
The Elephant in the Handaxe: Lower Palaeolithic Ontologies and Representations

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Indigenous hunter-gatherers view the world differently than do WEIRD (Western, Educated, Industrialized, Rich and Democratic) societies. They depend—as in prehistoric times—on intimate relationships with elements such as animals, plants and stones for their successful adaptation and prosperity. The desire to maintain the perceived world-order and ensure the continued availability of whatever is necessary for human existence and well-being thus compelled equal efforts to please these other-than-human counterparts. Relationships of consumption and appreciation characterized human nature as early as the Lower Palaeolithic; the archaeological record reflects such ontological and cosmological conceptions to some extent. Central to my argument are elephants and handaxes, the two pre-eminent Lower Palaeolithic hallmarks of the Old World. I argue that proboscideans had a dual dietary and cosmological significance for early humans during Lower Paleolithic times. The persistent production and use of the ultimate megaherbivore processing tool, the handaxe, coupled with the conspicuous presence of handaxes made of elephant bones, serve as silent testimony for the elephant–handaxe ontological nexus. I will suggest that material culture is a product of people’s relationships with the world. Early humans thus tailored their tool kits to the consumption and appreciation of specific animal taxa: in our case, the elephant in the handaxe.

When we look about us on the earth, what we see is colored by our worldview and the languages that we use to describe our observations. A landscape of streams and lakes, mountains and rich valleys, shared by thousands of species of plants and animals, is understood through the lens of the western materialist worldview as a wealth of ecosystem services or natural resources. In contrast, through the lens of traditional Indigenous philosophy the living world is understood, not as a collection of exploitable resources, but as a set of relationships and responsibilities.

Kimmerer (2018, 27)

Introduction

Today a thriving human lineage occupies every continent, whereas the elephant lineage, comprising

some of the largest mammals that ever walked on Earth, is endangered and geographically restricted to regions of Africa and Asia. (‘Elephant’ refers to all members of the Proboscidea taxonomic order, extant and extinct). Seven million years ago, the human clade underwent its earliest evolutionary divergence in Africa, while megaherbivores, including several proboscidean taxa, were distributed across the globe and showed impressive taxonomic diversity and richness (Faith *et al.* 2018). Therefore, human evolutionary history is characterized by the co-existence of humans and proboscideans, and the prehistoric archaeological record testifies to human–elephant interactions throughout time and space. In parts of Asia and Africa, close to the equator, the human–elephant interaction continues today, following a legacy of hundreds of thousands of years. In

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Europe, the rest of Asia and America, however, this interaction ended at the terminal Pleistocene, with the extinction of proboscideans. In specific regions in Africa and the Levant, however, the disappearance of elephants seems to have occurred during the Middle Pleistocene and was linked to significant cultural and technological transformations in human behaviour and adaptation strategies (Barkai *et al.* 2017; Ben-Dor *et al.* 2011; Blasco *et al.* 2019a,b; Potts *et al.* 2018). Prehistoric sites throughout the Old and New Worlds present ubiquitous evidence for the significant role in diet and culture elephants played in early human adaptation and well-being during the Palaeolithic (*c.* 2 million–10,000 years ago). Proboscidean remains are found in many Pleistocene sites and are associated with several human species (e.g. *Homo erectus*, *H. neanderthalensis* and *H. sapiens*).

Palaeolithic nutrition was based on animal meat and fat, in addition to vegetal sources, and archaeological sites bear evidence of elephant exploitation for dietary purposes by the use of stone tools. I argue that Proboscideans, when available, provided an unprecedented food-package for early humans, and that actually successful human subsistence depended largely on megaherbivores. Moreover, the central role of elephants as a food source, coupled with the social and behavioural similarities between elephants and humans (Lev & Barkai 2016), might explain the inclusion of these animals in early human cosmology and symbolic expressions (most vividly expressed in Palaeolithic parietal and mobile imagery: see e.g. Braun & Palombo 2012; Hussain & Floss 2015).

