Whose Bones are those? Preliminary Comparative Analysis of Fragmented Human and Animal Bones in the "Death Pit" at Domuztepe, a Late Neolithic Settlement in Southeastern Turkey

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ABSTRACT
A unique feature at the mid-6th millennium BCE settlement at Domuztepe, Turkey, is a large pit filled predominantly with fragmented human and animal bones. Previous studies have established that the "Death Pit" animal bone assemblage is characterized by specific features not found in the daily refuse from the rest of the site. The present study seeks further understanding of the Death Pit through a preliminary comparison of the animal and human bone

assemblages, including element preservation, degree of fragmentation and breakage patterns. Spatial models of animal and human bones in the Death Pit provide insight into depositional sequencing and the nature of the probable feasting activities that produced this assemblage. Our initial osteological results show that the near identical processing of humans and animals suggests of cannibalism. However, a lower occurrence of fragmentation on human skulls, together with depositional differences between animals and humans, also suggests that conceptual differences between human and animal were maintained.

KEY WORDS
Late Neolithic-Turkey,
Halaf,
communal burial,
butchery,
cannibalism.

RÉSUMÉ

À qui sont ces os ? Analyse comparative préliminaire des fragments d'os humains et d'animaux découverts dans le « Death Pit », à Domuztepe, un site du Néolithique final en Turquie du Sud-Est

Le site de Domuztepe, Turquie, a révélé une découverte unique pour la moitié du 6e millénaire avant notre ère avec la mise au jour d'une grande fosse remplie essentiellement de fragments d'ossements humains et animaux. Des études antérieures ont établi que l'assemblage des ossements animaux du « Death Pit » est caractérisé par des éléments spécifiques que l'on ne retrouve pas dans les déchets quotidiens découverts dans le reste du site. La présente étude vise une meilleure compréhension du « Death Pit » grâce à une comparaison préliminaire des assemblages osseux humains et animaux, étude incluant les éléments de conservation, le degré de fragmentation et les modes de fracture. Les modèles spatiaux des ossements humains et animaux du « Death Pit » donnent une vision des dépôts de séquençage et de la nature des probables activités festives qui ont produit de tels assemblages. Les premiers résultats de l'étude ostéologique montrent que les processus liés aux humains et aux animaux sont très proches et laissent présumer une indication de cannibalisme. Cependant, une plus faible présence de fragmentation des crânes humains, associée à des différences entre les dépôts humains et animaux, suggère que des différences conceptuelles entre les humains et les animaux étaient maintenues.

MOTS CLÉS
Néolithique final en Turquie,
Halaf,
sépulture commune,
boucherie,
cannibalisme.

DOMUZTEPE AND THE LATE NEOLITHIC IN SOUTHEASTERN TURKEY

This paper presents a comparative osteological analysis of human and animal carcass processing at Domuztepe, a large late Neolithic site in southeastern Turkey. Most of the excavated deposits date to the latter part of the Halaf tradition (c.5,800-5,450 cal BC), although the site was certainly occupied throughout the Halaf period and probably significantly earlier. Domuztepe is located at the northwestern extreme of the Halaf distribution, which extended from southeastern Turkey to northern Mesopotamia (Fig. 1). There is great interest in understanding changes in social complexity during this period of Near Eastern prehistory, following in time the earlier Neolithic societies and immediately preceding the emergence of urbanism. Attention has been focused in the past on elaborate craft production and long-distance exchange networks (LeBlanc & Watson 1973, Davidson 1977). More recently increased consideration has been given to the use of seals (*e.g.* Akkermans & Duistermaat 1996) and

the changing nature of social identities negotiated within new contexts of consumption, drawing on the rich symbolism of the painted pottery (*e.g.* Nieuwenhuyse 2007).

Domuztepe is the first large Halaf site to be excavated, offering a unique window on prehistoric settlement in this region. The site itself covers at least 20 hectares, making it one of the largest prehistoric sites in the Near East. Most of this area was probably occupied simultaneously, at least in the latter stages of occupation; its inhabitants perhaps numbered 1,500 people. One of the long-term strategies at Domuztepe has been to understand why such a large community was established and to explore the development of hierarchy and the role of social integration as expressed through ritual practice. It is in this context that the discovery of the Death Pit (see below) is particularly significant. Although several areas at Domuztepe have been examined, the main concentration has been on Operation I, a large exposure on the southern part of the site, which now extends to c.1750 m^2 (Fig. 2). The periods so far excavated at Domuztepe are confined to a span of about 350 years. The architecture includes both rectangular and circular buildings, although the latter seem to be restricted to specific functions. In addition to exhibiting marked local traits, the ceramics from the site show strong links with the Halaf tradition in north Mesopotamia but also with areas to the south along the Levantine coast. Both the faunal and botanical assemblages are dominated by domestic species, although wild plants, in particular, were also extensively exploited (Kansa et al forthcoming).

