left side looking upward and right side looking downward at steep and rocky terrain.

and Mignolo 1994). Spatial syntax along with geocentric referencing is grammar. “Gestures are non-verbal communications shared cross culturally.” (McNeill’s (1992). Gestures are the verbs while quadrupeds supply the context. It is my hope that others will continue with this research, following what was initiated by Martineau over fifty years ago.

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GROOVES: SPECIAL CATEGORY OF CENTRAL SAHARAN PREHISTORIC ROCK ART

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Introduction

In the prehistoric rock art of the Central Sahara the main focus of the research has long been human and animal figures. Non-figurative forms such as carved lines, if considered at all, were overlooked, or regarded as just secondary or incidental to the main art. Besides the well-known, documented and classified figurative rock art in the Central Sahara, namely the Kel Essuf engravings, the Round Head paintings, the Bubaline engravings, the Pastoral engravings and paintings, and the Horse and Cameline engravings and paintings, there is a special group of non-figurative engravings called grooves. These are simple lines usually between 5 – 40 cm long and between 0.5 – 2.5 cm deep, carved on vertical or horizontal rock supports, either inside or outside rock shelters, on boulders in rock shelters or in the open air.

The grooves have traditionally been ignored, or at most, just mentioned (Menardi Noguera 2017). In rare cases they were interpreted as by-products of activities (Di Lernia 1999). It is only in recent times that serious attention has been given to these engraved lines (Soukopova 2018) and since then it has become evident that they have a significance of their own. Re-

cent research conducted in the Algerian mountains of Tassili and Tadrart (Map 1), has shown that grooves were by no means accidental by-products but were consciously created in selected places.

The examination of more than 390 decorated shelters and open-air sites revealed that the grooves are very abundant in the Central Sahara and particularly numerous in certain regions, where they often represent the prevalent form of rock art. Since they present a very similar pattern throughout a large territory, they possibly functioned as codified signs created systematically and with special purpose known to prehistoric people.

Every rock art site was studied as a whole with a special focus being centred on the relationship of grooves with other forms of rock art, as well as on the presence/absence of water at a site and a possible relationship between grooves and water. Studying each site as a unit composed of multiple inter-related pieces and placed into an environmental context, the fieldwork attempted to determine a possible function of rock art sites in prehistoric times.

The ethnographic record and the comparative study



Fig 1. The study area and the regions of grooves mentioned in the text: 1. Northern Tassili (Bordj El Haouas), 2. Central Tassili (Djanet oasis) and Tassili plateau, 3. Algerian Tadrart (Google map modified by the author).



Fig. 2. Straight and zig-zag lines covered by paintings of an unidentifiable animal and a male figure in the Round Head style estimated to be roughly 10,000 years old. Photo elaborated with DStretch (Abri Freulon, south of the Algerian Tadrart).



Fig. 3. Grooves covered by white paintings of cattle in the Pastoral style estimated to be roughly 7,500 years old and mixed with the Kel Essuf engravings which predate 10,000 BP. Photo elaborated with DStretch (Aman Samednin II shelter, south of the Algerian Tadrart).

of other African rock art regions are used here to establish a possible interpretation. The focus on water and rain is a consequence of the fieldwork results, which showed an evident connection between grooves and waterfalls in 39 sites. Although this relationship might be explained as functional, in several instances the context suggests ritual purpose, for example when grooves are associated with cupules on vertical walls.

Chronology and location of grooves

The absolute chronology of the grooves is not known, but they were certainly produced in various periods. The earliest documented case consists of engraved lines, covered by Round Head paintings of an unidentifiable animal and a male figure at the Abri Freulon shelter south of the Algerian Tadrart (fig. 1). These paintings are estimated to be at least 10,000 years old and thus the grooves must be contemporary or older (Jelinek 2004; Soukopova 2018). At Aman Samednin II shelter in the same region, there are grooves covered by Pastoral paintings of domestic cattle (fig. 2) which have an estimated age of between 7,500 years BP to circa 3,000 years BP (Aumassip 2004; Dunne et al. 2012). Because the grooves here are mixed with the Kel Essuf engravings which predate the Round Head paintings, and they present a similar rate of erosion, they could be of the same period predating 10,000 BP (Striedter et al. 2002-3; Soukopova 2012). In the Central Sahara we also find engraved lines associated to the Pastoral engravings (fig. 3). The grooves in the

study area usually present a dark patina, which dates them to at least 6,000 years old (Cremaschi 1996). Taking these facts together, their patina, the state of erosion and their incorporation into the oldest rock art context, we can suppose that the majority of grooves documented in the study area belong to the prehistoric era.

The engraved lines are found in the whole of the Central Sahara but they are particularly numerous in the Algerian Tadrart. Recent research showed that grooves are also frequently present in the Northern and Central part of the Tassili mountains (Map 1). However, the



Fig. 4. Engraved lines associated to an engraved cow in the Pastoral style estimated to be roughly 7,500 years old. The grooves and the contours of the animal present the same patina. (Aman Samednin, south of the Algerian Tadrart).



Fig. 5. A row of vertical grooves with a few horizontal grooves found under the hand of the guide. (Tan Hedsan, Northern Tassili).

grooves seem to be typical only in the lower geographical regions. If compared with the high Tassili plateau, which is extremely rich in prehistoric rock paintings, we notice that grooves are rare here, whereas in the neighbouring lower mountains they are abundant. Sometimes we find a single groove or a couple of lines, however grooves are more often found grouped, leaving the surrounding rock surface empty. Their distinctive trait is that they are not randomly scattered on the rock but are carefully arranged into smaller groups, rows or clusters. When on a vertical wall, the grooves are always oriented vertically and only exceptionally do we find one or a few horizontal grooves (fig. 4). Whereas the figurative rock art, namely painted or engraved human and animal figures, were intended to be seen and admired, as they are often exposed on panels visible from large distances, grooves, which are much simpler and inconspicuous, evidently had a different function.

