KEYWORDS: ***'Track representation' – Hunter-gatherer – Petroglyph – Patagonia***

PRINTS ON THE ROCKS: A STUDY OF THE TRACK REPRESENTATIONS FROM PIEDRA MUSEO LOCALITY (SOUTHERN PATAGONIA)

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Abstract. This article analyses a sample of petroglyphs from the Central Patagonian Plateau which are morphologically similar to animal and human prints and can be related to the middle/late Holocene. The study is undertaken through a methodology which involves the identification, recognition and interpretation of the images, which in turn are based upon their formal comparison with objective referents (natural imprints). The goal of the analysis is not only to recognise possible species represented in rock art but also to evaluate the degree of naturalism versus non-naturalism that the different images display and, thus, to explore the animal symbolism among the hunter-gatherer groups that produced them.

Introduction

The 'style of tracks' from Patagonia was initially characterised by Menghin (1952, 1957) on the basis of the morphological resemblance of the motifs to imprints left by animals and humans. The repertoire of the style predominantly included animal tracks that could be attributed to felines (puma), artiodactyls (guanacos) and rhea (large flightless birds), as well as human imprints (feet and hands) and other figurative full body motifs such as lizards, guanacos and humans, among a wide variety of non-figurative motifs like meandering and straight lines, circles, crosses, rectangles and curvilinear figures comprising simple to very complex shapes. According to Menghin (1957), the style of tracks originated c. 2500 years B.C.E., and its emergence in Patagonia was coincident with the introduction of the engraving technique by diffusion from agriculturalists. The late Holocene chronological frame of the engraved motifs from southern Patagonia has been later confirmed by other researchers (Gradin 1976; Belardi and Goñi 2002, 2006), although the cultural implications of its origin have been criticised. The repertoire of the engraved motifs, far from being homogeneous, shows variability in its spatial distribution on a regional scale, which has been explained by causes which differ from cultural contacts, such as functional differences between the sites (Belardi and Goñi 2002) or internal social changes (Carden 2007a).

The present study is based upon the analysis of a sample of petroglyphs from Piedra Museo locality, situated in the north-eastern portion of the Central Plateau of Santa Cruz province (Argentina) (Fig. 1). These images, which have been attributed to the 'style of tracks', can be formally compared with animal and human imprints. Given their variability, the main objective of the analysis is to evaluate to what extent they may be morphologically related to these 'natural referents'. Regarding this last point, some authors have paid attention to the conspicuous differences between these kinds of representations from Patagonia and the natural forms, interpreting them as intentional (Casamiquela 1981) and classifying the motifs as symbolic (Schobinger 1956). However, although the formal distance of the track representations from the 'natural referents' may be relevant for exploring their symbolism, this fact should not deny the symbolic potential of naturalistic representations. An interesting ethnographic example to illustrate this point is the meaning that the San groups provide to the eland's behaviour at death, which is represented naturalistically in rock paintings and said to be symbolically linked to the 'shamans' death' as a metaphor of altered states of conscience (Dowson 1988). For this reason, this article does not only consider the formal distance of the images from the 'natural referents', but also evaluates the relationships between the most naturalistic and the less naturalistic motifs, understanding that the most naturalistic representations are those which display the greatest resemblance to the natural prints.

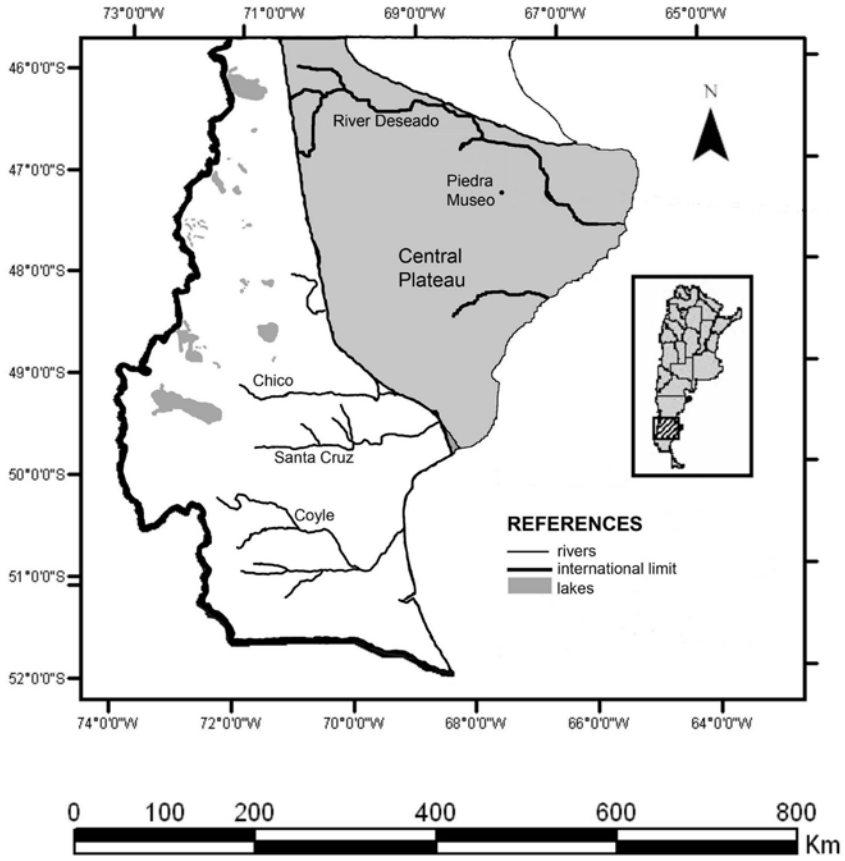

Figure 1. *Piedra Museo locality in the Central Plateau of Santa Cruz (Argentina).*

Methods

Considering rock art as a material correlate of the social production and circulation of meanings in the past (Hodder 1982, 1986; Llamazares 1989), the methodology employed in this work follows three analytical stages which were proposed by Magariños de Morentin (2002) for the semiotic study of *material visual images*. These kinds of images were defined by the author as proposals of visual perception considered as representations that configure forms to be valued by interpreters. The three stages are identification, recognition and interpretation. They are neither independent nor lineal; on the contrary, they are deeply interconnected in the whole analytical process which involves interpretation from the beginning. The *identification* is conditioned by the representative quality of the material visual images, which may be purely plastic, without referring to norms or existing objects from the real world; figurative, showing concrete formal analogies with existing referents; or symbolic, when the images are linked to an interpretative system which is temporally and spatially framed. To understand the symbolic meaning of visual images it is necessary to know the conventions that were actualised through certain norms in the visual configurations. Most material visual images are composed by a combination of the three aspects, where the presence of one of them may be predominant (Magariños de Morentin 2002). For example, the analysed motifs in this paper were identified as figurative according to their formal analogy with natural imprints, although they are also plastic and potentially symbolic. The *recognition* of these images implies making explicit which were the attractors that were actualised in the visual memory of the interpreter (the researcher, when no informed knowledge about the images is available) to classify them as figurative. This operation defines the marks, axes and closing forms that configure the shapes of the images. The *interpretation* attributes meaning to the representations. In the case of most archaeological visual images there are limits for the application of a semiotic method, since the values from the original producers have not been preserved through time and the images must be interpreted according to different cultural systems, where researchers can only rely upon their specific logic, categories and geometry (Velandia 1994). When there is no access to informed knowledge about the meanings of the images the analysis must rely upon formal methods, concerning the information from the images themselves, from their relationships to each other and to the landscape, and from their relationships with the archaeological context (Taçon and Chippindale 1998: 7–8).

Having recognised the limitations implied in the access to the meanings of images from other frames of reference, especially when these are mediated by time to the present researcher, the analysis is based, according to a Western taxonomy, on the assumption that the images considered may be representing animal and human tracks. Considering that the identification of figurative motifs already involves interpretation, the intention in this work is to concentrate on the interpretative instance and deal mainly with two questions. Firstly, if track representations have been identified, which are the formal indicators that allowed linking them to specific taxa? Secondly, why are these represented taxa present in this particular archaeological context? If the distinction of tracks on the ground is complicated, the recognition of animal track representations in rock art is even more difficult, especially considering that they could have been made, probably due to cosmological and/or aesthetic reasons, without an intention of reproducing the referent in a realistic way (Casamiquela 1981). This is why these motifs are not only analysed with the objective of recognising which possible species could be repre-

Figure 2. *View of Piedra Museo locality showing the opposite orientation in the sandstone outcrop of two rockshelters with rock art: Alero El Galpón faces towards the south-east and only receives direct sunlight in the early morning. Cueva Grande is oriented towards the north-west and only directly illuminated in the late afternoon.*

sented, but also, and mainly, in order to evaluate the degree of naturalism or non-naturalism that the different images could potentially be displaying. A good starting point to assume that an image is not naturalistic is to discard its morphological connection with 'natural referents', although understanding that the non-naturalism of an image does not necessarily imply that it did not represent natural objects from the real world. With this purpose, the representations have been classified following the criteria employed to distinguish real animal tracks in the field, including present species (Bang and Dahlstrøm 2001) and palaeontological species (Aramayo and Manera 1987, 1996; Manera and Aramayo 2003), and considering all the similarities and differences between the natural and artificial forms. The analysis only concerns the taxonomic groups that were identified in rock art. The preservation of the motifs was always evaluated, since natural and artificial agents (e.g. vandalism) have affected some of the original designs. Images that could not be identified because of their bad preservation were excluded from this study.