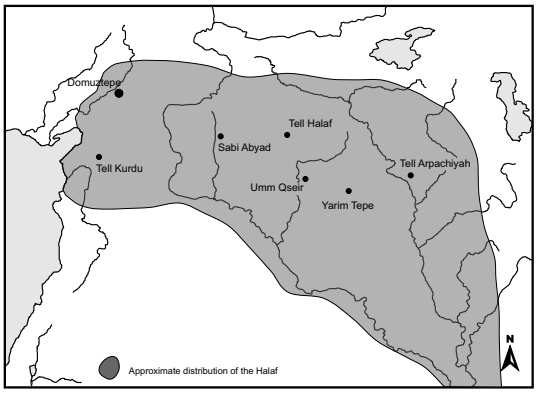


FIG. 1. — Map showing the location of Domuztepe in south-eastern Turkey.

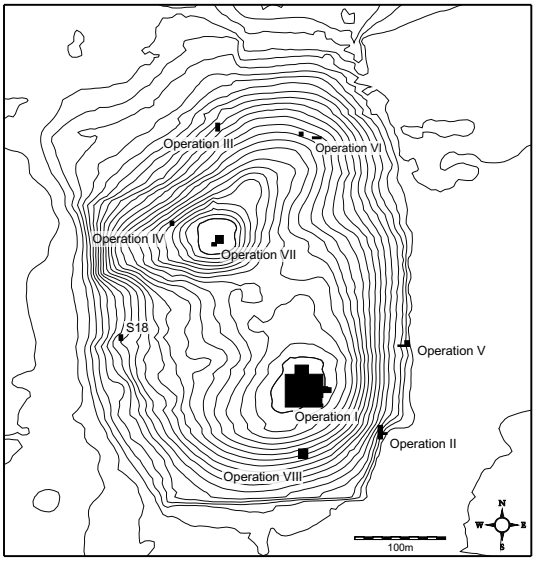
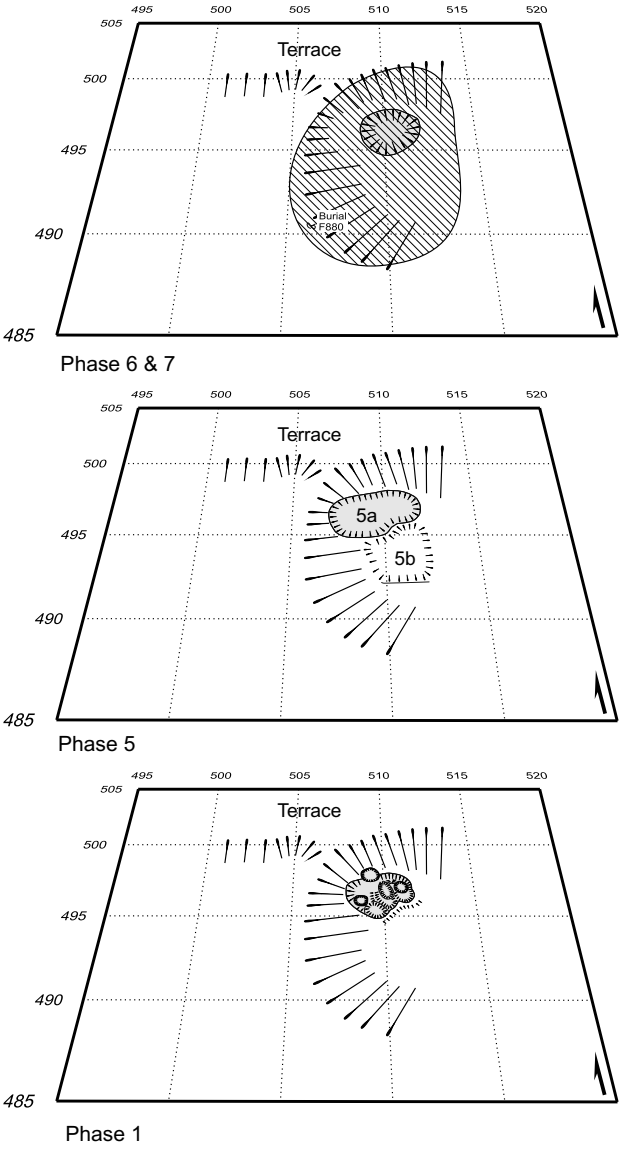


FIG. 2. — Plan of Domuztepe, showing the excavated areas. The "Death Pit" was found in Operation I.

THE "DEATH PIT" AT DOMUZTEPE

A unique feature of the settlement at Domuztepe is an extensive and complex burial deposit in Operation I, known informally as the "Death Pit" and more formally as Feature 148 (Figs 2 & 3). This feature, which measures approximately 5 meters by 4 meters, and 1 meter in depth, was densely packed with archaeological materials. Dominating the Death Pit assemblage were over 10,000 highly fragmented bones from both animals and humans, which form the focus of this article. In addition to the bones, substantial numbers of potsherds, lithics and plant materials came from the Death Pit along with bone tools, beads, stamp seals and remains of plastered baskets. While many of the artifacts found in this deposit do not stand out as simple grave goods (Irving & Heywood 2004), evidence for some special selection and distribution of human and animal remains in the Death Pit indicates a ritual component in its creation.



