

Representation of movement in the Upper Palaeolithic: An ethological approach to the interpretation of parietal art

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ABSTRACT

The earliest known figures produced by humans are mainly reproductions of animals. In this study (PhD thesis), which is limited to parietal art in France, animal figures in movement are analysed and interpreted by means of ethology, as these representations can shed light on the motivations of the hunter-artists of the Upper Palaeolithic. An ethological approach provides essential tools for the study and understanding of parietal art, as the representation of movement contributes to the meaning of this original art. Known behavioural themes and their combinations within assemblages probably constituted a kind of grammar which led to the first pictograms. Hunting and animal fertility were central to this.

RÉSUMÉ

La représentation du mouvement au Paléolithique supérieur. Apport du comparatisme éthologique à l'interprétation de l'art pariétal.

Les plus anciennes figures connues produites par l'homme sont essentiellement des reproductions d'animaux. Dans le cadre de cette recherche (thèse) limitée à la France et à l'art pariétal, il nous a paru opportun d'analyser et d'interpréter, par le biais de l'éthologie, les figures animées car elles peuvent nous éclairer en partie sur les motivations des artistes chasseurs du Paléolithique supérieur. L'approche éthologique fournit en effet des outils essentiels pour aborder l'étude et la compréhension de l'art pariétal. La représentation du mouvement participe à la signification de cet art originel. Les thèmes comportementaux reconnus et leurs combinaisons au sein des assemblages constituaient sans doute les termes d'une grammaire balbutiante annonciatrice des premiers pictogrammes. La chasse et la fertilité du gibier y tenaient probablement une place de choix.

MOTS CLÉS

Préhistoire,
Paléolithique supérieur,
art des cavernes,
art pariétal,
mouvement,
animation,
éthologie,
comparatisme,
interprétation,
naturalisme,
chasse,
reproduction.

1. A video presenting these decompositions of movement, kinds of “recompositions” of mental images of prehistoric peoples, may be viewed on the DVD attached at this volume.

INTRODUCTION

The earliest known figures² produced by humans are mainly reproductions of animals — the large mammals, principally the herbivores. Besides this Palaeolithic menagerie, containing some twenty themes, there are abstract, simple (punctuations, rods...) or quite complex (geometric assemblages of “quadrangular” or “tectiform” type) motifs, called “signs” for want of a better term. Human are almost completely absent from the caves as figurative subjects. Jean-Pierre Duhard (1993, 1996) counts more than 200 male or female figures, seen especially in objects; the simplicity of these images, of which the best known is the “scene of the well” at Lascaux (*cf. supra*), contrasts sharply with the realism of many of the animals. The female figures in the caves are limited to representations of vulvae and sometimes silhouettes of Gönnersdorf type as in the Plancard cave in the Ardèche (Bosinski & Sciller 1998). However, is not man omnipresent in the role of the “creator” and the “spectator” of parietal art? All other forms of representation, evoking the natural environment of the animals, the cosmos or manmade structures are deliberately omitted. The animal or rather certain animals appear to have been central in the preoccupations of the prehistoric artist.

For the prehistorian and all the more so the specialist of parietal art (“parietalist”), whose ultimate goal is the interpretation of the “message” sent across the millennia by our distant ancestors, the images of animals are the easiest to approach objectively. Indeed, contrary to the abstract motifs whose graphic construction relates to concepts which escape us, the animal images are directly relatable to natural science. In

this naturalist perspective, it would seem logical to study that element which enables differentiation of the status of these animal images from other life forms: movement, a word used here in its physical sense, that is, according to the Petit Larousse dictionary definition, the “state of a body whose position, in relation to a fixed point, changes continually.” Right away the dynamism exuded from compositions as remarkable as the *Salle des Taureaux* at Lascaux or the *Grand Panneau de la Salle du Fond* at Chauvet are enough to believe that animation is an essential factor in parietal art (in this article, “animation” is synonymous with “representation of movement”). For the artists of the Upper Palaeolithic, movement was an integral part of the process of understanding the animal. Let us not forget that these creators, whatever their social status, came from groups of hunter-gatherers whose hunting behaviour implied above all a perfect comprehension of the shapes, attitudes, strategies and tactics of the animals around them, even if certain species did not live in their immediate surroundings³.

Thus it is reasonable to postulate that the animation of an animal represented on the wall of a cave is the expression of its behavioural state. This justifies having recourse to ethology in order to discover and describe with maximum objectivity the movements represented, that is, to interpret them.

This “ethological comparison” enables identification, when possible, of the associated behaviour, that is, the “motives” (Leroi-Gourhan 1984a: 76) for this animation. In this article⁴, we wish to define the methodological basis of our ethological approach and present the initial results of its application to parietal art in France.

2. The word figure is used here in the sense of “drawing, engraving, representation, painted or sculpted, of a human being, of an animal” (Petit Larousse). Palaeolithic artists produced representations of thousands of animals and sometimes humans; signs are not figures but abstract representations.

3. “From a bioclimatic point of view, parietal representations prove only one thing, that the humans knew the animals they depicted, without our being able to say whether they existed in the region at the moment of creation of the representations, or whether a particular animal absent from the assemblages was too eminent or not eminent enough to be depicted on the cave walls” (Leroi-Gourhan 1980: 517).

4. This is a brief summary of the doctoral thesis in Prehistory defended by the author on July 4, 2003, at the University of Provence of Aix-en-Provence (Azéma 2003). A complete publication of this work is in preparation.

ETHOLOGICAL METHOD OF APPROACH

A TOOL FOR "PRE-ICONOGRAPHIC" AND ICONOGRAPHIC ANALYSIS

The ethological approach integrates perfectly into the "pre-iconographic" phase. This is the first of three stages in the method of analysing works of art established by the art historian E. Panofsky (1962) and which G. Sauvet (1993: 85-86) recommends, rightly, for application to Palaeolithic representations. Let us remember that at this stage, "we can only register the *artistic motifs* (objects and actions) which make up the *primary thematic content* of the work. This is a purely descriptive phase which Panofsky calls *pre-iconographic*, as iconographic analysis in the proper sense only begins afterward. The latter consists of recognizing in the figured motifs the themes or concepts which make up the *conventional meaning* of the work. A last stage, subordinate to the first two, consists of interpreting the symbolic values carried by the themes, which establish the *intrinsic meaning* of the work. It is obvious that the prehistorian has hardly any chance of going beyond the *pre-iconographic* stage, as the two following stages are deeply rooted in cultural traditions which no *palaeo-ethnologist* can ever reveal to us" (*ibid.*).

The ethological approach leads to registering the postures exactly. It offers the advantage of easing the passage to the second stage of analysis and thus to penetrate, little by little, the perilous domain of interpretation (of these postures). For, beyond individual movements, ethographic comparison enables study of group movement, of possible intra- or inter-specific relations, and may thereby provide a glimpse of the concepts which guided the construction of the parietal arrangement, or at best some of them.

NATURALISM AND PALAEOLITHIC ART

The ethological approach is part of the naturalist trend which has influenced some scholars of Palaeolithic art for several decades. We agree with D. Vialou (1996: 88) when he states "Palaeolithic animal art is naturalistic in that animal represen-

tations, created in the style specific to each culture, offer sufficient quantity descriptively and figuratively, taken to a peak by the Magdalenians". As J. Clottes states (1994a: 19), the naturalist approach is "the consequence of the ever-increasing meticulousness in archaeological research in all its aspects".

This is in opposition to the other tendency in research which considers Palaeolithic images "as symbols rather than faithful transcriptions of reality" (*ibid.*). Such an opposition has no sense as the naturalist approach is a necessary methodological prerequisite to the discussion of the possible symbolic nature of Palaeolithic art; we then enter into the second and third stages of Panofsky's analysis (1962).

This naturalist tendency has continued to advance, especially since the work of L. Pales and M. Tassin de Saint-Péreuse (1969, 1981, 1989) on the objects from the cave of La Marche (Vienne). She has convinced a good number of specialists since the symposium of Sigriswil, which brought together prehistorians, zoologists and ethnologists in June 1979, spurred on by H.G. Bandi, around the theme "the contribution of zoology and ethology to the interpretation of the art of prehistoric hunting peoples". Besides the acts of this symposium published in 1984 (Bandi *et al.* 1984b) there are other important works (Bandi 1968; Rousseau 1975; Guthrie 1984; Bandi *et al.* 1984a; Bandi 1986-87; Crémadès & Bonnissent 1993; Duhard 1993, 1996; Crémadès 1994; Dubourg 1994, 1997) among which are those, more recent, of Clottes *et al.* (1994a, 1994b) and of Paillet (1999), devoted to representations of bison in parietal art (in Ariège for the former, in Périgord for the latter).

But the first researcher to take up the particular question of the representation of movement through ethology was A. Leroi-Gourhan. Once again the pioneer, he defined in 1974, for classes he taught at the Collège de France (Leroi-Gourhan 1974), a typology which enabled classification into categories of movement. A few years later (Leroi-Gourhan 1984a), he based interpretation of these movements directly on ethology and classified them in the form of tables, being

inspired by the behavioural repertoires usually established in this branch of the natural sciences. He was the first to do this, but unfortunately this brilliant initial step could not be pursued as the prehistorian died a few years later. There remain these two precious articles, the foundations of our work (Azéma 1992a, 1992b, 2003, 2005a, 2005b, 2006). There are other studies devoted to the representation of movement, although partial and very specific: Prudhommeau 1984; Sieveking 1988; Rusinowski 1990; Villaverde Bonilla 1990; Rivenq & Welté 1992; Crémadès 1993; Crémadès & Laville 1995.

CORPUS

Our work is focussed on parietal art in France, a corpus of 4,634 representations of animals from 141 sites⁵, reflecting the entire chronology of the Upper Palaeolithic. Although the parietal figures may be counted in the thousands, only 23 animal themes have been recognized (Table 1). They are proof of a conscious selection of models in the natural environment of the human groups which produced these images, in other words "...a conventional list of animals which participated in a certain mythology" (Leroi-Gourhan 1984a: 76). The herbivores are dominant on this list (14 themes, 3,574 individuals, that is 77.1%)

compared to the carnivores/omnivores (9 themes, 189 individuals, 4.1%). There is also a quantity of undetermined animals (871, 18.8%), probably herbivores. These proportions can fluctuate from one site or geographic region to another, from the Aurignacian to the end of the Magdalenian. The preponderant place of felines in the Grotte Chauvet is an example (Clottes & Azéma 2005).

LEARNING PERIOD

Before tackling the images themselves, our strategy consisted of accustoming ourselves to the observation of present-day animals which are the closest to the images (European bison, Prejwalski's horse, ibex, red deer, reindeer...), conscious that for many of them, captivity and the effects of domestication and selection have caused modifications, difficult to evaluate, of their morphology and their behaviour. The reading of works on ethology, theses and veterinary reports, the viewing of documentaries on animals and audiovisual archives complemented our observations in the field (wildlife parks) and the advice provided by the specialists interested in our study (J.-P. Bégouën, R. Campan, D. Guthrie, G. Maury and M. Rousseau). As certain species have not survived into our times, we consulted palaeontology to understand their anatomy as well as the ethol-

TABLE 1. — The known animal themes in parietal art in France (the number of individuals is indicated in parentheses).

Principal themes	Rare themes
Horsel, <i>Equus caballus</i> (1258)	Giant elk, <i>Megaceros giganteus</i> (22)
Bison, <i>Bison priscus Bojanus</i> (779)	Bird (20)
Mammoth, <i>Mammuthus primigenius</i> (440)	Fish (13)
Ibex, <i>Capra pyrenaica</i> (318)	Chamois, <i>Rupicapra rupicapra pyrenaica</i> (10)
Aurochs, <i>Bos primigenius Bojanus</i> (220)	Seal, <i>Monachus monachus</i> (8)
Deer (122)	Snake (6)
Red deer, <i>Cervus elaphus</i> (146)	Musk ox, <i>Ovibos moschatus</i> (3)
Reindeer, <i>Rangifer tarandus</i> (129)	Penguin, <i>Pinguinus impennis</i> (3)
Lion, <i>Panthera leo spelaea</i> (120)	Hare, <i>Lepus europaeus</i> ? (2)
Rhinoceros, <i>Coelodonta antiquitatis</i> (87)	Saiga antelope, <i>Saiga tatarica</i> (2)
Bear, <i>Ursus spelaeus</i> , <i>Ursus arctos</i> (52)	Dog, <i>Canis Lupus</i> ? (2)
	Weasel, <i>Mustela nivalis</i> (1)

5. That is, 140 caves or painted rock shelters and one open-air site, the engraved rock face of Fornois-Haut in the eastern Pyrénées. Each of these sites contains at least one animal figure.

ogy of comparable living species to provide us with an idea of their behaviour. Thus the habits of African elephants served as models to understand those of their ancestors, the mammoths, by extrapolating that which could have been the adaptation of the latter to the climatic and environmental conditions of the Upper Palaeolithic.

INITIAL RESULTS: THE REPRESENTATION OF MOVEMENT

IDENTIFYING THE MOVEMENTS

How may whether or not there is representation of movement be determined with certainty? Several parameters disrupt the reading of the image on the wall. Although the assessment of the head or tail movements did not present too many problems for us, the reading of the supports and the movements of the limbs ran into many pitfalls: the non-figuration of the ground line, sometimes suggested by the wall relief, the incompleteness of many figures, intentionally abbreviated or not, the interpretative vision of the artist which also defines the style of the work. Depending upon the periods, the clumsiness or the talent of the individuals, the conventions defining a "style" can generate artificial deformations of the body (stretching of the trunk, projection of the head, twisting of the limbs...) which can be confused with signs of movement. The very meaning of a notion such as the "realism"⁶ of a figure differs according to the culture: the ordinary aspect of a barely outlined contour, a feature near the body or the mouth without apparent significance (for us) perhaps expressed a movement, an attitude, a very specific action. Only attentive preliminary observation of living models correlated with a consideration of all these parameters seen in the images facilitates the identification of "intentional" movements. But nothing allows us to certify that the animals which we consider to be static, according to the

laws of biomechanics, were so for our distant ancestors. One can presume that these figures which appear inert came to life in their minds, moving according to the fluctuations of the lighting on the irregular volumes of the wall, by changing the angle of observation (anamorphosis) or according to the distortion of perception caused by alteration of consciousness (visual hallucinations).

