Maya Zooarchaeology: An Integrative Approach

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Keywords
Maya, zooarchaeology, faunal analysis, paradigms

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Since the late 1960s faunal analysis, or zooarchaeology, has become one of the fastest growing sub-disciplines within archaeology (Crabtree 1990:155). Modern zooarchaeology has practitioners working in different theoretical paradigms (Brewer 1992:195), but as Thomas (1996) and Reitz and Wing (1999) have demonstrated these paradigms are primarily based on the functionalist and materialist archaeology of the middle decades of the twentieth century. However, a non-functionalist, non-positivist zooarchaeology is conceivable (Thomas 1996; O’Connor 1996; Holt 1996), and Thomas’ definition allows interpretation from any theoretical position:

“Zooarchaeology is, or should be, the study of past interactions between people and animals, usually involving the analysis and interpretation of animal remains from archaeological deposits but sometimes using additional data sets.”

(Thomas 1996:2)

More traditional definitions focus strictly on animal bones, rather than the processes of human/animal interaction which ultimately lead to the bones’ deposition:

“Zooarchaeology is defined as the identification and analysis of animal remains from archaeological sites.”

(Brewer 1992:196; Grayson 1973)

White et al. (in press b:3) adhere to this more narrow definition when they claim "no zooarchaeological evidence for domestication has been uncovered" in the Maya world. The present paper, on the other hand, follows Thomas’ (1996) definition, seeing art, ethnohistory and analogy as elements of zooarchaeological analysis. Postprocessual archaeological theory is integrated with an examination of ancient Maya deer exploitation. Postprocessualism’s (Hodder 1985, 1986) emphasis on contextualization, ideology and symbolism can only benefit Maya faunal analyses, and zooarchaeology as a whole.

Deer, including white-tailed deer *(Odocoileus virginianus)* and to a lesser extent brocket deer (genus *Mazama*), are among the most represented terrestrial species in many Maya faunal assemblages (e.g. Olsen 1972, 1978; Pohl 1985, 1990; Stanchly 1995; Wing 1975; Wing and Scudder 1991; Wing and Steadman 1980). Venison was a favoured food of the Maya, especially those of the elite class (Carr 1985; Pohl 1981, 1983; Pohl and Feldman 1982) as evidenced by
archaeological, artistic and ethnohistoric data. Deer embodied natural forces such as rain and sun, and were associated with yearly agricultural renewal rites, and political inauguration ceremonies (Pohl 1981, 1983). It is the symbolic aspects of deer, as manifested in Maya ritual ceremonies, which form the basis of this paper.

Using a number of lines of evidence -- animal bones and their temporal, functional and symbolic contexts (see Shaw in press), ethnohistory, art, ethnology, and ethnological metaphor -- this paper attempts to demonstrate some possibilities of a postprocessual zooarchaeological approach in addressing issues of animal domestication. Animals in general, and deer in particular, played an active role in Maya ritual.

Zooarchaeology: Functionalism and Integration

"Animals play a wide range of roles in human life. They provide food, shelter, clothing, status, symbols, and companionship. These roles and the social meaning of animals extend beyond their nutritional and economic value."

(Reitz and Wing 1999:332)

"There is no useful future for an 'archaeozoology' which divorces itself from archaeology, any more than there can be for an archaeology which cuts itself off from its various science-based specialisms."

(O'Connor 1996:15)

The development of archaeological faunal analysis is linked to the major paradigm shifts of the 1960s and 1970s (Thomas 1996), and it is firmly grounded in the positivism of processual archaeology, as outlined by Binford (1962, 1965; c.f. O'Connor 1996:6). Three elements were fundamental to Binford's (1962, 1965) "new archaeology": first was an emphasis on neoevolutionism and its high degree of cross cultural regularity in human behaviour; second was the materialist adoption of ecological-determinism; and third was the use of a Hempelian logico-deductive method (Trigger 1989a, 1989b). The resultant deference to "scientism" and scientific methodologies has been a major influence on the current analytical directions of zooarchaeology.