Homo erectus, the ancestor of *Homo sapiens* and Neanderthals, was obliged by their increased body size and energetically expensive brain and by the ceiling on the amount of protein they could safely digest to consume large animals high in fat. An association between the large-brained *Homo erectus* and the increased consumption of meat and fat, associated also with primary access to carcasses, has been noted (e.g. Aiello & Wheeler 1995; Pobiner *et al.* 2008), with some researchers concluding that *Homo erectus* evolved to be a member of the hypercarnivore guild (e.g. Domínguez-Rodrigo & Pickering 2017; Werdelin & Lewis 2013). I highlight the significance of proboscideans in human diet, culture and well-being in the Lower Palaeolithic, as well as the persistent production and use of the iconic Acheulean handaxes. I argue towards a dual functional-ontological link between elephants and handaxes and suggest that the extraordinary pattern of using broken elephant bones for the production of bone handaxes is

a manifestation of Lower Palaeolithic cosmologies and ontologies, centred on the elephant.

Fat, meat and the role of elephants in indigenous hunter-gatherer societies

Most indigenous hunter-gatherer societies depend to a significant extent—as they did in prehistoric times—on calories extracted from land and sea mammals. This was true mostly during Lower and Middle Palaeolithic times, when megaherbivores roamed the landscape presenting the highest biomass density (Ben-Dor & Barkai 2020) and continued ever since, although the extent of plant consumption by humans rose since the late Quaternary extinction of megafauna some 40,000 years ago. Fat and meat fuelled human biological and cultural evolution, and the well-documented indigenous craving for fat and meat in recent societies (e.g. Biesele 1993; Tanner 2014) is also reflected at prehistoric sites throughout the Old and New Worlds by the ubiquitous presence of the remains of consumed prey and the emphasis on fat acquisition (e.g. Ben-Dor *et al.* 2011; 2016; Blasco *et al.* 2019b; Boschian *et al.* 2019; Morin 2020; Solodenko *et al.* 2015; Speth 2020).

Fat and protein have been recognized as essential elements in human diet during the Pleistocene (e.g. Bunn 2006; Domínguez-Rodrigo & Pickering 2017), in addition to complementary calories from vegetal sources (Hardy *et al.* 2015). Fat and protein from animal carcasses are a source of essential amino acids, minerals, vitamins and fatty acids (Friedman 1996; Givens *et al.* 2006). Fat provides 9 calories/gramme at a minimal digestion cost, while carbohydrates and protein provide only 4 calories/gramme, and hence fat is the densest form of energy available in nature (Outram 2002). Its taste, too, has been documented to be favoured by humans (Reshef & Barkai 2015), and it is plentiful in large herbivores even when other resources are scarce. Human protein consumption is also known to have accepted ceilings, dependent on the ability of the liver and renal system to dispose of its by-products (Ben-Dor *et al.* 2011; 2016). Thus, on average, humans are able to gain only about one-third of their daily calorific intake from meat (Speth 2020). Vegetal food is not always available and accessible, its processing is demanding and its digestion is energetically costly (Ben-Dor & Barkai 2020). Prior to the habitual use of fire, plant consumption for dietary purposes must have been minimal (Barkai *et al.* 2017). Fat is available year-round, there are no physiological limitations on its consumption and it provides ultra-nutritious and tasty calorific supply.

Homo erectus (*sensu lato*) appeared on the scene some two million years ago in Africa, equipped with extended brain capacity, large body size and digestive and dental systems adapted towards high-energetic foods capable of sustaining the large brain and body (e.g. Aiello & Wheeler 1995; Domínguez-Rodrigo & Pickering 2017; Zink & Lieberman 2016). Animal fat and marrow provided the necessary food intake for the essential daily energy expenditure, especially in cases where plants were not available in abundance and prior to the habitual use of fire for cooking (Ben-Dor *et al.* 2011). The Lower Palaeolithic archaeological record is indeed consistent with such a scenario (Barkai *et al.* 2017; Domínguez-Rodrigo & Pickering 2017). This dependency on meat and fat led to the regular acquisition of animal carcasses by hunting (as well as scavenging) and a preference for megaherbivores such as elephants, mostly because they provided large quantities of high-quality fat (Agam & Barkai 2016; 2018; Guil-Guerrero *et al.* 2018).