The study area and the archaeological context of the track representations

The petroglyphs from Piedra Museo locality are related to the lower course of a temporary basin that drains southwards from the river Deseado (Fig. 1). As a result of the scarce rainfall, the river courses and creeks from the study area in the Central Plateau only carry water during the late winter and the early spring. The main sources of fresh water are subterraneous springs created by rain infiltration. The presence of water favours the development of a shrubby (e.g. *Junellia tridens*, *Berberis* sp. and *Senecio* sp.) and herbaceous (*Stipa* sp.) vegetation, and concentrates a wide variety of mammals, such as camelids (*Lama guanicoe*), red foxes (*Canis [Pseudalopex] culpaeus*), grey foxes (*Canis [Pseudalopex] griseus*), pumas (*Puma concolor*) and smaller wild cats (*Oncifelis geoffroyi*, *Lynchailurus pajeros*), Patagonian hare (*Dolichotis patagonum*) and armadillo (*Zaedyus pichiy*), as well as ground-birds (*Pterocnemia pennata* and *Eudromia elegans*) and water-birds, mainly swans (*Cygnus melancoryphus* and *Coscoroba coscoroba*), wild geese (*Chloephaga* sp.) and ducks (*Anas*, *Oxyura*, *Merganeta*).

In this volcanic and semiarid landscape, Piedra Museo is characterised by a high density and abundance of petroglyphs which are concentrated over the horizontal surfaces of large floor boulders collapsed from the ceilings of two rockshelters: Alero El Galpón (AEG-2) and Cueva Grande (CG), located at a distance from each other of 200 m within the same sandstone outcrop, and facing opposite directions (Fig. 2). As the resistance of the sandstone bedrocks to extractive techniques is low, it may have conditioned the depth of the grooves (which can reach more than 2 cm) and favoured a wide diversity of techniques, among which the most abundant is percussion, although some motifs were made by incision, scraping or drilling, or by a combination of these procedures.

Both sites, especially AEG-2, are closely connected to a group of springs and to a large, salty and dry lagoon (Fig. 2). From the top of the outcrop it is possible to obtain a wide vista of the surrounding lowlands, which in this portion of the area reach up to 200 m a.s.l. (Fig. 3). The ecological and topographic setting of Piedra Museo was interpreted as strategic for planning the ambush and capture of animals. The archaeological evidence from the lower units of Alero El Puesto (AEP-1), spatially contiguous to AEG-2, confirmed the recurrent functionality of the place as a killing and primary butchering site, with dates from c. 13 000 to 9000 years BP (Miotti et al 1999; Miotti and Salemme 2005). The lithic assemblage from these units includes unifacial and bifacial artefacts such as two fragments of 'fishtail projectile points', and the faunal remains correspond mainly to *Lama guanicoe* (guanaco), also including a low proportion of *Lama gracilis* (extinct camelid), *Hippidion saldiasi* (extinct horse), *Mylodon* sp. (extinct large sloth), *Rhea* sp. and *Pterocnemia pennata* (large flightless birds). This archaeo-

Figure 3. *View of the surrounding landscape from the top of the sandstone outcrop at Piedra Museo. The dry lagoon was active during the Pleistocene/Holocene transition.*

faunal record, together with the sediment and pollen information from the lower units, indicates a more humid and cold climate during the Pleistocene/Holocene transition, corresponding to an herbaceous steppe environment. The radiocarbon dates from the upper unit (layer No. 2) of Alero El Puesto and Alero El Galpón belong to the middle Holocene, c. 7400 and 7600 years BP, and the material evidences show that at this time the place was occupied for residential purposes (Cattáneo 2002; Miotti and Salemme 2005). The sediments from the Holocene layers indicate that the landscape was covered by a shrubby steppe and that the climatic conditions were semiarid like the present ones. The faunal remains from the upper units represent present species adapted to arid environments, among which guanaco is predominant. The stratigraphic information from the late Holocene is scarce because the top layer is thin and lacks radiocarbon dates, while the artefact density is low and associates with historical implements. During the excavations in AEG-2 it was observed that the bottom of the only engraved boulder present in the rockshelter was leaning horizontally on the middle of the top layer (No. 1). Although this unit lacks radiocarbon dates, it should be at least younger than 7400 years BP, which is the youngest date of the middle Holocene occupation below (layer No. 2). According to its stratigraphic situation, it is possible to infer that the boulder collapsed from the ceiling and became available after this date, so the petroglyphs could have been made at the end of the middle Holocene or during the late Holocene (Miotti and Carden 2007).

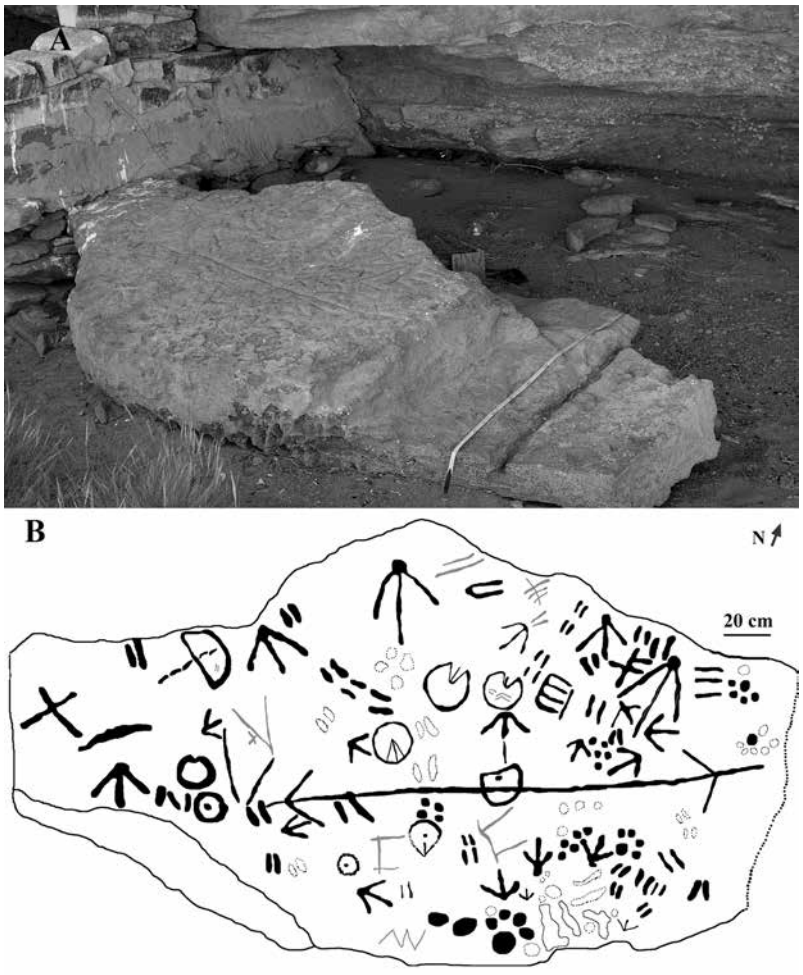

Figure 4. *Photograph and tracing of the engraved boulder from Alero El Galpón. The wall on the left hand section has been built at the left border of this large rock. This event, as well as the intentional removal of the right border, took place after 1935, when the first photographic documentation of the site was made. Fortunately, in these early pictures it is possible to observe the rest of the motifs, which are mainly crosses, circles and 'bird tracks' (De Aparicio 1935: Pl. XXX). On this boulder, bird, guanaco, feline and horse 'tracks' have been identified. Guanaco 'tracks' are arranged in trails. A circular motif below the long line resembles a vulva.*

MOTIFS	AEG-2 n	AEG-2 %	CG n	CG %
'Hand prints'	0	0	2	1
'Footprints'	0	0	6	3
'Bird tracks'	26	31	46	20
'Horse tracks'	3	4	0	0
'Guanaco tracks'	23	27	0	0
'Feline tracks'	7	8	16	6
Figurative	59	70	70	30
Circular	8	10	68	29
Curvilinear	3	3	45	19
Rectilinear	14	17	48	21
Non-figurative	25	30	161	70
TOTAL	84	100	231	100

Table 1. *Frequencies and proportions of figurative and non-figurative motifs from Piedra Museo.*

The chronology attributed to the 'style of tracks' on a regional scale supports this hypothesis (Menghin 1957; Gradin 1976; Schobinger and Gradin 1985; Belardi and Goñi 2002, 2006). No excavations were carried out in the interior of Cueva Grande because the sediments that cover it are very meagre.

