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Contextos, Interpretacións e Relacións da Arte Rupestre >>> Comunicaci3ns

## THE C3A CONTRADICTION

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*Abstract. The contradiction implicit in 'stylistic' datings of the C3a engravings to the late Pleistocene and 'scientific' datings to the Holocene is examined in relation to observations made at the image sites and elsewhere in the valley in September 1998. In the light of this examination it is suggested that the C3a images imply the presence of a foraging community of a Palaeolithic type in the Portuguese planalto until quite recent times despite contemporary agricultural activity in the Douro basin. Tentative suggestions as to how this community may already appear in the archaeological record are advanced.*

The parietal engravings on vertical joint planes of schist exposures in the C3a valley in Northern Portugal present what at first might appear an insoluble contradiction. Their style closely resembles that of parietal images in caves elsewhere in Iberia and in France that have been reliably dated to the upper Palaeolithic. Geological and isotope dating methods give a span of dates, but they suggest that only the exposure of the joint planes into which the engravings were subsequently incised is likely to have preceded the Holocene.

The C3a stylistic dating was based on comparisons between the stratified sequence of engravings on plaquettes from Parpall3 in Eastern Spain. (Pericot Garcia 1942, Villaverde 1994) Carbon isotope and thermoluminescence dates obtained from bone and burnt flint excavated from the cave with the plaquettes were a bit perplexing when they were received. They did not coincide with the dates anticipated. Nevertheless they confirmed that plaquettes found stratified with Solutrean and Magdalenian industries, should be placed in the time frame twenty two thousand to twelve thousand years before present. (Davidson 1974, 1977 and 1989)

Unfortunately for the attribution of dates by style, a characteristic of the Parpall3 plaquettes is their stylistic uniformity. Such differences as exist between one plaquette and another, in the Valencia museum or in the corpus of reproductions, can most readily be explained as minor differences in the way an animal was standing rather than in the draughtsman's approach to drawing. V.Villaverde's characterisation of the phases which was employed as dating evidence for the C3a by Jo3o Zilh3o (1995) and his colleagues is difficult to follow. When an animal's horn or mane is drawn in a particular way in the well dated sequence it does not necessarily imply that a comparable outline should be similarly dated. Some of the characteristics used could simply mean that the ethology of the animals represented was the same.

Jean Clottes, Michel Lorblanchet and Antonio Beltran (1995) and Paul Bahn (1995) like Jo3o Zilh3o contend that the C3a engravings are in an Upper Palaeolithic style but also say that not all of them are likely to be of Upper Palaeolithic date.

The dates obtained from electro-chemical and crystallographic analytical procedures which have been carried out on the surfaces of both the engraved lines and the adjacent rocks in the C3a in the main contradict those from stylistic analysis. The four separate procedures produced varied but basically compatible dates. Bias inherent in the specific nature of the samples available might or might not have affected the dates obtained. Accelerator Mass Spectrometer Carbon isotope dates of surface patinations caused by weathering (Watchman 1995, 1996 and Dorn 1997) were biased by contaminating organic material of unknown source and depositional chronology. Though the various possible carbon contaminations might equally well combine to increase or decrease the calculated dates by considerable margins they might equally balance out. The dates obtained from microerosion analysis of crystal structures (Bednarik 1995a, b and c) are affected by lack of knowledge about the average rates of decomposition of the crystal structure of the schist and about past changes in the microclimate around the exposures. Measurements of the duration of exposure of the rock surfaces to cosmogenic chlorine isotope accumulations concluded with some equivocation that the petroglyph panels were exposed and 'available for engraving during the Palaeolithic'. (Phillips et al 1997) Bias undoubtedly renders the dates imprecise but nevertheless they appear to be in agreement in so far as they support Holocene dates for the cut surfaces.

Combining the results from all the methods of dating makes it probable that the first engravings in the ten kilometre stretch of the C3a valley above its junction with the Douro were begun not later than the peak of the last glaciation around twenty thousand years ago. Repair, restitution and possibly some relocation and reinvention of engravings then continued into what elsewhere in Europe are historical times not much more than two thousand years before the present day.