Phase 1: A scoop was made into the southern face of a terrace. Three or four shallow pits were dug into the base of resulting hollow and each filled with large quantities of articulating animal bones, stones and pot sherds (shaded).
Phase 2: More material was placed over the pits in the bottom of the larger hollow.
Phase 3: The hollow was then flooded and allowed to dry out, leaving a thick deposit of silt. This may have happened twice.
Phase 4: A small pit was probably cut into the silt lenses and filled with animal bones.
Phase 5a: In the northern part of the Death Pit, animal and human bones, especially the latter, were tightly compacted within a largely pisé-like matrix (shaded). The top of this hard packed deposit was modeled to create a shallow raised hollow.
Phase 5b: At the same time in the southern part of the Death Pit, more material was deposited, possibly to maintain a level with the hollow created by Phase 5a. This deposit contained abundant animal bones but few human remains.
Phase 6: Further bones, roughly equal proportions of humans and animals, were placed in the base of the raised hollow (shaded).
Phase 7: The entire area of the Death Pit was covered by a thick layer of ash, which probably lay over an area of 10-15m in diameter (hatched). Either at the same time as the ash was deposited (or very shortly before) the body of a child was placed on the southern edge of the Death Pit.

FIG. 3. — Illustration of the different phases identified within the “Death Pit”.

TABLE 1a. — Number of identified specimens (NISP) of each taxon per Death Pit phase. (data for Tables 1b and 1c).

	Sheep/ Goat	Pig	Cattle	Dog	Human	Phase Total
Phase 1	240	35	167	118	7	567
Phase 2	97	17	100	6	8	228
Phase 5a	326	73	305	30	2349	3083
Phase 5b	281	45	133	0	4	463
Phase 6	51	19	27	1	110	208
Phase 7	45	15	32	0	51	143
Taxon Total	1040	204	764	155	2529	4692

Note: The Taxon Total for the non-human specimens is greater than the totals given in Table 3. This is because Table 1 takes into account the total number of specimens per taxon, even specimens that come from the same individual), in an attempt to demonstrate the relative proportion of all bones from the various taxa in each phase. Hence, for example, the far greater number of dog bones in Table 1, which includes the 116 bones from the partial dog skeleton in Phase 1 (whereas, as noted, these bones are counted as a single specimen in Table 3).

Our current understanding of the Death Pit is that it was created and filled within a short period, certainly within a period of weeks and possibly of a few days. This short timeframe, together with the high number of processed carcasses represented by the bones, suggests that execution of this event, from preparation to consumption, could have easily involved hundreds of people. The complex sequence through which the Death Pit was created and sealed took place through seven main phases, which indicates a relatively structured and formal approach to its creation (see Fig. 3). The following osteological observations indicate that the human and animal bones deposited in the Death Pit came from individuals whose death coincided with the Death Pit's creation:

– The demographic structure of animals and humans is compatible with short-term mortality events (see *Analytical Results*).

– The majority of animal and human bone fragments display fresh ("green") fractures.

– Weathering damage indicative of sub-aerial exposure is absent on animal and human bones.

– Evidence for gnawing by animals is nearly absent on both the human and animal bone assemblages.

– For humans and animals alike, there is no differential staining or degradation of bone that would indicate variation between time of death and interment in the Death Pit.

Subsequent to the Death Pit's creation, two substantial posts marked its northwestern edge and the area around it was left without buildings for several decades. Further human remains were deposited around the margin of the Death Pit, particularly to the west. Some of these were very fragmentary but one skeleton was also recovered, as well as a severed head buried in a shallow pit to the southwest of the Death Pit, and a grouping to the southeast that included a child's cranium, a pig's cranium and a pot. Clearly the Death Pit, and the rituals that produced it, retained a special significance that was long remembered and commemorated at Domuztepe.

Our analysis of the Death Pit remains a work in progress and, until a full 3D model has been completed, some elements of the spatial distribution of material within it will not be fully understood. Initial investigations show that remains from the primary food animals and humans co-occur in all phases of the Death Pit (see Tables 1a through 1c & Fig. 3). However, there are also some patterns in the distribution of remains across the Death Pit. For example, Phase 5a contained the greatest proportion of bones; approximately one third of all specimens from non-human taxa were recovered in Phase 5a and, most notably, 93% of all human specimens. In contrast, Phases 1, 2 and 5b contained almost entirely non-human specimens, while Phases 6 and 7 contained roughly equal proportions of human and non-human. While Phase 5a appears to have been the main human deposit, continuing spatial analyses have identified some patterning also in the

TABLE 1b. — Relative proportion of taxa in each phase of the Death Pit (based on data in Table 1a).

	Sheep/ Goat	Pig	Cattle	Dog	Human	Phase Total
Phase 1	42.3%	6.2%	29.5%	20.8%	1.2%	100%
Phase 2	42.5%	7.5%	43.9%	2.6%	3.5%	100%
Phase 5a	10.6%	2.4%	9.9%	1.0%	76.2%	100%
Phase 5b	60.7%	9.7%	28.7%	0.0%	0.9%	100%
Phase 6	24.5%	9.1%	13.0%	0.5%	52.9%	100%
Phase 7	31.5%	10.5%	22.4%	0.0%	35.7%	100%

TABLE 1c. — Distribution of remains of each taxon across the Death Pit phases (based on data in Table 1a).