However, the beginnings of modern functionalist faunal analysis lie in Graham Clark's earlier development of an archaeology primarily concerned with economic processes (O'Connor 1996:12; Trigger 1989a:270). His work on European Prehistory (e.g. Clark 1952, 1954) focused on subsistence patterns, shelter, technology, trade, travel, and transportation (Trigger 1989a: 268). Under Clark's tutelage, Higgs and Jarman developed the theory and methodology of what might now be termed palaeoeconomic archaeology, and the influence of this school largely drives the development of archaeological bone studies today (O'Connor 1996:12). Site catchment analysis (Higgs 1972, 1975; Jarman et al, 1982; Vita-Finzi and Higgs 1970) and optimal foraging theory (e.g. Bettinger 1991; Keene 1983; Yesner 1981) are important examples of the methodologies influenced by Clark's palaeoeconomics and used by faunal analysts. Termed 'optimization models' by Holt (1996), they have found their
way into Maya archaeology. For example, Pohl's (1990) analysis of the faunal assemblages of five Peten sites includes a comparison of their catchment areas.

Optimization models are used by functionalist zooarchaeologists with three major objectives in mind: (1) the compilation of taxonomic lists; (2) palaeoenvironmental reconstruction/biogeography; and (3) subsistence studies (Brewer 1992:197). The third objective has tended to justify the other two: "the primary value of zooarchaeological studies is in allowing an understanding of how humans have subsisted through time and across space" (Stewart 1995:13). What has changed from the functionalist zooarchaeology of the 1950s and early 1960s to the processual zooarchaeology which prevails today is not so much the theoretical basis for explanation, as the number of new methods and techniques used to achieve goals dictated by changing archaeological paradigms (Brewer 1992: 22). Major concerns, then, are with quantitative methods and the effects of taphonomic processes (e.g. Grayson 1984; Klein and Cruz-UrIBE 1984; Lyman 1994; Reitz and Wing 1999).

Unfortunately, zooarchaeology has been slow in connecting its methodologies with the "dynamic social forces which shaped so much of Maya life" (Shaw in press:2). And, indeed, the methodologies themselves are not above reproach. Optimization models in general, and site catchment analysis in particular, have been criticized for their "narrowness and determinism" (Trigger 1989a:270). By definition, they consider animals from a strictly economic perspective. They may be convincing in explaining why certain animals were chosen for exploitation but are less successful in explaining why others were not (Holt 1996:89). As Holt points out the decision to consume certain animals may have been a symbolic one and cannot, therefore, be explained by economic models (Holt 1996:91). The ritual and metaphorical importance of animals in archaeological cultures is well documented (Reitz and Wing 1999:274-275; Tilley 1999:49-57) and the Maya are no exception (see Pohl 1981, 1983; Pohl and Feldman 1982).

The Maya may be ill suited to the palaeoeconomic zooarchaeological models described above for another reason. These models were developed primarily for hunter-gatherer societies, and the dichotomy between faunal availability and the efficiency of human procurement is not as clear-cut for sedentary, agricultural communities (Shaw in press:3). Crabtree (1990) demonstrates the need to address questions beyond subsistence and economics when studying "complex" societies. She sees faunal analysis as useful in studying trade, social status, and ethnicity (although she fails to move beyond a functionalist paradigm while doing so). O'Connor (1996:11) recognizes another problem when dealing with large-scale, sedentary cultures such as the Maya. As they generally have a substantial corpus of artifactual and structural data, animal bones tend to be regarded as a fallback source of archaeological information, often included as appendices or as brief, disjunctive sub-sections. This has certainly been the case in Maya zooarchaeology (e.g. Olsen 1972, 1978; Wing 1975; Wing and Scudder 1991; Wing and Steadman 1980; see also Pohl 1985:136).
Zooarchaeologists need to remember that,

"Faunal data from complex societies cannot be studied in isolation. It is only through the combination of faunal data and other lines of evidence that we can begin to understand the economic basis of complex societies."

(Crabtree 1990: 191)

Any attempt to understand the social and ideational development of a past human population cannot ignore the animals, and must therefore engage the animal bone evidence (O'Connor 1996:12).

An integrative approach will widen the perspective of zooarchaeology allowing it to catch up to "the rest of archaeology [which has] moved forward, leaving animal bones studies marooned in a functionalist paradigm" (O'Connor 1996:12).

Crabtree (1990) suggests:

"We must be archaeologists first and zooarchaeologists second. We should spend less time worrying about the relative merits of MNI, NISP and other measures of taxonomic abundance, and more time considering how we can integrate faunal data with other lines of archaeological evidence."