QUANTITATIVE APPROACH

We have proceeded with analysis of the parietal figures by first setting aside the undetermined animals as their possible movements could not be interpreted through ethology. The results presented below thus concern the rest of the corpus, that is, the 3,763 animals determined zoologically. The representation of movement is far from being a marginal phenomenon in the parietal art of France: 41.1% of the animals are animated, the animation concerning the body of the animal as a whole or one of its parts (cf. *supra*). This percentage tends to put certain statements of Leroi-Gourhan (1975: 390) into perspective: "it is evident that the subject (bison, red deer...) takes precedent over the action (fleeing, charging, falling...) as one encounters a majority of figures in a state of non-movement or in vertical extension (the limbs placed perpendicularly)". Not only does A. Leroi-Gourhan affirm his statements without furnishing any percentage but our calculations show clearly that the representation of the movement of the subject (synonym of action) holds as much importance as the identity of the subject (taxon) itself: nearly one figure in two is in movement.

Does this percentage vary from one region to another in France? To attempt to answer this in view of the large size of our corpus we have divided the sites into five geographic zones according to their stylistic and cultural relationships, except for zone 1, made up of the few scattered caves in the north of the country. Zone 2

6. The visit to the caves in the Ariège, conducted by F. Rouzaud and H. Jamet (1993), in the company of caribou hunters, is very eloquent on this subject.

covers the caves located in Périgord, as well as those situated on the periphery (Gironde, Poitou-Charente, Limousin and central France). Zone 3 covers all the Pyrenean sites (Pyrénées-Atlantiques, Hautes-Pyrénées, Haute-Garonne, Garonne, Ariège, Pyrénées Orientales and Aude). Zone 4 covers the Quercy (Lot). Finally, zone 5 covers the caves of the Ardèche and southern France (Hérault, Gard, Bouche-de Rhône).

It shows up in our statistics that the percentage of movement varies little from one zone to another, swinging between 35% and 45%. Zone 2 retains the highest percentage, that is, 45.1%. It is also the densest in animal figures (1,628) and sites (54). Movement appears to be one of the essential features in the style of the figures at Lascaux (43.6%) and at Gabillou (54.6%), the closest cave in many aspects. This zone appears to be somewhat apart from the others for which the values are slightly below 40%. In the Pyrénées (zone 3), the percentage reaches 37.8% for a total of 1,127 animals listed. It is slightly higher in zone 5, with 39.4% for 607 animals. The lowest values are recorded in the Lot, 35.7% for 224 figures, and in zone 1, represented mainly by the caves of Arcy-sur-Cure where 30 representations in 85 (35.3%) are in movement.

CHRONOLOGICAL VARIATIONS

Has the percentage of movement changed over time? Again, to combine our observations, we have grouped the sites into three chronological phases, the “vectors” of which correspond to the best-dated sites. This classification is based on the idea that there exists, at least, a “pre-Magdalenian art”, from the Aurignacian of Chauvet to the Solutrean of Cosquer or Roc-de-Sers, and a “Magdalenian art”, stylistically more homogeneous, as seen in the great Pyrenean (Labastide, Les Trois-Frères, Niaux, Le Portel...) and Perigordian sites (Combarelles, Font-de-Gaume, La Mouthe, La Mairie...). After much hesitation, we have inserted an intermediate phase, called “Solutro-Magdalenian”, represented by two major caves in the Dordogne, Gabillou and especially Lascaux as “the elements that we have at present make it more than probable that art at

Lascaux began in the Solutrean, and probably continued and ended in the early Magdalenian. The related questions which remain concern the duration and the resumption of conventions or initial themes and the long use periods of the sanctuaries. There is nothing to deny that these caves were visited, painted and used for ceremonies over several millennia” (Clottes 2004).

According to our calculations, for a total of 3,763 representations, the percentage of animation is 37.7% in pre-Magdalenian art and 42.47% in Magdalenian art, a “peak” of 45.63% marking the intermediary “Solutrean-Magdalenian” period. This rejects definitively the idea of an increase in animation during the Upper Palaeolithic, as advocated by Leroi-Gourhan (1984b: 42): “there is no doubt that the preoccupation to represent movement increased during the development of Upper Palaeolithic art”. It is all the more true that one of the oldest and best dated caves (mainly Aurignacian), Chauvet, has a percentage appreciably equal or higher (41.2%) than a good number of middle or upper Magdalenian sites, such as Font-de-Gaume (42.5%), Rouffignac (33.8%) or Massat (28.6%). Contrary to what A. Leroi-Gourhan thought, animation is not at all a kind of “fossil” driving force which allows definition of a chronological period, a style or local particularities. It should be considered as a recurring component in Palaeolithic art, developing according to the inspiration of the artists, their talent or their clumsiness, the narrative or symbolic content of their creations. In this domain, the creators of the major works at Chauvet, Trois-Frères, Lascaux and Roc-aux-Sorciers may be considered to be masters.

TAXONOMIC VARIATIONS

We then wanted to know whether the percentage of animal figures fluctuated according to the taxa, and if so whether there were favoured themes. The species most dangerous for humans, the lion (65.6%), the bear (53.8%) and to a lesser degree the rhinoceros (54%), are represented in movement somewhat more so than the others, in decreasing order: reindeer (47.1%), bison

(44.6%), red deer (44.6%), horse (40.5%), ibex (38%), mammoth (28.4%), aurochs (27.6%). We note the relative numbers for “rare” themes: giant elk (7 figures in movement out of 22), bird (11/22), fish (0/13), chamois (8/10), seal (3/8), snake (6/6), musk ox (2/3), penguin (2/3), wolf (2/2), hare (2/2), saïga antelope (1/2), weasel (1/1). These animals, mainly herbivores, make up most of the corpus and show percentages near to the general average.

QUALITATIVE ASPECTS

The animation concerns the body of the animal as a whole or one of its parts. Consequently, for each species we have classified the movements observed on the cave walls by distinguishing, by convention, the three potentially dynamic parts of the body: the head, the legs and the tail; the “head” designates here the zone covering the neck and the head itself. It is enough that an internal element (ears, mouth, eyes) be represented in movement for us to consider that the “head” is in movement.

In concrete terms, the axes of reference (straight lines) were defined beforehand on the exterior of the body of the animal/model in an immobile position (Fig. 1). Each straight line divides in the longitudinal sense the part of the body concerned into two equal sections. Together these lines form a kind of simplified skeleton, a structure of “lines of force” and articulations with dynamic character, the fruit of our observations on the deformations of the bodies of the animals in movement. By convention, once applied to a parietal image, a change in position of a part of the body is judged significant, that is to say characteristic of a voluntary movement, if the axis taken by this part forms an angle large enough with the axis of reference (on average $\pm 30^\circ$). Of course graphic deformations relative to the style of the work and the possible clumsiness of the artist must be taken into consideration case by case. The large majority of the figures recognized as being in movement, that is 86.7%,

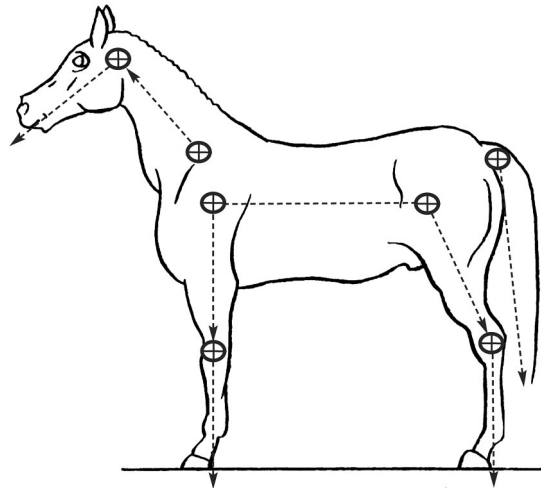


FIG. 1. — The horse, stationary: for each part of the body, an axis of reference characterises the immobile position. Horse drawn by M. Garcia (in Pales & Tassin de Saint-Pereuse 1981: fig. 17).

have the head represented as moving. The legs are animated in 52.9% of the figures and the tail in 31%. Graphically, the classification of these movements takes the form of “cinematic” scenes in which, by convention, the figures are oriented in the same direction, that is, in right profile. Movement of the head frequently brings the neck into play, especially in those animals which are more developed in that anatomical area, such as horses and deer. Most positions can be depicted, taking into account the bio-mechanical constraints of this part of the body. For example, the horse presents 99 dynamic positions combining movements of the neck and the head (Fig. 2). This animal is in fact the only one⁷ to be represented with its head turned backwards, at Pair-non-Pair and at Roc-aux-Sorciers (Angles-sur-l’Anglin).

The artists are not limited to the contours of the head. On numerous occasions, they animate the internal elements, mainly the ears and the

7. Of course, this affirmation concerns only France. In other countries, Spain in particular, we find figures presenting this characteristic, but they remain in the minority: doe of Covalanas, red deer of Candamo...

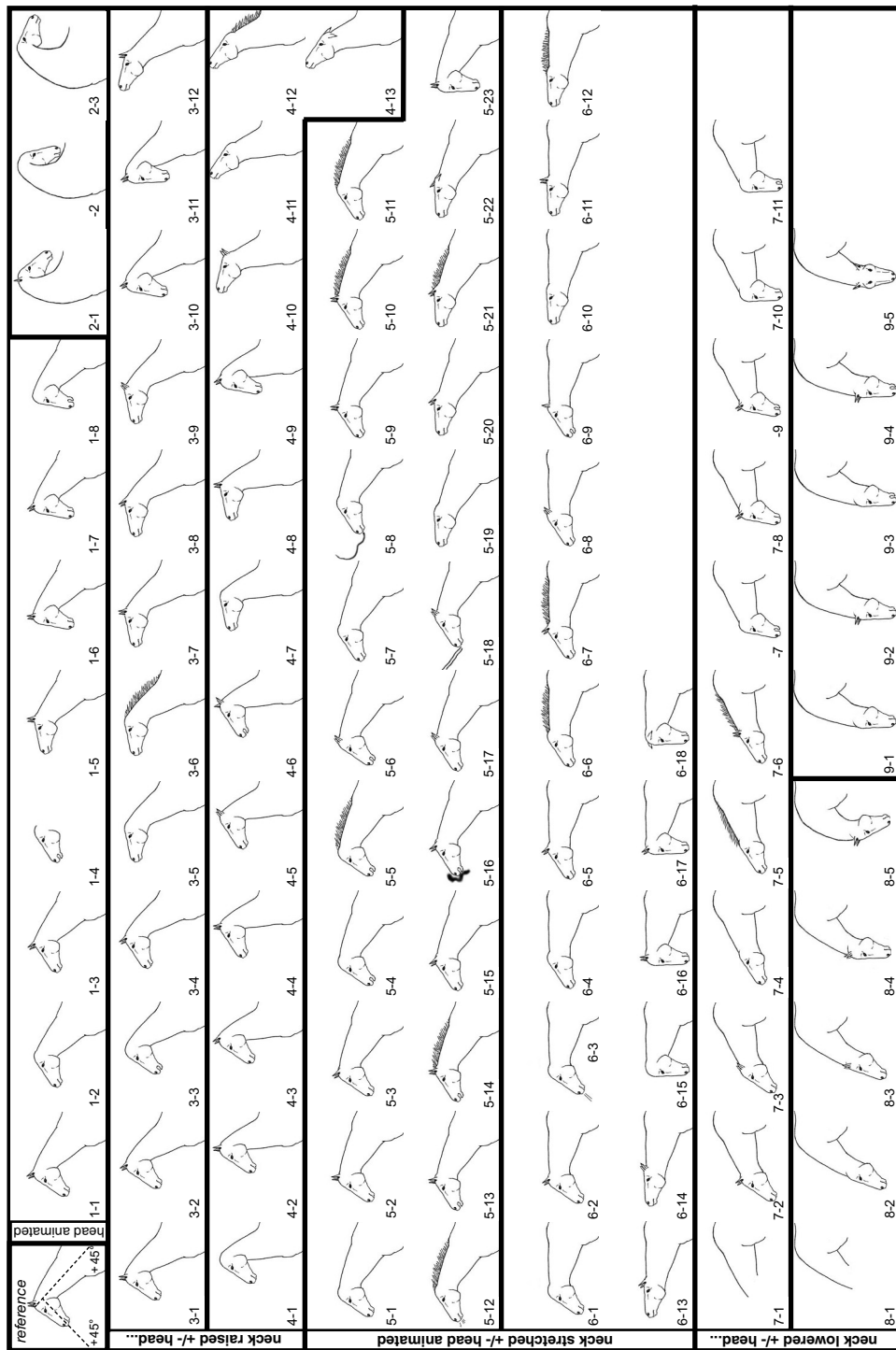


FIG. 2. — Repertory of movements of the head and neck of the horse in parietal art in France. Drawing M. Azéma (2002: tab. 3).

mouth, neglecting the eyes and the nostrils. The ears are animated especially in the case of the horse, the lion, the bear and the rhinoceros. They move in all directions, stand erect at the top of the head, point forward or are laid flat backward. For these animals, their function appears to have been well understood, unlike the other species, bison, aurochs, ibex, red deer and reindeer. For the latter, it may be presumed that the horns and the antlers, because of their nearness and their more imposing size, were substituted for ears in the imagination of the artists, thus becoming “organs” of expression. This would explain the errors and distortions sometimes discerned at their point of attachment to the skull (divergent horns, pointing in the wrong directions...). The ears are practically absent among the mammoths, the trunk being represented preferentially to the point that it is often represented in movement.