	Sheep/ Goat	Pig	Cattle	Dog	Human
Phase 1	23.1%	17.2%	21.9%	76.1%	0.3%
Phase 2	9.3%	8.3%	13.1%	3.9%	0.3%
Phase 5a	31.3%	35.8%	39.9%	19.4%	92.9%
Phase 5b	27.0%	22.1%	17.4%	0.0%	0.2%
Phase 6	4.9%	9.3%	3.5%	0.6%	4.3%
Phase 7	4.3%	7.4%	4.2%	0.0%	2.0%
Taxon Total	100%	100%	100%	100%	100%

animal bones, with cattle bones more common in the eastern half, pig bones in the southeast, sheep/goat bones in the north and west, and dog bones concentrated in the area where most of the human bones were found.

A study of conjoining human cranial bones (see Carter *et al.* 2003, fig. 11) provides further insight into the activities that led to the creation of the Death Pit. Together with postcranial bone conjoins that were discovered during analysis of the assemblage, these data show that fragments of individuals can be refitted across the Death Pit (Table 2a). A high occurrence of refitting human fragments (n=89) occurs within Phase 5a, the largest unit and the one with the most human bones. Inter-phase refits are much less common, notably the eight instances between Phases 5a and 6 (7.4% of all refits), which merit further investigation. Similarly, the animal bone data (Table 2b) show numerous articulations, pairings and refits occurring within distinct phases, with a small number occurring between phases (1.6%). Initial data suggest the Death Pit deposit was a single, related accumulation with spatial dispersal of fragments and some mixing of animal and human remains. A distinct taxonomic composition by phases suggests that each deposit resulted from spatially or temporally distinct behaviors, possibly related to deliberate placement of remains, basket dumping episodes or the temporal sequences of activities outside the Death Pit. The significance of these patterns, as well as their exceptions, remains under investigation.

METHODS

Although differing in detail and independently developed, the procedure we devised (and continue to refine) for comparing damage to human and animal bones parallels in some ways that adopted to understand the relationship between fragmentary human and animal bones at the Middle Bronze Age ritual enclosure of Velim Skalka, Czech Republic (Outram *et al.* 2005). Outram points out that human osteologists and zooarchaeologists have traditionally worked in relative isolation and use

different recording and analytical approaches. So, while mixed human and animal deposits are common, their contents are usually analyzed separately. Furthermore, while human osteologists normally record observations on modification to human bones, they are not normally in the position of recording the type of heavy processing fragmentation that faunal analysts deal with regularly. Thus, when assemblages contain mixed and fragmented human and animal remains, it is imperative not only that analysts work side by side, using similar approaches in the analysis and interpretation of these remains, but also that they consider a range of possible explanations for commingled animal and human bones. Heeding Outram's position that "a fully integrated approach allows the faunal remains to act as a point of reference for understanding the treatment of humans" (Outram *et al.* 2005: 1700), we have made every effort to align our analytical methods and to work side by side during this study, and we rely upon the better-developed and common interpretive frameworks of zooarchaeological analysis for comparing the fragmented animal and human Death Pit assemblage.

The results presented here attempt to consider differences in size, bone density, and food value of the various parts of different taxa in order to make our assemblages comparable. For the purpose of comparison, this study omits metapodials and phalanges because of the extreme variation between taxa. We also omit any element that is not common to all taxa, such as the fibula and the clavicle. These omitted bones are included in another study and are providing information useful to our interpretation of carcass processing; however, these results are not included in this paper.

Two primary methods for comparing the animal and human bone assemblages describe the following results. The first method involves calculating the relative minimum number of elements (MNE) for the humans and animals. This method can help us understand biases in the assemblages by indicating whether certain elements are missing or disproportionately represented. MNE is defined as "the minimum number of complete skeletal elements necessary to account for all observed specimens" (Lyman 1994: 290). For this study, we determined an MNE for each element for cattle, sheep/goat and humans by counting the most abundant element portion (such as the distal humerus or the caput of the femur), and taking into account age (fusion stages) for specimens from each side. The second method we use to contrast the human and animal assemblages compares the degree of bone fragmentation by element for each taxon, in order to determine if certain elements were more heavily processed than others. The degree of fragmentation was described by scoring the specimens in each taxonomic sample using five categories of bone completeness, when compared to the hypothetical "whole" bone before it underwent fragmentation (the categories are: <25%; 25-49%; 50-74%; 75-99%; complete).

TABLE 2a. — Conjoins and associations for human bones within and among Death Pit phases.

Phase	1	2	5a	5b	6	7
1	-					
2	-	-				
5a	-	-	89			
5b	-	-	-	-		
6	-	-	8	-	9	
7	-	-	-	-	2	-

TABLE 2b. — Conjoins and associations for animal bones within and among Death Pit phases.

Phase	1	2	5a	5b	6	7
1	80					
2	1	26				
5a	-	2	39			
5b	-	-	-	27		
6	-	-	-	-	2	
7	-	-	-	-	-	5

ANALYTICAL RESULTS

The Non-Human Animal Assemblage

This analysis reports on 8030 animal bones that have been identified (at least to element and taxon) from excavations at Domuztepe. Of these identified bones, 6035 came from non-Death Pit contexts, while 1995 came from the Death Pit (Table 3). While a detailed

TABLE 3. — Number of Identified Non-Human Specimens in the Site and the Death Pit at Domuztepe.

