# Crossing the boundary between humans and animals: the extinct fox *Dusicyon avus* from a hunter-gatherer mortuary context in Patagonia (Argentina)

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*The discovery of a grave of the late second millennium BC containing an extinct South American fox,* Dusicyon avus*, at Loma de los Muertos raises intriguing questions about the relationship between wild canids and humans. This sub-adult individual appears to have been buried in a human mortuary context in a comparable manner to adjacent human burials. It may have been kept as a pet and been considered part of the human social group. The ability of pets, especially canids, to leave the animal world and enter into a special relationship with people may be related to the cosmology of South American hunter-gatherers.*

*Keywords:* Patagonia, canid, *Dusicyon avus*, grave goods, animal burials, household animals

## Introduction

Interactions between humans and canids have been complex and varied for thousands of years, from purely economic to social, religious and even affectionate. Remains of canids are found in a wide range of archaeological contexts (e.g. cemeteries, ceremonial settings, residential camps). Moreover, the study of dogs from mortuary sites suggests that this species crossed the boundary between human and animal more often than any other species. That may explain the partially articulated skeleton of an extinct fox (*Dusicyon avus*) recovered at Loma de los Muertos, a hunter-gatherer site in Patagonia (Río Negro province, Argentina).

Archaeological associations between humans and animals fall within a very broad spectrum. Where animal bones were discarded as domestic refuse (e.g. food remains) there is generally no intention of deliberate burial. Intentionally buried faunal remains are less common, and usually involve well preserved and articulated skeletons. Although ritual and

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rational behaviour are not mutually exclusive, it may be possible to define some of these deposits as 'ritual' or 'ceremonial'. These might include, for example, ritual caches (*sensu* Schiffer 1987), ceremonial refuse (*sensu* Walker 1995), faunal caches (*sensu* Brown 2005), special animal deposits (Morris 2011), ceremonial offerings (Sandweiss & Wing 1997) and dedicatory offerings (Hill 2000). Most of these have been traditionally connected with actions aimed at making contact with supernatural entities (such as forces, gods and spirits), to obtain success in life or the afterlife, or simply as commemorative acts (Hill 2000: 364). A second category of intentionally buried animals are 'funerary deposits'. These include any animal remains thought to have been intentionally placed in a repository for the remains of the dead.

The inclusion of animals as part of a funerary deposit may tell us about symbolic relationships between people and animals, and also manifest the inner beliefs, desires and fears of the social actors (Ingold 1998; Morey 2006; Losey *et al.* 2011). Although funerary contexts are a correlate of highly ritualised actions, we consider them apart from other kinds of 'ritual' or 'ceremonial' deposits.

The majority of the animals found in funerary contexts are associated with human remains, and can be classified as 'grave goods' since they were put in a grave along with the dead. Grave goods were mainly intended to satisfy the material or immaterial needs of the deceased in the afterworld (see examples in Parker Pearson 1999). Food offerings were usually of species consumed in daily life, typically body parts with high nutritional value or, more rarely, whole skeletons of small animals (Sandweiss & Wing 1997). Other animal offerings satisfied ideological and symbolic needs, such as those with protective value (e.g. carnivore crania or teeth) (Politis *et al.* 2014), or animals with shamanic power and the ability to access other worlds (Belotti López de Medina 2012). Dogs, cats, horses, monkeys and birds (among others) were also sacrificed to accompany their owners and to signify social status (e.g. Muñoz Ovalle 1983; Wing 1989; Crockford 2000; Hill 2000; Vigne *et al.* 2004; Prates *et al.* 2010a; Belotti López de Medina 2012). Sometimes grave goods could have also been offered for reasons other than to satisfy needs (Ucko 1969); for example, to communicate the power and status of living persons engaged in the funerary event; as garments or gifts offered by mourners to the deceased; or items left in the grave without conscious intent (e.g. left over from ceremonies performed there) (Ekengren 2013). In sum, the defining feature of animal remains as grave goods is that they were not the primary subject of the ceremony performed at the grave. They had, at most, a secondary role, accompanying the primary human interment.