1. Identification of the 'track representations'

As the aim of the present article is to analyse the morphological variability of the 'track representations', Piedra Museo becomes a relevant study case, since it includes a high quantity of motifs resembling animal and human prints. The high proportion of figurative motifs at this locality is especially remarkable at AEG-2, where they are concentrated on only one boulder, which is c. 2 m long (Fig. 4 and Table 1). Although this is the only boulder present at the site, two other engraved rocks have been documented in the 1930s, both of which have now disappeared (De Aparicio 1935: Pl. XXXI).

The figurative representations from Piedra Museo only represent 'animal and human prints', while zoomorphic and anthropomorphous silhouettes are absent. A bow and arrow may also be represented on the left hand section of the engraved boulder from AEG-2 (Fig. 4). 'Human foot and hand prints' are only present in CG and their frequency is low (Table 1). The non-figurative motifs are mainly curvilinear, among which the circular designs are predominant. These representations are simple to very complex, such as some 'labyrinths' and spirals. The frequencies and proportions of the motifs were calculated after documentation in the field, which was complemented by the observation of the old photographs (De Aparicio 1935).

2. Recognition of the 'track representations'

At this stage of the analysis, the criteria by which the different kinds of 'tracks' were identified are made explicit through the morphological comparison of the track representations with the natural imprints left by the real animals. The 'track' motifs from Piedra Museo evidence a remarkable naturalism but also show a considerable distance from the natural referents. The different 'track representations' will be described starting from those that could be related with distinct taxa, followed by morphologically similar representations that could not be taxonomically related, and ending with those motifs that, in spite of being formally similar to the naturalistic types, are difficult to classify as figurative or non-figurative and, therefore, remain at a sort of threshold between both kinds of representations.

2.1. 'Bird track' representations at Piedra Museo

Among birds, different species can be distinguished through their tracks according to the size of the imprint, the length of the middle toe (No. 3) in the imprint, the length and shape of the rear toe (No. 1), the width of the angles between the toes and the robustness or thinness of the toes (Bang and Dahlstrøm 2001: 86).

According to the mentioned criteria and to the locomotion of the animals, the following kinds of birds have a better chance of being distinguished through their tracks in the study area (Narosky and Izurieta 1987):

1. The ground-birds include large flightless birds such as the Rheidae (*Pterocnemia pennata*) or birds that spend most of their time on the ground such as the Tinamidae (*Eudromia elegans*), commonly named partridges. These birds have powerful legs and sturdy feet for walking or running. Their three forward-pointing toes are strong with blunt claws, and a 45° angle is observed between each toe.
2. The waders inhabit the muddy banks of lagoons, streams or rivers. Their feet have long and slender toes with small claws, and a more open angle is observed between each toe, sometimes reaching 90°. Among this group, herons (Ardeidae: *Egretta alba*, *Nycticorax nycticorax*) are distinguished by the presence of a long rear toe, which is related to their habit of gripping tree branches.
3. The waterbirds have distinctive webbings between their toes, which increase the surface area of their feet and enhance propulsion when swimming. In the study area the main waterbirds are flamingos (*Phoenicopterus chilensis*) and different species of Anatidae such as swans (*Cygnus melanocoryphus*, *Coscorba coscorba*), wild geese (*Chloephaga picta*) and ducks (*Anas* sp.).

At Piedra Museo, 'bird tracks' are the most abundant motifs (Table 1) and also the most variable in types among the figurative. These figures were always made by three linear incised or pecked axes converging at one point, which may be represented by small drilled concavities as it is shown in types A, B and C (Fig. 5). These concavities could be representing the deep impressions that the ground-birds frequently leave

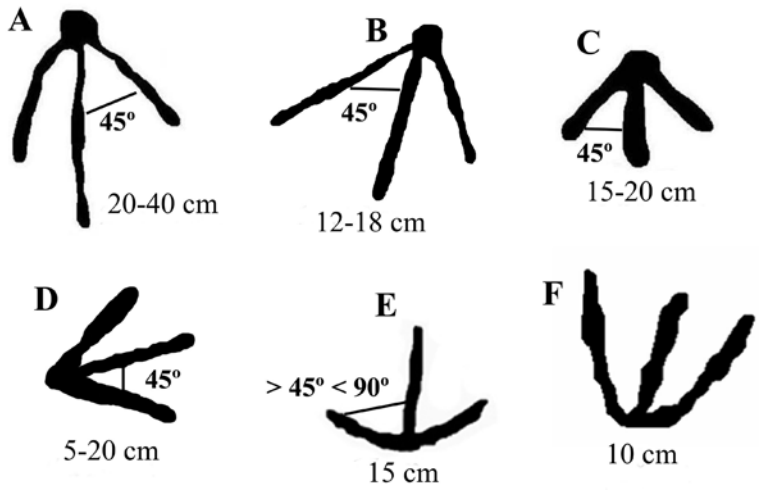

Figure 5. *Types of 'bird tracks' recognised at Piedra Museo.*

on the ground at the base of their toes. A diagnostic feature that allows distinguishing Tinamidae (partridges) from Rheidae (large flightless birds) tracks in the field, besides their size, is the structural unity of the former (toes and their union in one impression), while in the latter the toes are more robust and leave an impression which is separated from their union point, which in turn leaves an isolated hole on the ground (S. A. Aramayo, pers. comm. 2006). Although none of the three types (A, B or C) shows separated toes, according to the presence of concavities at their union points and to the large size of some motifs (reaching up to 30 cm length), it is possible that they may be representing Rheidae. The width of the toes is also very variable and only in type A the proportions of the toes' lengths resembles those found in the natural tracks, where the middle toe is longer (Fig. 5). Most of the bird tracks at Piedra Museo correspond to the D type, which is simple and can be thought to be schematic. However, there are birds that leave these kinds of imprints in nature, such as some Charadriiformes among the waders. Given that both options (schematic and naturalistic) are possible, it is not intended here to opt for one in detriment of the other. However, it cannot be denied that the motifs may be naturalistic. Type E can be assigned to a wader track because of the angle between the toes; while type F cannot be linked with specific taxonomic groups because of its 'U' shape (Fig. 5).

2.2. Digitigrade and unguligrade track representations at Piedra Museo

According to Bang and Dahlstrøm (2001), the imprints of digitigrade and unguligrade mammals can be classified as paw prints, cloven-hoof prints and non-cloven-hoof prints. The 'mammal track' representations identified at Piedra Museo may correspond to felines, camelids and horses.

a. Paw prints

Felines have five toes on their fore feet and four on their hind feet. However, the inner toe at the fore foot is so high up that it does not leave an imprint on the ground (Bang and Dahlstrøm 2001; Canevari and Fernández Balboa 2003). A feline footprint can be distinguished by four circular toes without claw marks (because claws are retractile and are not worn out in locomotion) and a larger three-lobed central pad. In the study area these criteria can be applied to distinguish natural tracks from pumas (*Puma concolor*) and wild cats (*Oncifelis geoffroyi* and *Lynchailurus pajeros*).