Taxon	Common Name	Site	Site %	Death Pit #	Death Pit %
DOMESTIC TAXA					
Bos taurus	Cattle	1278	21.2%	732	36.7%
Ovis aries/Capra hircus	Sheep or Goat	2684	44.5%	850	42.6%
Ovis aries	Sheep	210	3.5%	68	3.4%
Capra hircus	Goat	186	3.1%	70	3.5%
Sus scrofa	Pig	1529	25.3%	204	10.2%
Canis familiaris	Dog	16	0.3%	34*	1.7%
Total Domestic Taxa		5903	97.8%	1958	98.1%
WILD TAXA					
Bos taurus cf. *primigenius*	Wild cattle	1	0.02%	3	0.1%
Ovis orientalis /Capra aegagrus	Wild sheep or goat	1	0.02%	0	0.0%
Ovis orientalis	Wild sheep	3	0.05%	0	0.0%
Capra aegagrus	Wild goat	0	0.0%	1	0.05%
Gazella gazella	Gazelle	7	0.1%	0	0.0%
Cervus elaphus	Red deer	5	0.1%	1	0.05%
Dama dama	Fallow deer	5	0.1%	0	0.0%
Cervus/Dama	Red / Fallow deer	29	0.5%	5	0.2%
Capreolus capreolus	Roe deer	3	0.05%	1	0.05%
Sus scrofa	Wild boar	11	0.2%	0	0.0%
E. asinus/hemionus	Wild ass or onager	1	0.02%	0	0.0%
Equus sp.	Equid	1	0.02%	1	0.05%
Canis sp.	Canid	5	0.1%	5	0.2%
Canis/vulpus	Dog/wolf	3	0.05%	0	0.0%
Canis aureus	Jackal	0	-	1	0.05%
Martes cf. *martes*	Pine marten	1	0.02%	0	-
Ursus arctos	Brown bear	5	0.1%	0	-
Vulpes vulpes	Fox	11	0.2%	0	0.0%
Panthera pardus	Leopard	1	0.02%	2	0.1%
Lepus spp.	Hare	5	0.1%	1	0.05%
Castor fiber	Eurasian beaver	1	0.02%	0	-
Rodentia	Rodent	6	0.1%	2	0.1%
Testudines	Tortoise/turtle	4	0.1%	0	-
Aves	Bird	11	0.2%	10	0.5%
Anatinae	Duck	4	0.1%	0	-
Fish	Fish	8	0.1%	4	0.2%
Total Wild Taxa		132	2.2%	37	1.9%
Total Identified		**6035**		**1995**	

Note: Specimens found to rejoin, articulate, pair or group were counted as a single specimen.
* This number includes 116 bones from one dog found in Pit F1193 in Phase 1 of the Death Pit. For the calculations in this table, these 116 bones are counted as 1.

analysis of bone damages using a standardized methodology is still in progress, this paper presents initial results on observations related to preservation and fragmentation. In both the Death Pit and the non-Death Pit contexts, the animal bones are primarily from cattle, sheep/goat, and pigs. Only 2% of both assemblages represents wild taxa, including deer, bear, leopard, birds, and fish. The Death Pit assemblage is particularly unusual in that it contains a proportionately high number of dogs and low number of pigs. The MNI (minimum number of individuals) for animals in the Death Pit deposit is 11 cattle, 21 sheep/goat, 8 pigs and 6 dogs.

Cut marks, fragmentation and body part representation of animal bones in the Death Pit are consistent with processing for food and do not differ from the typical food debris found in other areas of the site. There is no evidence for sacrifice of the domestic livestock animals, in terms of wasteful expense, such as whole carcasses or an abundance of specific parts. Instead, these animals appear to have been processed and consumed using standard procedures, and their sheer numbers over what appears to be a short timeframe, point to feasting, likely involving a large portion of the community.

While processing is the same, a particular demographic signature is found in the Death Pit assemblage: the Death Pit contains a higher relative proportion of cattle and dogs, as well as three times fewer pigs than have been recovered from all non-Death Pit contexts. Dogs are prevalent in the Death Pit and, as we will discuss later, appear to have had special significance because their skulls, in particular, are included in specific Death Pit deposits. The Death Pit animal assemblage also shows a predominance of females over males (as high as 7:1 for cattle) and there is focus on prime-age animals. This most likely reflects culling of a "living herd", which consisted of mostly prime-age females and their young, as well as one male. This same pattern was observed on wild cattle bones from a very similar assemblage at Kfar HaHoresh (Horwitz & Goring-Morris 2004). Regardless of the motivation for its creation, the animal contents of the Death Pit reflect a huge expense of cattle and prime-age females whose milk and breeding would be sorely missed, as well as dogs, which likely played a valuable role in hunting, protection, and companionship.

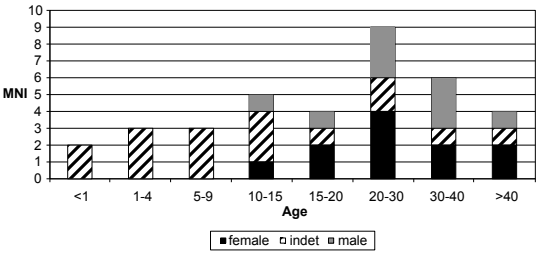


FIG. 4. — Number of human individuals per age class in the "Death Pit", including sex determination (MNI=36).