In contrast to the many animals that appear together with humans in graves, single burials of animals—where the animal was the principal subject—are rare in the archaeological record. Only in the case of dogs is this type of burial common. Morris (2011) discusses a review (Behrens 1964) which lists 459 sites with burials of complete animals from the Old World Neolithic and Early Metal Ages. Morris identifies two main contexts in which animal burials are not directly associated with human burials: 'foundation deposits' (where an animal is buried for the spiritual blessing of a new building) and 'animal cults' (burials of animals deemed to be special, feared or worshipped) (Morris 2011: 3; see also Jennbert 2003). In reviewing Late Holocene animal interments in south-western North America, Hill (2000) concluded that apart from canids, which were occasionally treated like humans

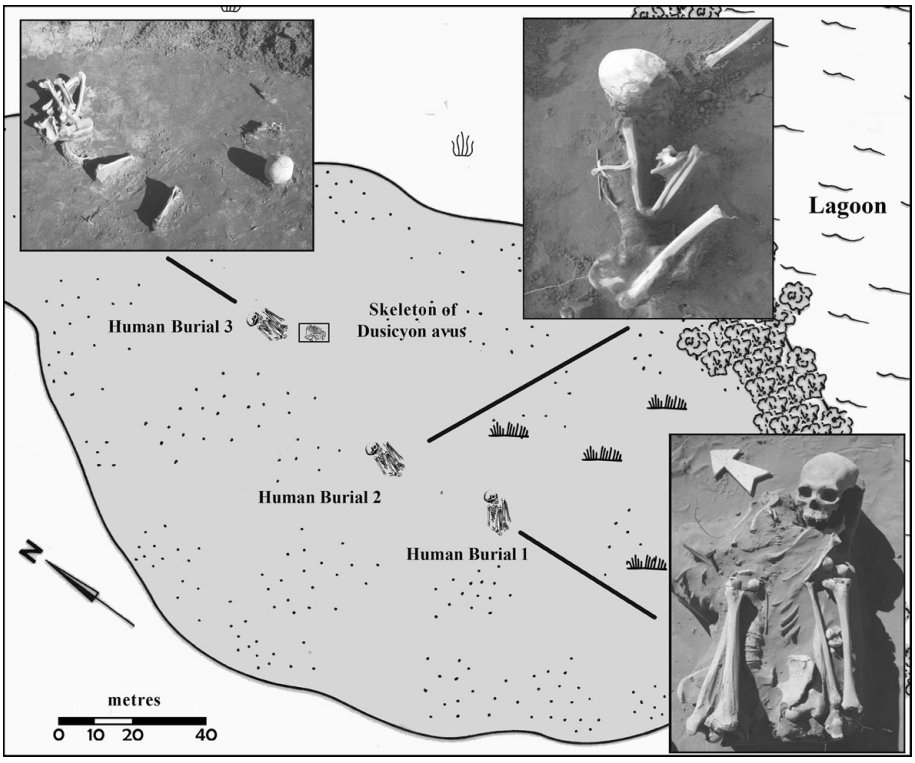


*Figure 1. Loma de los Muertos: the sand ridge (in grey) where human and carnivore skeletons were found.*

after death, most of the animals buried in individual pits represented animal sacrifices or dedicatory offerings. Although the majority of individual burials of animals involve domestic species such as dogs, in exceptional cases wild carnivores have also been treated in this way. These demonstrate that wild canids can have a similar relationship with humans to that of dogs (Maher *et al.* 2011). They also illustrate how important some animals may have been for early societies.