(Crabtree 1990: 191)

As the present paper hopes to demonstrate, attempts should also be made to integrate analytical developments from the dominant epistemologies of modern archaeology - positivism and relativism. "Cognitive" processualism (e.g. Renfrew and Bahn 1996) and "interpretive" postprocessualism (Hodder 1991) have recognized the need for a middle-ground approach although each maintains their respective epistemology. Trigger (1998), on the other hand, advocates a realist theory of knowledge combining idealism and positivism with an awareness of the constraints exerted by an external reality. Influenced by all these positions, the following sections consider how an integrative Maya zooarchaeology - both methodologically and theoretically - might look. Although the limited faunal database allows for preliminary investigations only, the present paper demonstrates the need for an integrative approach to Maya zooarchaeology.

DEER AND SYMBOLISM

"The construction of principles of metaphoric analogy between the domains of humans and the domains of animals forms a fundamental basis for self-understanding and the construction of meaning in all known societies

(Tilley 1999: 49)

The pre-Columbian Maya used fauna as analogic metaphors for sun, rain, and earth (Pohl 1983: 102), and artistic and ethnohistoric data suggest that the deer supernatural in particular, was a significant figure in ancient Maya religion (Pohl 1983; Tozzer 1967). In fact, Tozzer's (1967:348-349) interpretation of the post-Classic Maya codices suggests that the deer may have been the most important animal offered
as a sacrifice to the gods.

The early accounts of the Spaniards also suggest the religious and symbolic importance of deer in Maya society. When Cortés crossed Peten, Guatemala, in 1525, his men came upon a savanna filled with tame animals. The Spanish soldiers inquired about the strange behaviour of the deer and were told the animals were gods, and, consequently, there was a taboo on hunting them and they were not used to being pursued (Pohl 1981:521). The spiritual significance of deer is also seen in Bishop Landa's account of the "Great Deer". The Maya believed that when a great deer should enter the land, the cult of the gods would end. Tozzer (1941:44-46) suggests the great deer arrived with the Spanish, first in the form of horses, and later as European cattle. In fact, Oviedo states

"Had it not been for the horses, which went about loose and neighed and served as sentinels, and because the Indians felt such terror of them...that they ran off, not a Christian in the land would have escaped death."

(Oviedo quoted in Pohl 1981:521)

In her extensive analysis of Maya animal use, Pohl (1981, 1983; Pohl and Feldman 1982) has discussed deer symbolism in the ancient Maya *cuch* ritual. Evidence on stelae, murals, vase painting, graffiti and the codices points to the association of deer with the rites of fertility, agricultural prosperity, and the continuation of life. Deer were also associated with conch shells (Pohl 1983), the sacred tree (Pohl and Feldman 1982), water symbolism (Pohl 1990; Tozzer 1967), and the sun. For example, among the Cakchiquel Maya it was deer that sometimes pulled the sun across the sky (Pohl and Feldman 1982).

Archaeological evidence dating at least to the Preclassic period has also demonstrated the symbolic importance of deer (Pohl 1990; Wing and Scudder 1991). Of particular interest are two ritual caches from Late Preclassic Cuello, which contained 329 isolated deer teeth, 39 upper and lower jaws, and 23 auditory bullae. White-tailed deer dominated the assemblage, with only three isolated molars and one antler burr derived from brocket deer (Wing and Scudder 1991:84-85). Interestingly, a minimum of 25 of the individuals (total MNI = 35) were subadult. Bones from refuse deposits may also evidence ritual activity. At Seibal there was a discernible difference in the side from which bones were derived. Thirty elements came from the right side of animals, while 100 came from the left. This may represent codes of meat distribution, grounded in the observance of directional symbolism (Pohl 1985).

The following discussion considers animal symbolism and domestication, and how these trajectories can be re-directed to an interesting social paradox.

**Domestication**

"Maya deer were raised for the feast, or took advantage of the field, but were native to the forest."

(White *et al.* in press b)

Evidence for the Maya domestication or explicit management of deer populations is very contentious (Carr 1996; Pohl 1985, 1990). Part of
the problem stems from an inability to define domestication. White et al. (in press a:4) point out that Maya domestication can be viewed as a complex interaction of humans with animals as pets, hunting companions, and scavengers, in addition to being sources of food, medicine, labour, trade and ritual. Domestication is, then, an interactive process, taking place within human economic and symbolic spheres.