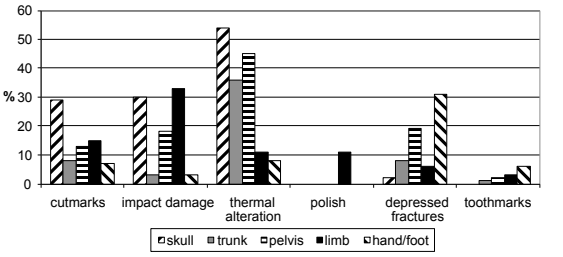


FIG. 5. — Processing damage on human bones from the "Death Pit".

The Human Assemblage

The human sample from the Death Pit deposit consists of 2697 heavily fragmented bone specimens representing a minimum of thirty-six individuals. While age and sex data for the assemblage show that both sexes and a cross section of ages are represented, it is important to note that a majority of the assemblage (68%) is comprised of individuals who died between the ages of ten and forty (Fig. 4). This pattern of relatively high mortality among prime age adolescents and adults, and relatively low mortality among infants, juveniles and the elderly, suggests that the Death Pit assemblage follows a catastrophic (*i.e.*, single event) mortality profile (White 1992, Paine 2000, Margerison & Knüsel 2002).

Although a detailed report is beyond the scope of this paper and will be presented elsewhere, Figure 5 summarizes the perimortem damage patterns found in the Death Pit human bones (Gauld & Oliver, forthcoming). These damages document a wide range of processing behaviors including:

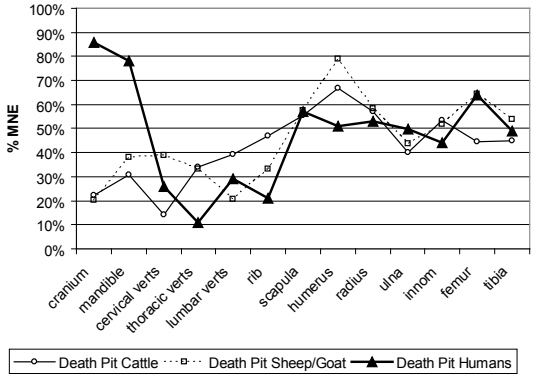


FIG. 6. — Relative MNE of major taxa in the "Death Pit".

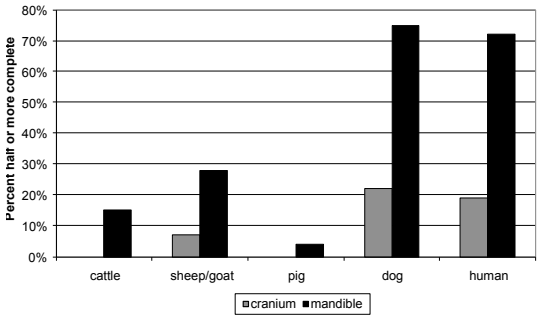


FIG. 7. — Comparison of human and animal skull preservation in the Death Pit.

1) cut marks whose patterning indicates disarticulation, evisceration and defleshing of the carcass (butchery) (Dominguez-Rodrigo 1997, Nilssen 2000, Bunn 2001, Lupo & O'Connell 2002);
2) deliberate hammerstone impact damage for the purpose of marrow and grease retrieval (Johnson 1985, Blumenschine & Selvaggio 1988, Oliver 1989, 1993);
3) localized bone burning and scorching indicative of low temperature thermal exposure (cooking) (Shipman *et al.* 1984, Buikstra & Swegle 1989, Walker & Miller 2005, Walker *et al.* 2005);
4) pot polish, a beveling of sharp ends produced by repeated contact between bone ends and a ceramic surface as fragments are stirred during cooking (White 1992);
5) the co-occurrence of small non-carnivore tooth pits and depressed fractures on the fractured ends of some bones indicative of consumption. This latter damage pattern is present in other cannibalism assemblages and has been experimentally linked to human chewing (White 1992, Fernandez-Jalvo 1999, Andrews & Fernandez-Jalvo 2003, Caceres *et al.* 2007).

Element Preservation

Relative MNE comparisons for postcranial bones from cattle, sheep/goat and humans show that all elements are present in similar proportions, with the smaller and more fragile bones being less well preserved (Fig. 6). Moreover, cattle and sheep/goat elements share the same representation in the Death Pit and Site assemblages, supporting the conclusion that all stages of carcass processing (from butchery to post-consumption discard) are present in the Death Pit bones. Poorer survivorship of fragile bones suggests that these bones were subjected to processes that degrade bone, such as butchery, cooking, exposure or trampling. Given their depositional context and an absence of evidence of exposure, we suggest that the similar survivorship describing the Death Pit animal and human bones most probably reflects their similar culturally mediated treatment prior to deposition.