Among the herbivores, the mouth is animated on rare occasions, to indicate effort (breathing when the animal is moving rapidly) or to signify a cry characteristic of the species: whinnying (horse), lowing (bison, aurochs), belling (red deer), bleating (ibex), trumpeting (mammoth), roaring (rhinoceros)... Sometimes the teeth are revealed (horses at Roc-aux-Sorciers) or the tongue, for certain excited males (bison, aurochs, ibex, deer). The clusters of lines or strokes depicted in front of the mouth or nostrils probably indicate breath for a good number of individuals, a gush of blood for others (aurochs of the *Frise Noire* at Pech-Merle, “emphasized” bears at the *Sanctuaire des Trois-Frères*, rhinoceros at the *Salle du Fond* at Chauvet...). But it is the lion that offers the widest range of facial expressions. The artists, especially those of Chauvet (Cottes & Azéma 2005), took care to represent the mouth opened to various degrees, by working on the contours of the lips, visualising the whiskers and sometimes the detail of threatening fangs, tongue displayed, and in combining the animation of the snout, the eyes and the ears. At Chauvet, the lions growl, hiss, scold and roar (Fig. 3).

Movements of the tail are frequent among long-tailed mammals (horse, bison, lion), which is logical enough. The tail moves somewhat less

among the other species and practically never for the bear (it is short and disappears in the fur). The diversity of the positions inventoried shows to what point the artists knew how to express the different meanings of this ethological indicator. This may be seen in the impressive group representing the bison (Fig. 4), particularly in the cave at Trois-Frères. Quite rare is the presence of clusters of lines and punctuations in contact with the anus, just below the raised tail, evoking either a secretion or a wound (rhinoceros of the *Scène du Puits* at Lascaux, wounded aurochs and mammoths in the *Frise Noire* at Pech-Merle).

A good number of movements could be qualified as “spectacular”: a horse’s tail raised flamboyantly (entrance of the painted gallery at Gabillou), a highly arched bison’s tail (*Sanctuaire des Trois-Frères*), an ibex tail lying flat against the spine (*Grand Plafond* at Rouffignac), the tail raised vertically on a reindeer (*Secteur des Chevaux* at Chauvet), a red deer (*Abside* at Lascaux) or even a mammoth (*Panneau des Mammouths Raclés* at Chauvet), a lion’s tail carried forward (*Grand Plafond* at Baume-Latrone).

The other movements, although more “discreet”, also had meaning for the artist-hunters. They contributed to the characterisation of specific behaviour. An upright ear, a turned-up snout or a half-open mouth were enough to capture the attention of the initiated. These subtle changes in position often escape the first glance, unlike the larger movements which are easier to discern. It must be said that in the collective unconscious the very notion of animation is wrongly confused with that of locomotion.

The study of the representation of movement of the limbs (but also other parts of the body engaged in locomotion) is based on a wide iconography taken from specialised literature and especially from an essential book, *Muybridge’s complete human and animal locomotion* (Muybridge 1979). At the end of the 19th century, and well before E.J. Marey, E. Muybridge had the idea of placing twelve to twenty-four cameras in line following the passage of an animal. The successive triggering of the camera shutters allowed decomposition of the movement into several images. The work devoted

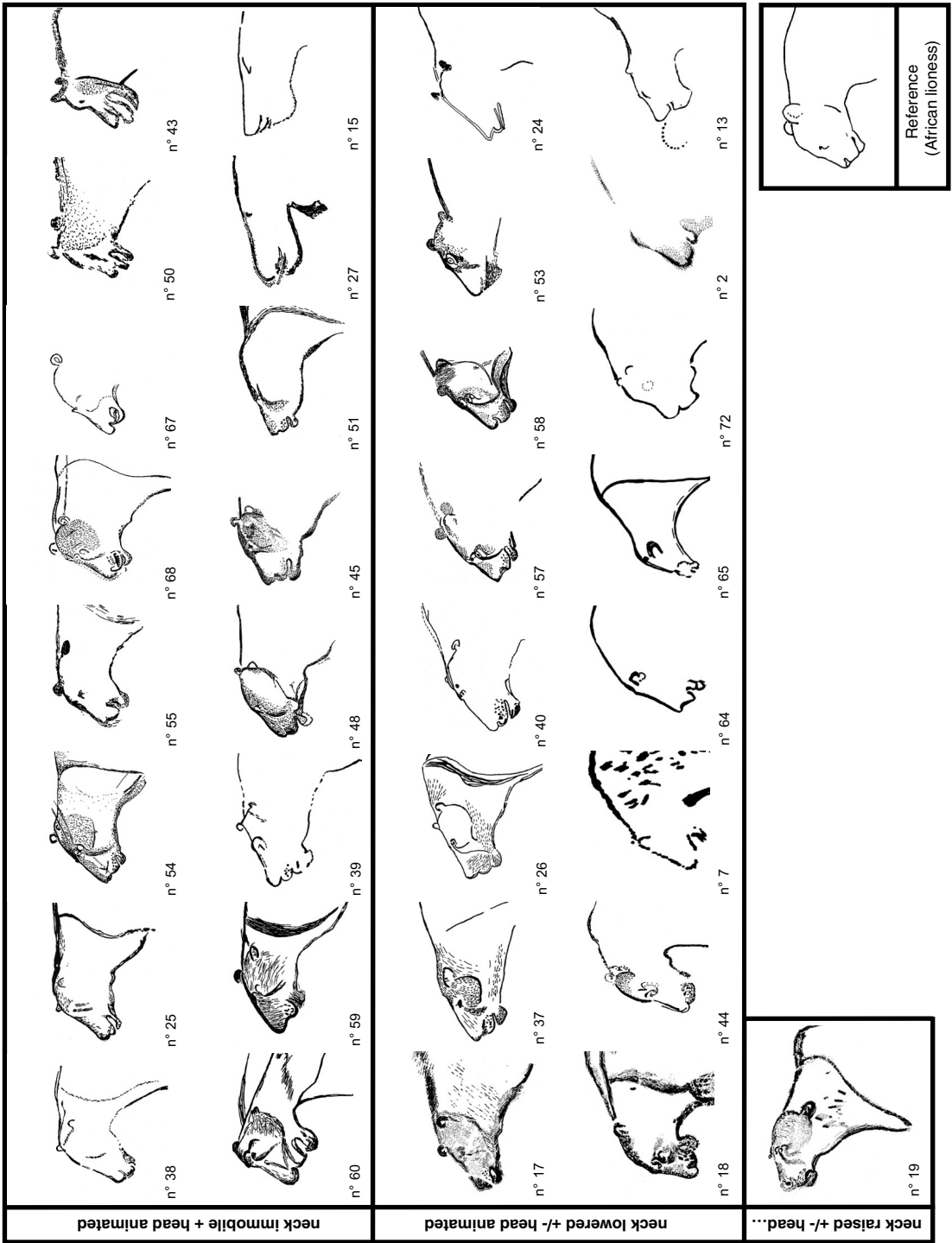


FIG. 3. — Animation of the head and facial expressions of felines at Chauvet. Drawing J. Clottes & M. Azéma (2005: fig. 61).

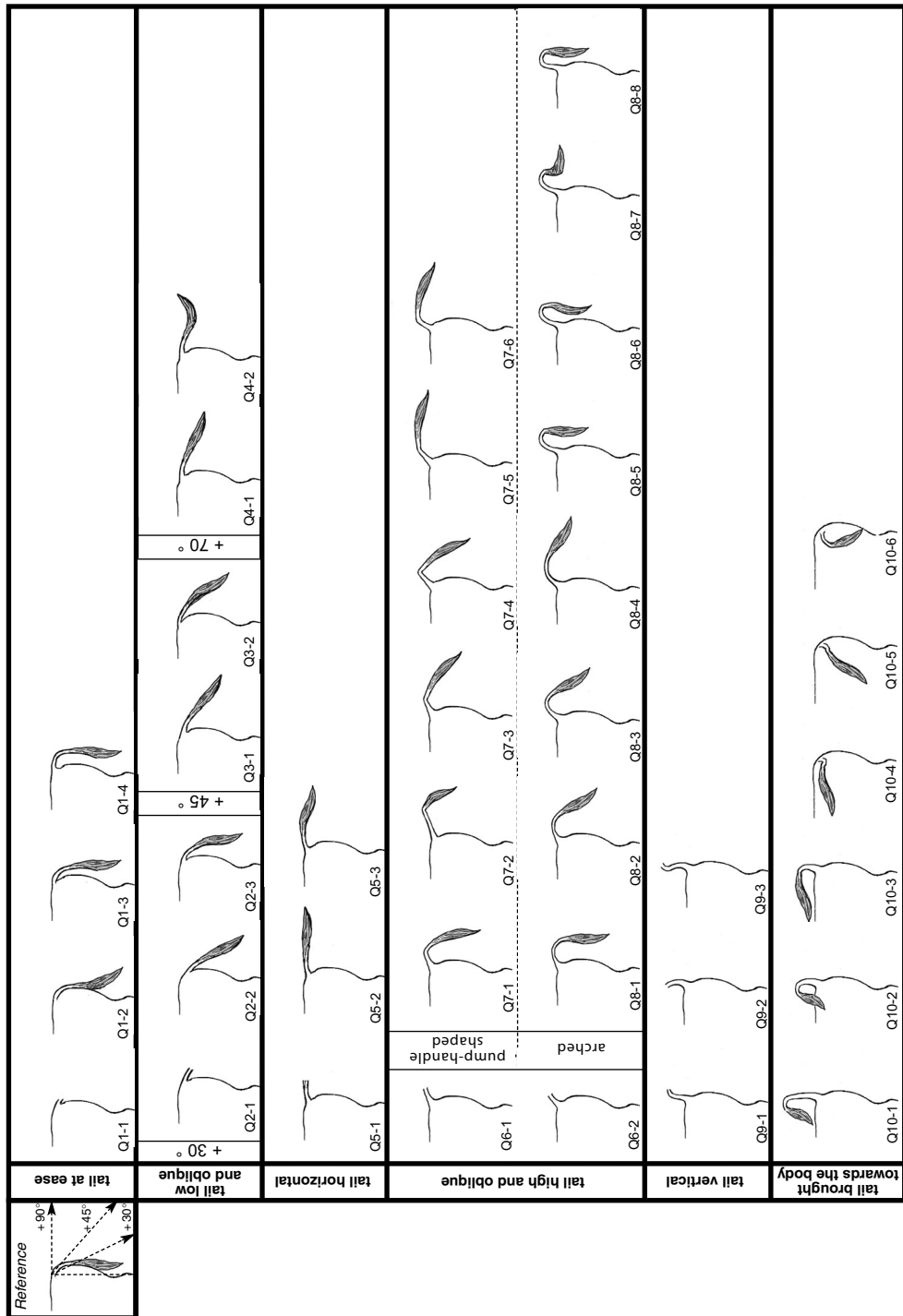


FIG. 4. — Repertory of movements of the tail of the bison in parietal art in France. Drawing M. Azéma (2002: tab. 12).

to this provides the great advantage of containing several hundred photographs decomposing the paces and attitudes of most of the animals concerning us here or their descendents. The establishment of reference plates according to speed and to animal in these photographs has served to determine precisely a good number of movements on the cave walls, but also to determine the voluntary deformations, sometimes aberrant, in relation to the real movements, suggesting the existence of graphic conventions throughout the Palaeolithic and much closer to us.

THE GRAPHIC TREATMENT OF SPEED OR PACE

The graphic reproduction of rapid movements, especially different speeds, has always presented problems for artists, up to the advent of photography (followed by chrono-photography and cinematography). The invention of photography especially demonstrated “that the representation of the horse since Antiquity has been sometimes correct for trotting and jumping, but rarely for the walk and never the gallop” (Ricard 1988: 375). The analysis of the different speeds represented suggests to us the establishment, from the beginning of the Upper Palaeolithic, of a system of graphic conventions (Fig. 5) reflecting the physiological limits of the visual perception of the artists. We define five categories characterising the slow paces (conventions I and II) and the rapid paces (conventions III to V).

Convention I designates walking. In general, a front leg is raised forward, flexed or not, and the other legs are placed in a straight position on the ground (vertical extension). In convention II, the animal has two legs, either lateral or diagonal, placed on the ground, the legs of each pair spread in a “scissors” position, as when walking or trotting. Convention III is the most frequent. It resembles a kind of departure into a gallop or a suggestion of rearing up (two back limbs set on the ground). The front of the trunk is not raised high but sometimes attains the position of rear-

ing. This latter attitude is especially observed for the horse and the ibex, but more surprisingly for a mammoth at Pech-Merle (*Frise Noire*). The existence of convention IV, defined by one leg placed on the ground (with the three others in clear extension), is problematic as the cases observed are rare (one to two figures for each species). We would tend to include it in the following category. Convention V corresponds to a phase of idealised suspension of the gallop or jump called “flying gallop” by art historians. It is characterised by a strong extension of the legs to either side of the trunk (this extension is sometimes asymmetrical). For most of the quadrupeds represented, this phase does not exist in reality; the legs are gathered under the body at that moment. However, felines run in this manner. Through a graphic artifice, the synecdoche⁸, often employed in Palaeolithic art, convention V is defined by the lone presence of the front legs in extension while the hindquarters are not represented. An extreme case, when the legs are not present, the synecdoche expresses locomotion by the simple artifice of a mane blowing in the wind or the forward tension of the neck and head. It is used in this way and repeatedly at Chauvet: the aurochs and the horses of the *Panneau des Chevaux* are running away, head forward. In the *Grand Panneau de la Salle de Fond*, a herd of bisons seeks escape from some twenty lions and lionesses chasing them, represented only by their heads; the legs in running extension are represented on only two individuals. This process occurs sporadically on other sites (Lascaux, Mayenne-Sciences...) and especially in objects tending towards the schematic.

These graphic conventions were used in animal images in all regions and all periods of the Upper Palaeolithic. However, nuances are observable, such as the flexing of knees, the more or less good coordination of the legs together, their combination with the movement of other parts of the body (mane, open mouth, raised tail). They

8. The synecdoche designates any “process of style which consists of taking the part for the whole [...], the whole for the part, the genus for the species, the species for the genus” (Petit Larousse). In the present case, a member in extension, isolated, symbolises running.