Evidence for Maya deer domestication has not been found in the skeletal remains of animals. However, Maya art and archaeology provide limited evidence for deer management. In addition, ethnohistory and ethnological analogy, for example the Peru Moche, suggest the possibility of domestication. In the Madrid Codex deer are commonly depicted tied to trees (Pohl 1981; although Tozzer 1967 interprets these images as deer caught in spring pole snares). This suggests some form of human control, as might the already mentioned story of Cortés and the tame deer in Peten. But, perhaps more compelling ethnohistoric evidence comes from the account of Bishop Landa that women:

"...let the deer suck their breasts, by which means they raise them and make them so tame that they never go into the woods, although they take them and carry them through the woods and raise them there."

(Tozzer 1941:127)

This passage not only suggests that the Maya raised deer, it also demonstrates that they may have preferred to control the deer's environment rather than controlling the deer themselves. This may have been a more economical practice (Pohl 1990).

Carr (1996) suggests that up to a certain point, human interference with the environment would actually benefit the white tailed-deer. These animals thrive in second-growth brush, and in edge areas where forest and clearings meet. Shifting agriculture would develop an ideal habitat, in addition to providing salty ashes that attract deer. However, a point would be reached when agriculture became sufficiently intensive to adversely affect deer populations. When this occurred, Carr (1996:259) believes that the Maya would have two options: (1) they may have maintained their efforts to catch deer, but would have necessarily supplemented their diet with other species; or (2) a conscious conservation effort may have ensued. Unfortunately, due to the limits of the Maya faunal data, no site has yet been associated with either option. Compounding the problem of insufficient evidence, Carr realizes that her model is "strictly biological and materialistic" and that the Maya "may have seen resource problems in a different light and approached their solution from an entirely different angle" (Carr 1996:261).

Archaeological evidence for deer domestication is minimal. One Terminal Classic structure at Seibal, associated with the remains of deer antler has been interpreted as a possible deer pen (Pohl 1990). Although difficult, penning deer is not impossible, and ethnohistoric evidence suggests that the Moche of Peru used tame deer in their ceremonies (Pohl 1985).

Perhaps the most compelling evidence for Maya deer domestication comes from the investigation of animal diet through isotopic analysis (White and Schwarcz 1989; White et al. 1993, in...
This approach assumes that dependence on humans for food is a necessary criterion of domestication (White et al. in press a: 4). When interpreting isotopic results it is important to remember that, although the wild:domestic polemic may be real in terms of cognitive dichotomization, in actuality it may not be a valid categorization of vertebrates (O'Connor 1996:15):

"We might expect deer diets to vary considerably, because they can be completely wild forest feeders, semi-domesticates feeding from agricultural fields at the forest edge, herds managed in the wild, or enclosed captives being fed by humans."

(White et al. in press a:14-15)

Moreover, not all of these distinctions are reflected in the isotopic results. White et al. (in press a) were able to demonstrate that deer at Preclassic Colha "were forest feeders". Likewise, bones from Late Preclassic Tikal were probably derived from wild deer (White et al. in press b:12). Conversely, at Late Classic Lagartero two deer specimens revealed significant amounts of maize in their diet, and one of them in particular was fed nothing but maize from its infancy (White et al. in press:11). It is possible, then, to isotopically identify wild individuals, and ones that had been captively fed a long-term diet of maize. However, it is impossible to distinguish semi-domesticates who fed from agricultural fields from herds managed in the wild, or even from captive deer who had been fed maize for a comparatively shorter period of time. Unfortunately, many of the tested samples fit this ambiguous category, for example, Late Classic Copan (White et al. in press b:12), Classic Pacbitun (White et al. 1993), and Postclassic Lamanai (White and Schwarcz 1989).

Symbolic Domestication

There is ample evidence for deer being hunted by the ancient Maya. One Late Classic period polychrome plate depicts several hunters disguised in deerskins, luring does by imitating the sound of stags or fawns, and another plate painted in Late Classic style shows a hunter with deer headdress and blowgun, surrounded by a pack of dogs (Pohl 1985: 137-138; Pohl 1990). The Late Classic period Actun Balam vase depicts several hunters pursuing deer with spear throwers, and Pohl (1985: 139) suggests this may show an organized animal round-up. The Maya may also have used nets in their hunts. Nets are associated with deer on Classic style pottery, and the Popul Vuh mentions them in connection with ceremonial hunting (Pohl 1985:139). It is unquestionable that at some point in the past deer were harvested by the Maya solely by hunting, and because of this they must have been associated with the wild, and the more abstract notion of "wildness".