If a continuity of belief, be it a religious belief or some other sort, is the determining factor in the stylistic similarity between Solutrean images in Parpall3 and images in the C3a valley then the content of the visual image must be the memory aid, the symbol system, which enables belief recall over such an enormous span of time. Even when human memories were trained to be retentive, to repeat beliefs in formal and often rhythmic arrangements and to instigate exact transmission to, and through, following generations, aide memoirs would be needed. Narrations unsupported by some form of more or less permanent corrective are bound to lapse into changes in the message like 'send three and fourpence' instead of 'send reinforcements'. All useful analyses of prehistoric image making have to deal with this assumption.

Andr3 Leroi Gourhan's assumption of a linear, time constrained structure in cave assemblages though he worked on it industriously throughout his life and attempted several modifications at different times produced inconclusive results. (Leroi

Gourhan 1968, 1970, 1978, 1980) He never managed to contradict Henri Breuil's earlier observations (1952, 66). He could not show that caves tell a story. No linear sequence of symbols could be found even in a single passage cave such as Combarelle.

David Lewis-Williams and Jean Clottes have attempted to overcome this difficulty by asserting that the images are drug or trance induced products and as such fundamentally incoherent. Drug or trance induced motivation could be referenced by the cryptiform marks André Leroi Gourhan called 'signs'. There are certainly cryptiforms at both Upper Palaeolithic parietal image sites and at San Bushmen image sites in Natal and Lesotho which some San ethnography suggests may represent entoptic images reproduced while the draughtsman's neural function was impaired. Similar marks at Upper Palaeolithic image sites could have the same origin. However, As couched this is a self defeating theory. If the image is incoherent then it cannot operate as a memory aid and an efficient memory aid these images must have been to continue in use for between twenty and thirty thousand years.

The majority of cryptiform arrangements of marks could equally refer to real objects. The marks could have been assembled with insufficient redundancy for the viewer to be certain that one object rather than another is meant. Entoptic images, like the green after images which develop while staring at a red light source, are manifestations of the neural processes by which we interpret visual stimuli. Some reference to these processes must be present in any pictorial image if it is to be interpretable by a viewer..

Neural physiologists are amassing evidence which explains the various stages of visual perception (Hubel 1995; Gregory 1966; Hubel and Weisel 1959, 1962, 1965, 1968; Campbell and Robson 1968, Graham and Nachmias 1971, Nathans 1989). The procedures determining edge position and orientation of objects in the visual field, are so fundamental to both human and animal activity that not unnaturally they have been shown to be initial procedures in the perception process. Edge differentiation and orientation of an object in the visual field are frequently, but not invariably, reproduced as linear marks. The outline is therefore a carefully selected reproduction of an entoptic image derived from the visual stimuli by the perception process. Pattern recognition, colour recognition and the recognition of void and relief in the visual field have been shown to follow on in the sequence of neural activity. In a real sense they progressively overlay the initial procedure of edge differentiation.

The meaning of an image can never be confined by the interpretation based on a single outline. The single outline may be recognisable as a horse with particular characteristics but horse and characteristics will have a meaning which derives from the context in which it is placed. The black line drawing of horse in Niaux, and the horse by John Flaxman, utilise the same basic entoptics. The shapes outlined are drawn as though they are plane to the surface of the support and superimposed, one on another like playing cards in a deck, to create a sense of relief. The means used are particularly well adapted to describing the balance of the horse depicted. The Niaux horse is balanced in arrested movement, the Flaxman stiff like a child's toy.

The meanings of the two drawings have already begun to diverge at the initial stages of perception but they diverge still further despite their initial similarity. The Niaux drawing is one of many drawings of different animals placed, apparently carefully, on the curving walls and floor of a cave system which joins the valleys of the Vicdessous and the Ariège in the central Pyrenees. The cave is one of a number painted and engraved with animals around the confluence of the two rivers during interstadials in the last ice age when the glaciers in the valleys had melted. The John Flaxman drawing was part of a group of superimposed outlines engraved in 1834 and reproduced over the title *Ulyses departing from Lacedaemon for Ithaca with his bride Penelope*. between pages 366 and 367 of a leather and cloth bound book containing *The Odyssey of Homer translated by Alexander Pope*. Both the taphonomy of the marks assembled on a surface and of the context are necessary to any understanding of the meaning of an image.