The location of grooves in the study area may be divided into 6 characteristic situations:

- Grooves under a waterfall – 39 sites
- Grooves on a boulder – 16 sites
- Associated to cupules – 8 sites
- Large clusters of grooves – 6 sites
- Long rows of grooves – 6 sites
- Associated to kettles – 3 sites.

Each of these characteristic situations is described below in order of frequency. It must be noted that these are minimum numbers of characteristic situations because large areas of the Central Sahara have not yet been documented.

Grooves and rain

Research undertaken by the author proved that numerous Central Saharan rock art sites with paintings or engravings were connected to rainwater (Soukopova 2011; 2016; 2020). When the Central Saharan

Region in Algeria:	Number of sites with grooves:
Northern Tassili (Bordj El Haouas area)	19
Central Tassili (Djanet area)	20
Tassili plateau	3
Algerian Tadrart	100
TOTAL NUMBER OF SITES	142

Tab.1 Region and numbers of sites with grooves in the study area. These are minimum numbers as there are still large territories in the Central Sahara to be explored.



Fig. 6. Dark stripes on the rock wall are traces of ancient waterfalls. The grooves were carved in a place of the rock where rain water was running down. (Tissetnekrar, central Tassili).



Fig. 7. Grooves carved on a protrusion from the rock under which there is a free space. (Wadi Imassarajan, Northern Tassili).

grooves were first presented (Soukopova 2018), their connection to water was not yet recognised. Only with further research did it become evident that numerous grooves were intentionally carved under ancient waterfalls (Soukopova 2020). Other fieldwork has confirmed this connection and has also provided new information and documented further cases of grooves associated with water. However, not each site in the study area is related to water. Of 142 sites presenting grooves, 39 sites have clear connections to ancient waterfalls. Other sites with grooves do not present an evident relationship to rainwater, nevertheless this relationship cannot be excluded since many sites are found in the open air and thus exposed to rain.

Water has always played a fundamental role in the life of African societies, where God is associated with sky and rain and according to numerous creation myths the World originated from divine water. Rainmaking has always been practised in Africa: riverbanks, waterfalls, caves or mountains have been used as places for rain rituals (Mbiti 1969; Griaule 1965).

Due to the lack of direct ethnographic records applicable to the prehistoric rock art of the Central Sahara, we may instead approach the interpretation through comparative studies. The ethnographic record shows that the fundamental issues of African traditions such as rituals, taboos or rules connected to the initiation rites had to be preserved in their original form from generation to generation. Change was not permitted in order not to offend the divinities or ancestors (Jahn 1961; Jaulin 1967). Some traits of African belief, for example those regarding rain, have thus been in use for an extremely long time, possibly for millennia.

Grooves under a waterfall

The traces of ancient waterfalls are still visible on the rock walls. Throughout the millennia, running water left visible stripes of a different colour to that of the underlying rock - either much darker or much lighter (fig. 5). Sites where grooves are carved intentionally under ancient waterfalls are present throughout the whole study area: in the Northern part of the Tassili (9 sites), in the central part (13 sites) and in Algerian Tadrart (17 sites). They are situated mainly on the rock walls, but also sometimes on the rock floors. When carved on the wall they are often located on a protrusion from the rock under which there is a free

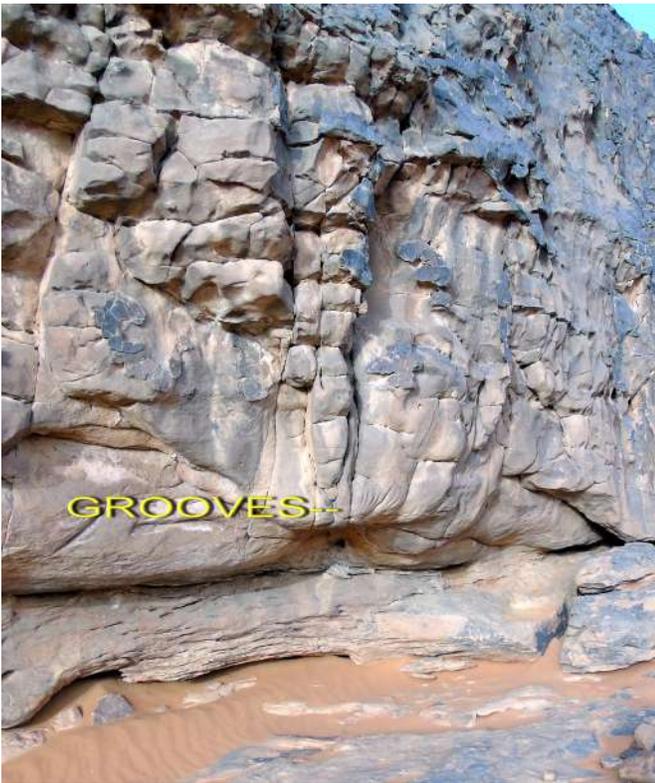


Fig. 8. Grooves carved on the edge of a protrusion may have collected running water into one flow. (Taren, central Tassili).