At Piedra Museo, the images that could be representing feline tracks are round concavities displayed around larger central holes (Fig. 6). These concavities can be technically defined as 'cupules', which are hemispherical percussion petroglyphs that occur on horizontal or vertical surfaces and are almost always arranged in groups or large accumulations (Bednarik 2008). As the sandstone boulders are conformed by natural concavities, it is possible that some of these features could have been enhanced through the confection of the cupules. The cupules from Piedra Museo are not only concentrically arranged, but also occur as isolated holes, aligned in rows, or associated with linear designs. Among the concentric figures that formally resemble feline tracks, only one type (A) can be considered as a potentially naturalistic representation because it has four circles around a larger central concavity, although the latter is round and not three-lobed as the natural imprints are. The rest of the types cannot be linked with feline footprints because they have more or less than four circles around the central concavities, but they are still morphologically connected with the

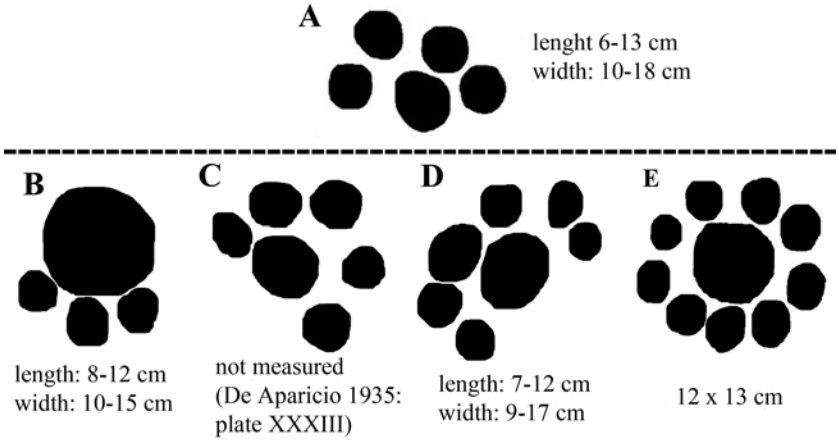

Figure 6. *'Feline tracks' and associated motifs recognised at Piedra Museo.*

Figure 7. Natural imprint of a guanaco recorded in the study area.

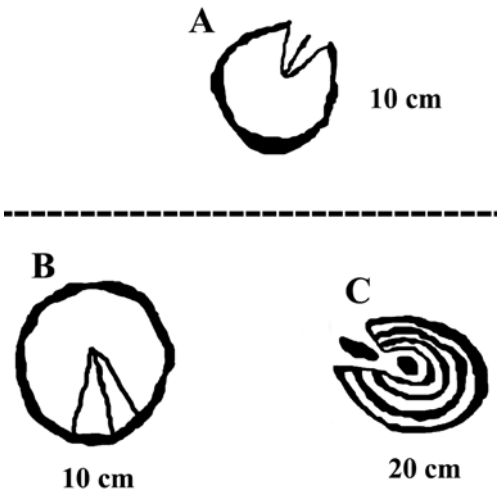

Figure 9. Naturalistic 'horse tracks' (A) and associated motifs (B and C) recognised at Piedra Museo.

naturalistic design (Fig. 6). According to Gradin (see interpretation in Schobinger and Gradin 1985: 39) these kinds of motifs are abstract and the starting point of the abstraction process is the puma's footprint, to which more toes are added around the central pad, sometimes completing the whole contour of the circle.

b. Cloven hoof-prints

Artiodactyls (such as deer, pigs and camelids) have paired toes and step on the two central ones, leaving a symmetric imprint on the ground. In the study area, tracks of this kind correspond to guanacos (*Lama guanicoe*); since deer inhabit the forested environments towards the Andes cordillera (Fig. 7). The interior border of these footprints is straighter than the external borders which are curved. The imprint of the fore foot is larger than the imprint of the hind foot and shows a more open 'V' shape between both hoofs (Aramayo and Manera 1996; Bang and Dahlstrøm 2001).

These kinds of track representations were only recorded at AEG-2. Their size is small (less than 5 cm long) and they occur in groups. Each footprint is composed by two small parallel grooves which can be straight (type A) or curved (type B) (Fig. 8). In none of these motifs is it possible to distinguish if the 'prints' could be representing the fore or hind feet, since they do not manifest the 'V' shape between the hoofs and their size is similar. However, their formal relationship with guanaco footprints is still evident; especially because they seem to be representing trails (see Fig. 4).

c. Non cloven hoof-prints

These kinds of tracks correspond to ungulates with only one digit such as horses, which step on very strong hoofs with an almost circular shape and a deep notch at the back (Bang and Dahlstrøm 2001; Manera and Aramayo 2003). Within this notch it is possible to observe the linear imprint left by the little toe pad.

Motifs that could be representing horse tracks have only been identified at AEG-2. They are circular with a 'V' shaped notch and a short line in its interior (Fig. 9: type A). Although similar motifs with a morphological connection to type A were identified, they cannot be assigned to an animal's footprint. Among these motifs, type B differs from type A because it is a closed circle (Fig. 9). Although type C has a much more complex shape than the other two types, the external contour of the image and the grooves observed in the interior

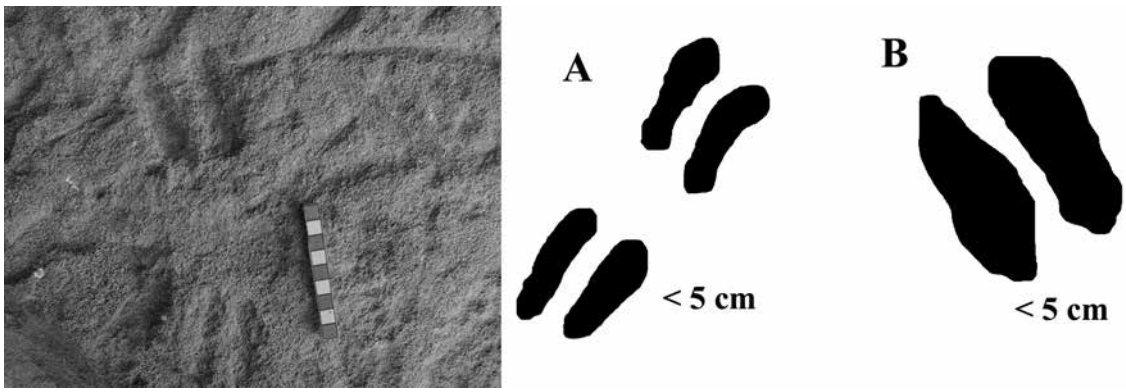

Figure 8. Types of 'guanaco tracks' recognised at Piedra Museo.

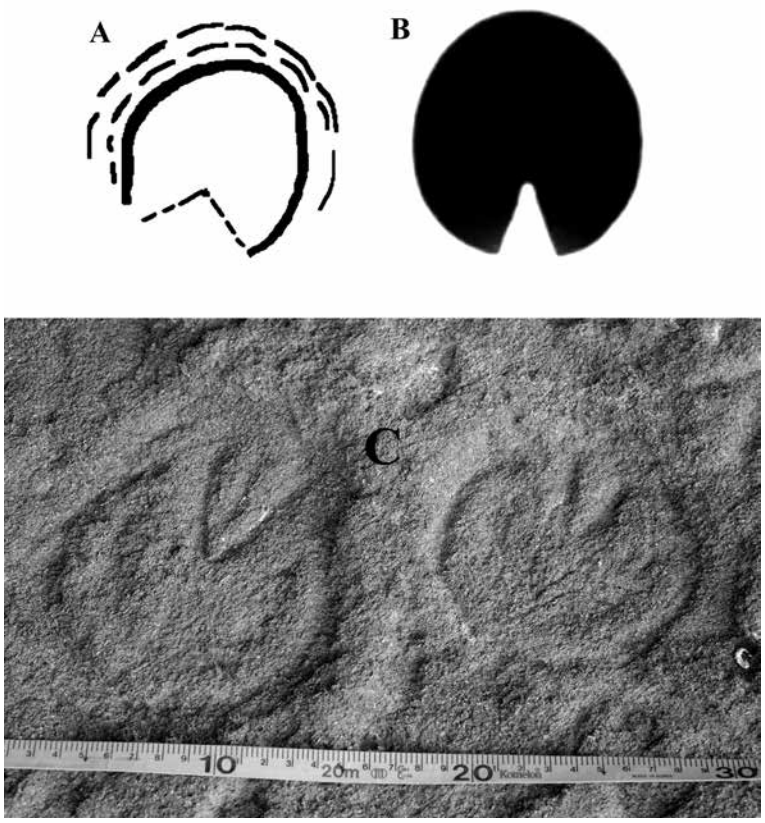

Figure 10. *(A) Schematic drawing of an ichnite of* Hippidion *sp. (13 × 10 cm) at Pehuén Co palaeontological site, Buenos Aires province (after Manera y Aramayo 2003); (B) tracing of a modern horse track without shoe (12 × 10 cm) (after Bang and Dahlstrom 2001: 82); (C) naturalistic 'horse track' motifs from Alero El Galpón (20 × 20 cm).*

notch suggest its formal connection with them (Fig. 9). This complex figure, which can be observed in a photograph that was published by De Aparicio (1935: Pl. XXXI) and is no longer present at the site, has been interpreted as a 'labyrinth' by many researchers (Aschero 1973; Casamiquela 1981; Schuster 1956/58, 1988; Menghin 1957; Schobinger and Gradin 1985; Miotti 1991). This interpretation criticises De Aparicio's (1935) original assignation of these kinds of motifs to horse prints without shoes. However, it is important to notice that De Aparicio did not refer to the complex type in his interpretation, but to the simplest forms (type A) (see discussion in Miotti 1991). Other circular motifs on the large boulder are related to these types: one is a simple circle and four are circles with central dots. One of these motifs is much eroded and seems associated to a small 'bird track' made by incision. According to its better preservation, the 'track' representation was added later to the previous circle. The whole design resembles motifs that can be interpreted as 'vulvas', although it is not possible to know if this diachronic juxtaposition was created with this intention (see Fig. 4).