Figure 1 On the left the horse in black manganese paint is from Niaux 'Salon Noir' c 13,000 BP. On the right John Flaxman

drew the horse published in 1834 as an engraving in a translation of the Odyssey of Homer by Alexander Pope.

### The Taphonomy of the engravings.

The Cõa runs across water graded sediments deposited in the bottom twenty or thirty metres of its valley. It is usually concluded that, where montane glaciation occurred in recent glacial episodes in southern Europe, valleys downstream of the glaciation tended to be scoured down to bedrock when the ice melted. (Vita-Finzi 1969, Bellamy 1981) Montane glaciation is established at least during the Wurm glacial maximum and possibly in the final Wurm transgression in the headwaters of the Cõa (Davenau 1971) There is no obvious evidence in the shape of the valley or on rock exposures of glacial action in the region of the engravings so it is unlikely that glacial till was deposited there in the last glacial episodes to be swept away by the final melt water. Terracing due to changes in Atlantic sea levels is not obvious either. It is therefore likely that fluvial deposits have been accumulating at varying rates since the last glaciers melted. This would account for the fact that some of the lower engravings at Penascosa at the southern end of the section with engravings are now below the upper surfaces of water born gravel deposits. However, as there is no major difference in surface quality between these engravings and those higher up the valley profile, marks cannot have been subjected to the kind of erosion by river born abrasives and electrolytes that has altered all except the highest engravings and paintings in La Lluera beside the Nalon in Asturias.

The major axis of each crystal in the schists of which the Cõa valley walls are composed lies practically horizontal, and generally at right angles to the course of the river. It is therefore to all intents and purposes in an east west orientation. Surfaces of rock exposures parallel to the river's course present an array of ends of crystals. The sides of the rocks expose the long sides of crystals. Since less of the side than the end of a long thin crystal has to be eroded away before it becomes loose and drops out exposing the surfaces of the crystals beneath to attack, rock surfaces facing the river are slower to erode than the sides facing up and down the valley. Changes in temperature, abrasion by wind born crystalline materials and etching caused by differences in electrical potentials set up between crystals by the distribution of electrolytic solutions over the surface will all have contributed to this erosion.

Rocha 3, the furthest downstream of the panels at Penascosa and therefore the first approached down the track from the village above has a number of sets of superimposed drawings. At least five layers are obvious but there are several within each drawing in a group of outlines like the three bovids facing left (Martinho Baptista and Varela Gomes 1996). The mark outlining the head and neck of the largest of the three bovids was heavily eroded to the extent that there remain few robust upstanding crystals. Between them the whole surface of the groove is pitted to various depths. The mark outlining the dewlap is of an entirely different nature. The surface is eroded with pits of varying depths but it does not appear to have been eroded enough to disguise the fact that there can never have been either the multiple ridges along its length which indicate repeated application of an stone point or the U shaped profile typical of abrasion with a slip stone. Instead the groove forms a relatively clean and narrow V. No exact measurement of its dimensions is available but it looks several millimetres deep and subtends an angle at the bottom of less than 90° and not much more than 45°. The arrises between the sides of the V and the surface of the block though pitted by erosion are quite clean and unchipped by pressure flaking.

Figure 2. Penascosa rocha 3. Vale do Côa: outlines of ibex, horse and bovids engraved on schist at various times.

Experiment proves that such a deep and narrow V is impossible to cut in the Côa schist without flaking the arrises unless a tool which combines robustness with good clearance behind a sharp cutting edge is used. A fire sharpened mason's carbon steel lettering chisel with a cutting edge some three times as wide as the diameter of the steel stock from which it was forged does the job but a square ended tungsten carbide tipped lettering chisel does not. A fairly rapid taper inwards from the extremity of the edge to the shaft is needed if the arris between the groove and the face of the block is to be kept clean and unchipped while the centre line at the bottom is being cut. Work hardened bronze tools, are capable of percussion working harder rocks than the Côa schists but they are turned and produce an untidy, distorted surface if they are used to cut grooves. It is therefore improbable that the final work on the uppermost bovid outline could have been done much before the construction of the Roman station a kilometre away at Quinta da Barca on the other side of the valley.