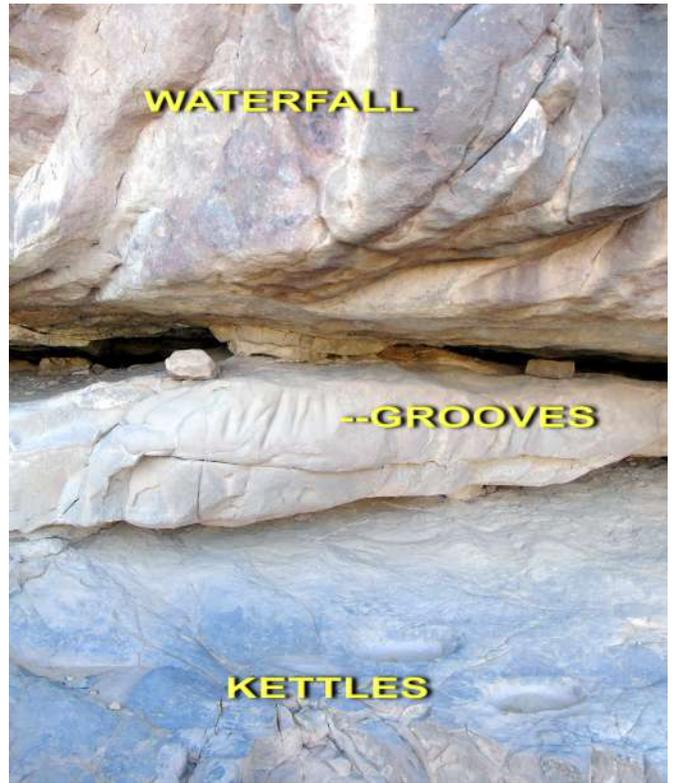


Fig. 9. Grooves and kettles carved under a waterfall. (Tan Hed-san, Northern Tassili).



Fig. 9. A detail of the grooves carved on the rock protrusion. (Taren, central Tassili).



Fig. 10. Grooves arranged in a V shape and mixed with cupules on the shelter's floor. (Bohedien shelter, the Algerian Tadrart).

space (figs. 6, 7, 8). We may hypothesize that these carvings collected running water and lead it into a container placed under them. Sometimes we find kettles carved under the waterfall and grooves (fig. 9). A typical pattern is grooves arranged in a V shape: several lines are carved so that they get closer in the lower part of the motif (fig. 10). In these cases, the intention to unite the water course seems plausible.

Grooves carved under ancient water courses did not always have suitable conditions for placing a possi-



Fig. 11. Grooves and a zig-zag line carved in a place where water was flowing during rains. (Temelra, Northern Tassili).

ble container under them. In these cases, the water was only passing through them. A hypothesis may be that these grooves were indicators of places where water was flowing in certain periods, i.e. they may have served as markers of water points (fig. 11).

The last case regards grooves that are accumulated in great numbers under waterfalls and occupying a large surface of the rock wall. Examining these sites as a whole (such as the presence of other forms of rock art, their position, etc.) the author suggests that these were



Fig. 12. Grooves on a boulder mixed with cupules. (Tan Hedsan, Northern Tassili).



Fig. 13. This boulder is covered with cupules, the grooves were added on the remaining marginal spaces on the surface. (Wadi Tidunadj cave, the Algerian Tadrart).

ritual places where water played a fundamental role (see section Water sites).

Grooves on a boulder

Boulders adorned with grooves have been documented in the whole of the study area: in the Northern part of the Tassili (5 sites), in the central part (1 site) and in Algerian Tadrart (10 sites). Grooves on boulders are sometimes mixed with cupules (fig. 12). It is difficult to imagine a practical function of such boulders. In a few cases the boulder was originally covered with cupules and the grooves were added later on the remaining marginal spaces on the surface (fig. 13).

There is one case, at least, where it is evident that grooves leading from cupules on the boulder were intended to drain liquids. At Agiugil site in the Northern Tassili the surface of the boulder is covered with cupules of variable depth: they are deeper in the area of the cupule that is nearest the edge of the boulder (fig. 14). The cupules carved on the edge of the boulder have grooves leading straight down from them. It is very likely that the carved complex served as drainage for liquids. The cupules and grooves occupy only one part of the boulder leaving the second half empty. If prehistoric altars existed, this boulder would be an ideal example: its empty flat space could have served as a slaughtering area for an animal whose blood would then run down through cupules and grooves.

Grooves associated with cupules



Fig. 14. This boulder may have been a prehistoric altar: the cupules carved on its edge have grooves leading down from them. (Agiugil, Northern Tassili).

Apart from those on boulders, grooves are also associated with cupules on rock walls and floors. Grooves associated with cupules have been documented in the Northern part of the Tassili (1 site), in the central part (2 sites) and in the Algerian Tadrart (5 sites). In several cases they are carved together under an ancient water course which indicates that cupules were also connected to rainwater. Indeed, sites where cupules were connected to rain have already been documented in the Central Sahara (Soukopova 2017; 2020).

Large clusters of grooves

Clusters of grooves have been documented in the Northern part of the Tassili (1 site), in the central part (2 sites) and in the Algerian Tadrart (3 sites). The grooves are accumulated into large clusters containing up to several hundred lines. They are carved on vertical walls, and in one case on an isolated boulder. In Wadi Tidunadj one site has hundreds of grooves carved on a vertical wall (fig. 15). The lines are placed deliberately side by side and they cover the whole wall up to 3 meters above the soil. It was evidently a place where more and more grooves were periodically added perhaps as a part of cyclical events. Moreover, the grooves are the only motif on the wall except for a few tiny engravings of cattle which were probably added later. The wall thus appears to have been reserved exclusively for simple lines.