In spite of their naturalism compared with natural footprints, whether they are of present or extinct species (Fig. 10), the interpretation of the mentioned images (type A) as horse tracks involves a chronological problem. In the first place, the origin of the engraved rock art in Patagonia has always been related with the late Holocene, c. 4000 years BP (Menghin 1957) or c. 2000 years BP (Gradin 1976; Belardi and Goñi 2002, 2006). In the second place, the boulder with 'horse track' representations leans on the middle of the top layer of AEG-2, which should correspond to the middle/late Holocene according to the dates of c. 7400 years BP obtained below at layer 2 (Miotti and Carden 2007). Therefore, the images could not be representing horse tracks (whether extinct or European) because these animals were not living in the region at the time of their production. Bone remains from *Hippidion saldiasi* are frequently represented in the archaeological record of two areas from southern Patagonia. In the Central Plateau they have been found at El Ceibo (Cardich et al. 1981–82), Los Toldos (Cardich and Miotti 1983) and La María localities (Paunero et al. 2005), while in the Magellan Strait region they were recovered at Cueva del Mylodon, Las Buitreras (Sanguinetti de Bórmida and Borrero 1977), Cueva del Medio (Nami and Menegaz 1991), Cueva Lago Sofía (Prieto et al. 1991), Tres Arroyos (Massone 1987), Cueva Fell, Pali Aike and Cerro Sota (Bird 1988). All these fossils have been associated with layers dating from the Pleistocene/Holocene transition, evidencing that *Hippidion* coexisted with hunter-gatherers from c. 11 000 to at least 10 000 years BP. The faunal analyses indicate that these animals were consumed by hunter-gatherers as complementary resources to guanacos (Miotti and Salemme 1999), and some authors suggest that early hunters may have been partially responsible for their extinction, together with environmental changes (Alberdi and Prado 2004).

Considering the temporal distance between the extinction of *Hippidion* and the production of the representations interpreted as 'horse tracks', and given the naturalism of the images (type A) and the importance of Piedra Museo as a hunting locus since the Pleistocene/Holocene transition, including bone remains from *Hippidion saldiasi* in the lower component (layers 4, 5 and 6) (Miotti et al. 1999; Miotti and Salemme 2005), the evidence may be discussed in diachronic terms. Therefore, it is possible to formulate the following questions regarding the representations. Could the naturalistic type (A) be representing the persistence of horse prints in memory, expressed and probably re-signified through the artistic repertoire of the middle/late Holocene hunter-gatherers? Moreover, could types B and C be indicating such re-signification

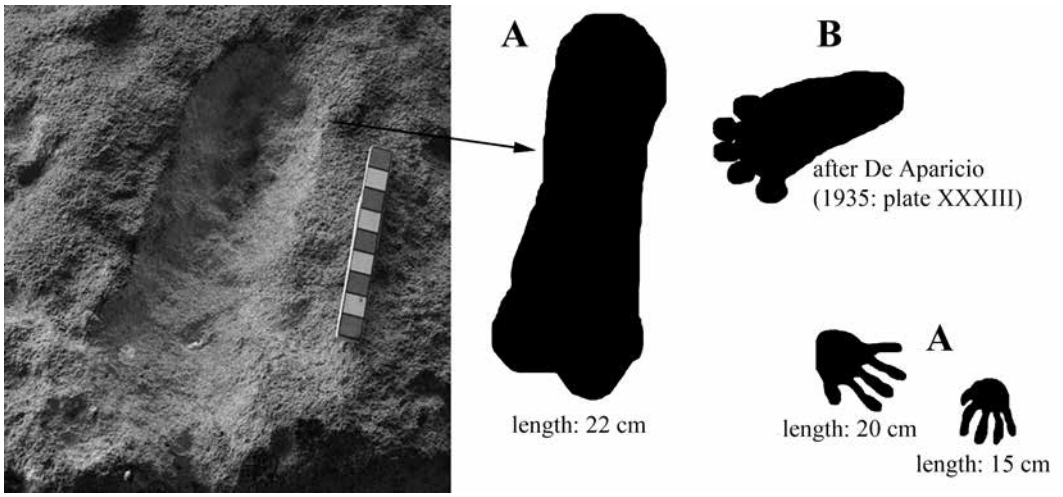

Figure 11. *'Foot and hand print' representations recognised at Piedra Museo.*

of forms through time? The continuity of memory through thousands of years is difficult to explain, understanding that demography was probably low during the Pleistocene/Holocene transition and that there are no clear indicators of a population continuity along time (Borrero 2001). For this reason, following the distinction made by Gosden and Lock (1998), the present argumentation for the persistence of horse prints in memory does not imply a 'genealogic history', where the past is created through links to known ancestors, but a 'mythical history', where a less well-known past is evoked and where complex processes of symbol's reinterpretations come into play. Certain references of fantastic animals resembling Pleistocene species in myths from the Patagonian and Mesopotamian regions in Argentina suggest the existence of a mythical history (Bórmida and Siffredi 1969/70; Casamiquela 1988; Ceruti 2000: 114). Furthermore, the presence of Pleistocene bone remains in Holocene layers from the Patagonian and Pampean regions implies that fossils were collected by humans (Gradin et al. 1979: 215; Martínez 2006) and probably reinterpreted and imbued with symbolic meanings (Bonomo 2006). The long-term importance of Piedra Museo for the concentration of animal resources involved recurrent and changing relationships between humans and animals. This process may have favoured the development of a mythical history about the 'place' (Ingold 1993), and it is relevant for understanding the high concentration of 'animal track' representations on only one boulder within AEG-2.

2.3. Human print representations (plantigrades)

Representations of 'human hand and footprints' are only present in Cueva Grande and they are not numerically abundant. Although the 'footprint' representations show some differences compared with the natural imprints, such as the lack of a thinner section at the portion corresponding to the arch, which does not touch the ground, they are nevertheless very similar. Two kinds of 'footprints' were defined: type A without differentiated toes and type B with differentiated toes, although type A may be the result of the bad preservation of the motif (Fig. 11). Toes were made by drilling small holes at the borders of the motifs, which were made by pecking and scraping. Type B can only be observed from old photographs of a boulder, which has been intentionally destroyed by vandalism (De Aparicio 1935: Pl. XXXIII).

Only two petroglyphs from Piedra Museo could be representing 'hands'. These motifs were manufactured by pecking and scraping, and they show similar proportions to the natural referents in the length of the fingers and palms (Fig. 11).