## Canid remains in context

Loma de los Muertos is located next to a pool, on the edge of a palaeo-channel at the southern margin of the Río Negro valley, Patagonia, Argentina. It was accidentally discovered when ground levelling exposed a large number of human bones (Figure 1). In addition to the fox burial, three primary human burials were excavated, two of them disturbed and disarticulated by recent ploughing. These inhumations spanned a period of more than 1000 years (from *c.* 2000–3000 BP) (Prates *et al.* 2010b). In the period since these excavations local farmers have reported the discovery of more than 12 further incomplete human skeletons.

The discovery of the canid remains at Loma de los Muertos closely followed the recovery of the human skeleton from Burial 3 (a young male, 23–35 years old, dated 2718±47 BP) (AA81829; 976–801 cal BC; all radiocarbon dates cited are at $2\sigma$ and were calibrated using

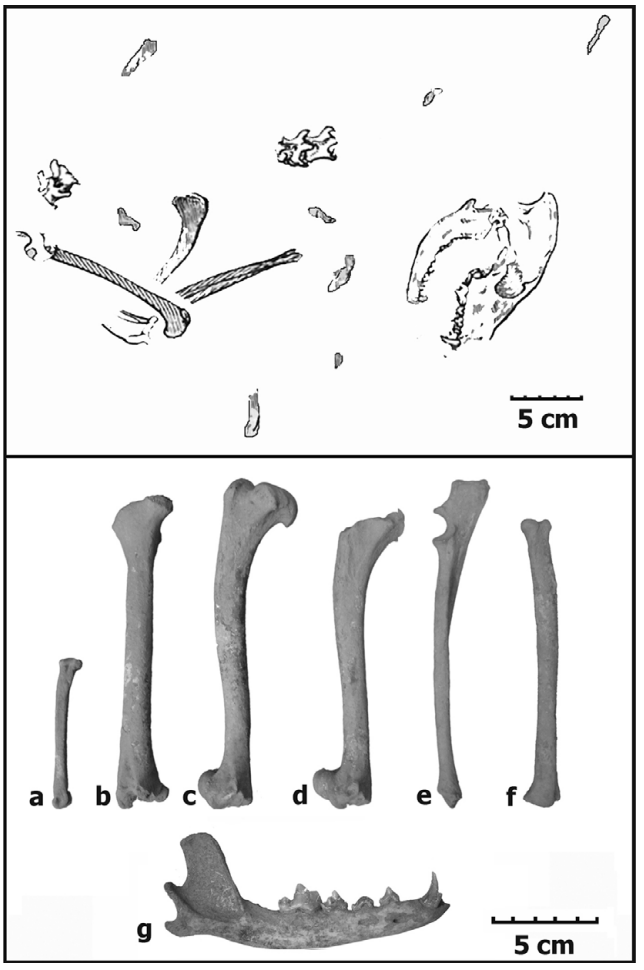


*Figure 2. Plan of the excavated canid remains (above) and selected bones (below): a) metatarsal; b) femur; c–d) humerus; e) ulna; f) radius; g) hemi-mandible.*

OxCal v4.2.3 and IntCal13 (Bronk Ramsey 2009; Reimer *et al*. 2013), two metres away from it and at the same depth (0.3m). Like the human remains, several of the carnivore bones had been disturbed by modern ploughing, leaving the skeleton partially disarticulated with numerous elements scattered in the surrounding area. Despite that, all bones were well preserved except for the fractured neurocranium. The body lay on its left side and only certain parts of the skeleton were articulated or in anatomical position at the time of excavation: the neurocranium with the jaw, four vertebrae, the left humerus with the radius and ulna, and one femur (Figure 2). This strongly suggests that the skeleton was initially complete, and that its disarticulation occurred recently.