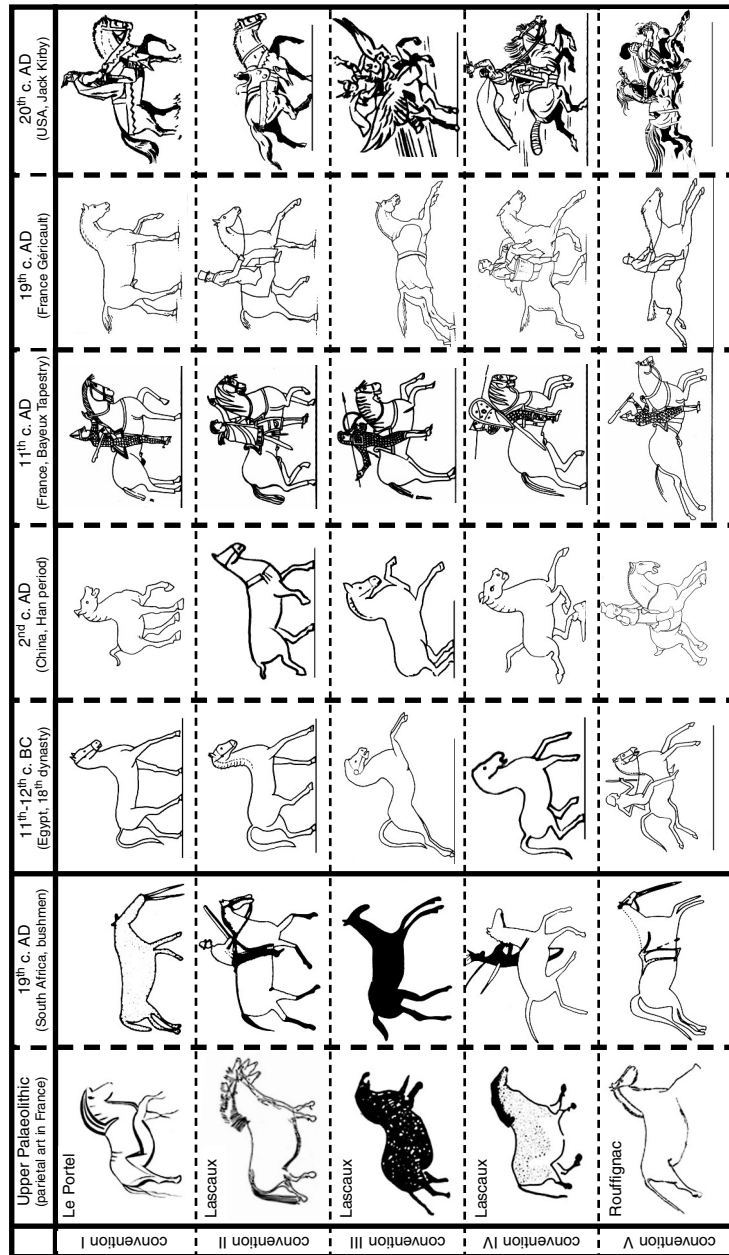


Fig. 5. — The five conventions used in the treatment of different speeds, from Prehistory to the present (examples of horses). From left to right and from top to bottom: Upper Palaeolithic, Le Portel (drawing H. Breuil in Breuil & Jeannel 1955); Lascaux (drawing A. Glory and drawing A. Leroi-Gourhan in Leroi-Gourhan & Allain (dir.) 1979); Rouffignac, drawing C. Barriere (1982); 19th c. AD, another form of rock art, paintings from Contact, drawing *Rock Art Research Unit* (in Clottes 2000: fig. 70); 11th-12th c. BC, drawings M. Azéma after photographs of Egyptian paintings (in Michalowski, Corteggiani & Roccati 1994: figs 450, 455, 465, 523, 541); 2nd c. AD, drawings M. Azéma after photographs of Chinese paintings and statues (in Watson & Rey 1997: figs 52, 340, 344, 354, 911); 11th c. AD, drawings M. Parisse (1983) from the Bayeux Tapestry; 19th c. AD, drawings M. Azéma after drawings and paintings of Géricault (in Chenique 2002); 20th c. AD, drawings J. Kirby taken from comic books *Thor and Silver Surfer* (Lee & Kirby 2001, 2002).

Note: the images are all oriented in the same direction, in right profile.

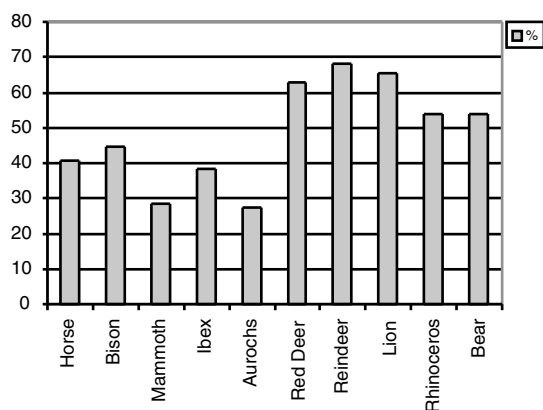


FIG. 6. — Percentages of figures in movement in the main themes of parietal art in France.

depend also on the degree of realism and the style of the figures. These conventions are found (Fig. 5) in all periods of art history, as seen in a few examples reflecting the development of graphic arts (Egyptian art, Chinese art of the Han period, Bayeux tapestry, equestrian paintings of Gericault...) They still exist today in spite of our knowledge of biomechanics and the knowledge gained from rapid cinematography; many artists continue to use these “universal” conventions, particularly in cartoons and animated films.

ANIMATION, A COMBINATORY PROCESS

After studying the different parts of the body in movement, it was necessary to look at the whole animal in order to observe how these movements could possibly combine.

A. Leroi-Gourhan (1974: 385-388) distinguishes four categories of animation: none, symmetrical, segmental and coordinated. We have simplified this typology by limiting it to two significant divisions: segmental animation and coordinated animation. We have ruled out the concepts of no animation (we prefer to speak of “immobility”) and symmetrical animation (too restrictive, this category is characterised just by the symmetrical extension of the legs on either side of the trunk). For us animation is “segmental” when it concerns only one part of the body, legs or other. It is “coordinated” when two or three parts of the

body are in movement; the legs are not necessarily present, contrary to Leroi-Gourhan’s definition which determines this category according to the disposition of the legs.

According to our calculations, segmental animation is less frequent than coordinated animation for the majority of animals (Fig. 6): horse (36% against 64%), bison (35/65%), ibex (28/72%), aurochs (32/68%), rhinoceros (45/55%). The two percentages are almost equal for the lion (51/49%) and the reindeer (47/53%), and this tendency is reversed for the red deer (55/45%), the bear (57/43%) and above all the mammoth (64/36%). For the last two, the artists emphasized the animation of the head which they probably considered to be the most dynamic part of a silhouette which was somewhat heavy in appearance.

In segmental animation it is especially the head that comes into play, as it is the corporal element that is most often represented. Coordinated animation associates two parts of the body, preferentially the head and the legs, rarely three. The importance of segmental animation for the lion images may be seen especially in the synecdoche employed for most of the felines at Chauvet, which contains the majority of the great felines of parietal art.

Segmental animation is not an archaic process, contrary to A. Leroi-Gourhan (1974: 388), for whom coordinated animation indicated graphic progress; he especially associated it with Magdalenian art. Indeed, the distribution of segmental animation and coordinated animation remains constant throughout the Upper Palaeolithic and preserves the tendencies discussed above.

THE DECOMPOSITION OF MOVEMENT: BIRTH OF THE “ANIMATED DRAWING”

The Palaeolithic artists surprise us the most when they seek to formulate graphically the fourth dimension, that is, time. For this they would have developed two processes for breaking up movement: decomposition by superimposition of successive images and decomposition by juxtaposition of successive images (Azéma 1992b, 2005a,

2005b). Through computer-graphic and audio-visual techniques, these two processes can be explained in video images⁹.

The first process is the easiest to define (Fig. 7). It is reflected in an effect of increase in the parts of the body in movement (multiple contours). This generates a kind of “graphic blur” in the most naturalist representations such as a reindeer at Saint-Eulalie (Lot) or an ibex at the Abri du Colombier (Ardèche). The different versions of the head (up to five for the horses of the *Passage* and the *Nef* at Lascaux), the legs (eight on a bison of the *Secteur des Chevaux* at Chauvet, Fig. 8) and the tail (two to three on the bison of the *Sanctuaire des Trois-Frères*) are generally placed in positional opposition: legs set on ground/in extension, head raised/lowered, tail hanging/raised... This process is in evidence throughout the Upper Palaeolithic, on dozens of figures (53 that is 3.5% of the animated figures), all species together. They are found in Périgord (Lascaux), the Pyrénées (Trois-Frères, Gourdan, Massat), Quercy (Sainte-Eulalie) and the Ardèche (Abri du Colombier, Chauvet). But it is at Lascaux that we have counted the most, almost always equines (*Abside*, *Nef* and *Passage*). The Magdalenian objects (La Marche, Limeuil, La Madeleine) and the parietal art of the Iberian peninsula (Altamira, Foz Côa) provide other clear examples. Thus, the artists of prehistory, or at least certain individuals whose talents were above average, would have invented, or at least sensed, the modern concept of “animated drawing”!

The second process is more difficult to determine: the positions taken successively over time by the animal are juxtaposed and oriented in the same direction, following the principle of the single file. The hypothetical cases of the panel of the “Cerfs Nageant” at Lascaux (Prudhommeau 1984: 12) and the frieze of the *Rotonde des Chevaux* at Villars (Groenen 1997: 71-72) are not enough to validate this process in parietal art. However, the frieze of

felines at the cave of La Vache (Ariège) is convincing enough to confirm its existence at least for objects of the end of the Magdalenian (Fig. 9).

THE ETHOLOGICAL INTERPRETATION

SOME DETAILS

Many of these animated images reflect specific behaviour which ethology has helped us to understand and to define a list of “behavioural themes” by species. It was necessary to take the figurative environment of the animals in action into account, as in many cases the representation of a movement is conditioned by the proximity of other animated figures. The concept of “figurative environment” includes here that of “panel”, defined as a “well-delineated portion of the wall where several figures are disposed whose association appears intentional” (Roussot 1998: 40), and that of a “graphic ensemble”, when there appears to be a desire to group several panels together in the same zone of the cavern, as in the *Salon Noir* at Niaux or the *Salle des Taureaux* at Lascaux. As G. Sauvet (1993: 304) specifies, the notion “of a graphic ensemble, necessarily more subjective than that of a panel as it is already close to interpretation, enables the introduction of hypotheses relative to the structure of the Palaeolithic expression”.

According to our conventions, when the figurative environment contains no other animal of the same species, the animal represented in movement is said to be “socially” isolated. On the other hand, we distinguish “simple” assemblages and “complex” assemblages. Ethological interpretation leads to qualifying the former as “interactions” rather than “scenes”, these assemblages having two individuals, and the latter as “groups” as they contain at least three individuals and potentially reflect a social organisation. In ethology, the notion of interaction characterises the relation between two individuals. It is preferable

9. A video presenting these decompositions of movement, kinds of “recompositions” of mental images of prehistoric peoples, may be viewed on the internet site: http://www.passesimple.net/rockart_azema.htm and on the DVD attached at this volume.

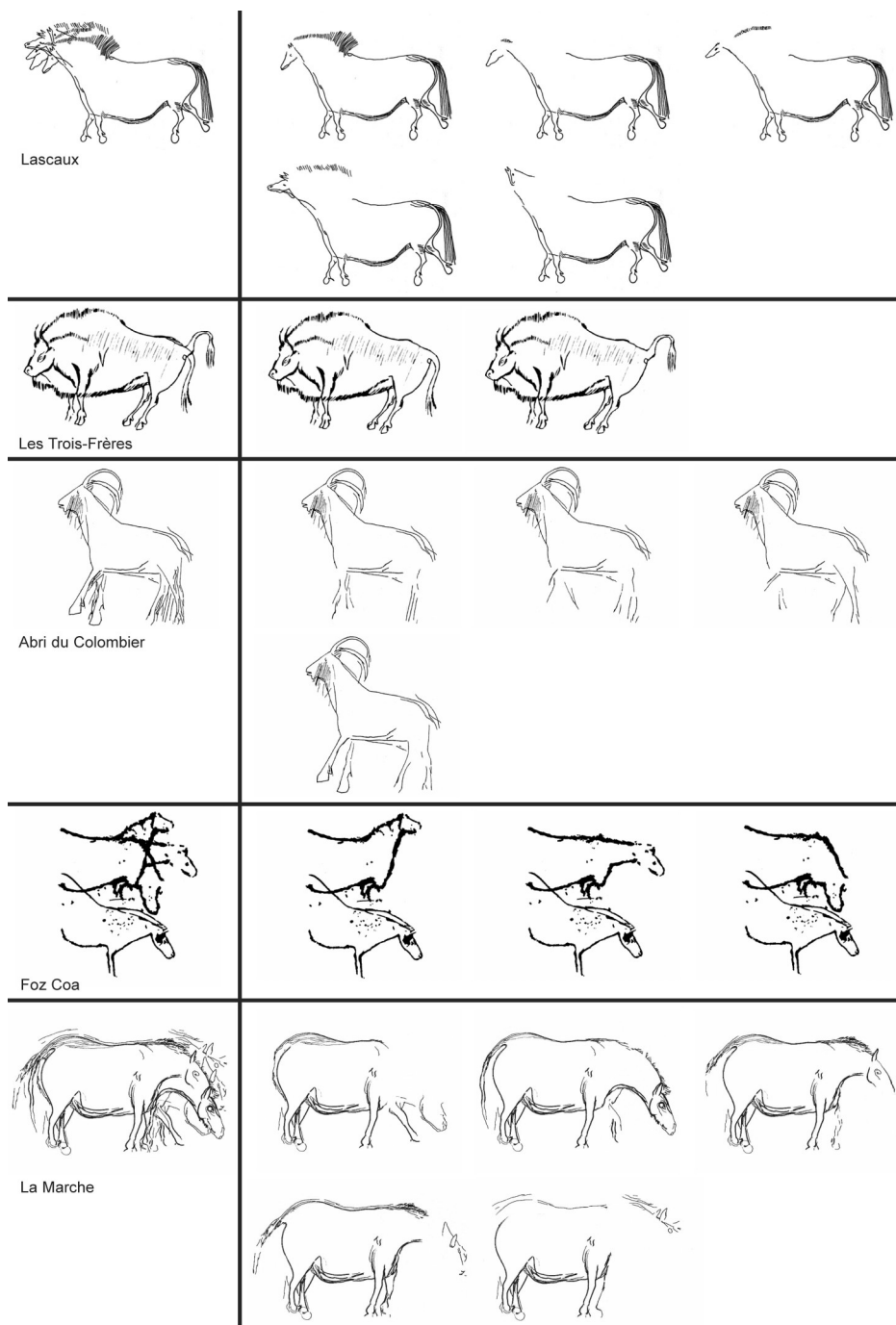


FIG. 7 — The decomposition of movement by superimposition of successive images in parietal art in France: Lascaux (after A. Glory in Leroi-Gourhan & Allain (dir.) 1979); Les Trois-Frères (after H. Breuil in Bégouën & Breuil 1958); Abri du Colombier (after P. Ayrolles). Comparison with the open-air art of Foz Coa (after Baptista and Gomez in Baptista 1999) and objects from La Marche (after L. Pales in Pales & Tassin de Saint-Péreuse 1981).