Clusters in the other sites present the same character-



Fig. 15. A detail of a rock wall with a cluster of grooves. (Wadi Tidunadj, the Algerian Tadrart).

istics - the grooves on vertical walls are always carved vertically side by side. Only exceptionally do we find a few lines carved horizontally. Clusters of grooves are not mixed with other forms of engraving, lines constitute the only motif on the panel. We also find similar clustering of the same motif when it comes to cupules and the Kel Essuf engravings (Soukopova 2018).

Long rows of grooves

Long rows of grooves have been documented in the

Northern part of the Tassili (1 site) and in the Algerian Tadrart (5 sites). Except for clusters, grooves may be grouped in straight long single rows containing dozens of grooves carefully arranged side by side and always in a vertical position. Occasionally there are two long rows of grooves on a wall, one above the other (fig. 16). They are carved mainly on vertical walls, and sometimes under ancient waterfalls. They are placed roughly 1.20 m above the soil, i.e. at a comfortable height for a standing adult to carve. In one case they



Fig. 16. Two parallel rows of approximately 100 grooves on a vertical wall. (Iberdj, the Algerian Tadrart).



Fig. 17. A groove created a tiny canal which guided water into a small kettle during rain. (Bohedien, the Algerian Tadrart).



Fig. 18. An isolated rock formation with four clusters of grooves carved under ancient waterfalls may have been a ritual place. (Grotte des Ambassadeurs, Djanet, central Tassili).

are carved on the rock floor.

Grooves associated with kettles

This relationship is rare since only 3 sites have been found where engraved lines are connected to kettles: in the Northern part of the Tassili (2 sites) and in the Algerian Tadrart (1 site). At Bohedien site a groove created a small canal which guided water into a circular kettle in prehistoric times (fig. 17). At Imassarajan site in Northern Tassili, three grooves are carved between one oval kettle and two cupules, but they were not meant to channel water. On the contrary, in the Central Sahara there are frequent cases of canals leading from kettles, where canals served for draining water or other liquids (Soukopova 2017; 2020).

Water sites

When taking a holistic approach in the study of these sites, such as the location in the landscape, the presence of ancient waterfalls and all of the rock art, we notice that, not only single rock art elements but also entire sites, may have been related to rainwater. As discussed below, this connection does not seem to be founded for utilitarian reasons, on the contrary, it strongly suggests the existence of ritual places.

A good example is Grotte des Ambassadeurs, a large shelter near Djanet oasis in the central part of the Tassili (fig. 18). In this isolated rock formation, there

are four areas with clusters of grooves carved under ancient waterfalls: two are facing east and two are facing west. Apart from these, there are small groups of grooves disseminated all around the rock formation. Only under one cluster of grooves carved on a protrusion is there a space for a possible container; other clusters of grooves were placed on vertical walls so that rainwater only passed through them. In one spot grooves are mixed with cupules (fig. 19). The utilitarian function of these clusters of grooves appears unlikely and as all of them were located under a waterfall,



Fig. 19. Grooves under an ancient waterfall mixed with cupules on a vertical wall. (Grotte des Ambassadeurs, Djanet, central Tassili).

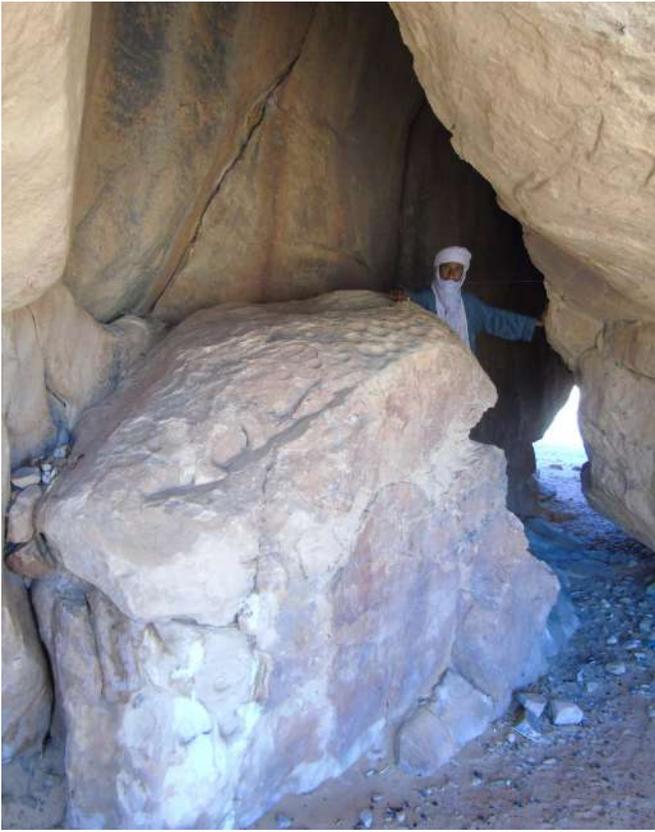


Fig. 20. A rock formation with cupules under a crack in the ceiling from which rainwater used to flow through. (Grotte des Ambassadeurs, Djanet, central Tassili).

the author hypothesizes that this site was a place of rituals related to rain.