The hunting of very large animals, including elephants, was surely demanding, but does not require extraordinary means (Agam & Barkai 2018; Churchill 1993; Lewis 2015). Moreover, the preferred human consumption of large animals can be deduced from the decline, and even disappearance, of large animal populations in Pleistocene Africa and the Levant (Ben-Dor & Barkai 2020; Ben-Dor *et al.* 2011; Potts *et al.* 2018; Smith *et al.* 2018) and from the prominent role of elephants, along with other large mammals, at Early and Middle Pleistocene hominin sites worldwide.

Proboscideans, with their large size and high fat content, must have been an essential source of calories for early humans. In analysis of mammoths found in permafrost Siberia (Guil-Guerrero *et al.* 2018), fat-rich organs were suggested to be of ultimate importance for Stone Age hunters:

Brain, bone marrow, subcutaneous fat, viscera and meat would have been the targeted mammoth organs for Stone Age hunters and given the high energy needs of Stone Age hunters, protein-rich food, such as meat, should have been ingested to a lower extent than other fatty tissues. (Guil-Guerrero *et al.* 2018, 459)

Moreover, the authors suggested that the fat available from large mammals would have provided sustenance for a group of people for an extended period:

Achieving 4500 kcal, the previously estimated daily energy need at those times, would have been possible by consuming ~566 g of meat complemented by ~592 g of fatty tissues, such as subcutaneous fat. For a mammoth of ~3.0 tons, ~5% subcutaneous fat and other

similar fats distributed throughout the body would be a conservative figure, and thus a medium-sized mammoth would have stored ~1 million kcal as fat, providing clean energy for a hunting group of 12–24 individuals for approximately 9–18 days, while the consumption of variable amounts of meat would have extended this figure for some days. (Guil-Guerrero *et al.* 2018, 461)

It should be stressed that the above calculations do not take into consideration the consumption of bone marrow, one of the most elementary nutrients and a favourable source of calories for Palaeolithic humans (Boschian *et al.* 2019). Thus, when the contribution by bone marrow is added to the sum of calories provided by a proboscidean, the quality and significance of this food package is surely unprecedented. Moreover, African Pleistocene elephants were much larger and heavier than the European mammoths (up to 8–10 tons in weight); their dietary potential is thus much higher than the above estimates. In addition, recent research on the fat composition of juvenile frozen mammoths shows a rare nutritional value of their fat itself, with a high concentration of polyunsaturated fatty acids, which are known to build up cell membranes. Fat from juveniles also had a higher nutritional profile due to milk intake (Guil-Guerrero *et al.* 2014). These nutritional properties, the large number of juvenile elephant bones found at various sites and the better taste of young animal fat might indicate a preference for proboscidean calves by Pleistocene humans (Reshef & Barkai 2015). Moreover, it should be highlighted that isotopic studies indicated time and again that Palaeolithic humans consumed proboscidean meat and fat even in the absence of relevant bones in the faunal record, strongly indicating the underrepresentation of the role of megaherbivores in the Palaeolithic human diet (Bocherens 2009; 2011). Likewise, it was recently argued that both human behaviour in the past and the methods of calculating the contribution of large animals to the human diet in the present actually mask and underappreciate human dependency on calories provided by megaherbivores (Ben-Dor & Barkai *in press*; Bocherens *in press*).

Palaeolithic sites demonstrate the ubiquitous consumption of large herbivores by early humans and it is becoming rather evident that hunting was practised as a primary procurement strategy for humans to meet their calorific and nutritional demands (Bunn 2019; Domínguez-Rodrigo & Pickering 2017). There is also ample evidence that, during the Palaeolithic, elephant bones were used as material

for tool production. Proboscidean bones were also used as fuel and as material for constructing dwelling structures and windbreaks. Furthermore, elephants and mammoths are also significantly represented in Palaeolithic parietal depictions and mobile 'art' in Upper Palaeolithic Europe and in the production of non-utilitarian items such as bone handaxes in Europe, Africa and Asia during Lower Palaeolithic times (Barkai 2019; Gaudzinski *et al.* 2005; Hussain & Floss 2015; Zutovski & Barkai 2016).