2.4. Degree of naturalism of the different taxonomic groups represented at Piedra Museo

All the taxonomic groups that were recognised in the track representations from Piedra Museo include types with a strong resemblance to the natural footprints, but not all of them include types which are different from the referents in nature. 'Guanaco' and 'human' imprints include a low variety of types, and the formal differences between these representations and the natural referents are not strong enough to reject their resemblance. The opposite situation occurs with 'felines' and 'horses', where types with strong differences from the natural footprints are predominant. Among the 'feline tracks', most of the types defined are not possible to relate with the natural referents. Although fewer types were defined among the 'horse tracks' (n=3), they manifest a strong diversity, including naturalistic forms and designs which are considerably different from the natural footprints. As these representations are interpreted as the material correlates of a mythical memory, it is possible that the low number of types and their formal distance from the natural footprints could be expressing the temporal gap between the existence of the original referents (extinct horse footprints) and the time in which these motifs were manufactured and used in rock art. The situation of the 'bird track'

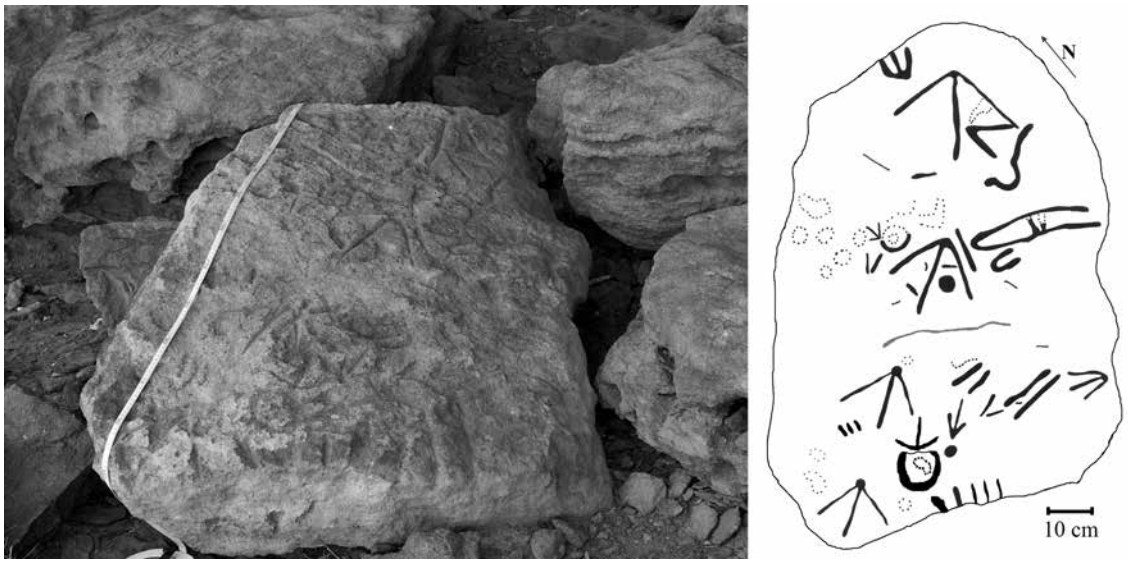

Figure 12. *Photograph and tracing of a boulder with a 'trail of bird tracks' at CG.*

representations is intermediate, because among the high formal variability they manifest, only a low proportion of types are significantly different from the natural referents. The high diversity of types identified among the 'bird tracks' can be explained as a consequence of the wider inclusiveness of the taxonomic category employed for the analysis (class of vertebrate) compared to the other taxonomic levels that were used (families of mammals).

3. Interpretation of the 'track representations'

The diversity of the 'track representations' from the study area does not only concern the norms and conventions involved in their construction, but also refers to the ways in which these motifs associate with other images. At this stage of the analysis, the spatial relationships between the different motifs (syntax) become highly relevant for exploring their semantic context through the ways in which meanings were structured (Llamazares 1989; Magariños de Morentin 2002). This study, combined with the evaluation of the degree of naturalism of the possible taxonomic groups represented, compared to the ecological role of the natural referents, and related with the cultural and ecological conditions of Piedra Museo, intends to explore a possible symbolic dimension of these kinds of images.

3.1. Syntax of the different 'track representations'

The diversity in the spatial associations of the 'track representations' within the rock art panels illustrates the variability of signifying contexts in which different animals could have been involved. The most recurrent and contrasting associations that could be identified at Piedra Museo concern:

- Trails among the 'guanaco and bird tracks', on some occasions manifesting a certain perspective and probably expressing dynamism (Fig. 12).
- 'Feline tracks', 'human prints' and complex curvilinear figures ('labyrinths' and spirals) which are closely connected at the central portions of some boulders (Fig. 13).

3.2. The naturalism of the images and the ecological context of the natural referents

The high quantity of 'footprints' in Piedra Museo can be related with the favourable ecological conditions of the place for the concentration of animals. Among the 'track representations', birds' are the most abundant and diverse, but this diversity is very limited if it is compared with the enormous variability of birds that may potentially leave their tracks on the ground in the study area. To provide an example, although a wide diversity of waterbirds commonly inhabit lagoon environments such as Piedra Museo and step over muddy soils frequently leaving characteristic webbed imprints, these kinds of footprints are absent in the petroglyphs. This absence is not only site specific but can also be extended for the 'style of tracks' on a regional scale (see animal repertoire of petroglyphs in Schobinger and Gradin 1985). Considering the important presence of waterbirds (and other birds such as Passeriformes) in different myths recorded from the southern Patagonian Tehuelche Indians (Bórmida and Siffredi 1969/70; Wilbert and Simoneau 1984), the limited variety of bird tracks in rock art is even more conspicuous and seems to indicate that, although birds may have been important in the ideational realm of past hunter-gatherers, only certain species (especially ground-birds) were represented through this medium. The same situation occurs with the 'mammal footprints'. Although myths refer to a wide variety of mammals, including small species (see ibidem), the repertoire in rock art is much more limited and, together with the bird tracks, if they belong to rhea, it refers to taxonomic groups that can be associated

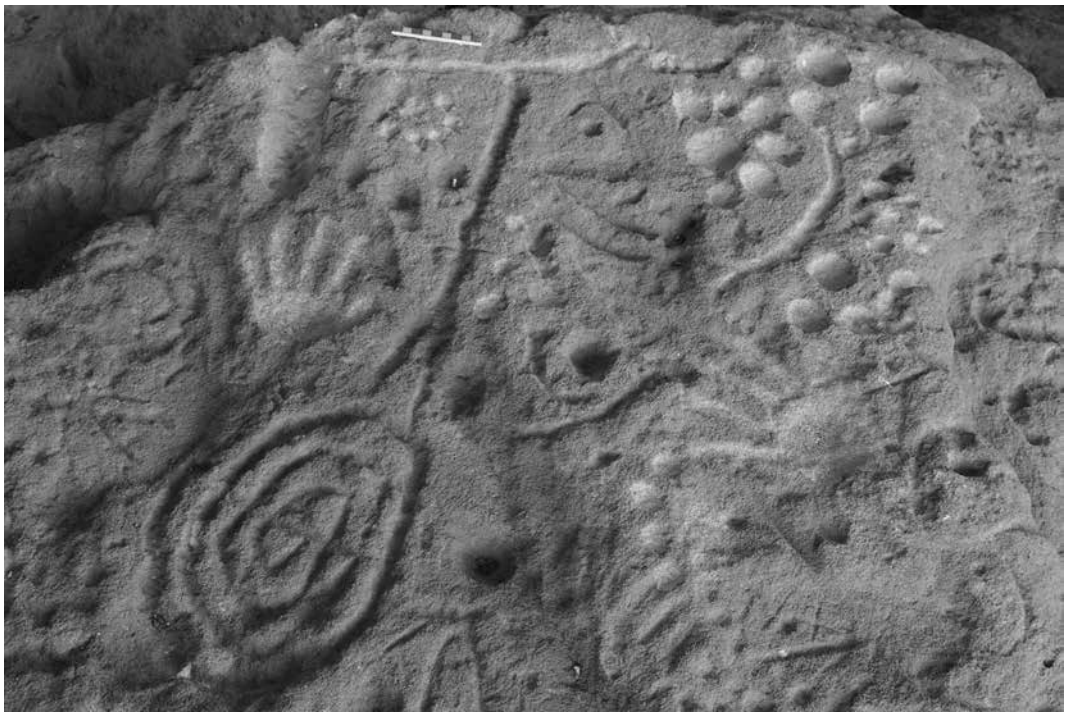

Figure 13. *Detail of a boulder from Cueva Grande showing the spatial association between 'feline tracks', 'hand prints', a 'footprint' and a complex spiral figure. Some of the motifs were painted in white after De Aparicio's (1935) initial documentation of the site and before the fieldwork started in the 1980s (Miotti 1991).*

with hunting practices as prey or as predators. The prey animals included in the representations are perhaps guanacos and maybe horses, considering the evidence of their appropriation and butchering since the Pleistocene/Holocene transition (Nami and Menegaz 1991; Prieto et al. 1991; Miotti et al. 1999; Miotti and Salemme 1999; 2005). On the other hand, the predators include felines and humans.

The analogies in the relationships between the degree of naturalism of the representations and the ecological role in the trophic chain of the possible referents shall be explored by the comparison of birds (mainly naturalistic), guanacos (naturalistic), humans (naturalistic) and felines (mainly non-naturalistic). Horses are excluded from this analysis because their 'tracks' do not show clear tendencies in their representations and are thus ambiguous because of their variability (naturalistic and non-naturalistic) within the few types (n=3) that were identified.