Communal deer hunts may have been a metaphoric dramatization of harvesting successful maize crops or capturing rivals in warfare (Pohl 1985; White et al. in press a). My suggestion is that the specific rituals of the hunts may have involved the symbolic domestication of the wildness of the deer (distinguishable from the domestication of the deer itself). Hodder (1990:10-11) recognized that in the European Neolithic "symbolism is involved in the celebration and control of the wild, and that control relates to social power". At
the Lepinski Vir site, Serbia, he sees the stag as representing wildness, and ultimately representing death. It was one of the largest animals in the vicinity and must have been considered dangerous with its large and imposing antlers. The Maya may have viewed deer similarly. As described above, they were afraid of the Spaniards' horses which they equated with the great dear. Hodder points out that bringing a hunted stag into a household literally and symbolically domesticates the animal. Specifically, removing the antlers of an animal represents domination and control (Hodder 1990:29). The Maya Calcehtok vase depicts a stag undergoing this very procedure. The ceremonious context of the image also suggests the metaphor of domestication. We see the deer wearing some form of cape, obviously related to the domestic sphere. Signia of death are also evident on the Calcehtok vase. The cape is decorated with bones and a vulture flies overhead. As Hodder (1990:10) demonstrated with the European Neolithic, death and wildness are symbolically related: "The main overt expression of elaborate symbolism envelops death, the wild and the fearful".

The vase from the Actun Balam Cave contains more compelling evidence for the association of deer and "the domestication of wildness". One of the deer being hunted (~wildness) is actually being ridden by a female figure (~domestication). Moreover, behind the female figure a dwarf is depicted holding a spindle with unspun cotton hanging from it. In ancient Mesoamerica spinning is a symbol of civilization (Pohl 1983:87), which is logically and fundamentally related to the processes of domestication. So, when Pohl and Feldman (1982:299) see the tying of the stags in the Madrid Codex representing the closing of the agricultural cycle, I see the more direct metaphor of the domestication of wildness.

This symbolism can also be applied to the Maya cuch festival. Pohl (1981:524; Pohl and Feldman 1982) believes the association between deer and agricultural renewal rites was based on the grazing habits of the animal. They would browse on the edges of fields and in second growth, and thus "became intimately associated with cultivation in the Maya mind" (Pohl 1981:524). I suggest the importance of deer in the cuch festival may be less superficial than this happenstance association. Rather than being a participant in the ritual, based on ecologically determined feeding habits, the deer may have actively been involved in creating the domestication metaphor. The cuch festival may have been a ritual of agricultural renewal, fertility and prosperity, but its origins had a deeper meaning - that the wild is separate from the domestic, and that it can be tamed. When this deeper meaning dominated the ceremony, the deer was more than just a passive player in it. As a metaphor for the domestication of the wild, the deer was the ceremony.

But this metaphor could only be maintained as long as the actual wildness of deer approximated the metaphorical wildness of deer in the minds of the Maya. Because deer were central to the domestication ritual, demand for animals for sacrifice would be high. Exactly how many would be needed on an annual basis is unknown, but over "hunting" may have occurred. Deer populations would also have been depleted as a result of habitat destruction (Carr 1996). As the human population
increased forest was turned into agricultural land, eventually to the detriment of the animals.

"Since hunting and deforestation must have reduced animal populations by Late Classic and especially Terminal Classic times, Maya nobles might have arranged for the management of deer habitats or had deer raised in pens."

(Pohl 1990:167)

This creates a paradox. The desire to metaphorically domesticate the wild deer necessitates actual deer to be ceremoniously "domesticated". To ensure sufficient animals for the ceremonies, I believe deer management strategies were developed. At this point the domestication metaphor broke down. A ceremony based around the metaphorical domestication of an animal that is already cognitively perceived as domesticated has little or no impact.

When deer became sufficiently domesticated in the eyes of the Maya, both metaphorically and literally, the wild:domestic polemic became of negligible importance. Of course, deer have never been truly domesticated in every sense of the word, and it may have been the development of this third "semi-domestic" category that further acted against the sustainability of the wild:domestic dichotomization. The blurring of the wild:domestic boundaries reduced the metaphorical impact of one dominating the other, and thus reduced its importance. Of course, deer did not lose their significance as a symbolic animal. We see their continued importance in the ceremonial hunt and the cuch festival (Pohl 1985). Perhaps it was at this point that the cuch ritual became dominantly associated with agriculture, fertility, and rebirth.