FIG. 8 — The bison with eight legs at the Chauvet cave (*Niche du Panneau des Chevaux*, right wall). Photograph Ministère de la Culture et Communication, Direction régionale des affaires culturelles de Rhône-Alpes, Service régional de l'archéologie.

to that of “scene” which by definition takes on a dramatic character: used for parietal art, this term signifies “presentation which represents something interesting, extraordinary, moving” (Petit Larousse dictionary). To us, most interactions described somewhat hastily as “scenes” have nothing “extraordinary” about them and are rather more anecdotal in relation to the life cycle of the animals represented. We prefer to reserve the term “scene” to the assemblages that are truly “dramatic”, when the organisation of the figures and their integration in the underground space define a veritable “scenography”, as is the case for example in the *Grand Panneau* of the *Salle de Fond* at Chauvet or the Great Ceiling at Altamira.

Our interpretation is based particularly upon the most coherent graphic ensembles, those for

which the probability of a simultaneous execution of the figures is assured. We are thinking of the *Salle des Taureaux* at Lascaux, of the *Panneaux des Lions* at Chauvet (*Salle de Fond*), of the *Salon Noir* at Niaux and the *Grand Plafond* at Baume-Latrone, even if we cannot exclude, in theory, phases of re-painting (re-activations? re-touching?) spread over millennia, as is the case for the *Frise des Mégacéros* at Cognac. Examination of compositions which are much more complex such as that of the *Sanctuaire* at Trois-Frères or the *Passage* at Lascaux demand much more caution because of the dense superimposition of dozens, even hundreds, of representations and the oldness of drawings which are often incomplete (the omission of one or more figures can distort or even falsify our interpretation).

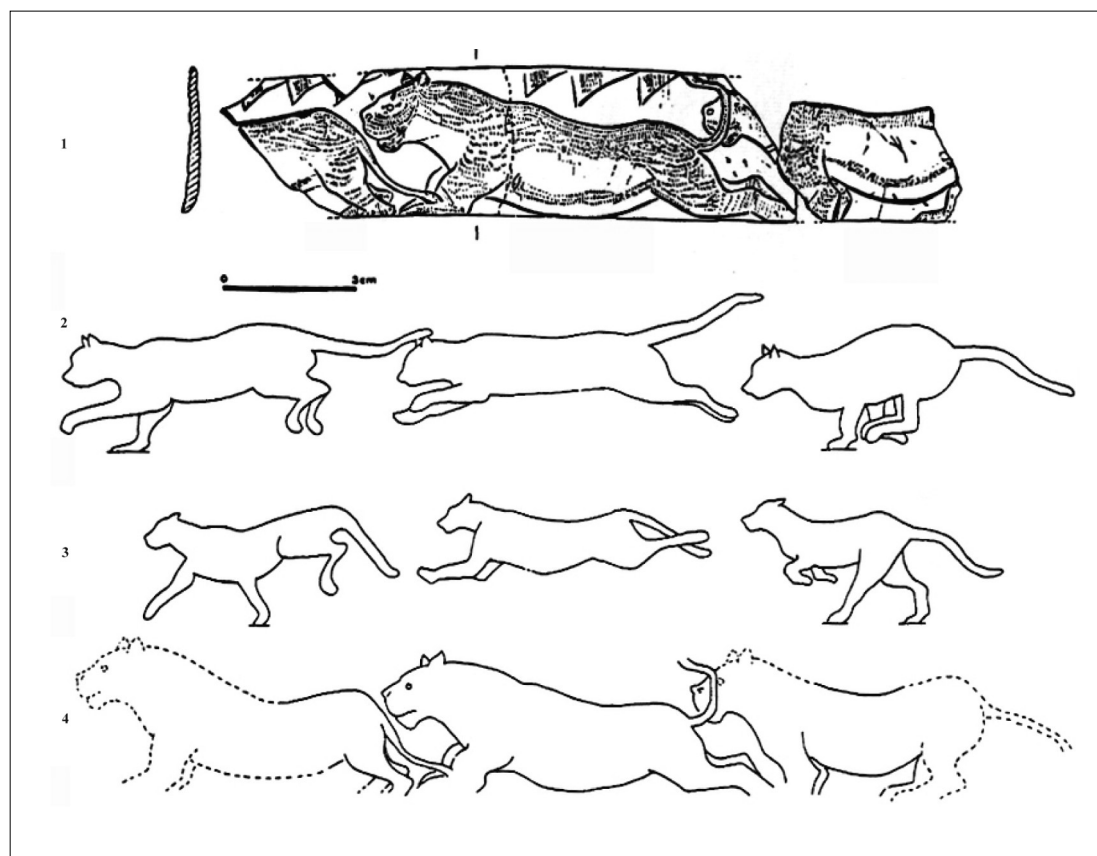


FIG. 9 — Decomposition of movement by juxtaposition of successive images in parietal art in France : *Frise des Lions* at La Vache (1 : ox rib) with decomposed movement of a cat (2) and a leopard (3); proposed reconstitution of the frieze (4) (sketch D. Buisson in Buisson & Delporte 1988 and drawing M. Azéma in Azéma 1992).

It is adult individuals that seem to be represented for the most part on the cave walls and in movement. Identifiable more by their characteristic proportions than by insignificant differences in size in parietal art, the young individuals depicted are few: 6 for the horse, 4 for the bison, 6 for the aurochs, 5 for the mammoth... However, it must be understood that the distinction between young male and adult female often remains impossible, the case for several ibexes (Baffier 1984: 147). When possible, sexual determination of these figures shows a very clear majority of males. For lack of other evidence, this determination is based on the secondary sexual characteristics which are almost nonexistent for

certain species, and not the least important (horse, mammoth).

Concerning the bison, our count for France, 67% males, agrees with that of J. Clottes (1994a: 26; 41) who counted in the Ariège 68% males: "the males are thus in a proportion of more than two for one female". This statistical fact is of capital importance as it contradicts one of the foundations of A. Leroi-Gourhan's theory (for the interpretation of parietal art) which presents the bison as a particularly female sexual symbol; if this is the case, why represent twice as many individuals of the opposite sex?

The presence of certain secondary sexual characteristics (antlers for the red deer stag...) would

tend to prove that for the most part the animals are depicted in full maturity, in the spring or summer months or in the autumn. On this point (seasonality), we agree with the conclusions of N. Aujoulat (2004: 194) in reference to the animals of Lascaux: "the analysis of indications of seasonality establishes that each species represented at Lascaux corresponds to a definite calendar period. The horses mark the end of winter or the beginning of spring, the aurochs full summer, while the stags are depicted with the attributes of autumn. This is not fortuitous. Each of these species has been represented at a particular phase of the annual cycle, that of the mating season". This statement, made in parallel to our research, is fundamental as we will see later (gatherings related to the rutting season).

But it may also be presumed that the representation of the most spectacular anatomical attributes, having reached the maximum of their development (accentuation of the fetlock and of the line of the withers, presence and form of antlers, horns and tusks), serve not only to determine sex, age or a precise period of the year (cf. Crémadès & Bonnissent 1993; Dubourg 1994). It should also facilitate recognition of the different species.

A MAJORITY OF "REACTIVE" OR "AGGRESSIVE" ANIMALS

How may the different types of behaviour be classified? In the present state of our reflection, we have opted for a classification of behavioural themes in three main categories: "non-aggressive behaviour", "aggressive behaviour" and "hunting behaviour". This division takes the form of a list by species (Table 2: example of the bison) and takes account of the degree of mobility of the animal by distinguishing "stationary attitudes" and "moving attitudes".

Distinguishing behavioural themes according to the absence or lack of aggressiveness may appear a little simplistic but we think that it would be

even more risky and disputable to classify them according to the three main categories fixed by ethologists ("social behaviour", "feeding behaviour" and "reproductive behaviour"¹⁰). In fact there are many themes which could enter into two categories at a time or even all three. For example, for the bison, the conflicts between males reflect social behaviour as much as reproductive behaviour; they serve to establish a social hierarchy within the group (social behaviour) but usually occur at times of large gatherings for the rutting season (reproductive behaviour). Moreover, certain postures related to eating (feeding behaviour) are part of the behavioural range of a male in a situation of confrontation (social and reproductive behaviour): after a combat or to avoid one, the dominated animal sometimes grazes (Lott 1978). This attitude, isolated on the wall of a cave, could thus be classified in one or the other category.

The recognition of certain themes has led us to establish a category entitled "hunting behaviour". We agree with A. Leroi-Gourhan (1984a) who groups together in this way "the details of hunting character observed by the hunter: animal wounded or falling into empty space, or slumping into empty space, or with slumped head and four legs or still charging". We are limited to the attitudes provoked in principle by a hunting act of human origin (fall, slumping or tilting back) and sometimes involving the presence of signs indicating projectiles or impacts ("arrows", "wounds", "angular" or "barbed" signs according to the typology of D. Baffier (1990).

The first piece of information provided by our repertoires: the stationary attitudes (60%) are more numerous than the attitudes in movement (40%). Second piece of information: "aggressive" or "pseudo-aggressive" behaviour (61.3%) predominates over the "non-aggressive" behaviour (29.8%) and the "hunting behaviour" (8.9%), except for the mammoth and the horse (Fig. 10).

10. Certain ethologists integrate reproductive behaviour into social behaviour. This is not illogical as the combats between males also serve to establish a social hierarchy within the group and occur at the moments of the great gatherings of the mating season.

TABLE 2. — The behavioural themes of the bison in parietal art in France (« I » = interaction ; « ? » = uncertain).

Stationary attitudes	Non-aggressive behaviour		Aggressive behaviour		Hunting behaviour	
Stationary attitudes	listening, attentive	49 (4 ?)	alert	10 (1 ?)	wounded	6 (1 ?)
			breathing hard	2		
	listening (<i>l</i> : <i>mutual observ.</i>)	8	calling or lowing	7 (1 ?)	wounded (<i>l</i> : <i>hunting</i>)	1
	listening (<i>l</i> : <i>mutual observ.</i>)	2	agitated	26 (3 ?)	slumping	1
					slumping, wounded	7
	listening (<i>l</i> : <i>mutual sniffing</i>)	1 (1 ?)	femelle in heat	5 (4 ?)		
	listening		femelle in heat		lying down, at rest?	2
	(<i>l</i> : <i>sniffing, maternal behav.</i>)	3	(<i>l</i> : <i>pré-mating</i>)	4 (2 ?)	lying down, dead ?	7
			excited male (<i>l</i> : <i>pre-mating</i>)	2		
	listening (<i>l</i> : <i>pre-mating</i>)	1	male, tongue out	6 (1 ?)	knocked down	2
			male, erect penis	3 (1 ?)	falling	1 (1 ?)
	feeding	3	male, erect penis			
			(<i>l</i> : <i>pre-mating</i>)	1		
	giving birth	1				
			pawing the ground	6 (3 ?)		
Moving attitudes			threatening	4		
			on the defensive	17 (4 ?)		
			sniffing			
			(<i>l</i> : <i>meeting, intimidation</i>)	2 (2 ?)		
			agitated (<i>l</i> : <i>confrontation</i>)	5 (2 ?)		
			head to head			
			(<i>l</i> : <i>confrontation</i>)	2 (2 ?)		
			threatening (<i>l</i> : <i>confrontation</i>)	1		
			on the defensive			
			(<i>l</i> : <i>confrontation</i>)	6 (3 ?)		
			rearing ?	1 (1 ?)		
	walk or trot	15	walk, calling	2	walk, wounded	2
	walk or trot, listening	9	walk or trot, tongue out	2		
	walk, feeding	1	walk or trot, excited	2 (2 ?)		
			(<i>l</i> : <i>pré-mat.</i>)			
			walk or trot, agitated	6		
			walk or trot, agitated			
			(<i>l</i> : <i>confrontation</i>)	1		
			walk or trot, agitated			
			(<i>l</i> : <i>meeting, intimidation</i>)	4 (3 ?)		
			gallop	15	gallop, tongue out, suffering?	1
			gallop, head high (alert?)	21		
			gallop, calling	1		
			gallop, agitated	25		
			gallop, tongue out	4		
			gallop, agitated or excited	1		
			gallop, excited (<i>l</i> : <i>pre-mating</i>)	1		
			gallop, erect penis	3		
			gallop, agitated			
			(<i>l</i> : <i>meeting, intimidation</i>)	6 (1 ?)		
			gallop (<i>l</i> : <i>intimidation</i>)	1		
			charging	10 (3 ?)	charging (<i>l</i> : <i>hunting</i>)	1
			charging (<i>l</i> : <i>confrontation</i>)	6 (1 ?)		
			falling (<i>l</i> : <i>confrontation</i>)	1 (1 ?)		
Total		93 (5 ?)		222 (40 ?)		31 (2 ?)

The “aggressive behaviour” category is nevertheless very delicate to define. The truly aggressive themes are related to the male sex and their hierarchical battles in the rutting season (social and reproductive behaviour). They are limited to acts of light aggressiveness: behaviour for leading the herd, threatening, avoiding or defensive postures. Acts of open aggression (confrontation¹¹, submission) are rarer. This corresponds to the reality of animal behaviour where combat is the last course of action. The most evident representations are visible at Roc-de-Sers (ibex), Trois-Frères (bisons of the *Panneau des Petits Bisons*, Fig. 11, n° 7, 8) and Chauvet (Mammoths Raclés, Fig. 12, rhinoceros of the *Panneau des Chevaux*, Fig. 13).