The naturalism of the 'bird and guanaco footprints' at Piedra Museo contrasts with the non-naturalistic representations of the 'feline tracks'. This opposition is analogue to the opposition observed in nature through the ecological relationships between the prey animals (guanacos and birds) and the predators (felines) (Table 2).

If 'human representations' are included in these relationships, the oppositions are not any more analogical. Concerning their ecological position in the trophic chain, humans as hunters are analogous to feline predators but opposite of their prey (guanacos and birds). Although the relationship between humans and felines is more complex, since felines can also be hunted by humans and humans may be caught by felines, they are both still equivalent in their potential hunter condition. Conversely to the ecological situation, humans are equal to birds and guanacos in their naturalistic representation, while they are opposite of the non-naturalistic 'feline tracks'. Thus, the similarities and differences observed in the representations do not reflect the similarities and differences which are manifested through the ecological relationships of the referents (Table 3).

Among the multiple dimensions of meanings inherent in visual images (Ouzman 1998; Tilley 1991; Magariños 2002), if these motifs expressed at some level the ecological relationships between the natural referents, the role of humans as hunters was naturalised through their treatment in art while the role of felines as predators was not naturalistically represented. The formal distance between these images and their natural referents could be thus indicating the metaphoric importance of large carnivores in the cosmological realm of hunter gatherers (Ingold 1986: 249; Saunders 1998; Politis and Saunders 2002), and also signalling their ambiguity as signs that could be

Ecological role	Prey (G + B)	≠	predator (F)
		=	
Representation	naturalistic (G + B)	≠	non naturalistic (F)

Table 2. *Analogy between two systems of differences: ecological roles and representations. G: guanacos, B: birds, F: felines.*

Ecological role	Prey (G + B)	≠	hunter (H)	=	predator (F)
		≠		≠	
Representation	naturalistic (G + B)	=	naturalistic (H)	≠	non naturalistic (F)

Table 3. *Relationships centred on humans between two sets of differences and similarities: ecological roles and representations. G: guanacos, B: birds, H: humans, F: felines.*

representing human or animal referents, especially considering the spatial proximity between the 'human tracks' and the 'feline footprints' in the central portions of the boulders.

3.3. The images in the landscape

Among the 'footprints', the most important concentration is observed in AEG-2, where they only represent animals. The quantity and the proportion of the animal tracks in this rockshelter are outstanding on a regional scale if they are compared with the proportions of these representations at other sites with petroglyphs from the late Holocene (Gradin 1976; Re et al. 2005; Carden 2007a, 2008). This fact can be interpreted as a consequence of the temporal depth in the relationships between humans and other animals at Piedra Museo, especially considering that this is the only known site from southern Patagonia which includes petroglyphs and evidences of a long-term use related to hunting practices. Within this context, the topography of the locality and its functionality become relevant for interpreting the oppositions in the proportions of the animal and human tracks in AEG-2 and CG, which may be related to the oppositions in the reception of sunlight of both rockshelters. Thus, AEG-2 is oriented towards the south-east and has a higher concentration of figurative representations (70% of animal tracks), while the proportion of figurative motifs at CG, oriented towards the north-west and only receiving direct sunlight during the late afternoon, is lower (30% of animal and human tracks) (see Table 1). Unfortunately, the symbolism involved in these oppositions has not been preserved through time, although some interpretations may be proposed. For example, considering that AEG-2 is more closely connected to the water springs and only receives direct sunlight during the early morning, the higher concentration of animalistic representations in this site could have been related with ideas concerning the origin and/or renewal of animals. The cardinal opposition between AEG-2 and CG could also have expressed ideas related with life renewal, since it manifests continuity of the course of time through the succession of days and nights. Further relationships between both sites, including the role of non-figurative motifs such as 'labyrinths' and spirals, have been analysed elsewhere (Carden 2007a, 2007b, 2008).

Conclusions

This study intends to show that the division between figurative and non-figurative representations in rock art is not always obvious. On the contrary, this limit is very difficult to outline, especially when our concepts of humanity and animality may differ widely from the ideas held by the authors of the images. The results obtained from the present study are not meant to be applied to interpret the animal track representations from other sites, since these motifs are present worldwide and their interpretation should be context specific (Hodder 1986). However, the recognition of possible natural referents through actualistic methods and the interpretation of the motifs through their spatial syntax, their degree of naturalism and their cultural and ecological context, are valued here as relevant methodological alternatives to explore their denotative and connotative dimensions. Although this exploration definitively does not lead to what the images meant in their own social context, it is stressed here as an important exercise that can at least encourage the formulation of questions through which these aspects may be considered and worked through.

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REFERENCES

Alberdi, M. and J. L. Prado 2004. *Caballos fósiles de América del Sur. Una historia de tres millones de año*s. Serie Monográfica INCUAPA, Olavarría.

Aramayo, S. A. and T. Manera de Bianco 1987. Hallazgo de una icnofauna continental (Pleistoceno tardío) en la localidad de Pehuén-Có (Partido de Coronel Rosales), Provincia de Buenos Aires, Argentina. Parte II. Carnivora, Artiodactyla y Aves. *Actas del Cuarto Congreso Latinoamericano de Paleontología* 1: 532–547. La Paz.

Aramayo, S. A. and T. Manera de Bianco 1996. Edad y nuevos hallazgos de icnitas de mamíferos y aves en el yacimiento paleoicnológico de Pehuen-Co (Pleistoceno Tardío), provincia de Buenos Aires. Argentina. *1ª Reunión Argentina de Icnología. Asociación Paleontológica Argentina. Special Publication* 4: 47–57. Buenos Aires.

Aschero, C. A. 1973. Los motivos laberínticos en América. *Relaciones de la Sociedad Argentina de Antropología* 7: 259–271.

Bang, P. and P. Dahlstrøm 2001. *Animal tracks and signs*. Oxford University Press, New York.

Bednarik, R. G. 2008. Cupules. *Rock Art Research* 25: 61–100.

Belardi, J. B. and R. A. Goñi 2002. Distribución espacial de motivos rupestres en la Cuenca del Lago Cardiel (Patagonia Argentina). *Boletín de la SIARB* 16: 29–38.

Belardi, J. B. and R. A. Goñi 2006. Representaciones rupestres y convergencia poblacional durante momentos tardíos en Santa Cruz (Patagonia argentina). El caso de la meseta del Strobel. In D. Fiore and M. M. Podestá (eds), *Tramas en la Piedra. Producción y Usos del Arte Rupestre*, pp. 85–94. Sociedad Argentina de Antropología, Asociación Amigos del Instituto Nacional de Antropología, World Archaeological Congress, Buenos Aires.

Bird, J. 1988. *Travels and archaeology in south Chile*. University of Iowa Press, Iowa.

Bonomo, M. 2006. Un acercamiento a la dimensión la simbólica de la cultura material en la región Pampeana. *Relaciones de Sociedad Argentina de Antropología* 31: 89–115.

Bórmida, M. and A. Siffredi 1969/70. Mitología de los Tehuelches meridionales. *Runa* 12(1–2): 199–245.

Borrero, L. A. 2001. Cambios, continuidades, discontinuidades: discusiones sobre arqueología fuego-patagónica. In E. Berberián and A. Nielsen (eds), *Historia Argentina Prehispánica 2*, pp. 815–838. Brujas, Córdoba.

Canevari, M. and C. Fernández Balboa 2003. *Cien mamíferos Argentinos*. Albatros, Buenos Aires.

Carden, N. 2007a. El arte rupestre de la Meseta Central de Santa Cruz. El área de los zanjones blanco y rojo al sur del río Deseado. Unpubl. PhD thesis, Facultad de Ciencias Naturales y Museo, University of La Plata.

Carden, N. 2007b. Paisajes rituales y laberintos: relaciones entre dos sitios con grabados rupestres en Piedra Museo, Argentina. *Boletín del Museo Chileno de Arte Precolombino* 12(1): 43–60.

Carden, N. 2008. Territories among hunter gatherers and the ritual dimension of landscapes: a case from the Central Patagonian Plateau. *Before Farming* [online version] 2008/1, article 1. *http://www.waspress.co.uk/journals/beforefarming/*

Cardich, A., M. E. Mansur-Franchomme, M. Giesso and V. Durán 1981–82. Arqueología de la Cueva de El Ceibo, Santa Cruz, Argentina. *Relaciones de la Sociedad Argentina de Antropología* 14: 173–210.

Cardich, A. and L. Miotti 1983. Recursos faunísticos en la economía de los cazadores-recolectores de Los Toldos (provincia de Santa Cruz, Argentina). *Relaciones de la Sociedad Argentina de Antropología* 15: 145–157.