DISCUSSION

"Because animals were the tangible manifestations of Maya religious thought, the bones provide unique insight into prehistoric ceremonies and the people who conducted them."

(Pohl 1983: 55)

Acknowledging the symbolic significance of animals does not necessitate the adoption of any particular epistemology. Ritual assemblages from archaeological contexts can be explained from a positivist perspective, and indeed they often are. However, such explanations have a tendency to wrongly assume the passivity of symbol in material culture. Hodder (1982a, 1986) has demonstrated that:

"Material culture does not just exist. It is made by someone. It is produced to do something. Therefore it does not passively reflect society - rather, it creates society through the actions of individuals."

(Hodder 1986:6, original italics)

The notion of the meaningful constitution of archaeological material culture extends beyond the realm of artistic style. Animal bones, both in midden and ritual contexts, are consciously accumulated and deposited by humans - in a sense they are 'made'. As Shaw points out "We cannot assume
that the Maya disposed of their food randomly" (Shaw in press:5). This is because:

"The cultural landscape is a medium for communication, filled with mnemonic symbols that organize cultural activities. The household is an archaeologically visible minimal cultural landscape, so household refuse is more than simply a passive residue of behavior."

(Wilson 1995: 169)

Trash is, then, a communicative device. Okely (1975) and Hodder (1982b) have observed this among the British Roma (Gypsies) whose camps are generally perceived and interpreted by non-Roma as filthy. However, the trash and dirt of the camps actually act to produce meaningfully constituted messages to outsiders (Wilson 1995: 180).

Maya deer bones may have also been encoded with culturally specific information. As Ingold (1989) has argued, animals are an essential part of the "cognitive mindscape" of a human population, not just resources to be exploited on an objective, rational basis (O'Connor 1996:12). In their interpretations archaeologists have tended to project subjective meanings onto the minds (and ultimately the material culture) of archaeological peoples. The emphasis in zooarchaeology on "frameworks based on palaeoeconomy, subsistence, and environment" (Thomas 1996:1) has given priority to the economic functions of animal bones. However,

"...to assume that bones discarded on a settlement bear any relation to the economy is to make assumptions about how people perceived animals, bones, discard, etc. In many societies complex social meanings are attached to...animals, bones and dirt."

(Hodder 1986:78-79)

Building on the ideas of Hodder (1986) and Wilson (1995) one might view animal bones as encoded with at least two levels of metaphorical meaning. First is the deep metaphor that is also associated with the live specimen as a member of a particular species. This is sustained beyond the life of any particular animal and will be projected onto its skeletal remains. The second level of metaphor is less ingrained. These are the polymorphous themes added to the skeletal elements through manipulation by human agents, through the process of being culturally 'made'. These levels of metaphor act in tandem to create the meaningfully constituted messages that develop the bones into active creators of society.

If we accept that bones may contain metaphorical messages which reflect the cognitive processes of the ancient mind how might we discover what these messages are? Deferring to postprocessual theories, Holt (1996) suggests using a structuralist zooarchaeological approach. Structuralist analyses look for symmetries of transformations between data types, usually displayed as binary pairs (e.g. male:female):
"When we ask for the meaning of the symmetries or other formal structures, when we consider whether the symmetries in the pottery decoration are transformations of those in the organization of settlement space, or in burial practices, and when we relate such structures to abstract structures in the mind, we begin to move from formal to structuralist analysis."

(Hodder 1986:41)

The multiple data types available to the Mayanist - archaeological, architectural, artistic, ethnohistoric, historic, bioarchaeological - offer an opportunity to employ structuralist analyses. A structuralist zooarchaeology can determine "how people themselves categorized animals" (Holt 1996:105). Happily,

"A zooarchaeological structural analysis...sees the economic and the symbolic as inseparable arenas... After all, animals are more than just food - and food, for that matter, is more than just calories."

(Holt 1996:105)

This is important as "The Maya...did not dichotomize the material and spiritual as we do (Carr 1996:261).