After much hesitation, we have integrated into this category the manifestations of nervousness or excitement: roaring for the lion (Labastide, Chauvet, Baule Latrone...), trumpeting for the mammoth (Grotte du Cheval at Arcy-sur-Cure, Fig. 14), raised arched tail for the bison (Les Trois-Frères, La Mouthe...) rearing for the horse (Lascaux, Les Trois-Frères...), etc. They foreshadow in many cases future interactions of combat (especially when the image is placed near confrontations). There are also the alert postures which often precede a reaction to the attack of a predator. By deduction, we have associated with them the rapid displacement (trot or gallop) which makes up the main part (89.4%) of the paces listed in this category. Even without any sign of aggressiveness, they evoke flight in general, behaviour related to a stimulus or a danger exterior to the group.

Logically, slow displacements represent 87.8% of the paces found in the “non-aggressive behaviour”: the animals move without any apparent nervousness. This category includes the themes related to listening and social interactions: obser-

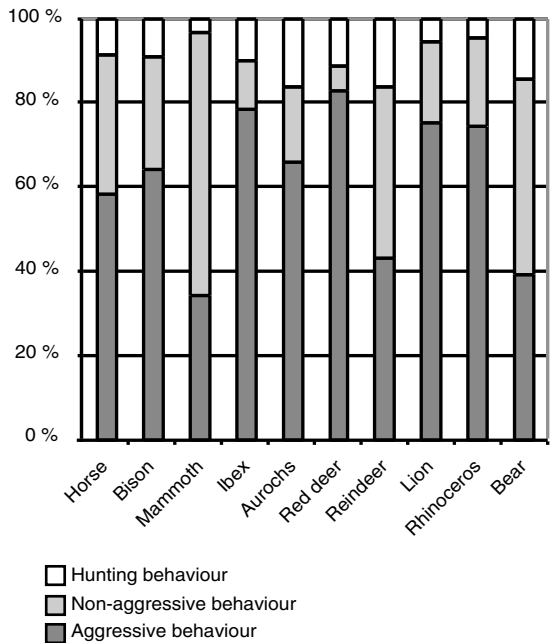


FIG. 10. — Distribution by percentage of categories of behaviour, “aggressive behaviour”, “non-aggressive behaviour” and “hunting behaviour” of the animals depicted in parietal art in France.

vation or mutual sniffing (horses of Combarelles I, bisons of the *Salon Noir* at Niaux), greeting as at Rouffignac where several mammoths face each other shaking their trunks (these postures are characteristic of great moments of social agitation among elephants today, Fig. 15).

To all appearances, feeding behaviour is rarely depicted: “grazing” horses of Marsoulas and Roc-aux-Sorciers at Angles-sur-l’Anglin, a “drinking” reindeer at Combarelles (Fig. 16). But it is very likely that a good number of the herbivores represented as stationary or walking, with the head more or less inclined and the mouth open (and

11. A.C. Welté (1975, 1976) studied the theme of confrontation in prehistoric art. She used it to designate two animals of the same species, identical in style and workmanship, represented face to face, at the same level and no more distant from each other than a space less than half the sum of their lengths. But within the framework of our research, the term confrontation will not be employed except when the aggressive character of the face-to-face between two animals or two groups of animals is indisputable.



FIG. 11. — Les Trois-Frères, *Sanctuaire*, panel of the "little sorcerer with musical bow": emphasizing the bisons in movement (in black). After the drawing of H. Breuil (in Bégouën & Breuil 1958; fig. 62). The dotted-line circle indicates that the "females in heat", no 1, 2, 5, are in the centre of the composition, as at Altamira (Fig. 13) and accompany the famous "sorcerer with the musical bow"; the excited female no 6 is slightly off-centre, to the right.

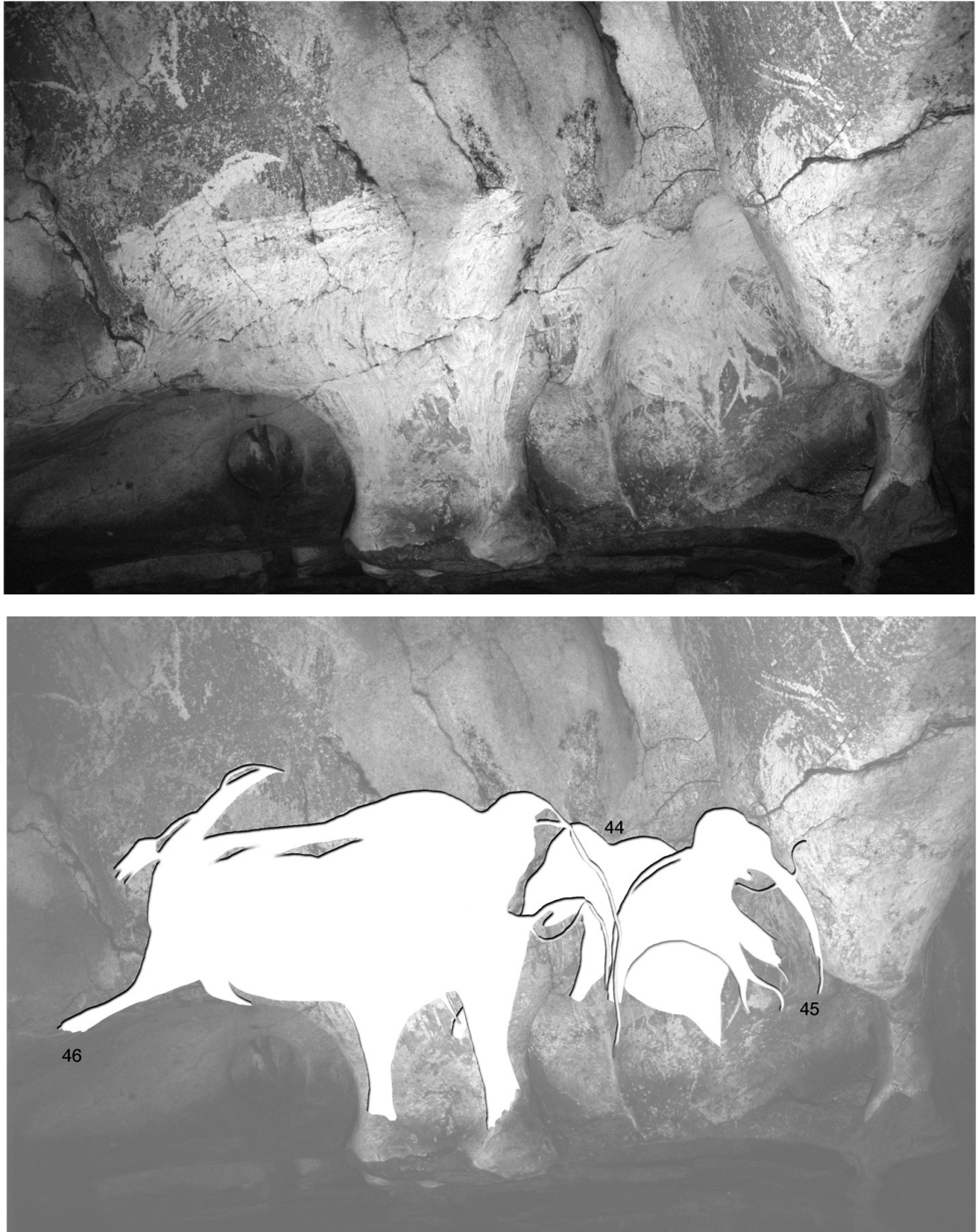


FIG. 12. — Example of aggressive behaviour: mammoths in confrontation in the *Panneau des Mammouths Raclés* at the Chauvet cave (in order of placement). The interaction between the three individuals expresses a common agitation, the telescoping of the largest ones (n° 44 and 46) and the flight of the smallest: combat between males, violent games between young animals? Sketch B. Gély and M. Azéma (2005: figs 37a, 37d).



FIG. 13 — Example of aggressive behaviour: rhinoceroses in confrontation in the *Panneau des Chevaux* in the Chauvet cave. Drawing C. Fritz and G. Tosello (2000: fig. 1).



FIG. 14 — Example of an agitated or threatening animal: a mammoth trumpeting in the Grotte du Cheval at Arcy-sur-Cure. Drawing A. Leroi-Gourhan (1965: fig. 546).

the trunk curled for the mammoth), without apparent nervousness, are in the process of feeding. It is also possible that some are dozing or ruminating.

Reproductive behaviour is reduced to a few situations of pre-mating, not always easy to define and absent from the repertoire of the mammoth, the rhinoceros and the bear. The best known is that of the clay bisons of Tuc d'Audoubert (the vulva of the female is modelled). There also other "couples" depicted in a similar situation: bisons (Fig. 17) at Pergouset (sniffing comparable to Tuc d'Audoubert), lions in the *Salle du Fond* at

Chauvet (the female is rubbing against the male), reindeer at Combarelles I (the two partners are sniffing noses)...

No coupling has been identified with certainty, at least not in France. The only two cases possible, related to horses (La Chaire-à-Calvin, Font-de-Gaume), are problematic. However, in Portugal, one of the engraved rocks of Foz Côa depicts what is very probably a coupling scene (Fig. 7). In Spain at Altamira a mating of bisons has been reported (Freeman & Gonzales Echegaray 2001: figs 69; 70).

This near-absence of a mating scene presents a problem. Was it a taboo? The act of copulation is not depicted in an explicit manner, certainly (except for perhaps some human images at Enlène and La Marche), but representations of the male member in erection and of vulvae exist, as much in parietal art as among the objects. The attention of the artists appears more focussed on the moments preceding the sexual act, on other (indirect) manifestations of sexual behaviour, for example the tongue protruding or the raised arched tail for bisons (*Sanctuaire des Trois-Frères*, Figs 7; 11), the bell of stags (axial diverticulum at Lascaux), the tail lying flat on the spine for male ibexes (*Grand Plafond* at Rouffignac).

The expressions of maternal behaviour are even less frequent. Let us note two significant inter-



FIG. 15. — Example of social interaction without aggression: mammoths greeting each other in the Rouffignac cave. Drawing C. Barrière (1982: fig. 301).



FIG. 16. — Example of feeding behaviour: "drinking" reindeer at Combarelles I. Drawing C. Barrière (1997: fig. 360).

actions. In the cave of Bigourdi (Lorblanchet & Ipiens 1984: fig. 2), a female reindeer nurses her fawn. At Portel, there is a "clearly maternal scene" (Clottes et al. 1994a: 32): a female bison sniffs her young watched by an attentive "very old male" (Breuil & Jeannel 1955: pl. XXIII). Hunting themes are in the minority, especially for the animals most dangerous to humans: the lion (5.1% of the animated figures), the mammoth (3.17%) and the rhinoceros (4.2%). They are a little more frequent for the other species, the

percentage varying between 8.3% (horse) and 16% (aurochs) as though the artists had preferentially "marked" or depicted in appropriate postures (animals slumped, lying down, falling, spitting blood or bleeding from the anus) the herbivores which they hunted or were in contact with. The "Magic of the Hunt" cannot explain Palaeolithic art in its entirety; however, to consider the rareness of wounded or dead animals enough to set aside this old theory would be a fundamental error, as hunting would have led humans to select, in the best of cases, the individuals which were less dangerous, the wounded, the young or the old, to avoid confrontation with the more vigorous animals, and certainly not to kill a whole herd. For that matter such behaviour may be observed among present-day great predators such as the Tanzanian lion: "When female lions go for a herd, they encircle it and harass it in order to isolate the most vulnerable animals" (Denis-Huot 1991: 40). If we propose the hypothesis that the artist wanted to depict such behaviour on the walls of the caverns, it becomes logical that the signs indicative of hunting are associated mainly with a minority of figures in the panels, that is, females and young animals, in other words the weakest individuals of the herd, as is the case in the *Salon Noir* at Niaux: for example, an ibex, young or female (Fig. 18), falls



FIG. 17. — Example of pre-mating: bison couple at Pergouset. Drawing M. Lorblanchet (2001: fig. 62).



FIG. 18. — Example of wounded and “pierced” animal: ibex at the Salon Noir de Niaux. Drawing H. Breuil (1950: fig. 11).

forward, hit by long “lines” (spears?) in the chest (heart) and on the back, fatal points well known by hunters of such game (Grange & Lepeudry 1997: 13).

The content of certain assemblages tends to mitigate our statement, particularly the *Panneau des Rennes* at Trois-Frères (Bégouën & Breuil 1958: figs 70; 71) where most of the deer are wounded or dead. But this “scene”, unique in parietal art, could illustrate a more “massive” hunting technique specific to this type of game: hunting by beating known to the Inuits (Bobard 1987: 139-144). This hunting practice implies the participation of all the tribe, youths and children included. It involves directing the reindeer herd through natural passages or camouflaged walls towards a place where they are easy to kill, for example a large circular enclosure of the Tikkeragmiut of Point Barrow in Alaska (*ibid.* : 144). Once in this place, the animals are enclosed or killed on the spot. It is perhaps this tragic moment in the life of Upper Palaeolithic reindeer that is represented at Trois-Frères but no enclosing wall is depicted. This is not surprising because, as we stated in the introduction to this article, prehistoric artists never represent man-made structures or landscapes. We may presume that the hunters of the time used other forms of enclosure or a complex arrangement of traps

leading to the massive capture of individuals in places which were naturally closed.

A MAJORITY OF “SOCIALLY INTEGRATED” ANIMALS
The study of the figurative environment of the animals represented in movement shows that these figures are rarely isolated and that they tend to group together by species. This phenomenon, which we call “social integration”, reflects the more or less gregarious behaviour of the main representatives of these animals.

Moreover, examination of the most readable parietal assemblages proves that the behavioural themes are associated between themselves in a logical manner (see supra: “thematic convergence”) within groups or herds which can reach several dozen (mammoth at Rouffignac, rhinoceroses at Chauvet) or hundred head (bisons at Niaux or Trois-Frères, horses at Lascaux), herds which are smaller (red deer at Lascaux, ibexes at Angles-sur-l’Anglin, lions at Chauvet) or just “families” (bears at Chauvet).