Lower Palaeolithic stone handaxes, and the peculiar presence of handaxes made of elephant bone

Stone tools provide a unique window into the mode of adaptation and cognitive abilities of Lower Palaeolithic early humans. As stone tools (along with animal bones) are often the sole remains of early human activities, the persistently produced large cutting tools (bifaces/handaxes) have long been an appealing focus of research in the reconstruction of Lower Palaeolithic survival strategies. In general, Lower Palaeolithic stone-tool technologies are characterized by flakes and flakes shaped as tools, while the canonic handaxe is considered as the most prominent Acheulean tool-type (see Finkel & Barkai 2018). Handaxes (Fig. 1) are relatively large items shaped by bifacial flaking that reflects skilled production and in many cases extended life-history. Despite recent research that strongly highlights the variability and complexity of Acheulean lithic technologies, and most prominently the role of flakes in human adaptation (e.g. Agam *et al.* 2015; Lycett & Gowlett 2008; Venditti *et al.* 2019a), the canonic handaxe still attracts most of the scholarly attention and is still considered as a hallmark of the Acheulean.

The available functional, technological, and experimental data imply that Lower Palaeolithic handaxes were most probably employed in animal carcass processing (e.g. P. Jones 1980; Keeley 1980, 160–70; Machin *et al.* 2007; Mitchell 1996; Solodenko *et al.* 2015). However, this issue is still hotly debated. Handaxes were sometimes in operation in the execution of tasks not related to animal carcass processing (e.g. Domínguez-Rodrigo *et al.* 2001; Hardy *et al.* 2018; Zupancich *et al.* 2018), and thus it was suggested that handaxes acted as multi-purpose tools. I argue that the available data point towards repeated archaeological association of animal carcasses and handaxes (e.g. Goren-Inbar *et al.* 2018; Solodenko *et al.* 2015) as well as the efficient use of handaxes in de-fleshing and dismembering

animal carcasses (Fig. 2), and in particular carcasses of large herbivores (e.g. P. Jones 1980; 1981; Key & Lycett 2015; 2017).

A previous paper (Finkel & Barkai 2018) addressed the dissonance between the alleged 'stasis' of the Acheulean handaxe for over one million years and the significant transformations in culture and biology throughout the Lower Palaeolithic period. Most research on this topic suffers from neophilia, the enthusiasm towards what is new and novel. We suggested instead that while persistency was preferred in handaxe manufacture and use, innovation took place at other realms of human behaviour and adaptation, enabled by the stability provided by the familiar mode of adaptation based on the assured performance of the good old handaxe. We highlighted the dependency of Acheulean hominins on megaherbivores for sustaining their energetic needs, and the significance of handaxes in supplying calories by efficiently processing large game. We argued that the pivotal role of the handaxe in Acheulean adaptation accorded it its fixed position in Acheulean technology and culture following human conformity and majority imitation. In short, we proposed that the persistence of the Acheulean handaxe acted as an adaptive mechanism based on preferred cultural conservatism, which allowed and enabled the successful adaptation of Lower Palaeolithic human groups in the Old World for over one million years.

It is true that Acheulean handaxes might have been used to process large animal carcasses other than elephants (for example horse processing at Boxgrove; see Pope & Roberts 2005). In other cases, carcasses of large mammals such as elephants and horses seem to have been processed without handaxes (e.g. Aureli *et al.* 2015; Gallotti & Peretto 2015; Van Kolfschoten *et al.* 2015). Thus, the alleged elephant-handaxe nexus is not obligatory for every encounter people had with elephants, but depends upon specific circumstances and interactions. Even if certain elephants, in certain situations, were conceived as other-than-human persons that must be treated, processed and consumed with respect, this need not always be the case. This point can be clarified by the case of Ojibwa ontology regarding how objects such as stones can, *in certain circumstances*, become animate:

Since stones are grammatically animate, I once asked an old man: Are all the stones we see about us here alive? He reflected a long while and then replied, 'No! But some are'.... Whereas we should never expect a stone to manifest animate properties of any kind under any



Figure 1. A handaxe from late Acheulean Revadim, Israel.