On the basis of anatomical features, the remains were assigned by Dr Francisco Prevosti to *Dusicyon avus*, a wild South American canid that became extinct during the Late Holocene (Prevosti *et al.* 2011). The bones, including disarticulated elements, comprise part of the neurocranium (both left and right tympanic bullae, occipital condyles, glenoid cavities and

frontal bones); broken facial bones; and the maxillaries, retaining part of their dentition (right P4–M2 and left P1–2). The left mandible is well preserved and possesses some of its teeth (C1, P2–M2). Bearing in mind the widespread use of grooved or perforated canid-teeth pendants in Pampa-Patagonia (Prevosti *et al.* 2011), it is striking that the canine remains in the jaw of this individual. The postcranial skeleton consists of most of the long bones from the right-hand side, including the humerus, radius and ulna, femur and metatarsals. No cut marks have been identified on the bone surfaces, which suggests the animal was not butchered or consumed before burial. These remains represent one of the most complete skeletons of *Dusicyon avus* found to date.

The epiphyses and diaphyses of the long bones were not fully fused, which is why some of the former were not recovered. The cusps of the teeth are sharp and show little or no wear. Although the fusion between basioccipital and basisphenoid is almost complete, the suture can still be observed. This suggests that the canid buried at the site was a sub-adult, about one year old. Direct radiocarbon dating of a tooth produced an age of 2972±50 BP (AA-83516; 1382–1027 cal BC).

*Dusicyon avus* is a large extinct South American fox with an estimated body mass of about 12–15kg (Prevosti *et al.* 2011), documented in the southern part of South America, particularly the Pampas and Patagonia. Remains of this species are of Pleistocene–Holocene age and most of them come from archaeological sites (Prevosti *et al.* 2011). The archaeological record of *D. avus* consists almost entirely of dental and cranial specimens, and the economic exploitation of these mammals by prehistoric hunter-gatherers is unclear. While two sites located in northern and southern Patagonia—Tres Arroyos and El Trébol, respectively—show some evidence of consumption (Massone 2004; Lezcano *et al.* 2010), it seems that these carnivores were not usually eaten by humans (see Borrero 2009) but must have held some symbolic or ritual meaning in the ideology of these groups (Bonomo 2006; Stahl 2012). Their remains were usually deposited as grave goods in mortuary contexts or used as raw material for ornaments (see Prevosti *et al.* 2011; Stahl 2012). At any rate, notwithstanding the symbolic or ritual role of carnivores in general, they do not usually seem to have been accorded special treatment, such as burial, after death.

## An intentional burial?

The fox remains found at Loma de los Muertos are especially interesting because they come from what appears to have been a sacred place. Before the significance of this association can be properly understood, several specific questions about the context need to be addressed. The first issue to be resolved is whether the fox was intentionally buried by humans or whether it was incorporated into the archaeological context through natural processes. Several lines of evidence strongly suggest human agency in this burial. First, the skeleton was buried in a sand dune that was used as a mortuary location for at least 1000 years; this type of landform was repeatedly used for that purpose throughout the Río Negro valley during the Late Holocene (Prates *et al.* 2010b). Second, the skeleton lay at the same depth as most of the human bodies buried in the surrounding area. Both human and canid remains were buried between 0.30 and 0.35m below the surface, which might indicate a similarity of burial practice. Third, the fox was buried quickly after death, and had probably never

been exposed until the recent ground-levelling work; these inferences are based upon the following observations:

a) the skeleton was relatively complete and articulated;
b) several parts (head, trunk and limbs) were in correct anatomical or articulated relationship;
c) the surface of the bones showed no traces of cracking or flaking (stage 0 of the weathering process *sensu* Behrensmeyer 1978), which suggests some soft tissue covered them at the time of burial;
d) the more dispersed/disarticulated bones (left side and hind limbs) were those that lay closest to the surface, which is why these were more affected by modern farming activities;
e) the possibility that the fox had died a natural death inside its den (etho-ecological cause *sensu* Pardiñas 1999) does not seem to be well supported by available data. Carnivore den sites are expected to contain bones of their prey, especially mammals, whether scatological or transported assemblages (Mondini 2004; see examples from Patagonia in Martin 1998, Fernández *et al.* 2010). No direct evidence supporting this hypothesis was recorded at the site; on the contrary, no other faunal remains were recovered from the sediments surrounding the carnivore.