The line of the dewlap cuts into two layers of marks representing two different animals. The uppermost layer formed by what can still be distinguished despite erosion as a relatively continuous wide groove whose sides are marked with multiple smaller grooves, represents the dorsal line of another bovid facing right. The lower layer, representing the jaw and brow of a horse with an upstanding mane, has been described as 'pecked' (Faustino de Carvalho et al 1996)

The marks outlining the horse in the schist appear to be much broader and looser than those in the superimposed outlines but even so it is unlikely that they were made by multiple percussive blows. The surface visible at present suggests that it could have been formed by erosion rather than by a misdirected point. If the ends of a crystal array were all being eroded back at a constant rate then the bottoms of grooves would remain the same depth. Actually this is unlikely to happen. Wind born abrasives are likely to remove the more exposed crystals on the rock faces while electrolytes are more likely to be retained in recesses, etching away the surfaces of crystals there. The overall rate at any surface will depend upon the balance between these two processes. However, most of the surface of a groove cut into a face composed of the ends of crystals is closer to being parallel to their sides. Exposed sides of crystals erode faster than their ends so what started as a narrow groove inevitably widens as the whole surface erodes back. The process is illustrated diagrammatically in Figure 3.

The outlines of the Côa engravings which look as though they are pecked are the most heavily eroded. They are the lowest in any superimposition sequence and they are the oldest. There is little likelihood that originally they differed in any conspicuous way from the Upper Palaeolithic engravings which preceded them or the recent engravings imposed on top.

Figure 3. Diagram showing the effect on the section of a vee shaped groove of differential erosion rates on crystal ends and sides in a block of schist or shale with pronounced crystal alignment.

### **Context: the implications of the location.**

The context of the Côa engravings is different from other surviving parietal engravings which are certainly of an Upper Palaeolithic date in the important respect that they are placed in selected places in an approximately nine and a half kilometre stretch of a valley that is approximately two hundred metres deep and a kilometre between rims whereas the others are all within caves. Since the context is different then the meaning is likely to be different in some way even if they were done by the same Palaeolithic people a few days after work had been completed on a cave wall elsewhere. Nevertheless there are some contextual similarities between the two that increase the possibility their intentional meanings had something in common.

Most of the watersheds of tributaries south of the Douro are close to the mainstream and the catchments are small, unlike those to the north. The Côa is an exception. It constitutes a more awkward barrier to east west movement across the *planoalto* south of the Douro than the other tectonically aligned valleys with the possible exception of the valley in which the open air site of Siega Verde is located. (Balbin et al 1996) The engraved schist surfaces are all close to the valley floor. They are at locations where the beasts represented in them might be expected to descend to drink in the river or to cross the barrier it creates.

The location is closely paralleled in its topography by image sites in France and northern Spain. Around Cabrerets on the limestone escarpment to the north of the valley of the Lot, the Cele imposes a constraint to passage and some ten or eleven parietal image sites in caves cluster round it. The passageway along the limestone escarpment parallel to the Rhone is impeded by the deep gorge of the Ardèche which contains at least fourteen image sites, all located at points where it can be crossed. The way up the Ariège valley to mountain pastures has to cross the Videssous which joins it at Tarascon. Here images in four caves overlooking the junction were intensively developed after the glaciers which scoured the valley during the glacial maximum had retreated. The hardrock ridges crossing the bed of the Vézère near Les Eyzies encourage fording of the mainstream at that point and image sites in both caves and rock shelters cluster round the crossing points. Along the coastal strip in northern Spain cave

sites with parietal images are to be found at every constraint to movement along the strip, up the valleys into the mountains and up their larger side valleys.