GATHERINGS RELATED TO THE MATING SEASON AND SEASONAL DISPLACEMENTS

In the mating season the gregarious species are much less vigilant, thus it is easier to approach them, observe them or hunt them. This explains the presence near the males of females sometimes accompanied by young: this is the case for the herds of bison of the *Salon Noir* at Niaux (Clottes 1995: fig. 143, n^{os} 129-130) and those spaced along the Galerie Breuil at Portel (Breuil & Jeannel 1955: pl. XXIII) each of which integrates at least one interaction of maternal nature (female sniffing her young one). Another example, at Angles-sur-l’Anglin, within the herd of ibexes moving “during the autumn migration” (Iakovleva & Pinçon 1997: 128), a female ibex is depicted watching over her young one (*ibid.*: figs 77-81).

Other remarkable assemblages are evidence of thematic convergence clearly referring to the mating season and the preliminaries to mating: nervous or excited males, females in heat, confrontations... The most convincing is a herd of bisons depicted in the panel of the “little sorcerer with the musical bow” at the cave of Trois-Frères.

This is one of the densest panels in the *Sanctuaire* (Fig. 11). Around the composite being (“sorcerer”), there are at least 60 animal figures, including 32 bisons. Twenty-three are animated and arranged in sub-groups.

The “female in heat” theme is depicted four times (Fig. 11; n^{os} 1, 2, 5, 6). This is characterised by the tail carried very high and brought forward, revealing the female genital orifice (Fig. 19), an exceptional occurrence in Palaeolithic art, on n^o 2 (Vialou 1986: 141). These images are situated to the right of the “sorcerer”, that is, in the centre of the composition, as though to justify the excitement of the males around them. Thus the right part of the panel shows at the top a male “charging” (n^o 12) in the direction of another male, apparently knocked down (n^o 13). A little lower, there is another male “charging” (n^o 10) an adversary on the “defensive” (n^o 11): the latter has a lowered head, the front legs are stretched out in front and the tail whips the air nervously. Finally, at the bottom, two larger males (n^{os} 7, 8) are in a situation of “confrontation”. This direct confrontation is one of the most violent in parietal art (Fig. 20). This dramatic progression from above to below, from the first aggressive manifestations to frontal combat, deserves to be signalled out. Moreover, the two bisons “cross each other” (n^{os} 15, 16), situated just above the “sorcerer”, providing a sort



Fig. 19. — Les Trois-Frères, *Sanctuaire*, panel of the “little sorcerer with musical bow”: female (n^o 2) in heat. Exceptionally for Palaeolithic art, the genital orifice is depicted. Drawing H. Breuil (in Bégouën & Breuil 1958: fig. 62).

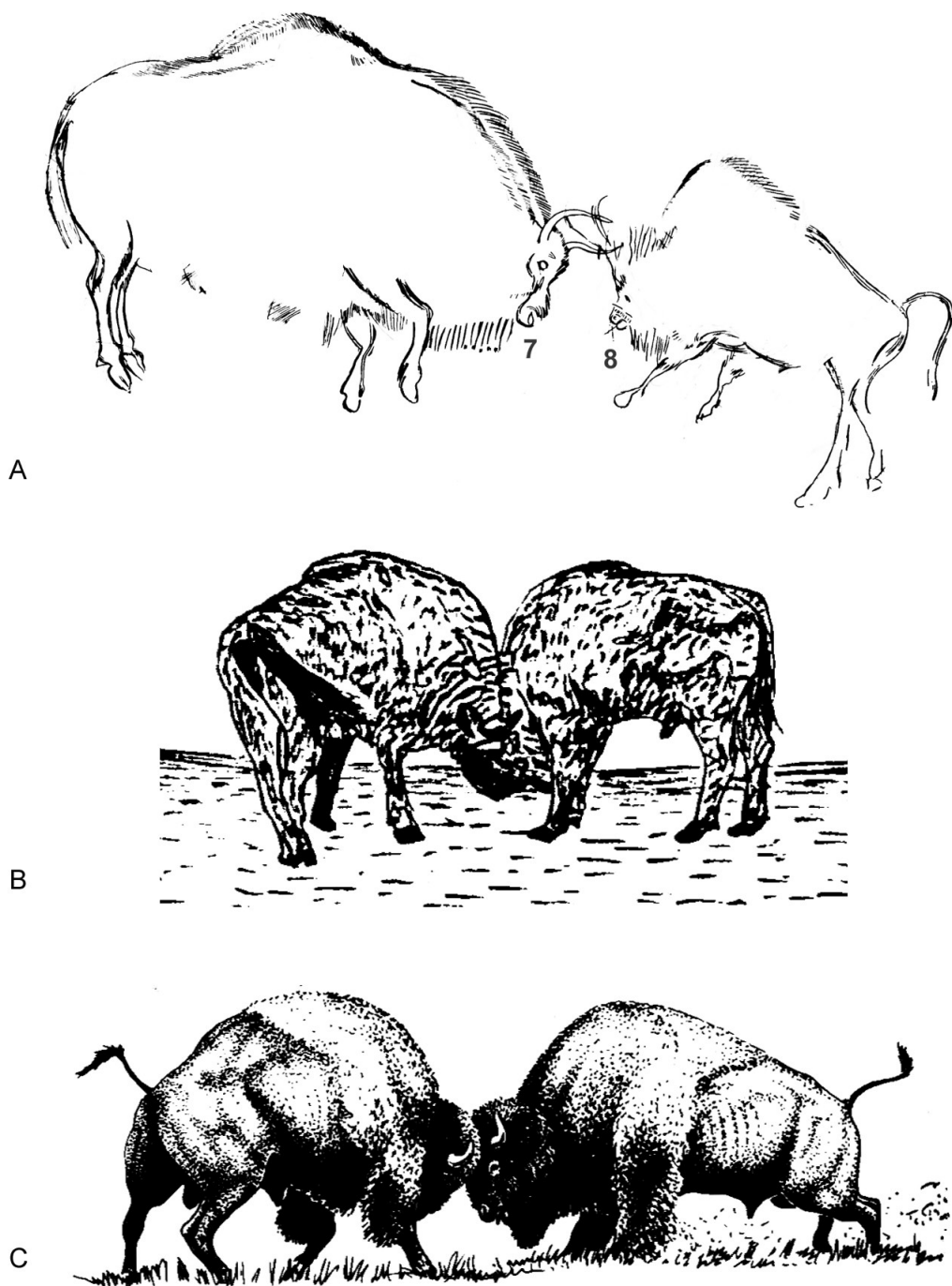


FIG. 20. — **A.** Les Trois-Frères, *Sanctuaire*, panel of the “little sorcerer with musical bow”: bison in confrontation, n° 7 being the dominant one. Drawing H. Breuil (in Bégouën & Breuil 1958: fig. 62). Comparison with two drawings illustrating this behaviour in the European bison (**B.**), drawing A. Bouguin (1983: fig. 35) and in the American bison (**C.**), drawing J. Lalanda (in Rodríguez de la Fuente (dir.) 1984-1985: 1056).

of prelude to the confrontation below. They also provide a link, above left, with a group of males (sub-adults?) represented as chasing each other, very excited (n° 17-21) some “sticking out their tongues” (n° 18, 19). A little to one side, n° 3 also sticks out his tongue. He appears to wish to catch up with the group of excited young males, a least so that he is not driven back towards n° 11. The other themes detected in the panel show males which are just as aggressive, moving at the “gallop, overexcited” (n° 14, 23), “breathing hard” (n° 9: lines drawn in front of the muzzle indicating breathing) and “threatening” (n° 22). The latter, the largest with n° 7 (the dominant ones?), are almost in front of the “sorcerer” but appear to be looking towards the confrontation. By thus associating the key interactions and attitudes demonstrating the intense agitation of the bison at mating time, the artist was in all likelihood seeking to recount the “great social event of the year” as P. Paillet called it (1993: 119).

Let us jump to Spain, on the other side of the Pyrénées, to place this panel in parallel with the Great Ceiling at Altamira (Cantabria). Indeed, our ethological interpretation agrees with that of L.G. Freeman and J. Gonzales Echegaray (2001: 87-90) for one of the best known groups in cave art. As at Trois-Frères, the composition (Fig. 21) “faithfully reflects a common and recognizable association of animals in their natural context” (*ibid.*: 87): bison, deer and horses at Altamira; bison, horses, rhinoceroses and ibexes at Trois-Frères. In both cases, the bison are in the majority by far, with an equivalent number of males and females at Altamira, a higher number of males at Trois-Frères. They constitute a herd represented at the time of the mating season: “it is not only possible, it is absolutely certain!” (*ibid.*: 88). L.G. Freeman and J. Gonzales Echegaray also identify the attitudes as “characteristic and stereotypic for the mating season or at the least more frequent at this period” (*ibid.*).

There are for example excited males with arched back and raised tail (n° 14, 16a) and a lowing female in heat (n° 8). “The very disposition of the group is characteristic of a herd of bison at mating time” (*ibid.*). Indeed, for the European bison in the mating season, small groups of males who live the rest of the year apart, rejoin the mixed herds made up of one or several families, that is females with calves and immature males (MacHugh 1958). In these gatherings, which can number up to 50 individuals, the females tend to gather together in the centre, as at Trois-Frères and Altamira. L.G. Freeman and J. Gonzales Echegaray (2001: 88) saw this clearly on the Great Ceiling and added: “among the animals placed in the centre, four – of which at least two are visibly females [the udder is depicted] – are shown in the process of rolling in the dust and wallowing, behaviour typical of bison of both sexes during the mating season¹², and which can serve as an *activity of substitution* for the sexually excited animals [the themes “female in heat” and “male galloping with tongue out” represent the same behavioural state at Trois-Frères]. On the edges of the composition, male bison are turned towards the centre of the group as though defying the other males nearer the centre [as in the Ariège]. The battles between peripheral males and dominant older males [the *peripheral* male n° 1 charges the *dominant* male n° 2] are also typical, for cattle species, of behaviour at the moment of mating [at Trois-Frères, the dominant male n° 7 drives off the peripheral male n° 8]” (*ibid.*).

A last point of convergence between the two Magdalenian compositions: the presence of anthropomorphic figures. Seven in number (engravings) at Altamira, they appear to play a less important role (less conspicuous in any case) than at Trois-Frères where a single human (“sorcerer”) is depicted much more carefully. It is moreover at the centre of the “scene”, in association with

12. This behaviour is well known, especially in the males : to calm their excited state, the bulls “urine in their wallowing spots and roll energetically in them, striking the ground with their flanks and waving their legs in the air, indicating their presence by the dust they produce” (Paillet 1993: 119).



FIG. 21. — Altamira, Great Ceiling of Hall I. Drawing L.G. Freeman and J. Gonzales Echegaray (in Freeman & Gonzales Echegaray 2001 : fig. 10). The grey circle indicates that the "females in heat" (n° 5, 6, 8, 9, 1) are situated in the centre of the composition (herd) as at Trois-Frères (Fig. 11).

bisons (females in heat) and two composite animals (half-reindeer, half-bison) fleeing towards him and introducing a “supernatural” dimension to the whole panel of the “little sorcerer with the musical bow”.

Besides these two masterly compositions, other examples appear to us to demonstrate the predilection of the artists to represent gatherings related to the mating season or to the great migrations, moments of the year favourable to acquiring a maximum supply of meat for hunters (human or animal). These are: for the bisons, the *Panneau des Bisons* at Fontanet (Vialou 1986: fig. 14) and the *Salle des Petits Bisons* at La Mouthe (Breuil 1952): fig. 338); for the ibexes, the frieze of Roc-aux-Sorciers at Angles-sur-l'Anglin (Iakovleva & Pinçon) and its “equivalent” situated on the periphery of the *Grand Plafond* at Rouffignac (Barrière 1982: fig. 100, below left); for the stags, the “harem” at Massat (Barrière 1990: fig. 26) and the herds of rutting males at Lascaux (*Panneaux des Cerfs Nageant, Panneau des Cinq Cerfs...*); for the rhinoceroses, the herds of the *Secteur des Chevaux* and the *Salle du Fond* at Chauvet (Chauvet *et al.* 1995: figs 49, 81)... To a lesser degree, there are the impressive herds of horses, “kossiaks” and “tabouns” in the *Grande Frise* at Combarelles I (Barrière 1997: 78-82), in the nave and the passage at Lascaux, but the distinction between the sexes is impossible to establish for this species (Fig. 22).

If we look again at the animation aspect, we observe that a good number of these herds are moving about or moving forward at great speed. They are often going in the same direction even when different species are associated. Individual movements are substituted by group movements which form the dynamic keystone of the vault of the great friezes having one or two rows (*Salle des Taureaux* at Lascaux, *Grande Frise* at Combarelles I, *Grand Panneau de la Salle du Fond* at Chauvet) or circular compositions (*Grands Plafonds* at Rouffignac and Baume-Latrone). Thus, horses and aurochs are found side by side in the *Salle des Taureaux* at Lascaux or the *Panneau des Chevaux* at Chauvet.

These group movements express in a somewhat allegorical manner (gatherings of several species of herbivores) the intense activity of animals during mating preliminaries and/or collective flight; herbivores tend to economise their energy the rest of the time. The hypothesis of flight is all the more justified when these animals are in the presence of predators with clearly belligerent intentions. The extraordinary “hunting scene” in the *Salle du Fond* at Chauvet (Chauvet *et al.* 1995: fig. 82), where a herd of very expressive lions chases a herd of bisons, and that of the *Grand Plafond* at Baume-Latrone (Bégouën 1941: pl. XIII), where a “gigantic” feline (in comparison with the size of the other, much smaller figures) is attacking a group of mammoths, leaves little doubt. However the absence of dangerous carnivores in a composition does not exclude the hypothesis of flight, as we can again question the role of the prehistoric “spectator” or “creator” of the works: are not humans the supreme predators? Although absent from the cave walls, they perhaps participate in an indirect manner (ceremonies...) and thus in the “actions” depicted.

“THE PART OF THE LION”

The study of inter-species relations demonstrates the peaceful cohabitation of herbivores.