If we conclude that the carnivore was intentionally buried by humans, the second question to be answered is whether or not it was associated with a human burial. The direct $^{14}$C dating of the canid and of the nearest human (Individual 3; Prates *et al.* 2010b) gave close but slightly different ages: 2972±50 BP (AA83516; 1382–1027 cal BC) for the canid and 2718±47 BP (AA81829; 976–801 cal BC) for the human. In addition to the difference in dates, which suggests we are looking at two different burial events, there is no close spatial relationship between the human and canid which would suggest a single archaeological deposit. The skeletons are more than two metres apart, and the presence of articulated bones in both suggests that they remained (partially) in their original positions. The distance between them cannot be explained by post-depositional causes. Since the human (Individual 3) and *Dusicyon avus* corpses were not buried together in a single grave, and no other skeleton was found near the carnivore, one can assume the animal was not sacrificed or placed as an offering within a human burial. Grave goods might be offered at the moment of burial or after it, but are expected to display a close spatial association with the deceased.

## Burial behaviour and animal interments

The making of offerings to the dead was not widespread among the pre-Hispanic hunter-gatherers of Pampa-Patagonia. In this region, non-perishable grave inclusions are usually nothing more than body accessories (e.g. clothes and ornaments) and mollusc shells. The inclusion of other kinds of grave good became more common and systematic after the appearance of inter-ethnic territorial competition and the emergence of social hierarchies (e.g. Berón 2010) around 1000 years ago, and especially from the seventeenth century AD. The most noteworthy example of an animal used as an offering in Pampa-Patagonia was recovered at the Chenque 1 site (in the Dry Pampas) where a dog and a child were buried together in the same grave *c.* 900 BP (Berón 2010; Prates *et al.* 2010a). Although the

practice of offering animals to the dead was frequently mentioned by chroniclers during the eighteenth and nineteenth centuries, in most of these cases they were not buried directly after death, but left on the ground surface (e.g. Barreto 1992). Such practices were mainly reserved for mortuary ceremonies involving politically or symbolically important men.

As observed above, when a body (human or animal) is included among the goods offered in a grave, it occupies a secondary role in the burial ceremony because it is naturally subordinate to the main individual in the inhumation. In such a case the subordination is mediated by the reification of the offering in order to make it part of the dead person's equipment and to convey prestige, companionship, attendance, protection and/or power. By contrast, the fact that the canid was not part of the grave offerings accompanying a human but was individually buried necessarily implies that the animal took a leading role in the burial ceremony.

At this point it should be asked why people might decide to bury the body of a fox, especially as this practice was neither common nor usually applied to non-domestic species. Although we are far from answering the question definitively, we can at least explore the implications of this practice on the basis of archaeological and ethnographic data.

Cross-cultural data strongly suggest that when animals were selected for individual burial it was because they were highly valued. Either they may have had sacred status and a significant ritual value, or they might be given some sort of human status that would mean they had a special relationship with people or were part of a given social structure (e.g. companion animals; see for example Erikson 1988). Animals with sacred or ritual status were buried in very different and complex circumstances, mostly mediated by ritual killings or sacrifices, in animal cults, as dedicatory offerings or foundation deposits. The circumstances could be very diverse, but corpses were usually buried at special places and subjected to *peri-mortem* manipulation or human agency (i.e. killing, consumption, rearrangement of bones: Jennbert 2003; Hill 2000; Morris 2011). The canid from Loma de los Muertos was not buried at a special location but in a mortuary area, and no traces of manipulation of the corpse were identified. Neither butchery nor trauma marks were noticed on the skull, cervical vertebrae or long bones; and no evidence of rearrangement of anatomical elements or body parts was recorded. These features of the fox burial do not seem to support the first explanation, that of a sacred animal. Hence we will give more attention to the second explanation: that the canid was buried in the same way as a person—an animal grave in Jennbert's terminology (2003: 140)—because of its special relationship with people.