While human and animal postcranial elements in the Death Pit are fragmented in nearly identical patterns, the one outstanding difference is the relative completeness of human and dog skulls compared to skulls of other taxa. Figure 7 compares the relative preservation of crania and mandibles for the predominant taxa in the Death Pit (showing the percentage of specimens half or more complete). Crania and mandibles from humans and dogs show far less processing than those of the common domestic food taxa (sheep/goat, cattle, and pigs) in both the Death Pit and the Site. That is not to say human and dog skulls were left untouched; on the contrary, 90% (n = 25) of the human crania complete enough for assessment show evidence of blows to the head, some of which destroyed large sections of the vault. Beyond that, however, these same crania were only partially fragmented, with 60% (n = 17) being more than half complete. While the extent of cranial destruction displays strong individual variation, the overall greater preservation of the human head, the most "individualized" portion

of the body, is certainly of significance, perhaps in terms of personal or social identity.
A greater level of preservation of the skull is not the only parallel humans have with dogs. The majority of the dog bones in the Death Pit came from Phase 5a, where the human bones are concentrated. The dog elements are mostly crania or mandibles and one cranium shows blunt force trauma in the frontal/parietal area, an identical pattern to the majority of the humans. The importance of dogs to humans as protectors, companions, and hunting aides may have been emphasized through this association.

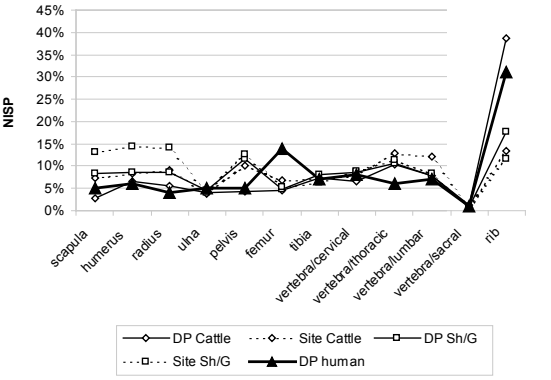


FIG. 8. — Relative NISP for major taxa in the "Death Pit" and the site at Domuztepe.

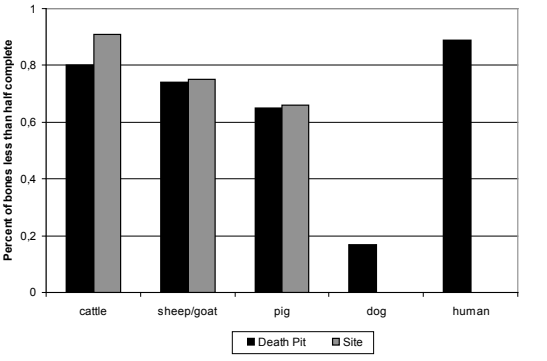


FIG. 9. — Fragmentation of limb bones by taxon in the "Death Pit" and the site, showing the percentage per taxon that is less than half complete.

Element Fragmentation

Figure 8 shows the relative NISP (number of identified specimens) counts for the taxa in the Death Pit compared to the site. All skeletal elements are present in both assemblages in more or less the same numbers. The one notable difference is cattle ribs (and to a lesser extent, sheep/goat and human ribs as well), where the Death Pit contains far more ribs than the site, again likely a result of the Death Pit being quickly filled and closed. Most remarkable is how closely the Death Pit human postcranial NISP values align with the food animals. Their similarity to the animals in the proportion of each element, including the predominance of ribs, indicates that humans were fragmented in a similar way to the animals. The over-representation of human femur fragments is probably because the human femur is a very long bone and provides more fragments when heavily processed than other limb bones. These results support the argument that there was little difference in the way domestic livestock and human remains were processed. The method we chose for comparing element fragmentation is based on their relative completeness.
With just 17% of their limb specimens representing less than half of a complete element, Death Pit dogs display a limb fragmentation pattern that is distinct from both humans and livestock assemblages. This sharply lower rate of postcranial fragmentation, in combination with their low overall representation and lack of butchery damage, provides strong evidence that dogs were not used as food animals at Domuztepe. In contrast, domestic food animals and humans display similar and high overall levels of fragmentation, with only minor differences. For example, Death Pit livestock show slightly less fragmentation than site bones (Fig. 9). Complete bones comprise an average of only 10% of the total site assemblage, and 17% of the Death Pit livestock assemblage. Cattle were more highly processed (fragmented) than sheep/goat, both in the site and the Death Pit. This may be due to their size — the larger bones of cattle yield more marrow than those of sheep/goat so may have been more frequently crushed for marrow extraction. It may also be due to pot sizing, or breaking the meat portions down to sizes reasonable for cooking in pots.
If the aim of breakage were simply to fragment the bones, we would expect similar fragmentation on all bones, regardless of marrow content. What we

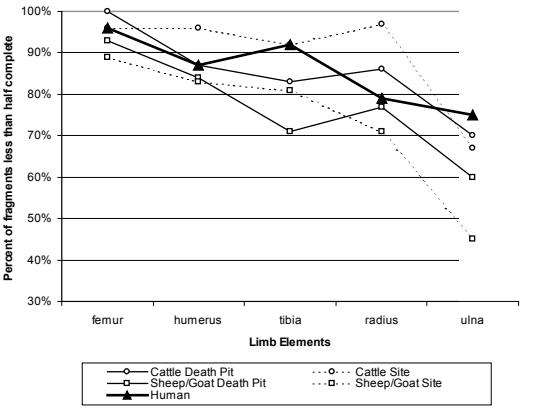


FIG. 10. — Fragmentation of limb bones by taxon, in order of decreasing marrow content.