Besides grooves, the site presents cupules scattered in various areas of the walls and floor, and large paintings of Round Head animals (estimated to be rough-

ly 10,000 years old) alongside recent paintings of the Cameline period (circa 2,000 years old). To further support a hypothesis of a rain site is a 1.50 m high rock formation in the middle of the shelter (fig. 20). It is placed under a crack in the ceiling from which rainwater used to flow through. Indeed, the upper surface of the formation is covered by cupules which, as already mentioned, were also connected to rainwater. As known from the ethnography, mountains and rock formations are favourite places for performing rain rituals. Single stones are also frequently associated with rain. Sacred stones are often employed in rainmaking ceremonies because rock is believed to be a manifestation of god or to be a dwelling-place of the spirits (Haruna 1997; Ombati 2017). All over Africa, god is associated with the sky; he is the supreme being who gives rain and therefore rain, as the saliva of god, is sacred. Rain is considered the greatest blessing, and its supply is one of the most important activities of god. Many societies make sacrifices, offerings and prayers to god in special places in connection with rain (Mbiti 1969; Akong'a 1987; Melis 2002).

Despite the spread of the Islamic and Christian religions, there is still a strong belief throughout Africa that rock is a source of water and rain (Fernández 2011). The notion of rain is one of those very fundamental life issues which, we believe, has changed



Fig. 21. The Algerian Tadrart is a region with the greatest concentration of grooves. This particularly shaped rock formation also presents grooves. (Tin Merzouga, the Algerian Tadrart).

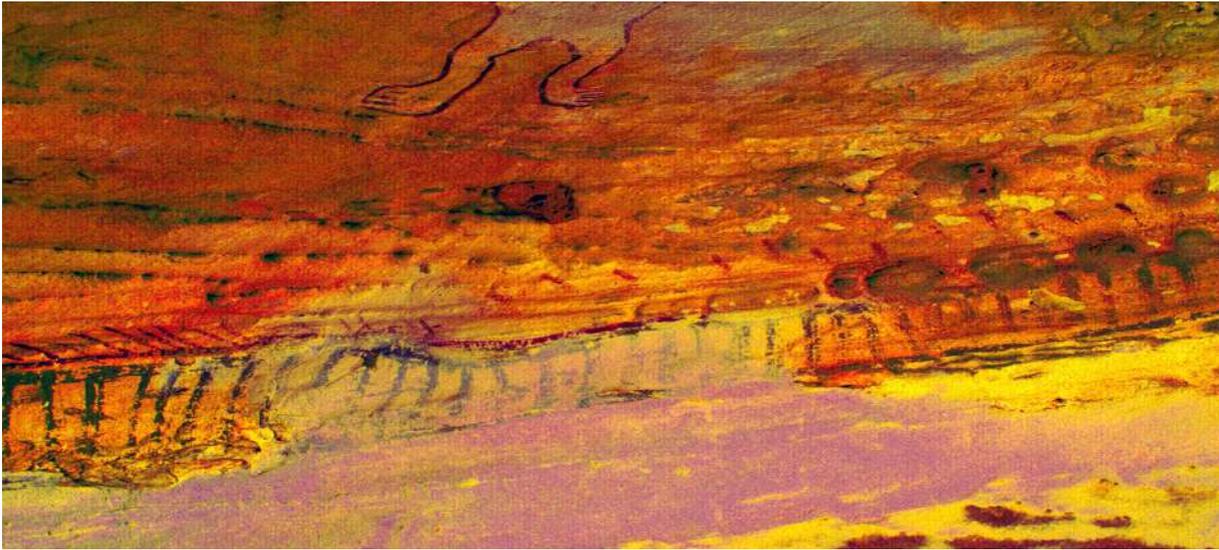


Fig. 22. Painted lines in the oldest Central Saharan paintings called Round Heads, estimated to be at least 10,000 years old. Photo elaborated with DStretch. (Uan Assakamar, the Tassili plateau).

little through the millennia. Therefore, as there are still rainmaking places in Africa today, similar places surely must have existed even in prehistoric times. The Grotte des Ambassadeurs, for its combination of various rock art elements and evident association to rainwater is an excellent example of a prehistoric ritual place where everything appears to revolve around water. Similar ritual places related to rain have already been documented in the Algerian Tadrart (Soukopova 2020).

Region of groves

Even though the entire territory of the Central Sahara has not yet been explored in terms of engraved lines, it is already evident that certain regions are richer in grooves than others. The richest is the Algerian Tadrart which, from the 142 documented sites in the study area, has 100 sites with grooves, 17 of which are connected to rainwater (fig. 21). Furthermore, we observe concentrations of sites with grooves in certain areas. For example, in a single wadi, In Djaren, there are 26 sites with grooves. This long wadi was one of the main water courses in prehistory and it still has sections with green vegetation today. The sites with grooves are located near riverbanks and 9 of them are definitely connected to rainwater. The fact that one of the wettest places in the Central Sahara was also one of the richest regarding sites with lines carved under waterfalls is significant. Also, as they are located in a place with an abundance of water, grooves as indicators of a drinking water resource does not seem plausi-

ble. Can we hypothesise instead that this ancient river was a scene of rituals related to rain?

A similar situation is found in another long wadi in the Algerian Tadrart, called Tidunadj, which has 12 sites with grooves, 2 of them are connected to waterfalls. It is significant that two main water courses are also the main areas with grooves, and it would be interesting to find out if the same occurs in those Central Saharan wadies near the Libyan and Nigerian borders, which are currently inaccessible due to political reasons.

The places with a larger incidence of grooves may have represented areas of specific activities. We know from the ethnographic record that in southern Cameroon there are special places reserved for healing rituals and they are frequented by various healers. In such places, sacred trees are found which play a fundamental role in the healing. During each ritual, the healer carves several lines into the trunk next to older lines, thus extending the concentration of grooves on the sacred tree (De Rosny 1996). Comparing this case with the Central Sahara, we cannot exclude that the act of carving into the rock was also a part of prehistoric rituals.