The Côa is therefore in a very similar location to other major areas with parietal Palaeolithic images and could have been used for similar purposes. Notices about its use, roadsigns directed at others who might be unfamiliar with its functions, would be useful both to makers and viewers.

The marks in the rock surfaces beside the Côa delineate a restricted range of references. Bovids, equids, caprids, cervids, and one salmonid can be recognised. There are at least two anthropomorphs, one definitely male and the other probably female. Among numerous marks which do not form sufficiently complete outlines for recognition there is perhaps only one engraving which may be ancient, a meander, which is coherent but completely unreferenceable by the visual means we normally use in the perception of real objects. On a few surfaces, particularly at Rêgo de Vide about three kilometres south of the confluence, there are some outlines which like the meander are cryptiform. Even if there were not other drawings close to them recognisable as a Douro sailing boat for wine transport and a steam engine crossing the bridge near the Côa Douro confluence, dated 1944 and signed Alciño Tomé, there would be no doubt that they were intended to convey distinctly different ideas from the majority of the drawings in the valley.

A drawing like the horse measuring about fifty by sixty-five centimetres on one of the blocks at Ribeira de Piscos, on the west bank in the middle of the engraved stretch of the valley, may be taken as an example of a distinctive idea that the earlier draughtsmen or women attempted to convey. A 'pecked' outline presumably one of the earlier outlines that are visible on the rock surfaces, is superimposed on another representing the back and head of an even earlier horse. The complete horse has been assembled as several overlapping simple shapes. The effect is rather like that obtained when shapes, cut out of a neutral coloured card, are partially superimposed upon one another. They amalgamate to form a whole but retain sufficient individuality to suggest a volume of unspecific depth between the various layers and their support.

Figure 4. Ribeira de Piscos, Côa valley, Two opposed horses engraved on a joint plane and subsequently eroded sufficiently to appear to be 'pecked'.

Each shape of which the whole is composed has been formed rather as a shadow is formed by the sun, cast onto a surface as though from an almost infinite distance. This projection, orthogonal projection, makes a good dimensionally accurate representation when all surfaces of an object are at right-angles to each other and can be placed either plane to or parallel with the line of vision. However, where there are surfaces which curve or are oblique to the visual axis, the human tendency to try and see round corners which psychologists call 'regression towards the real object' takes over. The curved or oblique surfaces are pulled flat into the plane and in the process are made to appear extended. (Fig. 5.) It is for this reason rectangular sections of heads and limbs are drawn smaller than the curved surfaces of flank and rump in the Côa.

Figure 5. Diagram to demonstrate the kind of spreading observable when rotund forms are drawn as flat shapes as in the Ribeira de Piscos horses.

The net effect of the extension of oblique shapes is that the both the Palaeolithic and the Côa drawing readily convey a sense of the balance of the animal and its potential for motion. The weight on each visible foot, the alertness of the relationship between head and body and the amount of collection it would require before the limbs of the animal were in a position to drive it forward are all indicated by the relationships between the superimposed flat shapes. Since there is little detail within the outlines which makes the drawing effective in conveying the animal's individual or species characteristics the drawing has to have been constructed to present the kind of information required for a prediction of its future movements which might enable it to elude capture. The characteristics drawn are not those which would further a pastoralists preoccupation with breeding. On the contrary those of interest to a forager whose main concern is with hunting are emphasised.

There are no marks on the Côa schist surfaces representing the kinds of entoptics designed to orientate the viewer properly to what is represented; to frame it. Around many of the engravings in Lascaux, particularly those in the Apse, and also around the paintings in the Sanctuary in La Pileta, a grid of lines forms perpendiculars and horizontals in the plane of the image when the viewer is standing in a limited area of the cave floor relative to it. The predisposition of the perception process to recognise horizontality and verticality, to construct horizontal and vertical entoptic images out of stimuli which correspond on approximately, is being used to establish a kind of frame which dissociates the image from other adjacent images imposed on alternative grids. Elsewhere, other devices are employed for the same purpose. Caves like Gargas or Trois Frères where images are also crowded rely on their being a limited space on the cave floor where it is possible to stand or sit and see a particular image for instance.