Note: Relative marrow content estimates are based on calculations for white-tailed deer presented in Madrigal & Holt (2002) and for equids presented in Outram & Rowley-Conwy (1996).

see, in fact, is a positive correlation between degree of fragmentation and marrow yield for the limb bones of both livestock and humans (Fig. 10). For the livestock, the elements with a high marrow yield (the femur, humerus, tibia and radius) are more thoroughly fragmented than the ulna, which yields no marrow. Similarly, the human limb bones with the most marrow (femur, tibia, humerus) are highly fragmented, while those with the least marrow (the ulna and radius) have the least amount of breakage.

DISCUSSION

The results above support standard carcass processing of prime-age animals and point to extensive feasting in the creation of the Death Pit. The significance of the co-occurrence of similarly processed human carcasses remains under investigation and one of the interpretive challenges as this study continues will be to evaluate the different perspectives generated by this assemblage. It is certainly true that humans engage in a variety of mortuary practices, such as secondary burial, corpse destruction, cremation, removal and/or manipulation of body parts, and storage of the body for later burial. Any one of these activities can produce some of the perimortem damages found in the human bones from the Death Pit. For example, two instances of human bone (confirmed in one case, probable in the other) fragments found in vessels associated with the Death Pit suggest that some curation at Domuztepe may have taken place, at least on a small scale. In contrast, the total complex of multiple, well-patterned damages to human bones from the Death Pit documented by comparative osteological analyses, appears most consistent with the established criteria for diagnosing cannibalism in archaeological assemblages (Villa 1986, 1987; White 1992, DeFleur *et al.* 1999, DeGusta 1999, Turner & Turner 1999, Andrews & Fernandez-Jalvo 2003, Outram *et al.* 2005, Cole 2006, Caceres *et al.* 2007). In terms of the relative preservation of elements and the high levels of fragmentation of marrow-bearing bones, the human carcass processing resembles closely what we assume in animals to be food processing, especially from the neck down. Thus, the possibility of cannibalism at Domuztepe is, without doubt, one that needs to be considered very seriously.

Cannibalism, if indeed it took place at Domuztepe, does not appear to have involved a primarily nutritional motivation. It is clear that there were plenty of animals available to feed the people at Domuztepe at the time they created the Death Pit deposit (at least 11 cattle, 21 sheep/goat, 8 pigs and 6 dogs). The sheer amount of meat alone that this many carcasses would have produced points to feasting, where the amount of food produced exceeds the nutritional need. Moreover, the preservation of the human skulls, the particular association of human fragments with dogs, and indications that humans were not as mixed with other food taxa (to the same degree that other food taxa are mixed with each other), suggests that human remains were not placed on the same symbolic level as animal remains. The co-occurrence of high numbers of human and animal bones in the Death Pit provides us with the rare opportunity to explore the role of humans both as *creators*, as well as *contents*, of the Death Pit. Now, in addition to the more typical examination of the role of animals in nutritional, symbolic and cultural spheres, we have the rare opportunity to include humans in a complex and ritualized feasting deposit. The potential interpretations of this event, however, are diverse and lie beyond the focus of this paper.

CONCLUSIONS

From this initial comparison of the human and animal bone remains, we can draw the following conclusions:

1 – Both the stratigraphic and bone data (animal and human) indicate that the Death Pit formed over a short timeframe. The animal bone data suggest killing of living herds, while the human assemblage appears to display a single event mortality profile.

2 – The animal remains in the Death Pit largely represent an event that is different from the overall patterns of food debris from the site. This is characterized by a high presence of cattle compared to sheep/goat, but especially compared to pigs. Valuable, prime-age animals were processed for food and their remains put into the Death Pit, both before and at the same time as the human bones.

3 – Human bone processing in the Death Pit parallels animal bone processing for postcranial bones from the Death Pit. The greatest amount of fragmentation in both human and animal bones occurs on the bones that provide the greatest amount of meat and marrow.

4 – Human bodies were dismembered and broken up while fresh. Preservation of human bones suggests that there was no exposure to post-depositional processes, such as erosion, trampling, and animal gnawing.

5 – All Death Pit phases contain bones from humans, cattle, sheep/goat and pigs. However, the greatest number of bones for all taxa (35% of non-human taxa and 93% of humans) came from Phase 5a. In contrast, Phases 1, 2 and 5b contain almost entirely non-human bones, while Phases 6 and 7 contain roughly equal numbers of animals and humans.

6 – There evidence for mixing of fragments from single individuals within phases and, to a limited degree, across phases.

7 – The inclusion of more complete human skulls suggests that human remains, though processed the same as animals, were not viewed as normal food debris.

As we proceed with detailed investigations of the abundant contents of the Death Pit, we continue to explore the social context in which this complex deposit was created.

We hope to gain a better understanding of the underlying reasons and sequence of the events that produced the Death Pit as part of the interpretative process of our wider understanding of society at Domuztepe. Many aspects of the interpretation remain under active debate within the project and will be discussed in much greater detail in the forthcoming publication. We would hope, indeed, that this is only a starting point in a longer-term debate. Whatever the explanation for the creation of the Death Pit may be, the short timeframe of these events, together with the processing of dozens of humans and animals, points to community-wide participation in this, so far, unique feasting event. The systematic processing and deposition of the bones in the Death Pit provide insight on human activities in a large settlement at a key point in prehistory.

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