Any number of social elements might be investigated for conceptual symmetry using faunal data. Death:life and male:female are logical cross-cultural dichotomizations. In highly socially stratified societies such as the Maya the elite:commoner dichotomy may be of fundamental significance. Functionalist analyses have used animal bones to address issues of social status from the ancient Maya world and elsewhere (Carr 1985; Crabtree 1990; Pohl 1985). However, these do not incorporate the cognitively developed symbols of the actual ancient person. Hodder's (1990) emphasis on the wild:domestic dichotomization in his analysis of the European Neolithic should logically be of interest to anyone studying the zooarchaeology of non-hunter-gatherer societies. Reitz and Wing (1999) remind us that:

"Controlling animals through domestication is a major step toward accumulating wealth, managing fluctuations in abundance and accessibility of resources, and acquiring animal products and services."

(Reitz and Wing 1999:332)

Hodder (1990) demonstrates the shift to domestication in an economic sense is preceded by the development of domestication as a social and symbolic process. The ancient Maya knew the distinction between wild and domestic, and using Hodder's (1990) analysis I suggest this dichotomization was of fundamental importance in the structuring of Maya society. To demonstrate this, rather than focusing on architectural style, as Hodder (1990) does, I would suggest emphasizing the animals themselves. The animals would have been the most obvious metonymical transformation of the wild:domestic polemic and their bones are, therefore, worthy of a structural analysis of conceptual symbolism.
Maya archaeology has been chastized for its "intellectual parochialism and theoretical naivete" (McAnany 1995:5). The introduction of positivist thought in the 1970s and 1980s acted to jump-start the sometimes-lax methodologies of the Mayanists (and all archaeologists), and processualism has proven to be quite productive in the Maya world (Buikstra 1997:223; Sabloff 1990). Zooarchaeology, in particular, with its inherent functionalist tendencies, blossomed in the light of the new archaeology, but as Buikstra (1997) and McAnany (1995) have suggested, Maya archaeology may now be ready to accept postprocessualist theory as well. The present paper attempts to incorporate postprocessual ideas into zooarchaeology in general, by using the example of the ancient Maya. Specifically, a structuralist model was suggested in order to view the animal world as the Maya would have. I demonstrated the symbolic importance of deer, the communicative abilities of animal bones, and suggested that animal-human metaphors are in a constant process of structuring and re-structuring. The metaphors employed are both the medium and the outcome of human thought (Tilley 1999:50).

But there is much more work needed in the realm of Maya zooarchaeology. Larger animals such as deer are preferentially recovered in archaeological contexts, and this inhibits the validity of cross-species comparison. My study avoided this problem by concentrating on only one species, but in the future comparisons will be needed. For this reason (and others) improvements in excavation procedures as well as bone analysis are needed (O'Connor 1996).

Pohl (1983:56) states that "one of the greatest barriers to interpretation of Maya ceremonial activity is lack of information on the nature of the objects presented as offerings". The present paper is, of course, concerned with deer as a ceremonial offering. Carr (1996) outlines a number of requirements for accurate study of ancient Maya deer exploitation. We need (1) larger faunal samples; (2) samples allowing the reconstruction of the age structure, sex-ratio, seasonality of the deer kill; (3) samples from several time periods; (4) elite and non-elite samples; (5) ritual and non-ritual samples; (6) human population estimates from settlement surveys; (7) environmental data; and (8) ecological information on other types of animals in the assemblage (Carr 1996:261). If this heavy request is ever achieved we will gain further insight into the economic and symbolic uses of animals by the Maya. This will allow higher resolution of temporal and geographic diachronic processes (i.e. what species were used, when and where). I speculated above that a restructuring of cognitive perception occurred in the Maya mind as a result of deer exploitation. But it is impossible to tell when this happened, and where.

Deer domestication is a particularly contentious topic in Maya zooarchaeology. It is obvious from art, ethnohistory, isotopic analyses, etc. that no single trend prevailed in antiquity. White et al. (in press a, in press b) demonstrated multiple categories of deer diet. Refined definitions of the criteria of domestication are needed if generalizations about the roles and importance of domestication in antiquity are to be successful. Two related ideas which warrant further study are the roles of deer in ritual feasting, and the roles of women in animal husbandry (Pohl and

CONCLUSIONS
The Maya world offers countless opportunities to study the fascinating topic of ancient animal exploitation. Humans' fascination with the animal world stems from their metaphorical linkages. As Willis (1974) puts it:

"[the animal is] both within us, as part of our enduring biological heritage as human beings, and also, by definition, outside and beyond society. The image of the symbolic animal is therefore necessarily a dualistic image, structurally homologous with the duality in human society and the self between the real and ultimate ideal, the actual and the longed for."

(Willis 1974: 9)

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