Painted lines

Painted lines are found within the oldest Central Saharan rock art called Round Heads, estimated to be at least 10,000 years old (Mori 2000; Aumassip 2004). Although painted, they present similarities to engraved lines as they are carefully placed side by side (fig. 22). It is difficult to interpret painted lines because they are often associated with mysterious objects (fig. 23).

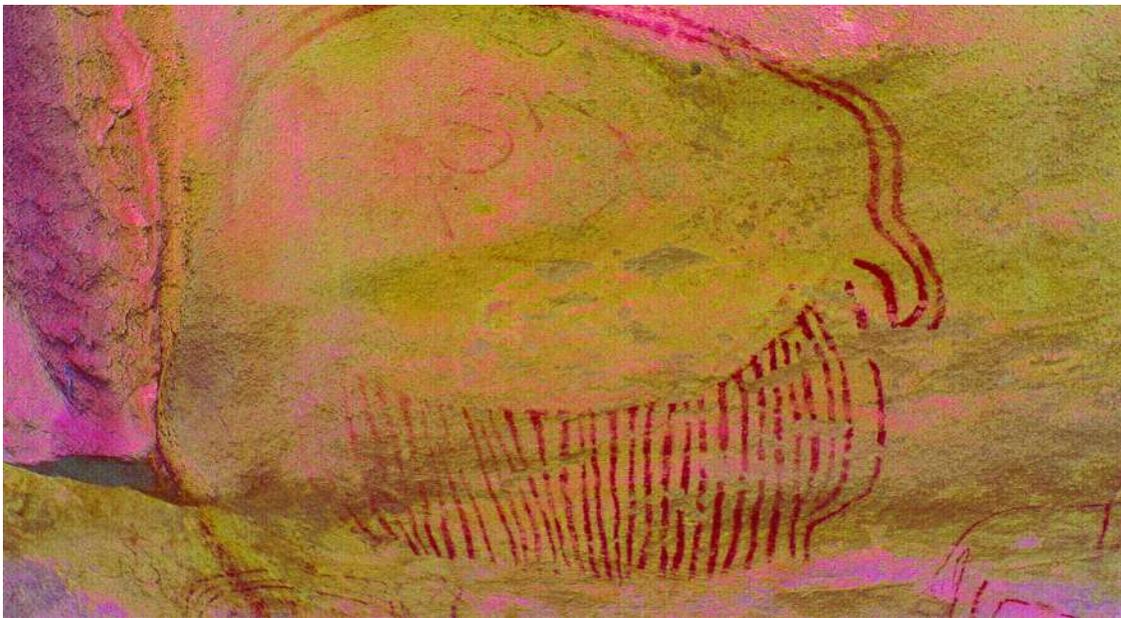


Fig. 23. Painted lines of the Round Head style associated to a mysterious object. Photo elaborated with DStretch. (Uan Assakamar, the Tassili plateau).

In several cases painted lines lead from unidentifiable down-headed animals which have been interpreted as rain animals (Soukopova 2011). If such interpretation is correct, the lines might signify rain. The hypothesis of lines as representing water at least in some situations is supported by a picture from wadi Bohedien in the Algerian Tadrart. It depicts an oval object strongly resembling a cloud: from its lower part, numerous parallel vertical lines are painted which, based on the holistic study of the site, together with comparative studies with other African regions, have been interpreted as rain (Soukopova 2020).

Painted lines are most numerous on the Tassili plateau, which is the region which has the fewest engraved lines, with only 3 sites with grooves revealed so far (fig. 24). On the contrary, there are 27 sites with painted

lines belonging to the Round Head period. We may ask why prehistoric people did not engrave lines on the Tassili plateau. A possible explanation may be that, in this highest point of the region, the shelter walls were particularly suitable for painting, rather than engraving. Indeed, not only grooves but engravings in general are rare on the plateau, where the absolute majority of rock art is painted. Another reason for the lack of engraved lines on the plateau may be the connection of grooves to waterfalls. If grooves served as water indicators in the lower regions, may this signify that in the highest point of the region these signs were not needed? Our understanding of grooves is only at the beginning and further research will hopefully give more answers.