In the few archaeological cases of animal burial among pre-Hispanic peoples of southern South America, the animals (wild or domestic) were 'imbued' with a certain 'humanity' and had strong social ties with humans. The two most prominent examples are the dog (*Canis familiaris*) recovered from the Lower Delta of the Paraná River (Acosta *et al.* 2011), and the mustelid (*Galictis* sp.) from the site of Huachichocana III, both in Argentina (Fernández Distel *et al.* 1995). The latter is particularly interesting because, like the present study, it involves the burial of a wild carnivore. The animal was laid in the grave accompanied by offerings (grinding stones and corn cobs) and wore a belt around its neck (Fernández Distel *et al.* 1995: 199, fig. 5). This would suggest it was kept as a tamed wild animal and, at the same time, it shows that a close human-animal relationship can be a powerful explanation in the case of animals treated like people.

Although taming is usually a prerequisite for domestication, it does not necessarily equate to domestication; "...taming is a relationship between a particular person and a particular animal without long-term effects beyond the lifetime of that animal" (Russel 2002: 286). Tamed animals are removed from the wild and brought into a new set of social relationships (see Clutton-Brock 2012). Unlike domestication, this has no effects on the population of the species (see Russel 2002). Taming (or an attempt at taming) emerges as an interesting hypothesis to account for the exceptional treatment given to *Dusicyon avus* at Loma de los Muertos. On one hand, the capacity of foxes to be tamed (Hare *et al*. 2005) and even domesticated (Trut 1999) has been proved; on the other, the mortuary context strongly suggests that the fox had been socialised (or an attempt to do so had been made).

In many cases, taming wild species has been seen as a functionally or materially orientated action; as a step toward domestication; for use in hunting (see Reitz & Wing 2008: 299); or as baby substitutes or toys for children (Groves 1999). Nevertheless, many ethnographic examples (especially from the tropical Amazonian forest) show how multidimensional the pet-keeping process can be (e.g. Erikson 2000; Descola 2002; Politis 2007), and that it has a strong association with motherhood (Hernando *et al.* 2011). In the ontology of the lowland South American Indians there is a very complex symbolic relationship between the universe and living things (plants, animals and humans), which was also a basic premise of the world-view of the hunter-gatherers of southern South America (see Llarás Samitier 1950). This has been treated in depth from several theoretical approaches such as Viveiros de Castro's perspectivism, Ingold's ecological phenomenology and Descola's socialised nature (Fausto 2007: 497). For these communities, awareness and reflective capacity are not uniquely human skills but can be acquired by other (living and non-living) beings. This means that drawing a line between animality and humanity does not make sense in many societies, and that pet-keeping may be a part of a complex social system. The inclination toward taming wild animals among lowland South American people is embedded within an intricate network of social and symbolic relationships that do not assume any ontological asymmetry between humans and animals. It cannot be seen as a pre-domestication stage or as a means to satisfy material needs from tamed species. On the contrary, keeping animals in settlements as pets or in households is usually a mechanism to solve a basic quandary arising from the act of hunting. This entails an attitude of reciprocity towards beings spiritually equivalent to humans (Brightman 1993; Stahl 2012). There is a widespread belief that animals do not belong to humans but to the 'masters of animals' (Erikson 2000). The act of hunting creates tension, with destructive effect on the hunter. To avoid any retaliatory actions people must negotiate with the 'masters of animals'; for instance, by the adoption of young animals as pets (see Erikson 1988, 2000). Once the offspring enter the household sphere and become part of the social network, they no longer belong to their original species. They leave the world of animals and acquire a status equivalent to that of humans. In many cases, after death, they are given the same treatment as humans (Erikson 2000).