Fig. 6. Bull and another bovid close together in the apse at Lascaux but 'framed' separately by records of entoptic grid.

The Côa engraved surfaces that are separated from each other by vegetation, bear relatively few images and possess restricted and convenient places for viewing, so they present no orientation problems. Where there are superimpositions there are greater difficulties. At Ribeira de Piscos on one of the outcrops the position of the sun in the sky distinguishes one image from another. The outline of a priapic man is only readily visible when the sun is high at noon in the summer months. It may possibly also be visible around midnight at a full moon when it is at a zenith of its eighteen year cycle. Other images on the rock surface are more visible when the light source is lower in the sky. Though in some cases this may be due to alterations in the line profile as a result of erosion it is possible the effect is intended. Images should be temporally as well as spatially separated.

## Discussion

The inevitable conclusion from the foregoing that the majority of the Côa engravings were placed in their present positions by a Holocene community which was similar in important respects to communities living in the late Pleistocene and possessing a social organisation supporting the kind of hunting and gathering once undertaken by Palaeolithic peoples further north, raises the question of how such a community could have survived when not far away on the other side of the Douro catchment agricultural communities existed. Any farmer living near the Douro would be likely to take grave exception to someone who stopped and took beasts from his pastures to barbecue however infrequently it was done. He would demand the sort of repayment which would have involved the person concerned, if he survived, himself becoming an involuntary and underprivileged participant in the agricultural economy. Indeed, painted images on a vertical surface protected by an overhang further up the Côa valley, which are of a type normally associated with Neolithic communities when they are found in Levantine Spain, suggest that groups of agriculturists may themselves have crossed the Douro to hunt.

It seems unlikely that large herbivores could have been eliminated from the diet of foragers stopping in the Côa without organisational changes which would have led to differences in their images. It is possible that the equids, the caprids, and the cervids of the engravings moved freely in small groups across the rather sparse feed provided on the observable soils of the *planalto* around the Côa catchment. The climatic variations, which are believed to have occurred when the periglacial conditions in the headwaters of its tributaries in the Serra da Estrela during the final phases of the Pleistocene had ameliorated, would have supported small populations of each species. (Daveau 1971).and in turn supported an upper palaeolithic social organisation.

Regrettably, the evidence from the few early habitation sites located in the region so far is insufficient to answer the ultimate question about whether the appropriate lifestyle went with an apparently palaeolithic pictorial style. Lithics recovered from Salto do Boi stratified both above and below ceramics are atypical of the Portuguese neolithic. (Zilhao et al. 1995) They are also in sections in which there is no reason to suppose disturbance. The artefacts might have been deposited sequentially by different groups or inconsistently by the same groups.

One site may however throw some light on the situation. Representations of bulls and cows in the Côa are usually the upper figures in a series of superimpositions or otherwise have features which may make them of later date. This might well be explained by an increase in huntable domesticated or semi domesticated animals nearby and might have necessitated the Roman Station at Quinta da Barca towards the southern end of the engraved section of the Coa and north of the habitation site of Salto do Boi. It would have been needed like the forts of the American mid west: an outpost to control wandering foragers when they passed. The degree of redundancy in the Côa images, greater if anything than in Pyrenean or Cantabrian Palaeolithic images since there are fewer cryptiforms, implies that the people who happened to be there at the appropriate moment, mid day in high summer or midnight when a full moon was high in the sky, might equally well have been at one of the other sites with similar images, Mazouco, Siega Verde or one that has since vanished. They had not necessarily been instructed in what they needed to know in any other way and were relatively unfamiliar with what to expect and the images continued to be needed.