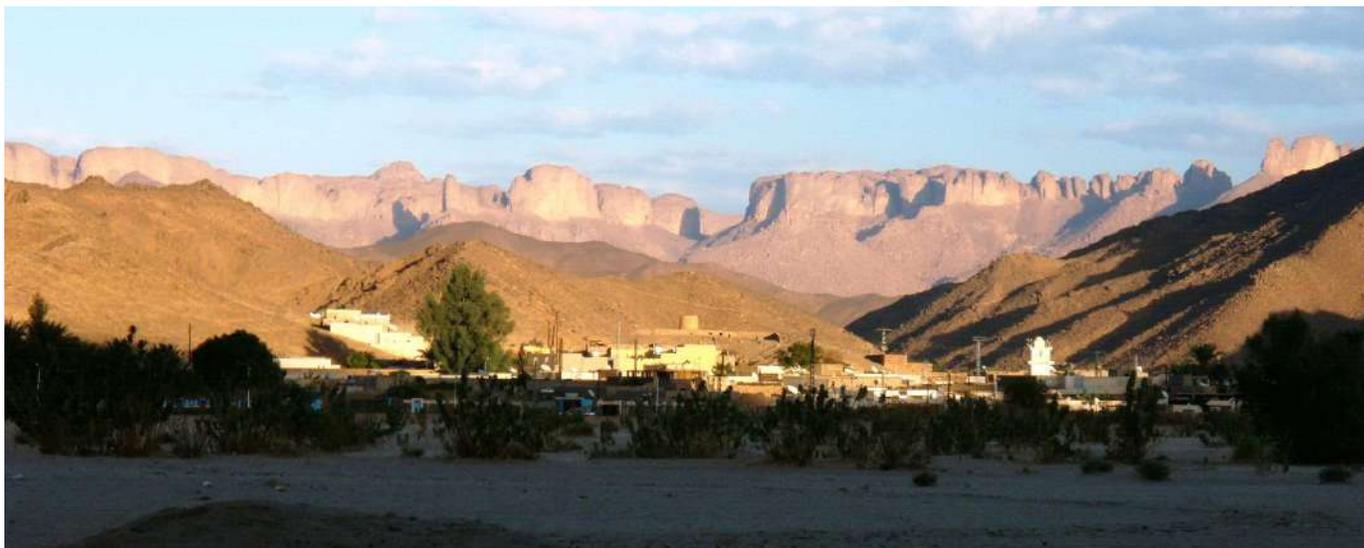


Fig. 24. The Tassili plateau is extremely rich in the Round Head paintings. On the contrary, there are almost no grooves. (the oasis of Djanet, central Tassili).

Conclusion

From a research perspective grooves in the Central Sahara have long been overlooked, or they have been considered as by-products of prehistoric activities such as the sharpening of tools. The research conducted by the author showed that these simple engraved lines, contrary to what was previously thought, were consciously created in selected places and endowed with their own meaning. Not only are the grooves very abundant in the Central Sahara but they are also so frequent in certain areas that they represent the main form of rock art.

The grooves were sometimes purposely carved in the locations of ancient waterfalls. Given the great importance of rain and water for African societies it is plausible that these sites were connected to water. This connection may have been purely utilitarian such as the supplying of fresh water. It is likely, however, that some sites were used for rituals in which water played an essential role. The theme of water is certainly only one of many possible interpretations. Further research is needed to explain, for instance, the function of those grooves which are not related to water courses. For better understanding, each site must be studied in its entirety: rock art elements must not be considered as isolated units, but as interconnected components linked to the place in which they were created.

This paper also discussed the presence of painted lines in the earliest painted rock art, namely the Round Heads. Although they have a different technique and are located outside the main area of grooved art, they bear the same characteristics. In some cases, painted lines seem to embody rainwater. The connection to water was also discussed for another non-figurative rock art, namely cupules, which are often associated to grooves.

In the Central Sahara there are large territories still to be explored and documented in terms of grooves. The chance of finding new sites is high, especially in the lesser-known Northern part of the Tassili mountains, south of the Algerian Tadrart, and obviously in all the mountains near the Libyan and Nigerian border which have been inaccessible due to political reasons.

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INTRODUZIONE ALL'ANTROPOLOGIA CONCETTUALE (in Italian)

Also defined as 'The New Archaeology', a meeting between anthropology, psychology and sociology, conceptual anthropology proposes a new dimension of research, reconstructing, through the finds, their origins, the motivations and contingencies that gave rise to them. New perspectives and new methods broaden the horizons of knowledge of the past and understanding of the present.

LA GUERRA ISRAELE-GAZA (in Italian)

This text is an experiment: applying conceptual anthropology, born for the research of the past, to a case of the present. The sample is the Israel – Gaza war, an ongoing event. The method is similar to that of psychoanalysis, it is applied not to pathologies of individuals but to those of societies and events: establishing the facts, tracing the roots, determining the reasons, conceiving treatments and proposing solutions. The sources of information are lived experiences and news events. Opinions are necessarily subjective, those of the various parties involved and those of the author.

READING THE LANGUAGE OF PICTOGRAMS

General editor
Emmanuel Anati



ATELIER
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Reading the Language of Pictograms

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Reading the language of pictograms is one of the aims of the new archeology: making history of prehistory.

Art becomes language, images become writing, their makers become people with feelings and emotions, and new horizons on the formative ages of culture and on the conceptual identity of our species are re-emerging. Decoding is progressing toward the aims.

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Anati, E. 2024

Con un contributo di Luigi Baldari

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This text is an experiment: applying conceptual anthropology, born for the research of the past, to a case of the present. The sample is the Israel – Gaza war, an ongoing event. The method is similar to that of psychoanalysis, it is applied not to pathologies of individuals but to those of societies and events: establishing the facts, tracing the roots, determining the reasons, conceiving treatments and proposing solutions. The sources of information are lived experiences and news events. Opinions are necessarily subjective, those of the various parties involved and those of the author.

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IS THE SUMMARY A MUST?

The idea of having a summary for each article has been suggested before and has come up again. It should not be dismissed as being an act of conformism if it can be useful for helping readers and promoting ideas. But does it? Considering the quality and reasoning of the texts, the question arises whether a summary banalizes the text and makes readers believe they understand the messages and the spirit of the article by looking at the summary without reading the text.

Conceptual anthropology needs analytical reasoning. Does a summary contribute to reasoning? The Bible, the Vedas and the Greek classical tragedies – or indeed any texts – do not need summaries, though such short cuts are often applied. We may doubt whether a text of 10 pages is enriched by summarizing it in 10 lines. However, the 10 lines may be used for arousing interest in the article.