Among the indigenous people of Pampa-Patagonia there is a central mythological figure: the 'gualicho', known alternatively as 'Elumgássum' in northern Patagonia (Harrington 1935) and 'Elal' in southern Patagonia (Bórmida & Siffredi 1969–1970). This god/demon

or mythical hero was believed to be the creator of people and the master of all things, including living animals (Harrington 1935; Casamiquela 1988). In these societies, the exchange of roles between people and animals and transformation from one to the other was a recurring and ambiguous phenomenon. Several myths hold that in ancient times all living animals, along with the sun and the moon, were people, who were subsequently transformed into animals by Elumgássum (Bórmida & Siffredi 1969–1970: 208). In other myths, animals are seen as forefathers of humans (Hernández 2003). Only foxes (and the burrowing rodent *Ctenomys*) seem to have been able to transcend the boundary between humans and their ancestors (Hernández 2003).

From this discussion one point clearly emerges. Despite the marked differences between the world-views of different societies, among the indigenous people of Pampa-Patagonia as amongst tropical forest hunter-gatherers, the limit between 'animality' and 'humanity' was permeable, or even artificial. The treatment of an animal as a person may have been simply the materialisation of the transcending of this boundary. Beyond any specific meaning in a given context, for an animal to be treated as a human strongly suggests it has somehow entered the human world. If any animals were more apt than others to make this social and symbolic passage, they were probably canids.

In our particular case, the fox found at the Loma de los Muertos site was a sub-adult which probably acquired the status of a household animal. Although canids can live in captivity, the majority of animals caught from the wild do not reach adulthood. Moreover, not only was it treated in the same way as a person after its death, but it was *not* treated like the majority of wild carnivores from archaeological contexts. The canine tooth is still present in the mandible, and was not removed as one would expect. The commonest remains of these animals in archaeological assemblages are canine teeth whose use as pendants, amulets or metonymic symbols for protection was very widespread among South American hunter-gatherers (see ethnographic examples in Politis 2007). An apparent prohibition against interfering with the carcass (for example, removing the canines) supports both the differential treatment given to this animal with respect to other members of the same species, and the hypothesis that the animal was included in the social framework or considered to have human status. In this regard Philippe Erikson refers to the treatment given to wild pets by the Amazonian *Maties*: ". . . on les enterre apres leur mort et on évite de les traiter comme leurs congenères destinés à la marmite. . .il est interdit, meme après leur mort, de prélever les dents. . ." [". . .they are buried after their death and one avoids treating them like their conspecifics destined for the pot. . .it is forbidden, even after their death, to take the teeth. . ."] (Erikson 1988: 30).

Although canids have had strong symbolic connotations among the hunter-gatherer societies of South America (Stahl 2012), and the co-evolution of humans and canids has been proposed by several scholars (Brantingham 1998; Coppinger & Coppinger 2001; Schleidt & Shalter 2003), archaeological evidence for the special (and individual) treatment of foxes at death is rare. The key to understanding this *Dusicyon avus* burial is the specific role this individual animal played in a particular space and at a given time, and which led to its inclusion within a particular social framework. As a result of this process the animal may have ceased to belong to the 'wild world' and became incorporated into the social fabric.

## Conclusion

The canid found at the Loma de los Muertos site may have been intentionally buried by humans and can be interpreted as an individual mortuary deposit. This conclusion is supported by the fact that the skeleton was complete (without cut marks), articulated and lay in a sand dune that was used as a mortuary context for at least 1000 years. It was not associated with any human interment—hence it was not a grave offering but an individual burial. It was treated as a person not only in that it was intentionally interred, but also in that it was placed in an established mortuary area. The special treatment of the fox at Loma de los Muertos may result from the animal having become part of the social structure of a particular group. It may have lost its essential attributes of animality and crossed the limit, real or virtual, between the human and animal worlds. The canid seems to have entered a new symbolic and social dimension denied both to other members of its species and to non-domestic animals in general, and which involved entering into a direct relationship with humans. Although several reasons might be proposed for this crossing of the boundary, ethnographic and archaeological data suggest that taming or pet keeping (or an attempt thereof) is the most likely explanation in this context.

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