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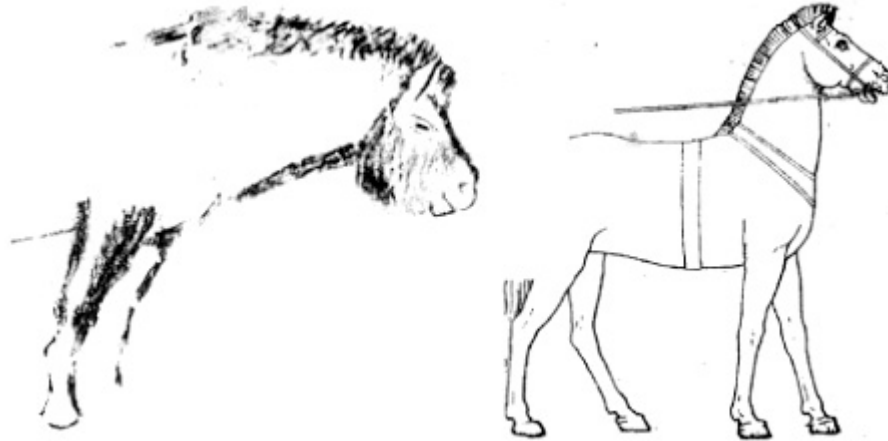
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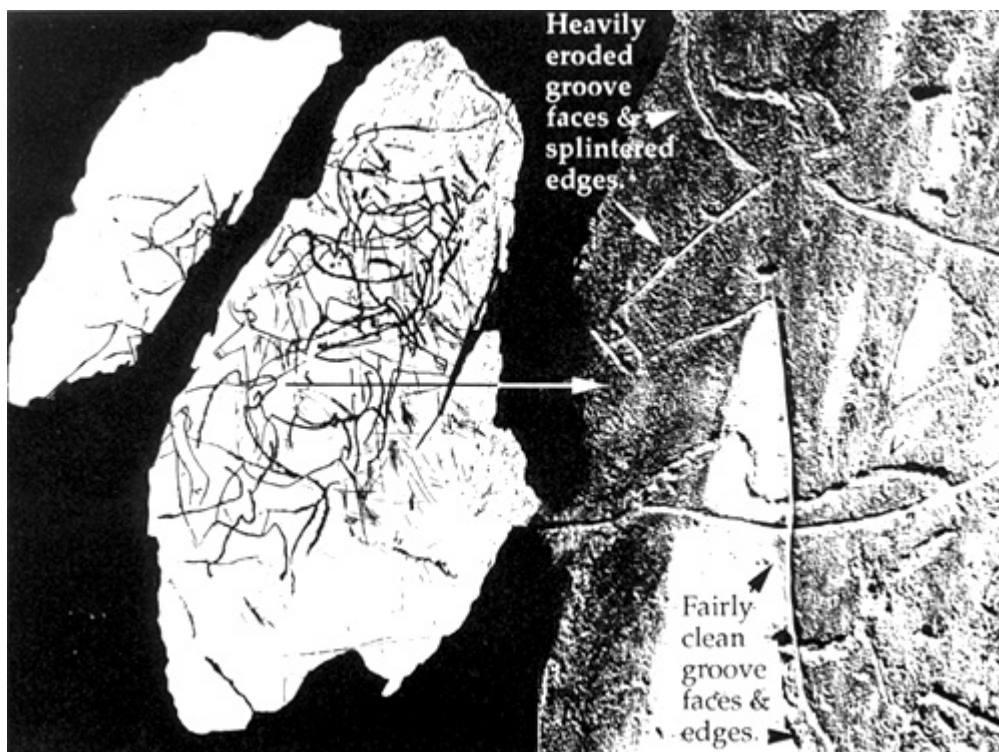


01.- On the left the horse in black manganese paint is from Niaux 'Salon Noir' c 13,000 BP. On the right John Flaxman drew the horse published in 1834 as an engraving in a translation of the Odyssey of Homer by Alexander Pope.

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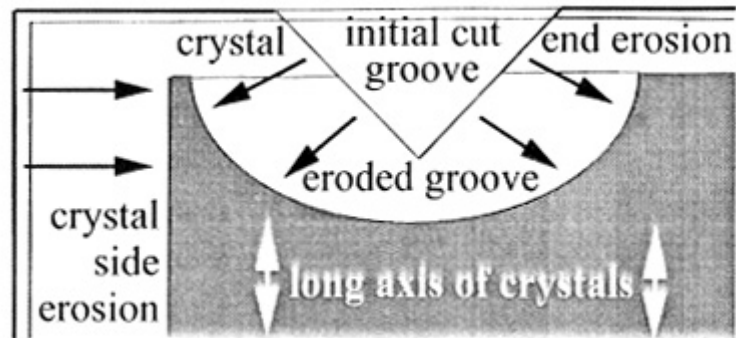


02.- Penascosa rocha 3. Vale do Côa: outlines of ibex, horse and bovids on schist at various times.