Text is a means of communicating ideas, feelings, beliefs, concepts, and reasoning, beside words. Beyond information, articles have the role of communication of mind to mind. Articles are published in order to be read. The habit of living out of summaries does not enrich culture.

We should think twice about following customs that reflect temporary trends in our contemporary society. People with no time or no interest to read are not obliged to read. People relying on summaries are obviously free to follow their own way.

Despite arguments, we leave summaries and key words a free option. Authors so desiring may include summaries and key words but we leave it up to their choice. In any case readers are invited to read the articles, not just the summaries.

IS NOT-WOKE, NOT-PARTISAN RESEARCH USELESS?

This seems to be the opinion of a reader who wrote: “Your journal is not involved in the rights of the native people therefore it is useless.” A previous, even more aggressive note by somebody else, called “trash” what she did not consider native rights according to her ideological viewpoint. Of course, the question depends on the concept of research. Turning archeology and anthropology into a political matter is now fashionable and some institutions have developed this tendency, which risks enhancing populism and demagogy. The intentions may be good, fighting for a just cause toward positive goals, but politicizing scientific research risks making politics overcome research.

A political approach to archeology and anthropology shaped scientific research under Fascist regimes and other totalitarian establishments, by using research for political goals and imposing pre-conceived political orientations,

included nationalistic, sectarian and racist ideologies. Extreme tendencies may lead to undesired trails. Developing a native archeology for achieving native rights, or a feminist prehistory to defend women’s rights leads to pseudo-research. To our mind, such tendencies are a means to mental taming and remain a means of using research for political goals. They may lead scientific research to a dead end.

You want a feminist prehistory? You may profess it as you please, if you can define what you are doing and how far you can go. You wish to fight for minority rights? If you know what you want you may declare it and you are very welcome. But do not call it archeological or anthropological research, you may call it political anthropology. Is non-political research trash? The future will tell what is and what is not trash. Actions for defending the rights of local cultures and minorities are of course legitimate, but they are political issues, a different discipline. You may choose between a political discipline claiming legal and other rights, or a traditionally scientific one to dig into the past and understand more about human origins and destiny. The two appear today as two different disciplines, one focused on political issues, actively working for opinion making and achieving political targets, the other for studying and understanding both past and present global and local issues. There is space for both political goals and scientific goals, but targets should be well defined and clearly stated. Humankind has always been involved in research since the making of the first tools, for understanding and for progressing. Research is part of human nature. The search for knowledge, not aiming at political achievements, may be considered useless or sterile by some, but without research there would be no culture. The two should not be confused.

Scientific research should concentrate on scientific research and political issues on political issues. The claim that whatever you say or do has a political meaning is valid only for people that think accordingly. Scientific research is for research’s sake. Political issues are for politics’ sake. Let them be kept separate. Mixing means messing. Some of the institutions involved in these issues should clarify for themselves their way forward and their goals.

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Articles are submitted to reviewers but acceptance for publication is decided by the editor. The recommended length of a paper is 2,000-5,000 words and be richly illustrated. Articles of less than 2,000 words or having no suitable illustrations may be considered for the Discussion Forum or for Notes and News.

Illustrations should be presented separately from the text and have a resolution of 300 dpi, with a base of 14 cm. They should have exhaustive captions, including source when relevant. Both text and illustration should be free from copyright and any other obligation, and preferably not having been published elsewhere. Authors are fully responsible for the submitted text and illustrations.

SHORT COMMENTS BY READERS

*Dear Dr. Anati,
I agree that Har Karkom is the holy mountain of the Exodus. I am sending you my research into the route of the exodus from Egypt.*

Huub Pragt, Egyptologist
Leiden University, The Netherlands

What a wonderful discovery this magazine is. Full of information, enlightening, and thought provoking. A gem in the dull world of research.

Brian Edginton
Blanchester, OH, USA

Reply:

*Dear Dr. Huub Pragt,
Many thanks for enclosing your text on the reconstruction of the itinerary of the biblical exodus. Prof. Anati appreciated it, especially considering your topographic method of following aerial photographs. Every effort in further evaluating the biblical itinerary of Exodus is laudable, and contributes to promoting the*

*scientific interest and the discussion. He congratulates you on your work and is pleased to learn of your recognizing Har Karkom as the biblical Mount Sinai.
Cordial regards and best wishes,*

Atelier
Research Center for Conceptual Anthropology

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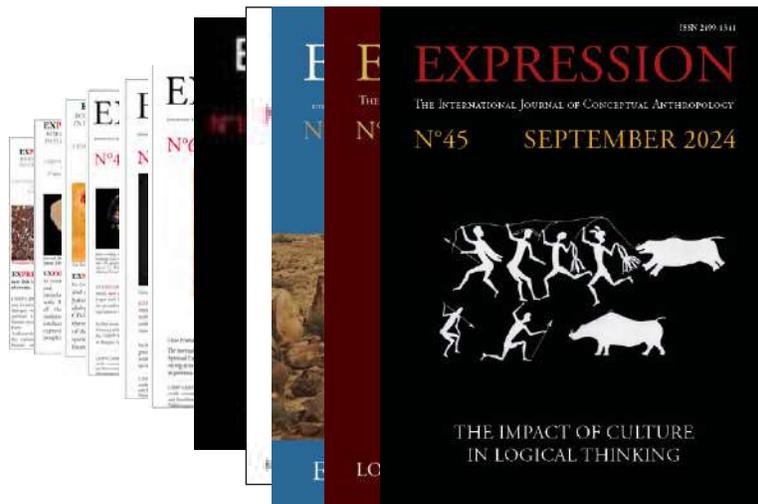
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