Figure 2. A replica of a flint handaxe used in experimentation of deer butchery. (Courtesy of Ruth Blasco and Jordi Rosell.)

circumstances, the Ojibwa recognize, a priori, potentialities for animation in certain classes of objects under certain circumstances. . . . The Ojibwa do not perceive stones, in general, as animate, any more than we do. The crucial test is experience. Is there any personal testimony available? In answer to this question we can say that it is asserted by informants that stones have been seen to move, that some stones manifest other

animate properties, and, as we shall see, Flint is represented as a living personage in their mythology. (Hallowell 1960, 24)

More elaborate arguments appear in a wonderful, recently published book describing the lives of stone tools in Gamo hide workers ontology in Ethiopia (Arthur 2018). In the same spirit, a study

of the Nayaka hunter-gatherers of southern India reveals their intimate familiarity with each and every elephant sharing the forest with them, while foreign elephants are treated differently and are not expected to demonstrate the norms of appropriate behaviour the Nayaka generally share with the elephants they know so well (Bird-David & Naveh 2008). Thus, I would suggest that the co-occurrence of handaxes and elephants at the same sites, sometimes together with handaxes made of butchered elephant bones, might reflect intimate and purposeful interactions with specific elephants, while other elephants might have been treated differently (in light of such a perspective, see a similar suggestion regarding treating specific individual horses in the Upper Palaeolithic Magdalenian: Birouste 2020).

As handaxes were also used in tasks other than carcass processing, I suggest that Lower Palaeolithic hominins were much less rigid and more practical than presumed. Thus, they manipulated objects in varied ways and contexts, according to changing relationships and interactions. This perspective contradicts neither the general pattern or effectiveness of handaxes in processing large game nor the chronological and geographical association between proboscideans and bifaces. The production and use of bifaces persisted as long as elephants and mammoths were around (Ben-Dor *et al.* 2011; Potts *et al.* 2018), while after their disappearance, new stone tool technologies and modes of adaptation were introduced (Barkai *et al.* 2017; Blasco *et al.* 2019a,b; Venditti *et al.* 2019b).

Early humans not only consumed elephant fat and meat but also broke up elephant bones and extracted bone marrow, particularly from limb bones (Boschian *et al.* 2019). Acheulean early humans sometimes also used elephant bones beyond their immediate nutritional benefit, in manufacturing artefacts that closely resemble the iconic Acheulean stone handaxe (Zutovski & Barkai 2016). Although Lower Palaeolithic Acheulean bone handaxes appear across a wide geographical range, they are a small-scale phenomenon. Bone bifaces were manufactured very similarly to the iconic stone handaxe and following shared elements of design and dexterity (Costa 2010).

Acheulean bone bifaces were mostly produced from elephant bones (Figs 3–4). All eight archaeological sites analysed (Zutovski & Barkai 2016) contained many skeletal elements of other large herbivores, on top of the proboscidean bones available at those sites. Nonetheless, only a single handaxe was shaped from the bones of other taxa than elephants. Moreover, bone handaxes were found only at sites also containing handaxes made of

stone (Zutovski & Barkai 2016). The striking similarity between handaxes made of the butchered elephant bones and the stone handaxes that were most probably used in the butchery of these elephants is striking. We have suggested the use of the butchered elephant bones for shaping replicas of the stone handaxes served as an expression of early Acheulean humans' sense of dissonance at consuming these majestic animals with which they shared the world, and perhaps also an ontological act of ensuring the continuation of this Acheulean mode of existence. I will further argue that butchered elephant bones were purposely selected to allow early humans to 'become elephants' and to maintain the special relationship between the species, much in accordance with the arguments presented in Tanner (2014) and similarly to the way indigenous groups practised—or practise—their ontology about the animals they depend upon. It is of note that Sano *et al.* (2020) provide the first unequivocal evidence for the use of a 1.4 million-year-old bone handaxe from Konso in carcass processing. I suggest that this important discovery further supports a dual functional and perceptual role for these items: use of a biface does not negate a complementary role in signifying the relationships of early humans with the megafauna who sustained them and with the cosmos in general. Moreover, the occasional use of an exceptional handaxe produced from megafauna bone does not preclude any symbolic meaning. The same holds, by the way, for the stone handaxes. Given the abundance of suitable stones at Konso, the decision to transform a bone flake into a handaxe, despite stone's better workability and efficiency in butchery, testifies to an exceptional, conscious act—an act of reverence that sheds light not only on the technological sophistication of the Acheuleans, but also on their perception of the world.