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03.- Diagram showing the effect of the section of a vee shaped groove of differential erosion rates on crystal ends and sides in a block of schist or shale with pronounced crystal alignment

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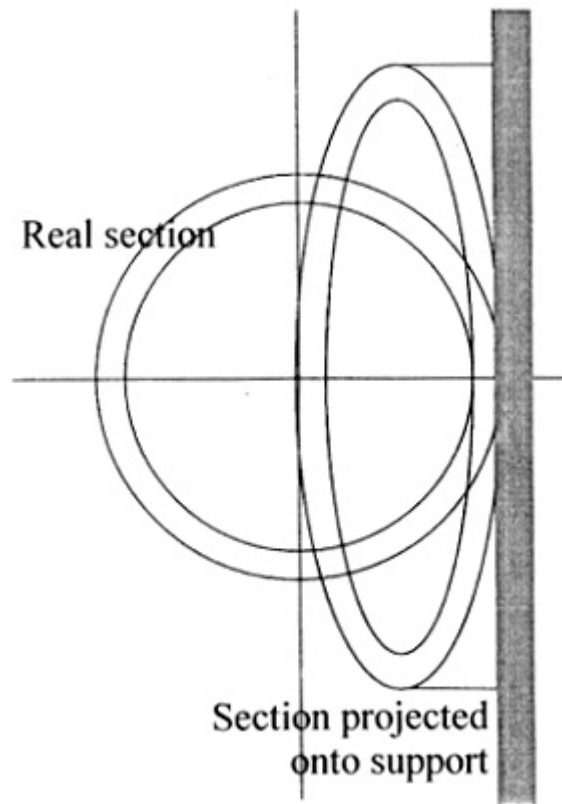


04.- Ribeira de Piscos, Cõa Valley, Two opposed horses engraved on a joint plane and subsequently eroded sufficiently to appear to be "pecked".

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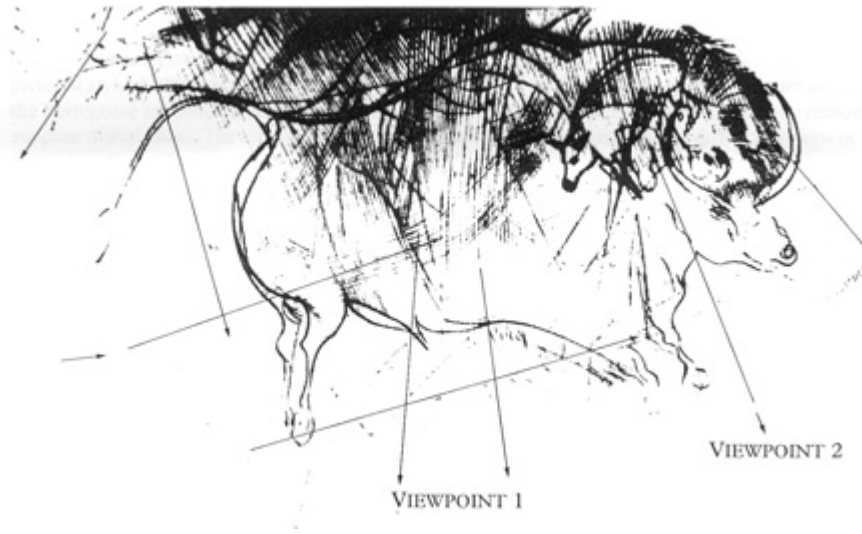


05.- Diagram to demonstrate the kind of spreading observable when rotund forms are drawn as flat shapes as in the Ribeira de Piscos Horses

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06.- Bull and another bovid close together in the apse at Lascaux but "framed" separately by records of entopic grid.

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