Equines and cattle species, that is the majority of these animals, are frequently associated on the cave walls, which was interpreted as symbolic by A. Leroi-Gourhan. But for J. Clottes (1994a: 42), “the frequent association of the bison and the horse in the cave paintings, which A. Leroi-Gourhan emphasized, could reflect an ethological reality, as when bisons are left in liberty (wildlife park at Mergeride, Lozère), they spontaneously show great interest in the horses, which they approach whenever possible”. It is true that wild horses are not territorial animals (Kingel 1974; Lebon 1992), unlike bisons (Bouguin 1983; MacHugh 1958), but the two species can live together in the same habitat and share it with other herbivores. It would have been the same in the Upper Palaeolithic, including the species which are today extinct (mammoth, great elks).

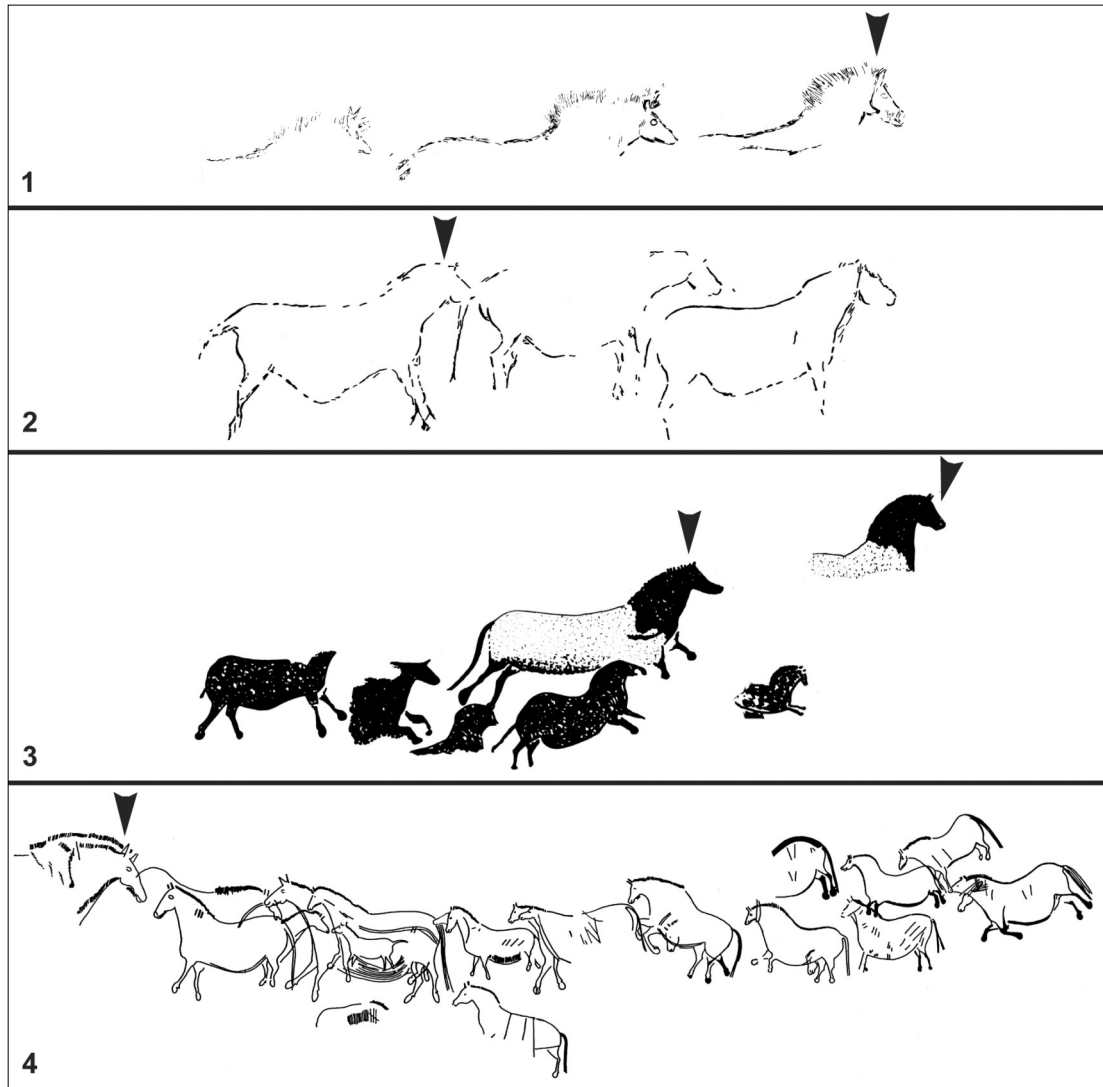


FIG. 22. — Herds of horses ("kossiaks"?) including several individuals in movement. 1. Oxocelhaya-Hariztoya, panel F (drawing G. Laplace in Laplace & Larribau 1984: fig. 2); 2. Etxeberri, west panel (drawing G. Laplace in Laplace et al. 1984: fig. 5); 3. Lascaux, Salle des Taureaux (after A. Leroi-Gourhan in Leroi-Gourhan 1984c: fig. 3) ; 4. Lascaux, Nef, Panneau de la Vache Noire, after A. Leroi-Gourhan (1979 : pl. XXIV). The possible leaders of the herd are indicated by an arrow.

Thus it is not surprising to see herds of herbivores mixing together, at Trois-Frères (*Sanctuaire*) or at Niaux (*Salon Noir*), without there being any real interactions. The only true exception is for the equines and cattle species, in the cave of Combarelles I (Barrière 1997), where a horse (VG30) stretches his head (curiosity?) towards a bison, who

looks at him, immobile. Horses, aurochs, bisons, as well as mammoths, ibexes and deer coexist in the same symbolised virtual space (distances reduced between the animals, perspective effects nonexistent or archaic, absence of reference points indicating space or plants...) in the spiral compositions on the *Grand Plafond* at Rouffignac, in the

frieze of the *Salle des Taureaux* and the *Diverticule Axial* at Lascaux and the main gallery at Font-de-Gaume.

When an herbivore is near to or in direct contact with a predator (feline), an interaction is usually established, the aggressiveness of the latter usually causing the former to flee, rarely to counterattack. In this situation, horses and bison are the favoured prey of lions. Again, Chauvet offers very explicit cases. Horses, bison and aurochs flee on both sides of the *Alcôve des Lions* in which four felines are depicted in threatening postures (two are swooping down on their prey). There is also of course the famous hunting scene of the *Salle du Fond* already discussed.

In bringing together all the information gathered on this predator (Fig. 23), we notice that the main phases of hunting are depicted: seeking the prey, head high, as at Gabillou (entrance); watching from a distance, crouching, head low, at Chauvet (*Grand Panneau*, left section); the chase, individual at *Deux-Ouvertures* or collective at Chauvet (*Grand Panneau*, right section)

and Lascaux (*Abside*); the moment when the predator jumps on its prey at Tuc d'Audobert (gallery of engravings) and at Chauvet (*Alcôve des Lions*). The natural role of each protagonist, hunter and hunted, is respected. Prehistoric humans felt close to the great herbivores, their social organisation (family units, hierarchical units) and their combat for survival (reproduction, migration) but they must have been fascinated by the felines with whom they shared the same fundamental preoccupation: access to meat. Another essential behavioural aspect unites them; they both regularly frequented caves, unlike wolves which are nearly completely absent in cave art, although closer to humans in their social organisation. The hunting scene at Chauvet becomes a kind of allegory, symbolising the identification with the "king of beasts" (which we call it today). In this panel, certain deformed and expressive profiles, tending towards the anthropomorphic and sometimes wrongly defined as caricatures, are disconcerting, almost as much as the statuette of a human with

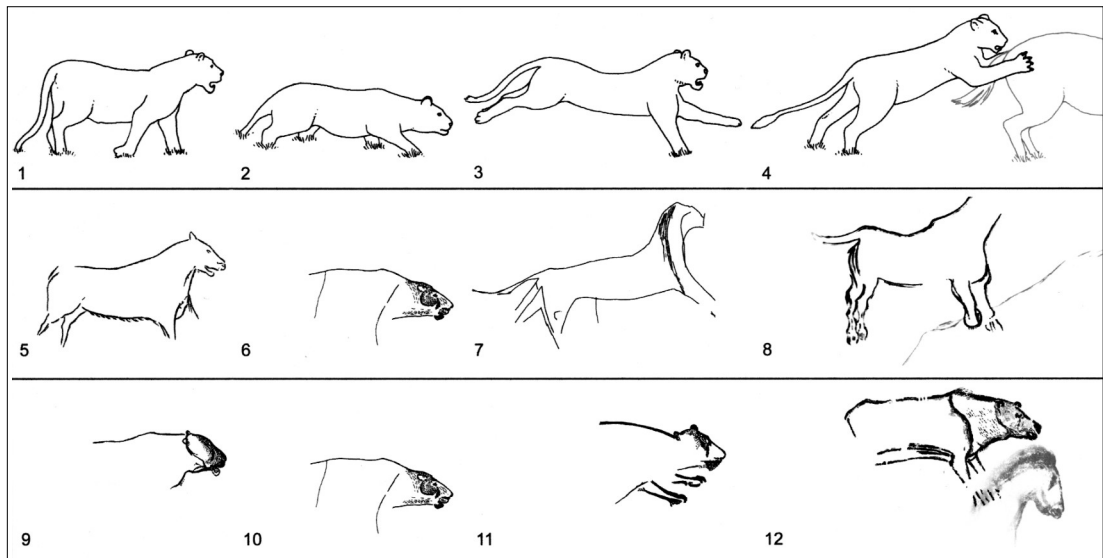


FIG. 23. – Comparison between the attitudes of a lioness hunting (1 to 4) and some parietal representations (5 to 12). 1. The lioness raises her head to seek the prey; 2. Crouched in the grass, she watches her next victim; 3. The lioness pounces on her prey; 4. The lion throws her prey (zebra) off balance by scraping its back; 5. Gabillou, drawing J. Gaussen (1964, pl. 3); 6, 9-11. Chauvet (drawings J. Clottes in Clottes & Azéma 2005); 7. *Les Deux Ouvertures*, drawing B. Gély & J.-L. Porte (1996: fig. 3); 8. Le Tuc d'Audoubert (sketch H. Breuil in Bégouën & Breuil 1958 : fig. 95) ; 12. Chauvet (drawing C. Fritz & G. Tosello, unpublished).

a lion's head from the "contemporary" site of Höhlenstein-Stadel in Germany (Hahn 1986). The anthropologist J. Robert-Lamblin, referring to "analogies between the populations of hunters-gatherers-fishermen in the Arctic regions and the Aurignacian populations of the Ice Age" reaches the same interpretation by advancing "the hypothesis of a belief in an identity between humans and lions" (Robert-Lamblin 2005: 204) at Chauvet. "The lion would have been the image of man, of the hunter: the incarnation of virility. It may be mentioned in regard to this that among all the animals represented at Chauvet, only one figure, that of a lion, is depicted with a male sexual attribute" (*ibid.*).

CONCLUSION

The ethological approach opens perspectives for new research. Of course, a closer collaboration with ethologists and anthropozoologists (especially for the study of the Chauvet cave) will enable refinement of our "tool" of analysis and our interpretation in the future. Although this approach contributes to distancing a little more the theory proposed by A. Leroi-Gourhan (who himself became oriented towards ethology at the end of his life), it is not necessarily incompatible with other interpretations (hunting magic, shamanism...) or at least some of their components.

Our initial results, which as we have said, focus on France¹³, demonstrate the importance and the role of the representation of movement which reflects in the Palaeolithic artist the will to express specific behaviour observed in his environment. He did not select and associate animal themes to each other, to specific places in the cave, with the sole aim of expressing a dualist symbolism (with sexual connotation) but rather sought to recount, to record episodes in which the body of mythic stories or anecdotes,

of which the content probably changed, developed over millennia.

The animals are not simple symbols divested of life: they move, develop and interact (actions and reactions). In many cases, the behavioural themes combine within the assemblages which could be compared to herds. The graphic space itself can be compared to one (or several) scaled-down "territory(-ies)" and "times", even, when the themes are associated with the scale of the cave, to a "virtual world" where only initiates may penetrate, travel or interact with the (magical?) images.

These themes "probably constitute the first wording of Palaeolithic expression" (Clottes *et al.* 1994a: 47), a grammar (stammering?) leading to the first pictograms, to graphic narration (or narrative figuration): in a way the first strip cartoons of humanity...

There are certain constants: a majority of male individuals, a predominance of herbivores represented at the approach or time of mating, the preponderant role of the great cat (predator) when present... Of course, the specific content of this "message", coming to us over millennia, escapes us and will continue to do so. However, it appears to us that it is related to the essential (vital) preoccupations of those who have sent it: to hunt and to reproduce; the guarantee of a good hunt, and thus the survival of the group, necessitating good "management" of the game and in consequence respect for its periods of reproduction.

The key is perhaps given by the *Salle du Fond* at Chauvet: on each side, great cats (symbols of humans?) are engaged in behavioural phases mixing preliminaries to mating (left wall: couple towards the entrance, Fig. 9, n° 4; right wall: couple (?) face to face in the main panel) and hunting acts as we have mentioned (left wall: *Grand Panneau*; right panel: feline with its head on a bison at the extreme left of the panel). To accentuate the scene and attach a symbolic character, vulvae, obvious signs of fecundity, are

13. In the future, we will extend our approach to the whole of Palaeolithic art, of all kinds.

clearly associated with predators and occupy places of choice in the composition: overlooking the felines facing each other in the panel of the right wall; near the “sorcerer”, associated with a feline (and a bison) and facing the hunting scene of the *Grand Panneau*. Even the configuration of the cave participates in this significance: the niche which opens in the centre of the *Grand Panneau*, like that which marks the median part of the *Secteur des Chevaux* and contains the felines, has an obviously vulvar shape. Concerning the other associated species, some (bisons) play their role as prey, others (rhinoceroses) are in parallel engaged in phases of combat related to mating. This interpretation¹⁴ should be tempered as it is based on observation of the walls at a distance; readings should soon enable judgment of the chronology of the execution of the figures and thus of the reality of the groups which we have discussed here.

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14. This interpretation is also valid in part for the *Secteur des Chevaux*, “foreshadowing” the content of the *Salle du Fond*, vulvae being found also in the *Couloir des Mégacéros* which joins the two parts of the cave.

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