Ontological and cosmological theories of the world among indigenous hunter-gatherers

Anthropological and archaeological thinking regarding the relations between indigenous groups and the world in which they live suggests that past and present hunter-gatherers were not simply exploiting natural resources. These societies view the world as composed of other-than-human persons potentially capable of thinking, feeling and decision-making. In this unique and complex view, multiple worlds might exist in parallel: a world of humans, a world of animals, a world of stone, a world of mountains, a world of rivers, and so on. The human world is just one of many, and humans are expected to live



Figure 3. An elephant bone handaxe from Fontana Ranuccio, Italy. (Courtesy of Margherita Mussi.)



Figure 4. Elephant bone handaxe from Castel di Guido, Italy. (Courtesy of Giovanni Boschian.)

side-by-side with the other entities, maintain good relations with them and pay them respect in order to ensure world order and well-being (e.g. Alberti 2016; Betts *et al.* 2015; Boyd 2017; Hill 2011; 2013; A. Jones 2017; Kohn 2015; Loring 1996; Nadasdy 2007; Tanner 2014; Viveiros de Castro 1998).

This worldview had an important expression in the seeming duality of humans perceiving animals both as other-than-human persons and equal co-habitants of a shared habitat while also hunting and consuming these animal-persons (Barkai 2019; Nadasdy 2007; Tanner 2014; Willerslev 2013). The

debate regarding human universals (Antweiler 2016; Brown 1991; 2004) is beyond the scope of this paper. While scholars highlight the diversity in hunter-gatherers' lifeways which is caused mostly by specific ecological adaptations (e.g. Fisher 2020; Hitchcock 2019) and/or contact with what Henrich *et al.* (2010) call WEIRD societies, it can be argued that certain commonalities do characterize the indigenous mode of existence, or what Barnard (2002) had termed 'The foraging mode of thought'. These might include core-values such as sharing, self-provisioning, personal autonomy, egalitarianism and animistic ontology which are expressed by behavioural phenomena such as singing, dancing, fire-side storytelling, communicating with the cosmos via altered states of consciousness, craving for meat and fat and close encounters with animals and plants (e.g. Dyble *et al.* 2016; Lavi & Friesem 2019; Lee 2006). In my view, these communalities are shared to some extent by past and present hunting societies, and specifically their reciprocal relationship with the game animals they are dependent upon. Such relationships are reflected in activities both mundane and sacred.

A recurrent idea in many recent indigenous societies is that prey animals willingly make themselves available to humans only if the hunters demonstrate appropriate behaviour towards them. In return, humans are obliged to treat the hunted animal with respect, waste nothing of the carcass, and follow strict customs regarding the use and disposal of the inedible remains:

A central attribute in the conduct of hunting is that game animals are persons and that they must be respected. The rules of respect after the killing involve essentially taking care of all elements of the carcass, and not allowing anything to be thoughtlessly discarded. Thus blood and intestines are consumed, buried in the snow, or fed to the dogs; bones are made into tools, hung in the trees, put on bone platforms, or put in a lake, and all uneaten meat is fed to the dogs or put in the fire. (Tanner 2014, 202)

And Tanner goes even further:

The more commonly held belief is that the inedible remains continue to be part of the species as a whole, and their proper treatment is a way of avoiding giving offence to the master of the species in question, thus enabling hunting to continue. (Tanner 2014, 261)