Casamiquela, R. M. 1981. *El arte rupestre de la Patagonia*. Ediciones Siringa, Buenos Aires.

Casamiquela, R. M. 1988. *En pos del Gualicho*. Fondo Editorial Rionegrino, Viedma.

Cattaneo, G. R. 2002. Una aproximación a la organización de la tecnología lítica entre cazadores-recolectores del Holoceno Medio/Pleistoceno Final de la Patagonia Austral (Argentina). Unpubl. PhD. thesis, Facultad de Ciencias Naturales, UNLP.

Ceruti, C. N. 2000. Ríos y praderas: los pueblos del litoral. In M. Tarragó (ed.), *Nueva historia Argentina. Los pueblos originarios y la conquista*, pp. 105–145. Editorial Sudamericana, Buenos Aires.

De Aparicio, F. 1935. *Viaje preliminar en el territorio de Santa Cruz. Publicaciones del Museo Antropológico y Etnográfico de la Facultad fe Filosofía y letras. UBA*. Serie A III: 71–92.

Dowson, T. 1988. Revelations of religious reality: the individual in San rock art. *World Archaeology* 20(1): 116–128.

Gosden, C. and G. Lock 1998. Prehistoric histories. *World Archaeology* 30(1): 2–12.

Gradin, C. J. 1976. Parapetos de piedra y grabados rupestres en la Meseta del Lago Buenos Aires. *Actas del IV Congreso Nacional de Arqueología Argentina*, II (1–4), pp. 315–337. San Rafael.

Gradin, C., C. Aschero and A. Aguerre 1979. Arqueología del área del Río Pinturas. *Relaciones de la Sociedad Argentina de Antropología* 13: 183–227.

Hodder, I. 1982. *Symbols in action*. Cambridge University Press, Cambridge.

Hodder, I. 1986. *Reading the past. Current approaches to interpretation in archaeology*. Cambridge University Press, Cambridge.

Ingold, T. 1986. *The appropriation of nature. Essays of Human ecology and social relations*. Manchester University Press, Manchester.

Ingold, T. 1993. The temporality of the landscape. *World Archaeology* 25(2): 152–174.

Llamazares, A. M. 1989. A semiotic approach in rock art analysis. In I. Hodder (ed.), *The meaning of things: material culture and symbolic expression*, pp. 242–248. Unwin Hyman, London.

Magariños de Morentin, J. 2002. La (s) semiótica (s) de la imagen visual. *http://www.centro-de-semiotica.com.ar/vision.html#LA(S).*

Manera de Bianco, T. and S. A. Aramayo 2003. Primer registro de huellas de Equidae en el yacimiento paleoicnológico de Pehuen Co (Pleistoceno tardío), Prov. de Buenos Aires, Argentina. *Ameghiniana* 40(4): 61R.

Martínez, G. 2006. Arqueología del curso medio del río Quequén Grande: estado actual y aportes a la arqueología de la región pampeana. *Relaciones de la Sociedad Argentina de Antropología* 31: 249–275.

Massone, M. 1987. Los cazadores paleoindios de Tres Arroyos (Tierra del Fuego). *Anales del Instituto de la Patagonia, Serie Ciencias Humanas* 17: 47–60.

Menghin, O. 1952 Las pinturas rupestres de la Patagonia. *Runa* 5: 5–22.

Menghin, O. 1957. Estilos del arte rupestre de Patagonia. *Acta Praehistórica* 1: 57–87.

Miotti, L. 1991. Manifestaciones rupestres de Santa Cruz: la localidad arqueológica Piedra Museo. In M. M. Podestá, M. I. Hernández Llosas and S. F. Renard de Coquet (eds), *El arte rupestre en la arqueología contemporánea*, pp. 132–138. Buenos Aires.

Miotti, L. and N. Carden 2007. The relationships between rock art and archaeofaunas in the Central Patagonian Plateau. In M. Gutierrez, L. Miotti, G Barrientos, G. Mengoni and M. Salemme (eds), *Taphonomy and archaeology in Argentina*, pp. 203–217. British Archaeological Reports, Oxford.

Miotti, L. and M. Salemme 1999. Biodiversity, taxonomic richness and specialists-generalists during Late Pleisto-

cene/Early Holocene times in Pampa and Patagonia (Argentina, southern South America). *Quaternary International* 53/54: 53–68.

Miotti, L. and M. Salemme 2005. Hunting and butchering events at the Pleistocene/Holocene transition in Piedra Museo: an example of adaptation strategies of the first colonizers of Patagonia. In R. Bonnichsen, B. Lepper, D. Stanford and M. Waters (eds), *Paleoamerican origins: beyond Clovis*, pp. 209–220. Texas A & M University Press, Texas.

Miotti, L., M. Vázquez and D. Hermo 1999. Piedra Museo, un Yamnagoo Pleistocénico de los colonizadores de la Meseta Central de Santa Cruz. El estudio de la arqueofauna. In R. Goñi (ed.), *Soplando en el viento*, pp. 113–136. Universidad del Comahue, Bariloche.

Nami, H. and A. Menegaz 1991. Cueva del Medio: aportes para el conocimiento de la diversidad faunística hacia el Pleistoceno-Holoceno en la Patagonia Austral. *Anales del Instituto de la Patagonia* 20: 117–132.

Narosky, T. and D. Yzurieta 1987. *Guía para la identificación de las aves de Argentina y Uruguay*. Vázquez Mazzini Editores, Buenos Aires.

Ouzman, S. 1998. Towards a mindscape of landscape as expression of world understanding. In C. Chippindale and P. Taçon (eds), *The archaeology of rock art*, pp. 31–41. Cambridge University Press, Cambridge.

Paunero, R. S., A. Frank, F. Skarbun, G. Rosales, G. Zapata, M. Cueto, M. Paunero, D. Martínez, R. López, N. Lunazzi and M. del Giorgio 2005. Arte Rupestre en Estancia La María, Meseta Central de Santa Cruz: sectorización y contextos arqueológicos. Relaciones de la Sociedad Argentina de Antropología 30: 147–168.

Politis, G. and N. Saunders 2002. Archaeological correlates of ideological activity: food taboos and the spirit-animals in an Amazonian hunter-gatherer society. In P. Miracle (ed.), *Consuming passions and patterns of consumption. Archaeological studies of material culture*, pp. 113–129. Mc Donald Institute, Cambridge University, Cambridge.

Prieto, A., J. Canto and X. Prieto 1991. Cazadores Tempranos y Tardíos en la Cueva 1 del Lago Sofía. *Anales del Instituto de la Patagonia* 20: 75–99.

Re, A., A. Nuevo Delaunay and L. Ferraro 2005. Grabados en la Meseta del Lago Strobel (Provincia de Santa Cruz, Argentina). El sitio Laguna del Faldeo Verde. *Relaciones de la Sociedad Argentina de Antropología* 30: 245–256.

Sanguinetti de Bórmida, A. C. and L. A. Borrero 1977. Los niveles con fauna extinta de la Cueva de Las Buitreras. *Relaciones de la Sociedad Argentina de Antropología* 11: 167–175.

Saunders, N. 1998. *Icons of power. Feline symbolism in the Americas*. Routledge, London.

Schobinger, J. 1956. El arte rupestre de la provincia del Neuquén. *Anales de Arqueología y Etnología* 12: 115–227.

Schobinger, J. and C. Gradin 1985. *Arte rupestre de la Argentina. Cazadores de la Patagonia y agricultores Andinos*. Ediciones Encuentro, Madrid.

Schuster, C. 1956/58. Genealogical patterns in the Old and New Worlds. *Revista do Museu Paulista*, N. S., 10: 7–123.

Schuster, C. 1988. Labyrinth and other paths to other worlds. In E. Carpenter (ed.), *Social symbolism in ancient tribal art*, pp. 13–686. Volume 3, Book 2, Rock Foundation, New York.

Taçon, P. S. C. and C. Chippindale 1998. Introduction: an archaeology of rock art through informed methods and formal methods. In C. Chippindale and P. S. C. Taçon (eds), *The archaeology of rock art*, pp. 1–10. Cambridge University Press, Cambridge.

Tilley, C. 1991. *Material culture and text. The art of ambiguity*. Routledge, London.

Velandia, C. A. 1994. *San Agustín. Arte, estructura y arqueología*. Biblioteca del Banco Popular, Bogotá.

Wilbert, J. and K. Simoneau 1984. *Folk literature of the Tehuelche Indians*. UCLA Latin American Studies, Vol. 59, UCLA Latin American Center Publications, University of California, Los Angeles.

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