I suggest that these traits of the ontological relationships between hunters and their prey should be sought in prehistoric archaeological assemblages of

all chronologies and might be reflected in the extensive exploitation of animal carcasses at archaeological sites (e.g. Barkai *et al.* 2017; Blasco *et al.* 2019a,b), in the shaping of selected inedible animal parts into tools (Barkai 2019; Blasco *et al.* 2013; Zutovski & Barkai 2016), the use of inedible animal body parts in certain activities (Conneller 2004) and the insertion of animal bones in rock cracks at decorated caves (Clottes 2009; Garate *et al.* 2019). I would not expect this to be the case at every archaeological site where humans interacted with animals, and much of the evidence of such an ontological stance might have not been preserved. However, I am confident that the body of evidence will grow if archaeologists will be more open to the possibility of unearthing it. Then, common terms such as 'ritual', 'symbolism', 'ceremony', 'deposits', 'art' and 'ornaments' might be better understood within this ontological framework, as part of the complex human-animal relationships. The anthropocentric worldview so characteristic of WEIRD societies would best be discarded and replaced with a more cosmos-centric approach that better lends itself to reconstructing past human engagements with the world (in the spirit of the work of Lucero 2018).

To please the elephant: concluding remarks

The relationships between hunters and the animals they share the world with (but also hunt, kill and consume) are often reflected by hunters identifying themselves with the hunted animal, being 'transformed' into an animal during the hunt and often adopting the hunted animal's perspective and even sharing its feelings and emotions (e.g. Guenther 2015; Lewis-Williams & Biesele 1978; Russell 2017). Hunters commonly make use of all parts of the prey, after the edible parts have been consumed, in order to manufacture items such as hunting gear, pendants, clothing and footwear, and amulets. They even sometimes conceal selected animal body parts on their body during the hunt (e.g. Betts *et al.* 2012; McNiven & Feldman 2003; Russell 2017; Živaljević 2015). This behaviour is not only an outcome of practical necessity but is also a token of appreciation towards the animals and a mechanism aimed at both showing respect and perpetuating the significant relationships people had with these animals.

The 'nothing is wasted' concept is another facet of hunter-hunted relationships aimed at pleasing the animals (Burnham 1992; Loring 1996). The selection and use of an animal body parts is far from accidental and not directed solely by practical or technical

considerations. As many have argued, it is an expression of the hunters' obligation to respect their prey (e.g. Tanner 2014). The intimate physical contact between the hunters and the item made from the hunted animal allows the former access to the animal's perspective and to 'transform' into the animal during the hunt and during carcass processing and consumption. They are thus granted the skills and strength of the respective animal, effectively enabling the hunters to 'become' their prey. This perspective was beautifully demonstrated in a reconstruction of the role of deer 'masks' in Mesolithic Britain: the masks were suggested not to comprise 'practical' elements used in the hunt or 'symbolic' elements with no clear explanation, but rather to consist of purposefully selected deer body-parts that enabled the hunters to transform into a deer (Conneller 2004).

In this paper I have argued that early humans shared the world with large herbivores, depended on fat and meat for their successful adaptation and well-being, and had special relationships with the animals they depended upon. Elephants are a salient example, as some proboscideans were viewed at the same time as other-than-human persons and an essential and significant source of calories. But this special relationship extended to all other prey animals as well, each taxon with its own special qualities and the specific tool-kit oriented towards its processing and appreciation.

Humans were repeatedly preoccupied by the procurement, exploitation and appreciation of elephants and other large herbivores. Thus, hunting and carcass processing were central practices in human life, well embedded in both practical and ontological adaptation strategies. I therefore suggest that specific technologies were associated with specific animal taxa, or a combination thereof, first for practical and then also for perceptual reasons, and that these relationships lasted as long as these animal taxa existed and supported human adaptation. I further argue that the dependency of human groups on specific animal taxa was a driving force behind the development of appropriate and specific technologies and tool-kits oriented towards both successful hunting and processing as well as respecting and maintaining good relationships with these animals. In this regard, the changing representations of animal taxa, and more specifically the decline in availability of large animals throughout the Pleistocene, led human groups to change their tool-kits accordingly in order to fit the practical and ontological necessities of consuming and appreciating different animal taxa. This approach might explain technological changes such as the replacement of handaxes

by Levallois, to be replaced later by systematic blade production, once viewed through the lenses of the changes in animal taxa available to humans (as proboscideans were replaced by horses and cattle, which were later replaced by deer, and so on) and the possible relationships humans maintained with the specific animal taxa they were dependent upon. These factors might have led to the anchoring of specific technological adaptations as mediators, both practical and perceptual, between humans and pivotal animal taxa, as in our case of the elephant in the handaxe.

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